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Basic Machinery and Equipment Standards

For

Tooling, Special Machinery and Welding Equipment

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**1. INTRODUCTION**

- 1.1. Ridgeview’s shared goal with suppliers is to establish a standard where-by special machines, tooling and welding equipment produced will be of consistent quality and workmanship to provide our customer with consistent components and assemblies. We understand various criteria, (i.e.) customer print requirements; longevity, type of material, volume, etc. can alter design and construction. Our shared goal is to allow our suppliers to use innovative ideas to design and construct cost effective equipment to be delivered in a reasonable amount of time using, but not limited to, the following standards.
- 1.2. These are general standards only. They are intended to supplement the specific tooling, special machinery and welding equipment specification. It is the responsibility of the designated Ridgeview engineer to determine the conformance to these standards as a requirement of the project.
- 1.3. It is the supplier’s responsibility to thoroughly review and understand the contents of these standards for tooling, special machinery and welding equipment. If necessary, contact the assigned responsible engineer at Ridgeview Industries for clarification.

**2. SUPPLIER REQUIREMENTS**

- 2.1. All supplier quotations for tooling, special machinery, and welding equipment must be submitted with the necessary information to clearly describe the proposed equipment.  
 The following will accompany each quote:
  - Design and Build Cost (capital & tooling separation )
  - Equipment Descriptions
  - Preliminary Sequence of Operations
  - Anticipated Cycle Time (including machine and assumed operator time)
  - Lead Time (shipping date)
  - Estimated change over time
- 2.2. After the release of a purchase order, the supplier will be responsible to attend a meeting so that all issues related to the project will be reviewed.
  - Concept Drawings
  - Project Timeline *by supplier*
  - Required Cycle Time (Part to Part)
  - Program Management (Single Point of Contact)

- 2.3. It is the responsibility of the supplier to obtain the approval of the assigned responsible Ridgeview engineer for all design prints and schematics that establish the primary function of the equipment. Approvals must be obtained prior to the release of the equipment for manufacture and the purchase of any major components through a design review meeting with key Ridgeview personnel. This approval process in **No Way** alleviates the vendor from full responsibility for the function, performance, and dependability of the equipment being supplied
- 2.4. Timing: The supplier must have adequate resources available to ensure that any minor changes to the system or equipment can be completed without delay to delivery of a fully functional system or piece of equipment.
- 2.5. At machine runoff on suppliers floor the vendor is responsible to provide one (1) copy of the machine maintenance and operation manual in a 3-ring binder format for review for each piece of equipment furnished. After equipment buyoff by Ridgeview, the supplier is responsible to update all drawings, schematics, and machine documentation to reflect the “**as-built**” condition of the equipment. This manual must contain the following machine documentation.

- The machine electrical wiring schematics, pneumatic and hydraulic schematics must be produced on a reproducible media, and a Memory Stick or CD (2D data to be DXF, PDF, 3D to be Native design – ie Mech Desk, Solidworks).
- The machine PLC program and documentation must be supplied on a Memory Stick or CD, in a file format which can be imported to Allen Bradley software. Programs must be “fully documented.”
- Bit maps of touch screens.
- JPEG/Bit maps of Medar setup screens-upon delivery.
- One (1) set of machine mechanical drawings on a reproducible media, and a Memory Stick or CD (2D data to be DXF,PDF , 3D to be Native Design –ie Mech Desk, Solidworks). This set must include machine layouts, bill of materials, and detail drawings. Detailed dimensioned drawings must be provided for all non-purchased wear items, perishables, and part specific details.
- All manufacturer’s data sheets, parts lists, and instruction manuals for all purchased items installed on the equipment. Any modifications made to standard purchased items must be shown in the detailed machine drawings and bill of materials.
- The recommended preventative maintenance procedures for the machine including frequency of inspections, lubrication diagrams, checkpoints, methods of determining wear, and methods for correcting malfunctions.
- The recommended list of spare parts which Ridgeview should stock in their facility
- A clearly documented procedure that outlines the steps required to properly change over the equipment to different product or models with photos if applicable.
- A clearly documented procedure that outlines the steps required to properly set-up and operate the equipment, including any critical sensor adjustments.
- Documentation of weld parameters as-supplied with corresponding weld performance data.

