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Ammunition Manufacturing Feasibility

FOR

The Confederated Tribes of the Colville Reservation

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Prepared By:

Montana Manufacturing Extension Center (MMEC)

Part of Montana State University, whose mission is *"to grow Montana's economy by helping Manufacturing companies succeed."*

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EXECUTIVE SUMMARY

This document is intended to provide tribal leadership with an understanding of the viability and impact of an ammunition manufacturing operation located within the Colville Indian Reservation. The Plan will provide three foundational elements for determining the next steps in business plan development of a targeted segment, supporting investments and associated site requirements: These elements are an economic analysis of the local and regional market to identify potential demand, competitive advantages and disadvantages of tribal investment and the property/resource development to support each alternative.

The small arms ammunition industry is broken into two basic categories pistol and rifle ammunition and the components necessary to manufacture each. The components are casings, powder, primer and bullet or projectile. There is further breakdown of each component and their types that will be later discussed. Manufacturers of ammunition range from being specific component manufacturers to being vertically integrated manufacturing some or all components and completed ammunition. A major consideration in this investment to be evaluated is supply availability of powder and primers. Some sources will be identified in this report but securing potential supply is outside the scope of this initial report.

There are several specific market segments for components and finished ammunition. These segments range from recreational shooting, hunting, self-defense, law enforcement and Department of Defense to mention a few. This report will further detail each of these market segments for competitive landscape, production, and technical expertise. This section will look at various market demand conditions and the associated pricing for products in those markets. There are various drivers to these market conditions predominantly government, regulatory, and personal safety related. These items will be further detailed to provide insight into overall business risk and financial performance expectations in these conditions.

Facility requirements are largely driven by the determination of the type of ammunition or component produced, volumes, and regulatory requirements. The details of this section will cover the different types of manufacturing methods and equipment used for component and ammunition manufacture as well as the environmental, energy, storage requisites, and regulatory requirements associated with each. A variety of manufacturing approaches will be evaluated with corresponding facility size and scope identified. Construction costs will be approximated based on estimates gathered for type of construction at the time but will not be verified quotes.

Manufacturing equipment and techniques vary dramatically depending on volume and requirements of market being served. The manufacture of cases and bullets and finished ammunition will be discussed in detail as these are the most common for industry competitors. The report will not address the manufacture of primers as it requires a very high level of expertise as an explosive component and would not be recommended as a new entrant to the industry. An overview of “white powder” commonly used in pistol and rifle ammunition will be included as a potential consideration. Primers and powder are the most difficult components to procure during high demand periods with cases being third on the list. A summary of

processes flow, equipment types, and investment at various production levels will be developed in this section as well as the associated supporting facility infrastructure.

Workforce and component supply are the final component to be evaluated in deciding the scope, size, and location of a manufacturing operation investment. This section will detail the necessary manpower and level of competency required for the type of manufacturing and automation level of equipment. Special knowledge around the handling of certain materials is crucial in maintaining operational safety. This will be covered in various sections of this document as it pertains to facility, storage, equipment, and workforce. There will be specific recommendations around employee recruitment and development relative to specific types of manufacturing and depth of knowledge to maximize operational success and safety. Lastly, we will identify the ammunition components and varieties for specific products, the producers, cost, and availability of each in various market conditions.

The preparation of this report will be from referenced industry reports, personal experience as a General Manager of an ammunition manufacturing facility, industry experts, component manufacturers, equipment manufacturers, and federal and state law enforcement bid portals.

SCOPE OF WORK / PLAN OF WORK

1. MARKET ASSESSMENT:
   Assess the ammunition market segments, demand, distribution and regulatory trends in the current political and economic environment as well as less favorable market conditions. Provide analysis of existing ammunition competitor performance in such markets and the operational challenges of a facility in each environment. Identify DOD contract opportunities and requirements.

2. SITE REQUIREMENTS & RECOMMENDATIONS: including but not limited to:
   Utilities: water, gas, electric and sewer
   Logistics: access requirements, parking, load/unload docks, exterior storage, expansion viability
   Discussion of facility location options (I.D sites within the Reservation Boundary & aboriginal traditional territories)

3. FACILITY REQUIREMENTS AND RECOMMENDATIONS, including but not limited to:
   Itemized list of primary building allocation of processing space: e.g. admin, shipping/receiving, warehouse, operator breakroom, maintenance equipment storage etc.
   Discussion of layout options: component and ammunition manufacturing
   Storage/facility requirements for explosives handling: primers & powder
   Wastewater management

4. REGULATORY REQUIREMENTS
   Explosives Licenses
   Import /Export requirements
   Plating process chemical/wastewater management
   Safety
   Environmental requirements
   Employee restrooms, break and clothing areas
   Access control
   Facility layout

5. AMMUNITION/COMPONENT EQUIPMENT AND PRELIMINARY COST ESTIMATES:
   Plated projectiles
      Plating Process: Analytical equipment: temperature measurement, timers, water activity meters, pH meters etc.
   Formed projectiles
   Case manufacturing/trimming
   Ammunition manufacturing:
      Plate loading/Index loading
   Inspection equipment
   Product testing
   Packaging
   Material Handling

6. COMPONENT SUPPLY & WORKFORCE:
   Operator skills, capabilities & training
   Professional/technical staff capabilities
   Sourcing challenges: powder & primer supply

Deliverables:

1. A written summary, submitted in electronic format with details to determine:
    a. Background and insights learned from like operations
    b. Current industry reports and metric analysis
    c. A site plan layout (as proposed) and cost estimates for constructing and operating a facility.

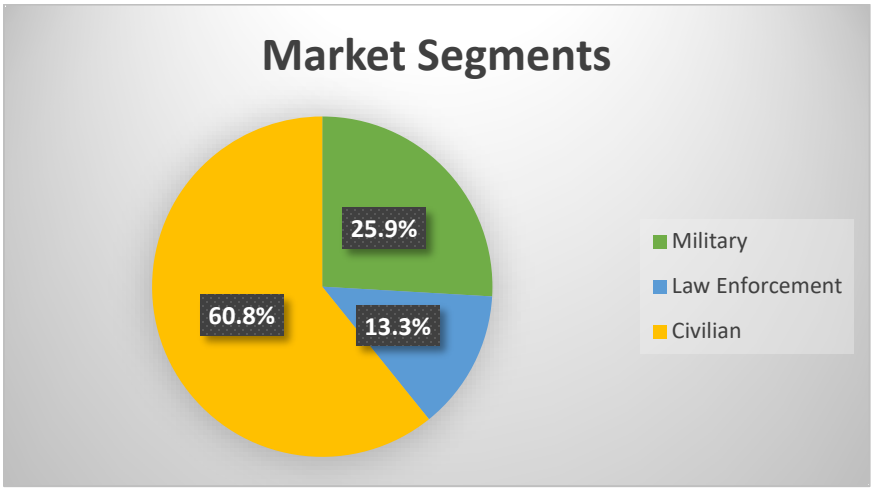
SECTION 1: MARKET ASSESSMENT

Section Summary:

The small arms ammunition industry is approximately $5.01 billion and is projected to grow 2.6% annually over the next five years to 5.7 billion. The small arms ammunition is typically equal in revenue to the sale of weapons but has lagged in 2022 due to ammunition shortages. The industry is largely driven by geopolitical, economic, and consumer dynamics. These conditions are expected to remain favorable though 2027 with little change. Civilians are estimated to make up roughly 60.8%, law enforcement 13.3%, and military 25.9% of the market in 2022. The military is also required to award a significant amount of contract spending to small business with emphasis on Woman-Owned, HUBZone's, (SDB) Small Disadvantaged Businesses, etc., potentially providing a significant competitive advantage to a dominant segment of the market.

Market Segmentation

The small arms ammunition market is predominantly broken into three primary segments military, law enforcement, and civilian.

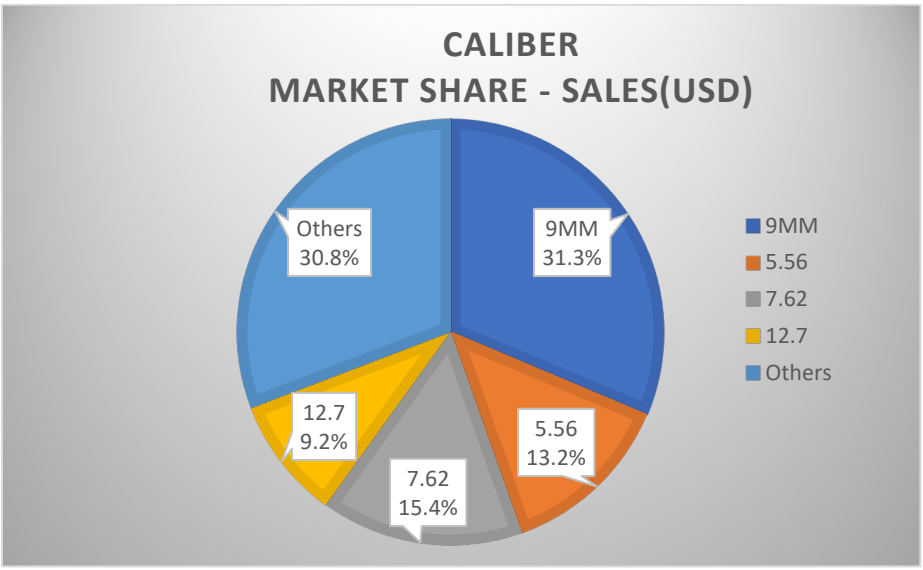


Each of these segments has specific requirements for the ammunition produced and the predominant calibers purchased. The specifications can be with respect to components and/or materials of the components as well as specific manufacturing processes required such as primer sealing (to be discussed in a later section).

Military or DOD ammunition is predominantly produced in captive facilities operated on 10-year contracts. These contracts require significant expertise and traditionally are won by a manufacturer who has been qualified as a second source producer facility. Within the military segment there are specific contracts for the development of longer-term technology related to bullets, cases, etc. One such program was the development of lightweight ammunition. One of the primary technologies here was the development of alternative casing materials and manufacturing processes for their mass production. Depending on organizational focus and product development expertise these contracts may be of interest to further investigate. To effectively penetrate this market would require positioning as one of the top three or four US ammunition producers with proven supply chain or vertically integrated component manufacture. This may be a 10–15-year business strategy or accomplished in a shorter time through a large acquisition that establishes technical expertise as well as reliable large scale production. We will discuss this option in the recommendations section including timeline, investments, and associated risks.

Law Enforcement is the second largest segment in the small arms ammunition market. Law enforcement includes Federal, State, and local law enforcement agencies. This segment is largely driven by pistol ammunition and also has some very specific product specification requirements. This is one of the more stable industry segments as most of these agencies have annual training, qualification, and duty use. These Federal and State agencies are often subject to small, minority, and disadvantaged business preferences for procurement activities. These supply contracts range from a single purchase to multiple year supply agreements. This segment, like the military segment, is especially focused on product quality and performance as this ammunition is considered "critical defense" products. Projectiles used for these products are specifically tested and/or approved for use and are generally part of the specification. There may be different specifications for qualification or practice ammunition versus field use ammunition. An entry point in the law enforcement segment is many times local county and municipal law enforcement to gain market acceptance and product brand reputation. Requirements are generally somewhat lower for these markets and the process to gain bidding access less intensive.

The predominant calibers for the law enforcement segment are similar to military but the demand for each is significantly different as shown in the chart below.



As depicted by this chart, serving this market segment can dramatically reduce the complexity of operations relative to necessary equipment and components required for their production.

Civilian consumers represent the third primary segment of the market and play a crucial role in the industries overall performance. In recent history, growth in this industry has been primarily attributed to geopolitical and socioeconomic instability.

Laws, Politics, Crime

Over the past decade, public perception of impending government regulatory changes governing the use and sale of guns and ammunition has fueled a purchasing frenzy. Political exploitation of gun-related tragedies has raised pressures on policymakers for reforms leading to greater restrictions on individual owners and specifically restrictions on certain product lines. Crime and terrorism play a role in the politicization as well, especially in presidential years when uncertainty is greatest.

Crime rates are a significant determinant in market demand. In most instances, when crime rate statistics are on the increase, as during the recent politically motivated violence, growing support for cuts to law enforcement budgets, and economic uncertainty of the COVID-19 pandemic, consumer demand is fueled. The historic jump in background checks is evidence of this fact.

Economics

Guns and ammunition have historically been considered as an expensive discretionary household item. Consequently, the demand has traditionally followed the trending economic conditions, disposable income availability, unemployment rate, and consumer confidence. Conversely, this trend has been broken over the last 18-24 months with the COVID-19 pandemic and now moving toward record inflation conditions. The continuing trend in high demand indicates that rising fear of crime and political tensions override economic conditions. During the period of 2019 to 2022, Americans who believed that firearms ownership laws should be stricter dropped from 64% to 52%, the lowest since 2014. Additionally , the banning of handgun ownership support is down from 29% to 19% over the same period.

Regulation

As mentioned above the regulatory environment can have a dramatic impact on demand for guns and ammunition. There has actually been little federal legislation in recent years. The predominant regulatory factor has been at the state level where there has been legislation surrounding the sale of primarily handguns and ammunition. For example, California has passed legislation eliminating online sales of ammunition within the state. This has changed the competitive landscape within the state for ammunition sales. Similarly, loose firearms regulations in some states have increased customer demand and caused producers to offer wider varieties of products in these markets.

Competitive Landscape

The ammunition industry is considered to have a moderate level of market share concentration. The top 3 players in the industry make of just over 64% of the total market, while the top 9 competitors make up roughly 78% of the market revenue. Other than the top 3, market share ranges from 1.5-4% with all other competitors comprising approximately 22% of the total market.

Table Major Players Sales Value Share (2020-2022)

	2020	2021	2022
Olin (Winchester Ammunition)	24.7%	28.0%	27.3%
Vista Outdoors	22.9%	24.4%	25.1%
Orbital Atk	13.5%	12.1%	12.3%
BAE Systems	4.5%	3.6%	3.6%
Nammo As	3.3%	2.9%	3.0%
IMI (Israel Military Industries)	2.8%	2.2%	2.3%
General Dynamics	1.9%	1.9%	1.9%
Ruag (Ruag Ammotec AG)	1.9%	1.8%	1.7%
CBC Ammo	1.5%	1.4%	1.4%
Others	22.9%	21.7%	21.5%

Profitability

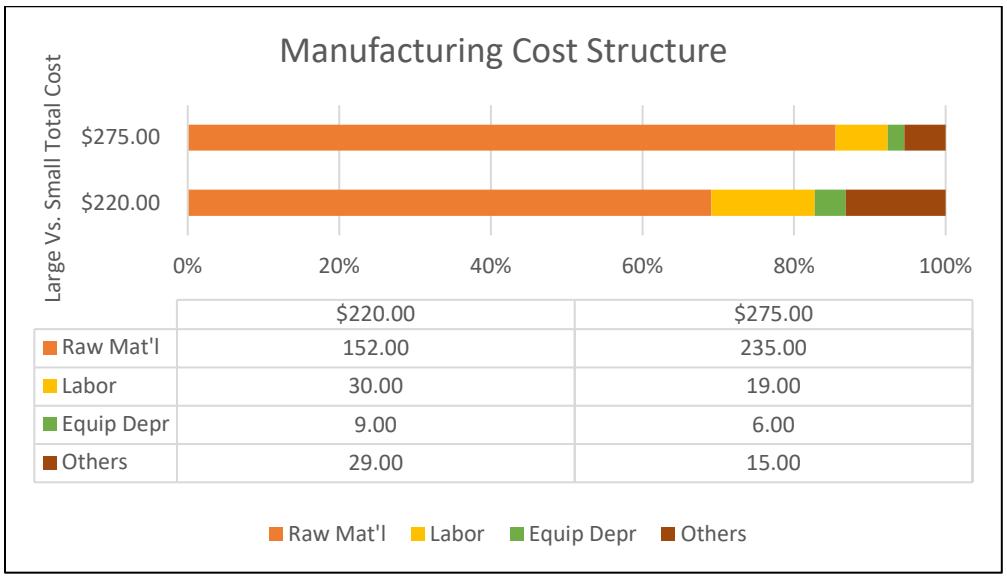
Analysis of industry profitability must be carefully considered with respect to the market structure. It should be understood that all of the nine Major Manufacturers competing in the ammunition industry have vertically integrated manufacture of at least 3 of the 4 ammunition components. For this reason the table below is somewhat misleading in that the Gross Margin for those purchasing all components is less than fifty percent of that listed below. The barrier to entry becomes two-fold in that during the high demand periods when profits are high, component availability of primers and powder are dramatically restricted to small producers. When consumer demand falls, the major players reduce pricing to the point where Gross Margins for a non-component manufacturer falls to 5% or less although components are widely available. An example of this would be 1000 rounds of 9mm Round Nose Solid Point ammunition sold for $198 in 2017 and $400 in early 2015. The price per round table below does not effectively represent these large price swings as they are an average of the year and various demand calibers.

Table United States Small Caliber Ammunition Sales, Value, Price and Gross Margin (2017-2022)

	2017	2018	2019	2020	2021	2022
Sales (M Rounds)	7,316	6,909	7,198	9,855	12,194	14,390
Price (USD/K Rounds)	329	340	337	359	440	476
Revenue (M USD)	2,409.7	2,350.8	2,428.7	3,537.3	5,367.7	6,846.5
Gross (M USD)	476.5	491.0	434.0	727.0	1,525.5	2,087.7
Gross Margin	19.8%	20.9%	17.9%	20.6%	28.4%	30.5%

Cost Structure

The manufacturing cost structure to produce ammunition varies widely across manufacturers in the industry. While capital investment for the manufacturing of 30MM rounds is relatively low the cost structure varies dramatically from an operation vertically integrated to manufacture components. Most large-scale manufacturers sell wholesale components to smaller scale producers helping to boost overall profits and maximize return on capital investments. This dynamic is what entices business growth during periods of moderate to high demand and causes substantial consolidation of producers during low demand periods. During these periods major manufacturers will stabilize component pricing while selling products at or below the cost of non-component producers to extract market share.



	$220.00	$275.00
Raw Mat'l	152.00	235.00
Labor	30.00	19.00
Equip Depr	9.00	6.00
Others	29.00	15.00

Labor

Labor plays an important role in the ammunition industry as the commercial equipment used is fairly technical and requires an attention to Safety protocols due to the explosive or flammable components being used. For this reason substantial training and supervision are required in these operations. Technical staffing with multi-faceted electrical and mechanical skills are essential to the long-term success of an operation. These skills are also developed through extensive experience with the processes, materials, and equipment specific to ammunition and component manufacture. A trained, competent, equipment operator will generally earn $25-30/hr. This is generally a benefit to the industry in that attraction and retention of these individuals is usually high if they possess required aptitude.

Regulation and Environmental Policy

Ammunition manufacturing is subject to substantial regulatory agencies including the EPA, DEQ, and ATF to name a few. All industry operators must be ready to work with agencies overseeing this highly regulated industry. These laws and regulations impose regulations on the discharge of materials into the environment common in ammunition manufacturing processes. Some processes require licenses to operate in compliance with government regulations. Due to the level of regulation in this industry, most companies have developed substantial environmental, health, and safety policies and procedures that include proper handling, storage, and disposal of hazardous materials and safety programs to minimize workplace accidents. These increased

regulations in the US have increased cost to manufacture and led many larger companies to look to countries with less stringent regulations to manufacture.

New Entrants SWOT Analysis

A SWOT analysis paired with the 2022-2028 projections provide insight of New Entrant risk to enter the ammunition industry. The current geopolitical environment across the world appears to be unstable in key aspects that drive the industry. Crime rates, international conflict, political unrest, economic stability, and regulatory policy environment are all indicating market growth over the next several years. Market projections show contractions in 2023-24 but then steady growth through 2028. The timing of available reports may not have foreseen the events of the past 3-5 months that may change this landscape. A change in political party control in the November elections as predicted may also serve to curb market demand.
An review of the SWOT analysis and evaluation of CCT resources, capabilities, and government policy offer discernment in the investment decision.

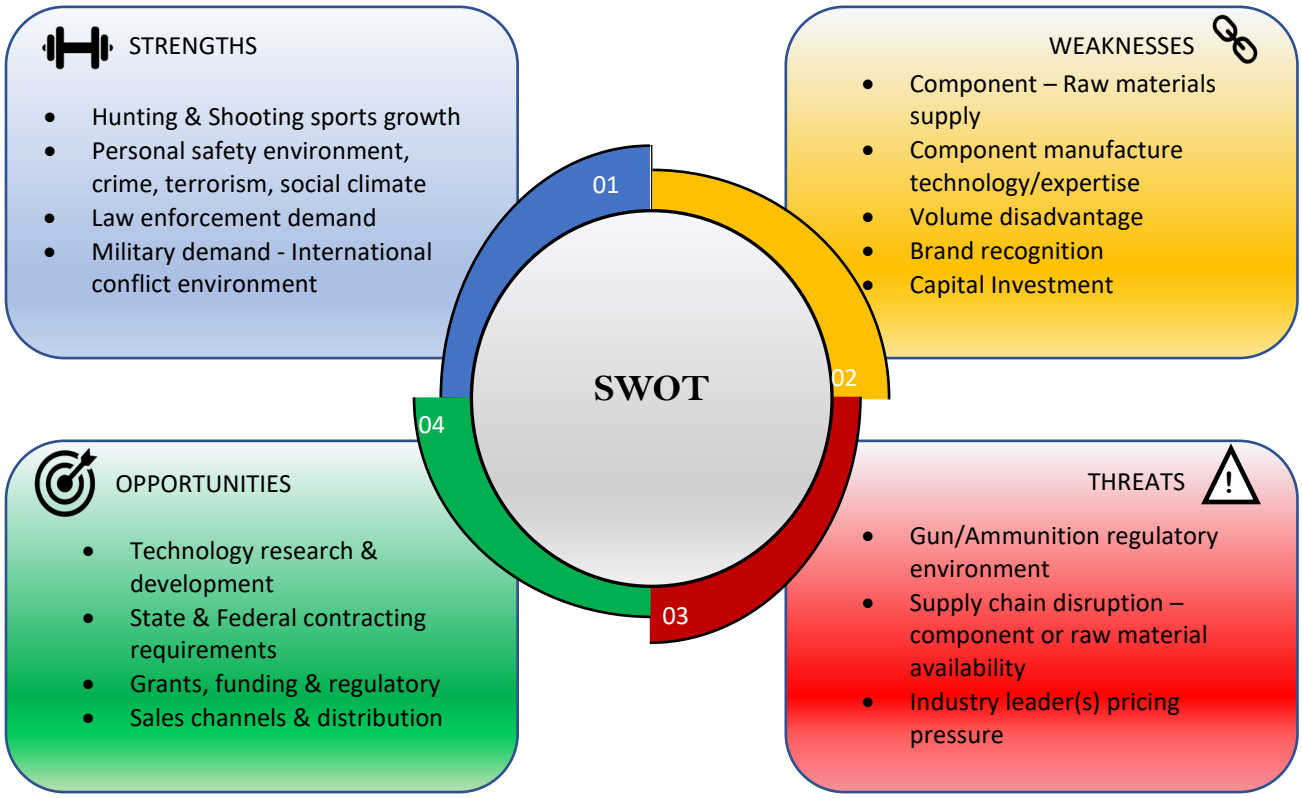


Table United States Small Caliber Ammunition Market Value (M USD) Forecast, by Type

	2022	2023	2024	2025	2026	2027	2028
5.56mm Caliber	902.48	714.98	608.78	603.12	612.52	637.97	654.52
7.62mm Caliber	1039.39	810.19	692.73	698.88	720.28	764.58	786.01
9 mm Caliber	2159.14	1736.00	1512.11	1528.28	1577.18	1653.45	1700.23
12.7 mm Caliber	621.70	490.87	413.06	407.68	417.34	439.86	447.13
Others	2123.82	1767.01	1501.09	1481.91	1501.68	1583.89	1620.49
Total	6846.54	5519.05	4727.76	4719.86	4829.00	5079.74	5208.39

Table United States Small Caliber Ammunition Market Volume (M Rounds) Forecast, by Type

	2022	2023	2024	2025	2026	2027	2028
5.56mm Caliber	3602.1	3109.6	2828.4	2866.0	2886.2	2975.5	3069.8
7.62mm Caliber	2282.4	1938.6	1770.7	1827.2	1867.2	1961.9	2028.2
9 mm Caliber	3254.8	2851.7	2653.4	2743.0	2806.9	2912.6	3011.9
12.7 mm Caliber	456.1	392.4	352.7	356.1	361.4	377.1	385.4
Others	4794.3	4347.6	3961.4	4018.5	4060.3	4248.7	4368.3
Total	14389.6	12639.8	11566.7	11810.8	11982.0	12475.7	12863.7

New entrants into the market must first achieve a reputation for quality and reliability of product. Many manufacturers choose to enter the market as the low-cost provider to gain access to customers and gain brand recognition. The alternative approach is generally a strong marketing campaign to drive brand recognition. Military and police field applications have stringent specifications and requirements to ensure "safety critical" performance in the field. This can be a challenge but is often avoided by manufacturers preferring the civilian markets. Targeting the military and law enforcement markets can significantly reduce breadth of product lines providing a narrower focus of the business. Whereas efforts to serve the civilian sporting and hunting markets will dramatically increase caliber spectrum and reduce individual product volumes.

SECTION 2: SITE REQUIREMENTS

Below are some general considerations on facility siting for an ammunition and components manufacturing site:

Utilities; water, sewer, gas, and electric services

Water:

Water volume and quality requirements for an operation is highly dependent on the manufacturing operation and products being manufactured. If manufacturing finished ammunition with **new brass casings** only and purchased bullets. The water requirements for manufacturing, testing packing would be minimal to support sprinkler systems, drinking and restroom facilities.

Remanufactured ammunition would require a process for the cleaning of previously fired brass casings. This processing would require additional water volume and some water treatment prior to disposal.

Plated bullet manufacture requires substantial volumes of water as well as water treatment capabilities. This water must be monitored and chemically controlled so a consistent source quality is necessary to effectively maintain process control.

Other processes such as case making and primer manufacture require minimal amounts of water.

Municipal water supply is preferred. The use of a dedicated well is possible.

Sewer:

Municipal sewer is preferred for a large-scale operation including remanufactured ammunition or a plated bullet production facility. Connection to a publicly owned treatment works (POTW) is most common for these facilities. Septic systems for such a facility are a possibility if connection to the POTW is not an option. However, the septic system would need to be specifically designed for the intended use and may require pretreatment steps as well as augmented drain field considerations.

Gas:

Natural gas is preferred for heating. Propane is viable, but more expensive than pipeline gas. Most of the equipment is electric driven.

Electrical Service:

The facility will require 3-phase electrical power. 460/480 VAC is required with 230/240 VAC available. Actual amperage of the required service will be largely dependent on size and scope of facility and should be determined by a qualified electrical contractor or engineering design firm. Major electrical equipment requiring 3-phase power would include but is not limited to:

- Building HVAC
- Ammunition loading machines
- Priming machines
- Case forming equipment
- Bullet plating lines
- Lead extrusion equipment
- Bullet cup & form machines
- Miscellaneous support equipment
- Overhead cranes
- Charging station for electric forklift or pallet jack

Logistics: access requirements, load and unload docks, truck access, parking, exterior storage, expansion viability

Facility Access and Load and Unload Areas:

The facility site should be readily accessible for articulated, multiple axle truck traffic. Trucks delivering components and picking up finished goods will need uninhibited access to the loading area. Careful consideration should be given to access routes for truck traffic when evaluating potential facility locations. Additionally, eastern Washington climate conditions, specifically snow accumulation and removal, should be given adequate consideration. Southern exposure for loading docks is generally preferred to mitigate ice build-up during winter months.

An elevated loading dock is often the most preferred configuration and can alleviate the need for an all-weather forklift. In addition to truck traffic, patrons will also need to drop off supplies and equipment by

personal and smaller delivery vehicles, which need to be accommodated as well. Covered areas for short-term sheltering of incoming and outgoing goods are desirable. Storage areas for both incoming material and outgoing finished good should be located adjacent to loading areas.

Parking:

Adequate parking for employees needs to be provided with adequate planned expansion. Due to the nature of the product and its street value, employee theft is often a major consideration. Controlled access is often a consideration in parking access and availability.

Exterior Storage:

When handling explosive or flammable products such as powder and primers, exterior structures for storage are often used to accommodate firewalls and separation. Larger quantities have additional restrictions to be considered in early planning. If local ordinances allow, these options should be given consideration during facility siting studies.

Expansion:

Ammunition facilities often start as loading facilities that expand into component manufacturing complexes. If possible, each component facility (bullets, casings, primers, etc) should be carefully studied and considered for future expansion to minimize handling while ensuring adequate protection of other operations. A single site would be preferred but may not be feasible depending on resource availability and internal use versus distribution.

Discussion of facility location options

Upon completion of Section 3: Facility Requirements & Recommendations as well as Section 4: Regulatory Requirements, an estimate can be made for the acreage and infrastructure required for different types of facilities. Water and septic requirements will be further defined for different types of component manufacturing. This will provide adequate insight to evaluate Tribal lands as site locations and determine feasibility.

SECTION 3: FACILITY REQUIREMENTS AND RECOMMENDATIONS

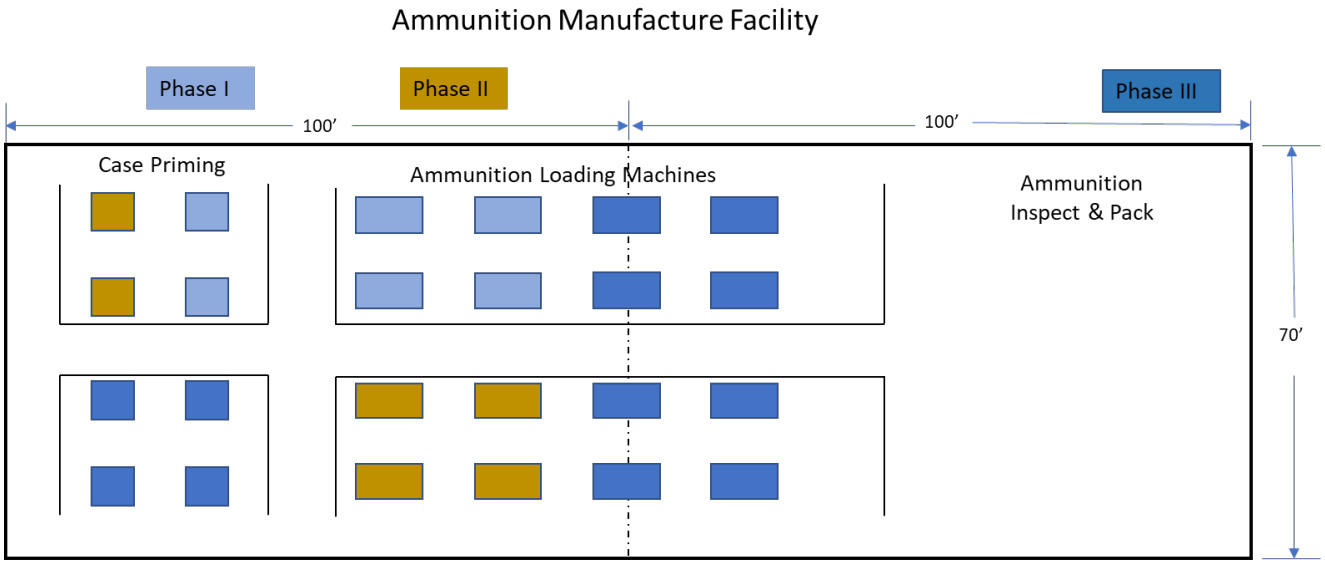
Section Summary:

The primary focus of this section will be to provide an overview of the different aspects of ammunition and component manufacturing as well as some indication of capacity impact on facility size.

Ammunition Manufacture

There are several producers of commercial loading equipment for various volumes of production capacity. This report will focus on equipment to support production capacities and desired equipment for volumes up to 750 million rounds annually. There are 4 basic types of ammunition loading equipment. There are indexing loaders, rotary loaders, plate loaders, and turret loaders. Most smaller scale ammunition facilities, under 300MM rounds annually, utilize either indexing or rotary machines as they provide adequate quality, have

reasonable investment, and are quite flexible for a variety of ammunition. Plate loading is for large scale ammunition production, predominantly used by large consumer producers, (Vista, Remington, Winchester, etc.) for consumer non-military ammunition. The last is referred to as turret loading equipment. This is the predominant loading technology for DOD and military ammunition production. This is perceived as the highest quality production technology and is able to meet military ammunition specifications. This equipment is typically run with minimal changeovers and dedicated calibers due to its complexity and changeover time. The investment for this equipment is approximately



Loading as a stand-alone manufacturing area requires adequate production and material handling space as well as providing adequate bulk storage of explosive components i.e. primers and powder. It is highly recommended that you invest in case priming equipment to support the loading equipment. Although this is an extra piece of equipment and step in the operation, it increases loading machine throughput, reduces operator training, machine changeover time, and increases loading operation safety. Typically one priming machine can support at least two loading machines. There are significant differences between pistol and rifle loading so it is recommended that dedicated machines be purchased for each product line. Accidental mixing of rifle and pistol powders when loading is one of the greatest safety and liability risks to the consumer. The changeovers between calibers are less time consuming and complex if this is done thus reducing downtime for changeovers and increasing run time. Rotary or indexing equipment will produce between 25,000 and 35,000 pistol rounds per 8-hour shift. It is suggested that for maximum efficiency one operator run two machines simultaneously. Annual single shift capacity for a pair of pistol machines is 12-17M rounds. A pair of machines and supporting priming machine ranges from $220-$435K. Rifle machines run approximately 15% slower and annual single shift volumes for a pair of machines would be 10-13M rounds. The investment for a pair of rifle machines and supporting priming machine is $275-$470. An initial plan would be to purchase (4) pistol machines, (2) running 9mm without changeover and the other two tooled for 40, 45, 380, 10mm. The rifle machines both tooled for 5.56 and one set of tooling for .308, 30-06, .270, 300 Win., 7.62 as market demands. A decision will need to be made as to whether to produce remanufactured ammunition. This would

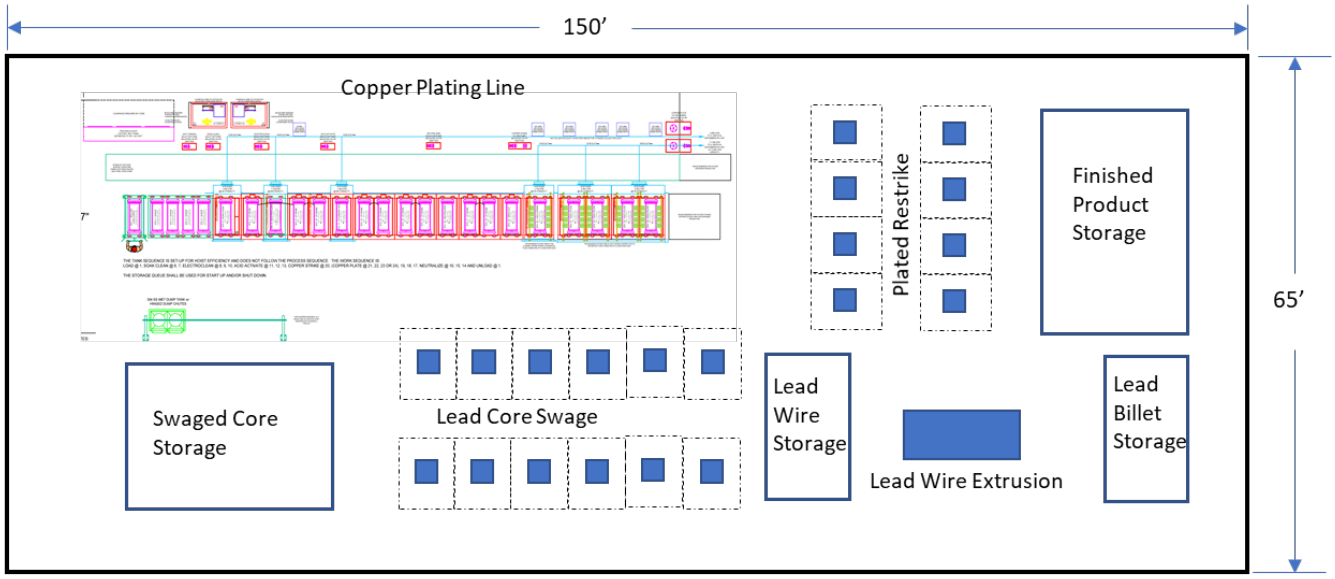
entail the procurement of pre-fired brass and subsequent operations to sort, de-prime, clean, and resize. This source of brass can provide an alternative if new brass is unavailable, however there is additional risk involved with the quality of pre-fired brass. Consideration of this process will be provided later for decision making purposes, but this does require a separate area, ventilation, respirators, water treatment, and additional equipment.

A priming machine has a footprint of 36”x 40” and the loading machines are 36”x 66”. A general floor plan for the ammunition facility is shown above. The complete buildout would be a 70’ x 200’ building but this could be done in two parts. Phase I would be 70’ x 100’ and Phase II would extend to 200’ in length. This building would encompass the loading operation, inspection and packing, and a finished goods warehouse. Some additional explosion proof storage buildings would be required for bulk powder and primer storage. The primer storage building 12’ x 20’ x 8’ and the powder storage 12’ x 40’ x 16’. Local building codes will determine construction and distances from the facility. The Phase one plan would be an investment of approximately $1.75M for the building at $250 sq-ft and $1.5M in equipment. An additional $500K should be planned for miscellaneous material handling, warehouse, and other items. This would provide four pistol machines and two rifle machines for loading with the supporting priming machines. Year one operation would be a single shift on this equipment, then beginning a second shift operation in year two. In year three an incremental investment of $875K would be made for 2 additional pistol and two additional rifle machines. At mid-year the building would be extended to the 200’ length which would be approximately $1.5M in investment. In year four the decision could be made to move to a 3-shift operation or purchase two additional pistol and two additional rifle machines. A three-shift operation would generate substantial return on already invested assets but may pose workforce staffing concerns. The final configuration would be a total of 16 loading machines. The estimated machine mix would be 10 pistol and 6 rifle machines; however this is easily adjusted with minimal tooling investment. Using a net profit of $20/1000 rounds the investment is recovered in year three with approximately a $3M annual profit year four after all investments. Year 5 production volumes would be approaching 1M rounds per day employing approximately 100 people.

Plated Bullet Manufacture

The Phase II investment would be to begin the production of plated pistol bullets. This would entail a building second building approximately 65’ x 150’ or 6,000sq-ft. The configuration is shown below and would be capable of producing 60M bullets annually on one shift. The investment for this line would be approximately $2.75M and the building approximately $2.5M for a total investment of $5.25M. The goal would be to sell 50% of capacity as wholesale components and 50% in finished ammunition. The annual net profit from a one shift operation would be $25/1000 or 1.5M. At full 3-shift capacity the net profit would be $4.5M annually.

Copper Plated Bullet Manufacture



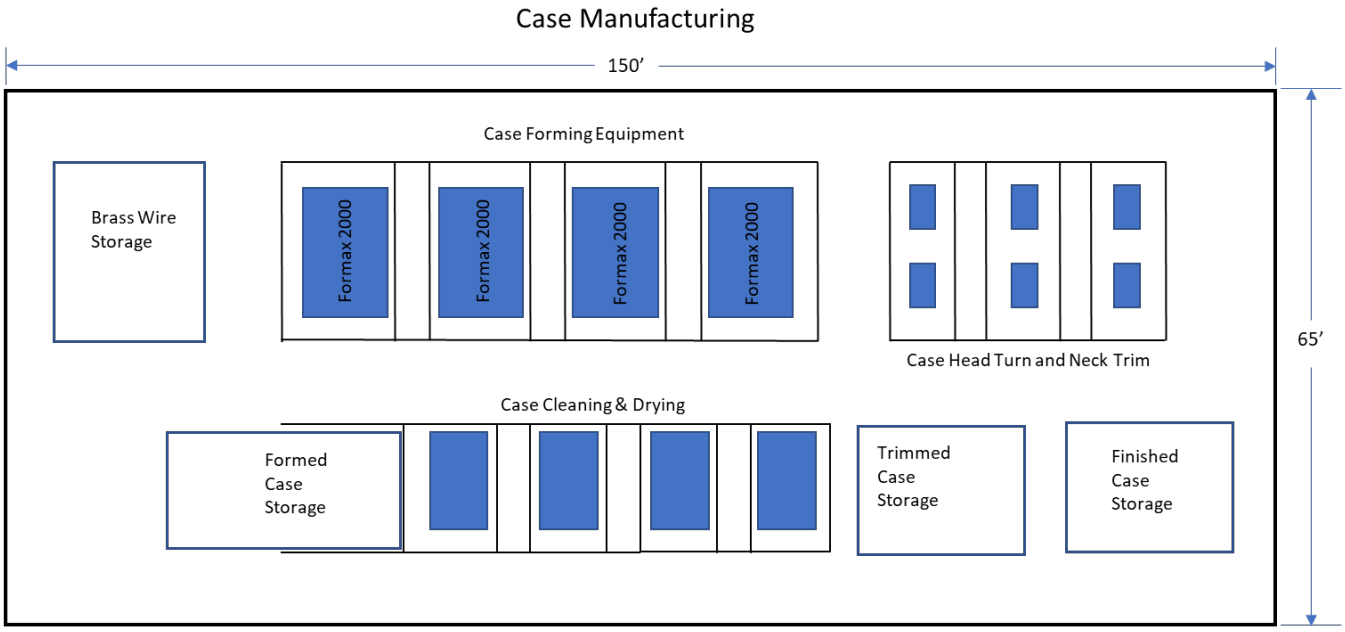
A plating operation does have some significant requirements relative to plant utilities and infrastructure. These are predominantly focused on electric, water, water treatment, and material handling of heavy materials with cranes and/or fork trucks. Additionally there are some specific hazardous materials that require special handling and storage, PPE, and ventilation requirements. Electrical service for this facility is estimated at 5,000amps and water flow at 25GPM. Push air requirements of 285 CFM is also necessary, but the compressor is provided as part of the quotation. There are three additional pieces of equipment not identified in this proposal which are a lead extrusion machine, swage machines for projectile forming and re-strike machines for final sizing. This equipment and other material handling would be expected to be an additional $1.2-1.5M of investment expense. This process requires specific chemistry control and supporting analysis equipment in order to maintain the highest levels of product quality.

Jacketed bullet Manufacture

Production of traditional jacketed bullets is relatively straight forward. The process consists of first making a cup from copper strip, forming the interior lead projectile from lead wire, then inserting the core into the cup for final forming. This process can be done in several individual machines or simultaneously in one machine in progressive steps. Each of these have their benefits and will be addressed in more detail in the equipment analysis portion of the report. This process is highly recommended for Full Metal Jacket (FMJ) bullets for 223/5.56 calibers. Producing High velocity rifle projectiles with the plating process and achieving the desired accuracy is much more difficult and can be accomplished in time but requires significant expertise. The cost benefit and availability of producing FMJ rifle bullets in house is typically well worth the investment. The progressive die type equipment does require significant tool and die expertise to support ongoing maintenance and process quality control. A 12’ x 12’ footprint is typically needed to support lead wire and copper coil management to feed a single machine. Pricing of this equipment has not yet been provided but will be part of the final report.

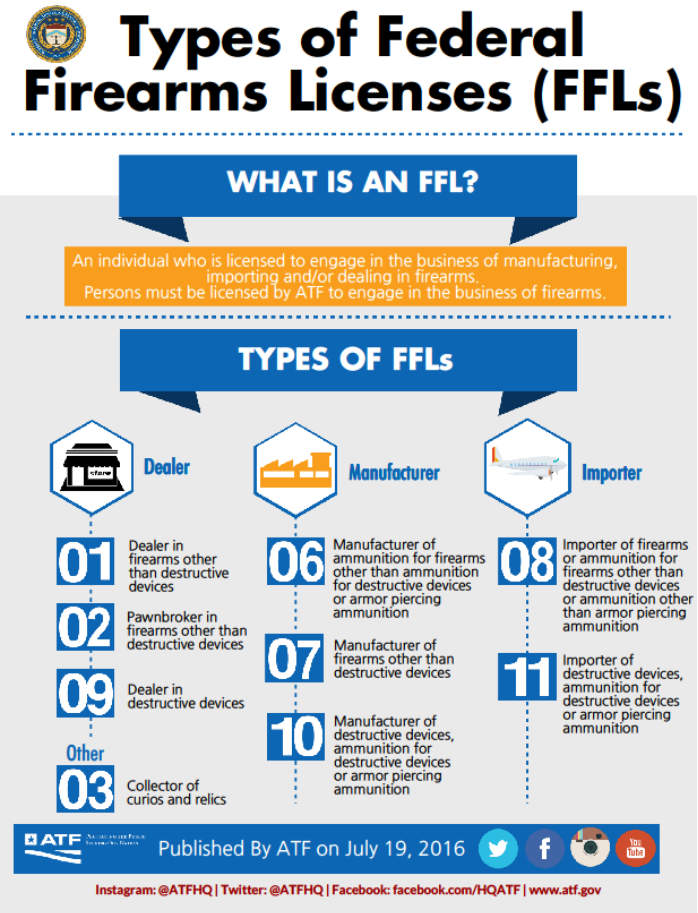
Case Manufacture

Phase IV would be to begin the manufacture of brass cases in house. Cases are one of the more difficult components to source and to manufacture. Technicians with sufficient technical and troubleshooting skills are important when deciding to undertake this manufacturing technology. A solid understanding of machining, tooling, and tool design are required for a manufacturing engineer to effectively support this operation. There are various technologies used for the manufacture of cases. The oldest process is referred to cup and draw. In this process a cup is first formed and then processed thorough multiple draws to form the final case. A technology has been developed over the last 10 years that forms the case from wire in a much more streamlined process producing a higher quality more cost-effective case. All major manufacturers are moving to this process in lieu of the traditional process. The forming equipment and supporting secondary equipment for each line is approximately $4.5 million. The equipment is capable of producing approximately 60M cases annually on three shifts. A cost savings of about $45/1000 can be recognized returning about $2.7M annually on this investment once running efficiently on 3 shifts. A single operator can support two machines as can a wash line. An optimum facility design would include (4) Formax machines, (2) wash lines, and the supporting head and neck trim machines. The recommended facility would be 65' x 150' or 9750 sq-ft. Estimated total cost of the building at $250sq-ft would be $2.5M. The suggested approach would be to construct the initial building of 65' x 100' in year three. Purchase a single machine for delivery upon completion. A second machine in the following year and begin the building expansion for two additional machines with a second wash line in year six. The first-year investment to begin this manufacture would be about $6.5-7M.



SECTION 4: REGULATORY REQUIREMENTS

The manufacture of ammunition in the United States is primarily governed by the Bureau of Alcohol, Tobacco, Firearms, and Explosives. An FFL 06 and FFL 08 should be acquired if desiring to pursue the manufacture of ammunition. Although the import of ammunition components is not mandatory for manufacturing. The recent availability of components, primarily gunpowder and primers which fall under the explosives category have required manufacturers to search internationally for supply of these items. Depending on the markets served it may also be of benefit to import finished ammunition as it can often be acquired at or below the cost to manufacture in high demand markets.



The specific forms for application can be found at the following link: [ATF Forms](#).

Facility Requirements

Employment:

There are additional employee requirements relative to background and criminal history that must be considered especially for management personnel who are employed within the ammunition industry and have access to items identified as explosives. Theft of components and finished ammunition is common within this industry and therefore companies frequently employ specific measures to mitigate these issues.

Health And Safety Considerations:

The different types of manufacturing i.e. ammunition, components, etc. bring with them specific kinds of health and safety considerations. The finished **ammunition** safety considerations are predominantly the premature ignition of components while handling and processing through the machinery. Training requires specific attention to the dangers of components and their handling. The predominant PPE in the loading area is safety glasses. If remanufactured ammunition is manufactured, this will require handling, sorting, and cleaning of the cases. Since the cases have trace amounts of lead it is necessary to wear respirators, protective clothing, gloves, and safety glasses while processing prior to being washed. The washing process will require water analysis and treatment to ensure proper characteristics prior to release. More detailed information can be provided if it is decided to produce remanufactured ammunition.

Manufacturing **plated bullets** comes with a few specific areas of consideration. Ventilation air management, water treatment, chemical handling and lead exposure. The ventilation and water treatment systems would be specified as part of the plating line purchase. However these items do require DEQ or EPA permitting and management of emissions and wastewater. Some acid products and cyanide are used in the plating process so there are specific requirements to be addressed around the MSDS of these products for storage and handling. In addition to these items a lead extrusion process is integral to efficient management of this process. The open exposure of lead will require specific PPE and wardrobe areas to mitigate health concerns to lead exposure to employees.

Case manufacture has relatively few requirements depending on the machining lubricants being used and any issues arising from the clean process and wastewater. These issues are generally minimal with the types of lubricants able to be used in brass forming and machining.

The manufacture of gun powder and primers are beyond the scope of this report but will be discussed as part of the component sourcing considerations.

SECTION 5: AMMUNITION/COMPONENT RECOMMENDATIONS & COST ESTIMATES

The recommended first phase of entering the ammunition market would be to establish an ammunition loading facility. This would entail the purchase of all components initially. These components consist of the case, primer, powder, and bullet. Of these components the smokeless powder(gunpowder) and primers will be the most difficult to procure. A breakdown of ammunition materials cost is shown in the table below. This provides insight as to the priority of investment and impact on total cost.

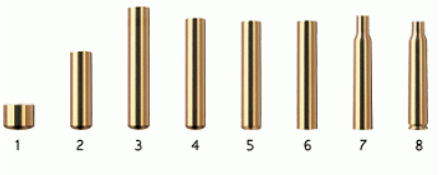
Caliber	9MM/1,000 pcs	% of Total Cost	5.56/1,000 pcs	% of Total Cost
Case	$78.00	32.5%	$185.00	42.5%
Primer	$50.00	20.8%	$ 50.00	11.5%
Powder*	$17.35	7.2%	$ 86.65	19.9%
Bullet	$57.00	23.7%	$ 66.50	15.3%
Labor @ $30/hr	$37.85	15.8%	$ 47.30	10.9%
Total Cost	$240.20		$432.65	
Market Price	$275.00		$485.00	
Margin/1,000	$34.80		$ 52.35	

**Powder pricing is an estimate at this point as no OEM pricing was available.*

Smokeless powder – There may be opportunities for partnerships, joint-ventures, or other supply ownership agreements for powder supply. It is not recommended that powder manufacture be pursued in the early stages of entering the ammunition market. The powder contributes 7-20% of total ammunition cost and may require the largest investment. This could develop into a strategic opportunity but would require specific research and effort to determine the barriers, benefits, and resources required to enter this manufacturing environment. Sources of supply are listed in the next section and the appendix. There may be opportunities to leverage Native American status for access to these materials especially if in support of government contracts.

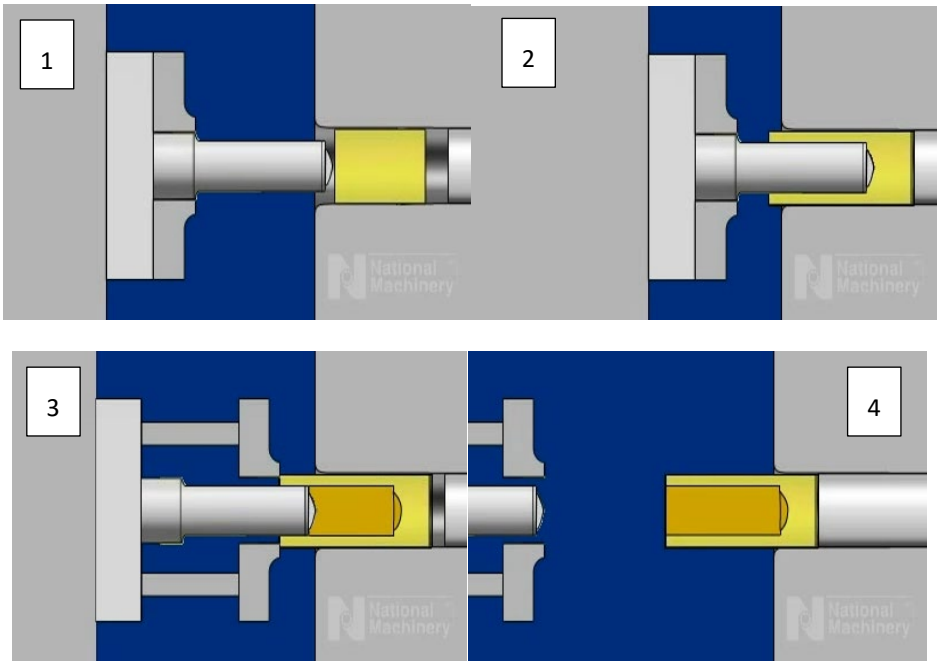
Primers – Due to the limited supply and sources in the US there have been efforts to import product as well as some new investment in US production. Primer manufacture is one of the most dangerous manufacturing processes within the ammunition industry and requires the acquisition of specific technology and process competency. The primer makes up 11-21% of total cost and would require substantial investment. Estimates of manufacturing cost indicate an opportunity of around $20/1000pcs savings or return on investment. This is the lowest return of any component manufacturing investment. The recommendation here is to develop a well thought sourcing plan that may include investment in a current operation for guaranteed capacity. The same opportunity may exist here for Native American business policies and regulatory benefits.

Cases - The brass case can make up 32-43% of total ammunition cost. This is probably the next most difficult component to procure behind powder and primers and requires substantial capital investment. The cases can be manufactured from a cup and draw or a cold header forming process. Each of these processes have their capital investment, flexibility, and labor cost benefit analysis. The figure below shows the basic steps in the cup and draw process. This process punches a cup from strip material and then progressively draws the cup into the desired case with annealing, cleaning, and final machining. This is the oldest process for the manufacture of cases and is the predominant method within the ammunition industry. This process has a somewhat lower capital investment and lends itself to the purchase of several dedicated pieces of equipment rather than changing over a single machine to run several calibers. The process of forming cups creates a strip of scrap material that ultimately impacts the total cost of product and requires management. This process has been integrated within several foundries to re-introduce the scrap to minimize this impact. Most case manufacturers are purchasing cups from the foundries and processing from there. There are several sources for these cups creating a competitive market. The press and tooling manufacturers of this equipment including Bliss, Waterbury Farrel, Invernizzi, Forza, and Atesci to name a few. These companies were contacted for quotes and responses are in the Appendix. Several manufacturers offer turnkey solutions for the total system. For purposes of comparison I used a turnkey quote. The $6.7M quote comprises all equipment necessary to support 40-50MM 9mm cases annually at an estimated cost of $63 per 1,000. The $10.62M quote comprises all equipment necessary to support 40-50MM .223/5.56 cases annually at an estimated cost of $89 per 1,000. This process includes annealing, cleaning, and trimming of the length and extractor groove. These secondary processes are similar for both methods of manufacture. For the purposes of this report I have quoted new equipment only. It should be recognized that much of this equipment can be found in the used market and may require only the purchase of the specific tooling as new.



1. Cup
2. 1st draw
3. 2nd draw
4. Cutting
5. Pre-pressing
6. Head pressing
7. Necking and perforation
8. Turning of rim and length

The second method for case manufacture is referred to as backward extrusion. This process is shown in the figures below. The feed material is a solid brass wire that is cut and formed resulting in virtually no scrap and yields a high-quality formed case. There is currently one manufacturer of this equipment, and the process is being rapidly adopted due to its efficiency and raw material scrap reduction. The equipment and tooling packages are quite expensive and although the machine can be changed over from one product to another in 30 minutes or less it is most effective to minimize changeovers due to the risk of tool damage in set-up. The wire for this process is available from a single US source and certain spare parts are only available from a manufacturer owned subsidiary. The tooling and process are highly technical and demand highly experienced technicians to minimize tooling expense and achieve cost benefits. this dramatically impacts the return on investment due to lost production time. The turnkey cost for this system is $5,000,000 and will produce approximately 50MM 9mm cases annually (3 shift operation) for an estimated $60 per 1,000. This process yields a case that requires washing, heat treatment, trimming of length, and head turn of extractor groove.



Bullets – The projectile comprises between 16-28% of the total round cost. The largest volume in 9mm and .223/5.56 is a FMJ or solid jacketed product. This bullet can be accomplished with two processes.

The first is a cup being applied to a lead core and the second being a lead core with a copper plated surface. Until the last 10-12 years the cup formed into a jacket with the core inserted was the primary method. This process entails stamping or loading copper cups and pre-formed cores into a progressive press that forms and assembles the two into a finished product. The pricing for a turnkey process is approximately $3.1M to produce 40-50MM annually at a cost of $48 per 1,000 for a 9mm 115gr RN and $28 per 1,000 for a 5.56 55gr FMJ. This process is very similar to that of case manufacture and utilizes similar tooling and technology. Bullets produced from this process are recognized as having a slight accuracy advantage over plated products in pistol projectiles. Manufacturers of these machines are similar to those in case manufacture and are listed in the appendix.

The second process of plating a pre-formed lead core has continued to evolve as the most cost-effective process for the manufacture of pistol bullets. At this point there are only a few manufacturers using this process for the production of rifle projectiles, but this is continuing to be developed. Plated projectiles are favored for cost and ease of manufacturing but are recognized as a less accurate product. The cost of a turnkey production system for producing 180MM plated bullets annually (3-shift operation) is estimated at $2.8M based on quotes provided with a 9mm 115 grain cost/1,000 of about $46. The plating system turnkey integrator quoted was Baker Technology Associates.

SECTION 6: COMPONENT SUPPLY AND WORKFORCE

Smokeless powder for ammunition production is branded as Alliant, Ramshot, Winchester, Accurate, Hodgdon, and IMR. Although there are numerous brands there are few producers in the US. These producers are St. Marks Powder (owned by General Dynamics) and Alliant Techsystems Operations LLC(New River Energetics) owned by Northrup Grumman Innovation Systems. There are also producers in Canada, Argentina, Belgium but most of these import to the US through Hodgdon who has developed distribution agreements. This component along with primers is one of the most difficult to acquire as the supply in the US is controlled in large part by major players in the Defense Industry who also have ammunition production operations. It is highly recommended that sourcing powder and primers be an early focus of the process to determine if advantages can be gained from Native American agreements or other means. There are also several companies beginning to pursue the development of production facilities for gunpowder and primers that may offer opportunities for joint ventures, partnerships, or long-term capacity commitment agreements. A list of manufacturers and contacts will be provided in the appendix for all components. The wholesale pricing of this component is difficult to acquire without the appropriate business and FFL licenses. Retail pricing has been gathered but it can be improved through other channels.

9MM 115gr RN Load Data

Powder Manufacturer	*OEM $/lb.	Load (grains)	Cost $/1,000
Accurate #2	$ 19.35	4.6	$ 12.72
W231 - Winchester	$ 20.63	4.8	$ 14.14
True Blue - Ramshot	$ 18.75	5.6	$ 15.00
Alliant BE-86	$ 18.75	5.4	$ 14.46
CFE – Pistol - Hodgdon	$ 19.40	4.9	$ 13.58
W244 – Winchester	$ 19.60	4.2	$ 11.76
Silhouette - Ramshot	$ 20.94	5.5	$ 16.45
HS-6 Hodgdon	$ 22.03	6.5	$ 20.46

*It is estimated that OEM cost would be 25% below retail.

Primers supply in the US is predominantly controlled by Vista Outdoors (Federal, CCI and Remington) and Olin (Winchester) the two primary competitors in the US markets for both military and consumer markets. International manufacturers include Sellier & Bellot (Czech Republic) and Ginex (Bosnia). These brands are somewhat inferior in quality but are widely accepted in the consumer marketplace. There is a new US manufacturer Expansion Industries of Carrolton, TX expected to come online in 2023. Relationships and connection with other manufacturers are important in this industry as frequently horse-trading of components occurs between manufacturers. This is where

manufacturing of other components such as bullets and cases is of greater value than the component itself. The wholesale pricing of this component is difficult to acquire without the appropriate business and FFL licenses. General pricing has been gathered but it can be improved through other channels.

Cases are probably the next most difficult component to procure behind powder and primers. This is starting to change as some of the larger manufacturers have invested in production equipment to provide high demand caliber cases like 9mm, 40 S&W, 45 Cal, 5.56 and .223. This equipment tends to run best with minimal changeovers and continuous running. Manufacturers of brass cases include Starline Brass, Hornady, Norma, Peterson, Prvi Partisan, etc. The cases are manufactured from a cup and draw or a cold header forming process. Once again there is typically sufficient market supply in "normal" environments but in "high demand" environments case supply has caused numerous small manufacturers to exit the business or move to re-manufactured ammunition using "once-fired" range brass and reprocessing. This was once a very cost effective and competitive approach in high demand markets when ammunition was simply not available, and people were looking to save money. A few players have moved into this niche and developed collection contracts that allow them to control this supply and extract some of the value. Some manufacturers such as Howell Munitions & Technology who produce ammunition loading equipment, provide component supply to individuals who purchase their equipment. They have developed internal capability to produce cases, jacketed bullets and plated bullets to maximize their own profits and benefit customers. Case manufacture should be an early consideration unless a reliable source of supply can be obtained. Even in this case, the benefit of in-house production of this component and reduce cost by as much as 30-40% making the investment quite attractive as well as mitigating risk in "high demand" markets.

CASE MANUFACTURER	9MM $/1,000	5.56 $/1,000
Starline Brass	$ 133.50	$ 201.50
X-Treme Bullets	$ 100.00	N/A
Capital Brass	$ 110.00	$ 220.00
DKC	$ 78.00	N/A
NAT		

Bullets are probably the easiest of the components to source depending on the application and whether you are sourcing for pistol or rifle. Consumer market demand is in three primary applications: target shooting, hunting & long range, and self-defense. The largest volume is by far the target shooting application which predominantly uses a Full Metal Jacket(FMJ) bullet. FMJ bullets are a commodity in "normal demand" markets but are one of the first to grow in demand during "high-demand" markets driving prices up rapidly. Plated pistol bullets are available through numerous manufacturers, but Berry's Bullets and X-Treme bullets are the leading brands. Other players are now entering the market and will be listed in the Appendix. A few manufacturers are producing plated rifle bullets, but most rifle bullets are produced using equipment that forms a lead core and assembles a copper jacket over the core to maintain accuracy at the high velocities achieved in these weapons. Major players in the rifle bullet market include: Nosler, Hornady, Sierra, Barnes, and Speer. The hunting and sports shooting industry consumer recognizes the leading rifle bullet brands and therefore the general practice is to manufacture ammunition using these bullets and differentiate based on cost, velocities, or accuracy contributed from the loading process. Once again in high demand markets it is often difficult to get certain caliber or grain bullets as the manufacturers tend to reduce changeovers making a smaller variety and range of products during these times. It cannot be stressed enough the importance of developing strong

supplier relationships as well as industry partners that may open doors for the exchange of components at times of critical supply.

BULLET MANUFACTURER	9MM 115GR RN /FMJ	5.56/.223 55GR FMJ
X-Treme Bullets (Plated)	$ 67.00	$ 66.50
Barry's Bullets (Plated)	$ 58.50	
X-Treme Bullets (FMJ)	$ 79.00	
Hornady	$ 84.00	
DKC (FMJ)	$ 57.00	
Cam Pro (Plated)	$ 59.70	$ 66.35

WORKFORCE

Ammunition industry reports indicate that successful businesses are producing between 650,000 and 1M rounds of ammunition per employee. This would include one indirect person (supervisor, engineer, accounting, etc.) per every 10 production employees. A production facility producing 100MM rounds of ammunition would employ approximately 100-125 people with 20-25 of them being operations, finance, quality, engineering, and sales.

- **Production** - Production operators will require significant training in the handling of ammunition materials and the supporting process materials. This can be accomplished with job knowledge training focused on the handling and storage of explosive materials, lead, and chemicals (i.e. plating, machine lubricants, cleaners, etc.) as well as understanding wastewater and hazardous materials disposal. PPE (Personal Protective Equipment) training will also be essential to employees entering specific production areas as exposure to some materials and processes can be hazardous. This awareness training should include basic awareness of high-risk quality issues such as powder mixing (rifle & pistol) and over charging, and others.
- **Technical Support** - Technical skills competency development of recruitment is a second area of focus critical to the success of this operation. Skills specific to supporting automated equipment and troubleshooting product issues will be essential. The long-term retention of these employees should be a consideration in their selection and compensation structure. The development of these employees should be initiated upon the purchase of the equipment, and they should be intimately engaged in the build, factory acceptance, and installation. Decisions should be made relative to the level of internal capabilities desired to perform equipment repair and spare part production. It is probable that a machine shop with 3-5 machinists and supporting equipment will be required for timely and cost-effective machine/tool repair.
- **Supervision** - Supervisors and line leadership are essential to the safe operation and performance of the facility. These individuals again need to be stable employees. These individuals must ensure that all individuals receive adequate training in all safety and functional aspects of their job prior to unsupervised assignment. These employees should be well versed in LEAN manufacturing concepts that drive organizational improvement and efficiency awareness in all employees.
- **Purchasing** - The procurement function is cornerstone to business success. The individual in this role must have or develop a strong understanding of the materials required as well as the network of availability. The surges in market demand and availability of components often leads to horse-trading of materials or sourcing though unorthodox methods. Relationships with suppliers, customers, and partners must be developed at the highest levels of the organization where appropriate. One of the most important aspects of these

relationships is financial stability and a flawless record of on-time payment. This is the first metric used to reduce customer base in times of short supply.

- **Quality** – Product quality and performance will drive reputation and acceptance in the marketplace. Achieving ISO 9001 certification will differentiate the business from other industry competitors. The basic training and toolset of a quality professional should be augmented with knowledge of SAMMI and other ammunition specific knowledge. This individual should be brought on early in the process to enhance knowledge during the sourcing and acceptance of equipment as well as developing the "Onboarding" training and process metrics.
- **Product Testing** – The finished ammunition product will require testing for performance including accuracy, weapons acceptance and operation, reliability, and recoil characteristics. This is another key individual(s) selection for the business. They should have specific firearms training and competency for this role as well as the necessary facilities.

SECTION 7: APPENDIX

Equipment Quotes
Component Quotes
Reference Documents - IBIS Report / MAIA Research

D&M Holding Company

Proposal for Turn-Key
Multiple Line Factory w/ Laboratories

Quote No: N/A

Date: January 5, 2023

Client: State of Montana

I. Introduction/History

D&M Holding Company represents a collection of individuals with a combined century of experience in the ammunition manufacturing industry. Our executives and engineers come not only from the equipment manufacturing sector of the industry, but from the loading, testing, finance, and sales sectors as well, giving us a unique perspective on setting up manufacturing lines.

From years of being in the position of the executives, the financiers, and the engineers on the buyer side, we saw what we believed was missing in the industry. A true Systems Integration company, who understands where our customers' needs and concerns stem from, because we have been in there as well. As a System Integrator, we see ourselves as sitting on the same side of the table as our clients.

From this approach, we maintain a singular focus, which puts the customers' mission first. We are not beholden to any one manufacturer, including ourselves, and have no other goal than to build the right line, at the right price, in the right timeframe, and always exceed our customers' expectations.

Point of Contact

Dan Powers
President & CEO
Email: dan.powers@dmholding.com
Direct: 813-563-0578
Cell: 813-477-6746

James B Jones
Vice President, Business Development
Email: james.jones@dmholding.com
Direct: 813-563-0738
Cell: 240-535-2513

II. Project Overview

a. Program Management

Our goal as systems integrators is to partner with our customer to ensure that you not only receive the right equipment, but that you understand and can implement effective and efficient processes to ensure success.

We have a team of Project Managers who will ensure our client's employees understand how to set up, operate, and maintain the equipment and integrated systems solutions we are supplying.

- **Layout recommendations** on the factory.
- **Facilities Blueprint** support to include Plumbing, Piping, and Air.
- **Supplier and Raw Material provider set up**
- **Written Quality Control Program and Training**
    - In Line QC Procedures
    - Lab Procedures
- **Return Preventive Maintenance visits** for caliber changeovers, tooling, and maintenance oversight. See section V. Equipment Set Up and Training for more details.
- **Individual Equipment Manuals**
- **Job Descriptions & Hiring Support**

b. Manufacturing Lines Offered

- 5.56mm Dedicated Line
    - Cartridge Case Line
    - Projectile Manufacturing Cell
    - Load, Assemble, Pack Line

- 9mm Dedicated Line
    - Cartridge Case Line
    - Projectile Manufacturing Cell
    - Load, Assemble, Pack Line

- Laboratories
    - Metallurgy Laboratory
    - Ballistics Laboratory

c. Production Capacity

The following represents both the “Maximum Theoretical Capacity” of the equipment based on strokes as well as our estimated “Realistic Capacity" based on realistic working conditions, meaning 7 hours per day and 250 days per year.

The efficiency of the equipment can be based on several factors including the material quality, equipment maintenance, and operator efficiency.

The below table is meant to assist the buyer in understanding the potential output of the machine.

5.56mm Dedicated Line

Maximum Theoretical: 180 PPM

Efficiency	60%	70%	80%	90%	100%
Annual 1-Shift	11,340,000	13,230,000	15,120,000	17,010,000	18,900,000
Annual 3- Shift	34,020,000	39,690,000	45,360,000	51,030,000	56,700,000

Note – The use of AP projectiles will cut capacity dramatically. Estimate 50% capacity.

9mm Dedicated Line

Maximum Theoretical: 180 PPM

Efficiency	60%	70%	80%	90%	100%
Annual 1-Shift	11,340,000	13,230,000	15,120,000	17,010,000	18,900,000
Annual 3- Shift	34,020,000	39,690,000	45,360,000	51,030,000	56,700,000

Equipment runoff target would be 70-80% efficiency.

III. Processes & Equipment

a. Cartridge Case Manufacturing

Based on your caliber requirements we recommend using our traditional line for rifle case manufacturing. This includes using a transfer press for drawing tubes from cups, then completing the case using traditional equipment and processes.

The D&M Cartridge Case Lines includes the following processes and machinery:

Rifle Cartridge Case Manufacturing Process

Step	Process	Machine
1	Initial Draw (s)	D&M US Baird 4 Series Transfer Press
2	Wash, Rinse & Dry	DM VB Wash, Rinse & Dry System
3	Head Turn/Extractor Groove	Universal Trimming Machine/Chip Sep
4	Body Anneal	D&M Annealing Machine
5	Neck/Taper Form	D&M Taper Press
6	Polish, Wash, Rinse & Dry	DM VB Polish Wash, Rinse & Dry
7	Mouth Anneal	D&M Annealing Machine
8	Polish	Polish Machine
9	Visual Inspection	360 High Speed Inspection System

Pistol Cartridge Case Manufacturing Process

Step	Process	Machine
1	Draw, Head Stamp, Primer Pocket	D&M US Baird 4 Series Transfer Press
2	Wash, Rinse & Dry	DM Wash, Dry, Polish System
3	Head Turn/Extractor Groove	Universal Trimming Machine/Chip Sep
4	Polish	Polish System
5	Visual Inspection	360 High Speed Inspection System

a.1 Case Forming – D&M/US Baird 4 Series Transfer Press

In this process tubes are drawn 2 at a time in a transfer press. The input material must be annealed cups.

Left Side of Press

Right Side of Press

SPECIFICATION

Rated machine capacity	Tons (kN)	45 (400 kN)
Ram Strokes	Inches (mm)	2.50 (63.5) 3.00 (76.2) 4.00(101.6) 4.50(114.3) 5.00(127.0)
Shut Height- measured from ram step to press bolster	Inches (mm)	15.250 (367.35)
Ram width	Inches (mm)	37.00 (939.8)
Cup tonnage	Tons (kN)	2.25 (20.0)
Motor HP & Motor RPM		10 (1150)
Speed rang –Strokes per min.		60-160
Controls		AB Touchscreen

DIMENSIONS

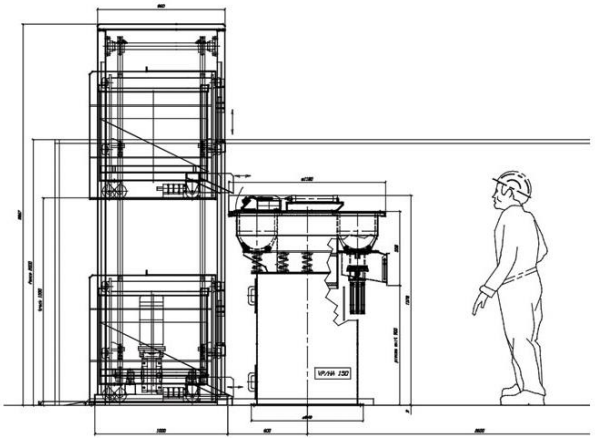
Floor space side to side	Inches (mm)	87.50 (2223)
Floor space front to rear	Inches (mm)	62.50 (1588)
Overall machine height	Inches (mm)	102.87 (2613)
Side to side with OSHA guards	Inches (mm)	103.00 (2616)
Front to rear with OSHA guards	Inches (mm)	68.00 (1727)
Height with OSHA guards	Inches (mm)	111.00 (2819)
Net weight with die set	Lbs. (Kg)	14500 (6580)
Shipping weight	Lbs. (Kg)	15000 (6800)
Maximum width of material	Inches (mm)	5.50 (140.0)
Maximum feed length	Inches (mm)	3.37 (85.7)

DIE SETS

No. of Die Set Stations	Center distance Transfer Stroke Inches(mm)	* Max. blank diameter Inches(mm)	** Max. blank diameter Inches(mm)
8	4.50 (114.3)	2.75 (69.9)	2.75 (69.9)
9	4.00 (101.6)	2.50 (63.5)	2.75 (69.9)
10	3.50 (88.9)	2.25 (57.2)	2.75 (69.9)
12	3.00 (76.2)	2.00 (50.8)	2.50 (63.5)
13	3.00 (76.2)	2.00 (50.8)	2.50 (63.5)
14	2.50 (63.5)	1.00 (25.40	2.00 (50.8)
15	2.50 (63.5)	1.50 (38.1)	2.00 (50.8)
17	2.50 (63.5)	1.50 (38.1)	2.00 (50.8)

a.2-2 Wash, Rinse, and Dry

The formed tubes will go through a wash and rinse system.



DESCRIPTION

The multi-purpose vibrating machine performs all routine finishing operations, such as greasing, deburring, polishing, and drying, consecutively or alternatively in fully automatic mode. Drying is achieved by passing hot air through the vibrating pieces: this system dries even the most complex details effectively and without staining. modular, multi-unit finishing plant.

Technical Data

working capacity dm3 130
lining hot cast 92 ShA polyurethane
machine width mm 1,130
bowl width mm 280
motor power kW 1,50, life-greased bearings
heating system fan 0.73 kW – heating elements 18 kW

Features

- pneumatic pieces loading system
- pneumatic bottom unloading, with control
- pneumatic liquid drain, with control
- hot air thermo controlled drying system

a.3 Head Stamp and Primer Pocket (Rifle Calibers Only)

The tubes are then run through a D&M Header Press in which the Head Stamp and Primer Pocket will be created using a specially tooled bunter.

DESCRIPTION

The DM-4 Horizontal Header Press is a modernized version of the reliable Bliss # 4 press. The DM-4 Horizontal Header Press stamps the primer pocket and headstamp into a cartridge case in a single stroke. This 56 Ton Maximum Capacity Press with 8" Stroke-Crankshaft and 6" Stroke -mandrel slide

SPECIFICATION

Description	Unit	Specification
Max Capacity	ton	56
Stroke – Crankshaft	mm (in)	203 (8)
Stroke – Mandrel Slide	mm (in)	152 (6)
Max Cycles per minute		80-100
Shell Size Maximum Diameter	mm (in)	12.7 (.50)
Motor	HP	5
Controls		AB Touchscreen
Electrical Supply	Volt	220/240/380/440 3-Phase
Air Line Size	mm (in)	19 (3/4")
Air Requirements	PSI	70
Air Supply	CFM	5.5

DIMENSIONS

Description	Unit	Specification
Machine Length	mm(in)	2,650 (104.3)
Machine Width	mm (in)	1,160 (45.6)
Machine Height	mm(in)	2,130 (83.8)
Machine Weight	kg (lbs.)	3,700 (8,157)

FEATURES

Feeder: Cases are fed into machine via a Pin Feeder System for proper orientation.
Electrical enclosure will include machine mounted relays and controls
One door/NEMA 12 with a disconnect
I/O terminated on terminal strip
Operators Panel/ Machine mounted/NEMA 12
Standard size button and lights
Emergency stop button
Cycle start with push button

a.4 Wash (Rifle Calibers Only)

The Head Stamped and Pocketed tubes are then re-washed and dried again in a multistage Wash Unit.

a.5 Head Turn and Trim

Next, the cases are run through Head Turn machines. D&M upgrades and tools Universal Trimming Machine systems. The Universal Trimming Machine is equipped with a rugged single axis tool slide, all mechanical motion designed in to maintain durability and reliability. The variable speed drives permit independent control to create a versatile machine to turn and trim ammunition. The headstock and tailstock assemblies are constructed of cast iron and are mounted on finished pads of the heavily constructed steel base.

Before After

SPECIFICATION

Description	Unit	Specification
Max Cycles per minute		120
Min part Diameter	mm (in)	5.7 (0.223)
Max part Diameter	mm (in)	22.2 (0.875)
Min part Length	mm (in)	12.7 (0.50)
Max part length	mm (in)	101.6 (4.00)

Chucking		Collet
Spindle Speed	RPM	1,700 ~ 3,400
Spindle Horsepower		1 hp ~ 5 hp

ELECTRICAL CONTROLS

Main System	380-460 volt, 3 phase, 50-60 Hz
Main Enclosure	Machine mounted relays / controls
One Door	NEMA 12 with a disconnect
I/O	terminated on terminal strip
Operator Panel	
Machine Mounted	NEMA 12
Buttons/Lights	Standard Size
Emergency Stop	Push Button
Cycle Start	Push Button

DIMENSIONS

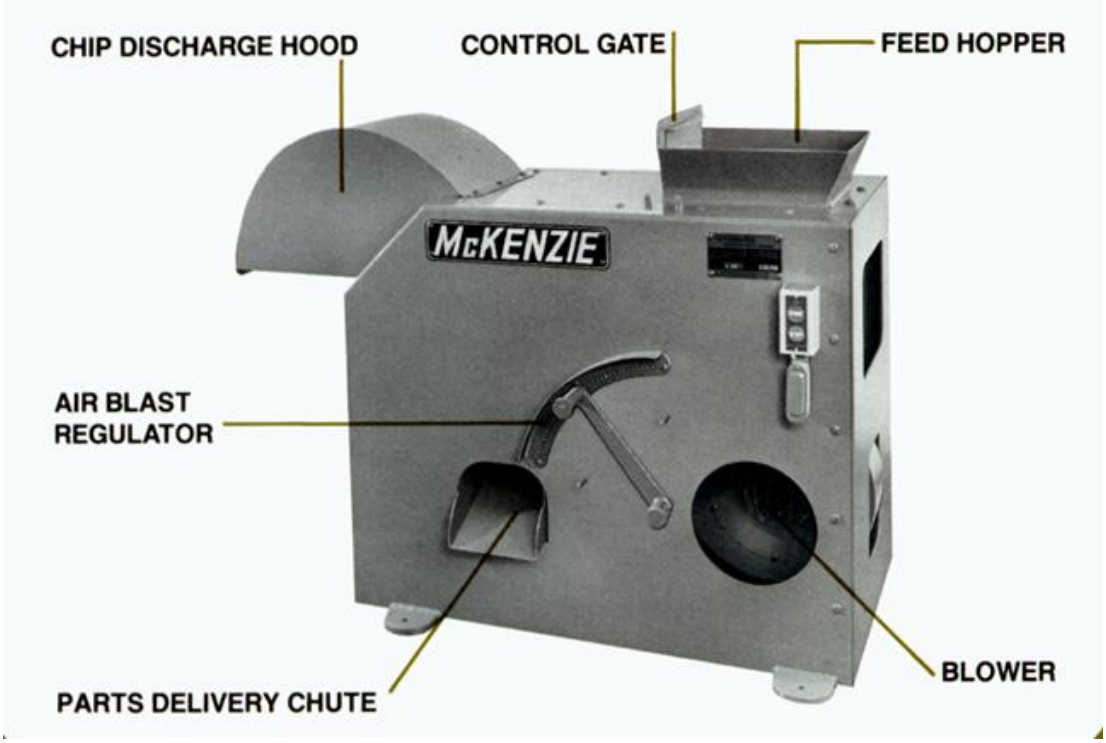
	Unit	**Machine**
Machine Length	mm(in)	1,524 (60)
Machine Width	mm (in)	813 (32)
Machine Height	mm(in)	2,184 (86)
Machine Weight	kg (lbs.)	907.5 (2,000)

FEATURES

- Independent variable speed drive on the camshaft and spindle
- Headstock and tailstock housings of cast iron construction
- Spindle construction is such that by simply removing the bearing housing caps at both ends, the spindle assembly may be removed as a unit thus simplifying maintenance.
- All-important wear surfaces are hard chrome plated and the tool slide is a linear bearing roller slide for longer life and less power to operate.
- Lubrication is positive through aid of an oil pump at the bottom of the headstock and a filter is added to the outside of the machine.
- Machine built to NEMA Specifications and SMS standards.

Chip Separation

After the Head Turn and Trim operations, the cases must go through a Chip Separation process to remove any excess material from the case.



a.7 D&M Annealing Machine - Body Anneal (Rifle Calibers Only)

DESCRIPTION

The D&M DM-200-L Induction Annealing Machine is a continuous motion machine that can be used for both body annealing and mouth annealing. With state-of-the-art features such as the Allen Bradley servo's and touch screen display, setting can be changed in a matter of seconds.

With this machine the operator can adjust the coil height electronically to quickly adapt to other calibers, make small changes in annealing and start from neck or body annealing.

The touch screen control allows for fine-tuning to the heat of the induction coil and has memory for storage of different 40+ settings. This enables the machine to quickly revert to a different caliber

SPECIFICATION

Description	Unit	Specification
Motion		Continuous Rotation
Controls		AB PLC / HMI screen
Electrical	Volt	300-500 3-Phase / 60 Hz
Motor		Servo
Cabinets		NEMA 12 / IP 52
Control Center		NEMA 12 / IP 52
Air Requirement	PSI	80
Air Line	mm(in)	12.7 (.50)
Air Supply	CFM	5

CONSTRUCTION / SAFETY

Frame	Steel
Enclosure	Fully Enclosed Lexan
Critical Parts	Hardened Steel Black Oxide / 7075 Aluminum Anodized
Doors	Extruded aluminum with Lexan
Door Locks	Magnetic
Feet	Shock absorbers

DIMENSIONS

Machine Length	mm(in)	3,404 (134)
Machine Width	mm (in)	1,372 (54)
Machine Height with Chiller	mm(in)	3,455 (135)
Machine Weight	kg (lbs.)	908 (2,000)
Work Area	m	3 x 3
Minimum Ceiling Required	m	5

a.8 Neck / Taper Forming (Rifle Calibers Only)

The taper or neck is then pressed into the case using a **D&M Progressive Taper Press** D&M Taper Press. This is a Progressive multi-taper press for necking rifle cartridges. This prevents cracks and folds that occur when trying to do this operation in a single die.

Features

- Automatic values that lubricate case prior to going through necking dies.
- Pneumatic case feeder to ensure proper alignment of cases into the machine.
- Servo stepper motors to ensure consistent proper alignment of parts under dies.
- Electric trimmer for OAL length after taper operation.

- With state-of-the-art features such as the Allen Bradley servo's and touch screen display, our D&M Progress Taper Press stands apart from the rest. The touch screen control allows for the user to see the operation of the machine and see any errors that occur. In addition, our system will automatically stop the machine if the lubrication is out of oil or the values are out of lubrication for the cases.

a.9 Polish, Wash, Rinse, & Dry

The tapered cases are again washed and dried in a multistage Wash Unit. This time with a 36-inch Polish System added to the Multistage Wash System.

a.10 Mouth Anneal (Rifle Calibers Only)

After cleaning the cases they are fed into a second automated D&M induction annealing system which this time anneals the case mouth to relieve the material stress of the previous operations.

a.11 Polish System

Parts are then polished in a wash polish system.

a.12 Cartridge Case Inspection Mectron Qualifier Q-2500-8 Inspection System

All finished Cartridge cases are inspected using a high-speed inspection system that utilizes a series of eight advanced proprietary cameras to measure features and detect surface defects.

1 system is needed for each case line.

DESCRIPTION

The most advanced inspection systems available on the market today, the Qualifier Q-series deliver high speed gauging and metallurgical inspection for a variety of parts in a wide range of materials. Utilizing Mectron's patented laser array, the Qualifier provides 360° inspection of each piece, displays its dimensions on the computer touch screen and automatically inspects the part features and measurement.

SPECIFICATION

Description	Unit	Specification
Max Cycles per minute	PPM	200+
Inspection Process		Laser Array
Lasers	ea.	8

Inspection Area	°	360
Repeatability (diameter)	mm	(+/- .005)
Repeatability (length)	mm	(+/- .05)
Gauge Zones		Unlimited
Max Diameter	mm	30

INSPECTION CRITERIA

Diameters	Mouth, Body, Head, Shoulder, Extractor Groove
Length	Bullet, Casing, Cartridge, Extractor Groove Width
Camera Inspection	Flash Hole, Primer Pocket, Mouth ID & OD, Case Splits

ELECTRICAL & AIR

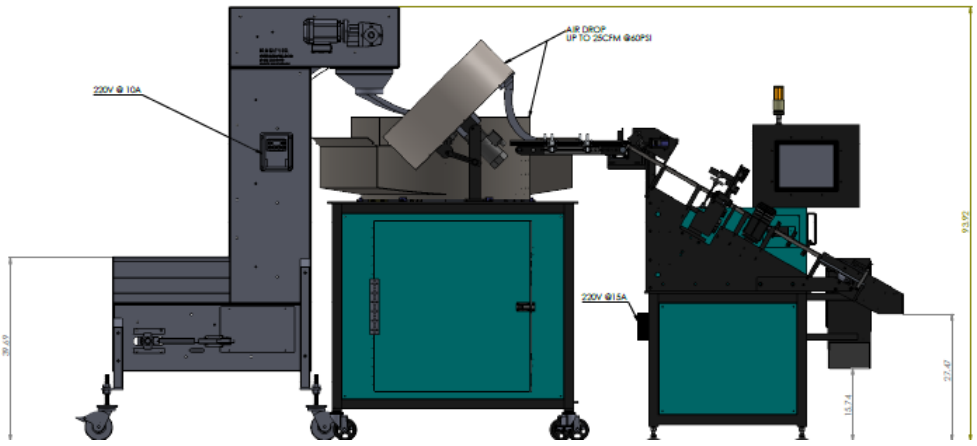
Control Enclosure		NEMA 12
Disconnect Fuse	amp	30
Power		220 Single Phase
Power line conditioning		Un-interruptible supply
Power Drop Req		2
Max Compressed Air	CFM/PSI	Up to 25 at 60

DATA & NETWORK

Data Storage		Hard Drive
Data Collection		Network / USB
Remote Service Requirement		Internet Access

DIMENSIONS (COMPLETE SYSTEM)

Machine Length	mm(in)	178.8
Machine Width	mm (in)	98.55
Machine Height	mm(in)	93.9
Machine Weight	kg (lbs.)	2,041 (4500)



b. Projectile Manufacturing Cells

D&M Pistol Projectile Cell is a compact cell which begins with lead wire being extruded through a horizontal press to create the bullet cores. The bullet cores are then feed through a collator into the assembly cell. The bullet jackets are drawn within the assembly press.

The D&M Projectile Cell includes the following processes and machinery:

Manufacturing Process

Step	Process	Machine
1	Lead Core Extrusion	D&M Horizontal Lead Extruder
2	Wash, Rinse & Dry of Cores	Wash, Rinse & Dry System
3	Bullet Cup Drawing & Assembly	D&M Tooled - US Baird Transfer Press
4	Polish, Wash, Rinse & Dry	Wash, Rinse & Dry System w/ Polish

Presses by Caliber

Small Rifle Projectiles	D&M Tooled - US Baird #3 Transfer Press – 14 Die Set
Pistol Projectiles	D&M Tooled - US Baird #3 Transfer Press – 14 Die Set

b.1 D&M DM-H-M Lead Header Press

DESCRIPTION

The D&M Lead Swagger runs via a crankshaft arrangement. Cut lead slugs are transferred by a dial that is driven by a mechanical cam. The lead slug swaged in a die by a punch in the ram. The finished lead core is transferred by the dial where it exists the machine.

SPECIFICATION

Description	Unit	Specification
Motion		Crankshaft / Indexing Dial
Max Stroke		150
Controls		AB Button / Relay Logic
Electrical	Volt	400 3-Phase
Motor	HP	2
Cabinets		IP 53
Control Center		IP 53
Air Requirement	PSI	80
Air Line	mm(in)	6.35 (.25)
Air Supply	CFM	<1

CONSTRUCTION / SAFETY

Frame	Steel
Enclosure	Aluminum Frame with polycarbonate panels
Critical Parts	Hardened & Nitride Steel
Door Locks	Electrical Interlocks
Tabletop	Blanchard ground, bolted to frame
Feet	Shock absorbing / Leveling

DIMENSIONS

Machine Length	mm(in)	2,210 (87)
Machine Width	mm (in)	1,016 (40)
Machine Height	mm(in)	1,930 (70)
Machine Height with Collators	Mm(in)	2,286 (90)
Machine Weight	kg (lbs.)	839.1 (1,850)
Work Area	m	3 x 8
Minimum Ceiling Required	m	3.3

b.3. D&M US Baird 3-25 Transfer Press

DESCRIPTION

The 3-25 Transfer Press is a 25-ton press makes the bullet jacket cup within the press, draws the jacket, insets the penetrator and core, closed the projectile, then creates the Cannelure.

3-25 SPECIFICATION

Rated machine capacity	Tons (kN)	25 (225 kN)
Ram Strokes	Inches (mm)	1.00 (25.4) 1.50 (38.1) 2.00 (50.8) 2.50 (63.5) 2.75 (70.0) 3.00 (76.2)
Shut Height- measured from ram step to press bolster	Inches (mm)	10.000 (254.0)
Ram width	Inches (mm)	24.93 (633.4)
Cup tonnage	Tons (kN)	1.3 (11.5)
Motor HP & Motor RPM		7.5 -1750
Speed rang –Strokes per min.		110-260
Controls		AB Touchscreen

DIE SETS

No. of Die Set Stations	Center distance Transfer Stroke Inches(mm)	* Max. blank diameter Inches(mm)	** Max. blank diameter Inches(mm)
8	3.00 (76.2)	2.00 (50.8)	2.25 (57.2)
9	2.50 (63.5)	1.62 (41.3)	2.25 (57.2)
11	2.00 (50.8)	1.25 (31.8)	1.875 (41.6)
12	2.00 (50.8)	1.25 (31.8)	1.875 (41.6)
13	1.75 (44.5)	1.00 (25.4)	1.875 (41.6)
14	1.75 (44.5)	1.00 (25.4)	1.875 (41.6)
15	1.50 (38.1)	.75 (19.1)	1.50 (38.1)
16	1.50 (38.1)	.75 (19.1)	1.50 (38.1)

DIMENSIONS (Machine)

Floor space side to side	Inches (mm)	58.37 (148.3)
Floor space front to rear	Inches (mm)	33.50 (851)
Overall machine height	Inches (mm)	79.87 (203)
Side to side with OSHA guards	Inches (mm)	76.50 (1943)
Front to rear with OSHA guards	Inches (mm)	62.00 (1575)
Height with OSHA guards	Inches (mm)	88.87 (2257)
Net weight with die set	Lbs. (Kg)	5400 (2450)
Shipping weight	Lbs. (Kg)	5700 (2585)
Maximum width of material	Inches (mm)	4.625 (117.5)
Maximum feed length	Inches (mm)	3.00 (76.2)

b.4. Parts Cleaning Unit HRC-5 Combo (Finished Bullets)

DESCRIPTION

Manufactured for D&M Holding by Hammond Roto, the Combo Series includes a second chamber for parts drying after washing. This structure utilizes the same tank head design for structural integrity. The addition of the second chamber to the outside of the process area reduces costs and floor space. With unload gates available for both the processing and drying channel, this is one of our most versatile machines.

FEATURES

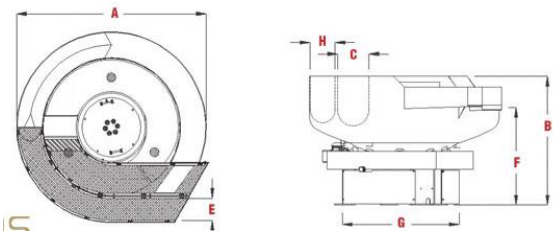
Heavy Duty Welded Steel Construction
1/2" thick pressure vessel material.
Cast Polyurethane Liner
"U" Shaped Straight or Curved Wall Processing Bowl
Full 90º Wrap-Around Separation Screen
Water-Driven Compound System
Heat Lamp(s), with Control Panel Mounted Controls
Automatic Gate Clearing System

HRC-5 SPECIFICATION

Description	Unit	Specification
Operating Capacity – Finishing	L (cu.ft.)	141 (5)
Operating Capacity – Drying	L (cu.ft.)	164 (5.8)
Total Capacity	L (cu.ft.)	300 (10.71)
Max Working Capacity	L (cu.ft.)	150 (5)
Dryer Channel Capacity	mm (in)	68 (204)
Overall Diameter	mm (in)	1,676 (66)
Overall Height	mm (in)	1,181 (46.5)
Process Channel Width	mm (in)	259 (10.2)
Screen Deck Width	mm (in)	203 (8)
Screen Deck Height	mm (in)	873 (39)
Case Diameter	mm (in)	1,193 (47)
Dryer Channel Width	mm (in)	214 (8.43)
Drain Size	mm(in) # drains	101.6 (4) / 3
Motor	HP	3
440 Volts Amp Load		7.8
230 Volts Amp Load		12.6
Approximate Shipping Weight	kg (lbs.)	1,632.9 (3,600)

HOT WATER HEAT

Enclosed hot water recirculation system
Replaces standard heat lamp
Utilizing recirculation heater
480 volts – 9 KW
Pump, Y-strainer, Thermostat, Sight gauge
All necessary couplings and plumbing
Connected to a heat exchange inside the cob dryer.
Includes 1gal of RTC-192 corrosion inhibitor.



c. Load, Assemble, and Pack (LAP) Lines

These cells include the following stations/processes:

- Priming – Primer Insertion into cartridge case
- Loading – Assembly of primed case, powder, and projectile
- Packaging – Automatic and Manual Packaging in purpose-built systems

Our LAP cells are made up of a combination of equipment manufactured by D&M Holding and Alpha Loading Systems of Montana.

c.1. Alpha P-350 Priming Machine

This machine is running on a continuous rotary disc with individual shell plates/case holders, which allows the machine to check the primer pocket, flash hole, primer depth, and primer presence with auto stop for any failed stations. Optional feature would be the vision inspection on the primer feed track, looking for inverted primers, anvils and priming compound. This machine has the same Alpha quality built into every part allowing for longevity and quality with each cartridge.

Features

- Multiple Calibers—Most Small to Medium Rifle and Pistol
- PPM = Pistol up to 250 PPM & Rifle up to 180 PPM
- 16 Position continuous rotation
- Manual Primer Depth Adjust
- Eliminates stacked primers
- Low Maintenance
- Easy Operation
- Simplistic Changeovers
- Controlled Primer Depths
- Rejection of Faulty Cartridges
- Manual Controls with Touch Screen Interface
- Primer Pocket Check
- Hardened and Precision Ground Tool Steel Components Where Needed
- Optional equipment includes Flash Hole Check and Camera System.

SPECIFICATION

Description	Unit	Specification
Controls		AB PLC / HMI screen
Electrical	Volt	230 Single Phase
Motor	HP	3
Cabinets		IP 65
Control Center		IP 55
Air Requirement	PSI	80
Air Line	mm(in)	12.7 (1/2”)
Air Supply	CFM	5

CONSTRUCTION / SAFETY

Frame	Steel
Enclosure	Fully Enclosed Blast resistant polycarbonate
Primer Bowl Enclosure	Blast resistant polycarbonate
Critical Parts	Hardened Steel / Carbide
Doors	Blast resistant polycarbonate
Door Locks	Air Locks
Tabletop	Sealed tabletop with removable bulkhead plates
Feet	Shock absorbing

c.2.a D&M Turret Loading System (Dedicated for 9mm and 5.56mm Lines)

DESCRIPTION

The D&M Turret Loading System is a mechanical system of assembly ammunition using a series of 7 turrets, 1 for each function, which allows for the assembly of 220 rounds of loaded ammunition with each stroke of the machine. The machine is run on motor and chain systems which are industry proven to be reliable and exact.

This fully automatic system is equipped with the following stations:

Turret 1 Case Flare / Bell Mouth to exact size
Turret 2 Powder Drop
Turret 3 Powder Check

Turret 4 Bullet Insertion
Turret 5 Bullet Seating
Turret 6 Bullet Crimp
Turret7 Profile Check

Inspection (Visual System) - Mirror

SPECIFICATION

Description	Unit	Specification
Turrets		7
Motion		Mechanical
Controls		AB PLC / HMI screen
Electrical	Volt	480 Three Phase
Cabinets		IP 65
Control Center		IP 55
Air Requirement	PSI	80
Air Line	mm(in)	12.7 (1/2”)
Air Supply	CFM	5

CONSTRUCTION / SAFETY

Frame	Steel
Enclosure	Fully Enclosed Blast resistant polycarbonate
Primer Bowl Enclosure	Blast resistant polycarbonate
Critical Parts	Hardened Steel / Carbide
Doors	Blast resistant polycarbonate
Door Locks	Air Locks
Tabletop	Sealed tabletop with removable bulkhead plates
Feet	Shock absorbing

DIMENSIONS

Machine Length	mm(in)	1,219.2 (48)
Machine Width	mm (in)	2,438.4 (96)
Machine Height	mm(in)	1,828.8 (72)
Machine Height with Collators	Mm(in)	2,286 (90)
Machine Weight	kg (lbs.)	1,587.6 (3,500)

c.3 Sealing (Military Ammunition)

All military ammunition must be sealed. Sealing of the finished ammunition by the Automatic application and drying of sealant on the case's mouth and on the primer. The sealing and lacquering operation is made by injectors while the drying operation is made by LED UV lights using the following operations:

1 - Positioning of ammunition of the transport chain
2 - Varnishing of the primer
3 - Varnishing of case's mouth
4 - Drying by led UV lamps
5 - Exit

Features

- 100 - 120 PPM sealing neck and prime
- Large Bin for loaded rounds that feeds into feeder
- EFD values, easy to replace.
- Safety features include open door stops, shield guard
- Sealant is readily available in international market
- Sealing material is provided
    - Standard 1-year shelf life
    - Estimated 15 million rounds per gallon
- Camera Inspection w/ Auto Reject

Operational Sequence

1. Case Feed
2. Orientation Check
3. Mouth Seal
4. Primer Seal
5. Curing via LED Light
6. Camera Inspection
7. Reject
8. Eject

c.4 D&M Partial Packaging System

DESCRIPTION

The D&M APM System is a packaging machine for traying pistol or rifle ammunition in 20 or 50 round trays or into customer specific boxes.

Cartridges enter through a feeder bowl and exit on a belt. The operator places trays on the conveyor and the trays automatically move into the system. The machine stops to fill the tray one row at a time until the tray is full.

SPECIFICATION

Description	Unit	Specification
Motion	Servo	Belt
Max Parts Per Minute		120
Controls		AB PLC / HMI screen
Electrical	Volt	220 1-Phase
Motor		Servo
Cabinets		NEMA 12 / IP 52
Control Center		NEMA 12 / IP 52
Air Requirement	PSI	80
Air Line	mm(in)	12.7 (.50)
Air Supply	CFM	5

CONSTRUCTION / SAFETY

Frame	Steel
Enclosure	Fully Enclosed Lexan
Critical Parts	Hardened Steel Black Oxide / 7075 Aluminum Anodized
Doors	Extruded aluminum with Lexan
Door Locks	Magnetic
Tabletop	Blanchard Ground with clear coat
Feet	Shock absorbing

DIMENSIONS

Machine Length	mm(in)	1,778 (70)
Machine Width	mm (in)	966 (38)
Machine Height	mm(in)	1,778 (70)
Machine Weight	kg (lbs.)	680 (1,500)
Work Area	m	3 x 3
Minimum Ceiling Required	m	5

d. Laboratories

d.1. Metallurgy Laboratory

The D&M Turn-Key metallurgy laboratory is purposely built to ensure the best quality of incoming, in processes, and outgoing parts. The laboratory operator can monitor grain size throughout the cartridge case, measure hardness, perform chemical testing, and measure and record the quality of outgoing cartridge cases against various international and military standards. The lab is delivered as a Turn-Key system which will be fully functioning and include all technical information specific to the factory and to the calibers being produced.

Brass Alloys

During the forming of brass alloys, the grain structure can rearrange to much smaller grains with material hardening. Manipulating the grain through annealing allows the brass to be worked multiple times over.

Additionally, a brass cartridge needs different grain sizes in different areas of the shell; the head will have very small grains to enhance resistance to expanding while the shoulder grain will be larger to allow forming to the chamber without cracking. The mouth needs enough hardness to maintain grip on the projectile while remaining soft enough so that embrittlement does not occur.

Instrumented techniques are used to monitor the grain size and shell hardness throughout the process.

Grain Size

Grain size analysis requires the case to be first polished to a mirror finish then acid etched to reveal the hidden grains boundary. The grain boundaries are either viewed through a microscope then compared to visual standards or imaged electronically and measured electronically. ASTM E112.

Material Hardness

The material hardness is measured using a Vickers hardness tester with a diamond indent. The brass sample is placed in an acrylic resin and polished to a mirror finish. Polishing is imperative to accurate measurement. Hardness correlates to the dimensions of the diamond indent formed using a known load.

Once cases are formed and loaded, they are exposed to either mercurous nitrate or ammoniacal hydroxide to reveal residual internal stress.

D&M provides thorough technical drawings and knowledge on all cases with specifications for hardness. Training manuals are provided detailing how to take a production case through the process of preparing for hardness testing. This is crucial to ensure the highest quality case is manufactured and will function properly within the specified pressures designed by CIP, SAAMI, or other specific requirements.

This lab is also used for testing incoming raw component cups and strip for both the projectile line and case line. Inspecting incoming raw manufacturing components is important to identify supplier mistakes prior to production.

Equipment List (Major Components / Does not include all materials)

- Automatic Vickers/Knoop Hardness Tester with software, spare parts, and miscellaneous accessories.
- Ecomet /Automet Grinding & Polishing System with intuitive membrane controls and manual or automated sample preparation.
- Fully Configured Inverted Materials Metallurgical Microscope w/Omnimet Advanced System
- IsoMet High Speed Pro Precision Saw
- Desktop Computer with software installed for Inverted Microscope & complete technical data package for all calibers and equipment for the laboratory and manufacturing lines.
- Acid Etching Station with Laboratory Hoods

- Technical Data to include:
  - Step-by-Step User Instructions for Turn-Key Lab
  - User Manuals for all equipment
  - Technical Drawings of Cups, Cartridge Cases & Bullet Jackets

D.2. Ballistics Laboratory

Our Turn-Key Ballistics Laboratory is purpose built to develop loads, test pressure, velocity, and accuracy of loaded ammunition.

For this factory, D&M is offering both a Laboratory with equipment and processes with the ability to meet SAAMI (USA) standards.

This lab includes but would not be limited to the following:

- Universal Receiver, Windage Table, Scissor Lift Table
- Oehler 85 with 3 Sky screens with enclosures
- Transducer Calibration System, Charge Amp, PC
- Insulation Tester
- Barrels (2 for each Caliber):
- Accuracy Barrels
- Pressure & Velocity Barrels
- Transducers
- Calibration Transducers

d.3. Wastewater Treatment

This section is a placeholder for a purpose-built system which will not be developed until building plans are in place. Once building plans are in place a separate offer will be created based on specific requirements.

Quoted pricing in this offer is based on previous experience.

IV. Tooling & Spare Parts

Tooling required to meet the first 30 days of production based on output estimated in this proposal will be included for one shift.

D&M will ensure buyer has complete tooling and spare parts lists and suppliers list.

V. Not Included

a. Raw Materials & Subcomponents

All raw materials for equipment run-off must be supplied by customer. D&M Holding will provide a list of US and international vendors which customer can utilize.

b. Equipment and Services

Equipment and Services in accordance with all applicable local codes and laws to be supplied by the customer shall include:

I. All construction, foundation work, cables or piping channels.
II. Foundation reinforcement or equipment.
III. Piping and alignment of components on the equipment shipped disassembled
IV. Fire protection, waste disposal, or air exhaust systems.
V. Electrical substations or plant power distribution systems or electrical safety equipment.
VI. All plant interconnecting piping the responsibility of the client.
VII. Service utilities such as electric power, compressed air.
VIII. Cranes or forklifts or metal bins for handling of parts and scrap and supply of work tools, mechanical, electrical, or electronic.
IX. Rigging Services

VI. Equipment Set Up & Training

Equipment run-off, and acceptance will take place in the following locations:

Case Line	**Projectile Line**	**Loading Line**
Cabot, AR	Cabot, AR	Cabot, AR

On-site training and future visits:

I. On-site during unloading and recommendations on placement. One (1) - Two (2) service technicians for 5 days, if necessary.

II. On-site training once machines are fully wired and ready for production. Two (2) service technicians for 15 days.

III. **Bi-Monthly** after the on-site training is completed, we will send one (1) - two (2) service technicians as needed until the factory is 100% operational. Service will include going over recommended preventative maintenance, refresher course or anything else that the customer needs

VII. Price List

No.	Description	Qty	Unit Price in USD	Total Price in USD
	5.56mm Dedicated Line			
1.	Complete Cartridge Case Line	1	$10 610 000,00	$10 610 000,00
2.	Bullet Assembly Machine (5.56mm)	1	$3 091 000,00	$3 091 000,00
3.	*Prime, Assemble, Seal, and Pack*	1	$2 985 000,00	$2 985 000,00
	Subtotal			**$16 686 000,00**
	9mm Dedicated Line			
1.	Complete Cartridge Case Line	1	$6 678 000,00	$6 678 000,00
2.	Bullet Assembly Machine (9mm)	1	$3 091 000,00	$3 091 000,00
3.	*Prime, Assemble, Seal, and Pack*	1	$2 985 000,00	$2 985 000,00
	Subtotal			**$12 754 000,00**
	Auxiliary Equipment			
1.	Metallurgy Equipment	1	$450 000,00	$450 000,00
2.	Ballistics Lab Equipment w/Changeovers	1	$210 000,00	$210 000,00
3.	Wastewater Treatment	1	$466 000,00	$466 000,00
	Subtotal			**$1 126 000,00**
	Total Cost			**$30 566 000,00**

VIII. Payment Terms & Schedule

Initial Deposit:	60%	With Purchase Order/Contract
Monthly Payments:	40%	Balance Paid Per Schedule

Payment schedule for balance payments will be developed at the time of contract based on actual manufacturing needs. A schedule of milestones will also be developed which will be the basis of balance payments.

IX. Lead Times and Delivery Schedule

Estimated at 24 months, depending on time of contract.

X. Commercial Terms and Conditions

By placing a Purchase Order with D&M Holding, the buyer accepts that the following terms and conditions will apply. Any modifications to these terms and conditions must be approved in writing by D&M Holding Company prior to acceptance of offer and Purchase Order.

a. Delivery

Shipping and Packaging for shipment is the responsibility of the Buyer and will be billed at actual cost.

b. Payment Terms

Payments should be made via wire transfer or ACH.

Service charges of one and one-half percent (1.5%) per month will be charged on all unpaid invoices. If the Buyer fails to make payments in accordance with these terms, D&M Holding may cease production and or deliveries until the buyers account is in satisfactory standing.

If buyer cannot accept delivery when the equipment is ready, D&M Holding Company will invoice Buyer payment will be due in accordance with the terms of this order.

c. Force Majeure

D&M Holding Company is not liable for delays due to Force Majeure (war, strike, riot, crime, or an event described by the legal term act of God.

d. Proposal Validity

This proposal is valid for a period of 90 days unless modified in writing by D&M Holding Company.

e. Taxes

The Buyer assumes all sales, use, excise, license, and or other taxes or fees related to the purchase and shipment of this equipment and services.

f. Jurisdiction

Any dispute that may arise in regarding the fulfillment of this proposal must be adjudicated in accordance with the laws of the State of Florida and the United States of America.

g. Export Approval

D&M Holding Company believes strongly in ITAR compliance. The U.S. State Department must approve all exports of goods, services or technical information prior to the exchange of technical information and or acceptance of Purchase Order.

h. Anti-Corruption Compliance Policy U.S. Foreign Corrupt Practices Act ("FCPA")

The U.S. Foreign Corrupt Practices Act ("FCPA") and other anti-corruption laws prohibit any payment or offer of payment to a "foreign official" for the purpose of influencing that official to assist in obtaining or retaining business.

No Company director, officer, employee, or agent has authority to give or to offer anything of value to a "foreign official" or government employee, or to any person while knowing that all or a portion of such money or thing of value will be offered, given, or promised, directly or indirectly, to any foreign official or government employee, for the purpose of inducing that person to affect any government act or decision in a manner that will assist the Company or any of its subsidiaries or divisions in obtaining or retaining business.

XI. Warranty

a) Mechanical. Electrical & Third Party

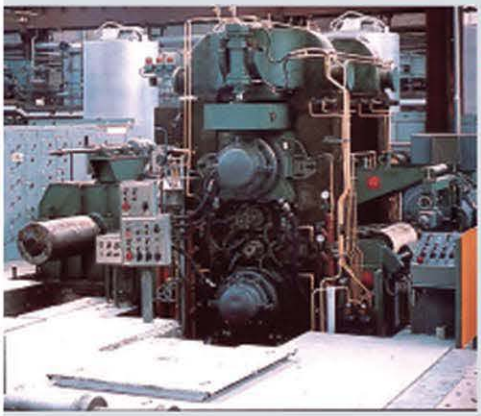
D&M Holding offers a one (1) year warranty for mechanical and electrical parts (other than machine tooling) for defect or workmanship under normal use.

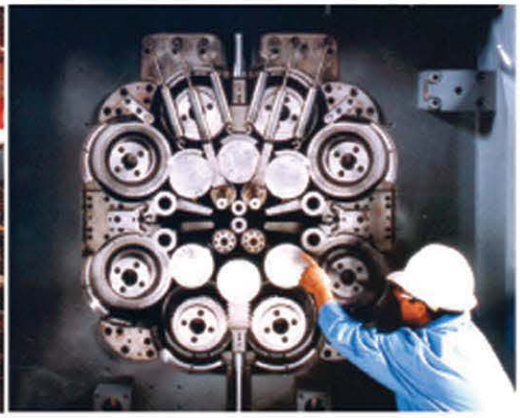
Warranty applies to New and D&M Factory Refurbished parts and equipment unless otherwise agreed to. Services to be performed by D&M Holding Company service technicians or by a technician authorized by D&M Holding Company. Any Equipment manufactured by third party suppliers will be warranted in accordance with the original manufacturers standard warranty, or that of D&M Holding Company, whichever is longest.

b) The following exclusions apply

Any machinery operating outside of normal use or voltage. Any machinery not properly maintained. Any machinery which has been altered by the buyer of any third-party representative of the buyer. D&M Holding Company does not warrant any loss in production, raw materials, or profits lost. Any claims submitted more than 6 months from the discovery of the potential warranty issue. Any machinery which remained in use after the initial discovery of the potential warranty issue.

End of Proposal





MAGNUM
INTEGRATED TECHNOLOGIES

200 First Gulf Blvd.
Brampton, Ontario L6W 4T5
Tel: +1 905-595-1998
Fax: +1 905-455-0422
Toll Free: 1 800-830-0642

WATERBURY FARREL
a division of
MAGNUM INTEGRATED TECHNOLOGIES

200 First Gulf Blvd.
Brampton, ON, Canada L6W 4T5
(905) 455-0106 Fax: (905) 455-0422
TOLL FREE: 1-800-206-8822
www.waterburyfarrel.com
e-mail: sales@waterburyfarrel.com

Cartridge Manufacturing Plant

For

MONTANA MANUFACTURING EXTENSION CENTER

Waterbury Farrel Proposal No. P-CL-4018

WATERBURY FARREL

a division of
MAGNUM INTEGRATED TECHNOLOGIES

P-CL-4018
January 12, 2023

Corporate Headquarters*: *Canada
200 First Gulf Blvd.
Brampton, ON Canada
L6W 4T5
Telephone: +1.800.830.0642
+1.905.455.0106
Facsimile: +1.800.896.1905
+1.905.455.0422
www.magnum-integrated.com

Divisions:

Hill Acme
Grinding, Polishing, Shears & Metalworkers
www.hill-loma.com
+1.800.595.8481

Loma Machine
Saws & Continuous & Non-Continuous Casting Systems
www.hill-loma.com
+1.800.595.8481

Waterbury Farrel
Rolling, Rod & Wire Mills
www.waterburyfarrel.com
+1.800.206.8822

Magnum Power
Hydro Dams & Gates
www.magnum-power.net
+1.800.309.4120

Anker-Holth
Fluid Power Specialists
www.anker-holth.com
+1.800.387.3834

Magnum Logix
Automation & Controls
www.magnum-logix.com
+1.800.784.3468

CERTIFIED ISO 9001:2015 COMPANY

Richard Roberts
Montana Manufacturing Extension Center
405 3rd St NW, Suite #203
Great Falls, MT 59404, USA
Tel : +1 (937) 489-3985
Emails : richard.roberts4@montana.edu

Sub: Cartridge Manufacturing Plant

Dear Sir,

Thanking you for allowing us to participate for the subject requirement.

Based on your requirement, we are pleased to offer the ammunition plant with the best automation to suit the safe and precise operations for manufacturing 9x19mm and 5.56x45mm cartridges as described in this technical proposal.

This offered equipment are designed to produce high quality cartridges at minimum cost, minimum operator involvement in tool setting and highest possible efficiency and output.

As you are aware Waterbury Farrel has over 100 years' experience in manufacturing special equipment to suit ammunition industry.

We trust that our offer merits your approval and look forward to receiving your valued order.

Thank You
Yours Sincerely

Jerry V. Eapen
Corporate Vice President
jerry.eapen@waterburyfarrel.com

WATERBURY FARREL
a division of
MAGNUM INTEGRATED TECHNOLOGIES

200 First Gulf Blvd.
Brampton, ON, Canada L6W 4T5
Tel: (905) 455-0106 Fax: (905) 455-0422
TOLL FREE: 1-800-206-8822
www.waterburyfarrel.com
E-mail: sales@waterburyfarrel.com

TECHNICAL PROPOSAL

For Procurement, of

CARTRIDGE MANUFACTURING PLANT
(9X19MM AND 5.56X45MM CALIBERS)

To

MONTANA MANUFACTURING EXTENSION CENTER

Waterbury Farrel Proposal No.: P-CL-4018

January 12, 2023

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E-mail: sales@waterburyfarrel.com

SECTION 1
INTRODUCTION

Contents

Section 2 Introduction

2.1 Preface

Waterbury Farrel, a division of Magnum Integrated Technologies Inc, is pleased to present this proposal for the complete ammunition plant for manufacturing 9x19mm and 5.56x45mm (M193) cartridges for you.

In addition to the Waterbury Farrel division, Magnum Integrated Technologies Inc is the parent to other world-renowned brands such as Loma, Pittron, Hill Acme and Anker-Holth. These divisions supply the ferrous and non-ferrous industries with casting, rolling and processing equipment allowing Magnum to provide complete turnkey projects due to the wealth of a combined experience of over 500 years.

The equipment and functions specified, result from over 100 years of experience manufacturing similar equipment. Our goal is to provide you with the most suitable solutions for the specific demands of your project. According to our understanding we have to meet your principal requirements concerning:

- Low life cycle costs,
- High productivity and flexibility,
- Output of products with reproducible, small tolerances,
- Sales prospects for your product at a higher return than your competitor,
- And finally, the highest Return-On-Investment.

2.1.1 About Waterbury Farrel

Waterbury Farrel has been in existence since 1851 and been building presses and special ammunition equipment for over 100 years with many installations of ammunition plants & equipment, mechanical & hydraulic presses, rolling Mills, hobbers, grinders etc. worldwide, Waterbury Farrel has built as many ammunition lines and related equipment throughout the World.

Waterbury Farrel was one of the major participants in the initial development, design and manufacture of many modern ammunition equipment and process. Our continuous dedication to engineering, research and development help us in maintaining our leadership in this ever-changing world of competitive industry.

Waterbury Farrel Presses are of the highest quality product, to the best tolerances available today at the speeds demanded of us. Waterbury Farrel continues to offer the most advanced technology available. All these aspects underscore our interest in long-term partnerships.

2.1.2 One Partner for your Needs

Waterbury Farrel has developed the know-how to integrate operating experience into the design of the offered equipment. This aspect of the equipment design provides you with the lowest operating cost. The difference is the experience that you acquire with a Waterbury Farrel Press.

Thus, Waterbury Farrel is able to offer the complete integrated solution from one source covering the following main fields:

- Process know-how
- Technological improvements
- Patented equipment design
- Effective peripheral equipment

Our services include project specific manufacturing, equipment engineering, testing and commissioning. This is carried out by a team of experienced project engineers who are responsible for the correctness of the design and the compliance with the contracted scope of supply. We commit to the timely coordinated sequences in all phases of the project development. All systems are subject to tests to ensure smooth and short installation and commissioning periods.

Waterbury Farrel specialists for supervision of installation and our highly-qualified commissioning engineers for all fields of applications are designated for the site services.

Competence in the know-how provides state-of-the-art customer training. We organize the courses according to the needs of the trainees, their qualifications and specifications. Additional customer training can be provided during the testing, installation and commissioning of the project.

2.1.3 Our Business Philosophy

The relationship to our customer is based on a partnership philosophy. We are convinced that our good reputation depends on our customers' success. Therefore, our business is based on the following concepts:

- **Partnership now and in the future**
  The commitment to our customer remains as long as a plant is operating. Our worldwide service organization is available at any time for any possible improvements of an economical, ecological and/or technological nature. Our experts are constantly working on upgrades and innovations as well as revamps and expansions of plants, which have been implemented years ago, both by Waterbury Farrel or other suppliers. We have proven that our business relationship outlasts the project contract.

- **Our customer is a key team member**
  All functional requirements of the project are carried out in close cooperation with the customer. Proper procedures for project planning and execution allow tracking of various changes to equipment and functionality throughout the execution phase. This helps in managing resources, commercial items and documentation requirements.

- **Top quality systems result in high performance**
  Experience gained from these successful partnerships with an extensive list of prestigious customers is used to improve our components, systems and services to maintain the high performance of our equipment. Extensive research and development contribute to this target.
  This results in advanced technology that keeps us, and our customers, on the leading edge in the marketplace. Customer feedback is appreciated and integrated into further Waterbury Farrel research, thus closing the loop and ever enhancing new developments.

- **Experienced project management guarantees on-time delivery and start-up**
  One project leader and his team take care of the project. He is responsible for the progress of the work, the cooperation and interactions of all partners involved. The planning of the resources for design, manufacture, delivery, installation, start-up, and technical assistance.

- **Long term competitiveness**
  Successful partners maintain the partnership to the benefit of both. Waterbury Farrel ensures results, which meet or exceed customer's expectations through:

  - Replacement parts supply to ensure your press operates at peak efficiency,
  - Preventive maintenance provided by our team of experts,
  - Quick service availability or our telephone service for emergency support,
  - Engineering support for ongoing system improvements or modifications,
  - Partnering with Waterbury Farrel for long term systems support (parts, service, engineering, information exchange),
  - Single source supplier for our customer.

- **Improvements in operating costs, productivity, and quality**
  In addition to the technical and functional needs, our business philosophy considers all topics related to the operating performance of the plant such as:

  - Product quality,
  - Equipment warranty,
  - Operator and maintenance personnel qualification and training,
  - Equipment Reliability

It is our goal to address all these issues in an open dialog with the customer. We are convinced that a joint team effort is going to show the best possible results.

2.2 Conclusion

While the brief nature of this document does not permit us to do justice to the hundreds of other changes done as part of continuous improvement, it does highlight the extensive experience, process know how as well as evolution of key concepts as applied to today's production demands.

Our valued customer will also be able to make a determination based on an "apples-to apples" comparison that Waterbury Farrel is far ahead of any of its competitors with regard to the press technology by offering the quickest return on investment and highest profitability.

At Waterbury Farrel we strive to maintain our tradition of continuous improvement and customer satisfaction. No one can match the performance record of our equipment. As a part of business philosophy and customer commitment, we truly believe in "When you succeed, we succeed".

SECTION 2
TECHNICAL SPECIFICATION
&
PROCESS DESCRIPTION

Contents

Section 2 Technical Specification and Process Description

2.1 GENERAL

All the small ammunition cartridges consist of three basic components - Bullet or projectile, cartridge case or cartridge shell and primer. These three components are manufactured separately from respective cups and finally assembled in stages and later inspected and qualified.

Here in this Proposal, we are offering the complete lines as noted below:

Production Lines	Calibers	Rate of Production/Line	No. of Lines
Cup Manufacturing Line	For all calibers	Up to 1800 ppm	1
Lead Wire Manufacturing Line	For all calibers	500 kg/hr.	1
Pistol Line	9x19mm	Up to 250 ppm	1
Small Rifle Line	5.56x45mm (M193)	Up to 250 ppm	1

Note: 1. ppm - pieces per minute
2. The above-mentioned production rates are theoretical production rate at 100% efficiency

2.2 CUP MANUFACTURING LINE

Cup manufacturing line for producing case cups and bullet cups involves following systems:

- *Un-coiler & Straightener*
- *Blank & Cup Press (B&C 100/70)*
- *Wash, Rinse & Dry Machine*
- *Annealing Furnace*
- *Pickle, Rinse, Lube & Dry Machine*

2.2.1 Material Data:

Material Description	Thickness	WF Compliance
Copper Alloy No. 260 Copper Alloy No. 220 Copper Alloy No. 210	As Required	Yes

2.2.2 Blank & Cup Press (B&C 100/70)

Waterbury Farrel Blank and Cup Presses are designed to provide good coverage of common press requirements. The press is cam-actuated on the blank slide and crank-actuated on the cupping slide, featuring double action design.

A cam driven slide powers the blanking punch which then serves as a hold down mechanism as the crank-driven cupping punch operates through the center of the blanking punch and forms the cup. Whether for cartridge cases, bullet jackets or primers, multiple row blanking is easily accomplished for significant savings in material costs. Precision slide guidance assures component accuracy for consistently precise finished cartridges.

Recommended Process

The strip is fed from a double coil reel through a stock straightener to the Waterbury Farrel Blank and Cup press. This system uses a double pay-off reel to minimize the coil change over time. A new coil is loaded on the one side while the machine is being supplied with metal on the other side. When a coil is completely used, the operator shuts down the press and rotates the coil reel 180 degrees so that the new coil is in the feed line. The coil is then fed through the straightener to the press feed rolls and the machine resumes the production again. As the coil is very wide and the material flatness is critical to the production tooling, a stock straightener is required between the reel and the press feed rolls.

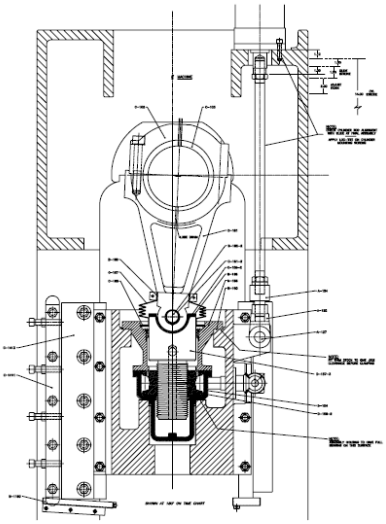
We recommend a beta thickness gauge to be used between the reel and the straightener to ensure that the material supplied to the press meets the tolerance range the tools were designed for. If the tolerance range is surpassed or the material is of poor quality, with lamination or other imperfection, the gauge will pick up the inaccuracy and shuts the press down before damage can be done to the tools.

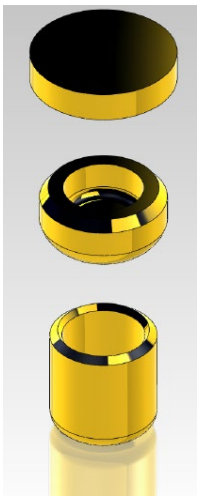
The strip material is drawn into the press by a double roll feed, mounted on the Blank and Cup press and driven by the press main drive.

The Blank and Cup press that we are proposing uses vertical construction. The outer slide, driven by cam has a dwell designed to its motion which performs the blanking and holding operation. Blanking punches serve as a blank hold-down mechanism and are individually adjustable for hold-down pressure when multiple blanking. This Press has a unique design that allows the most precise blank holding control with a minimum of tool complexity. The cams are designed to provide the blanking motion through the outer slide and then in a continuing motion move the blanking punch through the die pushing the sheared blank ahead of it. The blank comes to rest on the draw die held in place by the blanking punch which is now acting as the holding sleeve or pressure pad for the forming operations. The dwell designed into the cam holds the sleeve constant during the drawing operation. This dwell provides ample time to fully draw the metal from under the combination blanking punch and hold-down sleeve.

A crank-actuated center slide carries the cup drawing tools and operates through the center of the combination blanking punch and hold-down.

Action of the press is purely mechanical; no pneumatic or hydraulic pads are required. Full tonnage capacity of the press is available for the work being performed, since no tonnage is needed to overcome the reaction forces of pressure pads.





Once the cup is drawn, the stripper fingers catch the cup rim on the return stroke of the draw punch and the cup is stripped from the punch.

The freed cup drops by gravity down a tube which guides it onto the belt conveyor (not in our scope) mounted below the press bed. An electronic sensing unit checks that the cup has dropped clear of the die to ensure that damage does not occur due to cups caught in the discharge tube. Failure of a cup to drop will stop the press and signal the operator the area of malfunction on a display panel located on the press. The cups are dropped simultaneously onto the belt conveyor and moved out from under the press.

Electronic sensors protect the tooling and the machine. Load cells monitor tooling load and shut off the machine when overloads occur. Crankshaft bearing temperature sensors cause the machine to stop whenever operating temperature is abnormal.

Our newest design maintains stability of all tool modules. Punches and dies are mounted in modularized tool holders, bolted to the machine bed. Modularization of tools permits very fast tool changes. Our equipment is safety interlocked and integrated. Our forming system offers a unique mix of modern, yet industry proven technology, incorporating such advantages as:

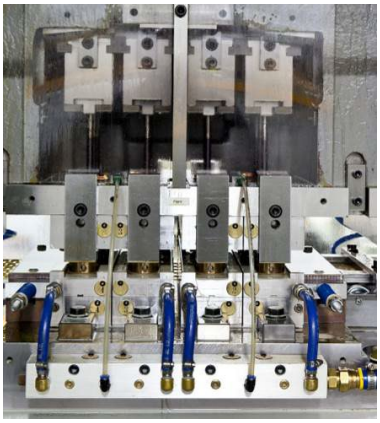
Special Features

Quality with Speed:
The double drawing action of the crank-actuated rams forms a dimensionally consistent cup with precision sidewall tolerances of less than .001 “. Large-sized guides on both rams contribute to this exceptional accuracy. It has precision gibbing for both blanking and cupping slides. Accuracy is of the highest order.

This offered Blank and Cup press uses 10-12 tooling stations to produce 1500 to 1800, 5.56mm cups per minute from .142” thick 70-30 brass sheet. When equipped with 8 tooling stations it will produce 1200, 7.62mm cups per minute.

Material Savings:
The Blank and Cup Press permits multiple-row blanking, which results in significant savings in material costs. Furthermore, may also take advantage of savings on slitting costs from the mill.

Quick Tool Changing & Less Downtime:
The integrated design of the press with tooling has incorporated the tooling quick change mechanism. This helps the interchangeable die-sets, completely pre-assembled outside with tools or individual tooling to be installed in a very short span of time. By testing the preassembled die-sets prior to installation, downtime is reduced considerably, and the need for modifications during operation is eliminated.



Total Production “Package”
Waterbury Farrel’s Tooling Division will design, develop, and fabricate your tooling. When you order both press and tooling together, you have a single source of responsibility for specialized part production.

Versatility

WF Blank & Cup Press can be used for manufacturing cups for all the pistol, small ammunition calibers and some medium caliber bullets and cartridge cases too. Quick interchangeability of die set will allow immediate production of new cups without any significant down time.

Machine Specification - 100/70 Double Action Blank & Cup Press

Frame Type	Straight Side
Type of Drive	Direct Flywheel Drive
Capacity:	
Blanking	100 Tons
Drawing	70 Tons
Blanking Stroke of (Outer Slide)	1½”
Blanking Stroke Position Adjustment (Outer Slide)	2.0”
Blanking Shut height (Outer Slide)	12⅛"
Drawing Stroke (Inner Slide)	4½”
Drawing Stroke Position Adjustment (Inner Slide)	1½”
Drawing Shut height (Inner Slide)	19½”
Stroke per minute (variable)	150
Area of Outer Slide (L-R x F-B)	49” x 20"
Area of Inner Slide (L-R x F-B)	17” x 10¾”
Bolster Area (L-R x F-B)	30” x 24”
Bolster Plate Thickness	4"
Diameter of Main Bearings	7¾"
Diameter of Eccentric Bearings	7¾”
Diameter of Pitman Bearings	7¾"
Diameter of Saddle Bearing	I 3”
Opening in Upright (side column)	14” x 23⅝”
Main Motor - Horsepower	75
Main Motor – Base Speed	850 RPM
Distance from Floor to Bed	38”
Approximate Weight	44,000 #
Opening in Bed (L-R x F-B)	16”x 11
Overall Dimension (L x W x H)	150” x 80” x 162”

100/70 Double Action Blank & Cup Press furnished with variable speed motor drive has following standard features:

- ✓ Variable speed drive
- ✓ Stock lubrication system
- ✓ Positive machine lubrication system
- ✓ Extra-long gibbing-precision tool guidance
- ✓ Special clutch and brake mechanism
- ✓ Roll feed mechanism
- ✓ Scrap chopper
- ✓ Anti-friction bearings on main shafts
- ✓ Cam-driven blank slide for proper timing of hold-down pressure system
- ✓ Excellent access for cup ejection

Electrical equipment shall be to Waterbury Farrel standard specifications. Any other standards will be at additional charge.

Press Frame
The press frame will be a vertical straight side design consisting of four members, a bed, two uprights and a crown. These units are contained as an assembly by means of alloy steel tie-rods

Bed
The bed is constructed of high strength cast iron with deep lateral and longitudinal cross sections that provide maximum strength and rigidity where needed to minimize deflection of accurately machined top surfaces when under full rated press load.

The box section legs are extra wide and long to spread imposed forces over a large area and provide outstanding stability

Uprights
The uprights are stress relieved box sections adequately braced with thick lateral and longitudinal ribs for optimum rigidity and reduction of angular forces transmitted from the slide through the gibbing. The uprights shall be keyed and front-to-back directions.