### 3. GENERAL MACHINE STANDARDS

- 3.1. All tooling, special machinery, and welding equipment supplied to Ridgeview must meet all safety requirements of the Occupational Safety and Health Act (OSHA/MIOSHA), including all provisions, standards, and amendments applicable at the time of shipment of a machine.
- 3.2. It is the supplier's responsibility to design and build equipment that conforms to these specifications in their entirety. In the event that a machine design requires the use of non-standard equipment as determined by these specifications or equipment not listed, the supplier is responsible for the following items:
  - 3.2.1. The supplier must submit in writing a request for the use of non-standard equipment along with the purchasing source, expected cost of replacement and projected delivery lead-time. This request must clearly define the equipment by listing the type, manufacturer, and model, as well as providing a brief description of its function on the machine.
  - 3.2.2. If the domestic availability, replacement costs or delivery lead times are deemed unacceptable to Ridgeview, the supplier will be required to deliver one (1) set of immediate wear items or replacement parts with the original equipment, *which must be included in the quote*.
- 3.3. All welding and assembly equipment must contain part presence sensing devices that comply with Ridgeview's standards. The equipment must detect that all parts are present/ not present before beginning the current operation. Whenever the assembly is removed from one assembly fixture and placed in subsequent assembly fixtures, that equipment must detect that all of the previous operations are complete. When the equipment detects that a part is not present or the previous operation is not complete, the equipment will not allow the part to be removed from the assembly fixture until the equipment is key reset. The operator will be notified of all faults through the operator control panel. All equipment must have a automated routine for performing sensor checks and must satisfy project PFMEA and Poke-e-Yoke plan as determined by RVI Launch Team ( Q.E, M.E. and C.E.).
- 3.4. Sensors that are used for part presence and/or operation complete should be wired and/or programmed in such a manner as to ensure proper operation of the sensing device during every cycle of the machine, including on a turntable in the load station to be off when the table stops and on when parts are loaded.
- 3.5 All Lockout Tagout points must be identified and labeled

### 4. MECHANICAL DESIGN

- 4.1. The equipment must have fork lift pockets 8" X 4" Tubing or lifting lugs (rings) if pockets are unfeasible
- 4.2. Working height between 36" to 40".
- 4.3. All steel guide ways shall have a hardened surface.
- 4.4. Machine Paint Standards:
  - 4.4.1. The supplier is responsible to make the necessary pre-paint preparations to all surfaces to be prime painted and finish painted. All surfaces must be clean and free of dirt, oils, greases, and steel scale. The vendor is responsible for using proper masking techniques to ensure that all areas and surfaces not intended for finish paint are protected from direct paint spray and over-spray.
  - 4.4.2. All machine equipment must conform to the specific paint color standards of Ridgeview. Final paint touch-ups are to be performed at machine installation.
    - 4.4.2.1. All barriers, permanent guards, and removable guard frames will be painted **safety yellow**, except for extruded aluminum frame and lexan . This standard applied to all Ridgeview manufacturing facilities.
    - 4.4.2.2. All machine frames, operator stands, and all other surfaces and components intended for finish paint will be painted. **Manufacturer: Benjamin Moore 219**

4.4.2.3. Supply water piping shall be **blue**, warm return water shall be **red**, and compressed air shall be **gray / black**.

- 4.5. All tooling shall, when possible, be manufactured so that the entire piece of tooling associated with one part can be removed from the machine as one assembly. This is for the purpose of modification, certification, or repair of the tooling on a CMM or surface table. All shim packs or adjustment blocks need be on the same plain that will have to be adjusted.
- 4.6. All clamping should be automatic. Manual clamping *should not* be used without Ridgeview's approval. Customized toggle clamps should have the clamping arm bolted to the toggle body – not welded. All clamps (both automatic and manual) should be checked for closed status. All clamping cylinders to have flow controls on both ports mounted at the cylinder unless authorized by Ridgeview.
- 4.7. All parts will be automatically removed or ejected from the fixture upon completion of the sequence to permit the operator free access for subsequent operations unless otherwise agreed to in writing.
- 4.8. Sensing of any moving parts (cylinders, clamps, slides, etc.) **Must** be done off the attached detail and not off the motion device, including documented procedure/gage for any critical sensor adjustments.
- 4.9. All bowl feeders, conveyors, air assist lines, etc. need to be shut down after the machine sits idle then automatically restart with the first cycle as long as it doesn't bring up any safety concerns.