Crown
The crown is constructed of high strength cast iron that in effect is a mirror image of the bed and provides the same degree of strength and rigidity to absorb crankshaft forces with minimum deflection. Machine lubrication will be contained and redirected to the main storage pump to minimize contamination with the die lubricant.

Tie-Rods
The alloy steel tie-rods are pre-stressed to 150 percent of rated blanking load.

Slides

The eight points square gibbing will fully contain the blanking slide throughout its entire stroke. Bronze wear plates secured to the four corners of the slide will run in accurately machined cast iron ways bolted to the press uprights. A pneumatic counter-balance system will be provided for the blanking slide. The slide is a deep box section casting to assure rigidity and resist deflection under rated loads.

Shut height control of the blanking slide is accomplished by engaging an air operated motor to a geared output shaft. A total adjustment range of two inches is provided as well as at locking system to secure the slide in position upon completion of the adjustment

Shut height control of the draw slide is accomplished by a manual adjustment independent of the blanking slide adjustment.

Shut height indicators for both the blanking and draw slide are provided as well as a cycle position indicator for the blanking slide.

Shut height control as related to equipment maintenance will be accomplished by a fitting plate which is an integral part of the blanking slide. This plate provides the means for establishing the shut height dimension.
Peak strain load monitors will be incorporated onto the side columns to detect blanking and draw loads. This unit will indicate the peak load and sense a catastrophic load failure when loads exceed the limits of the nominal setting.

Main Drive

The main drive is a flywheel direct drive type. The eccentricity is provided by a common crankshaft, which contains two points of suspension for the blanking slide and a single suspension point for the draw slide. The main drive consists of a totally enclosed fan cooled A.C. motor with a variable frequency drive system.

A separate control console containing:

- Run button
- Inch button
- Reverse button
- Top stop button
- Emergency stop button
- Appropriate indicator lights
- Speed Control and Tachometer
- Coolant Switch
- Cycle Counter etc.

Multiple outlets mounted on press for emergency stop circuit
A pneumatic low maintenance multiple disk combination clutch and brake is a single self-contained operating unit. Fewer moving parts and complete synchronization provide efficiency and economy not obtainable with two separate units. The flywheel on the clutch is mounted on tapered roller bearings.

A flywheel brake is provided to automatically stop the wheel through at loss of power or when the main drive motor is shut off.

Bolster Plate
The press bolster plate will be four inches thick and machined to accept the die sets that contain the Tool Set Package.

Die Area
A distribution manifold mounted on the press directs the die lubricant to each die set. Quick disconnects minimize delays when removing a die set.

Material Feed
The press roll feed is capable of handling brass material 0.170” thick by 9” wide. The maximum feed length is 2 inches and the maximum material speed is 300 inches per minute.

The pass line adjustment is plus or minus one inch. The feed cycle is 100^{o} of crank motion

To verify the feed accuracy to within a close tolerance, a spring-loaded pilot pin, mounted on the blanking slide, will probe the skeleton during each press cycle. If the feed length varies beyond prescribed limits, the pilot pin will collapse and generate a top-stop signal for the press. This visual over check will eliminate any large volume of scrap cups being generated due to feed mechanism failures.

This is a pull feed unit. Only a single unit is required to feed strip for this cupping system.

The feed rolls are 4¼ inch diameter by 16-inch face width. They are hardened and chromed finished to assure positive gripping. Both upper and lower rolls are driven. The upper roll hold-down is pneumatically actuated, and a hand actuated valve is provided for manual lifting of this roll.

Scrap Cutting
This is a press driven post-type sized for .170" thick brass up to 10 inches in width. The base and cutting ram are of cast steel. A ball connection drives the operating arm through a connecting rod operated from an eccentric mounted on the press crankshaft.

The cutting blades have four edges and are fabricated from a hi-chrome, hi-carbon steel.
A lateral adjustment is provided for cutting at the narrow section of the skeleton.

Tool Set Design
The Waterbury Farrel tool set concept is designed for minimum operator adjustment requirements through the usage of pre-set die sets. Individual die sets containing the perishable tool components are removed and replaced by the machine operator with ease and minimal effort.

An effective multi-station Tool Set must have minimum "operator-adjustment-interfacing" if quality cups are to be produced. Our design provides this technique and reduces the operator task to a "remove and replace" procedure for sub-assemblies.

Sound/Safety Enclosure Design

The press can be equipped with a sound enclosure designed to reduce resonant noise levels. Constructed of parcel sections, lined with noise abatement material and including exhaust fan venting to reduce ambient temperature, the structure will reduce average noise level readings to 85 DBA. Three critical areas; incoming strip, web scrap ejection and cup ejection points, may exceed the 85 DBA level as these points cannot be practically isolated to eliminate noise escapement while maintaining functionality. The structural design contains appropriate access doors for ease of maintenance and operator convenience. All doors and/or moveable panels will be electrically interlocked to shut down the system when ajar.

Shields and Guarding

The machine shall also incorporate internal shields and guarding as required to protect personnel from moving parts and shall be designed for easy maintenance access. All belts, sheaves, pulleys, couplings or other rotating parts shall be adequately protected by machine guards to protect the operator from contact with moving parts.

Access Doors

All access doors for the enclosure shall be equipped with electrical interlock switches which will result in automatic machine shutdown in the event that any door is opened or removed.

Caliber Change Over

Change over requirements for various caliber cup sizes, necessitates, due to blank diameter and strip web progression differences, new die sets, as well as a new bolster plate. The arrangement for 7.62 mm cups, based on machine capability, permits the production of 8 cups per stroke maximum. The arrangement for 5.56mm cups is set at 10 cups per stroke with added capability for 12 cups per stroke. Additional die sets and bolster plate pricing information can be quoted on request.

Machine Controls & Safety Sensing Systems

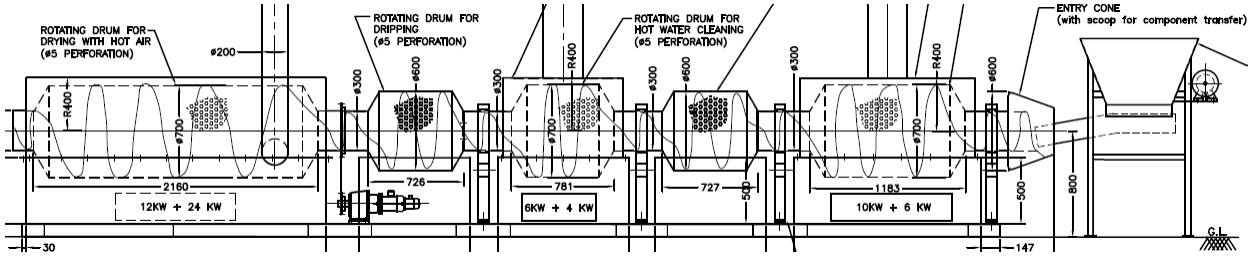
A separate electrical enclosure contains operator ‘s console is included in the offered systems. Press PLC based automation package includes built in brake monitor, counters for strokes, parts etc. including batch presets and total hits-on-a-tool, ethernet compatibility; clutch/brake control, clutch air pressure monitoring, press lube system control, overload control, press variable speed motor speed monitoring & control.

Our equipment is safety interlocked and integrated. Electronic sensors protect the tooling and the machine. Load cells monitor tooling load and shut off the machine when overloads occur. Crankshaft bearing temperature sensors cause the machine to stop whenever operating temperature is abnormal.

A complete set of reproducible drawings of the electrical system is provided.

2.2.3 Wash, Rinse Lube and Dry Machine

A four stage rotary drum machine (WASH, RINSE, LUBE & DRY UNIT) is used for the wash, rinse, lube and dry operations. The parts reach the machine by conveyor and drop directly into the end of the drum. The operations involved are an alkaline wash, a water rinse and a hot air dry.



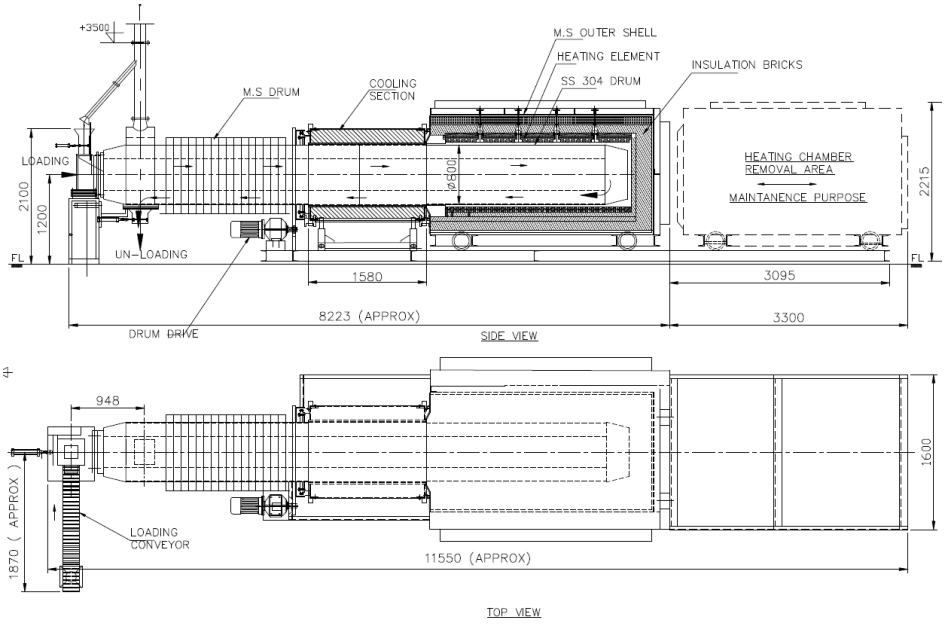
In case of the case cups, the lube section will not be operational. The case cups will only be washed rinsed and dried before it goes to the annealing operation.

But in the case of the bullet cups, the cups will be washed, rinsed, lubed and then hot air dried. The bullet cups need not to go through the annealing and pickling operations.

2.2.4 Annealing Furnace

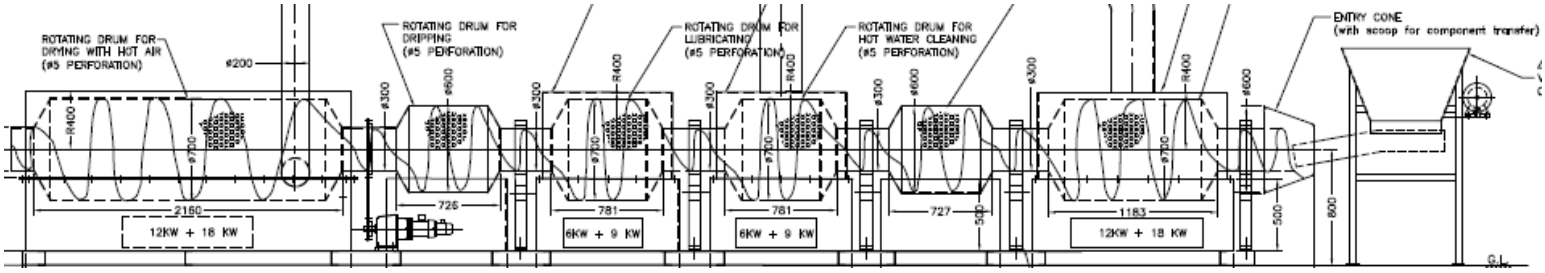
The annealing furnace is an electrical resistance heating furnace either with a continuous metal mesh conveyor belt or a fabricated long drum with an internal screw type auger, with automatic temperature control system. Parts are deposited directly onto the conveyor or at the opening chute of the drum, where they travel into the furnace at a specific speed.

Type:	Electrical
Maximum furnace temp.	1400 degrees F
Normal operating temp.	1025 F ± 10



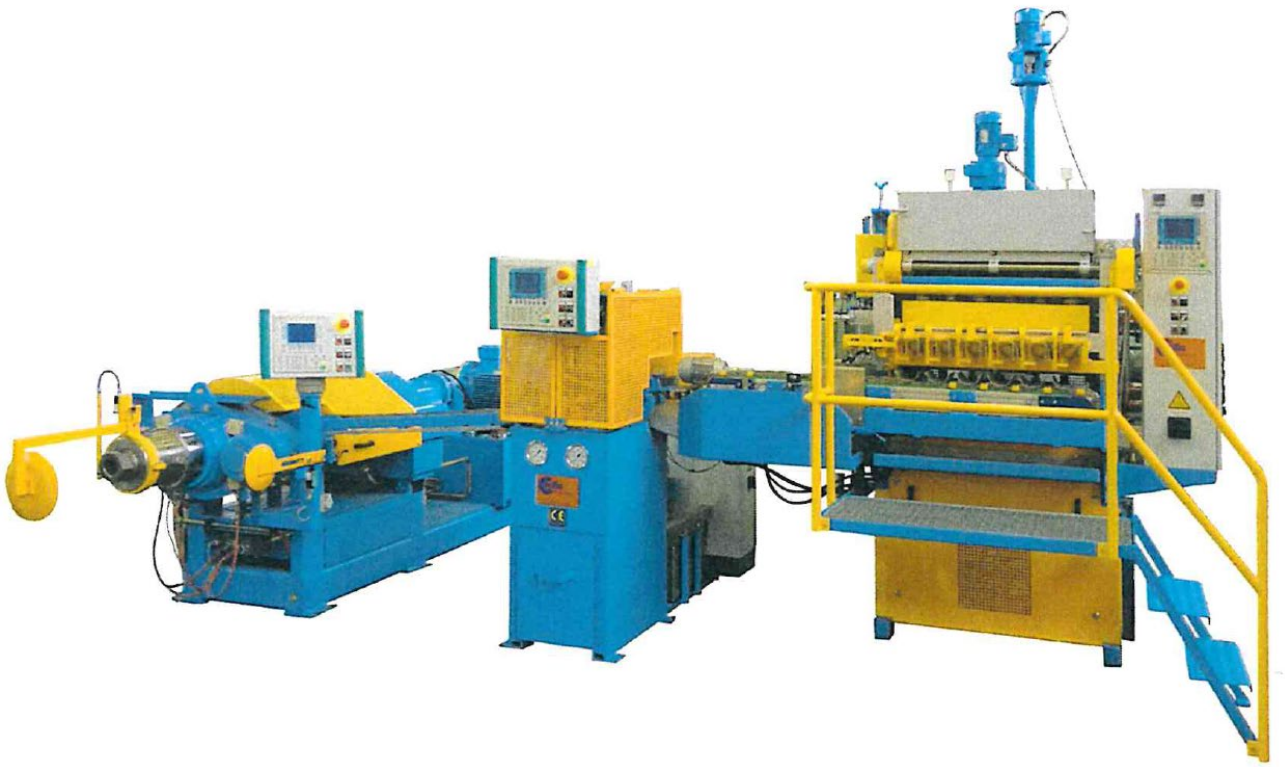
2.2.5 Pickle, Rinse, Lube and Dry Machine

The pickle, rinse, lube and dry unit is designed to process parts through a sulfuric or nitric acid pickle solution, adequate rinsing, a lubricating wash and hot air drying. Hot parts arrive by conveyor at the input hopper which feeds the rotating drum helical conveyor in the machine. The parts pass through a water bath (room temperature) to cool them down to the temperature of the pickle solution (150 to 185 degrees F), which follows. After pickling, the parts pass through two consecutive water rinses (room temperature), then through a hot lubricating wash (140 to 180 degrees F). Hot forced air drying (275 to 300 degrees F) then removes excess wash solution to complete the operation. The temperatures of all heated solutions are maintained automatically by a self-contained temperature controller. Exhaust steam and acid vapor is vented through a fume scrubber to remove the acid vapor from the discharge.



2.3 LEAD WIRE MANUFACTURING LINE

The lead wire manufacturing line consist of electric melting furnace, agitator, lead pump, billet casting machine, billet shear, lead wire extrusion press and spoolers.



Electric Melting Furnace

The furnace is supplied complete and ready for operation with a steel crucible, a manually operated valve in the bottom and mixing blade.

Thermal insulation provides effective heat insulation for the melting furnace. The electrical resistance heating is housed in the jacket; all electrical control elements are housed in a switchbox including a fully automatic temperature control system using a thermocouple and electronic controller for temperatures up to 500˚C. Machines are to operate free of vibrations with a capacity of 265 liter. With a connected load of 75 kW, (with an hourly melting capacity of approx. 1000kg/h).

Agitator

Agitator for the 265 liter melting furnace

Lead Pump

Lead Pump to pump the lead alloys from the melting furnace into the holding furnace of the billet casting machine. The pump runs automatically and is synchronized with the casting installation. It is powered by a frequency controlled electric motor with 0.75 kW power.

Max. delivery:	approx. 200 – 300 kg/min
Max. height:	approx. 2 meters
Max. working temperature:	500 degrees C
Material to be pumped:	Lead and tin-based alloys

Billet Casting Machine

It cast, in one operation, 6 billets of lead alloys, with dimensions of 72mm Ø and 190mm long. The machine comprises a steel housing which supports an electrically heated holding furnace. From this, 6 swiveling ladles fill 6 moulds which are then cooled with water. When ready, the billets are tilted from the moulds in a billet holding device. All 6 billets are placed on the shells of a conveyor belt by means of a pneumatic pushing device. The conveyor belt then transports the billets through a water spray up to the billet shear. The installation has fully automatic control. All operations can be precisely adjusted as required by means of time switches; they operate successively in timed sequence and interlocked. Machine are to operate free of vibration.

Hydraulic pistons, fed by a hydraulic pump with 1.1 kW motor and controlled by solenoid valves control all the operations of the machine. Electronic temperature controllers automatically control the 21 kW electric heating system of the metal holding furnace at temperature up to 600˚C by means of thermocouples.

Billet Shear

Billet shear is used to cut off both ends of the precast 72mm Ø billets to a length of 175mm to remove the oxide skin. A 4 kW electric motor, coupled to a hydraulic high-pressure pump and to an electro-hydraulic control device, drives a hydraulic cylinder for feeding the billets and two hydraulic cylinders for cutting off the billet ends. Machine are to operate free of operation. This is a very quiet, quick and clean machine, it can run synchronously with the automatic extrusion press and the automatic billet casting machine.

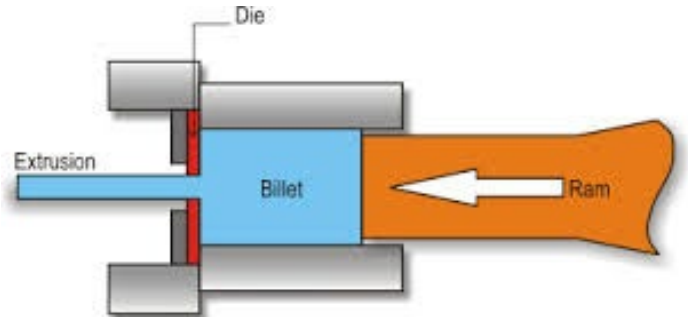
Spooler

An automatic spooler for winding lead and solder wire sections directly from the press or from the wire. Speed is continuously adjustable over a dancer device. Driven by frequency converter 4.5 kW. Machines are to operate free of vibrations.

Drive: 4.5 kW
Weight: appr. 800 kg
Supplied without spools

Lead Wire Extrusion Press

The automatic lead wire extrusion press is designed to extrude and produces lead wire from the lead billet, solid or cored with soldering fluxes. The press is of the 2 column construction, with double-acting hydraulic cylinder and the cross beam which carries the billet receiver.



Total press power	250 tons = 2500 kN
Operating pressure of hydraulics	320 bar
Piston stroke (total)	350mm (175mm extrusion stroke)
Loading capacity of receiver	1 billet measuring Ø 72x175mm long
Heating of receiver	6 kW
With automatic temperature control	
Motor rating	22 kW
Shortest work cycle	2 billets (a 7.60 kg) per minute = 14 kg/min

All tools, such as the receiver, the screw connection at the head, the ram, die-holder, die and feeder for the soldering flux are made from special hot working tool steel. The press is fed with precast billets measuring Ø 72x175mm length. A complete electrical and hydraulic system with solenoid and hydraulic valves, sensors etc. automatically controls the whole work cycle, i.e., the forward and return strokes of the ram and the rapid advance. In addition, sensors stop the forward stroke if there is no billet or if is not positioned correctly. When switched to “Automatic” the ram will move forwards and backwards continuously until the billet magazine is empty. The extrusion speed is variable. At the end of the extrusion stroke, the ram movement is automatically reversed to its starting position, where it is switched to the forward stroke again.

The adequately sized oil tank is equipped with a thermostat for automatic temperature control and an oil circulating pump to force the hydraulic oil continuously through a water-cooled heat exchanger and through a filter for cleaning. Machine are top operate free of vibrations.

The maximum output of the press is approx. by i.e., wire Ø 6mm 500 – 650 kg per hour, depending on the extruded section and the alloy used.

Technical Data

Input Billet Dimension	72mm dia. x 175mm long
Production Capacity	Approx. 500 kg/hr.
Press Tonnage	250 tons
Operating Pressure	320 bar
Motor rating	22kW
Receiver heating power	6kW
Spooler Drive	4.5kW

2.4 BULLET OR PROJECTILE MANUFACTURING

Bullet manufacturing line for pistol caliber (9x19mm) cartridge consists of the following systems:

- *Lead Swaging Machine*
- *Vibro Cleaning & Polishing Machine*
- *Bullet Assembly Machine*
- *Vibro Cleaning & Polishing Machine*

Bullet manufacturing line for small caliber rifle 5.56x45mm(M193) cartridges consists of the following systems:

- *Lead Swaging Machine*
- *Vibro Cleaning & Polishing Machine*
- *Bullet Assembly Machine*
- *Vibro Cleaning & Polishing Machine*
- *Bullet Gauge & Weigh Machine*

2.4.1 Lead Slug Swaging Machine

The Slug Header is a conventional high production crank actuated, single blow header with a proven performance record. Simple low-cost tooling and relatively easy changeover make this an economical machine tool for long run production schedules.

Machine Model	Lead Slug Swaging Machine	Lead Slug Swaging Machine
Wire diameter	0.375”	0.625”
Max. Wire Cutoff Length	7.50”	7.50”
Strokes per minute	250	50
Pieces per minute	250	50
Motor H.P.	5	10

Feed
Two rolls feed wire to an adjustable stop which assures correct length for cutoff. Length of feed is regulated by an adjustable eccentric on the camshaft. The feed may be engaged or disengaged while the machine is running. The roll feed is of the ratchet type design.

Cutoff
A cam actuated cutoff bar contains an open style knife with a spring retainer finger. The cutoff bar is supported in a frame mounted bushing which maintains the knife position flush to the cutoff die so that a clean shear is assured. Cutoff timing is adjustable and an overload safety protects the cutoff mechanism.

Heading Unit

Heading Unit consists of a gate (ram), punch slide on the gate front, punch holder attached to the slide and a slide shifter. The gate is mounted in frame ways on hardened liners. The cam operated punch slide has liberal bearing surfaces and is spring compensated for overtravel. The slide automatically locks in the heading position to assure concentricity of formed parts. The punch holder is readily accessible and easily adjusted in any direction.

Die Knockout – This is a positive cam actuated unit with simple adjustments.

Drive – A V-belt motor drive is provided with a single speed A.C. motor.

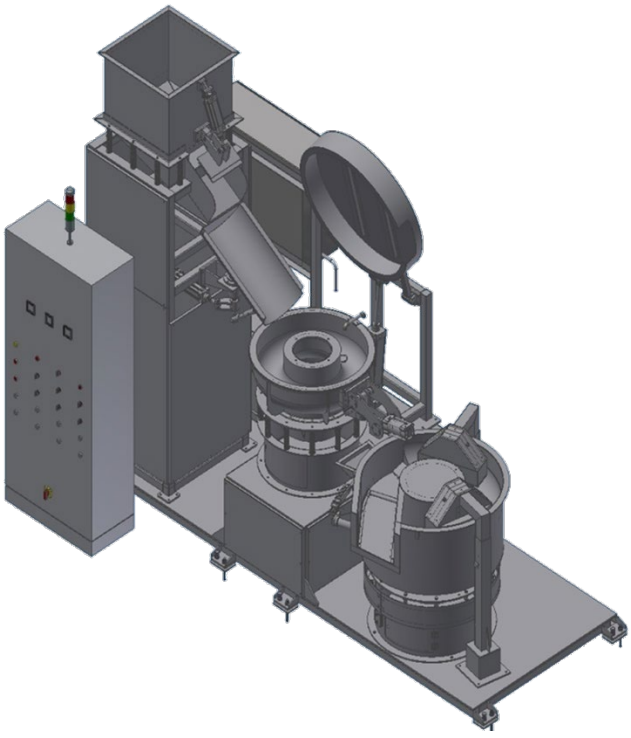
Lubrication – A fully automatic, circulating system with filter and pressure switch is provided.

Payoff Reel – A 300-pound capacity reel is provided.

Tooling – The tooling provided will produce the Filler, Point as per drawing.

2.4.2 Vibro Cleaning and Polishing Machine

A vibratory cleaning and polishing machine will be used for the clean de-burring of the formed lead slug. Machine base is made of heavy steel construction welded for maximum rigidity.

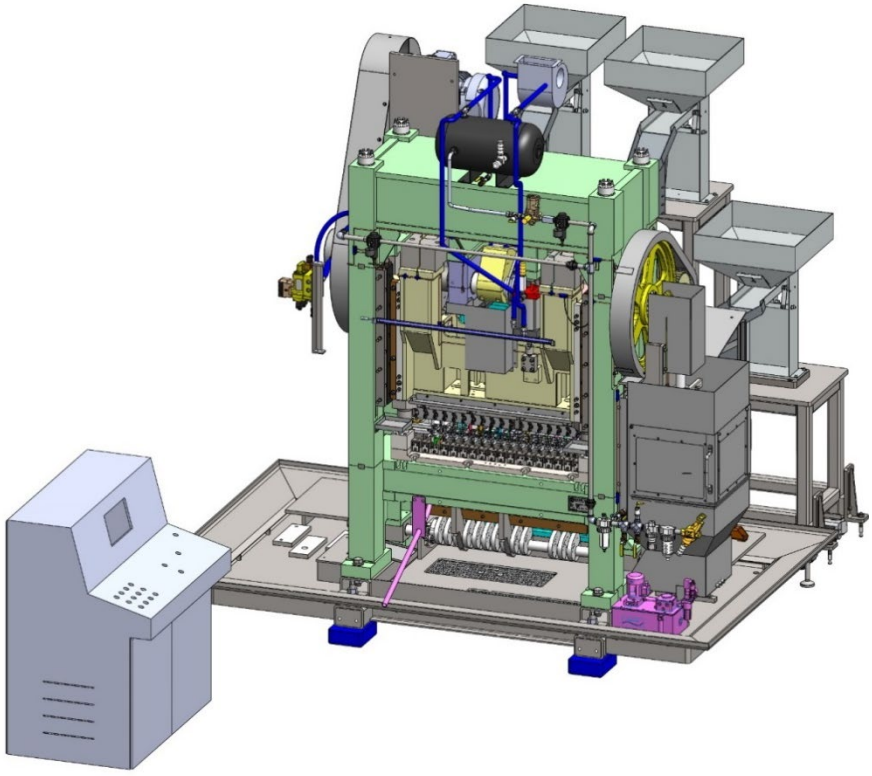


2.4.3 Bullet Assembly Machine

A Waterbury Farrel's specialized Bullet Assembly Machine for manufacturing bullets for the small ammunition has a well-earned reputation for developing innovative and productive equipment as required in ammunition industry.

Waterbury Farrel Bullet Assembly Machine performs operations such as feeding cups, draws, redraws, pointing, insert lead core, tapering, canneluring etc. in one continuous, uninterrupted cycle to produce complete 9mm and 5.56mm bullets. A single machine does the entire job. You start with cups and proceed to the finished bullets. These parts go through many operations without materials handling or transporting to waste time and labor. One operator can oversee several machines.

Our design efforts to modularize these functional units on transfer presses have simplified retooling the presses for subsequent jobs. The latest step in this trend is a new design of transfer press that uses modularized die set with quick change tooling rather than has each station of the press fitted out with individual punch and die holders.

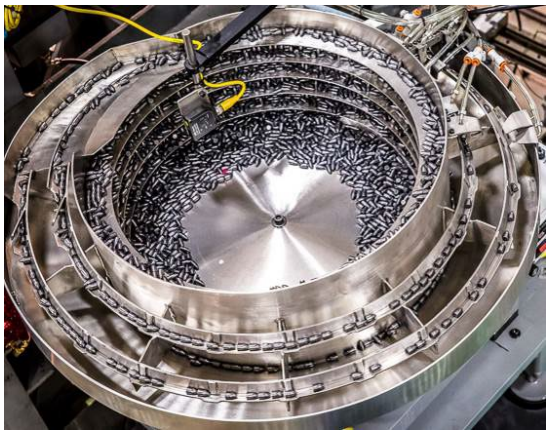


The concept starts with a basic machine, adds a stripper relief mechanism above the platen, a knockout drive system below, blank holders above actuated from below (if required) - all of which are modules of the press. Then the die set containing only the punches, holders and dies for each specific job is necessary. With all the modules in place, the machine is then guarded for protection of personnel.

The base machine is the die set transfer press, which improves upon the basic simplicity of a straight-side press. Its cam-driven solid gate and integrated transfer mechanism provide the positive part control that can only be found in the Waterbury Farrel design. It also has built-in provisions for integrating knock out cams, punch strippers as off-the-shelf subassemblies. This integrated, modular concept provides a true transfer press of unique design. Its speed and capability cannot be duplicated by retrofitting a transfer mechanism to a conventional press, regardless of how much you may spend in the attempt.

Recommended Process for Pistol Bullets

The preformed cups are fed through a vibratory cup feeder to the first station of the Waterbury Farrel Bullet Assembly Machine. The cup will be properly inserted into a finger to feed into the second station for the first draw. Further the formed cups are automatically inserted into the fingers on the carry bar at stations three. Each stroke of the machine advances the component for draw, re-draws, feeding the slug, trimming, sizing, etc. as required for the forming series and finally the assembled bullet can be ejected / discharged up to the final station.



This offered process also includes two (2) vibratory bowl feeder units for feeding the copper cups and lead slug to the appropriate workstation of our proposed Bullet Assembly Machine.

Stainless steel vibratory bowls are provided to supply oriented cups or lead slugs. This bowl has its own supply hopper located adjacent to the bowl. The supply hopper will automatically provide components as required by the bowl. This bowl and storage hopper are located on a common base and supported by a floor-mounted pedestal so that a discharge tube or chute will deliver the oriented components to the appropriate insertion station on the die set.

These units are located externally of the machine enclosure. The supplying of components to these storage hoppers is the responsibility of the buyer.

Sequence of Operations:

Station 01	-	Insert Oriented Cup into the Transfer Slide
Station 02	-	Draw
Station 03	-	Qualify
Station 04	-	Trim
Station 05	-	Insert Lead Slug
Station 06	-	Seat Lead Slug
Station 07	-	Fold
Station 08	-	Finish Fold
Station 09	-	Size & Eject

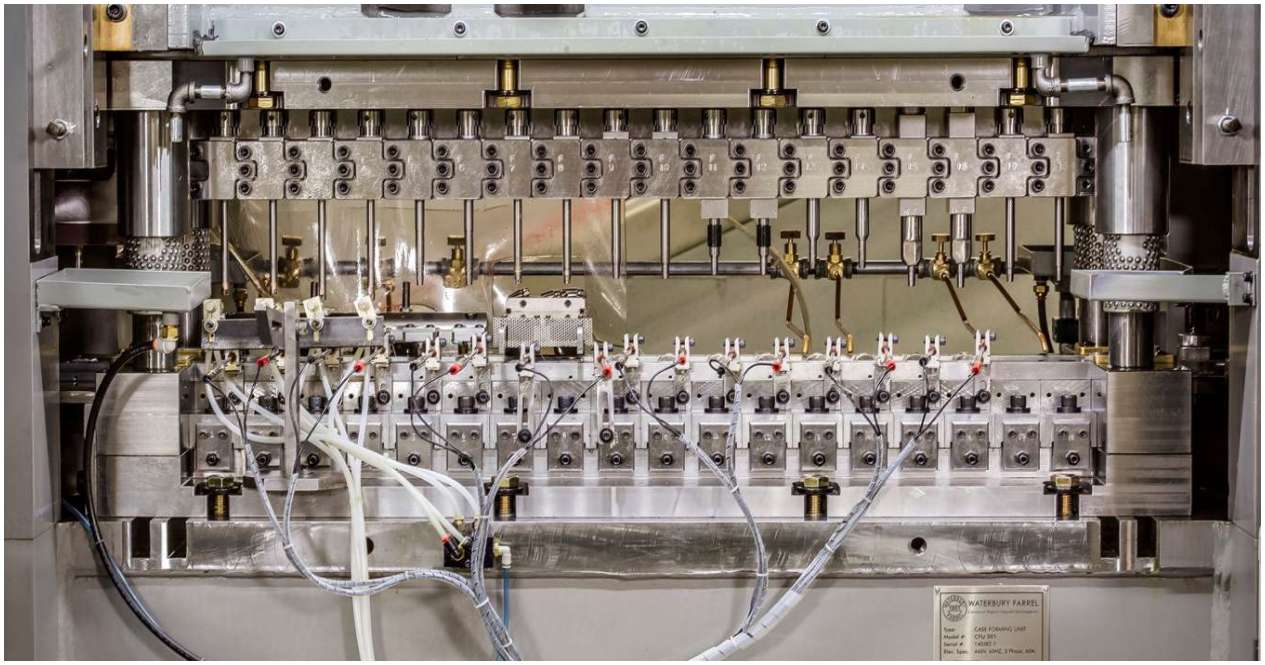
(This is only a preliminary sequence of operation. A final sequence of operation shall be prepared and supplied to you during the final acceptance.)

Recommended Process for Rifle Bullets

The preformed cups are fed through a vibratory cup feeder to the first station of the Waterbury Farrel Bullet Assembly Machine. The cup will be properly inserted into a finger to feed into the second station for the first draw. Further the formed cups are automatically inserted into the fingers on the carry bar at stations three. Each stroke of the machine advances the component for draw, re-draws, pointing, feeding the slug, trimming, boat tailing, sizing, cannelure etc. as required for the forming series and finally the assembled bullet can be ejected / discharged at the last working station.

This offered process also includes two (2) component orientor-feeder units for feeding the cup and the lead slug to the appropriate workstation of our proposed Bullet Assembly Machine.

Stainless steel vibratory bowls are provided to supply oriented components like cups and lead slugs. This bowl has its own supply hopper located adjacent to the bowl. The supply hopper will automatically provide components as required by the bowl. This bowl and storage hopper are located on a common base and supported by a floor-mounted pedestal so that a discharge tube or chute will deliver the oriented components to the appropriate insertion station on the die set.



These units are located externally of the machine enclosure. The supplying of components to these storage hoppers is the responsibility of the buyer.

Waterbury Farrel proposed offer for manufacturing bullets using the Bullet Assembly Machine is capable of making up to 125 parts per minute.

Sequence of Operations:

Station 01	-	*Insert Oriented Cup*
Station 02	-	*Draw*
Station 03	-	*Re-Draw*
Station 04	-	*First Pointing*
Station 05	-	*Second Pointing*
Station 06	-	*Third Pointing*
Station 07	-	*Fourth Pointing*
Station 08	-	*Pinch Trim*
Station 09	-	*Feed Lead Core*
Station 10	-	*Check the presence of Lead Core*
Station 11	-	*Idle*
Station 12	-	*Idle*
Station 13	-	*First Boat Tail*
Station 14	-	*Second Boat Tail*
Station 15	-	*Sizing*
Station 16	-	*Cannelure*
Station 17	-	*Size & Eject*
Station 18	-	*Idle*

(This is only a preliminary sequence of operation. A final sequence of operation shall be prepared after the tooling & layout design.)

Machine Specification - Bullet Assembly Machine

Machine Specification Number	BAM 301/302
Capacity at 1/2” above bottom	30 tons
Strokes per minute, variable	100 - 125
Stroke of slide	3.0”
Shut Height	13.75”
Maximum Tonnage per Station	10
Floor space, *L-R x F-B*	120” x 70”
Overall height	112”
Power requirements	As per customer requirement
Air requirements	80 PSI

Note: The total tonnage for all stations not to exceed designated tonnage. The maximum tonnage per station is provided for reference only. Actual load limitations are a function of tool design & forming sequence.

Frame

One-piece welded steel construction; stress relieved. Precision machining of this unit provides the base line for system accuracy.

Gibbing

Guidance is established by means of precision 90° ways in the back and 45° ways in the front. These ways have a fluorocarbon layer bonded to the gibbing base that provides a guidance surface which exhibits an extremely low coefficient of friction with wear resistance characteristics that surpass the conventional bronze liners.

Camshaft

Dual driver cams mounted on this shaft provide the special slide motions developed for our transfer presses.

Clutch

A combination multiple disk friction clutch and brake is a single self-contained air-operated unit. Air pressure activates the clutch through solenoid valves while the braking action is automatically performed by springs whenever the clutch is disengaged.

Flywheel brake

Solenoid valve operated and interlocked to automatically engage upon motor stop or emergency stop commands.

Machine Lubrication

A re-circulating positive lubrication system provides a continuous metered high-pressure flow of oil to all bearings and gibbing. A pressure switch provides central indication at the operator console of system blockage, low reservoir level, pump or motor failure.

Main Drive

The motor is a totally enclosed fan-cooled A.C. unit.

Die Lubricant

A metered flood lube system will be provided to lubricate the components at all the working stations.

Pneumatics

Exhaust silencer, lubricator filter, regulator, gage and pressure switch are provided. Counter-balancer system includes surge tank, regulator and gage.

Enclosure

A total enclosure is provided which contains a sound absorbent material to minimize the sound level emitted by this machine.

Shields and Guarding

The machine shall also incorporate internal shields and guarding as required to protect personnel from moving parts and shall be designed for easy maintenance access. All belts, sheaves, pulleys,

couplings or other rotating parts shall be adequately protected by machine guards to protect the operator from contact with moving parts.

Access Doors

All access doors for the enclosure shall be equipped with electrical interlock switches which will result in automatic machine shutdown in the event that any door is opened or removed.

Machine Controls

The machine controls are provided with 110/220-volt control circuitry. The electrical enclosure can be machine-mounted or stand-alone and also contains the operator‘s console.

Press Automation Center package is PLC based system which includes built in brake monitor, counters for strokes, parts etc. including batch presets and total hits-on-a-tool, ethernet compatibility; clutch/brake control, clutch air pressure monitoring, press lube system control, die protection control, press variable speed motor speed monitoring & control.

Part Transfer Monitor

A monitoring system is provided to sense the transfer of components between workstations. This system provides a high degree of protection for the equipment and tooling and assures that a proper transfer function is completed during each press cycle. Should a fault occur, the equipment will automatically shut down in the same machine cycle to minimize tool damage.

Side Shaft Safety Clutch

A side shaft safety clutch is also provided that will protect the press drive system if a tool fault occurs that restricts the normal transfer slide motion.

Stripper Arms with a Relief Motion

Stripper arms with a relief motion are provided at the draw stations to ensure that the formed components are securely positioned in the transfer fingers and safely transported to the next workstation.

Component Feeders

Two vibratory bowls are provided to supply oriented components for bullet jacket cups and lead slugs. Each bowl is located on its own floor-mounted pedestal so that a discharge tube or chute will deliver the oriented components to the appropriate insertion station on the die set.

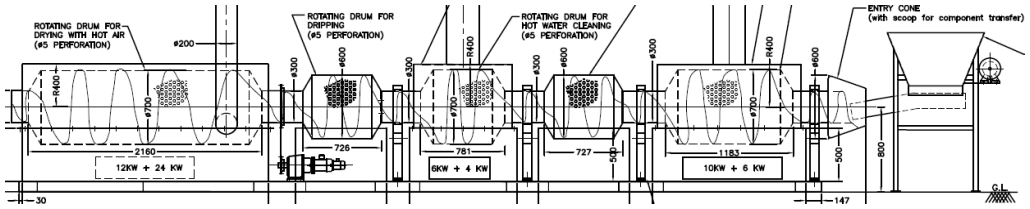
Tool Design

A four-post die set will contain the contact tooling and transfer slide. One complete Die Set assembly consists of Die Set, Punch and Die Holders, Blanking Station, Transfer Slide and Fingers, Stripper Levers shall be supplied with this press.

Complete Bullet Assembly Machine Tooling Program as required are quoted in this offer.

2.4.4 Wash Rinse & Dry Machine

A rotary drum machine (WASH, RINSE, DRY UNIT) is used for the wash, rinse and dry operations. The parts reach the machine by conveyor and drop directly into the end of the drum. The interior is in the form of a helix or propelling screw running the entire length of the drum. This results in the continuous forward movement of the parts through the machine as the drum revolves. As the parts pass through the first part of the drum, they are spray washed by a heated alkaline solution (160-180 degrees F). As the drum revolves, the parts pass through a perforated section and the solution drains back into a holding tank. The same action occurs as the parts pass through the next portion of the drum where they are sprayed with re-circulated and heated rinse water (160-180 degrees F).

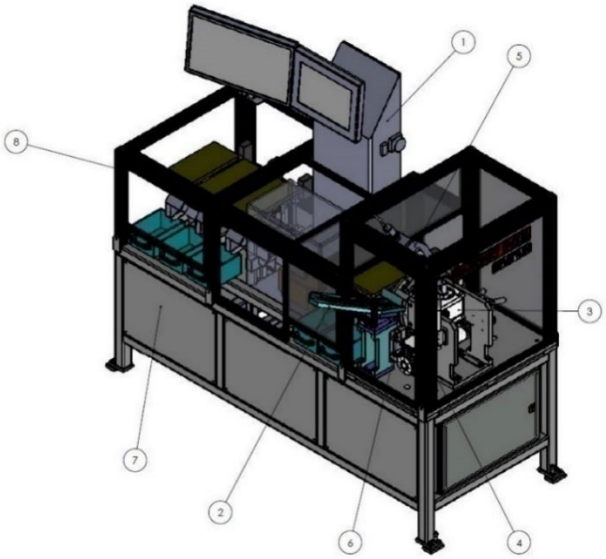


2.4.5 Bullet Gauge and Weigh Machine

The bullet gauge machine has been designed to automatically gauge all the critical dimensions of the finished bullets. This machine is capable of detecting the specified defects and rejecting bullets which do not meet acceptable limits. All bullets which are not within the accepted tolerance are rejected and segregated into groups determined by which dimension is out of tolerance. The offered gauge machine is equipped with multiple rotary turrets connected with transfer wheels and an attached conveyor-based weigh scale system for continuous weighing of bullets. The machine runs on a continuous and smooth motion allowing accurate gauging/measurements without any interruption. The machine provided with different types of sensing system like inductive/capacitive sensors for go or no-go checking, analog sensors for measuring and electromagnetic force restoration (EMFR) load cell for weighing. The maximum theoretical capacity of the offered machine is 250 pieces/minute.

The parameters checked are:

- Total Length - High & Low
- Outside diameter - High & Low
- Cannelure Diameter - High & Low
- Weight



2.5 CARTRIDGE CASE MANUFACTURING

Pistol (9x19mm) cartridge case manufacturing involves following systems:

- *Case Forming Unit*
- *Wash, Rinse & Dry Machine*
- *Head Turning & Mouth Reaming*
- *Vibro Wash & Polishing*
- *Case Gauge Machine*

Small Rifle (5.56x45mm) cartridge case manufacturing involves following systems:

- *Initial Forming Unit*
- *Wash, Rinse & Dry Machine*
- *Annealing Furnace*
- *Pickle, Rinse & Dry Machine*
- *Final Forming Unit*
- *Wash, Rinse & Dry Machine*
- *Head Turning & Mouth Reaming*
- *Mouth Annealing*
- *Low Temperature Annealing*
- *Case Gauge Machine*
- *Visual Inspection Machine – Case*

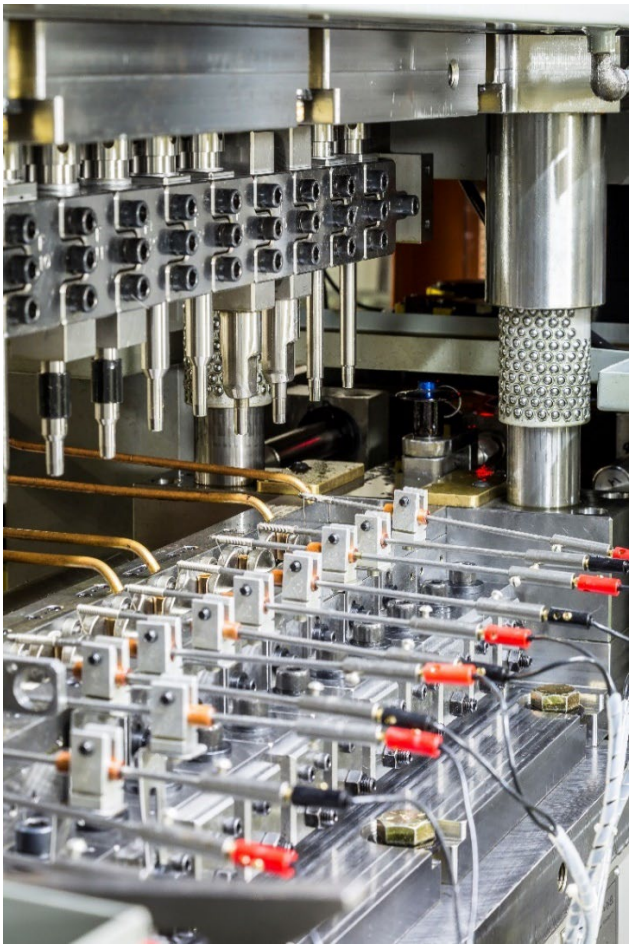
2.5.1 Case Forming Unit for Pistol (9x19mm)

This machine processes annealed brass cups through operations as specified below in preparation for the machining of the groove and other subsequent operations. The Cam Operated Draw Press accepts properly oriented cups (base down) from a bulk storage orientor-feeder via feed tracks. This press performs forming operation as shown above using 9 double stations.

Cups are automatically inserted into the fingers on a carry bar at the first stations. Each stroke of the machine advances the cups to first draw, then second draw, score, trim, swage, pierce, stamp and taper. The parts are then ejected and send to the head turner for the final machining operation.

Our design efforts to modularize these functional units on transfer presses have simplified retooling the presses for subsequent jobs. The latest step in this trend is a new design of transfer press that uses modularized die set with quick change tooling rather than has each station of the press fitted out with individual punch and die holders.

Waterbury Farrel proposed Case Press using double tooling is capable of producing up to 250 parts per minute.



Cartridge case manufacturing involves following sequences of process operation:

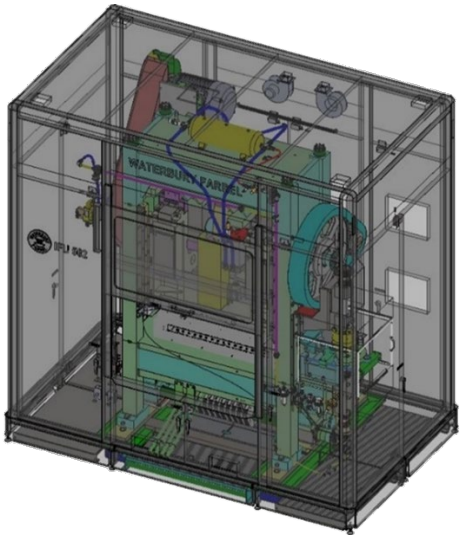
1. *Load the annealed cup*
2. *First draw*
3. *Second draw*
4. *Scour for trim*
5. *Pinch trim*
6. *Swage & extrude the primer pocket*
7. *Pierce the primer hole*
8. *Letter stamp*
9. *Taper & eject*

Cups are automatically inserted into the fingers on a carry bar at the first stations. Each stroke of the machine advances the cups to first draw, then second draw, then third draw and trimming. The trimmed parts are then ejected. The offered CFU with tooling is capable of manufacturing two parts per stroke to produce a theoretical maximum of 250 parts per minute.

2.5.2 Initial Forming Unit for Small Rifle (5.56mm)

This machine processes annealed brass cups through operations as specified in preparation for the final forming operations. The Cam Operated Draw Press (Initial Forming Unit) accepts properly oriented cups (base down) from a bulk storage orientor-feeder. This press performs two draws, qualify, trim and then ejects the pre-finished cartridge case component onto a conveyor at continuously variable speeds for further processing operations.

Cups are automatically inserted into the fingers on a carry bar at the first stations. Each stroke of the machine advances the cups to first draw, then second draw, then third draw and trimming. The trimmed parts are then ejected. The offered IFU with tooling is capable of manufacturing two case component per stroke to produce a maximum of 250 case components per minute.



IFU Sequence

IFU - Sequence of Operation

1. Cup Loading
2. 1st draw
3. 2nd draw
4. Trim Square
5. Trimming & Ejecting

Machine Specification

Machine	CFU	IFU / FFU
Camshaft diameter at main bearings	3.50”	5.50”
Strokes per minute, variable	125	120
Stroke of slide	4.5”	5.5”
Slide area, *Left-Right x Front-Back*	35” x 12”	54.5” x 13.5”
Bed and bolster area, *Left-Right x Front-Back*	45” x 15”	60” x 30”
Bolster Plate thickness	2.50”	2.50”
Net die space, shut height	13.75”	16.375”
Distance from floor to bed	40.00”	47.00”
Net weight of press, approx., (lbs.)	22,000	34,000
Floor space, *Left-Right x Front-Back*	120” x 70”	152” x 89”
Overall height	112”	151”
Power requirements	As per customer requirement	As per customer requirement
Horsepower	20 HP	40 HP
Air requirements	80 PSI	80 - 90 PSI 290 LPM

Case Forming Units are furnished with variable speed motor drive including the following listed details:

- ✓ Frame and Pedestal
- ✓ Crankshaft
- ✓ Transfer Drive and Cam
- ✓ Motor Drive
- ✓ Pneumatics
- ✓ Lube System
- ✓ Cam Limit Switches
- ✓ Safety Interlocks
- ✓ Complete Shields & Guarding
- ✓ Cup/Component Feed
- ✓ Tool Coolant System
- ✓ PLC Control System

Frame

One-piece welded steel construction; stress relieved. Precision machining of this unit provides the base line for system accuracy.

Gibbing

Guidance is established by means of precision 90° ways in the back and 45° ways in the front. These ways have a fluorocarbon layer bonded to the gibbing base that provides a guidance surface which exhibits an extremely low coefficient of friction with wear resistance characteristics that surpass the conventional bronze liners.

Camshaft
Dual driver cams mounted on this shaft provide the special slide motions developed for our transfer presses.

Clutch
A combination multiple disk friction clutch and brake is a single self-contained air-operated unit. Air pressure activates the clutch through solenoid valves while the braking action is automatically performed by springs whenever the clutch is disengaged.

Flywheel brake
Solenoid valve operated and interlocked to automatically engage upon motor stop or emergency stop commands.

Machine Lubrication
A re-circulating positive lubrication system provides a continuous metered high-pressure flow of oil to all bearings and gibbing. A pressure switch provides central indication at the operator console of system blockage, low reservoir level, pump or motor failure.

Main Drive
The motor is a totally enclosed fan-cooled A.C. unit.

Die Lubricant
A metered flood lube system will be provided to lubricate the components at all the working stations.

Pneumatics
Exhaust silencer, lubricator filter, regulator, gage and pressure switch are provided. Counter-balancer system includes surge tank, regulator and gage.

Enclosure
A total enclosure is provided which contains a sound absorbent material to minimize the sound level emitted by this machine.

Shields and Guarding

The machine shall also incorporate internal shields and guarding as required to protect personnel from moving parts and shall be designed for easy maintenance access. All belts sheaves, pulleys, couplings or other rotating parts shall be adequately protected by machine guards to protect the operator from contact with moving parts.

Access Doors

All access doors for the enclosure shall be equipped with electrical interlock switches which will result in automatic machine shutdown if any door is opened or removed.

Machine Controls

The machine controls are provided with 110/220-volt control circuitry. The electrical enclosure can be machine-mounted or stand-alone and contains the operator ‘s console.

Press Automation Center package is PLC based system which includes built in brake monitor, counters for strokes, parts etc. including batch presets and total hits-on-a-tool, ethernet compatibility; clutch/brake control, clutch air pressure monitoring, press lube system control, die protection control, press variable speed motor speed monitoring & control.

Part Transfer Monitor

A monitoring system is provided to sense the transfer of components between workstations. This system provides a high degree of protection for the equipment and tooling and assures that a proper transfer function is completed during each press cycle. Should a fault occur, the equipment will automatically shut down in the same machine cycle to minimize tool damage.

Side Shaft Safety Clutch

A side shaft safety clutch is also provided that will protect the press drive system if a tool fault occurs that restricts the normal transfer slide motion.

Stripper Arms with a Relief Motion

Stripper arms with a relief motion are provided at the draw stations to ensure that the formed components are securely positioned in the transfer fingers and safely transported to the next workstation.

Component Feeders

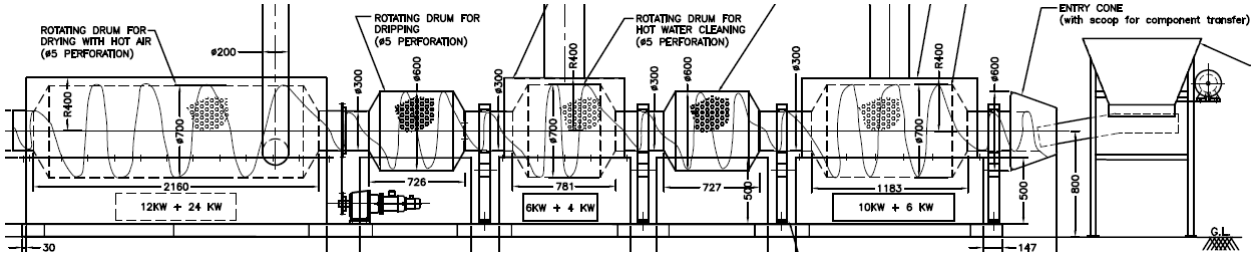
Two rotary bowl feeders is provided with the offered system for feeding case cups.

Tool Design

A four-post die set will contain the contact tooling and transfer slide. One complete Die Set assembly consists of Die Set, Punch and Die Holders, Blanking Station, Transfer Slide and Fingers, Stripper Levers shall be supplied with this press.

2.5.3 Wash, Rinse and Dry Machine

A rotary drum machine (WASH, RINSE, DRY UNIT) is used for the wash, rinse and dry operations. The parts reach the machine by conveyor and drop directly into the end of the drum. The operations involved are an alkaline wash, a water rinse and a hot air dry.



2.5.4 Annealing Furnace

The annealing furnace is an electrical furnace with a continuous metal mesh conveyor belt and automatic temperature control. Parts are deposited directly onto belt conveyor, where they travel into the furnace at a speed of five inches per minute.

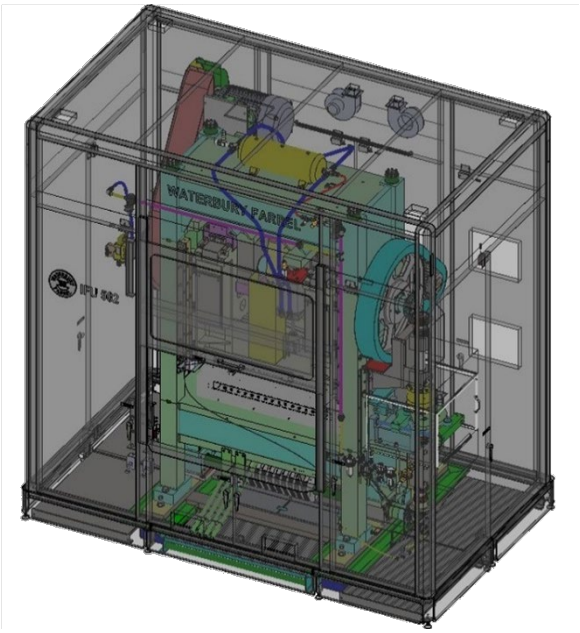
Type: Electrical
Maximum furnace temp. 1400 degrees F

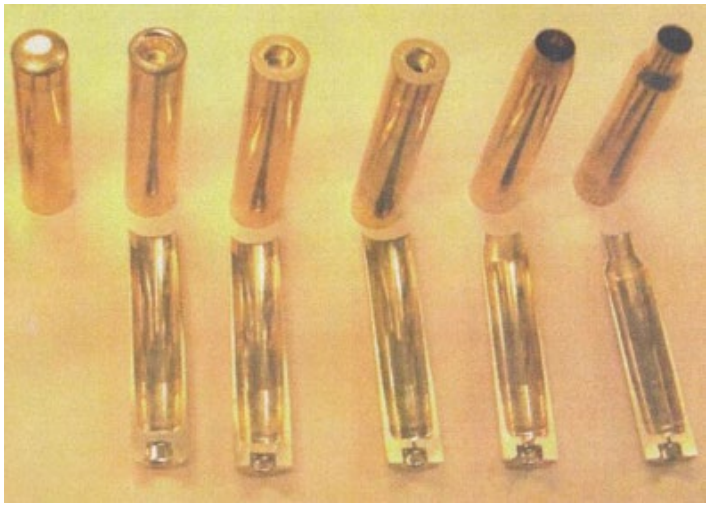
2.5.5 Pickle, Rinse and Dry Machine

The pickle, rinse and dry unit is designed to process parts through a sulfuric or nitric acid pickle solution, adequate rinsing and hot air drying. Hot parts arrive by conveyor at the input hopper which feeds the rotating drum helical conveyor in the machine. The parts pass through a water bath to cool them down to the temperature of the pickle solution, which follows. After pickling, the parts pass through two consecutive water rinses then through a hot lubricating wash. Hot forced air drying removes excess wash solution to complete the operation.

2.5.6 Final Forming Unit for Small Rifle (5.56mm)

This machine processes annealed, pickled, washed and dried pre-finished case components manufactured from the IFU through operations as specified in preparation for the final forming operations. The Cam Operated Draw Press (Intermediate Forming Unit) accepts properly oriented annealed case components from the IFU (base down) from a bulk storage orientor-feeder. In this press, the mouth of each part is shaped and qualified, primer pocket and the head are formed, identification markings are stamped, head is pierced, mouth of the case is tapered followed by sizing of the mouth to the correct diameter before ejecting parts onto a conveyor out of the press to further processing and manufacturing operations.

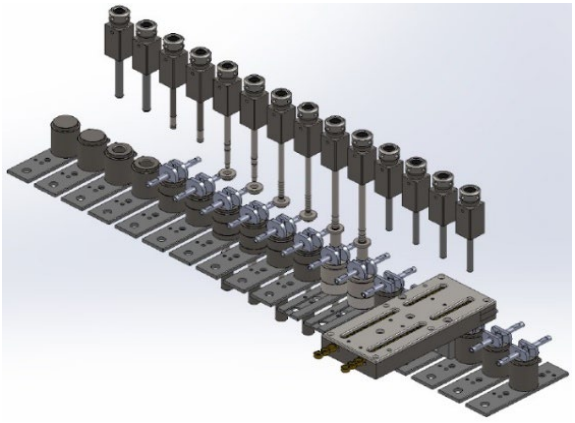




FFU Sequence

FFU - Sequence of Operation

1. Case Component Loading
2. 1st Bunting (Pocketing)
3. 2nd Bunting (Pocketing) and Letter Stamping
4. Fire Hole Piercing
5. Pierce Checking
6. 1st Necking & Tapering
7. 2nd Necking & Tapering
8. Sizing & Ejecting



The offered FFU with tooling is capable of manufacturing two case component per stroke to produce a maximum of 250 case components per minute.

Base machine specification of FFU is same as IFU as mentioned above.

2.5.7 Low Temperature Annealer

This stress reliever or a low temperature annealer helps to release the internal stresses of the case to enable it to have a higher shelf life. The offered electrical, low temperature annealing furnace, is equipped a continuous metal mesh conveyor belt and automatic temperature control.

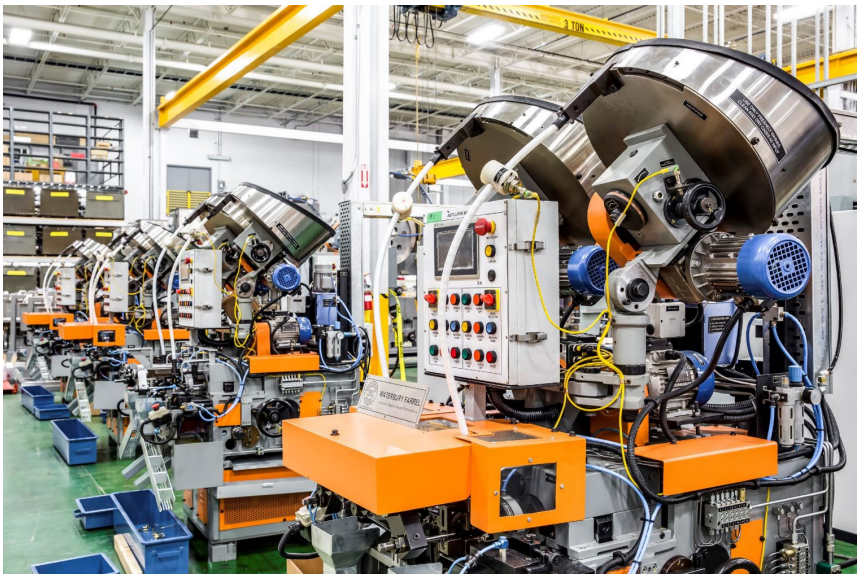
Type:	Electrical
Maximum furnace temp.	750 ºF
Operating temp.	300ºF to 600 ºF ± 10
Temp. Variation	±10F

2.5.8 Wash, Rinse and Dry Machine

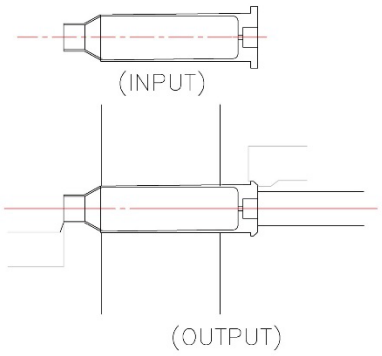
A rotary drum machine (WASH, RINSE, DRY UNIT) is used for the wash, rinse and dry operations. The parts reach the machine by conveyor and drop directly into the end of the drum. The operations involved are an alkaline wash, a water rinse and a hot air dry.

2.5.9 Head Turning and Trimming Machine

The head turning and trimming machine allows the turning of the extraction groove of cases for the automatic weapons as well as their setting to length & reaming of the case. This machine has been designed to avoid any hazard of chip and scrap presence into the machined cases.



The machine consists of a rigid fabricated base with an integrated coolant tank. The automatic rotary hopper with the loading system loads the oriented case for the head turning and mouth trimming. A swiveling mechanism is used to turn the case from a vertical position for its transfer.

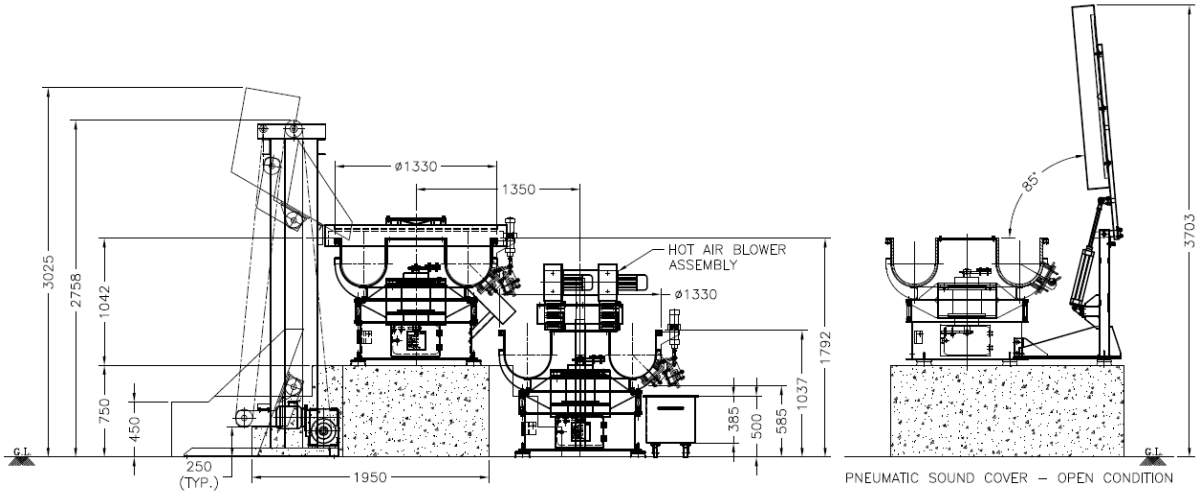


The case is pushed by a cam operated pusher against the inside taper of the rotating die, housed in a spring-loaded slide. The pusher is stopped against a mechanical stopper to a fixed position, so as the front face of the case is always held at a fixed axial position. The tool slides for grooving and mouth trimming are positioned in a fixed axial. This system accommodates to a reasonable extent the variation in the head flange position with respect to taper on case.

Description	Specification
Connected Power	13.5 HP
Compressed Air	70 PSI

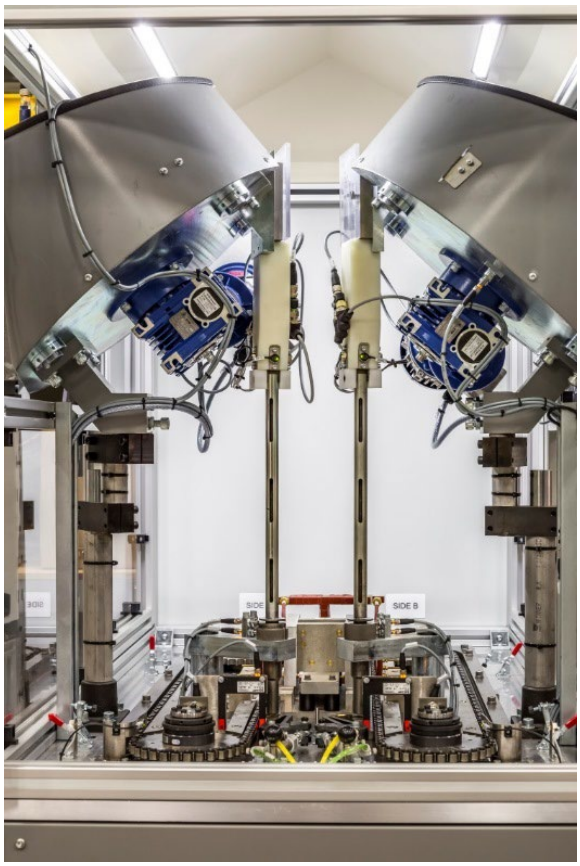
2.5.10 Vibro-Wash & Polishing

The offered system is a vibratory polishing machine combined with passivation and drying systems. It includes three pumps for dosing for different chemicals and water and a hot air dryer stem for the drying of the polished and passivated cases. It also equipped with automatic feeding system for the cases.



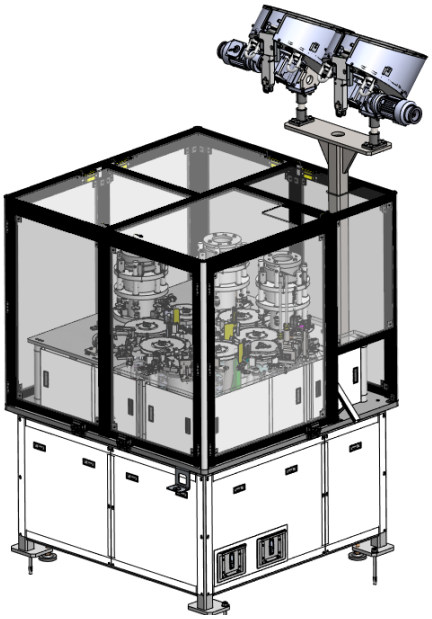
2.5.11 Mouth & Neck Annealer / Body Annealer

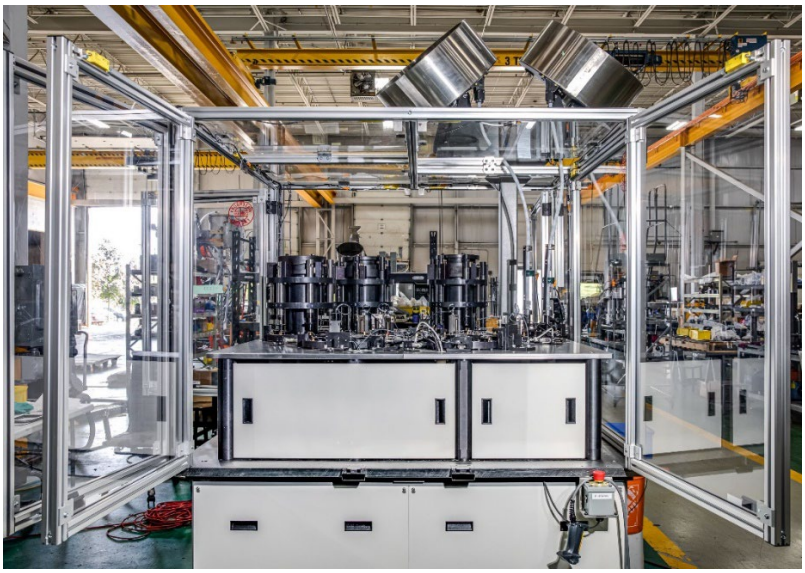
An induction based annealer shall be provided for the mouth annealing for the cases coming out of the head turning and trimming machine. A water-cooled generator provides the excitation for the induction coils for this mouth and neck annealer. Cartridge cases pass through the coils where they are rapidly heated to anneal the mouth and neck of the cartridge case to approximately 1/8-inch below the shoulder. The machine provides individual rotary motion to each case while passing through the linear feeding system of the annealer.



2.5.12 Case Gauge Machine

The case gauge machine has been designed to automatically gauge all the critical dimensions of the finished cartridge cases. This machine is capable of detecting the specified defects and rejecting cartridge cases which do not meet acceptable limits. All cartridge cases which are not within the accepted tolerance are rejected and segregated into groups determined by which dimension is out of tolerance. The offered case gauge machine is equipped with seven rotary turrets connected with transfer wheels. The machine runs on a continuous and smooth motion allowing accurate gauging/measurements without any interruption. The machine provided with different types of sensing system like inductive/capacitive sensors for go or no-go checking, analog sensors for measuring and vision system for flash hole checking. The maximum theoretical capacity of the offered machine is 250 pieces/minute.



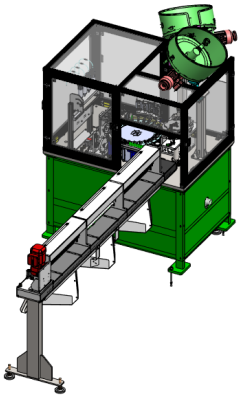


Sequence of Operations:

- Case feed
- Case Height Check
- Rim Height Check
- Rim diameter check
- Groove diameter check
- Flash hole check
- Mouth inside diameter check
- Primer pocket diameter check
- Primer pocket depth check
- Length to shoulder check
- Full form check
- Eject of all qualified cases
- Reject recoverable cases
- Reject scrap cases

2.5.13 Visual Inspection Machine – Cases

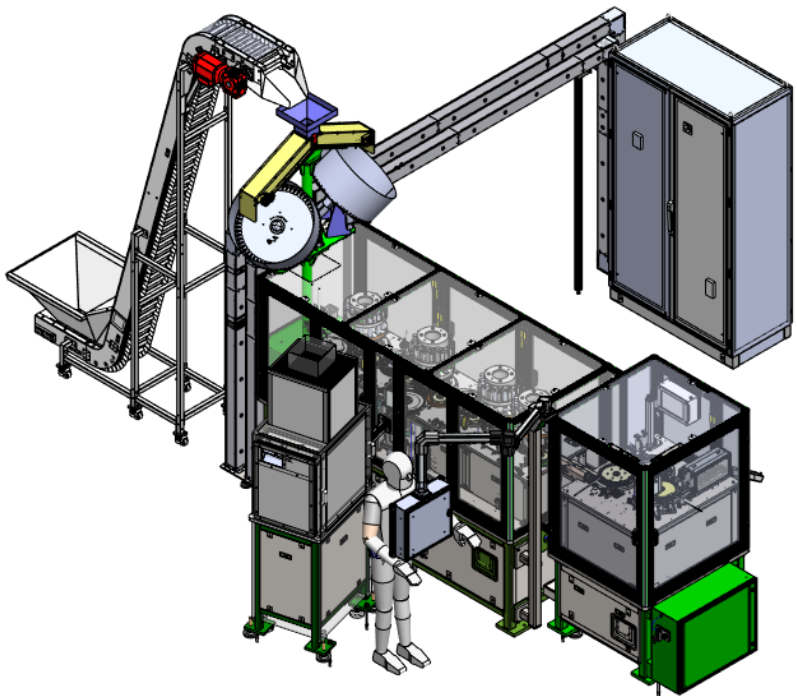
Visual Inspection Machine enables uninterrupted manual visual inspection process of small arms ammunition caliber cases by two operators. The cases are conveyed from a feed hopper through a bowl feeder onto a chain conveyor with support jigs of the machine equipped with proper lighting and reflective mirror attachments. The chain with support brackets rolls and carry the cases in front of the operators for their manual visual inspection. Operators pick the defective pieces from the conveyors and placed in appropriate drawers for specifically marked defect.



2.6 CARTRIDGE ASSEMBLY

2.6.1 Primer Insertion and Varnishing Machine

Our primer insertion and varnishing machine design is based on a rotary style system to rapidly and accurately install the primers into pistol and small arm caliber cases for both commercial and military grade ammunition.



Primer Insertion Process

The Waterbury Farrel primer insertion and varnishing system consists of a group of process stations mounted radially about a central carousel. The unprimed cartridge cases are fed through a vibratory feeder or a primer cassette into the loading mechanism, where the cases are loaded into the indexed rotary dial system (rotary carousel) with twelve stations. The presence of the case is also detected in the same station before it is transferred to the next station. Next station, the presence of vent hole is checked before it is conveyed to the 3rd station for primer insertion. At the station number three, the primer fed from the feeder into the loading mechanism, loads into the primer pocket of the case. The primer placed in its correct orientation, is properly seated with the help of a precise primer seating tool activated by a pneumatic cylinder. The primed case is then transferred to the station number four, where the orientation and availability of the primer in the primer pocket of the case is checked using a camera. After ensuring the availability, seating and orientation of the primer in the primer pocket, it is crimped to lock its position. Both circular and three-point crimping options are available. The next station checks and qualifies the primer depth using two LVDT probes. The qualified primed cases are ejected for varnishing.

Sequence of Operation

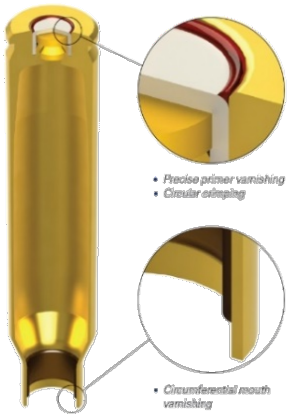
- Case feeding
- Case check
- Reject station (mouth and primer pocket check)
- Flash hole inspection
- Reject station (flash hole check)
- Primer feeding
- Primer insertion
- Inserted primer inspection
- Reject station (inserted primer orientation check)
- Primer crimping
- Verification of any explosion/burning of the inserted primer
- Primer depth check
- Reject station (primer depth check)

Varnishing Process

The qualified primed cases are automatically fed to the primer varnishing area where the primer and mouth are varnished sequentially. Two separate jet dispensing valves, one for primer varnish and the other for mouth varnish discharge and apply a definite and precise amount of varnish compound to the primer and mouth at two distinct stations. Motorized drive systems at each varnishing station allows the cartridge cases to rotate at a desired speed while applying the varnishes. A camera system is used to verify the presence of both varnishes. The varnished cases are then moved to a drying area, where the primer varnish is allowed to settle and dry. Finally, the acceptable varnished primed cases are ejected separately.

Sequence of Operation

- Primer sealant dispensing
- Mouth lacquering
- Mouth & primer inspection for varnishing
- Primer sealant curing
- Eject acceptable varnished primer



Specifications

No. of Stations	6
Motor	7.5 H.P.
Power Supply	As per customer requirement
Compressed Air	Minimum 6 bar
Rated Output	Up to 250 ppm
Floor Space (*L x W)*	3.5m x 1m
Overall Height	3.2m with bowl feeders

Construction

- The frame is of a single piece, stress relieved, welded steel construction. High precision machining of the frame with parts provides the base line for system accuracy.
- An elaborate pneumatic system consisting of lubricator, filters, regulators, manual and analogue gauges and pressure switched etc. are included in the package.
- A PLC/HMI system is offered. Complete safety and fault detection system is incorporated in the automation system. In case needed we can add a data acquisition system to store and review the data.
- Two bowl feeders are provided with the offered system. One rotary bowl feeder for feeding unprimed cases and another one, a vibratory bowl feeder for feeding primers.

The maximum theoretical capacity of the offered machine is 250 pieces/minute.

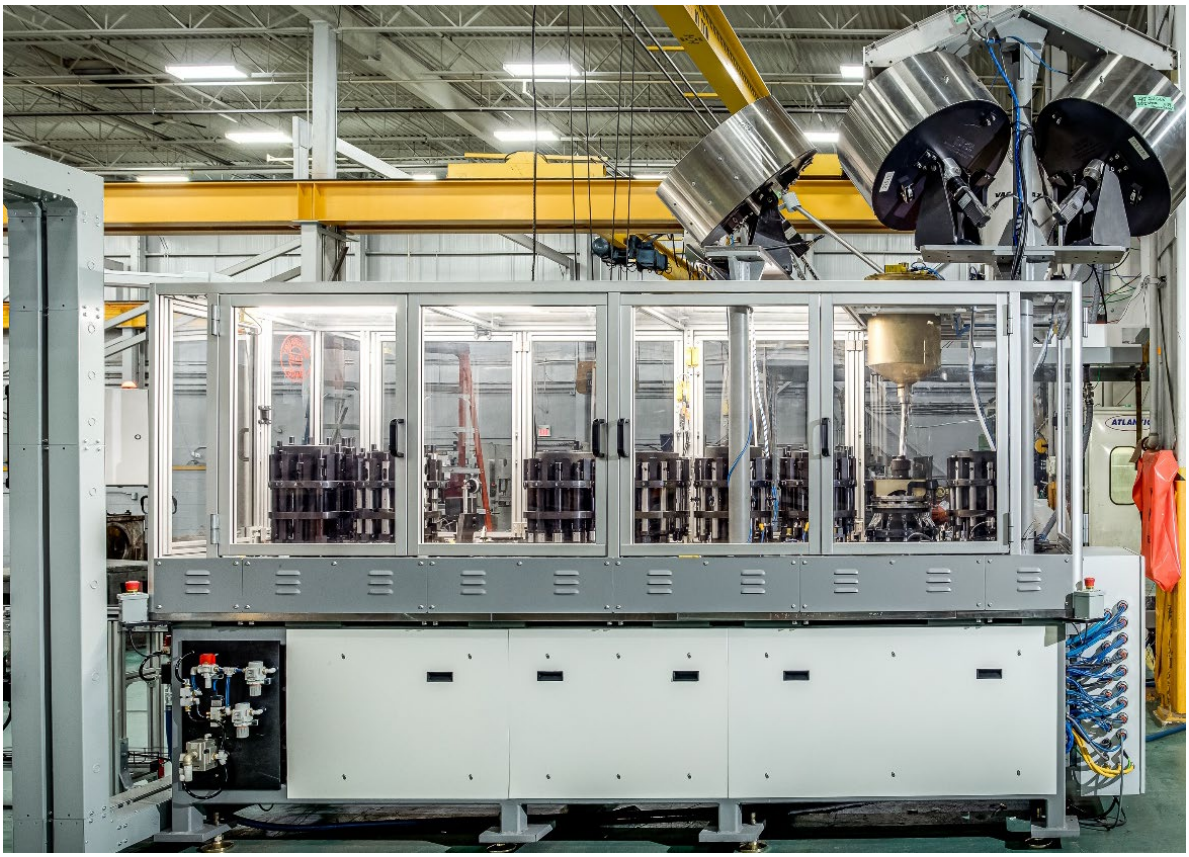
These machines have been designed to maximize usability in real world applications. The modular process stations enable rapid maintenance and replacement, minimizing service downtime, as well as allowing easy capacity upgrades.

2.6.2 Cartridge Loading Assembly Machine

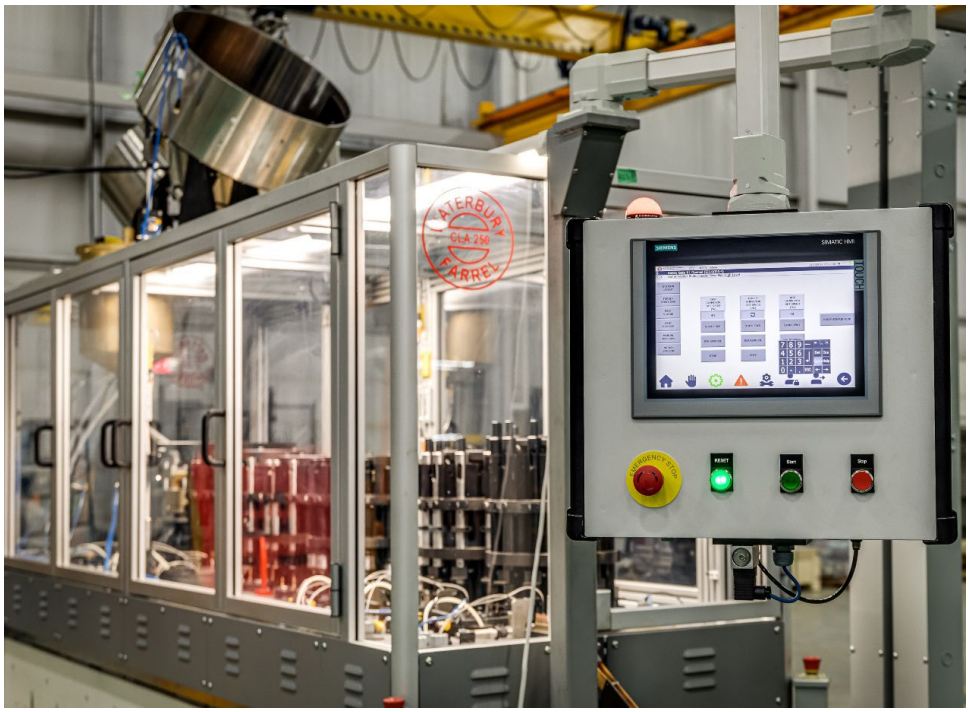
The Waterbury Farrel Cartridge Loading and Assembly Machine for small arms ammunition is an electrically driven automatic machine. It fills the primed cases with propellant, insert & crimp the bullets and finally eject the acceptable assembled cartridges.

The Cartridge Loading and Assembly Machine automatically weed out the cases with improper mouth, not enough propellant, cartridges whose dimensions/profile exceed or fall short of specification limits.

This design allows smooth operation at a very high production rate. The high accuracy operations performed on each multiple tool turrets gives a very high production rate.



No. of stations	8
Motor	10 H.P.
Compressed Air	90 PSI
Power requirement	As per customer requirement
Powder dispensing accuracy	± 20mg (for spherical powder)
Rated output	Up to 250



Sequence of Operation – 5.56mm	Sequence of Operation - 9mm
➢ Mouth inspection ➢ Propellant dosing and dispensing ➢ Propellant level checking ➢ Bullet insertion ➢ Bullet seating ➢ Crimping ➢ Height inspection ➢ Shoulder height inspection ➢ Cartridge overall shape inspection ➢ Rejections at respective stations ➢ Final ejection	➢ Mouth inspection ➢ Propellant dosing and dispensing ➢ Propellant level checking ➢ Bullet insertion ➢ Bullet seating ➢ Crimping ➢ Height inspection ➢ Cartridge overall shape inspection ➢ Rejections at respective stations ➢ Final ejection

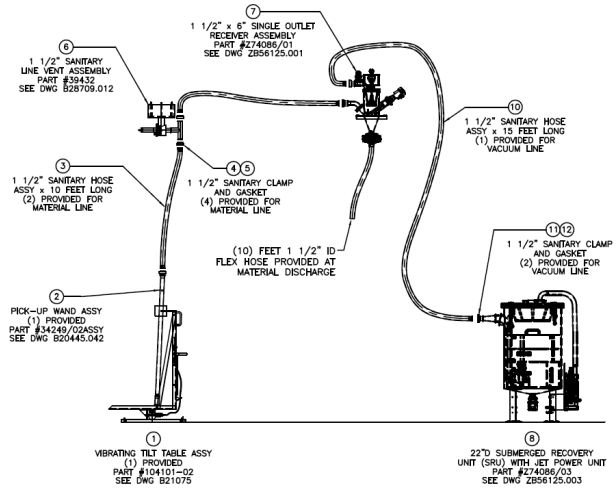
Component Feeders

Two stainless steel vibratory bowl and feeder systems are provided to supply oriented brass cases and bullets. The bowl has its own one cubic foot supply hopper located adjacent to the bowl. The supply hopper will automatically provide component as required by the bowl. Also, special dispensing system for propellant is also supplied with this machine

2.6.3 Propellant Feeding System

Propellant feeding system consists of two parts.

The first part composed of a vacuum conveyor with pneumatic vacuum pump which is located at the top of loading machine hopper. A liftable suction device with the propellant barrel receiving spot is connected through pipes and flexible ducts to the vacuum pump. This system is to automatically feed the propellant in small quantities to the loading machine storage hopper. The system cycle starts when an input signal from the loading machine storage hopper indicates that the propellant level is low.



Conveying distance :10 m max.
Max. elevation : 6 m max.
Vacuum capacity : As required

The second part is composed of a pneumatic operated metering slide discharging system, which automatically doses the propellant from the storage hopper into a funnel attached to the loading machine. The lock chamber principle allows propellant feeding with the advantage of fire breaking. The level sensors in the loading machine funnel regulate and control the proper filling of the powder in to the funnel.

Hopper capacity : As required
Air pressure : 75-90 psi

The device should be located outside of the loading room and at mezzanine level to prevent damages in case of explosion

2.6.4 Gauge & Weigh Machine

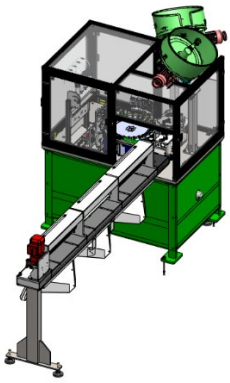
The gauge and weigh machine has been designed to automatically gauge all the critical dimensions followed by weighing of the finished cartridges. This machine is capable of detecting the specified defects and rejecting cartridges which do not meet acceptable limits. All cartridges which are not within the accepted tolerance are rejected and segregated into groups determined by which dimension is out of tolerance. The offered gauge & weigh machine is equipped with seven rotary turrets connected with transfer wheels and an attached conveyor based weigh scale system for continuous weighing of cartridges. The machine runs on a continuous and smooth motion allowing accurate gauging/measurements without any interruption. The machine provided with different types of sensing system like inductive/capacitive sensors for go or no-go checking, analog sensors for measuring, optical sensors for presence and electromagnetic force restoration (EMFR) load cell for weighing. The maximum theoretical capacity of the offered machine is 250 pieces/minute.

The parameters checked are:

- Total Length - High & Low
- Head Diameter - High & Low
- Groove Diameter - High & Low
- Rim Thickness - High & Low
- Presence of primer - Presence/Absence
- Gauge depth of primer - High & Low
- Datum Height - High & Low
- Full form - Check
- Weight - underweight & overweight

2.6.5 Visual Inspection Machine – Cartridge

Visual Inspection Machine enables uninterrupted manual visual inspection process of small arms ammunition caliber cartridges by two operators. The cases are conveyed from a feed hopper through a bowl feeder onto a chain conveyor with support jigs of the machine equipped with proper lighting and reflective mirror attachments. The chain with support brackets rolls and carry the cartridges in front of the operators for their manual visual inspection. Operators pick the defective pieces from the conveyors and placed in appropriate drawers for specifically marked defect.



2.6.6 Packaging Machine

The Waterbury Farrel packaging machine packs the cartridges as per buyer's requirement into a cardboard/plastic box with or without separators.

We work with pre-formed cardboard box (glued at the side) open at top and bottom, precut carton blanks or plastic boxes. In case of performed cardboard boxes, a rotary carton feeder with a vertical incline magazine feeds the carboard box blank into the machine. Then the cardboard boxes are automatically erected and sealed the bottom using hot melt glue. In case of the carton blanks, the cartoner system shapes the box and then transferred to glue the sides. The top side is kept open using guide rails. Separators may be placed if required.

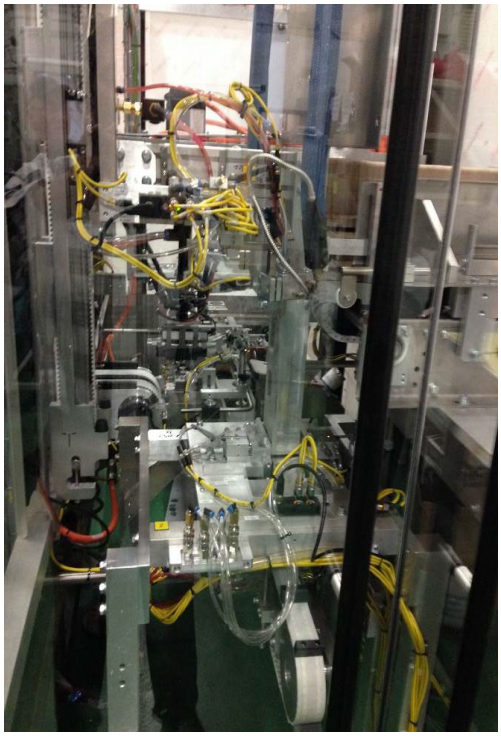
Meanwhile the fully assembled cartridges are fed from a bowl feeder. The properly oriented rounds are then horizontally arranged in specific numbers for feeding into the boxes. The rounds can be picked & placed by the robot or pushed into the boxes by our custom feeding system based on customer packing requirements. The rounds are transferred into a timing belt transfer system which advances and holds 10 or 15 cartridges before it loads into a box. The fully packed box then advances to a station equipped with camera to verify the completeness of the box. The box advances then to the gluing station, where the box is sealed using hot melt glue. The completely sealed box advances to the inkjet/thermal printing station for printing the batch numbers and bar/QR code on the acceptable boxes as required by the customer.

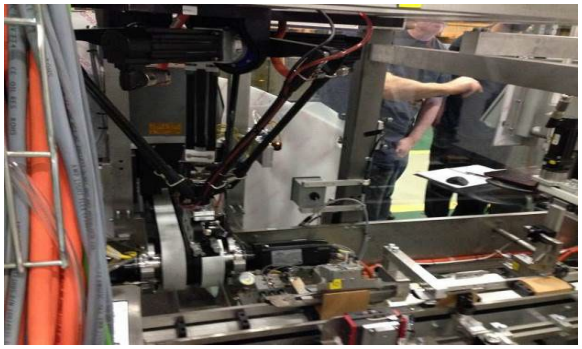
The accepted box and printed boxes are transferred for further bulk packaging (in the scope pf the customer) and the unacceptable boxes are rejected separately.

The offered system is fully protected using safety interlocks, alarm systems, guards and enclosures.

Machine Data

No.	Description	Data
1	Caliber Type	9x19mm and 5.56x45mm
2	Production Rate	Up to 250 cartridges per minute
3	Power Supply	As per customer requirement
4	Compressor Air required	80 PSI





2.7 LABORATORY EQUIPMENT (NOT QUOTED)

Laboratory equipment required to test the components and assembled cartridges includes hardness tester, bullet extraction tester, and bullet tightness tester, microscope with camera and polishing device for the metallurgical tests, PH meter, refractometer, etc.

2.8 BALLISTIC TESTING EQUIPMENT (NOT QUOTED)

This system is for to test internal, external and terminal ballistic capability for small arms ammunition.

Test Details:

Internal ballistics	-	chamber pressure, action time and pressure gradient
External ballistics	-	velocity
Terminal ballistics	-	accuracy and terminal effect

The test system consists of universal receiver for barrel, barrels, pressure checking by piezoelectric transducers or crusher, light barriers for velocity checking, automatic target, flash detector, climatic cabinets for high and low temperature ballistic test, manual cartridge assembly devices for the shooting range, cartridge drilling device (for pressure testing), primer sensitivity checking equipment and automation system with data acquisition, processing and printing.

2.9 PRODUCTION GAUGES

Complete production gauges for each calibers, mentioned in this proposal is included in this offer.

2.10 CONVEYOR SYSTEM

To complete the plant with internal components, transfer system and to minimize the inter-stage handling by operators, an automatic component transfer systems with conveyors and elevators (wherever applicable) between the equipment are supplied. The components will be fed into the machine feed hoppers or directly into the machine.

2.11 DOCUMENTATION

The Seller shall submit three (3) sets of following documents along with the delivery of Equipment to the End User:

a. Operation and Maintenance Manuals of Individual Machines
b. Electrical / Fluid / Schematics
c. Plant Operational Manual
d. Tooling Drawings, wherever applicable

2.12 ELECTRICAL

All the offered machines will be designed as per ISO (International Standards Organization) and IEC (International Electric Organization) standards. The power & control supply voltage/ frequency details shall be in accordance with customer standards and power supply availability at the site.

2.13 TRAINING

Waterbury Farrel will provide proper training to End User's/Buyer's personnel for individual equipment in our facility during the preliminary inspection and at End User's/Buyer's facility during installation and final acceptance. End User's/Buyer's designated persons will be instructed in the area of machine operation, electrical functions, mechanical functions and maintenance of machines.

2.14 PRELIMINARY INSPECTION AND FINAL ACCEPTANCE

All equipment are factory tested and approved prior to shipment.

Preliminary Inspection for individual equipment are conducted in presence of the Customer representative (if available) at Waterbury Farrel facility before shipping. The equipment/systems are inspected during the preliminary inspection visits. The Preliminary Inspection may include two (2) hours of continuous load/no load testing based on the testing procedures of individual equipment/system.

Final acceptance shall be conducted at Customer's site after the installation of all the Equipment & Systems for each Production Line under Waterbury Farrel engineer's supervision by the Customer representative. The final acceptance test shall consist of load tests for four (4) hours performed by customer under Waterbury Farrel engineer's supervision. The Final Acceptance Test of each Production Line shall verify the following:

a. Line production rate
b. Physical quality of the final produced cartridges
c. Ballistic performance as per standards for internal ballistics, external ballistics and terminal ballistics

The Final Acceptance Certificate shall be issued within 24 hours upon successful completion of the final acceptance test without any prejudice.

The minimum efficiency of the offered equipment/lines/systems shall be 85%.

Testing procedures and protocol of preliminary and final acceptance tests will be issued by Waterbury Farrel during course of the project.

SECTION 3
DESIGN DIVISION
AND
SCOPE OF SUPPLY

Contents

Section 3 Design Division and Scope of Supply

3.1 Division of Scope

3.1.1 General

The following definitions refer to the division of scope.

3.1.2 Engineering

The following definitions are used to establish the scope of engineering to be done by either side.

3.1.2.1 Basic Design

“Basic Design” shall mean specifications and design parameters for main equipment units such as capacities, speeds, power requirements and service factors as applicable. Basic data will also include functional information and the necessary data for design as far as applicable.

3.1.2.2 Design Engineering

“Design Engineering” shall mean the making of layout drawings and fluid system schematic drawings in accordance with the specifications as a basis for the detail engineering.

Regarding the mechanical part, these layout drawings include:

- Main dimensions
- Center distances
- Specifications on important proprietary parts such as bearings, seals and the like
- Specifications on torques and, if necessary, on static and dynamic loads

Regarding the fluid systems part:

- System schematic drawings
- Reservoir volumes, pump capacities, flow rates and pipe sizes
- Review of component selection done as part of detail engineering

Design engineering will also include reference component drawings with reference bills of material.

3.1.2.3 Detail Engineering

"Detail Engineering" shall mean the making of detail mechanical drawings and fluid system arrangement drawings in accordance with the design engineering as a basis.

Regarding the mechanical part:

- Individual component drawings with all the details necessary for manufacture or for ordering from sub-suppliers
- Final arrangement drawings
- Arrangement drawings of the location of the limit switches and/or any field devices, if required, and detail drawings of mounting brackets and trippers

Regarding the fluid systems part:

- Arrangement drawings of equipment units such as reservoirs, pumping units, valve stands, etc.
- Detailed bills of material of components.

Regarding pipe work on the equipment:

- Single line representation of the pipe work routing with an indication of the pipe and hose sizes, pipe clamps, and the necessary details for the ordering of material.

3.1.3 Supply Legend

The following abbreviations shall apply to the division of scope table:

WF: Waterbury Farrel or Waterbury Farrel's subcontractor

P: Purchaser or Purchaser's Representative

BD: Basic Design

D: Design

DD: Detail Design

S: Supply of Equipment / Service

O: Optional

UR: Upon Request

TBQ: To Be Quoted

3.1.4 Division of Scope Table

Item	Description	Engineering			S
		BD	D	DD	
	GENERAL ENGINEERING				
	General Layout Plan & Elevations	WF	WF	WF/P	P
	Foundation Bolt & Loading Plan	WF	WF	WF/P	P
	Utility Stub-Up Plan	WF	WF	WF/P	P
	Motor List	WF	WF	WF	WF
	Operating & Maintenance Manuals	WF	WF	WF	WF

Item	Description	Engineering			S
		BD	D	DD	
I	**CUP MANUFACTURING LINE**				
1	Blank & Cup Press	WF	WF	WF	WF
2	Un-coiler & Straightener	WF	WF	WF	WF
3	Wash, Rinse, Lube & Dry Machine	WF	WF	WF	WF
4	Annealing Furnace	WF	WF	WF	WF
5	Pickle, Rinse & Dry Machine	WF	WF	WF	WF
II	**LEAD WIRE MANUFACTURING LINE**				
1	Electric Melting Furnace	WF	WF	WF	WF
2	Agitator	WF	WF	WF	WF
3	Lead Pump	WF	WF	WF	WF
4	Billet Casting Machine	WF	WF	WF	WF
5	Billet Shear	WF	WF	WF	WF
6	Spooler	WF	WF	WF	WF
7	Lead Wire Extrusion Press	WF	WF	WF	WF
III	**PISTOL LINE - 9x19mm**				
A	***Bullet Manufacturing***				
1	Lead Swaging Machine	WF	WF	WF	WF
2	Vibro Cleaning & Polishing Machine	WF	WF	WF	WF
3	Bullet Assembly Machine	WF	WF	WF	WF
4	Vibro Cleaning & Polishing Machine	WF	WF	WF	WF
5	Bullet Gauge & Weigh Machine	WF	WF	WF	WF
B	***Case/Brass Manufacturing***				

Item	Description	Engineering			S
		BD	D	DD	
6	Case Press	WF	WF	WF	WF
7	Wash, Rinse, Dry Machine	WF	WF	WF	WF
8	Head Turning Machine	WF	WF	WF	WF
9	Vibro Wash & Polishing	WF	WF	WF	WF
10	Case Gauge Machine	WF	WF	WF	WF
C	***Loading, Assembly & Packaging***				
11	Primer Insertion & Varnishing Machine	WF	WF	WF	WF
12	Propellant Feeding System	WF	WF	WF	WF
13	Cartridge Loading & Assembly Machine	WF	WF	WF	WF
14	Gauge & Weigh Machine	WF	WF	WF	WF
15	Visual Inspection Machine	WF	WF	WF	WF
16	Packaging Machine	WF	WF	WF	WF
D	***Other systems***				
17	Conveyor System	WF	WF	WF	WF
IV	**SMALL RIFLE LINE –5.56x45mm(M193)**				
A	***Bullet Manufacturing***				
1	Lead Swaging Machine	WF	WF	WF	WF
2	Vibro Cleaning & Polishing Machine	WF	WF	WF	WF
3	Bullet Assembly Machine	WF	WF	WF	WF
4	Vibro Cleaning & Polishing Machine	WF	WF	WF	WF
5	Bullet Gauge & Weigh Machine	WF	WF	WF	WF
B	***Case Manufacturing***				
6	Initial Forming Unit (IFU)	WF	WF	WF	WF
7	Wash, Rinse, Dry Machine	WF	WF	WF	WF
8	Annealing Furnace	WF	WF	WF	WF
9	Pickle, Rinse & Dry Machine	WF	WF	WF	WF
10	Final Forming Unit (FFU)	WF	WF	WF	WF
10	Wash, Rinse, Dry Machine	WF	WF	WF	WF
11	Head Turning and Trimming Machine	WF	WF	WF	WF
12	Vibro Wash & Polishing	WF	WF	WF	WF
13	Mouth & Neck Annealer	WF	WF	WF	WF
14	Low Temperature Annealer	WF	WF	WF	WF
15	Case Gauge Machine	WF	WF	WF	WF
16	Visual Inspection Machine – Case	WF	WF	WF	WF

Item	Description	Engineering			S
		BD	D	DD	
C	***Loading, Assembly & Packaging***				
17	Primer Insertion & Varnishing Machine	WF	WF	WF	WF
18	Cartridge Loading & Assembly Machine	WF	WF	WF	WF
19	Automatic Powder Feeding System	WF	WF	WF	WF
20	Gauge & Weigh Machine - Cartridge	WF	WF	WF	WF
21	Visual Inspection Machine - Cartridge	WF	WF	WF	WF
22	Packaging Machine	WF	WF	WF	WF
D	***Other systems***				
23	Conveyor	WF	WF	WF	WF
V	**MISCELLANEOUS**				
1	Laboratory Equipment	NQ	NQ	NQ	NQ
2	Ballistic Testing System	NQ	NQ	NQ	NQ
3	All Utility and Plant Support System	P	P	P	P
VI	**SERVICES**				
1	Installation & Commissioning				P
2	Supervision of Installation & Commissioning				WF
3	Training				WF
4	Shipping				NQ

3.2 Clarifications

Please refer to commercial part for delivery, warranty and other commercial terms and conditions including terms of replacement and/or refurbishment of failed components.

3.3 Inclusions

3.3.1.1 Mechanical Equipment will be designed in the inch/metric system to applicable Canada / USA standards.

3.3.1.2 All drawings shall be on WF's format.

3.3.1.3 One (1) set of compact discs of arrangement drawings only will be supplied as final "as built" drawings. All drawings shall remain the property of WF.

3.3.1.4 Submission of mechanical arrangement in two (2) sets total of print copies for approval.

3.3.1.5 Foundation bolt plan and loading plan for foundation-mounted equipment.

3.3.1.6 Two (2) sets of operating and maintenance manuals.

3.3.1.7 All un-machined exterior parts shall have one (1) prime coat and one (1) finish coat of quality shop enamel paint. All exposed finished surfaces shall have one (1) coat of weather resistant grease.

3.4 Exclusions

The scope of supply of equipment and services does not include any items that are not expressly specified in the proposal. Our proposal is based on Waterbury Farrel System. The following items among other things are not included in the scope of supply:

3.4.1.1 Interconnecting piping including fastening elements for all media within the plant limits up to the takeover points of the equipment units unless specified in the proposal specifications.

3.4.1.2 Operating personnel, material and consumables for commissioning and for performing acceptance tests including raw material for testing. The Purchaser shall supply all the raw materials required for development and testing to WF free of cost. The details like quantities, specifications and the timing shall be informed you later.

3.4.1.3 Floor plates cover plates, border ledges and handrails around equipment, utility trenches and/or wiring trenches.

SECTION 4
COMMERCIAL PROPOSAL

Contents

Section 4 Commercial Proposal

4.1 Proprietary Information:

The information contained in this proposal and all related documents is proprietary and confidential information that belongs to Waterbury Farrel (hereinafter called “WF”). This information is being disclosed to you for the specific purpose of your evaluation of WF as a contractor for this particular project. By reviewing the information contained in these documents, you agree to be bound to a confidentiality obligation with respect to this information. Specifically, you hereby agree that (1) you will treat this information with the same level of care as you treat your own proprietary information; (2) you will not disclose this information to third parties without prior written consent of WF; and (3) you will not use this information for any purpose beyond evaluating WF as a contractor and / or contracting with WF for the particular project quoted herein.

4.2 Scope of Work:

The scope of work includes delivery of the plant as per the specification detailed in the proposal.

This document/information served as a guideline for the preparation of this proposal. We are committed to implement every requirement where possible and applicable. For Division of Scope, please refer to Section 3 of Specification and Functional information above.

4.3 Price Basis:

The prices are based on WF’s interpretation of your inquiry, subject to final clarification and mutual agreement upon the scope of work. Individual prices, if given, are valid only if purchased together as part of the total package.

The equipment will be shipped EXW Brampton basis, partial shipments allowed, according to Incoterms 2010. The prices are FIRM subject to the order being finalized within the validity period of our proposal.

4.4 Bonds and Guarantees:

Issuance of any specific bonds including advance payment guarantee bond is not offered.

4.5 Payment Terms:

An advance payment of 40% of the Contract Price shall be paid to Waterbury Farrel along with the order. The balance 60% of the Contract Price shall be paid at the indicated milestones

- 50% of Contract Price shall be paid before shipment on pro-rata basis
- 10% of Contract Price against final acceptance at customers site or 180 days from the last shipping date, whichever is earlier

4.6 Taxes, Customs Duties and other Fees:

The above-named payments apply exclusive of any taxes, customs duties and other fees payable in the country involved. Should the Agreement require the Seller to make any such payment, the Purchaser shall immediately refund the Seller via wire transfer on the basis of corresponding evidence attesting to the costs incurred.

4.7 Storage:

In the event, the seller is forced to withhold shipments for reasons beyond Seller's control the Purchaser shall reimburse the seller for the inventory and storage.

4.8 Validity of Quotation:

This quotation is open for Purchaser's acceptance until 12 weeks from the date of this proposal. Thereafter this quotation is subject to review by WF and/or confirmation by WF in writing.

4.9 Export Permit:

The supply of equipment, in case we receive the order are subject to the receipt of export permit from the Canadian Authorities and being the export permit valid at the time of shipment, allowing us to ship the equipment to the buyer's country.

4.10 Supervision of Installation & Commissioning:

We have included 1170 man-days towards supervision of installation & commissioning and training for the offered equipment. In case any additional supervision or training man-days is required to complete the installation, commissioning and training, we shall provide such services and the cost will be as per the service engineer's rate sheet included herewith.

4.11 Insurance:

Purchaser shall cover at his cost, all types of insurance for WF personnel at site and the equipment EXW basis, including - but not limited to – Comprehensive insurance for All Risks, Installation Site Insurance, Health & accident insurance, Third Party insurance.

4.12 Accommodation:

If WF personnel are asked for the supervision of installation and commissioning, all costs for adequate fully furnished house / apartment / hotel room for our supervisory personnel shall be borne by Purchaser.

4.13 Transportation:

Transportation shall be provided by Purchaser free of cost to our personnel with

- economy Class return airfare for within the country.
- all local transportation.

4.14 Supplemental Rates for Tools and Equipment:

It is assumed that tools & instruments required for the supervisory commissioning are provided by end user for the entire duration of commissioning, free of cost to WF. Rates for the use of tools and equipment shall be charged at actual if tools and equipment are to be hired by WF.

4.15 Warranty:

The Warranty of the offered system shall be One (1) year from the Final Acceptance Test at customer's site or 18 months from the FOB shipping date, whichever comes first. All other terms on the Warranty shall be as per the term given below in this Section 4.

4.16 Force Majeure :

The Seller shall not be held responsible for any delays arising due to Force Majeure that might occur during the process of manufacturing. Should the Seller be prevented from performing the Contract because of Force Majeure such as, but not limited to, war, due to any law, order, regulation or ordinance of Seller's Purchaser's or End User's government authority, serious flood, fire, strike, hurricane, storm and earthquake, the time for execution of the Contract shall be extended to the effect of those cases. In case, either party chose to terminate the Contract due to Force Majeure, the Purchaser's is obliged to pay the Seller the net incurred expenses ("Termination Expenses") as per Seller's written requests.

4.17 Law / Venue:

(Rules of Conciliation and Arbitration of the International Chamber of Commerce)

Any differences or disputes arising from this Contract or from agreements regarding its performance shall be settled by an amicable effort on the part of both parties to the Contract. An attempt to arrive at a settlement shall be deemed to have failed as soon as one of the Parties to the Contract so notifies the other Party in writing. If an attempt at settlement has failed, the disputes shall be finally determined by arbitration in accordance with the International Arbitration Rules of the American Arbitration Association. The place of arbitration shall be Toronto, ON Canada. The procedural law of this place shall apply where the Rules are silent. The language of the Arbitration shall be English. The arbitral award shall be substantiated in writing. The arbitral tribune shall decide on the matter of costs of the arbitration.

4.18 Substantive Law:

All disputes shall be settled in accordance with the provisions of this Proposal and all other agreements regarding its performance, otherwise in accordance with the **substantive law in force in Canada without reference to other laws.**

4.19 Warranty

Waterbury Farrel Corporate Warranty Policy

Waterbury Farrel warrants the equipment and /or components supplied against defects in design, material and workmanship as detailed below. Waterbury Farrel shall not be liable for consequential damages or injuries of any kind.

System Warranties

A conditional warranty of twelve (12) months from date of invoice is applied to all systems supplied by Waterbury Farrel unless otherwise specified by individual contract. The conditions of this warranty are as follows:

(a) Waterbury Farrel must have complete system design responsibility;
(b) The operating parameters are identical to the original design parameters;
(c) The operation of all components within the system must fall within the operating procedures as specified by the manufacturer;
(d) Waterbury Farrel is not responsible for installation related warranties.

Repair Warranty

All items repaired by Waterbury Farrel carry a ninety (90) day limited warranty unless otherwise specified by individual contract. This warranty is limited to cover the cost of materials and labour on replaced components only. An extended warranty of up to one (1) year is available for major rebuilds when authorized in writing by Waterbury Farrel.

Component Manufacturers Warranty

Waterbury Farrel warrants all products solely supplied as original equipment manufactured in accordance with contract specifications. The responsibility of Waterbury Farrel is limited solely to the repair or replacement of the defective component only. If another manufacturer through Waterbury Farrel has supplied major equipment, then conditions of warranty are as stated by that manufacturer only.

General Terms & Conditions of Warranty

The Waterbury Farrel shall not be responsible and this Warranty shall not apply for:

- damage during shipment, improper storage or handling, incorrect or negligent operations or improper maintenance
- normal wear and tear and consumables

Terms and conditions apply to all warranty situations. These being:

(a) All decisions as to the cause of failure and subsequent warranty are the sole determination of Waterbury Farrel.
(b) All warranties are limited to the repair or replacement of defective product only.
(c) Waterbury Farrel is not liable for consequential damages such as lost production time.
(d) Waterbury Farrel is indemnified of any third party claims.

The terms contained hereinabove over-ride the **Standard Terms and Conditions of Sale** attached.

4.20 Standard Terms and Conditions of Sale

DEFINITIONS: The word "Seller" as used herein shall mean, WATERBURY FARREL. The word "Purchaser", "Buyer", ""Owner"", "End-user" as used herein shall mean the party to whom the accompanying proposal is submitted.

ACCEPTANCE: The proposal is made subject to prior sales and in any event will become void unless accepted by the Purchaser within 30 days of the date hereof. Purchaser's order must be signed by a duly authorized agent, must indicate acceptance of Seller's proposal and can be accepted only at the HOME OFFICE of the Seller in Brampton, Ontario. The resulting contract shall in all respects be governed and interpreted according to the laws of the province of Ontario. After acceptance, the Purchaser's rights thereunder may not be transferred to any other party without the consent of the Seller. Any of the terms and conditions set forth herein shall not be binding on the Seller and shall not be considered applicable to the sale, unless expressly agreed to in writing by the Seller. This proposal shall constitute the entire agreement between the Seller and the Purchaser to this transaction.

PRICES: Prices quoted are EXW Brampton, for equipment crated or skidded (boxing for sea shipment extra). They are firm for items which are quoted for delivery within one year from the date of receipt of Purchaser's order. Items which are quoted for delivery beyond one year shall be subject to adjustment to prices applying as of the respective dates of delivery; however, such adjustment shall not exceed 10% of the quoted prices.

TAXES: Sales or other taxes that may be levied on the transaction by local, state, federal or foreign governments are not included in the quoted prices. If the Seller is obligated to pay such taxes, the Purchaser shall reimburse the Seller therefore.

TERMS OF PAYMENT: Domestic – Unless otherwise specified in the accompanying proposal, the Terms of Payment shall be net cash 30 days from the date of subject invoice; however, to approved credit rating. In cases where shipment of a completed machine is delayed at the request of the Purchaser, Seller reserves the right to issue an invoice for the machine as of the date it became ready for shipment. Foreign – Unless otherwise specified in the accompanying proposal, the Terms of Payment shall be 25% of the quoted price upon Seller's acceptance of the order, balance through an irrevocable Letter of Credit, all payments to be in United States dollars. Such Letter of Credit is to be established at the time of Seller's acceptance of the order, or at such other time as the parties may negotiate prior to Seller's acceptance of the order. The Letter of Credit shall be established through and confirmed by a Toronto bank and shall provide for payment against Seller's sight draft accompanied by commercial invoice, and Purchaser's forwarding agent's receipt acknowledging delivery of equipment to a Canadian port, and by such other documents, if any, as may be required by our respective governments.

DELIVERIES: Delivery dates are approximate, and are those dates available at the time of quotation, and are subject to revision (1) before Seller's acceptance of an order due to: (a) delay in receipt of Purchaser's signed order or final and complete specifications, or (b) Seller's previous acceptance of other orders; (2) at any time due to causes beyond Seller's control including, but not limited to fire, strikes, war, riots and any action imposed by authority of any governmental agency. Upon cessation of causes excusing performance by Seller, this order shall continue in full force and effect subject to such price modification as may be permitted in the paragraph "PRICES" above. Title and possession pass to the Purchaser on delivery F.O.B. point of shipment: the purchaser will assume freight charges and risks of transportation. In the absence of specific instructions Seller reserves the right to specify the routing of all shipments, unless otherwise agreed to. All costs incident to the installation of the machinery in the Purchaser's plant shall be bourn by the Purchaser. In no event shall the Seller be held liable for damages, or contingent expenses, caused by delays in delivery.

WARRANTY: Seller warrants that the machines proposed to be furnished under this contract will be free from defects in material and workmanship, under normal use, and service for a period of one (1) year from date of delivery. Components not manufactured by Waterbury Farrel will have the same warranty as given by the manufacturer of the components. The exclusive remedy of the Purchaser shall be the replacement by Seller of any material or parts. F.O.B. shipping point, found to be defective within such warranty period without any obligation of Seller for installation of replacement parts. Seller will not assume any expense or liability for repairs, additions or modifications made upon Seller's machines outside Seller's factory without due written consent of Seller.

DISCLAIMER OF WARRANTY: THERE ARE NO WARRANTIES OF FITNESS FOR PARTICULAR PURPOSE OR OF MERCHANTABILITY NOR ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, EXCEPT AS SPECIFICALLY SET FORTH IN OUR PROPOSAL.

LIMITATION OF LIABILITY: Seller shall not be liable for any indirect, incidental, special, or consequential damages such as, but not limited to, damage or loss of other property or equipment, loss of production, loss of profits, or loss of revenue. The total liability of the Seller with respect to this contract or from the manufacture, sale, delivery, installation or use of any equipment furnished by Seller, whether in contract, in tort, or under warranty shall not exceed ten percent of the total contract price on which such liability is based.

MAINTENANCE, OPERATION AND USE: Purchaser shall maintain, use and operate the equipment purchased herein in accordance with the instruction manual, operation manual and specific instructions provided by the Seller. In the event Purchaser does not maintain, use or operate the equipment as set forth above, the purchaser agrees to indemnify and save Seller harmless from any liability or obligation incurred by Seller to persons injured directly or indirectly in connection with the operation of such equipment.

TOOLING: Seller shall be responsible for tooling that they provide with the order. Any tooling furnished by Purchaser or Purchaser's supplier shall be the responsibility of the Purchaser, and any work required on such tooling (after the initial setup by Seller) shall be bourn by and/or charged to Purchaser. If the machine is ready for shipment, but is delayed for any reason due to the tooling furnished by Purchaser or Purchaser's supplier, the Seller will invoice Purchaser for the machine and may charge Purchaser for storage of the machine in Seller's plant. Any delay in delivery caused by tooling supplied by Purchaser or Purchaser's supplier, shall not be deemed to be a delay in delivery on the part of the Seller.

CANCELLATIONS: Orders are not subject to the stoppage of work or to cancellation at the direction of the Purchaser except on the following conditions: "A) Any part of such order which can be completed in 30 days after receipt from the Purchaser of notice of stoppage of work or cancellation will be shipped and shall be paid in full."
"B) All work in process and all material and supplies ordered by Seller to fill any orders as to which notice of stoppage of work or cancellation shall have been received whether such materials and supplies shall have been received by Seller, or are covered by commitments Seller has made, shall be paid in full by the Purchaser on the basis of the cost to Seller plus 15%."

MODIFICATIONS: This proposal and the Terms and Conditions stated herein shall constitute the complete agreement between the Seller and Purchaser and shall supersede all prior oral or written statements of any kind whatsoever made by the parties or their representatives. Any purported modifications hereto, after acceptance of this proposal and Terms and Conditions, shall not be binding, unless consented to in writing by an authorized agent of Seller.

4.21 Service Engineers – Rate Sheet (US $)

Daily Rates (service based on 8 hours) ……$2400.00 *or* $300 per hour
plus travel costs
(4 hours minimum charge)

Daily Rate Travel Time …… $300.00 per hour

Working Overtime …… $600.00 per hour

Saturdays …….. $600.00 per hour
(4 hours minimum charge)

Sundays & Holidays …… $600.00 per hour
(4 hours minimum charge)

1. Transportation, including local, charged at actual cost

2. In cases where a rental car is used, actual cost of rental to be charged to customer.

3. When service engineers stay overnight, living expenses including room, meals and incidentals are charged at actual cost.

4. Service time is time spent in customer's plant.

5. Travel time is comprised of time spent traveling to *and* from destination. All travel time charged at travel time rate except Saturday, Sundays and Holidays when overtime rates apply as stated above.

6. Travel time is based on the most expeditious form of travel.

7. When service engineer is required to remain Saturday, Sunday or Holiday to complete a job, but does not work either day, customer will be charged for living expenses and daily rate.

8. When service engineer takes care of more than one job on a trip from our plant, transportation, travel time and living expenses will be prorated.

SECTION 5
PRICE & DELIVERY

Contents

Section 5 Price & Delivery

5.1 Price

No.	Description	Qty	Total Price in USD
I	**CUP MANUFACTURING LINE** (for all case & bullet cups)		
1	Blank & Cup Press	1	
2	Cup Tooling	4	
3	Un-coiler & Straightener	1	
4	Wash, Rinse, Lube & Dry Machine	1	
5	Annealing Furnace	1	
6	Pickle, Rinse & Dry Machine	1	
	Total - Cup Manufacturing Line		**$3,455,000.00**

No.	Description	Qty	Total Price in USD
II	**LEAD WIRE MANUFACTURING LINE**		
1	Electric Melting Furnace		
2	Agitator		
3	Lead Pump		
4	Billet Casting Machine		
5	Billet Shear		
6	Spooler		
7	Lead Wire Extrusion Press		
	Total – Lead Wire Manufacturing Line		**$880,000.00**

No.	Description	Qty	Total Price in USD
III	**PISTOL LINE (9x19mm)**		
A	***Bullet Manufacturing***		
1	Lead Swaging Machine	1	
2	Vibro Cleaning & Polishing Machine	1	
3	Bullet Assembly Machine	1	
4	Vibro Cleaning & Polishing Machine	1	
5	Bullet Gauge & Weigh Machine	1	
B	***Case Manufacturing***		
6	Case Forming Unit	1	
7	Wash, Rinse, Dry Machine	1	
8	Head Turning & Trimming Machine	2	
9	Vibro Cleaning & Polishing Machine	1	
10	Case Gauge Machine	1	
C	***Loading, Assembly & Packaging***		
11	Primer Insertion & Varnishing Machine	1	
12	Propellant Feeding System	1	
13	Cartridge Loading & Assembly Machine	1	
14	Gauge & Weigh Machine	1	
15	Visual Inspection Machine – Cartridge	1	
16	Packaging Machine	1	
D	***Other Systems***		
17	Conveyor System	1	
	Total - Pistol Line		**$11,222,000.00**

No.	Description	Qty	Total Price in USD
IV	**SMALL RIFLE LINE (5.56x45mm M193)**		
A	***Bullet Manufacturing***		
1	Lead Swaging Machine	1	
2	Vibro Cleaning & Polishing Machine	1	
3	Bullet Assembly Machine	2	
4	Vibro Cleaning & Polishing Machine	2	
5	Bullet Gauge & Weigh Machine	1	
B	***Case Manufacturing***		
6	Initial Forming Unit (IFU)	1	
7	Wash, Rinse, Dry Machine	1	
8	Annealing Furnace	1	
9	Pickle, Rinse & Dry Machine	1	
10	Final Forming Unit (FFU)	1	
11	Wash, Rinse, Dry Machine	1	
12	Low Temperature Annealer	1	
13	Head Turning and Trimming Machine	2	
14	Vibro Wash & Polishing	1	
15	Mouth & Neck Annealer	1	
16	Case Gauge Machine	1	
17	Visual Inspection Machine - Case	1	
C	***Loading, Assembly & Packaging***		
18	Primer Insertion & Varnishing Machine	1	
19	Cartridge Loading & Assembly Machine	1	
20	Automatic Powder Feeding System	1	
21	Gauge & Weigh Machine - Cartridge	1	
22	Visual Inspection Machine - Cartridge	1	
23	Packaging Machine	1	
D	***Other Systems***		
24	Conveyor System		
	Total - Small Rifle Line		**$18,723,000.00**

No.	Description	Qty	Total Price in USD
V	**MISCELLANEOUS**		
1	Laboratory Equipment		*Not quoted*
2	Ballistic Testing System		*Not quoted*
3	All Utility and Plant Support Systems		*Under Customer Scope*
VI	**SERVICES**		
1	Installation & Commissioning		*Under Customer Scope*
2	Supervision of Installation & Commissioning		**$2,574,000.00**
3	Training		*Included in the above price*
4	Shipping		*Not quoted*

5.2 Delivery

All the individual equipment will be ready for run-off test from the Contract Effective Date (CED) as follows:

Description	No. of Lines	Ready for Run-off
Cup Manufacturing Line	1 Line	12-18 months
Lead Wire Manufacturing Line	1 Line	8-12 months
Pistol Line (9x19mm)	1 Line	12-18 months
Small Rifle Line (5.56x45mm – M193)	1 Line	20-24 months

and the delivery immediately thereafter.

CED is defined as the date Waterbury Farrel (WF) receives the 40% advance payment.

The delivery schedule is based on the current Engineering & Shop loads. The exact delivery shall be confirmed at the time of order finalization. Refer to the delivery terms and conditions.

Customer is required to give Waterbury Farrel (WF) the required quantity of raw material as specified by WF for the development and runoff tests. Waterbury Farrel (WF) shall inform the customer the required dates for the receiving the raw materials in advance. Any delay in supplying the raw material shall automatically delay the agreed delivery.

SECTION 6
CERTIFICATIONS

NSF ISR

Certificate of Registration

This certifies that the Quality Management System of

Magnum Integrated Technologies Inc.

(INCLUDING WHOLLY OWNED SUBSIDIARIES)
200 First Gulf Blvd.
Brampton, Ontario, L6W 4T5, Canada

has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

ISO 9001:2015

Scope of Registration:
Designer, manufacturer and consultant of non-Ferrous casting systems as well as Rolling Mills, Grinding Lines, Hobbers, Presses, Hydraulic Cylinders and Equipment including automation systems.

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

Certificate Number:	6F411-IS8
Certificate Issue Date:	20-JUL-2022
Registration Date:	23-JUL-2022
Expiration Date *:	22-JUL-2025

Jennifer Morecraft,
Senior Managing Director

NSF International Strategic Registrations
789 North Dixboro Road, Ann Arbor, Michigan 48105 | (888) NSF-9000 | www.nsf-isr.org

Authorized Registration and /or Accreditation Marks. This certificate is property of NSF-ISR and must be returned upon request.
*Company is audited for conformance at regular intervals. To verify registrations call (888) NSF-9000 or visit our web site at www.nsf-isr.org

Travaux publics et Services gouvernementaux Canada
Public Works and Government Services Canada

Programme des marchandises contrôlées
Controlled Goods Program

Certificat Certificate

d'inscription accordé à *of Registration issued to*

Magnum Integrated Technologies Inc.

carrying on business as / exerçant ses activités sous le nom

Le présent certificat confirme votre inscription au Programme des marchandises contrôlées. Votre inscription est assujettie à des conditions réglementaires et aux conditions énoncées par le ministre dans le document "Conditions de l'inscription".

This certificate confirms your registration with the Controlled Goods Program subject to conditions prescribed by regulations and any other conditions set out by the Minister in the "Conditions of Registration" document.

N° de certificat / Certificate No.	25262
Entrée en vigueur / Issued	2019/05/29 (yr/an mo/mois day/j)
Date d'expiration / Expires	2024/02/29 (yr/an mo/mois day/j)

Émis par le ministre en vertu de la *Loi sur la production de défense*
Issued by the Minister pursuant to the *Defence Production Act*

Gestionnaire / Manager

Canada

OTM-2000PM

ON THE MARK
AMMUNITION SOLUTIONS

November 30, 2022

Prepared by
Tom Morgan
On The Mark, Inc.

Prepared For
Richard Roberts

OTM-2000PM

CARTRIDGE PRIMER INSERTION

FIG.1 OTM-2000PM

FIG.2 PRIMED 9MM CASES

Features

- Continuous motion primer insertion machine.
- Sound enclosure.
- Main dial with heavy duty thrust bearing for long life.
- OTM-240A feed system.
- Various checks and bad part eject process
- Quick change tooling.
- Mechanical timed case insert with main cam wheel
- Stack light indicators to let the operator know feeder levels are low.
- Large touch screen PLC for machine controls.
- Lot sizes limit set points.
- Good part and reject part counters.
- E-stop and other safety features.
- Machine guards in place.
- Safety sensors.
- All parts machined from billed aluminums, steels and stainless.
- All fasteners are stainless steel to prevent corrosion issues.
- All parts that can be will be coated for corrosion prevention.
- Solid steel frame.
- Solid steel for machine rigidity.
- Smooth surfaces for easy clean up and maintenance.
- Set up, install and training on site.
- Product manual (digital and hard copy) that will include recommended ware parts, and daily maintenance.
- 165-210 PPM run rate. (Depends on Calibers)
- Power requirements 220/480V

The OTM-2000PM was built for continuous production along with numerous safety, checks and measure systems ensure highest quality product in the least amount of time.

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OTM-2000PM

The OTM -2000PM comes standard with an OTM-240A feed system. The 24” feeder is equipped with primer presents check camera to assure only empty primer pockets are fed. OTM feeders have been proven in the industry to be safe, reliable, and effective at keeping production rates up. Feeder is controlled on the main PLC and has low bowl indicators which let the operator know when the feeder needs to be filled.

FIG.3 OTM-240A (24” FEEDER)

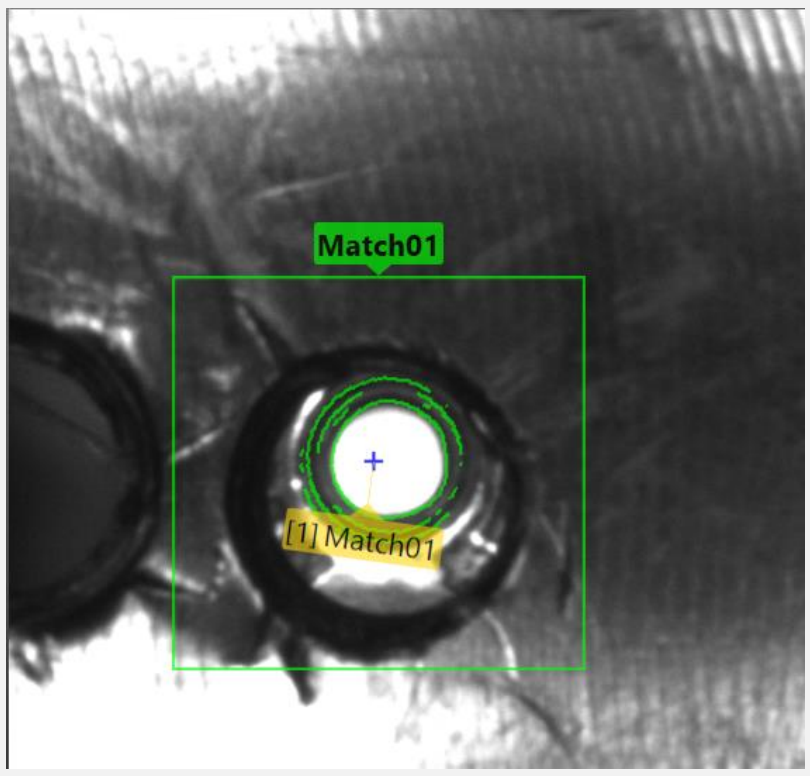

FIG.4 Primer Camera Inspection

As you can see in Figure 4 the OTM-2000PM come standard with a post prime inspection. This means we can ensure that nearly 100% of your parts that go into your finished bins are properly primed quality cases.

With cloud connectivity these ethernet base cameras can be connected to your network to allow you download and inspect the images. Images of bad parts can be tagged for inspection at later times.

Parts are inspected prior to the priming operation, cases are stacked in a vertical line and presented to the camera in a way that allows for quality images at high speeds.