## 5. PNEUMATIC STANDARDS

- 5.1. All pneumatic components must conform to ANSI (American National Standards Institute) pneumatics standards for industrial equipment or the latest revision thereof.
- 5.2. A detailed drawing of the pneumatic schematic and bill of materials must be submitted to, and approved by, Ridgeview.
- 5.3. All equipment provided must be designed to function properly, meet all cycle time requirements, and provide all output force requirements at **60 PSI**. A pressure switch shall be installed on the incoming airline capable of providing a signal to the PLC so that the air pressure has not dropped below an acceptable level. If operating pressures required **above 80psi, appropriate changes will need to be made.**
- 5.4. All pneumatic supply lines shall contain the necessary airline filters, lubricators, and pressure regulators (FLR) of proper size. A MIOSHA/ OSHA approved lockout device shall be installed on any machine using pneumatic equipment.
- 5.5. Cylinders and main actuators must have adjustable flow controls. Pilot operated checks are recommended on vertical cylinder applications.
- 5.6. Piping shall have provision for installation of quick disconnect air couplings at Main air source.
- 5.7. The compressed air exiting a machine pneumatic circuit must pass through an exhaust muffler.
- 5.8. Piping **ID** should be equal to or greater than port size ( $\frac{1}{4}$ " npt =  $\frac{1}{4}$ " **ID or larger** hose or tubing)

## 6. HYDRAULIC STANDARDS

- 6.1. All hydraulic components must conform to ANSI (American National Standards Institute) hydraulic standards for industrial equipment or the latest revision thereof.
- 6.2. A detailed drawing of the machine hydraulic schematic and bill of materials must be submitted to, and approved by, Ridgeview.

## 7. OPERATOR AND GENERAL SAFETY GUIDELINES

- 7.1. All machines with transfers, index tables, or other moving equipment must have adequate protection to prevent injury to operator from moving parts, arc flash, or sparks during normal operation. All safety protection provided must meet the approval of OSHA/MIOSHA. Robotic applications must comply with ANSI/RIA R15.06.99 or current version. Acceptable means of operator protection include the use of light curtains, palm button, and general machine guarding.
- 7.2. Light Curtains are to be used to ensure operator safety on open style machine accesses, loading stations, indexing conveyors, rotary tables, etc. Wherever a pinch point is present that an operator in the event breaks the light beam can be potentially injured, these motions must stop immediately. No detented valves are allowed where this potential exists.
- 7.3. The machine builder will be responsible for supplying all necessary guards, both permanent and removable, to protect the operator, set-up personnel or passerby from points of hazard on the machine or weld equipment.
  - 7.3.1. Permanent guards must be supplied to completely enclose all driven chains, sprockets, couplings, and gears. Guards should also enclose all areas of moving parts and potential pinch points.
  - 7.3.2. Removable guards must be supplied for general guarding of the machine or in areas that the operator or set-up personnel must access for routine inspection or maintenance. This guarding will prevent injury from breakage of any of the component parts.