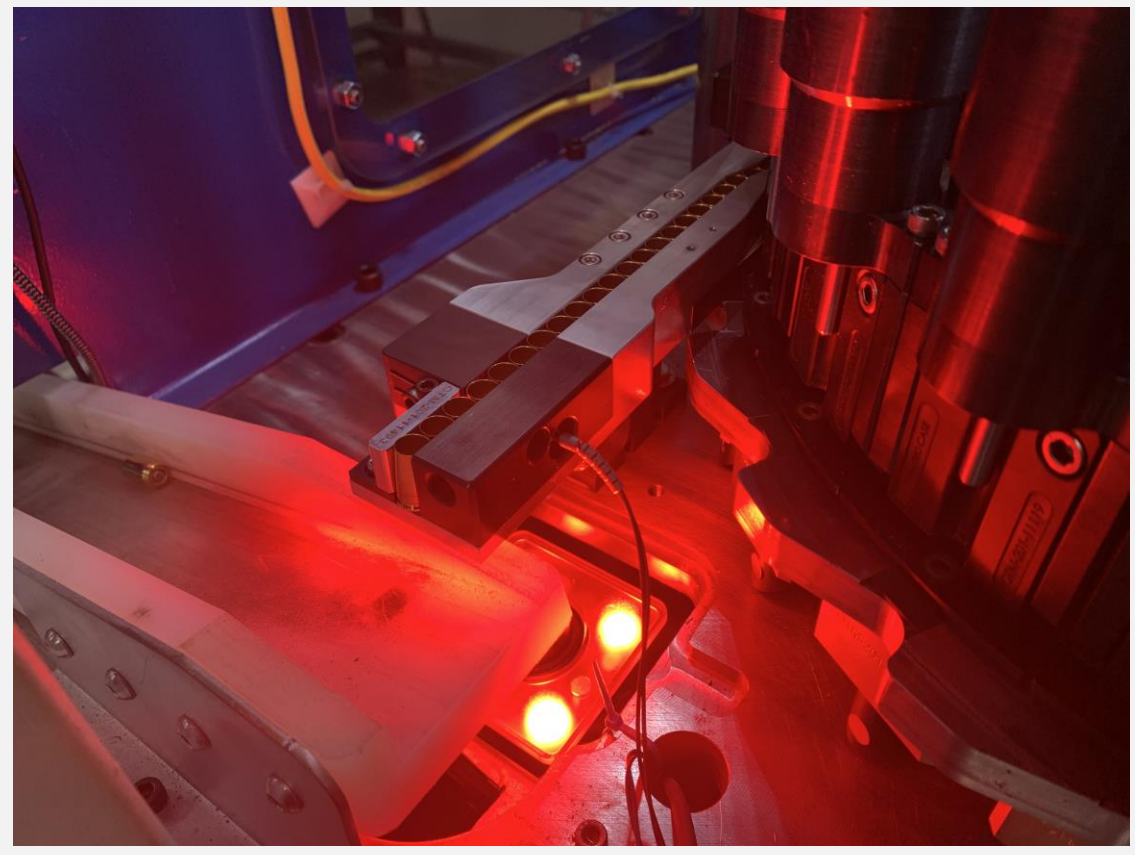

FIG.5 Case Inspection Slide

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OTM-2000PM

OTM-2000PM has 24 stations that can be removed in seconds. On other machines if damage occurs to a station replacing the tooling can result in hours of down time trying to fix issues. With the modular approach of the OTM design changing a station is as simple as turning a thumb screw and pulling straight up. This allows tooling failure problems to be fixed in minutes not hours.

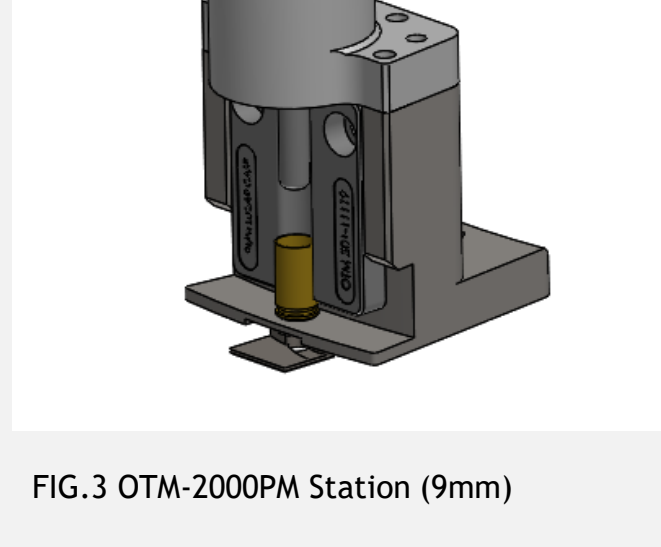

FIG.3 OTM-2000PM Station (9mm)

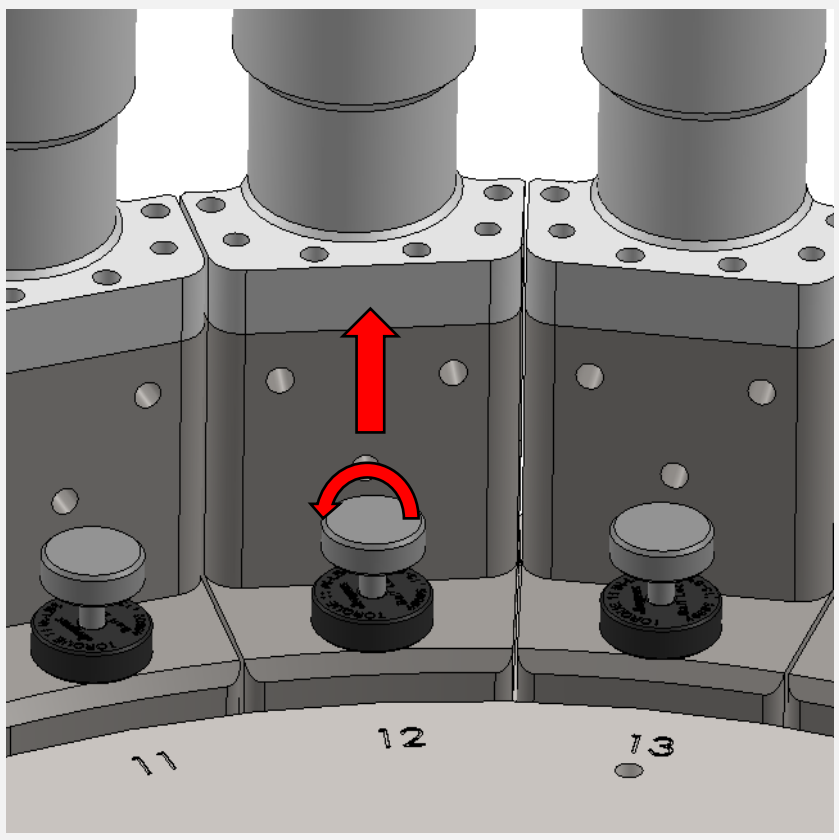

FIG.4 Back of Station

4 Easy Steps to Changing Calibers

1. Change Stations
2. Change Case Feed Block
3. Change Case Exit Slide
4. Change Case & Primer Feeders

Most caliber change overs can be completed in under 1 hour.

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OTM-2000PM

The OTM -2000PM comes standard with an OTM-6PF with is a 6 inch primer bowl that is CNC milled for accuracy and repeatability. Unlike other vibe bowls that are welded and all different from eachother we strive to provide the same parts everytime. Wheather it is 2 months or 5 years after purchase you will always get the same consistian replacement parts. The OTM-6PF sits on a 5 way adjustable base that contains the swappable primer slide for easy setup and change over. Each machine comes with a standard variable speed controller that allows you to be able to dial in the primer feed rate to your desired rate.

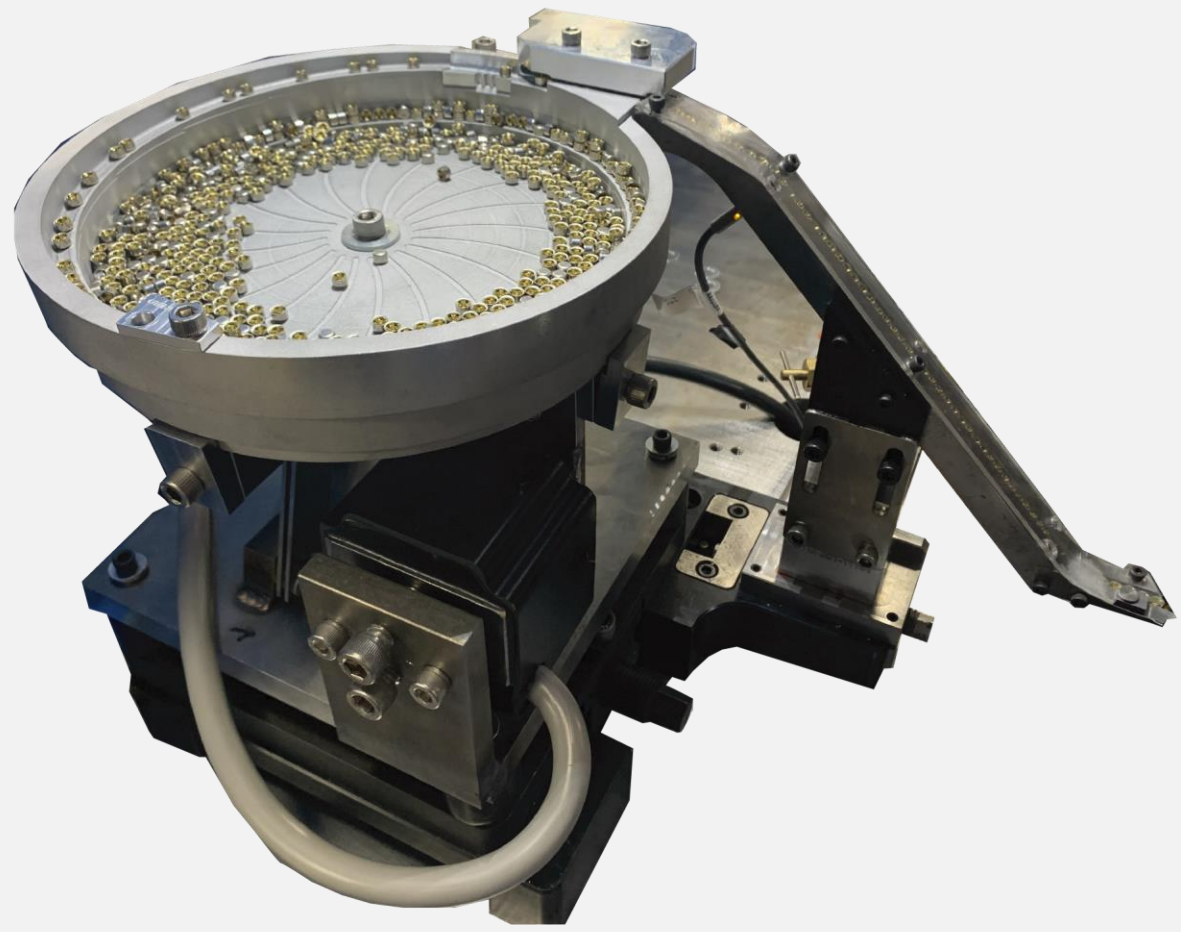

FIG.3 OTM-6PF (Primer Feeder)

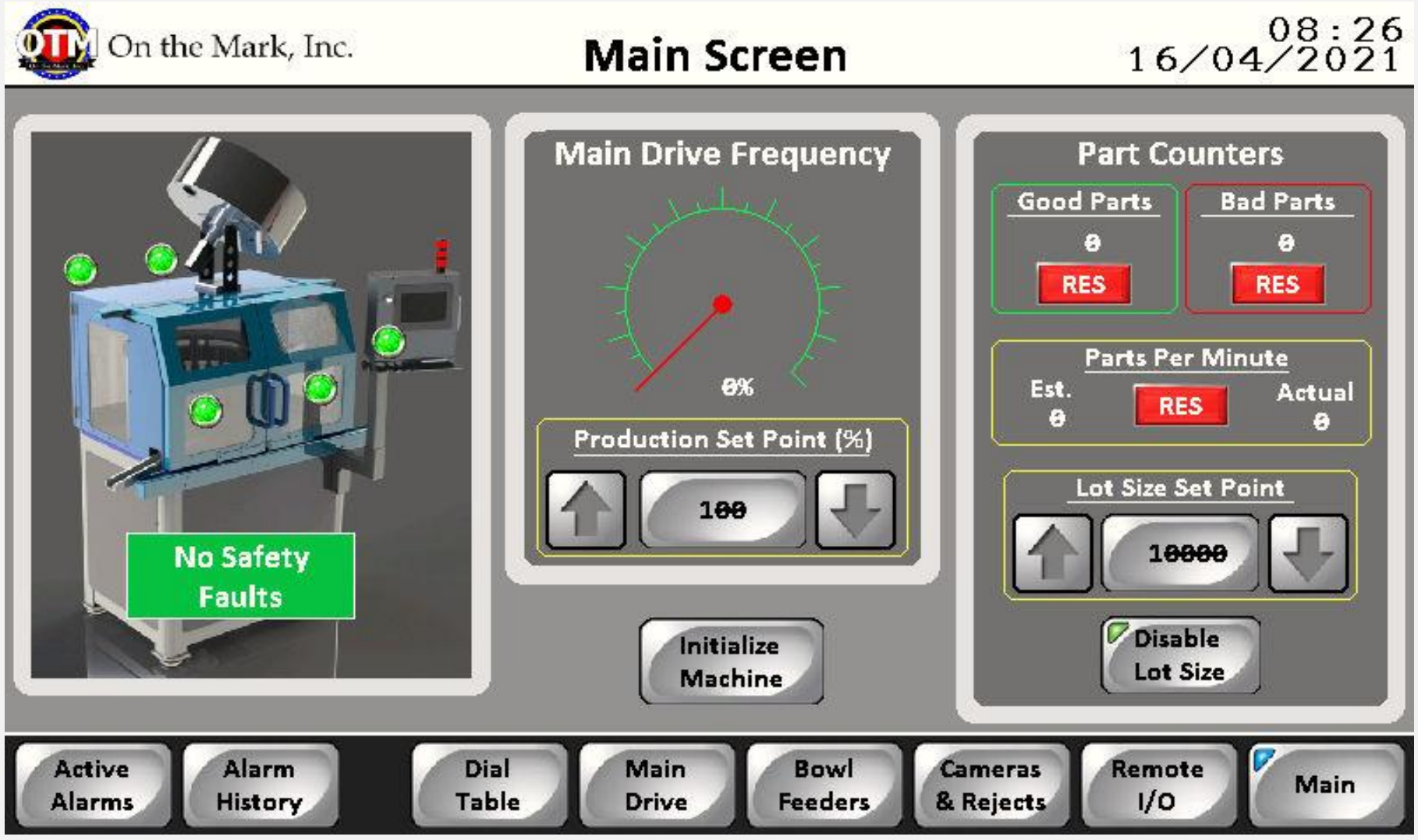

FIG.4 Primer Camera Inspection

Our proprietary OTM control is standard across all our machines. The software features many useful tools including lot point control, this allows users the ability to make the machine stop after desired set points. Only good parts past by the camera are counted to the lot. Other things include active part per minute this can be exported to use as a metric to view your machines efficiency rating. Camera controls, bowl and hopper controls, active alarms, and much more.

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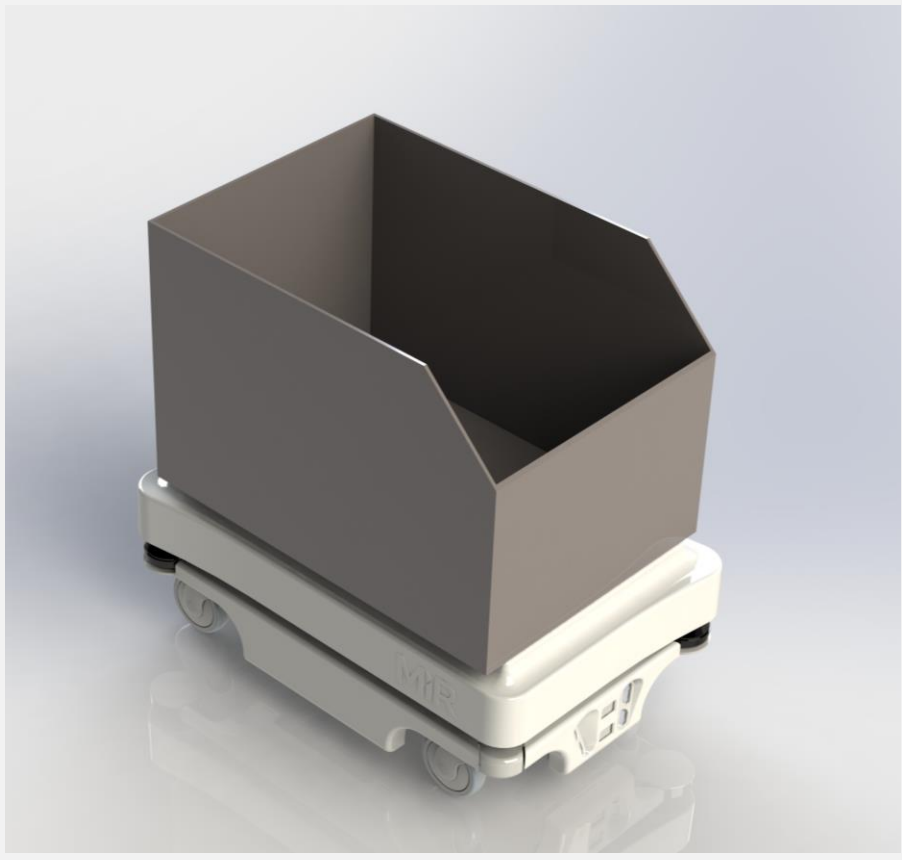
Optional Features

(Request Pricing)



Autonomous carts with self dumping hoppers. Reduce your labor by allowing automated carts to transport product from process to process. Reduce your labor costs and have the labor you have focus on building quality product and ensure your brand integrity.

OTM Machine View is a proprietary application and software that only works with OTM machinery. This application allows you to check machine status, get alarm alerts, current production rates, see reports for production time vs. down time, and much more. This can be used on any OTM machine and can be set up to control complete factories from any where in the world with a computer or mobile devise.

Hopper Conveyor to auto feed cases and bullets. This reduces the amount of attention required to keep hoppers full.

Other process automation. Looking to reduce labor, increase quality, and eliminate down time. Ask us about how factory automation and robotics can help your factory.

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Pricing Proposal OTM-2000PM

The table below includes pricing for the above listed equipment, including:

Equipment	Qty.	Price
OTM-2000PM Pistol	1	$130,000.00
Caliber Changeover OTM-2000PM		CALL FOR PRICING
OTM-2100PM Rifle	1	$145,000.00
Caliber Changeover OTM-2100PM		CALL FOR PRICING
Optional Pricing & Support Pricing		
Additional Training (US Only Pricing)	1	$1,000.00 per day per technician – Does not include Travel or Lodging which is separate. Figure 1-3 Days of Training.
Onsite Set Up (US Only Pricing)	1	$1.000.00 per day per technician – Does not include Travel or Lodging which is separate. Figure 1-2 Days Set Up.
Over the phone tech support	1	Lifetime Of Machine.
Optional Case Pre-Inspection W/Auto Eject – Inspects case mouth and primer pocket before case enters machine.	1	$18,000.00
Optional Elevator Hopper	1	$24,500.00 (per case feeder)
Optional Optical Primer Bowl Inspection	1	$10,000.00
Freight Charges	1	Transportation, crating, and any other shipping related charges the customer will be responsible for.
Terms	1	50% Down, 40% Run off at OTM, 10% Run off at end user.
Lead Time 3 to 4 Months (Lead Times May Be Greater for International Orders)		

Machine may not be exact to what is depicted above due to customer request
* Price Subject to change after 30 Days of this proposal*

If you have any questions, concerns or would like to see more information please feel free to call or email.

Tom Morgan
tomm@onthemarkindustries.com
989-317-8033

Terms & Conditions

Machinery acceptance procedures:

The approval protocol of machinery performance will be issued according to On The Mark, Inc standards. A four (4) hour run will constitute a successful F.A.T. (Factory Acceptance Test) at the On The Mark, Inc facility. A four-hour machine run without parts and at a run rate with 85% efficiency will constitute a successful S.A.T (Site Acceptance Test) at the Purchaser's facility.
Specific machinery listed in this quote may have its own specific acceptance procedure. Other acceptance procedures can be accepted by On The Mark, Inc under the condition of cost review.

Machinery Delivery and Installation at Purchaser's Facility:

On The Mark, Inc is to provide standard packaging. No special permit(s), storage costs or related delay costs are included. Installation supervision by a On The Mark, Inc technician is included.

Training:

OTM will train key personnel at the OTM facility prior and during the F.A.T. which is included in the current pricing. (Purchaser is responsible for their employee's expenses). This will be a key factor in the commissioning of the equipment at the Purchaser's facility. OTM will also provide training for ten days after S.A.T.

Spare Parts:

OTM can provide spare parts quotes as needed during the development of Purchaser's supply chain.

Delivery:

Lead time is 3-4 months.

These lead times are "after receipt of order" and based on production orders and schedules at the time of this quotation. Start date of project to be considered from date of receipt of Purchase Order, receipt of down payment and receipt of all technical and commercial details (End User Certificate). Ship dates are subject to review and confirmation at the time the order is issued, and stated terms are met.

Shipping Terms:

F.O.B.– Mount Pleasant, MI

Payment Terms:

Purchased Machines

50% Down with purchase order, 40% Upon completion of machine and F.A.T at OTM, net 15 days (before machines leave Mount Pleasant, MI). 10% Upon completion S.A.T. net 30 days.

Unless otherwise stated in our proposal our price does not include the sales, use, excise, duty, or similar taxes that may be applicable to the sale or use of the equipment. The cost of all taxes, import fees, duties, etc. shall be borne by Purchaser. All prices quoted are in U.S. dollars.

Cancellation:

See OTM Purchase Agreement terms and conditions.

Consequential Damages:

See OTM Purchase Agreement terms and conditions.

Warranty:

1-year mechanical parts & drive components

1-year standard electrical components

See OTM Purchase Agreement terms and conditions.

Safety Requirements:

Point of operation safeguarding required for the specific use of this equipment may not be included. It is Purchasers responsibility to safeguard the point of operation in accordance with current local regulations.

Terms:

See OTM Purchase Agreement terms and conditions as a part of and are inseparable from this quotation. Any terms not specifically mentioned in the commercial terms as described above are covered by the attached Terms and Conditions.

Transfer of Title:

Title of the goods remains with On The Mark, Inc, until receipt of all payments under this contract.

This Quote shall be governed by and construed in accordance with the laws of the State of Michigan without regard to conflicts-of-law principles that would require the application of any other law and excluding the Convention on International Sale of Goods. All disputes arising under or in connection with this or any other document pertaining to this shall be finally settled by arbitration in Mount Pleasant, Michigan before a single arbitrator appointed by the American Arbitration Association ("AAA") which arbitration shall be conducted under AAA's commercial arbitration rules provided, However, that discovery shall be permitted in accordance with the United States Federal Rules of Civil Procedure.

Additional Remarks:

The Acknowledgement is under reservation of an approval of the U.S. State Department, U.S. Department of Defense and all necessary U.S. Government authorities.

Proposal Expiration:

Prices quoted herein will remain in effect for a period of thirty (30) days from date of proposal. Any order resulting from this proposal will be subject to review, and acceptance by On The Mark, Inc.

Purchase Order:

Please address purchase order as follows:

On The Mark, Inc
801 Industrial Dr.
Mount Pleasant, MI 48858

We thank you for the opportunity to quote your manufacturing machinery. OTM's goal and motto is Excellence in motion, with every job we take we stive to keep that saying true and provide you with the best possible machinery for a fair price.

OTM-3000LM

ON THE MARK

AMMUNITION SOLUTIONS

November 30, 2022

Prepared by
Tom Morgan
On The Mark, Inc.

Prepared For
Richard Roberts

www.onthemarkindustries.com
tomm@onthemarkindustries.com
989-317-8033

OTM-3000LM

OTM LOADING MACHINE

FIG.1 OTM-3000LM

FIG.2 Loaded 5.56 X 45MM

Features

- Continuous motion assembly process.
- Spring loaded pins on an upper cam follower to ensure accurate OAL and smoot bullet seating.
- Sound enclosure.
- OTM-300A feed system cases and bullets.
- Primer direction check with bad part eject.
- Mouth flaring station.
- Powder drop with volumetric measuring system.
- Bullet seat and crimping stations.
- In process bullet OAL check and bad part eject.
- Quick change tooling.
- Rotary cartridge insert that is mechanically timed to prevent from having operator adjustment.
- Stack light indicators to let the operator know feeder levels are low.
- Large touch screen PLC for machine controls.
- Internet connectivity for offsite machine troubleshooting.
- E-stop and other safety features.
- Machine guarding in ¼” clear polycarbonate.
- Safety sensors on machine guarding.
- All parts machined from billed aluminums, steels and stainless.
- All fasteners are stainless steel to prevent corrosion issues.
- All parts that can be will be coated for corrosion prevention.
- Solid steel frame and no blind holes to prevent areas where primer compound can gather and cause danger.
- Using solid steel instead of square tubing also adds weight which leads to machine rigidity.
- Smooth surfaces and removeable guarding to ensure easy clean up and maintenance.
- All steel parts will be heat treated and surface ground to prevent premature ware.
- Product manual (digital and hard copy) that will include recommended ware parts, and daily maintenance.

The OTM-3000LM was built with 24/7 production in mind as we know down time cost company’s money. The OTM-3000LM strives to reduce jam points, operator adjustments, physical labor, and tooling change overs. As a hands-off approach mentality this machine is the key to great safety, check and measurable mechanisms

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On The Mark, Inc.

OTM-3000LM

The OTM-3000LM comes standard with an OTM-240A feed system. This is a 24” feeder. OTM feeders have been proven in the industry to be safe, reliable, and effective at keeping production rates up. Feeders is controlled on the main PLC and has low bowl indicators which let the operator know when the feeder needs to be filled.

Powder hopper is intentionally kept small to prevent injury if problems occur. The hopper is made from non-sparking materials that also help reduce risk of explosion. A powder delivery system can be arranged to be added to our machine this is typically stored in a dry/blast room and transported to the machine via vacuum tubes.

To ensure that cartridges are assembled correctly, there are various checks that are done in process to ensure an accurate finish product. Before the case enters the loading stations the first dial has an inspection station to check for primer presents and mouth roundness. After the powder has been dispensed there will be an optical check to validate the amount of powder was correctly installed. After the bullet is seated, there will be another optical check to validate whether the bullet is inserted to the correct length.

Figure 4 shows the continuous motion case feed system, to ensure we can run as fast as possible with out damaging parts. This machine is equipped with a case feed system that drop the cases into the stations while the machine is in motion still.

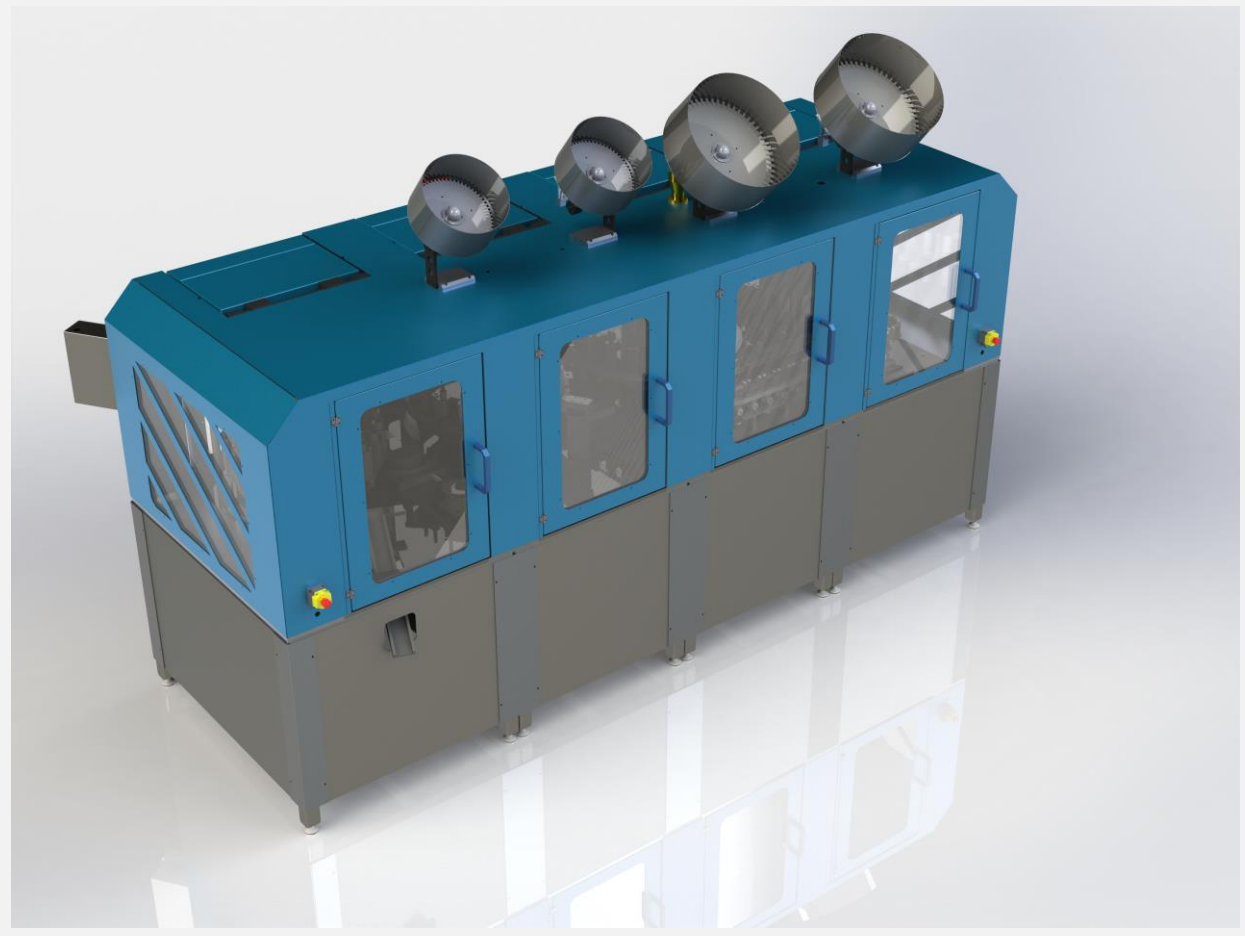

FIG.3 COMBINE HOUSING.

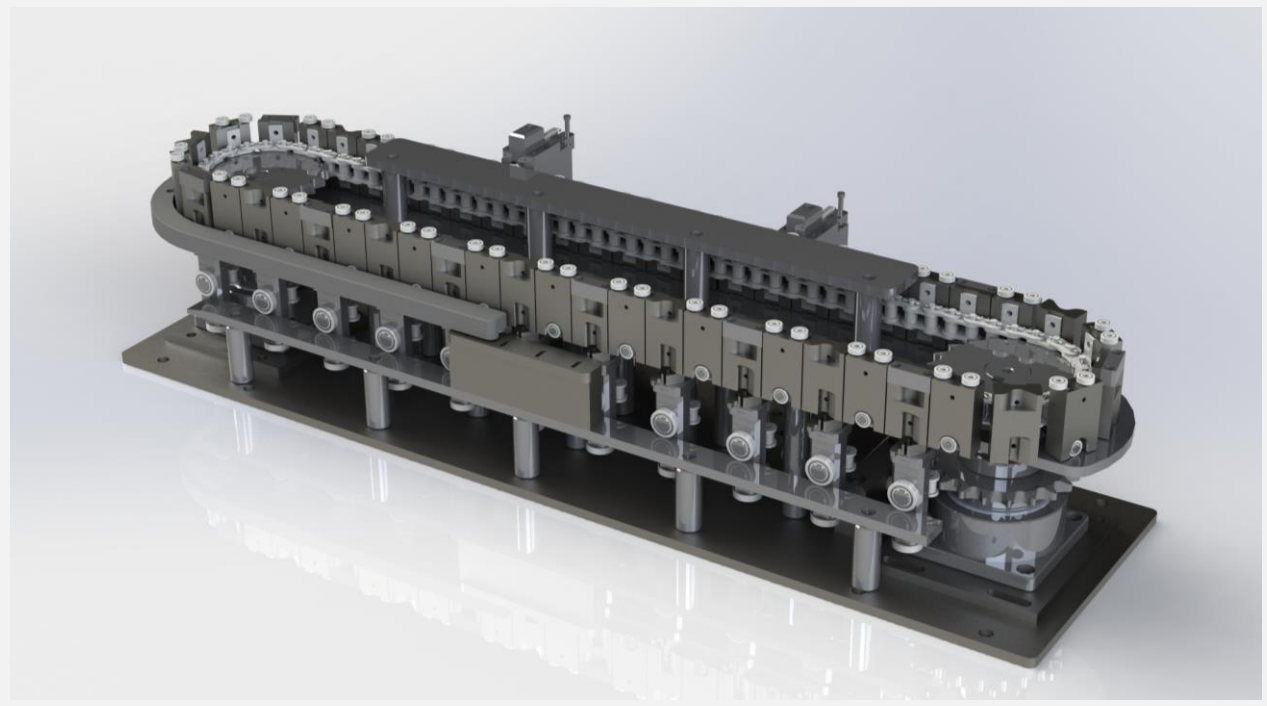

FIG.4 CONTINIOUS MOTION CASE FEED SYSTEM

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On The Mark, Inc.

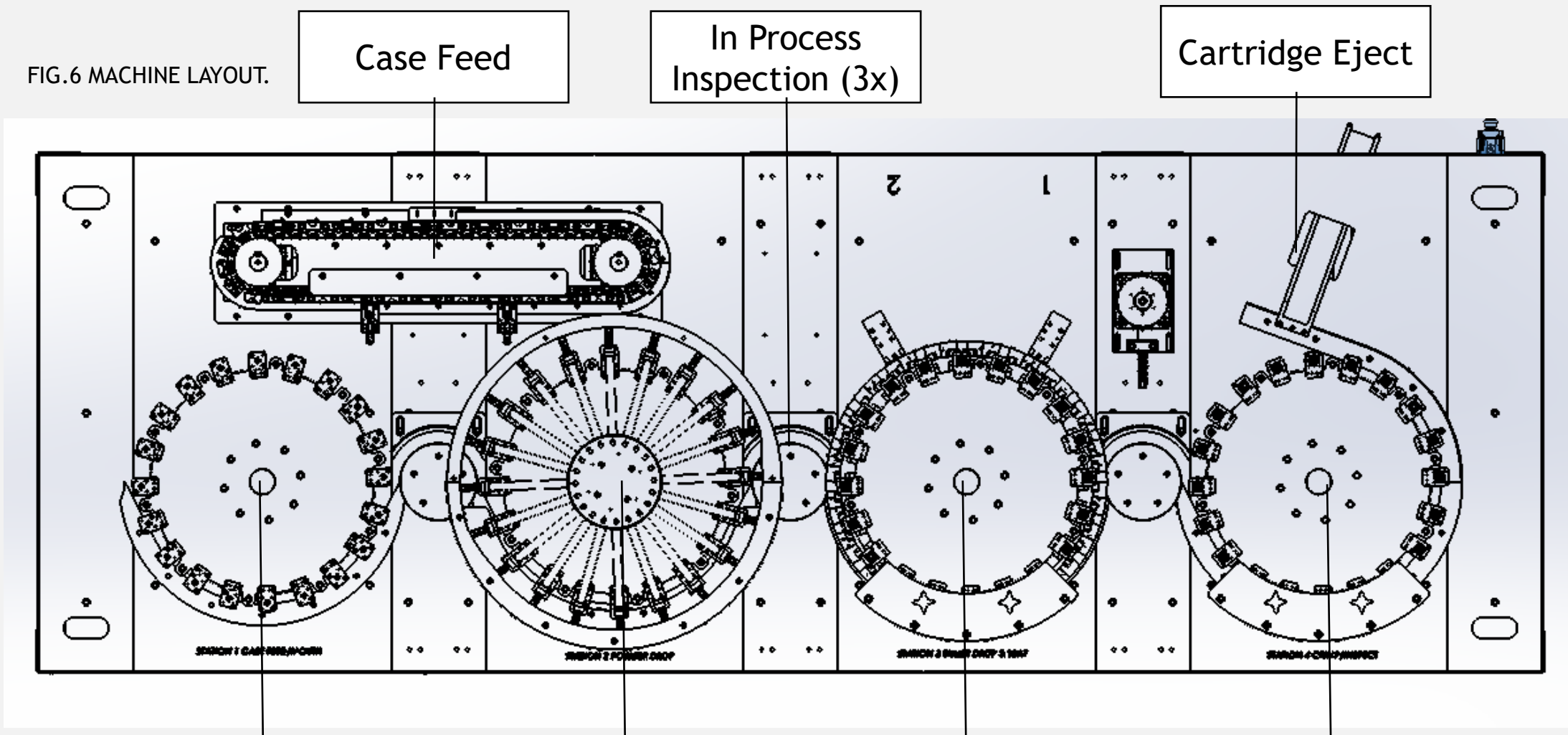
OTM-3000LM

Figure 5 shows the station holder, this station has spring-loaded precision-made fingers that hold the case through the whole process. This eliminates the need to transfer between processes and stop machine at each process. Each station has a vertical and horizontal alignment bearing which keeps the station lined up with the tooling above. These stations are connected with heavy duty No.80 roller chain, there are just under 200 identical stations on the machine.

Figure 6 shows the complete machine lay out with all of the stations and inspection points. The station travels in a counterclockwise serpentine path until it reaches the end where the loaded cartridge is ejected.

FIG.5 STATION HOLDER.

FIG.6 MACHINE LAYOUT.



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OTM-3000LM

FIG.7 Controller.

Figure 7 the 15-inch touch screen controller. This is a windows 10 based operating system which allows you to have remote connectivity. This single controller will run all operations including any auxiliary feed systems or powder delivery systems. Our custom designed software is similar to all of our other machines to allow for less training with staff turn over.

Machine Specs:

Weight:11,850 lbs
Footprint: 175.25” x 60.25” x 80” (plus feeder height)
Electrical Requirements: 480V
Feed Systems: 2 (OTM-160A) 2 (OTM-240A)
Drive system: 10hp W/Gear Box
Caliber Ranges: 380 ACP – 338 Lapua (Caliber Specific)
PPM Rates: 300+ (Pistol) 240+ (Rifle)
Air Requirements: 100 PSI

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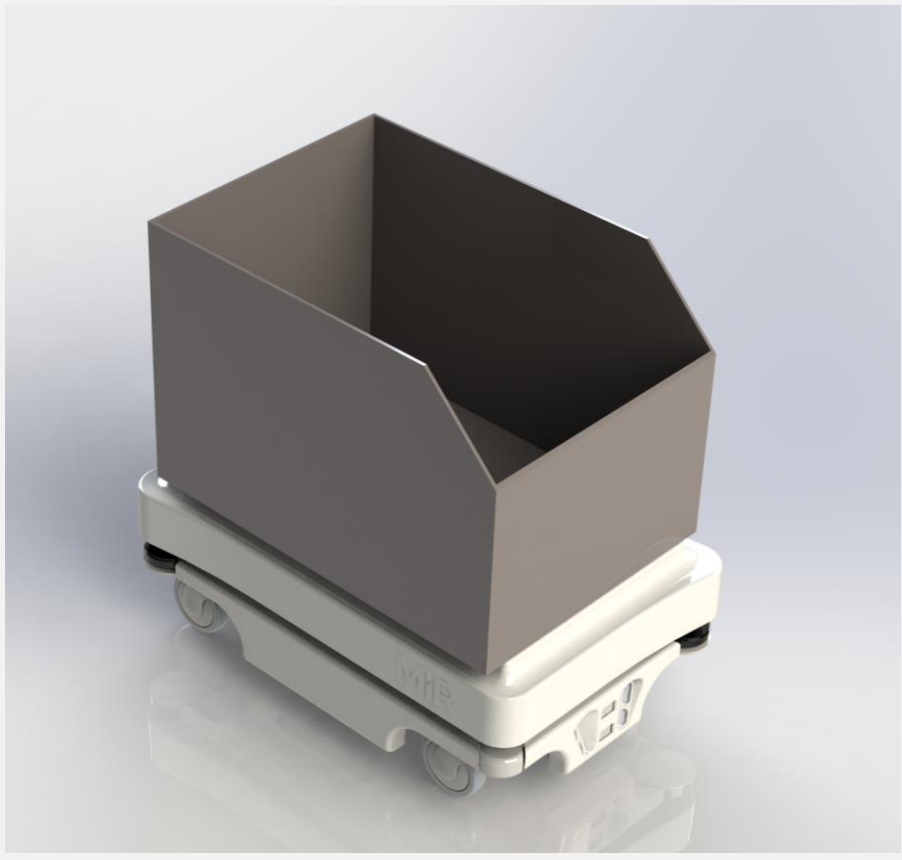
Optional Features

(Request Pricing)



Autonomous carts with self dumping hoppers. Reduce your labor by allowing automated carts to transport product from process to process. Reduce your labor costs and have the labor you have focus on building quality product and ensure your brand integrity.

OTM Machine View is a proprietary application and software that only works with OTM machinery. This application allows you to check machine status, get alarm alerts, current production rates, see reports for production time vs. down time, and much more. This can be used on any OTM machine and can be set up to control complete factories from any where in the world with a computer or mobile devise.

Hopper Conveyor to auto feed cases and bullets. This reduces the amount of attention required to keep hoppers full.

Other process automation. Looking to reduce labor, increase quality, and eliminate down time. Ask us about how factory automation and robotics can help your factory.

Pricing

The table below includes pricing for the above listed equipment, including:

Equipment	Qty.	Price
OTM-3000LM – Pistol	1	$1,350,000.00
OTM-3100LM – Small Rifle	1	$1,450,000.00
OTM-3200LM – Medium Rifle	1	$1,600,000.00
Optional Pricing & Support Pricing		
Training (US Only Pricing)	1	$1,000.00 per day per technician – Does not include Travel or Lodging which is separate
Onsite Set Up (US Only Pricing)	1	$1,000.00 per day per technician – Does not include Travel or Lodging which is separate
Over the phone tech support	1	Lifetime Of Machine.
Elevator Hopper – Would Need for (4) each	1	$26,500.00
Freight Charges	1	Transportation, crating, and any other shipping related charges the customer will be responsible for.
Terms	1	50% Down, 40% Run off at OTM, 10% Run off at end user.
Lead Time 8 to 10 Months (Lead Times May Be Greater For International Orders)		

Machine may not be exact to what is depicted above due to customer request
* Price Subject to change after 30 Days of this proposal*

****** Does Not Include Powder Delivery System but One Can be Quoted and is Available ******

If you have any questions, concerns or would like to see more information please feel free to call or email.

Tom Morgan
tomm@onthemarkindustries.com

Terms & Conditions

Machinery acceptance procedures:

The approval protocol of machinery performance will be issued according to On The Mark, Inc standards. A four (4) hour run will constitute a successful F.A.T. (Factory Acceptance Test) at the On The Mark, Inc facility. A four-hour machine run without parts and at a run rate with 85% efficiency will constitute a successful S.A.T (Site Acceptance Test) at the Purchaser's facility.
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Training:

OTM will train key personnel at the OTM facility prior and during the F.A.T. which is included in the current pricing. (Purchaser is responsible for their employee's expenses). This will be a key factor in the commissioning of the equipment at the Purchaser's facility. OTM will also provide training for ten days after S.A.T.

Spare Parts:

OTM can provide spare parts quotes as needed during the development of Purchaser's supply chain.

Delivery:

Lead time is 3-4 months.

These lead times are "after receipt of order" and based on production orders and schedules at the time of this quotation. Start date of project to be considered from date of receipt of Purchase Order, receipt of down payment and receipt of all technical and commercial details (End User Certificate). Ship dates are subject to review and confirmation at the time the order is issued, and stated terms are met.

Shipping Terms:

F.O.B.– Mount Pleasant, MI

Payment Terms:

Purchased Machines

50% Down with purchase order, 40% Upon completion of machine and F.A.T at OTM, net 15 days (before machines leave Mount Pleasant, MI). 10% Upon completion S.A.T. net 30 days.

Unless otherwise stated in our proposal our price does not include the sales, use, excise, duty, or similar taxes that may be applicable to the sale or use of the equipment. The cost of all taxes, import fees, duties, etc. shall be borne by Purchaser. All prices quoted are in U.S. dollars.

Cancellation:

See OTM Purchase Agreement terms and conditions.

Consequential Damages:

See OTM Purchase Agreement terms and conditions.

Warranty:

1-year mechanical parts & drive components

1-year standard electrical components

See OTM Purchase Agreement terms and conditions.

Safety Requirements:

Point of operation safeguarding required for the specific use of this equipment may not be included. It is Purchasers responsibility to safeguard the point of operation in accordance with current local regulations.

Terms:

See OTM Purchase Agreement terms and conditions as a part of and are inseparable from this quotation. Any terms not specifically mentioned in the commercial terms as described above are covered by the attached Terms and Conditions.

Transfer of Title:

Title of the goods remains with On The Mark, Inc, until receipt of all payments under this contract.

This Quote shall be governed by and construed in accordance with the laws of the State of Michigan without regard to conflicts-of-law principles that would require the application of any other law and excluding the Convention on International Sale of Goods. All disputes arising under or in connection with this or any other document pertaining to this shall be finally settled by arbitration in Mount Pleasant, Michigan before a single arbitrator appointed by the American Arbitration Association ("AAA") which arbitration shall be conducted under AAA's commercial arbitration rules provided, However, that discovery shall be permitted in accordance with the United States Federal Rules of Civil Procedure.

Additional Remarks:

The Acknowledgement is under reservation of an approval of the U.S. State Department, U.S. Department of Defense and all necessary U.S. Government authorities.

Proposal Expiration:

Prices quoted herein will remain in effect for a period of thirty (30) days from date of proposal. Any order resulting from this proposal will be subject to review, and acceptance by On The Mark, Inc.

Purchase Order:

Please address purchase order as follows:

On The Mark, Inc
801 Industrial Dr.
Mount Pleasant, MI 48858

We thank you for the opportunity to quote your manufacturing machinery. OTM's goal and motto is Excellence in motion, with every job we take we stive to keep that saying true and provide you with the best possible machinery for a fair price.

OTM-4000 HT PISTOL

ON THE MARK

AMMUNITION SOLUTIONS

November 30, 2022

Prepared by
Tom Morgan
On The Mark, Inc.

Prepared For
Richard Roberts

OTM-4000 HT

HEAD TURN OR TRIM MACHINE PISTOL

FIG.1 OTM-4000 T&T

FIG.2 TURNED AND TRIMED CASES

Features

- All cam operated off a single motor to actuate the machine movement.
- 1.50” machine stroke fits most pistol cartridges.
- Machine built for long life.
- Quick change tooling pods.
- Increased OAL to head turn location accuracy.
- Stack light indicators to let the operator know feeder levels are low.
- Large touch screen PLC for machine controls.
- Internet connectivity for offsite machine troubleshooting.
- E-stop and other safety features.
- Machine guarding in ¼” clear polycarbonate.
- Safety sensors on machine guarding.
- All parts machined from billed aluminums, steels and stainless.
- All fasteners are stainless steel to prevent corrosion issues.
- All parts that can be will be coated for corrosion prevention.
- Solid steel frame and no blind holes.
- Using solid steel instead of square tubing also adds weight which leads to machine rigidity.
- Smooth surfaces and removeable guarding to ensure easy clean up and maintenance.
- All steel parts will be heat treated and surface ground to prevent premature ware.
- Product manual (digital and hard copy) that will include recommended ware parts, and daily maintenance.
- 60-80 PPM run rate.
- Power requirements 220 / 480V.
- Collet part present sensor.
- Design modeled around the old Bliss No.30 which has decades of service around the world.

The OTM-4000 HT was built with 24/7 production in mind, we know down time cost companies' money that is why we strive to reduce jam points, operator adjustments, physical labor, and tooling change overs. With a set it and forget it mentality we know it is key to have great safety and check and measure mechanisms.

ON THE MARK AMMUNITION SOLUTIONS

www.onthemarkindustries.com
tomm@onthemarkindustries.com
989-317-8033

Excellence In Motion.

OTM-4000 T&T

The OTM -4000 HT comes standard with an OTM-200A feed system. This is a 20” feeder, OTM feeders have been proven in the industry to be safe, reliable, and effective at keeping production rates up. Feeder is controlled on the main PLC and has low bowl indicators which let the operator know when the feeder needs to be filled.

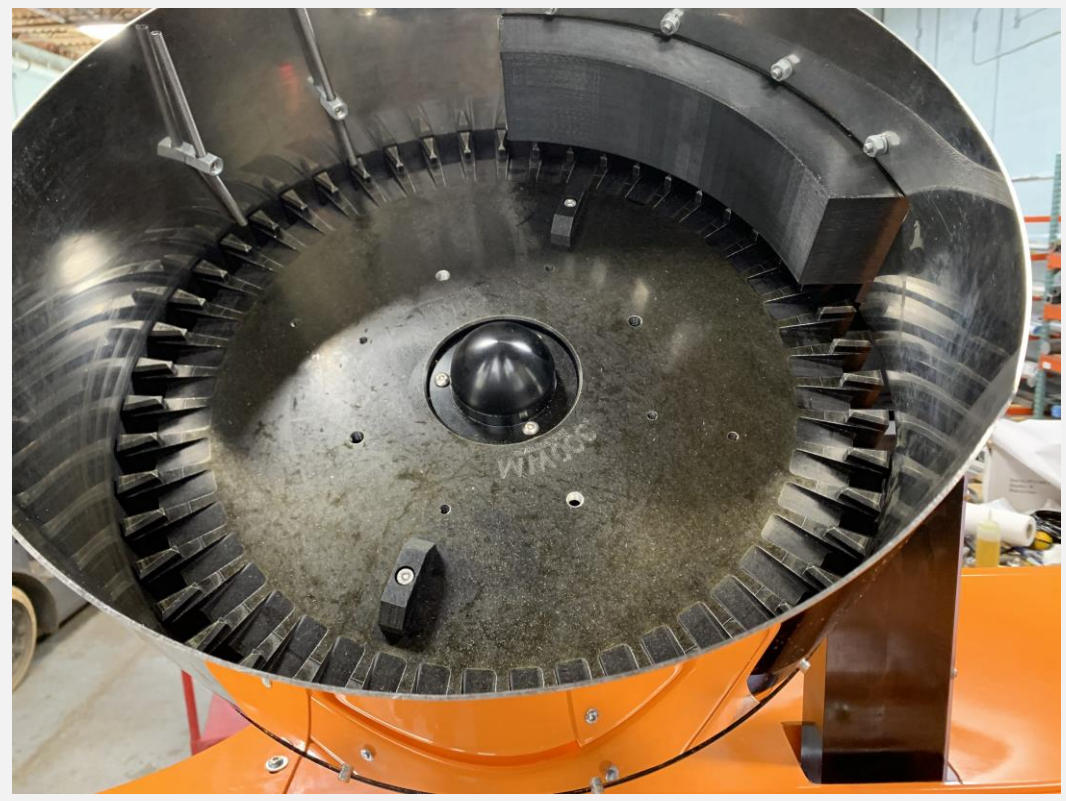

FIG.3 OTM-200A FEED SYSTEM

Designed with a through hole spindle for part access on either side of the part for rifle cartridges. If the machine is set up as a head turn, changing the machine over to trim is as simple as swapping the pins and adding the trim cutter. This allows for reduction of down time between operations.

Repeatable with in .0025” (.063mm), using cams and a heavy-duty construction we can machine cartridges more accurately than most. This leads to providing you with the most consistent and accurate parts to your customer.

This machine also features a positive open and close collet system. This eliminates the case tolerance issue that plagues the current draw back collets on the market now. You can see this in Fig. 4 the collet actuator is around the case when cutting.

Draw back collets work off a pull stud and a taper to close a collet on the part; this allows the part to move in the collet based of the diameter of the case leading to inaccurate parts.

Collet pressure is manually tightened or loosened using a easy to access adjustment nut inside the enclosure. Eliminating the need to take covers off to adjust this.

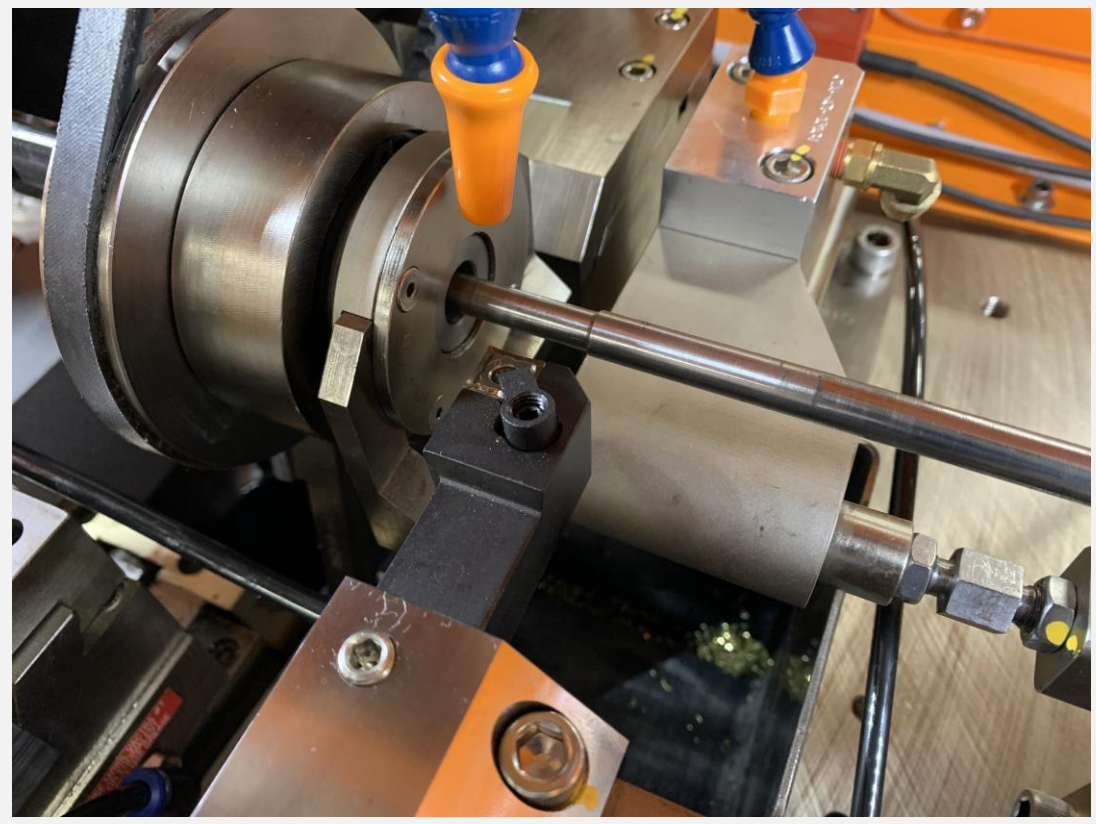

FIG.4 Trim Cutter with air blow off

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Excellence In Motion.

OTM-4000 T&T

FIG.3 Inspection Camera

Camera inspection is a standard feature on the OTM-4000. This will inspect the cases orientation as they travel down the magazine. If an upside down case is caught the camera will trigger a stop of the machine and allow the operator to remove the upside down case.

The tablet comes standard as well giving the operator a real time view of what the camera is seeing. This allows for easier operation and real time status indication. This also controls the cameras settings; operators can easily adjust settings to get the camera to operate at the optimum conditions. Camera uses a self learning software that allows it to automatically adjust for different lighting conditions and brass color changes.

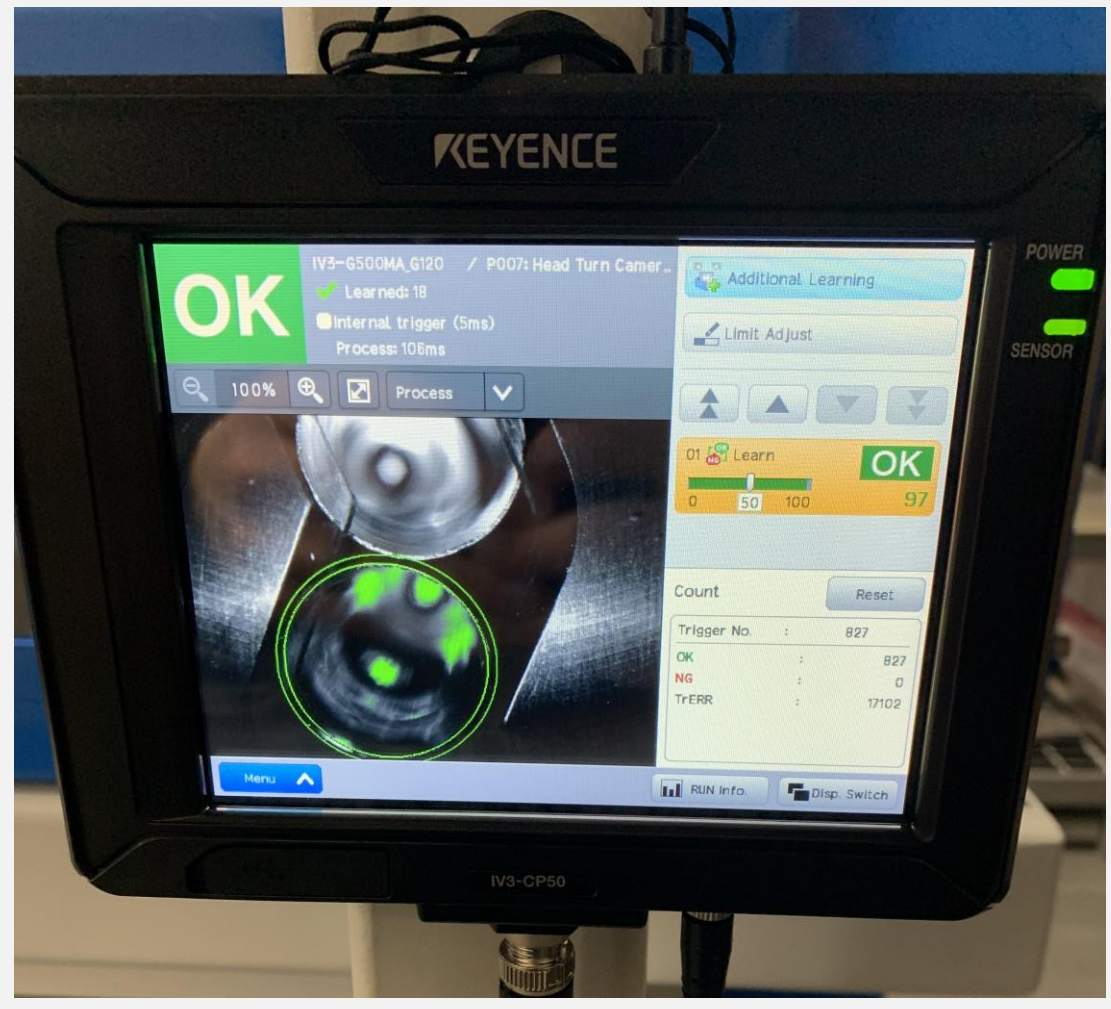

FIG.4 Camera Viewer

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OTM-4000 HT

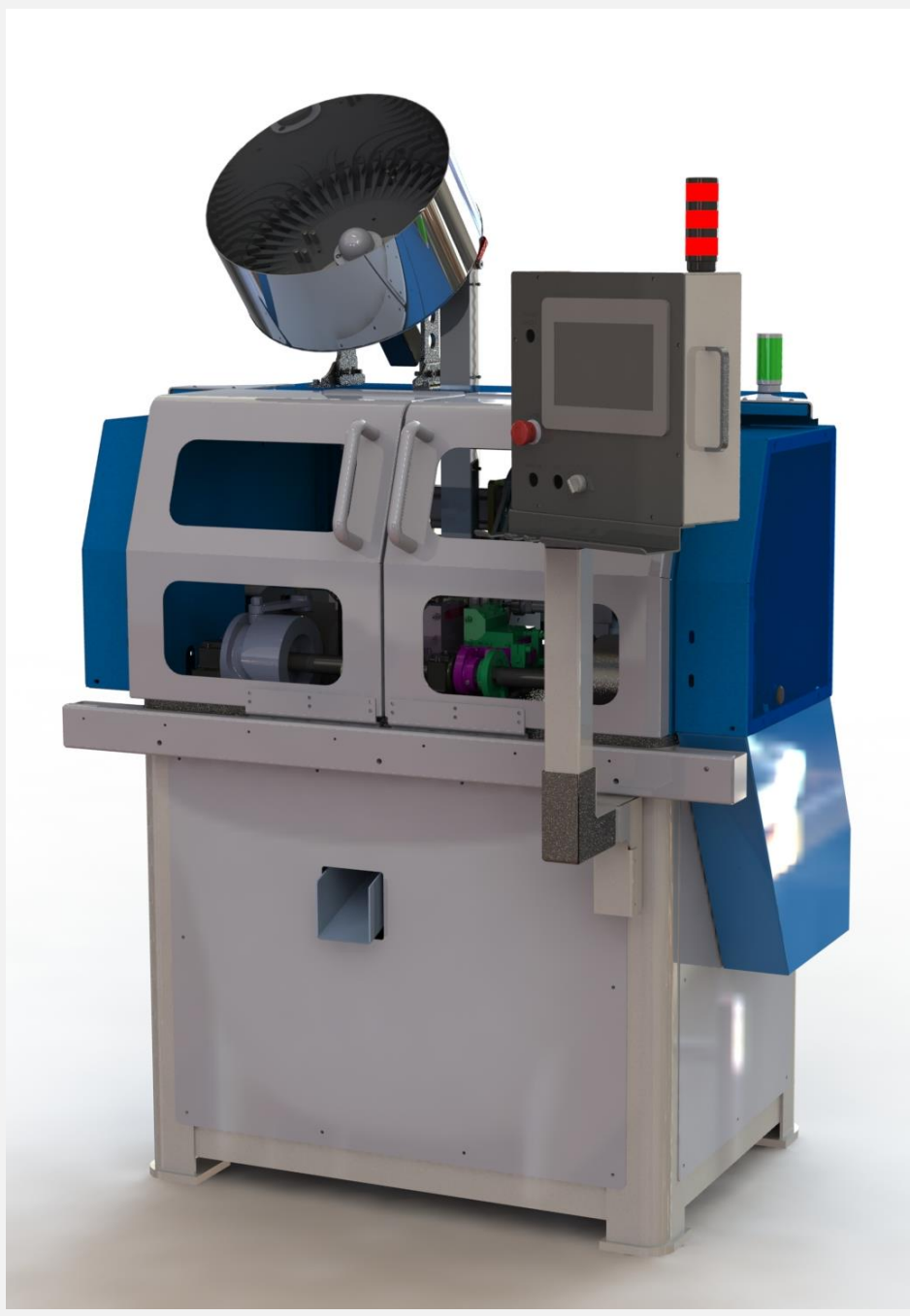

FIG.5 Front view good part exit.

FIG.6 Back view metal shaving/scrap exit.

Front

Good parts exit from the front of the machine, the machine has a flap that only opens when parts are being pushed out of the jaws. This allows the separation of metal shavings and good parts to be almost 100%.

With the good parts exiting in the front of the machine this also allows the operator to moitor the parts as they are coming out.

Part feed, part exit, and controller all on the same side for a more efficient user experience.

Back

Brass shavings will fall out of the scrap chute on the back of the machine. Small air blower to ensure all shavings exit the machine.

Large back access panel for servicing motors and other parts on the back of the machine.

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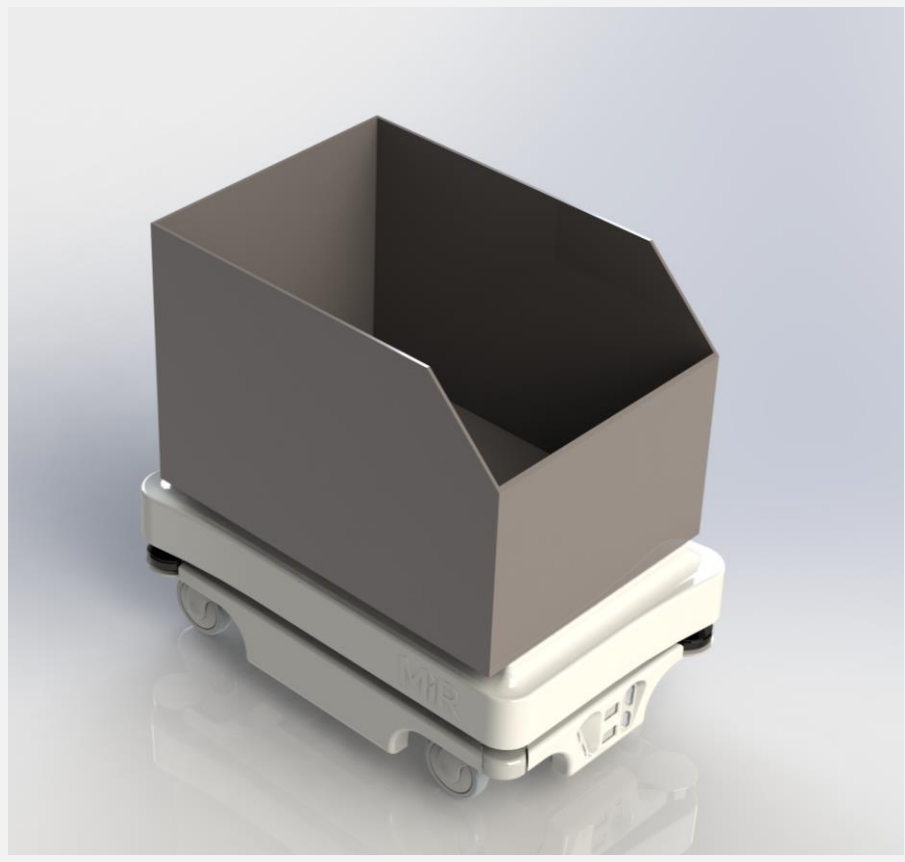
Optional Features

(Request Pricing)



Autonomous carts with self dumping hoppers. Reduce your labor by allowing automated carts to transport product from process to process. Reduce your labor costs and have the labor you have focus on building quality product and ensure your brand integrity.

OTM Machine View is a proprietary application and software that only works with OTM machinery. This application allows you to check machine status, get alarm alerts, current production rates, see reports for production time vs. down time, and much more. This can be used on any OTM machine and can be set up to control complete factories from any where in the world with a computer or mobile devise.

Hopper Conveyor to auto feed cases and bullets. This reduces the amount of attention required to keep hoppers full.

Other process automation. Looking to reduce labor, increase quality, and eliminate down time. Ask us about how factory automation and robotics can help your factory.

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Pricing

The table below includes pricing for the above listed equipment, including:

Equipment	Qty.	Price
OTM-4000 T&T	1	$125,000.00
Optional Pricing & Support Pricing		
Additional Training	1	$1,000.00 per day per technician – Does Not Include Travel or Lodging which is Separate. Figure 1 – 3 Days Training
Onsite Set Up	1	$1,000.00 per day per technician – Does Not Include Travel or Lodging which is Separate. Figure 1 – 2 Days Training
Over the phone tech support	1	Lifetime Of Machine.
Case Elevator Hopper (Optional)	1	$24,500 (per feeder)
Freight Charges	1	Transportation, crating, and any other shipping related charges the customer will be responsible for.
Terms	1	50% Down, 40% Run off at OTM, 10% Run off at end user.
Lead Time 3 to 4 Months (Lead Times May Be Greater For International Orders For Transit)		

Price good for 30 days
Machine may not be exact to what is depicted above due to customer request

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1-year standard electrical components

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BITTERROOT
TOOL & MACHINE Co

Offer No: 2957

Date: Oct 4th, 2022

Customer: Doug Roberts

Subject: Alpha Loading and Priming Machines

P.O. Box 130
497 Airport Road
Stevensville, MT 59870

Phone: 406-777-7096
Fax: 406-777-0209

MMEC

Doug Roberts-Sr. Bus Advisor
937-489-3985
Richard.robertsd4@montana.edu

Oct 4th,2022

Dear Doug,

Thank you for your interest in Alpha Loading Systems. Enclosed you will find an offer for;

Machine	**Calibers**
1 Alpha P-150	**9mm**
1 Alpha L-360ex	**9mm**
1 Alpha L-250ex	**9mm**
Changeover kits for	**.223**

The **Alpha P-150** primer machine has a run rate of 150-175ppm on **5,56** and 200-250ppm on **9mm** depending on the quality of the cases, will keep up with the L-360ex loader machine. The **Alpha L-360ex** loader machine is more caliber dedicated as it is a full mechanical machine. Run speeds on **9mm** are 220ppm and 180 ppm on **5,56** realistic and making fantastic ammunition. The **Alpha L-250ex** is a slightly less capacity but a more versatile machine as it can converted from caliber to caliber as needed. This machine runs **9mm** at 100ppm, easily will do **5,56** at 90ppm with excellent tolerances, and80-85ppm on the **7,62** stuff with great results.
Our standard payment terms are 50% deposit and balance after run off/FAT and before shipping.

Please feel free to contact me with any questions.

Regards,

Mark Bickish

Mark Bickish
Director of Sales
Alpha Loading Systems
Bitterroot Tool and Machine
497 Stevensville Airport Rd.
Stevensville, MT 59870
Work: 406-777-7096
Mobile: 406-361-1692
Email: markb@btm-mt.com

1. Alpha P-150 Small Caliber Ammunition Priming Machine

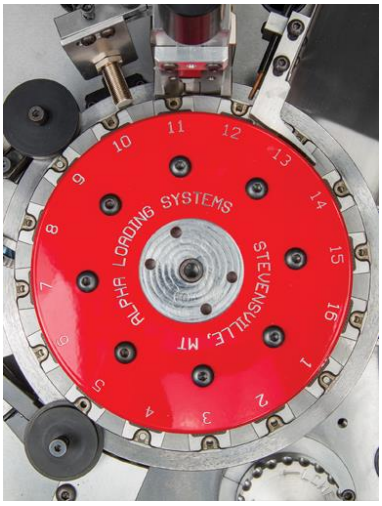
This machine is running on a continuous rotary disc with individual shell plates/case holders, which allows the machine to check the primer pocket, flash hole, primer depth, and primer presence with auto stop for any failed stations. Optional feature would be the vision inspection on the primer feed track, looking for inverted primers, anvils and priming compound. This machine has the same Alpha quality built into every part allowing for longevity and quality with each cartridge.

Features

- Multiple Calibers—Most Small to Medium Rifle and Pistol
- PPM = Pistol up to 250 PPM & Rifle up to 180 PPM
- 16 Position continuous rotation
- Manual Primer Depth Adjust
- Eliminates stacked primers
- Low Maintenance
- Easy Operation
- Simplistic Changeovers
- Controlled Primer Depths
- Rejection of Faulty Cartridges
- Manual Controls with Touch Screen Interface
- Primer Pocket Check
- Hardened and Precision Ground Tool Steel Components Where Needed
- Optional equipment includes Flash Hole Check and Camera System.

Operational Sequence

1. Case Feed
2. Primer Pocket Check
3. Flash Hole Check
4. Visual Inspection for Inverted Primer (Camera)
5. Primer Insertion into Shell Plate
6. Primer Insertion Step 1
7. Primer Insertion Step 2
8. Primer Insertion Step 3
9. Primer Check to ensure presence of primer
10. Eject



Dimensions – P-150

Hight:	84 Inches	2.133 Meters
Length:	32 Inches	81.28 Meters
Width:	38 Inches	0.914 Meters
Weight:	900 Lbs.	408.23 Kilograms

Allow 1.2m minimum around the machine for access. (suggested work area 3m x 3m x 2.4m ceiling)

Requirements

Air Requirements:	5 CFM at machine
	Clean, unfluctuating dry air
	80 psi, 1/4" line required air supply
Environment:	Controlled Environment, free of extreme temperatures or humidity.
Electrical Needs:	120Vac 15amp single phase / 230V option available
Mobile Network:	Remote Diagnostics are provided via internet. Internet connectivity is requirement to provide remote diagnostics services.
Run Rates	9mm 200-250ppm
	5,56 150-180ppm
	7,62 125-150ppm

2. Alpha L-250EX Small Caliber Ammunition Loading Machine

Alpha's L-250EX loading machines feature rotary motion that allows the cases to be accurately held in position thus ensuring consistent quality ammunition. They feature a touch screen, user interface. Alpha's loading machines use individually controlled, micro-adjustable powder drops. An automatic reject system keeps the machines running through non-critical faults without interruption.

This machine can load small pistol (.380) to larger rifle (.338 Lap mag) rounds on the same machine with an intuitive changeover. The L-250EX incorporates a split ram/tooling head, stationary powder drops, adjustable stroke mechanical drive system and touch screen automated controls.

Features – L-250EX

- 16 position indexable loader, with 20 shell holders
- Duel Powder Drop.
- Blast resistant polycarbonate doors & Airlock doors.
- OAL Micrometer
- Sealed tabletop with removable bulkhead plates
- Separate powder reservoir with automated feed with 700-900 grains per slide
- Separated powders slides with blast tube guards.
- IP 65 cabinets, IP 55 control center
- Pneumatic actuated case, powder & bullets slide.
- Allen Bradley PLC controls with HMI screen
- Individual case inserts for caliber changeovers
- Case & Bullet feed with BTM bespoke collator
- Remote modem
- Max Stroke 100 PPM
- Second Powder Drop
- Laser Powder Check
- Auto Reject System
- Partial Case Gage
- Tapered Crimp

Operational Sequence

1. Case Feed
2. debris check
3. Open
4. Open
5. Bell Mouth
6. 1st Powder Drop
7. 2nd Powder Drop
8. 1st Powder Check/Laser
9. 2nd Powder Check/laser
10. Bullet Drop/Seat
11. Secondary Seating Punch
12. Laser OAL Check
13. Tapered crimp
14. Partial Case Gauge Check
15. Reject
16. Eject

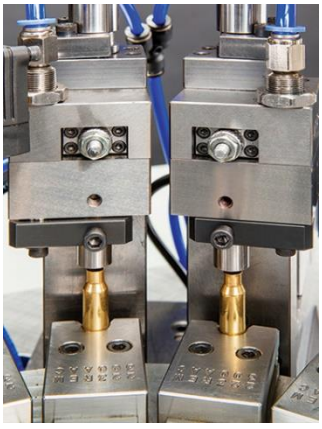
Dimensions – L-250EX

Hight:	84 Inches	2.133 Meters
Length:	36 Inches	.914 Meters
Width:	48 Inches	1.22 Meters
Weight:	1,200 Lbs.	544.3 Kilograms

Allow 1.2m minimum around the machine for access. (suggested work area 3m x 3m x 2.4m ceiling)

Requirements

Air Requirements:	5 CFM at machine
	Clean, unfluctuating dry air
	80 psi, 1/4" line required air supply
Environment:	Controlled Environment, free of extreme temperatures or humidity.
Electrical Needs:	120Vac 15amp single phase / 230V option available
Mobile Network:	Remote Diagnostics are provided via internet. Internet connectivity is requirement to provide remote diagnostics services.



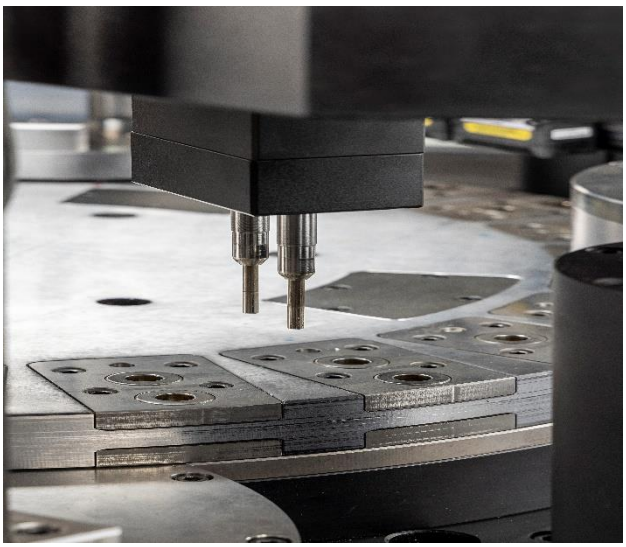
Capacity 9mm 100ppm 5,56 90ppm 7,62 80ppm

3. Alpha L-360EX Small Caliber Ammunition Loading Machine

Alpha's L-360EX loading machine features a Mechanically driven rotary indexer with individual case inserts being held with higher shell holder allowing cases to be held in position thus ensuring consistent quality ammunition. The great features of this machine include the size retaining case feed, full auto reject of any failed station, without shutting down machine increasing productivity, both laser and physical length checks, micro adjustable powder drops, user friendly touch screen controls, full cartridge check and the orientated cartridges at the end.

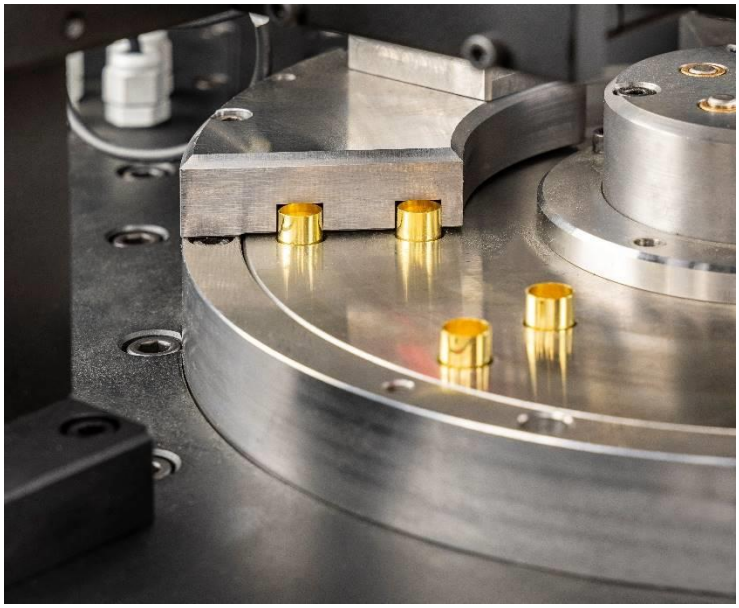
Features – L-360EX

- 24 position indexable loader, with 20 Dual shell holders
- Dual Powder Drop
- 3hp electric motor – ATEX
- Blast resistant polycarbonate doors & Airlock doors
- OAL Micrometer
- Sealed tabletop with removable bulkhead plates
- Separate powder reservoir with automated feed with 700-900 grains per slide
- Tandem powder slides with blast tube guards
- IP 65 cabinets, IP 55 control center - ATEX
- Mechanically actuated case, powder & bullets slide
- Allen Bradley PLC controls with HMI screen
- Mechanically controlled case feed, powder feed and bullet feed
- Reciprocating Ram with tooling plates
- Case & Bullet feed with Vibratory feeders
- Remote powder delivery-optional
- Remote modem for factory tech support
- Max Stroke 240 PPM
- OAL check laser and Physical Datum length check
- Auto reject of faulty station
- Bullet latch
- Secondary seating punch
- Case orientated discharge
- Full cartridge case check
- Case size retaining feed
- Tapered Crimp



Operational Sequence

1. Case Feed
2. Case Check
3. Open
4. Open
5. Bell Mouth
6. 1st Powder Drop
7. 2nd Powder Drop
8. 1st Powder Check/Laser
9. 2nd Powder Check/laser
10. Bullet Drop/Seat
11. Secondary Seating Punch
12. Tapered Crimp
13. Laser OAL check/
14. Datum Length check
15. Full Case Gauge Check
16. Reject
17. Eject



Dimensions – L-360EX

Hight:	84 Inches	2.133 Meters
Length:	36 Inches	.914 Meters
Width:	48 Inches	1.22 Meters
Weight:	3,000 Lbs.	1,360.0 Kilograms

Allow 1.2m minimum around the machine for access. (suggested work area 3m x 3m x 2.4m ceiling)

Requirements

Air Requirements:	5 CFM at machine
	Clean, unfluctuating dry air
	80 psi, 1/4" line required air supply
Environment:	Controlled Environment, free of extreme temperatures or humidity.
Electrical Needs:	120Vac 15amp single phase / 230V option available
Mobile Network:	Remote Diagnostics are provided via internet. Internet connectivity is requirement to provide remote diagnostics services.

Price

1 Alpha P-150 Primer machine- 9mm	**$ 89,500.00**
Camera Inspection system	**Inc**
1 Changeover kit for .**223/5,56**	**$ 4,500.00**

1 Alpha L-360Ex Ammunition Loading Machine-9mm	**$ 495,000.00P/ $525,000.00R**
Tandem case and bullet feeders	**Inc**
Auto Reject	**Inc**
Double Laser Powder Checks	**Inc**
Laser OAL Check	**Inc**

1 Alpha L-250Ex Ammunition Loading Machine-9mm	**$ 159,500.00**
Tandem case and bullet feeders	**Inc**
Auto Reject	**Inc**
Double Laser Powder Checks	**Inc**
Laser OAL Check	**Inc**
1 Changeover kit for **.223/5,56**	**$ 21,500.00**

Prices are in U.S. Dollars

Terms

The following represent terms and conditions specific to this proposal. A complete list of our Standard Terms and Conditions are attached.

Delivery Terms

9-12 Months from down payment and signed quote forL-360 loader machines and 4-5 months on all other machines.

Incoterms

EXW, Stevensville, Montana, USA.

Payment Terms

50% deposit for a down payment and the balance after Runoff/FAT and before shipping.

Run-Off Terms

Run-Off Components - Customer shall furnish all components deemed necessary by us for fabrication of the ordered product in new or working condition to BTM no less than thirty (30) days prior to our run-off/FAT date.

Components necessary for the Machine Run off/FAT shall include:

Machine	Set Up	Training
Alpha Loading Machines	5,000 units	50,000 units

Run-off in Montana is expected to be 3-5 days.

Product manufactured in set-up will not be eligible for resale. Any and all ammunition or Products produced during Runoff/FAT test shall not be made available for resale and disposal of the same shall be the sole and separate responsibility of Customer.

Customer shall provide BTM with all load data and specifications with the initial Purchase Order on Customer's company letterhead, signed by company owner or authorized agent. Customer shall be solely responsible for all inspection, testing and any liability associated with product production. Customer acknowledges and assumes all responsibility and liability for the unsatisfactory function of product if Customer does not provide needed components for runoff and/or fails to accept BTM training reasonably necessary.

Attachments

Standard Terms and Conditions

International Wire Instructions

BRUDERER

January 26, 2023

Montana Manufacturing Extension Center

Attn: Mr. Doug Roberts

Dear Mr. Roberts,

Reference is made to your recent correspondence with our Mr. Scott Randall regarding production equipment capable of producing 9mm Case/Projectile and 556 Case/Projectile components. As requested below please find some budgetary pricing for the required machinery.

9mm Bullet Components:

1. Invernizzi Model PMA C-9mm fed by Annealed Strip to produce **9mm CASEs**
    a. Tonnage: 120 Ton
    b. Speed: 120spm Producing 2 Parts Per Stroke for 240 parts per minute
    c. # of Station 10 + 10 (2 Rows)

    Cost Estimate: $ 1,650,000.00
2. Invernizzi Model PMA B-9mm fed by Annealed Strip or by Annealed Cup to produce **9mm BULLETs**
    a. Tonnage: 120 Ton
    b. Speed: 120spm Producing 2 Parts Per Stroke for 240 parts per minute
    c. # of Stations: 11 + 11 (2 Rows)

    Cost Estimate: $ 1,250,000.00

5.56 cal. Bullet Components:

1. Invernizzi Model PMA C-5.56 Double fed by cup to **produce 5.56 drawn cup** (shell – 1st draw prior to anneal)
    a. Tonnage: 120 Ton
    b. Speed: 120spm Producing 2 Parts Per Stroke for 240 parts per minute
    c. # of Stations 6 + 6 (2 Rows)

    Cost Estimate: $ 1,450,000.00
2. Invernizzi Model PMA C-5.56 Double (2) fed by annealed drawn cup (Produced with machine above) to **produce 5.56 rifle case.**
    a. Tonnage: 120 Ton
    b. Speed: 120spm Producing 2 Parts Per Stroke for 240 parts per minute
    c. # of Stations 7 + 7 (2 Rows)

    Cost Estimate: $ 1,750,000.00
3. Invernizzi Model PMA – Hybrid B-5.56 fed by annealed cups or annealed strip **to produce 5.56 BULLETs**
    a. Tonnage 60 Ton
    b. Speed 90-120spm Single Row (Depends on Bullet Configuration – FMJ etc.)
    c. # of Stations 17

    Cost Estimate: $ 1,650,000.00

We invite you to visit us at our NJ location to have further in depth discussions regarding your complete production requirements. We work with several other manufacturers here in the US that can assist with the overall scope of a turn key ammunition facility.

BRUDERER MACHINERY INC. **1200 Hendricks Causeway** **Tel: 1 201 941 2121** info@brudereramericas.com
Serving the Americas **Ridgefield, New Jersey 07657** **Fax: 1 201 886 2010** www.brudereramericas.com

Discussion Points:

- Tooling Illustrations on Page 3/4
- Equipment Delivery – Current lead time for the line is 11-12 Months after receipt of PO and clarification of all technical details.
- All above equipment quoted to latest OSHA/ANSI/CE Standards. Additional requirements will be against additional cost.
- Payment Terms:
    - 50% With Order
    - 40% At Equipment Shipment after customer acceptance
    - 10% After Start-Up at Customer facility.

Thank you for considering Bruderer Machinery Inc. for your production requirements and should you need anything further please do not hesitate to contact us at any time.

Best Regards

Alois J Rupp
President

9mm Case

9mm Projectile

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Ridgefield, New Jersey 07657

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5.56 Shell

5.56 Final Case

5.56 Bullet

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FORMAX 2000 Pistol Munitions Machines - FX35/FX36

Standard Features

- Precision Zero-Clearance Heading Slide Guiding system
- Precision linear feed system
- Bushing type quill and cutter
- Cutoff blank drop control
- Formapak, including toolpak, diepak and transfer slide with removable camshaft
- Zero-Clearance Straight Across Transfer
- Automatic adjustment of feed and die kickout to preset length
- Adjustable punch kickout in all punches
- Parts discharge conveyor
- Air clutch and spring-set brake
- Exhaust ventilation
- Formatrol PC advanced controls
- Safety systems for operator and machine
- Machine lube system with dual filters
- Die coolant system with magnetic filter
- Single-speed AC drive
- Free-standing sound enclosure

Munition Features

- Internal die coolant - 2nd & 3rd Dies
- Perforated scrap pan for small slugs
- Water soluble coolant system and external settling tank
- Transfer specials for water soluble die lubrication
- Lighter springs on transfer units
- Spl soft belt discharge conveyor
- Spl discharge chute (water resistant/ soft discharge)

Optional Features

- Extra Formapak
- Formapak set up fixture
- Formapak jib crane
- Extra transfer
- Extra Cutter/Quill Pak
- Micro Position Monitor
- Electrostatic filter
- Spare parts package
- Digital Machine Positioning (requires VSD)
- Short Feed Safety
- Variable-speed frequency-controlled AC drive

Standard specifications - All dimensions are **MILLIMETERS** unless otherwise noted

	MEDIUM WORK (M)		LONG WORK (L)	
Machine	**FX35**	**FX36**	**FX35**	**FX36**
Strokes per min. - single speed	300	275	255	255
Strokes per min. - variable speed	100/300	100/275	85/255	85/255
Total heading load (kN)	700		700	
Max Cutoff diameter (600 N/mm^2)	12.0		12.0	
Cutoff length (min./max.)	6/100		10/125	
Kickout stroke - die (min./max.)	8/75		16/100	
Kickout stroke - punch (min./max.)	12/32		12/32	
Die diameter	60		60	
Punch diameter	50		50	

Machine	FX35	FX36
Formapak weight (kg) 1*	275	305
Motor size (kW)	22	30
Net weight (kg)*	13,300	13,700
Boxed weight (kg)*	15,800	16,300
Floor space width (m) *	2.31	2.9
Floor space length (m)*	4.75	4.9
Height (m)*	2.19	2.3

1 Weight of complete pak as removed from machine
***Estimated**

As we are constantly striving to improve our products, discrepancies may exist between the actual product and the descriptions or photographs here, resulting from design modifications, specification changes and special or optional features which are extra as quoted.

NATIONAL® MACHINERY
NATIONAL MACHINERY LLC, 161 GREENFIELD ST., TIFFIN, OHIO 44883-2471,U.S.A
TELEPHONE: (1) 419-447-5211 FAX: (1) 419-443-2380
"The World Standard for Excellence"

Item M6051E

FORMAX 2000 Pistol Munitions Machines - FX35/FX36

Standard Features

- Precision Zero-Clearance Heading Slide Guiding system
- Precision linear feed system
- Bushing type quill and cutter
- Cutoff blank drop control
- Formapak, including toolpak, diepak and transfer slide with removable camshaft
- Zero-Clearance Straight Across Transfer
- Automatic adjustment of feed and die kickout to preset length
- Adjustable punch kickout in all punches
- Parts discharge conveyor
- Air clutch and spring-set brake
- Exhaust ventilation
- Formatrol PC advanced controls
- Safety systems for operator and machine
- Machine lube system with dual filters
- Die coolant system with magnetic filter
- Single-speed AC drive
- Free-standing sound enclosure

Munition Features

- Internal die coolant - 2nd & 3rd Dies
- Perforated scrap pan for small slugs
- Water soluble coolant system and external settling tank
- Transfer specials for water soluble die lubrication
- Lighter springs on transfer units
- Spl soft belt discharge conveyor
- Spl discharge chute (water resistant/ soft discharge)

Optional Features

- Extra Formapak
- Formapak set up fixture
- Formapak jib crane
- Extra transfer
- Extra Cutter/Quill Pak
- Micro Position Monitor
- Electrostatic filter
- Spare parts package
- Digital Machine Positioning (requires VSD)
- Short Feed Safety
- Variable-speed frequency-controlled AC drive

Standard specifications - All dimensions are **INCHES** unless otherwise noted

	MEDIUM WORK (M)		LONG WORK (L)	
Machine	**FX35**	**FX36**	**FX35**	**FX36**
Strokes per min. - single speed	300	275	255	255
Strokes per min. - variable speed	100/300	100/275	85/255	85/255
Total heading load (kN)	70		70	
Max Cutoff diameter (85,000 psi)	.472		.472	
Cutoff length (min./max.)	.236/3.937		.394/4.921	
Kickout stroke - die (min./max.)	.315/2.953		.630/3.937	
Kickout stroke - punch (min./max.)	.472/1.260		.472/1.260	
Die diameter	2.362		2.362	
Punch diameter	1.968		1.968	

Machine	FX35	FX36
Formapak weight (lbs) 1*	605	673
Motor size (hp)	30	40
Net weight (lbs)*	29,327	30,430
Boxed weight (lbs)*	34,839	35,941
Floor space width *	7'7"	9’6”
Floor space length *	15'7"	16’1”
Height*	7'2"	7’6”

1 Weight of complete pak as removed from machine
*** Estimated**

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FORMAX Plus Rifle Munitions Machines - FXP36M-R/FXP46M-R

Standard Features

- Precision Zero-Clearance Heading Slide Guiding system
- Precision linear feed system
- Bushing type quill and cutter
- Cutoff blank drop control
- Formapak, including toolpak, diepak and transfer slide with removable camshaft
- Pick-Move-Place transfer with hydraulic clamping
- Automatic adjustment of feed and die kickout to preset length
- Adjustable punch kickout in all punches
- Scrap conveyor
- Air clutch and spring-set brake
- Exhaust ventilation
- Formatrol PC advanced controls
- Safety systems for operator and machine
- Machine lube system with dual filters
- Die coolant system with magnetic filter
- Variable-speed frequency-controlled AC drive
- Free-standing sound enclosure

Munition Features

- Internal die coolant
- Perforated scrap pan for small slugs
- Water soluble coolant system and external settling tank
- Transfer specials for water soluble die lubrication
- Lighter springs on transfer units

Optional Features

- Extra Formapak
- Formapak set up fixture
- Formapak jib crane
- Extra transfer
- Extra Cutter/Quill Pak
- Micro Position Monitor
- Electrostatic filter
- Spare parts package
- Digital Machine Positioning
- Short Feed Safety
- Spl discharge chute (water resistant soft discharge)
- Spl soft belt discharge conveyor

Standard specifications - All dimensions are **MILLIMETERS** unless otherwise noted

Machine	FXP36M-R	FXP46M-R
Strokes per min. - variable speed	100/300	80/240
Total heading load (kN)	700	1200
Max Cutoff diameter (600 N/mm^2)	12.0	16.0
Cutoff length (min./max.)	6/100	4/56
Kickout stroke - die (min./max.)**	8/75	10/62
Kickout stroke - punch (min./max.)	12/32	15/40
Die diameter	60	80
Punch diameter	50	60

Machine	FXP36M-R	FXP46M-R
Formapak weight (kg) [1]*	280	530
Motor size (kW)	22	37
Net weight (kg)*	13,700	25,600
Boxed weight (kg)*	16,600	29,900
Floor space width (m)*	2.42	2.73
Floor space length (m)*	4.75	5.33
Height (m)*	2.19	3.09

1 Weight of complete pak as removed from machine
*** Estimated**
**** No die kick in 6th station**

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Item M6061E

FORMAX Plus Rifle Munitions Machines - FXP36M-R/FXP46M-R

Standard Features

- Precision Zero-Clearance Heading Slide Guiding system
- Precision linear feed system
- Bushing type quill and cutter
- Cutoff blank drop control
- Formapak, including toolpak, diepak and transfer slide with removable camshaft
- Pick-Move-Place transfer with hydraulic clamping
- Automatic adjustment of feed and die kickout to preset length
- Adjustable punch kickout in all punches
- Scrap conveyor
- Air clutch and spring-set brake
- Exhaust ventilation
- Formatrol PC advanced controls
- Safety systems for operator and machine
- Machine lube system with dual filters
- Die coolant system with magnetic filter
- Variable-speed frequency-controlled AC drive
- Free-standing sound enclosure

Munition Features

- Internal die coolant
- Perforated scrap pan for small slugs
- Water soluble coolant system and external settling tank
- Transfer specials for water soluble die lubrication
- Lighter springs on transfer units

Optional Features

- Extra Formapak
- Formapak set up fixture
- Formapak jib crane
- Extra transfer
- Extra Cutter/Quill Pak
- Micro Position Monitor
- Electrostatic filter
- Spare parts package
- Digital Machine Positioning
- Short Feed Safety
- Spl discharge chute (water resistant soft discharge)
- Spl soft belt discharge conveyor

Standard specifications - All dimensions are **INCHES** unless otherwise noted

Machine	FXP36M-R	FXP46M-R
Strokes per min. - variable speed	100/300	80/240
Total heading load (kN)	70	120
Max Cutoff diameter (85,000 psi)	.472	.630
Cutoff length (min./max.)	.236/3.937	.157/2.204
Kickout stroke - die (min./max.)**	.315/2.952	.393/2.440
Kickout stroke - punch (min./max.)	.472/1.260	.591/1.575
Die diameter	2.362	3.150
Punch diameter	1.969	2.362

Machine	FXP36	FXP46
Formapak weight (lbs) [1]*	615	1170
Motor size (hp)	30	50
Net weight (lbs)*	30,200	56,400
Boxed weight (lbs)*	36,400	65,900
Floor space width*	7'11"	9’0”
Floor space length*	15'7"	17’6”
Height*	7'2"	10’2”

1 Weight of complete pak as removed from machine
*** Estimated**
**** No die kick in 6th station**

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BAKER TECHNOLOGY ASSOCIATES

Budgetary Proposal No:
#JC-060121-R1

Presented to:

An Automated, Copper Plating Line for Lead Bullets

June 1, 2021
Rev. 1

DRAFT

We would like to point out things to consider as your review this proposal:

- **This quotation was provided to Customer for free, but at substantial cost and effort to BTA. Therefore, we hope that you will respect that these efforts remain confidential especially the information and pricing contained herein. This information may, of course, be used within your organization for purposes of evaluating our offering relative to that of the competition, but we respectfully request that you do not distribute copies to outside persons or companies without our written permission. We sincerely thank you for this respect.**
- **BTA is a "systems integrator"…. we work with numbers of equipment subcontractors to assemble a cost-effective system that will provide the customer with quality results at an economical capital and operating expense. We believe that this is a strength as it allows us to choose among several strategic partners to design and fabricate a line that meets your requirements at the most competitive price. We are not tied to our own or any single vendor's manufacturing techniques, designs and costs. We can choose vendors that best fit the requirements of the project.**
- **BTA is not a chemical vendor. However, we believe that, as a company, we have significant experience with the chemical processes utilized by the machine offered in this proposal. Furthermore, we have had Columbia Chemical, a leading supplier of chemistry to the metal finishing industry, review the process parameters and conceptual design of the equipment and they have found it compatible for optimal performance of their chemical processes.**
- **We believe we have thoroughly documented what we are supplying. However, this document describes a conceptual design and as BTA and our subcontractors go through our engineering efforts, there may be changes required for the final, executed design.**
- **We hope you will note that BTA has expended significant efforts to develop this detailed, conceptual design. We go through this effort because, in the end, we want our potential clients to be confident in what they are buying. In addition, we believe that this level of detail leads to fewer mistakes, and of more importance, fewer if any change orders.**
- **We believe we provide a very complete and descriptive proposal…. perhaps the most thorough that you have received. However, please be aware that this is only our conceptual design. With our years of experience, we believe it to be accurate. However, minor modifications may occur, and should we be fortunate to receive this contract and then engineer the design.**
- **Please be aware that, while we believe that this proposal is very accurate, it is still a conceptual design. Parameters and details may change as we execute engineering to revise the design from a concept to an engineered, final design ready for execution.**

Please be aware that this proposal includes the following documents:

1. A plan view drawing of the process line
2. A plan view drawing of the ancillary equipment
3. An equipment spreadsheet that summarizes the concept design

Baker Technology Associates Inc.
1507 7th St., Ste. 446
Santa Monica, CA. 90401

Project Summary

1. The process line shall be capable of plating lead bullets with a cyanide copper deposit using 14"Ø x 36" barrels.
2. In our base bid, the work is manually loaded into and unloaded from the barrels offline. The work is dumped wet into spin baskets and then, using a chain-fall hoist on a monorail, moved to spin drivers. After drying, the work is dumped from the baskets back into totes.
3. However, our concept shall also include an **OPTION** for automatic loading of the work into the barrel. This machine will feed a programmable weight of work into the plating barrel. This is a key feature to help assure consistent Quality results. Controlling the weight within each basket is important for the following reasons:
    a. The major limitation to plating work in a barrel is the ability to conduct DC current into the barrel. While there are different methods of conducting the current to the work, the most common method by far is the use of "danglers". A dangler is a conducting cable that enters the barrel through the hub at each end. The largest cable commonly used for danglers is a 250 MCM, multi-stranded copper cable which can conduct about 450 to 500 amps. As a result, the maximum amperage that can be conducted into a barrel is about 900 to 1,000 amps. The automatic loading machine is capable of feeding a programmable weight of work into the barrel. This allows the weight of the work to be varied so that each load consists of the optimum surface area.
    b. Loading to an optimum surface area will result in more consistent current densities in the plating processes. This in turn will result in a more predictable deposit thickness for a given plating time.
    c. Most companies have a maximum weight that an operator can ergonomically handle. With the density of the lead substrate, the number of part that an operator can handle is limited. Automatic loading will minimize the need for operators to handle the work. The operators will load the work totes into the loading machine using a forklift.
    d. Loading excessive weight into the barrel will cause excessive wear, resulting in excessive maintenance costs.
4. Our concept also includes an **OPTION** for automatic drying of the work using a conveyorized, tunnel dryer. The barrel will be automatically dumped "wet" onto a conveyor that moves the work through the dryer. As the work exits the dryer, it is automatically fed into empty totes
5. Our production estimates are as follows:
    a. 17,650,000 parts per month
    b. 85% Quality yield
    c. 15,000,000 parts per month
    d. 3 shift operation
    e. 5 days per week
    f. 114 production hours per week (leaving 6 hours for maintenance)
    g. 4.3 weeks per month
    h. 490 production hours per month
    i. 36,000 parts per hour
    j. 65 parts per pound average
    k. 554 pounds per hour
    l. 210 pounds per cubic feet average
    m. 0.8 cubic feet per load with barrel loaded 25%

n. 168 pounds per load average
o. 3.3 loads per hour (subject to final time-motion study).
p. Cycle time 18.2 minutes

6. The process line shall have one (1) guided-fall, cantilevered side-arm hoist to move the work through the process line. This design is offered because it has minimal interaction with the operators and thus, provides a higher level of safety than other hoist designs. Virtually all of the moving part are located behind the process line, opposite the operator walk aisle. Only the lift arm extends out over the tank and it will terminate an estimated 12" inside the front OD of the tank.
7. The hoists shall have the capacity to lift 500 pounds, have a maximum horizontal speed of 200 fpm and a vertical speed of 40 fpm. The hoist chassis and lift bar is fabricated from epoxy painted mild steel structures.
8. The hoist shall be equipped with barrel rotation in the raised position.
9. The hoist shall be positioned in the horizontal plane with laser. The vertical lift is controlled by duplicate switches at the top and bottom of the lift.
10. The hoist support structure or craneway shall be floor-supported and located behind the process line. It shall be fabricated from epoxy painted, mild steel structures.
11. The tank base shall be fabricated from epoxy painted, mild steel structures. It shall be approximately 6" tall and shall place the rim of the tanks at an elevation of about 42" above the factory floor. It shall be shimmed level during installation.
12. The flat cables that conduct power and control signals to/from the hoists shall be routed in an IGUS power track and terminate in terminal panels on the hoists and on the structure.
13. BTA shall provide a process and motor control panel that would provide the following functions:
    a. Provide on/off & VFD motor controls for the drive & lift motors on one hoist
    b. Horizontal and vertical control of the hoist
    c. Provide temperature control in six (6) tanks
    d. Provide fusing and contactors for heaters in six (6) tanks
        i. Three (3) 6 KW
        ii. One (1) 8 KW
        iii. Two (2) 12 KW
    e. Provide level alarms & safety interlocks for the heaters
    f. Provide recipe control of the six (6) rectifiers amperage output
    g. Monitor voltage output for six (6) rectifiers
    h. Provide on/off & motor controls for five (5) eductor pumps
    i. Provide on/off & motor controls for three (3) filter pumps
    j. Provide on/off & motor controls for twenty (20) barrel drive motor/reducers
    k. Provide on/off & motor controls for one (1) push air blower
    l. Provide on/off & motor controls for one (1) air agitation blower
    m. Provide alarm annunciation
    n. Motor &.or process control for selected options

    Note that the exhaust scrubbers, optional automatic loading and optional conveyorized tunnel dryer will have separate, dedicated motor control panels.
14. The process & hoist control software shall be provided by Kane Engineering Group in Grand Rapids, MI. The hoist control shall use a "timeway" hoist control algorithms which is a repeating time/motion loop.
15. At 3.3 loads per hour, the cycle time shall be 18.2 minutes. At this production rate, the maximum immersion times shall be:

a. Soak, Electrocleaner, Acid Activate & Cyanide Copper Strike 16.7 Minutes
b. Cyanide Copper Plating 71.4 Minutes

Note that the above immersion times are based on a nominal exchange time of 1.5 minutes.

16. The copper strike and plating immersion times shall be sufficient to deposit 1.5 mils of copper.
17. Eight (8) 14"Ø x 36" polypropylene plating barrels shall be provided. All of the barrels shall have $^{3}/_{16}$" perforations. The perforations are "dimpled" on the interior for better solution flow through to the barrel, less gas entrapment and lower drag-out. The structures that support the barrel hubs are not the traditional polypropylene end plates, instead being a molded polyglass hanger structure that presents less disruption of the exhaust flow. The barrel drive is mounted on the tank structure to further minimize disruption of the air flow. The superstructure that supports the two polyglass hanger, the gear train and the four (4) barrel saddles is epoxy painted mild steel. The ring gear is fabricated from polypropylene with a steel intermediate idler gear and drive gear. There are four (4) hoist pick-up points for stability. Electrical contact is made through two (2) danglers. The two (2) barrel covers are held in place by plastisol-coated, titanium snap-on clamps.
18. **Please be aware that the number of hoists, loads per hour and barrels shall be verified by a time/motion study performed under contract. Should additional hoists or barrels be required, optional pricing will be provided**.
19. BTA shall supply four (4) rolling carts to move barrels to/from the loading and unloading area. These carts shall be fabricated from epoxy painted mild steel and have a pneumatic barrel drive that allows the operator to attach an air drive and then manipulate the on/off valve to rotate the barrel and dump the work.
20. The process line would be a straight line shaped as follows:

Sta.	Process	Max. Temp.	Volume	Tank Construction
1	Docking Station for Rolling L/UL Carts	n/a	n/a	Painted MS
2-5	Storage Positions	n/a	n/a	Painted MS
6	Alk. Soak w/ Overflow Skimming	160°F	210 Gals.	Polypropylene
7	Immersion Rinse (Flows to WWTS)	Amb.	174 Gals.	Polypropylene
8	Alkaline Electrocleaner	150°F	201 Gals.	Ins. Mild Steel
9/10	CF Immersion Rinse (Flows to Sta. 6)	Amb.	174 Gals. Ea.	Polypropylene
11	Acid Activate	80°F	169 Gals.	Polypropylene
12/13	CF Immersion Rinse (Flows to WWTS)	Amb.	185 Gals. Ea.	Polypropylene
14/15	CF Immersion Rinse (Flows to WWTS)	Amb.	185 Gals. Ea.	Polypropylene
16	Neutralizer	Amb.	169 Gals.	Polypropylene
17/18	CF Immersion Rinse (Flows to Sta. 14)	Amb.	185 Gals. Ea.	Polypropylene
19	Static Drag-out Rinse	Amb.	174 Gals.	Polypropylene
20	Cyanide Copper Strike	135°F	240 Gals.	Polypropylene
21-22	Two Station Cyanide Copper Plate	135°F	464 Gals.	Polypropylene
23-24	Two Station Cyanide Copper Plate	135°F	464 Gals.	Polypropylene
25-26	Space for Future Cyanide Copper Plate			

Please note that the process sequence is established for the efficient hoist movement and not for the sequential process steps.

21. The dimensions of the system are as follows:
    - Overall length: Approximately 72'-9"
    - Overall width: Approximately 9'-9"

- Overall height: Approximately 13'-0"

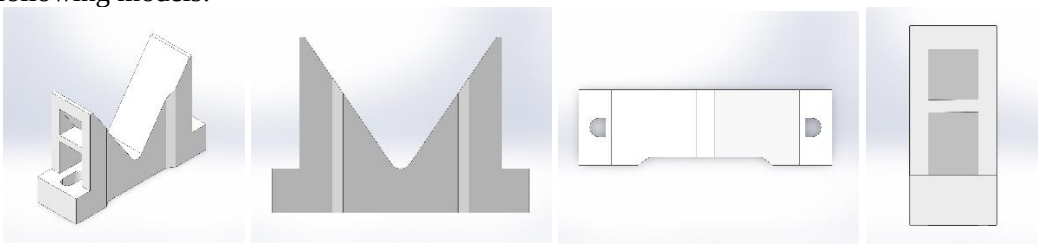
With space for space allotted for operational and maintenance access, the overall required space is approximately 28 feet wide by 88 feet long. Additional space of approximately 10'x 30' will be required for the scrubbers and 10' by 60' for the waste treatment system.

22. All polypropylene tanks shall be fabricated from ¾" thick, natural sheet and reinforced with one (1) perimeter girth bands fabricated from $^{3}/_{16}$"x 2"x 2" mild steel tubing encapsulated within polypropylene. These tanks shall be fabricated using the most robust manufacturing techniques:
    - Heat bent vertical corners
    - Butt fusion panel welds
    - Extrusion welding around the bottom, interior and exterior welds

    A butt fusion weld is performed on a machine that heats the entire edge of both pieces and then hydraulically forces them together. The result is fusion through the depth of the weld rather just on the surface. Theses welds result in virtually the strength of a single panel. An extrusion gun extrudes a single weld up to 1" wide which is significantly stringer then the traditional multiple bead welding method.

    The vertical corners are heat bent and thus continuous without a weld. The welds between vertical panels shall 180° in the middle of the panels. The floor extends about ¾" beyond the vertical walls with the interior and exterior perimeter welds performed with an extrusion gun.

    Please see the spreadsheet that accompanies the proposal for tank sizes.
23. All tank floors shall be flat with bottom drains that shall have the invert below the tank floor for maximize drainage. Unless otherwise specified, all tank drains shall be 1-½" with a threaded half-coupling connection and located on the back of the system.
24. To save space, the counterflow rinse tanks shall be common wall with over/under baffles separating the cells.
25. All piping within tanks would be secured to the tank floor and/or walls using clips welded to the tanks.
26. Drip shields shall be provided to prevent solution from dripping between tanks. They shall be fabricated from ¼" thick polypropylene.
27. Each non-electrified tank shall have four (4) molded polypropylene tank saddles, affixed to the front and back tank rim with stainless fasteners. Each approximately 1-$^{7}/_{8}$" thick by 5-$^{7}/_{8}$" long by 4" tall. They shall have a "vee" design that shall mate to the saddle horns to locate the work/barrel within the tank and provide stability. The proposed design shall be similar to the following models:

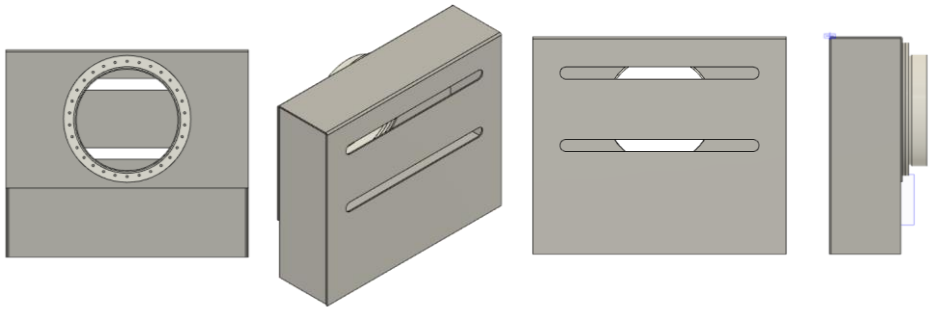


The saddles at the electrocleaner, cyanide copper strike and cyanide copper plating tanks would be similar in design but fabricated from cast bronze to provide the DC contact to the flight bar.

28. In our basic bid, while not required by most regulatory agencies, we would recommend exhaust ventilation on all of the heated and chemical tanks that emit noxious or corrosive vapors as well as water vapor. All ventilation would use a push/pull design with backdraft exhaust hoods, that are located above & behind the process tanks. To minimize the interference of a barrel setting in the tank, we shall provide 36" tall hoods and elevate the push air blanket 12" above the tank rim. This should allow the exhaust and push air blanket to move across the tank above the barrel superstructure.
29. We propose to use a minimum of 125 CFM per square foot of tank surface, an exhaust rate that exceeds the requirements of the Industrial Ventilation Handbook as published by the American Conference of Governmental Hygienists. Here are the basic exhaust calculations:

Process	Exhaust System	Exhaust Rate	Exhausted Surface Area	Exhaust Volume
Alk. Soak	A/A	150 CFM/Sq,Ft,	12.1 Sq.Ft.	1,938 CFM
Alk. Electrocleaner	A/A	160 CFM/Sq,Ft,	10.8 Sq.Ft.	2,131 CFM
Acid Activate	A/A	160 CFM/Sq,Ft,	9.0 Sq.Ft.	1,776 CFM
Copper Strike	CN	135 CFM/Sq,Ft,	12.2 Sq.Ft.	1,734 CFM
Copper Plate #1	CN	135 CFM/Sq,Ft,	24.8 Sq.Ft.	3,352 CFM
Copper Plate #2	CN	135 CFM/Sq,Ft,	24.8 Sq.Ft.	3,352 CFM
Future Copper Plate #3	CN	135 CFM/Sq,Ft,	24.8 SqFt.	3,352 CFM
			Total Volume of Recommended Exhaust:	16,779 CFM
			Total Volume of Acid/Alkaline Exhaust:	4,990 CFM
			Total Volume of Cyanide Exhaust:	11.789 CFM

30. As noted, the hoods would be backdraft in design and fabricated from ¼" polypropylene. Polypropylene is less brittle and therefore, less prone to cracking than PVC. It is also less expensive to fabricate. As noted above, the hoods shall extend 36" above tank rim. There shall be a 12" tall passage beneath the plenum to allow space for the barrel drive, piping and/or electrical conduit to pass. Here models of a typical, backdraft exhaust hood:



Note the polypropylene flange to PVC socket fitting on the side of the hood. It allows us to mate the PVC riser to the polypropylene hood with a solid, glued connection.

31. We would provide risers, with manual air flow dampers, to direct the exhaust flow up to the appropriate collection duct, both of which would be above and behind the machine. The acid/alkaline collection duct would be routed close to the machine with the cyanide to the outside; with both centerlines on the same elevation. However, if vertical clear space allows, we will route the A/A collection duct above the cyanide duct. This collection duct would be suspended from the machine superstructure and would have a single point of connection at the end of the

machine, adjacent to the cyanide copper plating tank. This ductwork would be fabricated from PVC as follows:

Diameter	**Construction**
4" to 24"	3/16" extruded
25" to 48"	3/16" rolled & welded
49" and up	1/4" rolled & welded

32. BTA would provide one (1) vertical, packed bed scrubber for the cyanide with a separate fan mounted on the roof, immediately above and behind the scrubber. The scrubber would be fabricated from 3/8" thick type II and type I, grade I high and normal impact gray PVC construction. It would be sized to exhaust 12,000 CFM. This scrubber shall have an integral reservoir, pH control, inlet/outlet transitions, chevron mist eliminator. The single recirculation pump shall be a vertical, seal-less design fabricated from CPVC. It shall discharge through spray headers to distribute 2 to 3 gpm/sq.ft. of packing evenly over the bed. All piping shall be Sch. 80 PVC. The packing shall be 3' deep using Lantec 3.5 corrosion resistant polypropylene packing; the area of the bed shall maintain a maximum velocity at or about 475 fpm. With the chevron mist eliminator, the unit would remove about 99% of all particles greater than 20 microns. Should a greater efficiency be required, the unit can be fitted as an option with a CMP mesh pad mist eliminator to increase the efficiency to about 99% of particles greater than 6 microns. Ducting shall be provided to connect the scrubber discharge to the fan inlet. The scrubber shall have approximate dimensions of 76" wide by 80" long by 116" tall. Additional space is required for the entry duct and discharge stack. We would recommend a foot print of 8' wide by 15'.
33. The fan for the cyanide scrubber would be a centrifugal fan with a vertical discharge and fabricated from type II, grade I, high impact white PVC of varying thickness from $^{3}/_{16}$" to ¾". It shall be designed to discharge 11,789 CFM at 6.5" total static pressure using a class II, corrosion-resistant coated steel wheel turning at 1,425 RPM by a 20 hp, 1750 RPM, TEFC, 230/460/3/60 motor operating at 17.9 BHP. This fan shall be balanced electronically with a vibration analyzer to insure smooth operation. It shall have a adjustable motor base, class II, corrosion-resistant coated steel wheel, totally enclosed weather cover, constant speed V-belt drive, heavy duty pillow block bearings, enamel coated steel base, lifting lugs, 3/8" thick bolt-on inspection door, shaft seal, drain, flexible inlet connection, stainless steel hardware and vibration isolators molded elastomer, vulcanized to metal providing up to 1/4" static deflection.. The fan shall have a discharge stack with cap that extends a minimum of 10 feet above the roofline. The estimated size of the unit is approximately 87" wide by 83" long by 87" tall with an operating weight of less than 1,750 lbs.
34. BTA would provide one (1) vertical, packed bed scrubber for the acid/alkaline with a separate fan mounted on the roof, immediately above and behind the scrubber. The scrubber would be fabricated from white PVC to allow for an outdoor location. It would be sized to exhaust 5,000 CFM. This scrubber shall have an integral reservoir, pH control, inlet/outlet transitions, chevron mist eliminator. The single recirculation pump shall be a vertical, seal-less design fabricated from CPVC. It shall discharge through spray headers to distribute 2 to 3 gpm/sq.ft. of packing evenly over the bed. All piping shall be Sch. 80 PVC. The packing shall be 3' deep using Lantec 3.5 corrosion resistant polypropylene packing; the area of the bed shall maintain a maximum velocity at or about 475 fpm. With the chevron mist eliminator, the unit would remove about 99% of all particles greater than 20 microns. Should a greater efficiency be required, the unit can be fitted as an option with a CMP mesh pad mist eliminator to increase the efficiency to about 99% of particles greater than 6 microns. Ducting shall be provided to connect the scrubber discharge to the fan inlet. The scrubber shall have approximate dimensions of 54" wide by 56" long by 103"

tall. Additional space is required for the entry duct and discharge stack. We would recommend a foot print of 8'x 10'.

35. The fan for the acid/alkaline scrubber would be a centrifugal fan with a vertical discharge and fabricated from type II, grade I, high impact white PVC of varying thickness from $^{3}/_{16}$" to ¾". It shall be designed to discharge 4,990 CFM at 6.5" total static pressure using a class II, corrosion-resistant coated steel wheel turning at 2,399 RPM by a 7.5 hp, 1750 RPM, TEFC, 230/460/3/60 motor operating at 7.3 BHP. This fan shall be balanced electronically with a vibration analyzer to insure smooth operation. It shall have a adjustable motor base, class II, corrosion-resistant coated steel wheel, totally enclosed weather cover, constant speed V-belt drive, heavy duty pillow block bearings, enamel coated steel base, lifting lugs, 3/8" thick bolt-on inspection door, shaft seal, drain, flexible inlet connection, stainless steel hardware and vibration isolators molded elastomer, vulcanized to metal providing up to 1/4" static deflection.. The fan shall have a discharge stack with cap that extends a minimum of 10 feet above the roofline. The estimated size of the unit is approximately 87" wide by 83" long by 87" tall with an operating weight of less than 1,500 lbs.
36. BTA would supply a common motor control panel for the two scrubbers and two fans. It would be built to NEC specifications with standard features that include master on/off switch, on/off switch for each motor, pilot indicator lights for each motor, motor starters with over load protection for the fan and recirculation pumps, terminal point connections, fused 1 kVA control transformer and NEMA 4 control panel. It shall be wired for 460V/3Θ current.
37. While we do not know the specific location of the scrubbers, BTA would provide monies to provide ducting from the point of connection on the process line to the inlet of the scrubber. This duct would be provided as follows:
    a. For the A/A system – 75 feet of straight 18"Ø duct and three (3) 90° elbows
    b. For the CN system – 75 feet of straight 28"Ø duct and three (3) 90° elbows
38. One of the key factors to the success of this exhaust system is the design of the push air system with the discharge velocity of the air being of supreme importance. These design parameters were first included in the 26th edition of the Industrial Ventilation Handbook and BTA follows these carefully. Too low of velocity will not direct the exhaust vapors to the hood efficiently. Too high of velocity will create excessive disturbances as work passes through the air curtain and will result in too much air being entrained. Too much entrained air may overwhelm the exhaust portion of the system, resulting in air rolling up the hood face and not being captured efficiently. It is also important to have a baffle located immediately behind the discharge manifold. As noted above, the push air discharge manifolds shall be elevated 12" above the tank rim. BTA would provide push air discharge manifolds with /$_{16}$" holes located on 2" centers. These headers shall be adjustable ±20° in the vertical plane and shall have a baffle located behind to minimize the entrained air. Push air shall be supplied as follows:

Process	**CFM**	**Discharge Manifold**
Alk. Soak	29 CFM	1-½" Sch. 40 PVC
Alk. Electrocleaner	27 CFM	1-½" Sch. 40 PVC
Acid Activate	24 CFM	1-½" Sch. 40 PVC
Cyanide Copper Strike	32 CFM	1-½" Sch. 40 PVC
Cyanide Copper Plate #1		Common
Cyanide Copper Plate #2	112 CFM	2" Sch. 40 PVC
Future Cyanide Copper Plate #3	60 CFM	1-½" Sch. 40 PVC
	Total = 284 CFM	

39. BTA shall supply a centrifugal high pressure blower to provide the required air for the push air. This blower shall provide 285 CFM of clean, oil-free, low pressure at 6.0" w.g, allowing 0.75" of

piping losses. This blower shall include an inlet filter, motor control functions, pressure gage, electrical/mechanical installation within 50 feet of pipe &/or conduit run to the connection on the process line and motor control functions. Piping will be 4" Sch. 40 PVC.

40. Depending on the size of the process room, it may be necessary to provide make-up air to replenish the exhaust volume and maintain the room balance. If required, Customer shall be responsible to provide this make-up air. It is important that this make-up air be discharged in a manner that minimizes cross drafts that can be disruptive to the capture of the process vapors.
41. The temperature control is on/off using 100Ω, 3-wire RTD sensors. All heated tanks have solution agitation with eductors to assure uniform temperature throughout the tank. We would expect that the temperature range shall not exceed ±5°F.
42. The following tanks shall be heated with electric immersion heaters as follows:

Process	Max. Temp.	Size of Heater	Const.	Description
Alk. Soak	150°F	15 KW	304 SS	Horizontal L-shaped, 3-Tube Stacked
Alk. Electrocleaner	120°F	12 KW	304 SS	Horizontal L-shaped, 3-Tube Stacked
Alk. Rinses	80°F	8 KW	304 SS	Horizontal L-shaped, 1-Tube
CN Copper Strike	135°F	12 KW	304 SS	Horizontal L-shaped, 3-Tube Stacked
CN Copper Plate #1	135°F	18 KW	304 SS	Horizontal L-shaped, 3-Tube Stacked
CN Copper Plate #2	135°F	18 KW	304 SS	Horizontal L-shaped, 3-Tube Stacked
Future Copper Plate #3	135°F	18 KW	304 SS	Horizontal L-shaped, 3-Tube Stacked

Total =83 KW without optional heat
Total =101 KW with optional heat

The heaters are sized to heat from a 65°F ambient to the operating temperature in 6 hours or less; however, since most start-ups will begin at temperatures above 65°F, heat-up will usually require 1 to 3 hours. All of the above heaters would have three levels of safety protection….

a. Duplicate contactors in series should one contactor arc or fuse closed
b. Non-resettable thermal fuse in the cold zone of the heater which will reset only by operator input
c. Level sensors to shut off power if the solution falls to unsafe levels

We would like to note that electric heating requires the least amount of capital expense; however, it also requires the greatest operating expense. BTA can offer an alternative of heating using a boiler and pressurized hot water. On large projects, this is our preferred heating method. However, at 70 KW, this project falls in a "gray" area. We felt that the ROI on hot water heating at this energy requirement may not be very favorable. If we are the preferred vendor, we can evaluate the return should you desire to consider hot water heating.

43. All tanks with a heater and/or without an overflow weir would have level sensors to generate high and/or low alarms. These sensors would be supplied as follows:

Process	Function	No. of Sensors
Alk. Soak	Hi/Lo Alarms & Heater Interlock	2
Alk, Electrocleaner	Hi/Lo Alarms & Heater Interlock	2
Alk. Rinses	Low Alarm & Heater Interlock	1
Acid Activate	Hi/Lo Alarms & Heater Interlock	2
Neutralizer	Hi/Lo Alarms	2
CN Copper Strike	Hi/Lo Alarms & Heater Interlock	2

CN Copper Plate #1	Hi/Lo Alarms & Heater Interlock	2
CN Copper Plate #2	Hi/Lo Alarms & Heater Interlock	2

Because the barrel end plates are tight to the front and back walls, we shall utilize capacitance-type of level sensors that can be mounted external of the tank and read the solution level through the tank wall. On the electrocleaner tank, the sensor shall be mounted in a capped, PVC pipe internal of the tank. The high level sensor shall be set at 3" below the tank rim elevation and the low level shall be set at 8" below the tank rim elevation. The alarm annunciation shall be visual and audible at the MCC panel and MMI.

44. Barrel rotation shall be accomplished by using a gear-motor mounted behind the tank and, on ventilated tanks, beneath the hood. The drive gear shall extend up through a slot cut in the back tank rim. The motor speed and gearing shall be established for 1 RPM rotation speeds and shall be the same across the process line. The motors shall be driven by AC power. The mount design shall allow for vertical adjustment.
45. While more expensive than air agitation, BTA prefers to use solution agitation in lieu of air on all chemical tanks. Air creates significant aerosol misting as the bubbles break the surface. This misting creates corrosion on and around the tank rim, increases maintenance costs to keep the line clean and increases the contaminant load within the exhaust system. In addition, it dissipates significant energy on heated tanks. Pumping shall be provided as follows:

Process	Design Discharge Flow	Design Discharge Pressure	Turnovers per Hour w/o Eductors	Turnovers per Hour w/ Eductors	Pump Const.	Pump Description
Alk. Soak	20 GPM	45' Head	5.7	25-27	PP	Horizontal, Mag-Drive, Seal-less
Alk. Electroclean	10 GPM	40' Head	3.0	12-14	PP	Horizontal, Mag-Drive, Seal-less
Acid Activate	10 GPM	40' Head	3.6	15-17	PP	Horizontal, Mag-Drive, Seal-less
Neutralizer	10 GPM	40' Head	3.6	15-17	PP	Horizontal, Mag-Drive, Seal-less

Please note that the above flow rates are "design" flow rates which may vary with piping losses and other factors. The pump on the soak cleaner is larger to provide sufficient flow over the weir to help skim the floating soils from the solution surface. All of the pumps are mounted externally behind the tank with flooded suction and on polypropylene drip pans. This pump location is a less corrosive environment than should they be mounted in tank. The suction piping shall be 1-¼" for the alkaline soak tank and 1" for all other pumps. The discharge piping shall be 1" for the alkaline soak tank and ¾" for all other pumps. There shall be a manual ball valve to isolate the pumps. The piping Sch. 80 PVC for temperatures at or below 120°F, Sch. 80 CPVC at temperatures above 120°F. All of the pumps would have a local on/off switch as well as on/off control via the MMI. With the motor starters in the control panel, the local switch would allow maintenance personnel to isolate the pump during maintenance activities.

46. There shall be four (4) eductors on the discharge of the soak pumps and two (2) on the discharge of all other pumps. Provided with sufficient pressure, these eductors shall increase the flow rate by a factor of 4X to 5X. They shall be a ¼" design molded from polypropylene and be located equally spaced across the tank floor adjacent the entry CDOT tank wall and orientated horizontally to sweep the tank floor.
47. The strike and plating tanks shall have filtration each using a horizontal, mag-drive, seal-less pump that is fabricated from polypropylene. This pump shall have a design flow of 10 gpm and a discharge pressure of 35' of head.

Design	Design	Turnovers			
Discharge	Discharge	per Hour	Pump	Pump	Filter

Process	Flow	Pressure	w/o Eductors	Const.	Description	Description
CN Cu Strike	15 GPM	40' Head	3.7	PP	Mag-Drive, Seal-less	CPVC, 1 x 30" DOE
CN Cu Plate #1	30 GPM	45' Head	3.9	PP	Mag-Drive, Seal-less	CPVC, 3 x 30" DOE
CN Cu Plate #2	30 GPM	45' Head	3/9	PP	Mag-Drive, Seal-less	CPVC, 3 x 30" DOE

The filter chamber for the strike tank shall be CPVC and designed to contain one (1) 30" double open ended (DOE) filter cartridge with a crush seal. The filter chamber for the plating tanks shall be CPVC and designed to contain three (3) 30" DOE filter cartridges. The chamber lid shall be gasketed. The chamber shall include an air bleed valve and a pressure gauge. Because the flow rate shall very with the back pressure of the filter, which is based on soil loading, there will be no eductors on the discharge.

48. The following tanks shall have air agitation using clean, oil-free, low pressure air as follows:

Process	No. of Tanks	Surface (Sq.Ft.)	Air Flow (CFM/Sq.Ft.)	Volume (CFM)	Total (CFM)
Ambient rinse	9	9.0	≈0.5	4.5 ea.	41
Ambient drag-out	1	9.0	≈0.5	4.5 ea.	5
				Total	≈ 46

The agitation system on each of these tanks shall use a single discharge sparger. It shall be a fabricated from ¾" piping, secured to the tank floor and located on the centerline of the tank. The supply riser shall be ¾" piping with a manual ball valve. The piping shall be Sch. 80 PVC.

49. A centrifugal low pressure air blower to provide 46 CFM of clean, oil-free air at 2.5" PSI shall be provided, allowing for 1PSI in piping losses. This blower shall include an inlet filter, pressure gage, installation, motor control functions and, if required, a pressure relief valve to prevent damage to the blower with insufficient air flow. Installation includes fabrication & mounting a support bracket to a wall, securing the blower and providing a maximum of 50 feet of piping & conduit without any roof/wall penetrations. The piping shall be 2" Sch 80 PVC with the initial 5 feet being metallic to dissipate the heat generated by the blower. It is recommended that the blower be mounted above the tank rim elevation. Due to the noise generated, an outdoor location might be preferred.

50. The DC current for the plating tanks shall be supplied by air cooled, switchmode power supplies and provided as follows:

Process	Qty.	Volts	Amps	Max. Surface Area (Sq.Ft.)	Current Density w/ Max. Load (ASF)
Electrocleaner	1	12	1,000	TBD	TBD
CN Copper Strike	1	12	1,000	TBD	TBD
CN Copper Plating #1	2	12	1,000	TBD	TBD
CN Copper Plating #2	2	12	1,000	TBD	TBD

Switchmode power supplies offer less than 3% AC ripple across the entire DC output as well as better amperage (1%) and voltage control (5%) than SCR or Diode type of rectifiers. They are also significantly smaller. The DC amperage output shall be automatically recipe controlled by the hoist/process control system. The control system would have a library of surface area by weight for each part and then would set the amperage based on the poundage within the barrel. The power supply shall have dimensions of approximately 18"x 18"x 10" tall; however, BTA shall provide a stand to locate it at an ergonomic height.

Of great importance, the rectifier must be capable of, as a minimum, current interrupt and possible, current reversal. During electroplating, cyanide copper processes can create an anodic

film that will interfere with the anodic dissolution of the copper. By interrupting the current, it allows the cyanide to dissolve this film and maintain good conductivity within the electrolytic cell.

51. The bussing between the rectifier and the tanks shall be 2/0, multi-stranded, copper cable with four (4) cable runs per polarity…. one (1) to each saddle and one (1) to each end of each cathode bar. Depending on the ampacity chart, 2/0 cable is rates at about 375 to 400 amps…. thus for this application, we would be using a about 66% of the cable's capacity. Each end of each cable shall have a copper lug that is hydraulically crimped in place and sealed with shrink wrap. All connections shall be made using conductive grease and secured with stainless steel fasteners.
52. Each plating station shall each have two (2) copper alloy C-110 cathode bars mounted dielectrically parallel to each CDOT tank rim. These bars shall be ¾"x 66" long with 1-½" milled flat at each end. They shall be secured to the tank rim with polypropylene mounting blocks and stainless fasteners. Once again, we would be using significantly about 55% of the amperage capacity of the bars.
53. In the base bid, BTA has not included monies for the anode baskets. These are generally purchased from an operating budget rather than the capital budget.
54. Many people prefer to dump the work from the barrel into the spin baskets while they are submerged in water. This does help to minimize any scratching; although the tin/copper surface is somewhat harder and less susceptible to such damage. BTA would provide one (1) T-304 stainless steel tanks, each approximately 24" wide by 48" long by 24" tall. It would have two "nests" on the bottom into which the operator would set the empty baskets. He would then close dump chutes which are hinged to swing into place. He then rolls the cart over the tank, connects an air hose to the cart, remove the barrel covers and rotates the barrel to dump the work into the baskets.
55. As noted above, the work is unloaded from the barrels by the operator dumping the work into two (2) 18" diameter by 18" deep spin baskets that would be located within the wet dump tank. The work is then dried in the two (2) spin dryers provided within our base bid. These spin dryers would be electrically heated temperature control, have a soft start feature, timer and an electric brake. BTA would provide eight (8) spin baskets fabricated from T-304 stainless steel with $^{3}/_{16}$" perforations.
56. A water distribution system shall be provided as follows:
    a. There shall be one (1) 1" water supply main for industrial water which shall be run along the front of the process line to serve Stations 7, 8, 9, 10, 11, 12, 13, 14, 17, 186, 7, 8, 9, 10, 11, 16, 17 & 18 with industrial water. Please note that BTA is not providing the backflow preventor.
    b. There shall be one (1) 1" water supply main for DI/RO water which shall be run along the front of the process line to serve Stations 12, 13, 14, 15, 19, 20, 21-22 & 23-24 with DI/RO water. Please note that BTA is not suppling water pre-treatment.
    c. There shall be ¾" water fill at every process and immersion rinse tank with a manual ball valve that terminates in the freeboard.
    d. There shall be one (1) rinse feed supplying rinse water to the following stations…. 10, 13, 14 & 17. These rinse feeds shall be fabricated from ½" piping with an isolating ball valve, 0-5 GPM rotameter and pipe to discharge at the bottom of the tank. With the exception of the discharge pipe on the hot final rinse, all water piping shall be Sch. 80 PVC. The discharge pipe on the hot final rinse shall be Sch. 80 CPVC.

57. BTA is offering a combination of double and triple counterflow rinses to maximize rinsing efficiency and minimize water consumption and waste generation. We estimate that the total rinse water wastes will be approximately 10 gpm or less of dilute acid/alkaline rinse wastes and 10 gpm or less of dilute cyanide rinse wastes.
58. Wastes are segregated as follows:
    a. Dilute acid/alkaline bearing rinse wastes fed by overflow weir drains from stations 7 & 12 shall be collected in a 2", Sch. 80 PVC drain main that runs along the back of the process line and terminates in the acid/alkaline dual pump lift station.
    b. Dilute cyanide bearing rinse wastes fed by overflow weir drains from stations 15 & 18 shall be collected in a 2", Sch. 80 PVC drain main that runs along the back of the process line and terminates in the cyanide dual pump lift station
    c. All bottom drains from non-cyanide tanks at stations 6, 7, 8, 9, 10, 11, 12 & 13 shall be collected in a 2", Sch. 80 CPVC drain main that runs along the front of the process line and terminates at the air diaphragm transfer station built on the top of the acid/alkaline lift station.
    d. All bottom drains from cyanide tanks at stations 15, 16, 17, 18 & 19 shall be collected in a 2", Sch. 80 CPVC drain main that runs along the front of the process line and terminates at the air diaphragm transfer station built on the top of the acid/alkaline lift station.
    e. The cyanide copper strike and the cyanide copper plating tanks shall not have either overflow or bottom drains.
59. As noted above, all tanks shall be provided with a bottom drain that has the invert below the tank floor. These bottom drains shall have 1-1/2" manual ball valve which, while at the factory floor level, shall be accessible to the operators. The valves on tanks operating at 120°F below shall be PVC and on tanks operating at 125°F and above shall be CPVC.
60. BTA shall provide a 10 gpm, dual pump lift station for acid alkaline rinse wastes that would include a polypropylene surge tank, duplicate pumps, ultrasonic level sensors for alarms and pump control and assembly. The surge tank would have approximate dimensions of 30" x 48" x 32" deep which would provide a pumping cycle of about 6 minutes on and 6 minutes off. It shall also provide about 10 minutes "emergency" time from the high level alarm to overflow.
61. To avoid accidental mixing of acid and cyanide wastes, BTA shall provide a second, dual pump lift station for cyanide bearing rinse wastes. It would be a 10 gpm, dual pump system that would have the identical design as the lift station above.
62. BTA shall provide a pumping system would consist of an air operated, ½" AOD pump provided to transfer concentrated acid or alkaline wastes from the machine to the waste storage tanks. This air diaphragm pump would have a polypropylene body and PTFE wetted parts. This transfer station would have suction manifold with two (2) inlets to pull from either the process line or a drum/tote. It would have a discharge manifold with four (4) outlets…. the lift station, the acid storage tank, the alkaline storage tank or a drum/tote. All valves shall be manually actuated ball valves. The piping shall be with ¾" Sch. 80 CPVC. The air supply to the pump would have a manual on/off valve and a pressure regulator to control the pump rate. To minimize floor space requirements, this AOD transfer station would be located on the top of the acid/alkaline lift station.
63. Again, to avoid accidental mixing of acid and cyanide wastes, BTA would provide a second concentrated pumping station. This pumping system would also consist of an air operated, ½" AOD pump provided to transfer concentrated cyanide bearing wastes from the machine to the

appropriate waste storage tanks. This air diaphragm pump would have a polypropylene body and PTFE wetted parts. This transfer station would have suction manifold with two (2) inlets to pull from either the process line or a drum/tote. It would have a discharge manifold with three (3) outlets…. the lift station, the cyanide storage tank or a drum/tote. All valves shall be manually actuated ball valves. The piping shall be with ¾" Sch. 80 CPVC. The air supply to the pump would have a manual on/off valve and a pressure regulator to control the pump rate. To minimize floor space requirements, this AOD transfer station would be located on the top of the acid/alkaline lift station.

64. BTA would supply concentrated alkaline cyanide waste holding tank consisting of a roto-molded, polyethylene concentrated acid waste storage tank with a minimum volume of 1,500 gallons, a 2" bottom drain & valve and an ultrasonic level sensor to provide percent full and high level alarms. The high level alarm shall be interlocked with the waste transfer system (wiring to the air transfer stations by others). This tank shall have approximate dimensions of 64"Ø by 115" tall. These concentrated wastes would include spent chemistry &/or dilution of the alkaline cyanide tanks. They would be stored until transported off site for legal disposal.
65. BTA would supply concentrated alkaline waste holding tank consisting of a roto-molded, polyethylene concentrated acid waste storage tank with a minimum volume of 1,500 gallons, a 2" bottom drain & valve and an ultrasonic level sensor to provide percent full and high level alarms. The high level alarm shall be interlocked with the waste transfer system (wiring to the air transfer stations by others). This tank shall have approximate dimensions of 64"Ø by 115" tall. These concentrated wastes would include spent chemistry &/or dilution of the alkaline non-cyanide tanks. They would be stored until transported off site for legal disposal.
66. BTA would supply concentrated acid waste holding tank consisting of a roto-molded, polyethylene concentrated acid waste storage tank with a minimum volume of 1,500 gallons, a 2" bottom drain & valve and an ultrasonic level sensor to provide percent full and high level alarms. The high level alarm shall be interlocked with the waste transfer system (wiring to the air transfer stations by others). This tank shall have approximate dimensions of 64"Ø by 115" tall. These concentrated wastes would include spent chemistry &/or dilution of the acid non-cyanide tanks. They would be stored until transported off site for legal disposal.
67. There are several waste treatment methodologies that BTA could provide to treat the dilute wastes from this machine. The two primary candidates would be ion exchange and cyanide oxidation, metal precipitation precipitant clarification by gravity and final pH monitoring. We would be pleased to quote either methodology. In our base bid, we have decided to offer the continuous flow, oxidation and metal precipitation option. Therefore the treatment system for the dilute rinse wastes would consist of the following:
    a. A 10 GPM, two-stage cyanide oxidation using alkaline bleach. This reactor would include the open-top, flat-bottom, round roto-molded, polyethylene reactor tanks, mixers, pH control, ORP control and chemical dosing systems. It would gravity flow to the metal precipitation reactor. Each stage reactor would have approximate dimensions of 36"Ø by 53" deep and provide about 21 to 22 minutes of retention time.
    b. A 20 GPM, two stage metal precipitation. This option would include the open-top, flat-bottom, round roto-molded, polyethylene reactor tanks, mixers, pH control and chemical dosing systems. Each stage reactor shall have approximate dimensions of 48"Ø by 53" deep and provide about 17 to 18 minutes of retention time.
    c. A continuous-flow, incline-plate gravity clarifier will separate the precipitated metal from the waste flow. This clarifier will be a 3-stage unit consisting of a flash mixing step in which a polymer or flocculant is added, a floc growth tank to allow the precipitant to

coagulate and the incline plate section where the precipitant is separated from the waste flow. Two unique features of this clarifier will be its polypropylene construction and gravity flow from the metal precipitation reactor through to the final pH neutralization. This latter feature will eliminate the need for a lift pump that can disrupt the formation of a quality floc. The rapid mix tank has a direct drive, pneumatic-driven mixer with a 3" prop that allows the operator to vary the speed to provide the required mixing with minimal shear of the metal hydroxide and polymer. The clarifier has approximate dimensions of 60" wide by 84" long by 42' tall. The incline plate pack measures approximately 64' tall by 60" long by 48" wide and is removable to allow for maintenance cleaning. The pack offers approximately 10 sq.ft. of surface area per gallon of waste flow.

d. A 20 GPM, two stage final pH adjustment and monitoring reactor that includes mixers, pH control in each stage, chemical dosing systems and a final pH monitoring probe in the discharge piping. Each stage reactor shall have approximate dimensions of 48"Ø by 53" deep and provide about 17 to 18 minutes of retention time.
e. An air operated diaphragm pump to transfer the wastes from the clarifier to the sludge holding tank. This pump would automatically turn on and off based on a programmable timer. The air supply riser shall have an isolating valve, 24VDC N/C solenoid valve and a pressure regulator. The air control valve does not require lubrication and shall not freeze, even on continuous operation. The solenoid valve shall be interlocked with the level sensor on the sludge storage tank to disable the pump on a high level. The interlock safety wiring shall be provided by the owner. The pump shall be mounted to a drip pan fabricated from ½" polypropylene with a 3" spill berm around the perimeter.
f. A 1,050 gallon, conical bottom sludge concentrating tank roto-molded from polyethylene and setting on a roto-molded stand. This tank shall have approximate dimensions of 73"Ø by 75" deep with an overall height of 86" on its stand. This tank shall have a ultrasonic level sensor. The sludge from the 1-½" air diaphragm pump shall discharge though a capped, horizontal pipe with holes drilled in it to minimize the disturbance of the setline sludge bed.
g. The filter press shall de-water the sludge from the sludge concentration tank. This press shall have a 5 cubic feet. Plates shall be fully 630 mm, gasketed with recessed filtering cloths and center feed with four-corner discharge points that are plumbed to a single point of discharge. The press shall have a hydraulic closure system utilizing a hydraulic power unit. The hydraulic cylinder or ram shall have a power retraction feature., The press frame shall be fabricated from mild steel with an epoxy primer and topcoat (with nominal dry film thickness of 2 mils.) to withstand the corrosive effect of the process chemistries. The press shall have an air blow down manifold that uses compressed air to de-water and dry the filter cake. The press shall be equipped with a 1" air diaphragm pump that pushes the sludge through the plates. The pump shall have a polypropylene body and Wilflex wetted parts. The air control valve does not require lubrication and shall not freeze, even on continuous operation. The air supply shall be ABS plastic with an manual ball valve and pressure regulator. The filter press shall pump solution from the bottom of the sludge concentrating tank. The operator shall choose between two discharge points:
    h. The clarifier lift station
    i. The final polish and pH station.

   It shall have elevated legs to dump the precipitant into a 1 cubic yard bag.

Please be aware that the options for waste pumping, waste storage or waste treatment would only include setting the equipment. Since we do not know the relative location of the treatment area in relation to the process line, we would not include any piping between the systems. Please also be aware that since this piping contains hazardous materials, it would require double containment outside of the spill containment areas.

68. The owner shall be responsible to make AC power drops with disconnects to the following equipment:
    a. 480V/3Θ to the hoist/MCC control panel (disconnect is included)
    b. 480V/3Θ to the eleven (11) switchmode power supplies
    c. 480V/3Θ to the optional four (4) spin dryers
    d. 480V/3Θ to the optional two (2) automatic loading machines
    e. 480V/3Θ to the exhaust MCC panel
    f. 480V/3Θ to the optional chilled water system
69. BTA is providing a fully functional process system with certain exceptions noted throughout this proposal. However, we do believe that this process line can be enhanced with **OPTIONAL** features.
    a. Additional barrels if required to reach 3.5 loads per hour
    b. Additional rolling carts
    c. CMP mech pad mist eliminator for the CN scrubber (see item 33 above)
    d. CMP mech pad mist eliminator for the A/A scrubber (see item 35 above)
    e. Stainless Steel Tank Base
       The tank base would be fabricated from unpainted, T-304 stainless steel in lieu of epoxy coated mild steel for improved corrosion resistance and longer service life.
    f. Motorized Trolley for Loading & Unloading
       Once the work has been dried, the barrel will be set on a motorized trolley to bring it out from beneath the hoist path. This trolley will have three stations:
        a. Hoist path
        b. Barrel cover removal/replacement
        c. Barrel dump and automatic fill

       When the hoist sets the barrel down on the trolley at station a on the process line, the machine's control system shall automatically move the cart to station b, assuring that there is not conflict with the hoist movement. The operator shall rotate the barrel openings up, then remove the barrel covers and actuate a push button to allow the cart to move to station b. At station b, the barrel shall rotate 180º down to dump the work on to a unload rubberized conveyor. The barrel then rotates 180º back to the vertical position and the automatic loading sequence begins. Once the loading has finished, the cart automatically indexes back to position b where the operator replaces the cover and actuates a second button to release the cart back to the process line. The hoist control system shall actuate this movement to assure no conflict with the hoist movement.

       The trolley shall have a gear-reduced motor mounted on the cart with motion powered through a friction drive system and guided by stainless steel rails mounted to the factory floor. The horizontal positioning system shall use proximity switches that detect flags attached to the rails. The cart shall have personnel protection bumpers on the front and back that stop the motion on contact, a flashing beacon and an audible chirp when in motion.

g. Automated Loading Machines
As noted, the work is loaded and unloaded to/from the barrels off line. To aid in the loading, the work would be loaded into the barrels using one (1) automated loading machines. This machine will dump work from a static storage bin on to a metering conveyor. This bin shall be fabricated from 1" polypropylene with a painted steel support structure. It shall have a bottom floor that slopes in three dimensions leading to an automated gate. The conveyor is key because it slows the rush of work that slides out of the storage bin and then meters the work slowly and evenly into the barrel. This allows the system to load a programmable weight into the barrel with reasonable accuracy. The work slides from the metering conveyor down a chute into the barrel. When the programmed weight is achieved, the chute raises to stop the inflow of work. There shall be some variation in the accuracy of the dispensed weight; however, we estimate this variation will be less than ±1%. The conveyor belt shall be fabricated from PVC and the drive motor for this is belt shall be driven by a VFD to allow variable speeds. Operator input to the machine will be through a MMI consisting of a 7", color touchscreen.

Please note that it is the responsibility of the owner to convey the work from the fabrication area to the storage bin.

h. On Line barrel Dryers
The barrel dryer shall be designed and fabricated in Italy by our partners who have built these units often. The dryer shall be fabricated from 304 stainless steel and heated by electric heating elements. The dryer has automated tank covers to reduce heat loss and increase energy savings. Blowers recirculate the heated air through the barrel to dry the work.

i. Unload Conveyors
As noted above, at position c, the barrel shall rotate 180^{o} to dump the dry work on to a rubberized conveyor within a collection enclosure fabricated from polypropylene. This conveyor shall move the work up an incline to a tote queue. At the tote queue, the work falls from the conveyor into the production tote which is setting on a platform with load cells. When the programmable weight is achieved, the conveyor is stopper and the full tote is then pushed off of the scale on to an incline, gravity roller conveyor that has the capacity to hold up to six (6) totes. The system shall move an empty production tote on to the scale from a second incline, gravity roller conveyor that also has the capacity to hold up to six (6) totes.

j. Automatic rinse water flow control
Each of the four (4) rinse feeds can be equipped with rinse flow control. When the hoist control system places the work in a rinse tank, it would initiate water flow by actuating a programmable timer. The timer would open a 24 VDC N/C solenoid valve to allow water to flow. Thus no work…. no flow.

k. Automatic replenishment of evaporation
The evaporation losses at the soak tank and the electrocleaner tank shall be automatically replenished. Additional level sensors would be provided to open and close a 24VDC, N/C solenoid valve to replenish the evaporation losses.

l. Automatic Drag-out Recovery
The evaporation losses at the cyanide copper strike tank and the two (2) cyanide copper tanks shall be automatically replenished with solution from the static drag-out recovery tank. There would be three (3) ¼" air actuated diaphragm pumps, one for each tank. These pumps would have a polypropylene body and Sanopreme wetted parts. Each air supply would have an isolating ball valve, 24 VDC N/C solenoid valve and a pressure regulator. In addition, the solution pumped from the drag-out would be automatically replenished with level controls that would actuate a 24 VDC N/C solenoid valve which would be isolated with a manual ball valve.

m. Chemical replenishment to minimize handling of dangerous chemicals.
BTA is a strong proponent of automated handling of chemicals to reduce the possibility of an operator injury. One worker's compensation claim could cost more than this option. For each of these systems, the operator shall input a programmable volume of reagent based on a laboratory analysis.
The following systems would be provided:

i. A four (4) pump systems that would replenish a single liquid reagent to each of the following tanks:
   - Soak cleaner
   - Electrocleaner
   - Acid activator
   - Neutralizer

ii. A nine (9) pump system that would replenish three (3) liquid chemistries to each of the following tanks:
   - Cyanide copper strike
   - Cyanide copper plate #1
   - Cyanide copper plate #2

Each system shall consist of a ¼" AOD pump, polypropylene pump bench, safety splash shield and PVC tubing for suction and discharge. These pumps offer reasonable precision for an economical price. For your application, the chemistry would be dispensed based on the number of strokes for the pump. With calibration, the system can automatically extrapolate strokes into volume. Each pump stroke is approximately 45 milliliters so that your precision is about plus or minus a stroke or about 0.05 liters.

The pumps are mounted on skids fabricated from polypropylene so that there is minimal corrosion concerns. Each skid would have a splash shield or cover to provide further safety. The suction and discharge piping shall be ⅜" tubing. We would assume that the replenishment skids, reagent storage tanks and discharge tubing would be within the spill containment area so we have not provided any double containment for the tubing. We would simply secure it to other piping or machine structure using wire ties.

There would be a master control panel on one of the skids that has the man machine interface and the PLC that controls the other skids. You will find that the MMI is very easy for your operators to calibrate the pumps and ultimately make the adds. We would assume that the volume of the add would initially be determined by laboratory analysis. As you begin to operate the machine at production volumes, most of our clients make an "80%" add on a daily basis or perhaps three times a week. Then on a weekly or bi-weekly basis,

they analyze the chemistries and make an add to adjust to full strength
The optional price would include installation. Here is a photo of a typical system:

Additional information is required concerning the chemistries that you intend to use before BTA can provide an accurate cost for this option. Please let us know if you are interested in this feature.

h. Automatic Addition of Brighteners
One liquid brightener would be automatically replenished to the following tanks based on amp-hours:
   - Cyanide copper strike
   - Cyanide copper plate #1
   - Cyanide copper plate #2

These feed systems would use solenoid-driven chemical feed pumps with adjustable stroke and pacing of strokes. Additional information is required concerning the chemistries that you intend to use before BTA can provide an accurate cost for this option. Please let us know if you are interested in this feature.

i. Polypropylene Spill Containment
In most areas of the country, spill containment is required for the process and waste treatment areas. The most typical requirement is 110% of the largest tank within the contained area plus 20 minutes of sprinkler flow. This containment can be provided by a number of methods with concrete and polypropylene being the most common. Concrete requires more on-site construction and the concrete must be protected by a corrosion resistant coating. Polypropylene containment pans can be pre-fabricated in the factory and then welded together on site. BTA has not included any monies but with further discussions, we can provide the polypropylene containment.

70. BTA would provide installation on a prepared site.
71. Once onsite installation is complete, we will thoroughly test the operation and debug as required. When it is operational, the line will undergo testing with water to demonstrate the operation of key features.
72. Once the line is tested and operational, we will then provide training, in English. Upon completion of the training, the line is turned over for make-up of chemistries and your commissioning.

73. While we are providing the project on a turnkey basis, there will be exclusions and work that will be required to be done by Customer. Our typical exclusion list is as follows:
    a. None of the engineering will be stamped or approved by a Professional Engineers (PE)
    b. Any certification or approval an independent testing laboratory such as UL, CE, CSA or others. If this is a requirement of the project, BTA must be told before engineering and fabrication.
    c. Engineering for environmental and /or H-Occupancy.
    d. Any equipment needed to satisfy H-Occupancies.
    e. Calculations for seismic and structural engineering, etc. and seismic anchoring resulting from these calculations.
    f. Making permit submittals, securing permits or paying permit fees. BTA will provide the required engineering for the provided equipment…. loads, weights, sizes, fastening requirements and etcetera.
    g. Paying federal, state or local taxes and/or import/export costs.
    h. Shipping costs including crating, packaging, shipping containers and freight costs. We will provide estimates as available.
    i. Demolition or removal of any existing equipment.
    j. Double containment for any piping, whether routed within or outside of spill containment areas.
    k. Any site preparation, including, but not limited to, roof or wall penetrations, spill containment berms, pipe trenches, sumps or pits and/or floor coatings.
    l. We have assumed installation on a flat floor with individual tanks having a tank base to elevate approximately 10”
    m. Sprinkler work, or other fire prevention devices, including within the ventilation ductwork, if applicable.
    n. Modifications to any area lighting.
    o. Material handling equipment required to off-load and place into position any equipment installed by BTA or our subcontractors or to install equipment in elevated positions.
    p. Any fencing required for storage areas and/or isolation of the installation site.
    q. Safety eyewashes, showers, safety blankets and/or other emergency equipment for regulatory purposes.
    r. Backflow preventer for the industrial water supply
    s. Main disconnect panels or other electrical distribution equipment, including transformers if required.
    t. Any modification to existing air make-up equipment.
    u. Balancing air flows within the exhaust system and/or source testing of exhaust discharge from provided equipment.
    v. FM approved exhaust collection duct.
    w. Emergency power generation.
    x. Production tooling such as plating racks and WIP carts
    y. Processing chemicals.
    z. Any items or equipment not specifically included in this proposal.
74. A typical milestone schedule for this type of project would be as follows:

PRELIMINARY MILESTONE SCHEDULE

Milestone	**Weeks**	**Weeks After PO**

• PO & Funded Down Payment	0	0
• Completion of Engineering	4	4
• Completion of Fabrication	6	10
• Completion of Pre-Assembly & Modularization	4	14
• Buy-off & Final Modifications	1	15
• Preparation for Shipment	1	16
• Shipment	1	17
• Re-assembly on site	4	21
• Installation of Ancillary Equipment	4	25
• De-bugging & start-up	1	26
• Training	1	27
• Turn over to owner for commissioning	0	27

The above is a typical project schedule for a project of this scope. However, the project may be accomplished either faster or slower depending upon the work load of BTA and/or subcontractors at the time the purchase order is issued. With the current viral epidemic, we believe that the schedule can be expedited. However, BTA will commit to a formal schedule after receipt of the purchase order.

Total cost for equipment and services as described within preceding proposal is as follows:

Project Management, Process Line, Controls, Material Handling	**$1,784,532.00**
Ancillary Equipment (Exhaust & Chiller)	**$253,475.00**
Installation, Start-up & Training	**$224,751.00**
PROJECT TOTAL	**$2,262,758.00**

Optional Features

Additional third hoist* ….	**$104,153.00**
Additional flight bars* ….	**$2,363.00**
Additional, Single compartment barrels* ….	**$5,953.00 ea.**
Additional, Dual compartment barrels* ….	**$6,543.00 ea.**
Additional rolling carts for barrels* ….	**$3,683.00 ea.**
Additional rolling carts for flight bar* ….	**$2,904.00 ea.**
CMP mesh pad mist eliminator for the A/A scrubber ….	**$9,561.00**
CMP mesh pad mist eliminator for the CN scrubber ….	**$4,050.00**
Estimated duct from process line to scrubber inlet for the A/A scrubber ….	**$44,414.00**
Estimated duct from process line to scrubber inlet for the CN scrubber ….	**$20,654.00`**
Stainless tank base in lieu of painted mild steel ….	**$14,715.00**
Two (2) Automated tote dumper & barrel loading ….	**$179,550.00**
One (1) Wet dump tank ….	**$4,725.00**
Four (4) spin-dryers manufactured in the USA ….	**$81,740.00**
Four (4) spin dryers manufactured in the China ….	**$28,890.00**
Automatic rinse water flow control for six (6) rinses ….	**$7,202.00**
Automatic evapopration replacement for six (6) rinses ….	**$6,084.00**
Waste pumping for CN & A/A rinse & concentrated wastes ….	**$49,513.00**

Waste storage for CN & A/A concentrated wastes ….	**$28,613.00**
Waste treatment for CN & A/A rinse wastes ….	**$123,483.00**
Chemical replenishment ….	**TBD**
Amp-hour brightener Feed ….	**TBD**
Polypropylene spill containment ….	**TBD**

Please note that the optional pricing is an estimate at this time. The selection of multiple options could have an impact, most likely a decrease, on the optional pricing. Once we know the options that you are interested in, we can provide a final, firm price.

If this scope of work and pricing is acceptable, BTA will provide a more detailed specification. It should the noted that we confidently believe that the above pricing is accurate and, without a change in the scope of work, we do not believe the pricing will change with the firm proposal.

Please also be aware that BTA does a lot of buying and selling used equipment. Should you be inclined, we might possibly find a used scrubber/fan, chiller, rectifier and/or other item that is in good working condition and applicable to this project. Please discuss this with BTA.

Baker Technology Associates Inc.
1507 7th St., Ste. 446
Santa Monica, CA. 90401

CONDITIONS OF SALE

TERMS: 35% down payment with formal purchase order, with progress payments up to 90% of total order value prior to shipment from factory following customer sign-off, on a net 15 day basis. Final 10% due upon start-up, or 90 days after receipt, whichever comes first. If through no fault of Baker Technology Associates (BTA), installation is not completed and start-up does not occur within sixty (60) days of receipt of goods, the final 10% shall be due and payable. This does not affect warranties written into this proposal.

Note: For purposes of this contract, system start-up is defined as electrical/ mechanical system start-up and operation in automatic mode, and does not imply the presence or suitability of the chemical products and processes to be installed (by others) in the system.

F.O.B.: Shipping Points.

PRICES: Normally, prices quoted are firm for a period of 60 days. **However, due to the current large fluctuation in metal and plastic pricing, this quote is good only for 30 days.** After this period, they are subject to confirmation, due to circumstances beyond our control. However, we are currently in a period of rising steel and oil prices. Therefore, this quote is valid only for 30 days.

SHIPMENT: **System will be ready for Customer's inspection and subsequent shipment approximately 15-18 weeks after receipt of purchase order, Customer deposit, and technical review meeting to verify all specifications.**

PRO-RATA: On partial shipments, pro-rata payments shall be made. In case shipments are delayed by the Buyer or due to reasons beyond our control, we reserve the right to render invoices on material ready to ship and payment shall be made based on dating of invoice in accordance with above terms. In the event work is delayed by the Buyer, we reserve the right to invoice progress payments based on the contract price and percent of completion in accordance with terms. Such payments are to be considered advance payments only, and shall not discharge the Buyer from the obligations of the contract.

WARRANTY: The equipment manufacturer's standard warranty is provided on a pass-through basis by BTA. The typical manufacturer's warranty is for one (1) year for parts found to be defective in workmanship or materials under normal conditions upon receipt of defective item. In no event will Seller be liable for removal or reinstallation of any defective parts without prior written consent. No allowance will be made for repairs or alterations unless specifically authorized in writing by Seller.

Warranties of manufacturers of component equipment supplied by BTA, shall apply, and no additional warranties are extended by BTA. Removal and reinstallation of defective parts shall be the responsibility of the Buyer.

NO CLAIM WILL BE ALLOWED FOR DAMAGES OR DELAYS CAUSED BY DEFECTIVE MATERIALS, OR OPERATIONS FAILURES INCLUDING DELAYS IN ANY EQUIPMENT, OR ANY CONSEQUENTIAL DAMAGE OR BUSINESS LOSS INCURRED BY BUYER.

OSHA COMPLIANCE:
BTA strives to provide equipment which complies with the regulations set forth in 29 CFR 1910 with primary focus on: Subpart A – General, Subpart D – Walking-Working Surfaces, Subpart G - Occupational Health and Environmental Control, Subpart O – Machinery and Machine Guarding and Subpart S – Electrical.

Compliance in reference to the regulatory bodies henceforth cited, is attempted by way of: machine design to incorporate regulatory mandates, vetting of supplier manufactured/supplied equipment, incorporation of best practice and historical lessons learned.
Standard equipment supplied includes items such as safety barriers, emergency stop switches, emergency pull cords, warning beacons, alarms and color schemes, interlock switches, limit switches, electrical equipment amenable to lock out tag out protocol, machine ventilation incorporating ACGIH guidelines, stairs, platforms and walking surfaces incorporating Subpart D design elements.
Though BTA attempts to comply with those requirements of which we are aware, we cannot account for the impact of finite detail at each individual installation or the differences in standard interpretation from site to site and between inspectors. As such, ultimately, compliance is up to the end user of the equipment and Baker Technology will not be held liable for any noncompliance to OSHA standards regardless of whether said non-compliance stems from method of equipment use, installation, alteration, change in standard, existing or pre-existing condition.

RESPONSIBILITY:
We do not assume responsibility for loss, damage or breakage in transit. Carriers are responsible for goods lost or damaged in transit. **AS REQUIRED IN RULE 3 OF UNIFORM BILL OF LADING, IN CASE OF LOSS OR DAMAGE EN ROUTE, CONSIGNEE MUST IMMEDIATELY NOTIFY THE CARRIER'S AGENT AT DESTINATION WHEN PRESENTED.**

CANCELLATION:
An order placed can be canceled only with our consent and upon terms that will indemnify us against loss on costs incurred, and provide a fair profit upon work we have performed.

ACCOUNTING:
In the event of any legal processes necessary to collect monies due BTA, the Buyer agrees to remain liable for all damages, losses and expenses including reasonable attorney's fees and legal expense resulting to BTA from such cancellation and collection, together with all expenses BTA may reasonably incur in connection with collecting the sums due hereunder. Buyer agrees that in any legal action brought under this section, jurisdiction and venue shall lie in Los Angeles County, California.

TAXES AND DUTIES:
BTA collects sales tax for sales in the State of California only. Sales, excise, use, gross receipts or similar taxes, export or import tariffs, Federal, state or otherwise whether presently in force or hereafter enacted, shall be deemed extra charges and Buyer agrees to be contractually obligated to pay same at applicable rates.

PERMITS: All permits, whether local, Federal or state shall be paid for by Buyer in advance of installation. BTA will assume no responsibility for obtaining this certification.

ENGINEERING CERTIFICATION: Professional engineering certification, if required by local, Federal or state regulatory agencies, shall be BTA and paid for by the Buyer. BTA will assume no responsibility for obtaining this certification.

QUOTATION: All orders placed hereunder are subject to acceptance by BTA. All proposals, verbal or written, previously made are withdrawn. All modifications shall be made in writing and duly accepted. The buyer order shall be deemed to incorporate, without exception, all the terms and conditions hereof. No modifications of these terms and conditions shall be of any force or effect unless reduced in writing and signed by an officer of BTA. No modification shall be affected by BTA's mere acknowledgment of acceptance of the buyer's purchase order forms, which may contain different terms and conditions.

DELAY:
We shall not in any event be held responsible or liable for consequential damages, nor for any loss, damage, detention, or delay caused by fire, strikes, civil or military authority, or by insurrection or riot, or by any other cause beyond our control. Receipt of the apparatus by the Buyer shall constitute a waiver of any claim for loss or damage due to delay. Buyer delays shall extend time for completion accordingly and the amount of increased cost incurred shall be added to the price in this proposal. If delivery of equipment is not accepted within 15 days of date ready for shipment, goods will be placed in storage at Buyer's expense.

TITLE:
The title and right of possession of described articles shall remain vested in BTA until the Buyer shall have made full payment thereof in cash, and this right shall not be waived by attachment of said articles to the real estate. Upon failure to make agreed payments, or any part thereof, BTA are to retain any and all partial payments which may have been made as liquidated damages and shall be entitled to take immediate possession of said materials.

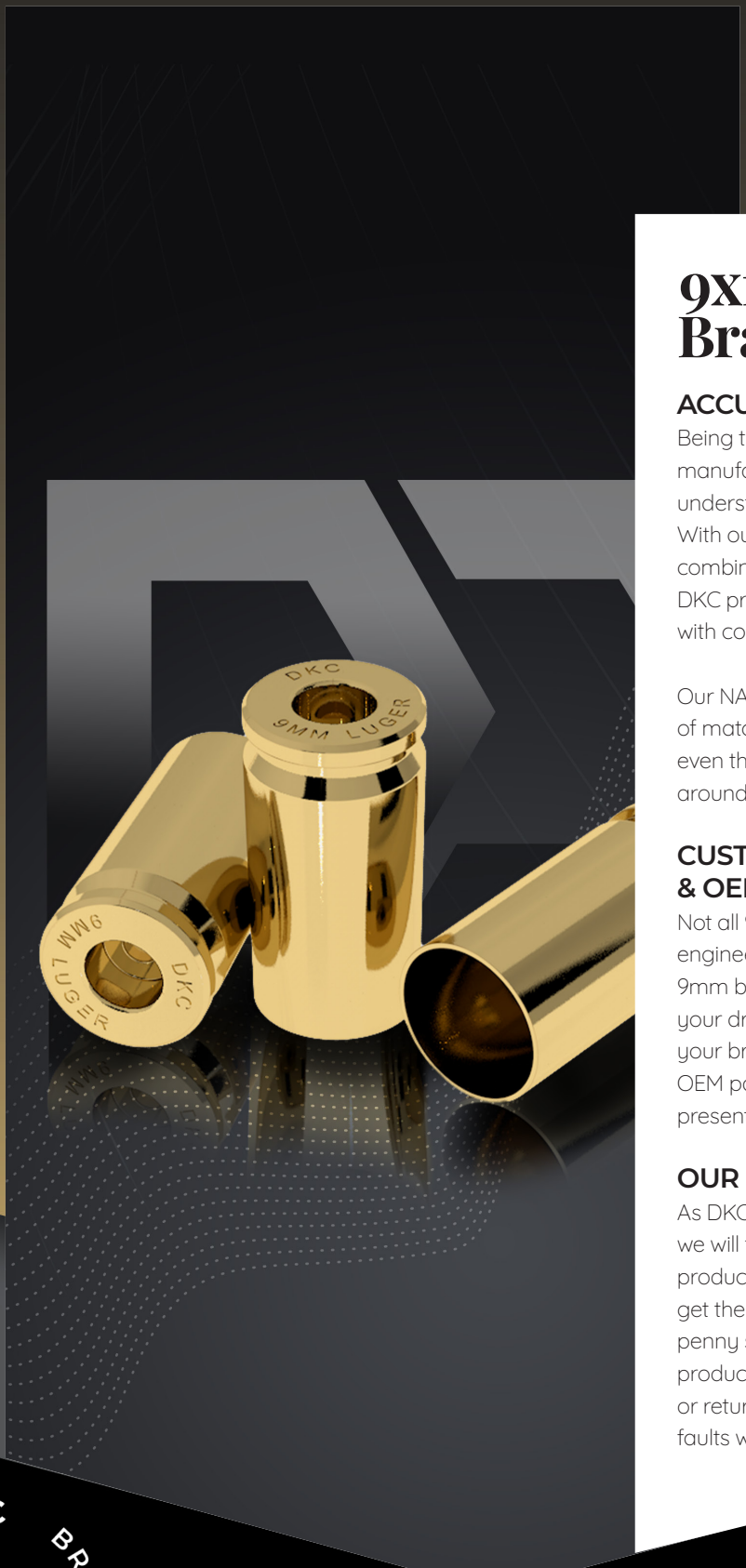
SPECIFICATIONS:
Any change desired by the Buyer in specifications or drawings will be subject to acceptance by BTA and any increased cost resulting there from shall be paid by the Buyer upon invoice. If requested, BTA will submit one (1) set of original drawings and "as built" drawings. All other revisions are subject to an additional charge. BTA assumes no responsibility for the correctness of drawings or specifications of equipment components not manufactured by equipment components not manufactured by BTA.

We hope that you find this description clear and complete. Please feel free to e-mail or call if you have any questions, comments or concerns.

DKC

www.dkc-us.com

DKC BRASS CASE & PROJECTILES



9x19 mm Brass Cases

ACCURATE & CONSISTENT

Being the leader and the largest private manufacturer in its territory, we do understand our customers' demands. With our state-of-the-art factory combined with highly qualified engineers, DKC produces the most accurate brass with consistent quality.

Our NATO-certified facility is capable of matching the requirements of even the most demanding militaries around the globe.

CUSTOM HEADSTAMPS & OEM

Not all 9MM cases are the same. Our engineers are experts in producing the 9mm brass you need. DKC will apply your drawings accordingly and stamp your brand at no extra cost. We also offer OEM packing for those who wish to be present in retail stores.

OUR WARRANTY

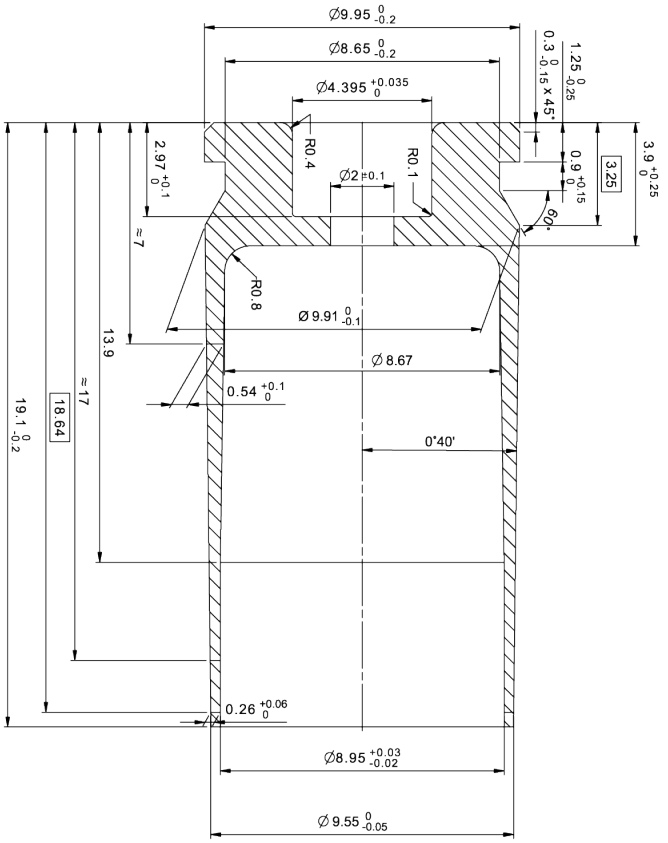
As DKC, we promise our customers that we will timely deliver the highest quality products. We want our customers to get the value they deserve for every penny spent. We do proudly back up our products and provide a 100% exchange or return policy in case of any production faults we might have.

DKC BRASS & PROJECTILES

9x19 MM Cases

Tech Specs

Diameter	9x19mm
Weight	~3,67 g
Material	Brass (CuZn30)
Primer	Boxer



OUR QUALITY & GOALS

Our goal is to produce the highest quality products at competitive prices. We understand the importance of timely and steady delivery of top-quality products that are vital to your production. DKC has earned several quality certificates so you can be assured that we will be your reliable partner that matches your high-standard business.

NATO CERTIFIED PRODUCTION FACILITY

Our family-owned and operated production facility has 110+ employees that produce 12 million brass cases, 12 M FMJ projectiles as well as over 750 metric tonnes of lead products. We comply with the highest standards of several demanding militaries around the globe.

LOGISTICS & DISTRIBUTION

Our branch office in the USA takes care of imports and logistics while helping our customers save significant time and money. This local facility helps us to deliver products on time as well as keep local stock to fulfill your urgent orders.

Follow us on

CONTACT

SALES & DISTRIBUTION

DKC BRASS & PROJECTILES
1753C N POWERLINE RD
33069 FL / USA
+ 1 972 265 92 44
info@dkc-us.com
www.dkc-us.com

PRODUCTION

DKC AV SANAYi TURKIYE
Acıdere OSB Mahallesi
Baklalı Cd. No:8 Sarıçam
+ 90 322 881 0 444
Adana / TURKIYE
www.dkcav.com

DKC

www.dkc-us.com

DKC BRASS CASE & PROJECTILES

9 mm FMJ RN Projectiles

ACCURATE & CONSISTENT PERFORMANCE

Having the advantage of our in-house lead processing facility, we start our production by recycling lead scrap into ingots then forge into lead wires. After forming the bullet cores according to preferred weights, they are fed into our transfer press machinery for copper or brass jacketing. Thanks to our precision quality procedures, we end up with the highest quality, accurate and consistent projectiles.

All DKC FMJ projectiles are optically controlled with state-of-the-art 100% quality control machinery that detects any irregular products instantly.

MILITARY GRADE QUALITY

Our goal is to produce the highest quality and most reliable products. We do exceed the quality demands of armed forces and our facility is NATO certified.

NATO CERTIFIED PRODUCTION FACILITY

Our family-owned and operated production facility has 110+ employees that produce 12 million brass, 12 M FMJ projectiles as well as over 750 metric tonnes of lead products. We comply with the highest standards of several demanding militaries around the globe.

CERTIFIED ISO 9001:2015 COMPANY

AFEMS

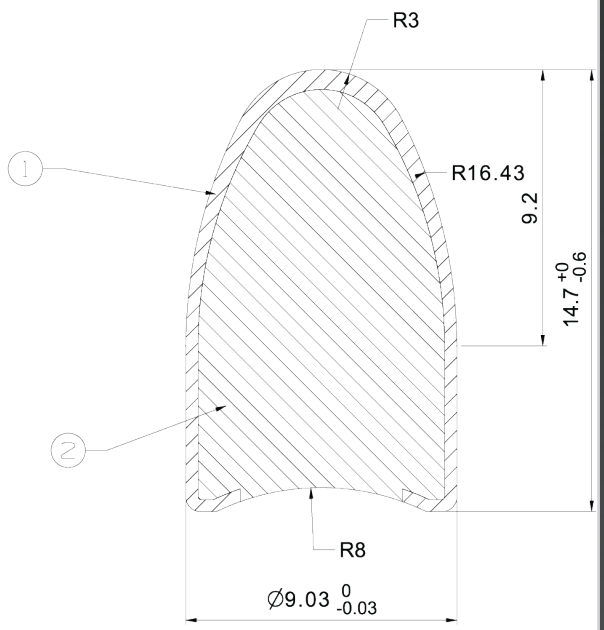
NATO OTAN

DKC BRASS & PROJECTILES

9 mm 115gr FMJ RN Projectile

Tech Specs

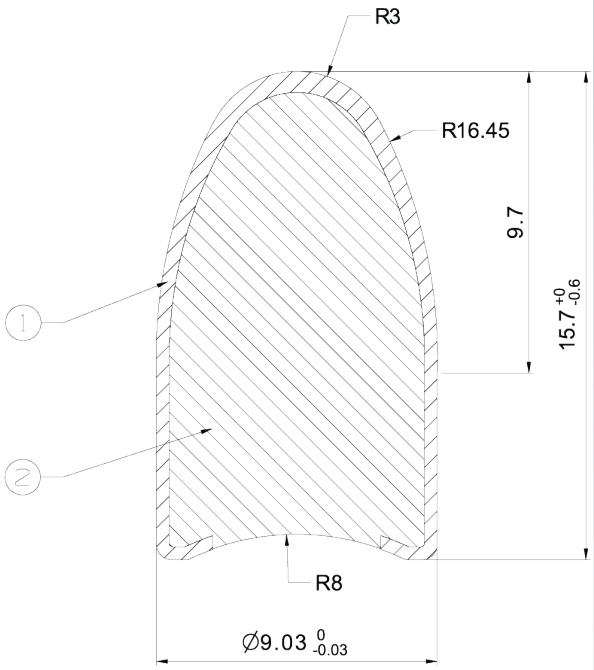
Diameter	9x19mm
Weight	115 GR., 7,45 g ±0.075
Lead Core	Lead - Antimony Alloy (2% Sb)



9 mm 124gr FMJ RN Projectile

Tech Specs

Diameter	9x19mm
Weight	124 GR., 8,03 g ±0.075
Lead Core	Lead - Antimony Alloy (2% Sb)



CONTACT

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LISTE DE PRIX / PRICE LIST

Your current exchange rate form CAD dollars	*0.79*

	Diameter	Pack Size	Price per 1 000	Price in your currency	Sugg. Price per 1 000
223 55 gr FMJ SBT	0.224	500	83.99 CAD	66.35 $	127.25 CAD
TOKAREV 85 gr FCP RN	0.308	500	73.10 CAD	57.75 $	110.75 CAD
30 CARBINE 110 gr FCP RN	0.308	500	101.31 CAD	80.03 $	153.50 CAD
308 147 gr FMJ SBT	0.308	500	194.70 CAD	153.81 $	295.00 CAD
32 71 gr FCP RN	0.312	500	68.31 CAD	53.96 $	103.50 CAD
32 85 gr FCP RNFP	0.312	500	71.28 CAD	56.31 $	108.00 CAD
32 115 gr FCP RNFP	0.312	500	77.55 CAD	61.26 $	117.50 CAD
32 98 gr FCP HBWC	0.314	500	73.10 CAD	57.75 $	110.75 CAD
380 95 gr FCP RN	0.355	500	71.94 CAD	56.83 $	109.00 CAD
380 95 gr FCP HP	0.355	500	73.43 CAD	58.01 $	111.25 CAD
380 100 gr FCP RNFP	0.355	500	74.75 CAD	59.05 $	113.25 CAD
9mm 115 gr FCP RN	0.355	1,000	75.57 CAD	59.70 $	114.50 CAD
9mm 115 gr FCP HP	0.355	1,000	76.89 CAD	60.74 $	116.50 CAD
9mm 121 gr FCP RN	0.355	1,000	76.89 CAD	60.74 $	116.50 CAD
9mm 121 gr FCP HBRN	0.355	1,000	78.38 CAD	61.92 $	118.75 CAD
9mm 124 gr FCP RN	0.355	1,000	78.38 CAD	61.92 $	118.75 CAD
9mm 124 gr FCP HP	0.355	1,000	79.70 CAD	62.96 $	120.75 CAD
9mm 135 gr FCP RN	0.355	1,000	84.65 CAD	66.87 $	128.25 CAD
9mm 147 gr FCP RNFP	0.355	1,000	86.63 CAD	68.43 $	131.25 CAD
9mm 147 gr FCP HP	0.355	1,000	88.11 CAD	69.61 $	133.50 CAD
9mm 158 gr FCP RNFP	0.355	1,000	90.26 CAD	71.30 $	136.75 CAD
38 Super 115 gr FCP RN	0.356	1,000	75.57 CAD	59.70 $	114.50 CAD
38 Super 115 gr FCP HP	0.356	1,000	76.89 CAD	60.74 $	116.50 CAD
38 Super 121 gr FCP RN	0.356	1,000	76.89 CAD	60.74 $	116.50 CAD
38 Super 121 gr FCP HBRN	0.356	1,000	78.38 CAD	61.92 $	118.75 CAD
38 Super 124 gr FCP RN	0.356	1,000	78.38 CAD	61.92 $	118.75 CAD
38 Super 124 gr FCP HP	0.356	1,000	79.70 CAD	62.96 $	120.75 CAD
38 Super 135 gr FCP RN	0.356	1,000	84.65 CAD	66.87 $	128.25 CAD
38 Super 147 gr FCP RNFP	0.356	1,000	86.63 CAD	68.43 $	131.25 CAD
38 Super 147 gr FCP HP	0.356	1,000	88.11 CAD	69.61 $	133.50 CAD
38 Super 158 gr FCP RNFP	0.356	1,000	90.26 CAD	71.30 $	136.75 CAD
38 Super 165 gr FCP RNFP	0.356	1,000	98.67 CAD	77.95 $	149.50 CAD

38 Super 180 gr FCP RNFP	0.356	1,000	103.46 CAD	81.73 $	156.75 CAD
38/357 100 gr FCP HBWC	0.357	1,000	73.76 CAD	58.27 $	111.75 CAD
38/357 125 gr FCP TC	0.357	1,000	79.04 CAD	62.44 $	119.75 CAD
38/357 148 gr FCP HBWC	0.357	1,000	84.65 CAD	66.87 $	128.25 CAD
38/357 158 gr FCP TC	0.357	1,000	92.24 CAD	72.87 $	139.75 CAD
38/357 158 gr FCP RNFP	0.357	1,000	92.24 CAD	72.87 $	139.75 CAD
9mm MAKAROV 95 gr FCP	0.364	1,000	73.10 CAD	57.75 $	110.75 CAD
375 250 gr FCP SPITZER	0.375	250	179.19 CAD	141.56 $	271.50 CAD
10mm/40 155 gr FCP TC	0.400	1,000	87.95 CAD	69.48 $	133.25 CAD
10mm/40 165 gr FCP TC	0.400	1,000	94.05 CAD	74.30 $	142.50 CAD
10mm/40 165 gr FCP SH	0.400	1,000	94.05 CAD	74.30 $	142.50 CAD
10mm/40 180 gr FCP TC	0.400	1,000	98.84 CAD	78.08 $	149.75 CAD
10mm/40 180 gr FCP RN	0.400	1,000	98.84 CAD	78.08 $	149.75 CAD
10mm/40 180 gr FCP SH	0.400	1,000	98.84 CAD	78.08 $	149.75 CAD
10mm/40 180 gr FCP HP	0.400	1,000	100.16 CAD	79.12 $	151.75 CAD
10mm/40 200 gr FCP TC	0.400	500	104.12 CAD	82.25 $	157.75 CAD
44 - 40 200 gr FCP TC	0.427	500	149.99 CAD	118.49 $	227.25 CAD
44 200 gr FCP TC	0.429	500	105.60 CAD	83.42 $	160.00 CAD
44 240 gr FCP TC	0.429	500	118.47 CAD	93.59 $	179.50 CAD
45 200 gr FCP TC	0.451	500	104.12 CAD	82.25 $	157.75 CAD
45 230 gr FCP RN	0.451	500	113.69 CAD	89.81 $	172.25 CAD
45 230 gr FCP HP	0.451	500	115.01 CAD	90.85 $	174.25 CAD
45 COLT 250 gr FCP RNFP	0.452	500	126.56 CAD	99.98 $	191.75 CAD
45 - 70 300 gr FCP RNFP	0.458	250	192.56 CAD	152.12 $	291.75 CAD
45 - 70 405 gr FCP RNFP	0.458	250	237.27 CAD	187.44 $	359.50 CAD
458 350 gr FCP SPITZER	0.458	250	213.18 CAD	168.41 $	323.00 CAD
458 450 gr FCP SPITZER	0.458	250	264.00 CAD	208.56 $	400.00 CAD
458 500 gr FCP SPITZER	0.458	250	287.27 CAD	226.94 $	435.25 CAD
458 550 gr FCP SPITZER	0.458	250	317.30 CAD	250.66 $	480.75 CAD

9mm 114 gr FCP RN	0.3555	1,000	63.03 CAD	49.79 $	95.50 CAD
9mm 125 gr FCP RN	0.3555	1,000	64.35 CAD	50.84 $	97.50 CAD

Termes et conditions / *Terms and purchase condition*

Les prix sont affichés en dollars canadiens. Toute les commandes sont payables avant la livraison. Le taux de change utilisé sera celui de la date de réception de votre commande. La devise de facturation doit être convenu lors de la commande.

Pour passer une commande, il est obligatoire de nous transmettre par courriel un BON DE COMMANDE. Une acceptation vous sera transmise dans les jours suivants. Si des conditions particulières ont été négocié, celles-ci seront incluses dans l'acceptation de commande.

Prices are listed in Canadian dollars. All orders are payable prior to delivery. The exchange rate used will be the rate of the date of reception of your order. The billing currency must be agreed upon at time of order.

To place an order, it is obligatory to send us an ORDER FORM by email. An acceptance will be sent to you in the following days. *If any particular conditions have been negotiated, they will be included in the order acceptance.*

Transport

Les conditions de livraison sont EXW à notre usine. Nous sommes en mesure de vous organiser le transport et les frais de ce transport vous seront facturés. Pour des livraisons au Etat-Unis, nous pouvons vous offrir les services d'importation et de dédouanement moyennant des frais.

Delivery terms are EXW to our factory. We are able to arrange transport for you and the costs of this transport will be invoiced to you. For deliveries to the United States, we can offer you import and customs clearance services for a fee.

Emballage / *Packaging*

Les projectiles sont emballés en sac suivant les quantités mentionnées dans la liste de prix. Il est possible de commander les projectiles emballés en plus petit format. Une surcharge de 4,00$ / 1 000 unités sera facturée. Pour les produits normalement emballés en 1 000 unités, vous pouvez les obtenir en 500 unités. Pour les produits normalement emballés en 500 unités, vous pouvez les obtenir en 250 unités. Des mini sacs sont aussi disponibles sans frais pour faire des emballages en plus petit format.

Il est aussi possible d'obtenir les produits en vrac. Ils seront conditionnés en lot de +/- 125 000.

The projectiles are packed in bags according to the quantities mentioned in the price list. It is possible to order the projectiles bagged in a smaller size. A surcharge of $4.00 / 1,000 projectiles will be charged. For products normally packaged in 1,000 units, you can get them in 500 units. For products normally packaged in 500 units, you can get them in 250 units. Mini bags are also freely available for smaller packaging sizes.

It is also possible to obtain the products in bulk. They will be packaged in batches of +/- 125 000.

POUR FAIRE VIREMENT ÉLECTRONIQUE / TO MAKE AN ELECTRONIC TRANSFER

Bénéficiaire / Recipient : MétoPlus inc. / CamPro
Nom de la banque / Bank Name : Banque Nationale du Canada
Adresse de la banque / Bank Adress : 421, Route 138, St-Augustin-de-Desmaures (Québec) G3A 2S7
Numéro de transit / Transit number : 06731
Numéro de banque (institution) / Bank number : 006
Numéro du compte bancaire CAD / Bank account CAD : 01-286-23
Numéro du compte bancaire USD / Bank account USD : 00-029-64
Numéro du compte bancaire EURO / Bank account EURO : 109610 264 050 001 01
SWIF (IBAN) : BNDCCAMMINT
Faire parvenir le détail de votre paiement à / Foward the payment details to : chloe@campro.ca.

2022 OEM Pricing Program

OEM Level Pricing

A type 6 or 7 FFL is required for OEM level pricing. A minimum purchase of any combination of 200,000 bullets is required for OEM Level Pricing. After an annual order of 200,000 bullets, customers may place smaller orders in lots of 25,000 bullets for one full year at OEM level pricing. After one year, another 200,000-bullet order at OEM level pricing will be required. These bullets must be used for OEM manufacturing and not component sales. Berry's reserves the right to refuse pricing to any company unable or unwilling to comply with this program.

OEM-Distributor Level Pricing

To provide for OEM customers who are unable to order 200,000 bullets, orders of 25,000 bullets or more can qualify for Distributor Level Pricing with a Type 6 or 7 FFL. These bullets must be used for OEM manufacturing and not component sales. Berry's reserves the right to refuse pricing to any company unable or unwilling to comply with this program. A minimum purchase of any combination of 100,000 bullets is required to receive Distributor Level pricing for component sales.

Shipping

Shipping cost is not included in bullet pricing. Shipping is included in all other product pricing once order minimums are met. USPS Flat Rate Shipping will be used on smaller bullet shipments. Any non-bullet products may ship via FedEx Ground or UPS Ground. Orders of 500 lbs. or more may ship by means of less-than-truckload or truckload carriers. LTL residential or lift-gate fees are not paid by Berry's for any order. Shipping is shopped with multiple carriers to determine best cost for our customers. Shipping will be agreed upon with our customers before shipment of orders. Customers are welcome to provide their own shipping services.

**Berry's reserves the right to adjust pricing and programs at any time. **

Berry's Superior Plated Pistol Bullets

Items in red new for 2022

SKU	.32 Cal. (.312)	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
99586	.32 Cal. (.312) 71gr Round Nose	250	6	711148995867	$15.55	$15.55	$25.99
75556	.32 Cal. (.312) 71gr Round Nose	1000	2	711148755560	$50.62	$54.92	$87.99
SKU	**.380 Cal. (.356)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
67767	.380 Cal. (.356) 100gr Flat Base Round Nose	250	6	711148677671	$19.32	$19.32	$31.99
39481	.380 Cal. (.356) 100gr Flat Base Round Nose	1000	2	711148394813	$62.93	$68.34	$110.99
54458	.380 Cal. (.356) 100gr Round Shoulder	250	6	711148544584	$19.32	$19.32	$31.99
72643	.380 Cal. (.356) 100gr Round Shoulder	1000	2	711148726430	$62.94	$68.35	$110.99
12535	.380 Cal. (.356) 100gr Hollow Base Round Nose	250	6	711148125356	$19.58	$19.58	$32.99
75727	.380 Cal. (.356) 100gr Hollow Base Round Nose	1000	2	711148757274	$63.80	$69.27	$111.99
SKU	**9mm (.356)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
79585	9mm (.356) 100gr Hollow Base Round Nose	250	6	711148795856	$19.58	$19.58	$32.99
19544	9mm (.356) 100gr Hollow Base Round Nose	1000	2	711148195441	$63.80	$69.27	$111.99
19355	9mm (.356) 115gr Round Nose	250	6	711148196553	$20.59	$20.59	$33.99
36002	9mm (.356) 115gr Round Nose	1000	2	711148360023	$58.50	$72.93	$116.99
01055	9mm (.356) 115gr Flat Point	250	6	711148011055	$20.59	$20.59	$33.99
43519	9mm (.356) 115gr Flat Point	1000	2	711148435196	$67.33	$72.92	$116.99
00231	9mm (.356) 115gr Hollow Base Round Nose Thick Plate	250	6	711148002312	$21.94	$21.94	$35.99
00173	9mm (.356) 115gr Hollow Base Round Nose Thick Plate	1000	2	711148001735	$71.60	$77.60	$123.99
73429	9mm (.356) 121gr Hollow Base Hollow Point	250	6	711148734299	$21.31	$21.31	$33.99
65921	9mm (.356) 121gr Hollow Base Hollow Point	1000	2	711148659219	$69.15	$75.02	$119.99
76848	9mm (.356) 124gr Round Nose	250	6	711148768485	$21.61	$21.61	$34.99
19324	9mm (.356) 124gr Round Nose	1000	2	711148193249	$60.50	$76.48	$121.99
43234	9mm (.356) 124gr Flat Point	250	6	711148432348	$21.60	$21.60	$34.99
19584	9mm (.356) 124gr Flat Point	1000	2	711148195847	$70.41	$76.47	$122.99
10299	9mm (.356) 124gr Target Hollow Point	250	6	711148102999	$21.94	$21.94	$35.99
32871	9mm (.356) 124gr Target Hollow Point	1000	2	711148328719	$71.60	$77.60	$123.99
15143	9mm (.356) 124gr Hollow Base Round Nose Thick Plate	250	6	711148151430	$24.20	$24.20	$38.99
29325	9mm (.356) 124gr Hollow Base Round Nose Thick Plate	1000	2	711148293253	$75.16	$81.53	$130.99
00335	9mm (.356) 124gr Hollow Base Flat Point Thick Plate	250	6	711148003357	$24.20	$24.20	$38.99
00401	9mm (.356) 124gr Hollow Base Flat Point Thick Plate	1000	2	711148004019	$75.16	$81.53	$130.99
46109	9mm (.356) 135gr Round Nose	250	6	711148921729	$21.49	$21.49	$32.99
38194	9mm (.356) 135gr Round Nose	1000	2	711148381943	$71.25	$77.30	$123.99
62793	9mm (.356) 135gr Hollow Base Flat Point	250	6	711148627934	$23.38	$23.38	$35.99
00359	9mm (.356) 135gr Hollow Base Flat Point	1000	2	711148003593	$72.49	$78.64	$125.99
74030	9mm (.356) 147gr Round Nose	250	6	711148740306	$22.10	$22.10	$34.99
47636	9mm (.356) 147gr Round Nose	1000	2	711148476366	$72.07	$78.18	$124.99
00355	9mm (.356) 147gr Flat Point	250	6	711148003555	$22.10	$22.10	$34.99
00180	9mm (.356) 147gr Flat Point	1000	2	711148001803	$72.07	$78.18	$124.99
SKU	**.38 Super (.356)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
21637	.38 Super (.356) 130gr Round Nose	250	6	711148216375	$21.52	$21.52	$36.99
55897	.38 Super (.356) 130gr Round Nose	1000	2	711148558970	$71.03	$77.06	$123.99
SKU	**.38/.357 Cal. (.357)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
95022	.38/.357 Cal. (.357) 125gr Flat Point	250	6	711148950224	$22.36	$22.36	$35.99
95400	.38/.357 Cal. (.357) 125gr Flat Point	1000	2	711148954000	$73.15	$79.16	$126.99
59945	.38/.357 Cal. (.357) 125gr Target Hollow Point	250	6	711148599454	$22.33	$22.33	$35.99
35569	.38/.357 Cal. (.357) 125gr Target Hollow Point	1000	2	711148355692	$74.38	$80.53	$128.99
68188	.38/.357 Cal. (.357) 148gr Double Ended Wadcutter	250	6	711148681883	$23.61	$23.61	$36.99
06769	.38/.357 Cal. (.357) 148gr Double Ended Wadcutter	1000	2	711148067694	$76.27	$90.65	$142.99
38587	.38/.357 Cal. (.357) 148gr Hollow Base Wadcutter	250	6	711148385873	$23.10	$23.10	$36.99
35654	.38/.357 Cal. (.357) 148gr Hollow Base Wadcutter	1000	2	711148356545	$76.33	$91.82	$143.99
57945	.38/.357 Cal. (.357) 158gr Round Nose	250	6	711148579456	$26.76	$26.76	$42.99
01594	.38/.357 Cal. (.357) 158gr Round Nose	1000	2	711148015947	$87.36	$94.69	$148.99
84525	.38/.357 Cal. (.357) 158gr Flat Point	250	6	711148845254	$27.00	$27.00	$42.99
00616	.38/.357 Cal. (.357) 158gr Flat Point	1000	2	711148006167	$88.22	$95.60	$149.99
83330	.38/.357 Cal. (.357) 158gr Target Hollow Point	250	6	711148833305	$25.90	$25.90	$44.99
63197	.38/.357 Cal. (.357) 158gr Target Hollow Point	1000	2	711148631970	$93.16	$97.05	$161.99
72843	.38/.357 Cal. (.357) 158gr Flat Point Thick Plate	250	6	711148728434	$28.85	$28.85	$45.99
18493	.38/.357 Cal. (.357) 158gr Flat Point Thick Plate	1000	2	711148184933	$94.34	$102.34	$163.99
SKU	**9x18 Makarov (.364)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
18250	9x18 Makarov (.364) 95gr Round Nose	250	6	711148182502	$19.47	$19.47	$30.99
18918	9x18 Makarov (.364) 95gr Round Nose	1000	2	711148189181	$63.56	$68.94	$110.99
SKU	**.40 S&W/10mm (.401)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
84352	.40 S&W/10mm (.401) 155gr Flat Point	250	6	711148843526	$28.67	$28.67	$44.99
72953	.40 S&W/10mm (.401) 155gr Flat Point	1000	2	711148729530	$93.77	$101.54	$157.99
32541	.40 S&W/10mm (.401) 155gr Round Shoulder	250	6	711148325411	$28.68	$28.68	$44.99
59314	.40 S&W/10mm (.401) 155gr Round Shoulder	1000	2	711148593148	$93.77	$101.54	$157.99
97152	.40 S&W/10mm (.401) 155gr Hollow Base Flat Point	250	6	711148971526	$29.68	$29.68	$46.99
44572	.40 S&W/10mm (.401) 155gr Hollow Base Flat Point	1000	2	711148445720	$97.05	$105.05	$163.99
54489	.40 S&W/10mm(.401) 155gr Hollow Base Round Nose	250	6	711148544898	$29.67	$29.67	$47.99
52222	.40 S&W/10mm(.401) 155gr Hollow Base Round Nose	1000	2	711148522223	$97.05	$105.05	$163.99
54174	.40 S&W/10mm (.401) 165gr Flat Point	250	6	711148541743	$29.45	$29.45	$45.99
31500	.40 S&W/10mm (.401) 165gr Flat Point	1000	2	711148315009	$96.01	$104.23	$164.99
54175	.40 S&W/10mm (.401) 165gr Hollow Base Flat Point Thick Plate	250	6	711148541750	$33.38	$33.38	$50.99
01500	.40 S&W/10mm (.401) 165gr Hollow Base Flat Point Thick Plate	1000	2	711148015008	$101.54	$112.97	$180.99

SKU	.40 S&W/10mm (.401)	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
99958	.40 S&W/10mm (.401) 180gr Flat Point	250	6	711148999582	$31.20	$31.20	$47.99
33701	.40 S&W/10mm (.401) 180gr Flat Point	1000	2	711148337018	$96.38	$110.41	$171.99
38854	.40 S&W/10mm (.401) 180gr Round Nose	250	6	711148388546	$31.20	$31.20	$47.99
45855	.40 S&W/10mm (.401) 180gr Round Nose	1000	2	711148458553	$96.38	$110.41	$171.99
31646	.40 S&W/10mm (.401) 180gr Round Shoulder	250	6	711148316464	$31.20	$31.20	$47.99
09911	.40 S&W/10mm (.401) 180gr Round Shoulder	1000	2	711148099114	$96.38	$110.41	$171.99
10659	.40 S&W/10 mm (.401) 180gr Target Hollow Point	250	6	711148106591	$30.04	$30.04	$47.99
25894	.40 S&W/10 mm (.401) 180gr Target Hollow Point	1000	2	711148258948	$97.61	$105.88	$169.99
66728	.40 S&W/10mm (.401) 180gr Flat Point Thick Plate	250	6	711148667283	$35.67	$35.67	$54.99
58513	.40 S&W/10mm (.401) 180gr Flat Point Thick Plate	1000	2	711148525136	$105.34	$118.44	$180.99
50400	.40 S&W/10mm (.401) 200gr Flat Point	250	6	711148504007	$34.15	$34.15	$46.99
00218	.40 S&W/10mm (.401) 200gr Flat Point	500	2	711148002183	$54.78	$58.60	$90.99
SKU	**.41 Cal. (.410)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
62049	.41 Cal. (.410) 210gr Flat Point	250	6	711148620493	$31.06	$31.06	$47.99
00205	.41 Cal. (.410) 210gr Flat Point	500	2	711148002053	$50.31	$54.58	$87.99
SKU	**.44 Cal. (.429)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
20588	.44 Cal. (.429) 220gr Flat Point	250	6	711148205881	$34.36	$34.36	$51.99
00206	.44 Cal. (.429) 220gr Flat Point	500	2	711148002060	$55.63	$60.35	$96.99
97080	.44 Cal. (.429) 240gr Flat Point	200	6	711148970802	$31.33	$31.33	$47.99
00207	.44 Cal. (.429) 240gr Flat Point	500	2	711148002077	$54.90	$59.56	$99.99
99208	.44 Cal. (.429) 240gr Target Hollow Point	200	6	711148992088	$32.39	$32.39	$49.99
00208	.44 Cal. (.429) 240gr Target Hollow Point	500	2	711148002084	$57.01	$66.18	$105.99
SKU	**.45 Cal. (.452)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
25016	.45 Cal. (.452) 185gr Flat Point	250	6	711148250164	$31.23	$31.23	$46.99
00209	.45 Cal. (.452) 185gr Flat Point	500	2	711148002091	$49.12	$53.29	$84.99
84477	.45 Cal. (.452) 185gr Hollow Base Round Nose	250	6	711148844776	$31.84	$31.84	$48.99
00210	.45 Cal. (.452) 185gr Hollow Base Round Nose	500	2	711148002107	$50.36	$54.63	$87.99
15770	.45 Cal. (.452) 185gr Semi-Wadcutter	250	6	711148157708	$29.99	$29.99	$46.99
00211	.45 Cal. (.452) 185gr Semi-Wadcutter	500	2	711148002114	$49.12	$53.44	$80.99
00337	.45 Cal. (.452) 200gr Hollow Base Flat Point	250	6	711148003371	$30.83	$30.83	$47.99
00402	.45 Cal. (.452) 200gr Hollow Base Flat Point	500	2	711148004026	$50.93	$55.25	$88.99
75546	.45 Cal. (.452) 200gr Flat Point	250	6	711148755461	$31.32	$31.32	$48.99
00212	.45 Cal. (.452) 200gr Flat Point	500	2	711148002121	$52.16	$55.24	$92.99
41391	.45 Cal. (.452) 200gr Semi-Wadcutter	250	6	711148413910	$31.32	$31.32	$48.99
00215	.45 Cal. (.452) 200gr Semi-Wadcutter	500	2	711148002152	$50.93	$55.25	$88.99
41968	.45 Cal. (.452) 200gr Target Hollow Point	250	6	711148419684	$30.88	$30.88	$46.99
00213	.45 Cal. (.452) 200gr Target Hollow Point	500	2	711148002138	$51.53	$55.89	$89.99
46967	.45 Cal. (.452) 200gr Round Shoulder	250	6	711148469672	$31.32	$31.32	$50.99
00214	.45 Cal. (.452) 200gr Round Shoulder	500	2	711148002145	$50.93	$55.25	$88.99
45978	.45 Cal. (.452) 200gr Round Nose	250	6	711148459789	$31.32	$31.32	$50.99
23898	.45 Cal. (.452) 200gr Round Nose	500	2	711148238988	$50.93	$55.25	$88.99
98192	.45 Cal. (.452) 230gr Round Nose	250	6	711148981921	$34.04	$34.04	$52.99
00216	.45 Cal. (.452) 230gr Round Nose	500	2	711148002169	$53.72	$61.17	$94.99
SKU	**.45 Long Colt (.452)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
97593	.45 LC (.452) 250gr Flat Point	200	6	711148975937	$27.51	$27.51	$41.99
00217	.45 LC (.452) 250gr Flat Point	500	2	711148002176	$55.80	$60.53	$96.99
SKU	**.50 Cal. (.500)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
00360	.50 Cal. (.500) 300gr Round Shoulder	150	6	711148003609	$47.35	$47.35	$79.99
00198	.50 Cal. (.500) 300gr Round Shoulder	500	2	711148001988	$99.99	$108.63	$167.99
82445	.50 Cal. (.500) 350gr Round Shoulder	150	6	711148824457	$54.95	$54.95	$91.99
86248	.50 Cal. (.500) 350gr Round Shoulder	500	2	711148862480	$108.16	$117.90	$180.99

Berry's Hybrid Hollow Point Bullets

SKU	.380 Cal. (.356)	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
15328	.380 Cal. (.356) 100gr Hybrid Hollow Point	100	15	711148153281	$11.20	$13.83	$20.99
27619	.380 Cal. (.356) 100gr Hybrid Hollow Point	250	6	711148276195	$23.22	$23.22	$36.99
51837	.380 Cal. (.356) 100gr Hybrid Hollow Point	1000	2	711148518370	$77.52	$84.09	$134.99
SKU	**9mm (.356)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
16998	9mm (.356) 124gr Hybrid Hollow Point	100	15	711148169985	$15.24	$15.24	$23.99
01704	9mm (.356) 124gr Hybrid Hollow Point	250	6	711148017040	$26.30	$26.30	$42.99
00915	9mm (.356) 124gr Hybrid Hollow Point	1000	2	711148009151	$88.05	$95.52	$152.99
01805	9mm (.356) 147gr Hybrid Hollow Point	250	6	711148018054	$28.82	$28.82	$43.99
01000	9mm (.356) 147gr Hybrid Hollow Point	1000	2	711148010003	$97.32	$105.57	$168.99
SKU	**.40 S&W/10mm (.401)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
72111	.40 S&W/10mm (.401) 180gr Hybrid Hollow Point	50	15	711148721114	$9.36	$11.56	$17.99
01502	.40 S&W/10mm (.401) 180gr Hybrid Hollow Point	250	6	711148015022	$33.34	$33.34	$55.99
00725	.40 S&W/10mm (.401) 180gr Hybrid Hollow Point	1000	2	711148007256	$113.75	$123.39	$197.99
SKU	**.45 Cal. (.452)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
00328	.45 Cal. (.452) 185gr Hybrid Hollow Point	250	6	711148003289	$34.21	$34.21	$51.99
00258	.45 Cal. (.452) 185gr Hybrid Hollow Point	500	2	711148002589	$58.43	$63.39	$101.99
01110	.45 Cal. (.452) 200gr Hybrid Hollow Point	250	6	711148011109	$36.41	$36.41	$54.99
00334	.45 Cal. (.452) 200gr Hybrid Hollow Point	500	2	711148003340	$62.29	$67.57	$107.99
65300	.45 Cal. (.452) 230gr Hybrid Hollow Point	50	15	711148653002	$11.98	$11.98	$18.99
01225	.45 Cal. (.452) 230gr Hybrid Hollow Point	250	6	711148012250	$40.54	$40.54	$65.99
00400	.45 Cal. (.452) 230gr Hybrid Hollow Point	500	2	711148004002	$69.51	$75.41	$120.99

Berry's Superior Plated Rifle Bullets

SKU	.30 Carb. (.308)	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
26513	.30 Carb. (.308) 110gr Round Nose	250	6	711148265137	$20.54	$20.54	$33.99
54402	.30 Carb. (.308) 110gr Round Nose	1000	2	711148544027	$66.40	$72.03	$115.99
SKU	**.30-30 Win. (.308)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
73348	.30-30 Win. (.308) 150gr Round Shoulder	250	6	711148733483	$26.72	$26.72	$42.99
24485	.30-30 Win. (.308) 150gr Round Shoulder	1000	2	711148244859	$85.89	$93.18	$148.99
SKU	**7.62x39mm (.311)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
00170	7.62x39mm (.311) 123gr Spire Point	250	6	711148001704	$26.79	$26.79	$40.99
00159	7.62x39mm (.311) 123gr Spire Point	1000	2	711148001599	$87.34	$94.75	$151.99
SKU	**.45-70 Govt. (.458)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
53781	.45-70 Govt. (.458) 350gr Round Shoulder	150	6	711148537814	$24.77	$30.58	$61.99
77964	.45-70 Govt. (.458) 350gr Round Shoulder	500	2	711148779641	$86.24	$94.01	$189.99
SKU	**.458 SOCOM (.458)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
19588	.458 SOCOM (.458) 350GR Round Shoulder	150	6	711148195588	$27.98	$34.54	$58.99
26879	.458 SOCOM (.458) 350GR Round Shoulder	500	2	711148268494	$95.20	$103.76	$158.99
SKU	**.300 AAC Blackout (.308)**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
70631	.300 AAC Blackout (.308) 150gr Spire Point	200	6	711148706319	$33.73	$33.73	$53.99
39421	.300 AAC Blackout (.308) 150gr Spire Point	500	2	711148394219	$67.87	$73.62	$117.99
02175	.300 AAC Blackout (.308) 180gr Spire Point	200	6	711148021757	$39.07	$39.07	$63.99
02164	.300 AAC Blackout (.308) 180gr Spire Point	500	2	711148021641	$78.03	$84.65	$135.99
02197	.300 AAC Blackout (.308) 200gr Spire Point	200	6	711148021979	$42.00	$42.00	$67.99
02186	.300 AAC Blackout (.308) 200gr Spire Point	500	2	711148021863	$84.37	$91.52	$146.99
21019	.300 AAC Blackout (.308) 220gr Spire Point	200	6	711148210199	$44.74	$44.74	$71.99
10100	.300 AAC Blackout (.308) 220gr Spire Point	500	2	711148101008	$90.45	$98.12	$156.99

Berry's Jacketed Bullets

SKU	.223/5.56mm (.224)	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
18435	Berry's .223/5.56mm 55gr Full Metal Jacket boat-tail	5000	1	711148184353	$330.75	$351.84	$661.99
48683	Berry's .223/5.56mm 55gr Full Metal Jacket boat-tail	2000	1	711148486839	$151.58	$151.58	$302.99
00339	Berry's .223/5.56mm 55gr Full Metal Jacket boat-tail	500	6	711148003395	$46.18	$46.18	$91.99

Berry's Blue Diamond Muzzleloader Bullets

SKU	50 Cal. (.451)	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
05995	250gr Bullet w/ Sabot	25	5	711148059958	$14.90	$14.90	$24.99
53555	275gr Bullet w/ Sabot	25	5	711148535551	$15.57	$15.57	$25.99
20600	305gr Bullet w/ Sabot	25	5	711148206000	$16.24	$16.24	$26.99

Berry's Ammo Boxes

SKU	50 Round Ammo Boxes	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
53852	401 - .380 Cal./9mm 50rd Blue/Black	1	50	711148538521	$0.94	$0.94	$4.99
19642	401 - .380 Cal./9mm 50rd Smoke/Black	1	50	711148196424	$0.94	$0.94	$4.99
71933	401 - .380 Cal./9mm 50rd Clear/Black	1	50	711148719333	$0.94	$0.94	$4.99
36713	403 - .38/.357 Cal. 50rd Blue/Black	1	50	711148367138	$0.94	$0.94	$4.99
92948	403 - .38 Cal./.357 50rd Smoke/Black	1	50	711148929480	$0.94	$0.94	$4.99
61687	403 - .38/.357 Cal. 50rd Clear/Black	1	50	711148616878	$0.94	$0.94	$4.99
11964	404 - .22 Horn./.30 Carb. 50rd Blue/Black	1	50	711148119645	$1.28	$1.28	$5.99
77334	404 - .22 Horn./.30 Carb. 50rd Clear/Black	1	50	711148773342	$1.28	$1.28	$5.99
44661	405 - .223 Rem./5.56mm 50rd Blue/Black	1	50	711148446611	$1.28	$1.28	$5.99
29682	405 - .223 Rem./5.56mm 50rd Smoke/Black	1	50	711148296827	$1.28	$1.28	$5.99
79462	405 - .223 Rem./5.56mm 50rd Clear/Black	1	50	711148794620	$1.28	$1.28	$5.99
82469	407 - .44 Cal. 50rd Blue/Black	1	50	711148824693	$1.28	$1.28	$4.99
59621	407 - .44 Cal. 50rd Smoke/Black	1	50	711148596217	$1.28	$1.28	$4.99
68345	407 - .44 Cal. 50rd Clear/Black	1	50	711148683450	$1.28	$1.28	$4.99
38861	408 - .40 S&W/.45 ACP 50rd Blue/Black	1	50	711148388614	$1.28	$1.28	$4.99
13897	408 - .40 S&W/.45 ACP 50rd Smoke/Black	1	50	711148138974	$1.28	$1.28	$4.99
67425	408 - .40 S&W/.45 ACP 50rd Clear/Black	1	50	711148674250	$1.28	$1.28	$4.99
82467	409 - .243/.308 Cal. 50rd Blue/Black	1	50	711148824679	$1.71	$1.71	$5.99
46826	409 - .243/.308 Cal. 50rd Smoke/Black	1	50	711148468262	$1.71	$1.71	$5.99
79314	409 - .243/.308 Cal. 50rd Clear/Black	1	50	711148793142	$1.71	$1.71	$5.99
28397	409 - .243/.308 Cal. 50rd Hunter Orange/Black	1	50	711148283971	$1.71	$1.71	$5.99
50199	410 - .270 Cal./.30-06 Sprg. 50rd Blue/Black	1	50	711148501990	$1.76	$1.76	$5.99
32019	410 - .270 Cal./.30-06 Sprg. 50rd Smoke/Black	1	50	711148320195	$1.76	$1.76	$5.99
91023	410 - .270 Cal./.30-06 Sprg. 50rd Clear/Black	1	50	711148910235	$1.76	$1.76	$5.99
77550	410 - .270 Cal./.30-06 Sprg. 50rd Hunter Orange/Black	1	50	711148775506	$1.76	$1.76	$5.99
87962	411 - .45/70 Govt. 50rd Blue/Black	1	30	711148879624	$2.41	$2.41	$5.99
38482	411 - .45/70 Govt. 50rd Clear/Black	1	30	711148384821	$2.41	$2.41	$5.99
19975	412 - Ultra Mag. 50rd Blue/Black	1	30	711148199753	$2.60	$2.60	$5.99
71156	412 - Ultra Mag. 50rd Clear/Black	1	30	711148711566	$2.60	$2.60	$5.99
33541	413 - WSSM/500 S&W 50rd Blue	1	50	711148335410	$2.20	$2.20	$5.99
26105	413 - WSSM/500 S&W 50rd Clear	1	50	711148261054	$2.20	$2.20	$5.99
43974	414 - WSM 50rd Blue/Black	1	30	711148439743	$2.64	$2.64	$5.99
19685	414 - WSM 50rd Clear/Black	1	30	711148196851	$2.64	$2.64	$5.99
20015	415 - Various 50rd Blue/Black	1	30	711148200152	$2.41	$2.41	$5.99
54020	454 - 50 A.E. 50Rrd Blue	1	50	711148540203	$2.20	$2.20	$5.99

Berry's Ammo Boxes

SKU	100 Round Ammo Boxes	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
69874	001 - .380 Cal/9mm 100rd Blue/Black	1	50	711148698744	$1.79	$1.79	$5.99
41236	001 - .380 Cal./9mm 100rd Smoke/Black	1	50	711148412364	$1.79	$1.79	$5.99
87412	001 - .380 Cal./9mm 100rd Clear/Black	1	50	711148874124	$1.79	$1.79	$5.99
00350	001 - .380 Cal./9mm 100rd Z-Green/Black	1	50	711148003500	$1.79	$1.79	$5.99
95182	003 - .38/.357 Cal. 100rd Blue/Black	1	50	711148951825	$1.79	$1.79	$5.99
75321	003 - .38/.357 Cal. 100rd Smoke/Black	1	50	711148753214	$1.79	$1.79	$5.99
15382	003 - .38/.357 Cal. 100rd Clear/Black	1	50	711148153823	$1.79	$1.79	$5.99
86410	005 - .223 Rem./5.56mm 100rd Blue/Black	1	50	711148864101	$2.20	$2.20	$5.99
11664	005 - .223 Rem/5.56mm 100rd Smoke/Black	1	50	711148116644	$2.20	$2.20	$5.99
03856	005 - .223 Rem./5.56mm 100Rrd Clear/Black	1	50	711148038564	$2.20	$2.20	$5.99
00372	005 - .223 Rem/5.56mm 100rd Z-Green/Black	1	50	711148003722	$2.20	$2.20	$5.99
02070	007 - .44 Cal. 100rd Blue/Black	1	50	711148020705	$2.20	$2.20	$5.99
99667	007 - .44 Cal. 100rd Smoke/Black	1	50	711148996673	$2.20	$2.20	$5.99
48882	007 - .44 Cal. 100rd Clear/Black	1	50	711148488826	$2.20	$2.20	$5.99
67789	008 - .40 S&W/.45 Cal. 100rd Blue/Black	1	50	711148677893	$2.20	$2.20	$5.99
92199	008 - .40 S&W/.45 Cal. 100rd Smoke/Black	1	50	711148921996	$2.20	$2.20	$5.99
16678	008 - .40 S&W/.45 Cal. 100rd Clear/Black	1	50	711148166786	$2.20	$2.20	$5.99
00410	008 - .40 S&W/.45 Cal. 100rd Z-Green/Black	1	50	711148004101	$2.20	$2.20	$5.99
83500	.22 LR 100rd Blue/Black	1	50	711148835002	$0.97	$0.97	$4.99
63600	.22 LR 100rd Clear/Black	1	50	711148636005	$0.97	$0.97	$4.99
SKU	**10 & 20 Round Ammo Boxes**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
50010	150 - .50 BMG 10rd Smoke	1	50	711148500108	$2.55	$2.55	$5.99
50020	150 - .50 BMG 10rd Clear	1	50	711148500207	$2.55	$2.55	$5.99
09020	109 - .243/.308 Cal. 20rd Blue	1	50	711148090203	$1.15	$1.15	$4.99
09010	109 - .243/.308 Cal. 20rd Smoke	1	50	711148090104	$1.15	$1.15	$4.99
09030	109 - .243/.308 Cal. 20rd Clear	1	50	711148090302	$1.15	$1.15	$4.99
09060	109 - .243/308 Cal. 20rd Hunter Orange	1	50	711148090609	$1.15	$1.15	$4.99
10020	110 - .270/.30-06 Sprg. 20rd Blue	1	50	711148100209	$1.24	$1.24	$4.99
10010	110 - .270/.30-06 Sprg. 20rd Smoke	1	50	711148100100	$1.24	$1.24	$4.99
10030	110 - .270/.30-06 Sprg. 20rd Clear	1	50	711148100308	$1.24	$1.24	$4.99
10060	110 - .270/.30-06 Sprg. 20rd Hunter Orange	1	50	711148100605	$1.24	$1.24	$4.99
11020	111 - .45/70 Govt. 20rd Blue	1	50	711148110208	$1.64	$1.64	$5.99
11030	111 - .45/70 Govt. 20rd Clear	1	50	711148110307	$1.64	$1.64	$5.99
11060	111 - .45/70 Govt. 20rd Hunter Orange	1	50	711148110604	$1.64	$1.64	$5.99
11202	112 - Ultra Mag. 20rd Blue	1	50	711148112028	$2.06	$2.06	$5.99
12030	112 - Ultra Mag. 20rd Clear	1	50	711148120306	$2.06	$2.06	$5.99
11206	112 - Ultra Mag. 20rd Hunter Orange	1	50	711148120603	$2.06	$2.06	$5.99
11302	113 - WSM 20rd Blue	1	50	711148113025	$2.06	$2.06	$5.99
13030	113 - WSM 20rd Clear	1	50	711148130305	$2.06	$2.06	$5.99
57543	209 - .243/6.5/.30-06 20rd Blue/Black	1	50	711148575434	$1.24	$1.24	$4.99
68349	209 - .243/6.5/.30-06 20rd Smoke/Black	1	50	711148683494	$1.24	$1.24	$4.99
78925	209 - .243/6.5/.30-06 20rd Clear/Black	1	50	711148789250	$1.24	$1.24	$4.99
19963	209 - .243/6.5/.30-06 20rd Hunter Orange/Black	1	50	711148199630	$1.24	$1.24	$4.99
46387	210 - .270/.30-06 20rd Blue/Black	1	50	711148463878	$1.35	$1.35	$4.99
39958	210 - .270/.30-06 20rd Smoke/Black	1	50	711148399580	$1.35	$1.35	$4.99
42655	210 - .270/.30-06 20rd Clear/Black	1	50	711148426552	$1.35	$1.35	$4.99
14489	210 - .270/.30-06 20rd Hunter Orange/Black	1	50	711148144890	$1.35	$1.35	$4.99
82216	211 - 45-70/WSM 20rd Blue/Black	1	50	711148822163	$1.45	$1.45	$4.99
36875	211 - 45-70/WSM 20rd Clear/Black	1	50	711148368753	$1.45	$1.45	$4.99
76881	211 - 45-70/WSM 20rd Hunter Orange/Black	1	50	711148768812	$1.45	$1.45	$4.99
46582	211 - 45-70/WSM 20rd Smoke/Black	1	50	711148465827	$1.45	$1.45	$4.99
35861	212 - Ultra Mag 20rd Blue/Black	1	50	711148358617	$1.57	$1.57	$4.99
75448	212 - Ultra Mag 20rd Clear/Black2	1	50	711148754488	$1.57	$1.57	$4.99
21385	212 - Ultra Mag 20rd Orange/Black	1	50	711148213855	$1.57	$1.57	$4.99
28664	212 - Ultra Mag 20rd Smoke/Black	1	50	711148286644	$1.57	$1.57	$4.99
SKU	**Shot Shell Ammo Boxes**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
20302	20 ga. 3" 25rd Blue	1	50	711148203023	$1.87	$1.87	$5.99
23020	12 ga. 3" 25rd Blue	1	50	711148230203	$1.87	$1.87	$5.99
35020	12 ga. 3.5" 25rd Blue	1	50	711148350208	$1.87	$1.87	$5.99
SKU	**Utility Boxes**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
22301	003U Blue	1	50	711148223014	$1.07	$1.07	$4.99
25010	403U Blue	1	50	711148250102	$0.94	$0.94	$4.99
29020	409U Black	1	50	711148290207	$1.31	$1.31	$4.99
90108	300U Clear (Polycarbonate)	1	50	711148290210	$1.53	$1.53	$4.99
66812	Berry's Range Box	1	1	711148668129	$11.99	$11.99	$20.99

Berry's Ammo Cans

SKU	Ammo Can	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
68911	Tri-Can Utility Box Black	1	5	711148689117	$15.07	$15.07	$32.99
88664	Tri-Can Utility Box Orange	1	5	711148886646	$15.07	$15.07	$32.99
49667	Tri-Can Utility Box Red	1	5	711148496678	$15.07	$15.07	$32.99
33805	Tri-Can Utility Box Tan	1	5	711148338053	$15.07	$15.07	$32.99
56235	20 Cal. Plastic Ammo Can (Black)	1	20	711148562359	$4.47	$4.47	$12.99
72169	20 Cal. Plastic Ammo Can (Tan)	1	20	711148721695	$4.47	$4.47	$12.99

Berry's Ammo Cans

SKU	Ammo Can	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
12887	30 Cal. Plastic Ammo Can (Black)	1	12	711148128876	$5.44	$5.44	$15.99
49171	30 Cal. Plastic Ammo Can (Tan)	1	12	711148491710	$5.44	$5.44	$15.99
00330	40 Cal. Plastic Ammo Can (Black)	1	10	711148003302	$5.81	$5.16	$16.99
91151	40 Cal. Plastic Ammo Can (Tan)	1	10	711148911515	$5.81	$5.81	$16.99
SKU	**Berry's Bulk Ammo Cans**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
12692	20 Cal. Plastic Ammo Can (Black) - 500ct	500	1	N/A	$1,747.54 ($3.50ea)	$1,747.54 ($3.50ea)	N/A
69573	20 Cal. Plastic Ammo Can (Tan) - 500ct	500	1	N/A	$1,747.54 ($3.50ea)	$1,747.54 ($3.50ea)	N/A
12888	30 Cal. Plastic Ammo Can (Black) - 500ct	500	1	N/A	$2,127.73 ($4.26ea)	$2,127.73 ($4.26ea)	N/A
71592	30 Cal. Plastic Ammo Can (Tan) - 500ct	500	1	N/A	$2,127.73 ($4.26ea)	$2,127.73 ($4.26ea)	N/A
33500	40 Cal. Plastic Ammo Can (Black) - 500ct	500	1	N/A	$2,274.47 ($4.55ea)	$2,274.47 ($4.55ea)	N/A
43824	40 Cal. Plastic Ammo Can (Tan) - 500ct	500	1	N/A	$2,274.47 ($4.55ea)	$2,274.47 ($4.55ea)	N/A

Berry's Ammo Packaging Trays

SKU	Tray Size	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
00920	9mm 20 Round Trays (Black) - 532ct	532	1	N/A	$104.91 (.20¢ea)	$104.91 (.20¢ea)	N/A
00950	9mm 50 Round Trays (Black) - 790ct	790	1	N/A	$176.32 (.22¢ea)	$176.32 (.22¢ea)	N/A
04520	45 Cal. 20 Round Trays (Black) - 532ct	532	1	N/A	$111.08 (.21¢)	$111.08 (.21¢)	N/A
04550	45 Cal. 50 Round Trays (Black) - 720ct	720	1	N/A	$176.32 (.24¢ea)	$176.32 (.24¢ea)	N/A
00144	110 Rifle Ammo Box Base (Black) - 2000ct	2000	1	N/A	$1,067.20 (.53¢ea)	$1,067.20 (.53¢ea)	N/A

Berry's Brass Cleaning Accessories

SKU	Vibratory Tumblers	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
00540	Berry's QD-500 Vibratory Tumbler w/ Extra Bowl (110V)	1	1	711148005405	$56.20	$56.20	$96.99
00356	Berry's QD-500 Vibratory Tumbler (110V)	1	1	711148003562	$50.16	$50.16	$86.99
00416	Berry's QD-500 Extra Bowl & Lid	1	1	711148004163	$18.10	$18.10	$35.99
65555	Berry's 400 Vibratory Tumbler (110V)	1	1	711148655556	$41.04	$41.04	$85.99
95454	Berry's 400 Tumbler/Rotary Sifter Kit (110V)	1	1	711148954543	$62.17	$62.17	$123.99
39185	Berry's 400 Tumbler/Pan Sifter Kit (110V)	1	1	711148391850	$54.27	$54.27	$111.99
00845	Berry's QD-500 Vibratory Tumbler w/ Extra Bowl (220V)	1	1	711148008451	N/A	N/A	$96.99
00539	Berry's QD-500 Vibratory Tumbler (220V)	1	1	711148005393	N/A	N/A	$86.99
51414	Berry's 400 Vibratory Tumbler (220V)	1	1	711148514143	N/A	N/A	$85.99
66821	Berry's 400 Tumbler/Rotary Sifter Kit (220V)	1	1	711148668211	N/A	N/A	$123.99
99909	Berry's 400 Tumbler/Pan Sifter Kit (220V)	1	1	711148999094	N/A	N/A	$111.99
SKU	**Media Separators**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
00375	Berry's Rotary Brass/Media Separator	1	1	711148003753	$26.55	$26.55	$60.99
00420	Berry's Rotary Brass/Media Separator Basket	1	1	711148004200	$18.70	$18.70	$36.99
47869	Berry's Rotary Media Sifter	1	1	711148478698	$17.92	$17.92	$45.99
19282	Berry's Pan Media Sifter	1	20	711148119287	$3.60	$3.60	$13.99
SKU	**Tumbling Media & Polish**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
75221	Berry's Walnut Media 8 lb. Box	1	120	711148752217	$11.49	$11.49	$19.99
91686	Berry's Walnut Media 30 lb. 5 Gallon Bucket	1	12	711148916862	$18.49	$18.49	$45.99
85436	Berry's Corn Media 14/20 Grit 6 lb. Box	1	120	711148854362	$8.25	$8.25	$18.99
77925	Berry's Corn Media 20 lb. 5 Gallon Bucket	1	12	711148779252	$14.99	$14.99	$39.99
73743	Berry's Corn Media (6 lb.) & Brass Polish Combo (8 oz.)	1	12	711148737436	$12.30	$12.30	$28.99
56236	Brass Bright Polish 8 oz. Bottle	1	25	711148562366	$8.90	$8.90	$15.99
22724	Brass Bright Polish 32 oz. Bottle	1	12	711148227241	$19.10	$19.10	$34.99

Berry's Reloading & Shooting Accessories

SKU	Reloading Accessories	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
22909	Berry's Reloading Data Labels (100ct Roll)	1	10	711148229092	$5.95	$5.95	$11.99
15315	Berry's Superior Bullet Puller	1	50	711148153151	$10.87	$10.87	$29.99
13141	Berry's Superior Bullet Puller Collet Set	1	50	711148131418	$3.49	$3.49	$6.23
27781	Berry's Superior Case Lube 8 oz. Bottle	1	20	711148277819	$6.15	$6.15	$11.99
97124	Berry's Primer Flip Tray	1	10	711148971243	$5.44	$5.44	$12.99
31577	Berry's Powder Funnel Set	1	10	711148315771	$4.23	$4.23	$9.99
SKU	**Shooting Accessories**	**Item Qty.**	**Ship Qty.**	**UPC**	**OEM (4)**	**DIST (2)**	**MSRP**
18756	Berry's Single Pistol Case (Tan)	1	12	711148187569	$4.73	$4.73	$12.99
94632	Berry's Double Pistol Case (Tan)	1	5	711148946326	$8.96	$8.96	$19.99
86434	Gun Swing - .22 Cal.	1	5	711148864347	$4.57	$4.57	$10.99
37043	Gun Swing - .38 Cal.	1	5	711148370435	$4.57	$4.57	$10.99
07568	Gun Swing - .45 Cal.	1	5	711148075682	$4.57	$4.57	$10.99

Berry's VersaCradle™ System

SKU	VersaCradle™ Systems & Kits	Item Qty.	Ship Qty.	UPC	OEM (4)	DIST (2)	MSRP
05569	Berry's Versacradle™ Gun Vise Complete System	1	1	711148055691	$143.00	$143.00	$199.99
05570	Berry's Versacradle™ Shooting Rest Complete System	1	1	711148055707	$192.00	$192.00	$259.99
73990	Berry's Versacradle™ Precision System	1	1	711148739904	$245.00	$245.00	$289.99
05573	Berry's Versacradle™ Machine Vise Complete System	1	1	711148055738	$172.00	$172.00	$239.99
05610	Berry's Versacradle™ Checkering Cradle Complete System	1	1	711148056100	$211.00	$211.00	$279.99
05570	Berry's Versacradle™ 360° Ball & Case	1	1	711148055776	$85.00	$85.00	$119.99
05568	Berry's Versacradle™ Gun Vise System Kit	1	1	711148055684	$70.00	$70.00	$99.99
05576	Berry's Versacradle™ Shooting Rest System Kit	1	1	711148055769	$146.00	$146.00	$189.99
05574	Berry's Versacradle™ Machine Vise System Kit	1	1	711148055745	$104.00	$104.00	$139.99
05601	Berry's Versacradle™ Checkering Cradle System Kit	1	1	711148056018	$124.00	$124.00	$159.99
05602	Berry's Versacradle™ System Stand	1	1	711148056025	$94.00	$94.00	$119.99
05579	Berry's Versacradle™ System C-Clamps (Set Of 2)	1	1	711148055790	$37.00	$37.00	$49.99
06601	Berry's Versacradle™ System Table Top Base	1	1	711148066017	$46.00	$46.00	$59.99
59068	Berry's Versacradle™ Tripod Adapter	1	1	711148590680	$28.00	$28.00	$39.99

DKC

Brass & Projectiles

SHOT SHOW JANUARY 2023

Visit Us At Caesars Forum Booth # 70753

OEM Level Pricing

A type 6 or 7 FFL is required for OEM level pricing.
The minimum purchase is a pallet size of products which is 200K per product.
A resale certificate is required for tax purposes only.
All of our products must be used for OEM manufacturing and can not be resold.

Pricing Confidentiality

Quotes, price lists, and pricing terms may be unique to the Recipient, therefore, and except as otherwise provided by law, the Recipient hereby agrees to keep confidential all pricing quotes and invoiced amounts received from Provider. Recipient shall not use this confidential information in furtherance of its business, or the business of anyone else, whether or not in competition with Provider.

Shipping

Shipping is not included in pricing unless stated otherwise. We shop multiple carriers for the best rate.

For the customers who prefer to use their own carriers, the BOL must be provided a day before the pickup arrives and all products must be taken in 2 weeks after purchase. If you need us to extend this time please let us know.

Returns

All sales are final. However, if there has been a mistake with your order please contact us.
Any products with defects must be returned only after obtaining a return authorization number. Products returned without authorization numbers can not be accepted by our staff during delivery.
In case of a return, restocking fees may apply. All shipping costs are non refundable.

DKC reserves the right to change the price lists without any notice.

DKC

Brass & Projectiles

SHOT SHOW 2023

OEM Price List

SET Prices

	200K - 1M	1M - 5M	Over 5M
9x19 mm Brass Case + 9mm 115gr FMJ RN Projectile	**$0.145**	**$0.130**	**Contact For Pricing**
9x19 mm Brass Case + 9mm 124gr FMJ RN Projectile	**$0.147**	**$0.132**	**Contact For Pricing**

	200K - 1M	1M - 5M	Over 5M
9x19 mm Brass Case	**$0.085**	**$0.078**	**Contact For Pricing**
9mm 115gr FMJ RN Projectile	**$0.065**	**$0.057**	**Contact For Pricing**
9mm 124gr FMJ RN Projectile	**$0.067**	**$0.059**	**Contact For Pricing**

Please note that prices are limited with our current stock and may change without notice. Please contact us for further details.

A valid FFL license and Tax certificate are required.
Shipment is calculated separately at the time of order. Orders are shipped from our warehouse in Savannah, GA.
Our production facility is NATO certified. All of our components comply with NATO military standards.
OEM orders include free headstamp of your brand.

Please contact us for orders and questions.

info@dkc-us.com

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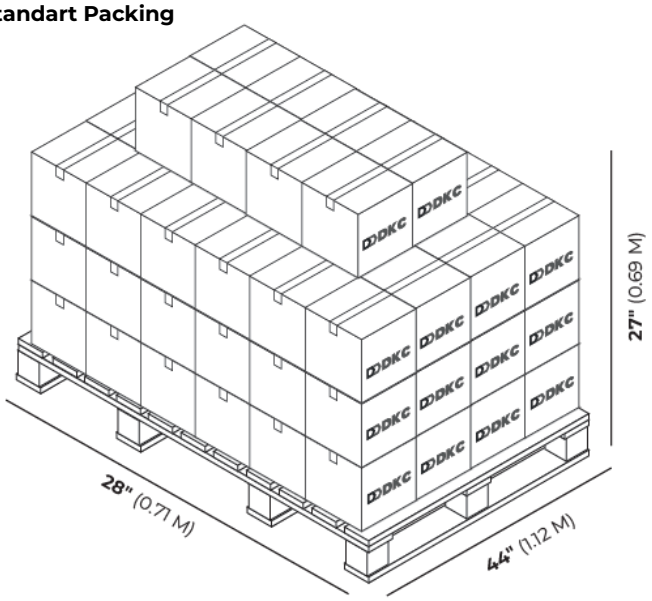
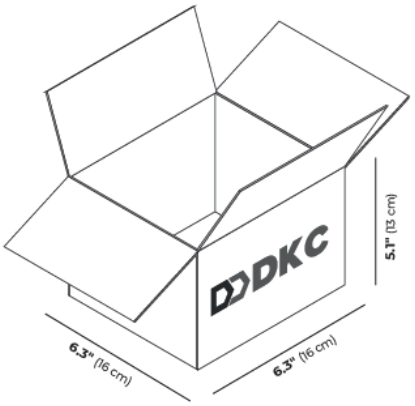
Tel: (561) 542 5416

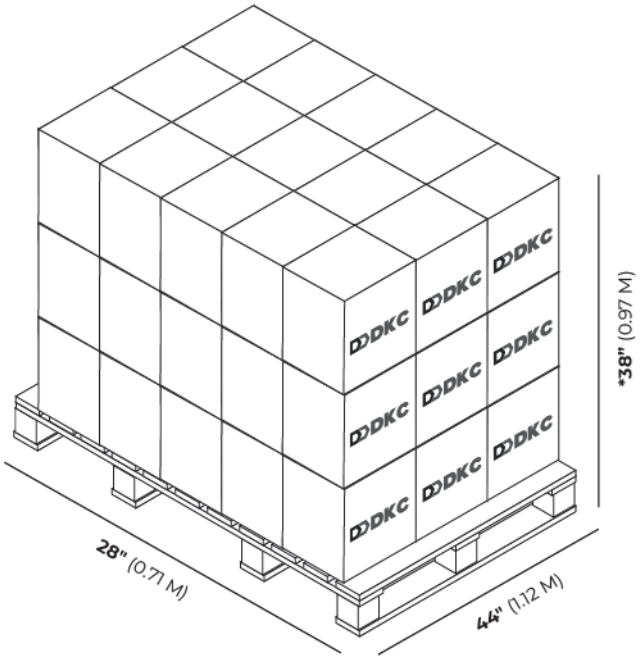
Standart Packing



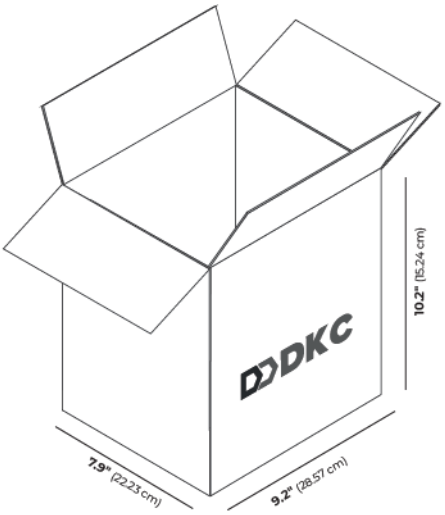
9mm FMJ RN Projectile Pallette
(3,340 lbs for 115gr) (3,622 lbs for 124gr)



9mm FMJ RN Projectile Box
(41.6 lbs for 115Gr) (44.5 lbs for 124Gr)



9x 19 mm Brass Case Pallette
(1,865 lbs)



9x19 mm Brass Case Box
(41 lbs)

	Number of Boxes	Quantity Per Box	Total Quantity	Dimensions	Weight (lbs)
9mm 115gr FMJ RN Projectile	**80**	**2500**	**200,000**	**L-44 / W-28 / H-27**	**3,340**
9mm 124gr FMJ RN Projectile	**80**	**2500**	**200,000**	**L-44 / W-28 / H-27**	**3,622**
9x19 mm Brass Case	**45**	**5000**	**225,000**	**L-44 / W-28 / H-38**	**1,865**

2022 BRASS PRICING

Stock Code	Case	Price per K	Drum Qty	Order Qty
CRPR9MM	PROCESSED 9MM UNPRIMED	NA	100,000	
CRPR9MMP	PROCESSED 9MM PRIMED	NA	100,000	
CRPR40	PROCESSED 40 S&W UNPRIMED	NA	65,000	
CRPR40P	PROCESSED 40 S&W PRIMED	NA	65,000	
CRPR45	PROCESSED 45 ACP UNPRIMED	NA	50,000	
CRPR45P	PROCESSED 45 ACP PRIMED	NA	50,000	
CRPR223	PROCESSED 223 REM UNPRIMED	NA	40,000	
CRPR223P	PROCESSED 223 REM PRIMED	NA	40,000	
CM380	NEW 380 AUTO UNPRIMED	$118.00	100,000	
CM380P	NEW 380 AUTO PRIMED	NA	100,000	
CM300BOF	NEW 300 BLACKOUT UNPRIMED	$187.00	40,000	
CM300BOFP	NEW 300 BLACKOUT PRIMED	NA	40,000	
CM9MMF	NEW 9MM UNPRIMED	$100.00	100,000	
CM9MMFP	NEW 9MM PRIMED	NA	100,000	
CM40	NEW 40 S&W UNPRIMED	$126.00	65,000	
CM40P	NEW 40 S&W PRIMED	NA	65,000	
CM357SIG	NEW 357 SIG UNPRIMED	$150.00	50,000	
CM357SIGP	NEW 357 SIG PRIMED	NA	50,000	
CM10MM	NEW 10MM UNPRIMED	$150.00	45,000	
CM10MMP	NEW 10MM PRIMED	NA	45,000	
CM45	NEW 45 ACP UNPRIMED	$130.00	50,000	
CM45P	NEW 45 ACP PRIMED	NA	50,000	

*DUE TO CURRENT SITUATIONS WE ARE NOT OFFERING ANY PRIMED BRASS OR PROCESSED BRASS AT THIS TIME

To Place order Please Phone, Fax, or Email

Kelsey Wakefield: 208-748-1532 Brook Layes: 208-748-1534 Hannah Rice 208-748-1535 Fax: 208-746-1703

Email: kelsey.wakefield@kashca.us brook.layes@kashca.us hannah.rice@kashca.us

Company Name

Number

Address

City, State, & Zip Code

2022 OEM PRICING

Stock Code	Bullet	Price per K	Drum Qty	Order Qty
XCB42233	.223 55 FMJ	$66.50	170,000ct	PCS
XCB42232	.223 62 FMJ	$85.00	170,000ct	PCS
XCB43030	30 Carb 110 RN	$66.00	100,000ct	PCS
XCB43080	7.62X39 123 FP	$76.00	95,000ct	PCS
XCB43081	30-30 150 FP	$90.00	75,000ct	PCS
XCB43082	308 147 FMJ	$145.00	70,000ct	PCS
XCB43815	380 95 RN	$63.00	110,000ct	PCS
XCB43800	380 100 RNFP	$63.00	110,000ct	PCS
XCB43812	380 100 HP	$66.00	110,000ct	PCS
XCB43550	9MM 115 RN	$67.00	100,000ct	PCS
XCB43561	9MM 115 RN HPCB	$72.00	100,000ct	PCS
XCB43557	9MM 115 HP	$71.00	100,000ct	PCS
XCB43574	9MM 115 RN FMJ	$79.00	100,000ct	PCS
XCB43552	9MM 124 RN	$71.00	90,000ct	PCS
XCB43551	9MM 124 FP	$71.00	90,000ct	PCS
XCB43562	9MM 124 RN HPCB	$75.00	90,000ct	PCS
XCB43558	9MM 124 HP	$72.00	90,000ct	PCS
XCB43575	9MM 124 RN FMJ	$91.00	90,000ct	PCS
XCB43553	9MM 135 RNFP	$71.00	85,000ct	PCS
XCB43564	9MM 135 HP	$78.00	85,000ct	PCS
XCB43554	9MM 147 RN	$72.00	80,000ct	PCS
XCB43559	9MM 147 RN HPCB	$84.00	75,000ct	PCS
XCB43565	9MM 147 HP	$85.00	75,000ct	PCS
XCB43560	9MM 165 RN	$95.00	70,000ct	PCS
XCB43801	38 125 FP	$73.00	90,000ct	PCS
XCB43808	38 125 HP	$77.00	90,000ct	PCS
XCB43803	38 148 WC	$79.00	75,000ct	PCS
XCB43804	38 158 SWC	$90.00	70,000ct	PCS
XCB43805	38 158 FP	$89.00	70,000ct	PCS
XCB43806	38 158 RNFP	$87.00	70,000ct	PCS
XCB43807	38 158 HP	$92.00	70,000ct	PCS
XCB43569	357 Sig 125 FP	$131.00	85,000ct	PCS
XCB44000	40 155 RNFP	$85.00	70,000ct	PCS

2022 OEM PRICING

Stock Code	Bullet	Price per K	Drum Qty	Order Qty
XCB44001	40 165 RNFP	$90.00	70,000ct	PCS
XCB44006	40 165 HP	$99.00	70,000ct	PCS
XCB44008	10/40 165 RNFP HPCB	$100.00	70,000ct	PCS
XCB44002	40 180 RNFP	$97.00	65,000ct	PCS
XCB44005	40 180 HP	$98.00	65,000ct	PCS
XCB44007	10/40 180 RNFP HPCB	$106.00	65,000ct	PCS
XCB44003	40 200 RNFP	$99.00	55,000ct	PCS
XCB44009	40 200 RNFP HPCB	$161.00	55,000ct	PCS
XCB44004	40 220 RNFP	$109.00	50,000ct	PCS
XCB44100	41 210 FP	$99.00	55,000ct	PCS
XCB44403	44 200 RNFP HPCB	$107.00	55,000ct	PCS
XCB44402	44 240 RNFP HPCB	$125.00	45,000ct	PCS
XCB44500	45 185 FP	$96.00	60,000ct	PCS
XCB44502	45 200 RN	$100.00	55,000ct	PCS
XCB44501	45 200 FP	$101.00	55,000ct	PCS
XCB44503	45 200 SWC	$99.00	55,000ct	PCS
XCB44508	45 200 HP	$103.00	55,000ct	PCS
XCB44504	45 225 FP	$106.00	55,000ct	PCS
XCB44505	45 230 RN	$108.00	50,000ct	PCS
XCB44507	45 230 HP	$121.00	50,000ct	PCS
XCB44506	45 255 FP	$124.00	45,000ct	PCS
XCB44580	458 300 RNFP N/C	$191.00	35,000ct	PCS
XCB45001	50 325 RNFP N/C	$208.00	32,000ct	PCS
XCB45000	50 350 RNFP	$216.00	30,000ct	PCS
XCB43818	380 95 HP XDEF	$121.00	100,000ct	PCS
XCB43571	9MM 115 HP XDEF	$128.00	100,000ct	PCS
XCB43566	9MM 124 HP XDEF	$130.00	90,000ct	PCS
XCB43572	9MM 135 HP XDEF	$134.00	85,000ct	PCS
XCB43573	9MM 147 HP XDEF	$136.00	75,000ct	PCS
XCB44010	40 165 HP XDEF	$168.00	70,000ct	PCS
XCB44011	40 180 HP XDEF	$171.00	65,000ct	PCS
XCB44012	10MM 200 HP XDEF	$174.00	55,000ct	PCS
XCB44583	45 200 HP XDEF	$204.00	55,000ct	PCS
XCB44582	45 230 HP XDEF	$212.00	45,000ct	PCS

To Place order Please Phone, Email, or Fax
Kelsey: 208-748-1532 Brook: 208-748-1534 Hannah Rice: 208-748-1535 Fax: 208-746-1703
E: kelsey.wakefield@kashca.us Brook.layes@kashca.us hannah.rice@kashca.us

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2022 INDUSTRIAL PRICE LIST

UNPRIMED BRASS

RIFLE CALIBERS

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#3450	222 REMINGTON	$276.50	12,000
#3440	5.56X45MM	$201.50	12,000
#4840	223 REMINGTON	$195.00	12,000
#4860	223 BLANK	$315.00	10,000
#4890	224 VALKYRIE	$331.50	12,000
#4920	243 WINCHESTER	$381.50	7,000
#3260	6MM CREEDMOOR (LRP)	$441.50	8,000
#3270	SR 6MM CREEDMOOR (SRP)	$534.00	8,000
#2310	6.5 GRENDEL	$400.00	10,000
#4850	6.5 CREEDMOOR (LRP)	$400.00	8,000
#3230	SR 6.5 CREEDMOOR (SRP)	$492.00	8,000
#2470	260 REMINGTON	$514.00	7,000
#4880	277 WOLVERINE	$254.50	15,000
#3240	6.8 SPC	$320.50	10,000
#2620	270 WINCHESTER	$359.00	5,000
#2480	7MM-08 REMINGTON	$370.50	7,000
#2520	30 CARBINE	$205.50	20,000
#4870	30 CARBINE BLANK	$312.00	15,000
#2820	30-30 WINCHESTER	$288.00	8,000
#4220	300 BLACKOUT	$223.50	15,000
#3950	300 HAM'R	$243.00	14,000
#2440	308 WINCHESTER (LRP)	$366.50	7,000
#2490	308 MATCH (SRP)	$441.50	7,000
#2610	30-06 SPRINGFIELD	$359.00	5,000
#5000	7.62X39	$254.50	10,000
#3310	7.62X39 SHORT BLANK	$425.50	10,000
#5001	7.62X39 LONG BLANK	$436.50	8,000
#4900	32-20	$192.50	15,000

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#4940	32 WIN SPECIAL	$398.00	8,000
#2460	338 FEDERAL	$443.50	7,000
#3040	348 WINCHESTER	$1,298.50	5,000
#4260	350 LEGEND	$223.50	12,000
#2450	358 WINCHESTER	$516.00	7,000
#1340	375 WINCHESTER	$503.50	7,000
#3855	38-55 SHORT (2.080)	$378.50	7,000
#382125	38-55 LONG (2.125)	$454.50	7,000
#4410	444 MARLIN	$525.50	5,000
#3220	450 BUSHMASTER	$544.50	7,000
#4630	45 RAPTOR	$492.00	7,000
#4052	458 SOCOM	$585.00	7,500
#4010	458 HAM'R	$607.00	7,500
#4065	40-65	$440.50	6,000
#4570	45-70 GOV'T	$370.50	5,000
#4590	45-90 (2.4)	$727.50	4,000
#4526	45-100 (2.6)	$787.00	4,000
#3055	12.7X42MM	$552.50	7,000
#4560	500 AUTO MAX	$492.00	6,500
#4050	50 ALASKAN	$847.00	4,000
#4030	50-70 GOV'T	$889.00	5,000
#4040	50-90 SHARPS	$1,143.50	3,500
#3010	50-110 WINCHESTER	$897.00	3,500
#4020	56-50 SPENCER (TAYLOR'S)	$847.00	8,000

PRECISION PRS RIFLE SERIES

★ = NEW LRP = LARGE RIFLE PRIMER SRP = SMALL RIFLE PRIMER

PRICING SUBJECT TO CHANGE WITHOUT NOTICE. Minimum Order: 50,000 cases. Industrial order must be in box quantity per caliber as listed. Nickel plated cases are available in all calibers. Pricing listed is for Starline headstamp. Custom headstamps are available for an additional fee. Prices include shipping and handling to all destinations within the United States. An additional charge will apply if priority delivery is requested. Prepaid shipping to all destinations within the United States.

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2022 INDUSTRIAL PRICE LIST

UNPRIMED BRASS

HANDGUN CALIBERS

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#2810	30 LUGER	$174.00	20,000
#4500	30 MAUSER	$175.00	15,000
#4200	7.62X25 TOKAREV	$175.00	20,000
#4830	32 AUTO	$143.00	30,000
#3140	7.65 FRENCH LONG	$172.00	25,000
#2510	32 S&W LONG	$149.50	20,000
#2560	32 S&W	$155.00	30,000
#2500	32 H&R MAG	$147.00	20,000
#2530	327 FEDERAL	$205.50	20,000
#1100	9MM	$133.50	25,000
#1120	9MM +P	$136.00	25,000
#2300	9X21	$152.50	25,000
#3500	9MM LARGO	$160.00	25,000
#1130	9MM STEYR	$168.00	20,000
#4600	9 SUPER COMP (9X23)	$174.00	20,000
#3300	9MM WIN MAG	$177.00	15,000
#2600	9MM MAKAROV	$152.50	25,000
#2700	38 SUPER	$141.00	20,000
#3600	38 SUPER +P	$151.00	20,000
#4700	38 SUPER COMP	$151.00	20,000
#4720	38 TJ	$170.50	25,000
#1300	357 MAG	$138.00	15,000
#1330	357 MAXIMUM	$369.50	12,000
#3100	357 SIG	$171.00	20,000
#3110	360 DW	$186.00	12,000
#1230	38 LONG COLT	$152.50	20,000
#3920	38 S&W	$155.00	25,000
#3900	38 SHORT COLT	$152.50	25,000
#1200	38 SPECIAL	$133.50	15,000
#1220	38 SPECIAL +P	$135.00	15,000
#4100	380 AUTO	$138.00	30,000
#3800	38-40	$246.00	3,500
#2100	40 S&W	$157.00	20,000
#2110	40 SUPER	$233.50	15,000
#1900	10MM	$163.50	15,000
#2200	10MM MAG	$211.50	10,000

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#4000	400 COR-BON	$216.00	15,000
#1820	41 COLT	$494.00	15,000
#1830	41 SPECIAL	$202.50	12,000
#1800	41 MAG	$178.50	12,000
#2410	414 SUPER MAG	$368.50	8,000
#1440	44 AUTO MAG	$319.00	10,000
#1410	44 COLT	$178.00	15,000
#1400	44 MAG	$178.50	10,000
#4400	44 RUSSIAN	$177.00	15,000
#1700	44 SPECIAL	$177.00	12,000
#2400	445 SUPER MAG	$380.00	8,000
#3700	44-40	$212.50	3,500
#1500	45 AUTO	$166.00	15,000
#1530	45 AUTO BLANK	$227.00	10,000
#1520	45 AUTO + P	$186.00	15,000
#1540	45 AUTO RIM	$182.00	15,000
#1600	45 COLT	$186.00	10,000
#2010	45 G.A.P.	$177.00	15,000
#1610	45 LONG COLT BLANK	$199.00	10,000
#3400	45 S&W SCHOFIELD	$189.50	10,000
#1640	COWBOY 45 SPL	$213.00	15,000
#2900	45 SUPER	$214.50	15,000
#2000	45 WIN MAG	$203.50	10,000
#2420	454 CASULL	$301.00	10,000
#3410	455 WEBLEY/MKII	$381.00	15,000
#4610	460 S&W MAG	$502.50	7,000
#4060	460 ROWLAND	$245.00	15,000
#4760	475 WILDEY MAG	$498.50	8,000
#4750	475 LINEBAUGH	$428.50	8,000
#2040	480 RUGER	$398.00	8,000
#3000	5 IN 1 BLANK	$382.50	10,000
#3050	50 AE	$336.50	8,000
#4550	500 LINEBAUGH	$428.50	7,000
#4510	500 S&W MAG (R)	$462.00	6,500
#4530	500 SPECIAL	$462.00	8,000

★ = NEW

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cmsa cowboy mounted shooting association
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COWBOY FAST DRAW ASSOCIATION

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2022 DEALER PRICE LIST

UNPRIMED BRASS

RIFLE CALIBERS

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#3450	222 REMINGTON	$304.00	3,400
#3440	5.56X45MM	$217.50	3,200
#4840	223 REMINGTON	$212.50	3,300
#4860	223 BLANK	$353.00	3,100
#4890	224 VALKYRIE	$365.00	2,800
#4920	243 WINCHESTER	$419.00	1,800
#3260	6MM CREEDMOOR (LRP)	$486.00	1,900
#3270	SR 6MM CREEDMOOR (SRP)	$587.50	1,900
#2310	6.5 GRENDEL	$439.50	2,800
#4850	6.5 CREEDMOOR (LRP)	$439.50	1,900
#3230	SR 6.5 CREEDMOOR (SRP)	$525.50	1,900
#2470	260 REMINGTON	$547.00	1,800
#4880	277 WOLVERINE	$280.00	3,300
#3240	6.8 SPC	$354.00	2,600
#2620	270 WINCHESTER	$386.50	1,600
#2480	7MM-08 REMINGTON	$400.00	1,800
#2520	30 CARBINE	$232.00	4,600
#4870	30 CARBINE BLANK	$349.00	3,700
#2820	30-30 WINCHESTER	$309.50	2,200
#4220	300 BLACKOUT	$245.50	3,500
#3950	300 HAM'R	$261.50	3,500
#2440	308 WINCHESTER (LRP)	$390.00	1,800
#2490	308 MATCH (SRP)	$486.00	1,800
#2610	30-06 SPRINGFIELD	$386.50	1,600
#5000	7.62X39	$293.00	2,700
#4900	32-20	$204.00	4,900
#4940	32 WIN SPECIAL	$441.50	2,300

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#2460	338 FEDERAL	$492.00	1,700
#3040	348 WINCHESTER	$1,461.50	1,200
#4260	350 LEGEND	$245.50	3,500
#2450	358 WINCHESTER	$550.50	1,800
#1340	375 WINCHESTER	$547.00	1,900
#3855	38-55 SHORT (2.080)	$417.50	2,300
#382125	38-55 LONG (2.125)	$489.50	2,300
#4410	444 MARLIN	$558.00	1,600
#3220	450 BUSHMASTER	$591.00	2,000
#4630	45 RAPTOR	$536.00	2,200
#4052	458 SOCOM	$645.50	1,800
#4010	458 HAM'R	$667.50	1,700
#4065	40-65	$469.50	1,600
#4570	45-70 GOV'T	$385.00	1,700
#4590	45-90 (2.4)	$775.50	1,500
#4526	45-100 (2.6)	$850.00	1,400
#3055	12.7X42MM	$601.50	2,000
#4560	500 AUTO MAX	$536.00	1,700
#4050	50 ALASKAN	$887.00	1,300
#4030	50-70 GOV'T	$943.00	1,400
#4040	50-90 SHARPS	$1,203.00	1,200
#3010	50-110 WINCHESTER	$935.50	1,300
#4020	56-50 SPENCER (TAYLOR'S)	$901.00	1,800

PRECISION PRS RIFLE SERIES

★ = NEW LRP = LARGE RIFLE PRIMER SRP = SMALL RIFLE PRIMER

PRICING SUBJECT TO CHANGE WITHOUT NOTICE. Minimum Order: 4 boxes. Order in box quantities only. Prices include shipping & handling within the United States. Add $3.15 per $100 up to $300 and $1.05 per additional $100 ordered for shipping insurance. Expedited shipping available upon request at additional cost. Payment must accompany order. VISA, MasterCard, Discover, American Express, cashiers check, money order, personal checks accepted. Orders subject to check clearance. Credit card payment subject to fee. Nickel plated cases are available in all calibers, please ask for details.

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2022 DEALER PRICE LIST

UNPRIMED BRASS

HANDGUN CALIBERS

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#2810	30 LUGER	$194.50	5,200
#4500	30 MAUSER	$185.50	4,700
#4200	7.62X25 TOKAREV	$185.50	4,700
#3140	7.65 FRENCH LONG	$189.50	8,100
#4830	32 AUTO	$157.50	8,000
#2510	32 S&W LONG	$162.00	5,700
#2560	32 S&W	$168.50	7,200
#2500	32 H&R MAG	$161.00	6,100
#2530	327 FEDERAL	$226.50	5,100
#1100	9MM	$140.50	5,600
#1120	9MM +P	$141.00	5,400
#2300	9X21	$162.00	5,200
#3500	9MM LARGO	$171.00	5,000
#1130	9MM STEYR	$184.50	5,100
#4600	9 SUPER COMP (9X23)	$183.50	5,000
#3300	9MM WIN MAG	$190.50	4,200
#2600	9MM MAKAROV	$164.00	5,600
#2700	38 SUPER	$151.50	5,000
#3600	38 SUPER +P	$161.50	5,000
#4700	38 SUPER COMP	$161.50	5,200
#4720	38 TJ	$184.50	5,100
#1300	357 MAG	$146.00	4,500
#1330	357 MAXIMUM	$394.00	3,200
#3100	357 SIG	$185.50	4,600
#3110	360 DW	$202.50	3,400
#1230	38 LONG COLT	$162.00	5,200
#3920	38 S&W	$164.00	5,600
#3900	38 SHORT COLT	$162.00	5,900
#1200	38 SPECIAL	$140.50	5,000
#1220	38 SPECIAL +P	$142.00	4,900
#4100	380 AUTO	$148.00	6,800
#3800	38-40	$282.50	3,000
#2100	40 S&W	$165.00	4,900
#2110	40 SUPER	$259.50	3,000
#1900	10MM	$175.00	4,400
#2200	10MM MAG	$220.50	3,700

PART NO.	CALIBER	PRICE/1000	BOX QTY.
#4000	400 COR-BON	$231.50	3,400
#1820	41 COLT	$540.50	4,000
#1830	41 SPECIAL	$214.50	3,300
#1800	41 MAG	$190.00	3,100
#2410	414 SUPER MAG	$408.00	2,300
#1440	44 AUTO MAG	$346.00	2,600
#1410	44 COLT	$190.00	3,100
#1400	44 MAG	$188.00	2,900
#4400	44 RUSSIAN	$190.00	3,200
#1700	44 SPECIAL	$184.50	3,100
#2400	445 SUPER MAG	$416.00	2,500
#3700	44-40	$245.00	3,000
#1500	45 AUTO	$176.00	4,000
#1530	45 AUTO BLANK	$253.50	2,600
#1520	45 AUTO + P	$193.50	3,400
#1540	45 AUTO RIM	$190.00	3,500
#1600	45 COLT	$193.50	3,000
#2010	45 G.A.P.	$190.00	4,100
#1610	45 LONG COLT BLANK	$210.00	2,900
#3400	45 S&W SCHOFIELD	$202.50	3,100
#1640	COWBOY 45 SPL	$234.00	3,300
#2900	45 SUPER	$224.50	3,600
#2000	45 WIN MAG	$218.00	3,100
#2420	454 CASULL	$322.00	2,500
#3410	455 WEBLEY/MKII	$407.50	3,300
#4610	460 S&W MAG	$556.00	2,000
#4060	460 ROWLAND	$266.00	3,600
#4760	475 WILDEY MAG	$573.50	2,500
#4750	475 LINEBAUGH	$452.00	2,300
#2040	480 RUGER	$419.00	2,200
#3000	5 IN 1 BLANK	$408.00	2,300
#3050	50 AE	$359.50	2,000
#4550	500 LINEBAUGH	$452.00	1,700
#4510	500 S&W MAG (R)	$515.00	1,700
#4530	500 SPECIAL	$515.00	1,800

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Ammo Load Worldwide, Inc

815 D St
Lewiston, ID 83501

Phone: (2 08-748-1531 Email: eric.nelson@kashca.us

Price List

2/1/2020

All prices are subject to change without notice
All prices F.O.B. Lewiston, Idaho, USA
All prices in US dollars

MARK X PISTOL SYSTEM	**Unit Price**
Mark X - Standard Calibers (38 Spl, 357 Mag, 45 Auto, 9MM, or 40 S&W)	$28,175.00
Mark XII-Standard Calibers	$45,300.00
16" Rotary Case Collator	$4,485.00
14" Rotary Bullet Collator	$3,335.00
24" Adjustable Stand for Pin/Case & Bullet Collators $150/ea	$300.00
Automatic Primer Tube Filler	$1,980.00
Plexi Glass Primer Filler Cover	$460.00
Heavy Duty Flip Top Table (powder coated with caster wheels)	$2,770.00
Adjustable Powder Shuttle System (replaces powder disc)	$5,175.00
Bullet Feed Shuttle System (replaces bullet disc)	$4,485.00
Bulk Case & Bullet Pre-Feed System with PLC	$10,400.00

MARK L V RIFLE SYSTEM	
Mark LV - Standard Calibers (.223, .308)	$67,850.00
Mark LV - Custom Order Calibers (price may vary)	Call for Quote
16" Rotary Pillar Case Collator	$5,400.00
20" Rotary Pillar Case Collator (used with larger calibers)	$6,980.00
16" Rotary Bullet Collator	$4,175.00
Automatic Primer Tube Filler	$1,980.00
Bulk Case & Bullet Pre-Feed System with PLC	$10,400.00

OTHER EQUIPMENT

Cannelure Machine, dual pistol	$53,575.00
Cannelure Machine, dual rifle	$52,425.00
Large Rotary Dryer (gas or electric)	*$145,100.00*
Large Barrel Style Rotary Parts Washer / Tumbler	$71,330.00
Restrike Press	$91,400.00
Shaker Style Inspection/Packaging Machine	$8,920.00
Gauge Blocks for Shaker Table (50 rounds per block)	$470.00

OPTIONAL EQUIPMENT ON THE STANDARD MARK X

CONVERSION KITS

Classification	Caliber	Unit Price	
MARK LV RIFLE SYSTEM			
Standard	223/5.56	$7,500.00	
Standard	308/7.62	$7,500.00	
300 Blackout		$8,300.00	
Custom Order		Call for quote	
Quick Change Tool Head (does not include tooling conversion kit)		$9,200.00	
collator conversion kit	(both bullet and case)	$2,200.00	
MARK X PISTOL SYSTEM			**
Standard	38 Special *	$5,720.00	$7,320.00
Standard	357 Magnum *	$5,720.00	$7,320.00
Standard	45 ACP	$5,720.00	$7,320.00
Standard	9MM	$5,720.00	$7,320.00
Standard	40 S&W	$5,720.00	$7,320.00
Special Order	38 S&W	$5,950.00	$7,595.00
Special Order	380 Auto	$5,950.00	$7,545.00
Special Order	44 Magnum	$5,950.00	$7,545.00
Special Order	44 S&W	$5,950.00	$7,545.00
Custom Order	10MM, 38 Auto, 41 Mag, 45 LC	$6,325.00	$7,929.00
Custom Order	38 Super	$6,930.00	$8,525.00
Custom Order	25 Auto, 32 Auto, 32 S&W-L, 32 S&W-S	$7,100.00	$8,695.00
Custom Order	30 Carbine **(rifle cartridge)**	$7,050.00	$8,650.00
Custom Order	44/40 **(rifle cartridge)**	$7,900.00	$9,495.00
Custom Order	30 Luger	$9,700.00	$11,290.00

Case sizing press-2" stroke	$88,400.00
Case sizing machine 3" stroke	$98,625.00
Refurbished case processor	$37,550.00
Conveyor inspection table	$14,320.00
Case hopper	$520.00
Used Mark L (when available)	$61,100.00
Used Priming machine (when available)	$71,300.00
Bullet Kinkart Hopper	$155.00