## 8. ELECTRICAL STANDARDS

- 8.1. General Requirements: All tooling, special machinery and welding equipment shall comply with the following general requirements for conditions, components and practices.
  - 8.1.1. This standard is not intended as a summary of current safety requirements. All equipment and designs supplied to Ridgeview must comply with the current revision of the National Electric Code (including the version currently accepted by MIOSHA, the American National Standards Institute (also referred to as ANSI), the National Fire protection Agency (also referred to as NFPA), OSHA and any other local, state or national safety codes.
  - 8.1.2. Ridgeview's manufacturing facilities have available a supply of 480 volt, 3 phase, 60 hertz and 120V. All equipment provided must be designed to accept this supply. All machine control circuitry shall be not more than 120 volts with a fuse or circuit breaker on the line side and a grounded neutral line. All operator interface with machine should be 24vdc.
  - 8.1.3. All electrical components, whether located in the main control panel or mounted on the machine, must be clearly labeled to identify their function in correspondence to the symbols and abbreviations shown on the machine electrical wiring schematics. If control is by PLC, wire labeling will correspond with input/output PLC address.
- 8.2. Microprocessors and Programmable Logic Controllers (PLC's): A microprocessor or PLC shall be used whenever possible. PLC equipment shall be Allen Bradley as a general standard and, per the machine requirements. The PLC shall, upon final design and machine delivery, contain 50% spare memory and 25% spare space for future I/O or I/O racks. If a PLC with fixed I/O is selected, 25% spare I/O must be provided.
  - 8.2.1 Control systems using Ethernet communications need to be Compact Logix or higher. (Ethernet connectivity is encouraged but requires RVI review prior to build) SLC platform is acceptable if Ethernet connectivity is not used.

8.3. Control Panels:

8.3.1. The main control panel for each machine shall have an I.D. tag (oil and heat resistant, non-fading) with the following information thereon:

Manufacturer	Name and Address	Electrical	Volts (Line and Control)
	Telephone Number		Amperage
	Machine Model #		Phase
	Machine Serial #		Cycles
	Mfg. Job #		PLC Program Name

8.3.2 Spare terminals shall be provided on all control panels. The number of spare terminals shall be 10% of the total in use on each panel, subject to a minimum of eight (8) spare terminals for control conductors and three (3) for power conductors. Multiple layers of terminal block arrangements will not be allowed.

8.3.3 Operator control stations and devices:

8.3.3.1 Shall be mounted only on the front plate of control panel enclosures or submit specifications at engineering design review. HMI height 57" from bottom of viewing screen.

8.3.3.2 Shall have push buttons that retain their color identification indefinitely.

8.3.3.3 Shall utilize the following push button color code:

Red	- Stop
Red (mushroom Head)	- Emergency stop
Green	- Start motors, cycle start
Black	- Manual machine motions
Yellow	- Cycle stop or top stop

“Emergency Stop” operators shall be the red, maintained, mushroom type of push button.

8.3.3.4 Key Reset required for the following features.

1. Tip change reset. (need button on screen to allow 1<sup>st</sup> and 2<sup>nd</sup> call for tip change without key)
2. RSW tip dressing (function and schedule)
3. Machine faults that would produce a bad part

8.4 Wiring Practices:

8.4.1 Machine Wiring. All wiring and wiring connections to a control panel enclosure shall conform to applicable NEC and ANSI standards in their entirety. Wiring must be enclosed in suitable conduits, metal raceways, or enclosures. 480V AC wiring and control wiring must be in separate wire ways. Flexible connections must be made by liquid tight flexible metal conduit or non-metallic multi-conductor cable with an oil resistant synthetic jacket. The weight of remote push button stations must be supported by means other than the flexible conduit or cables. All machine components must be bonded/grounded. All flexible conduit lines must contain a continuous ground wire. ***Splicing is not allowed.***

8.4.2 Wire Coding and Marking: All wires shall be identified at each termination point, by marking with a number on the wire, which corresponds, with all diagrams. When a PLC is used, all wire termination labels shall correspond to the I/O address point. Wires shall be color-coded as follows:

A-Line and load circuits, AC/DC power	Black (except 120V AC-Red)
B-AC control circuit	Red.
C-DC control circuit	Blue.
D-Circuit neutral conductor	White (when grounded)
E-Outside power entering the panel	Yellow.
F-Machine Ground	Green.

*Note: Wire markers shall be used for all wire identification. Deviations from this color code may be permitted on the internal wiring of individual purchased devices that are completely pre-wired.*

- 8.4.3 Control Wiring: All AC or DC wiring shall be made with color-coded #18 multi-strand machine tool wire with a 600 volt rating as a minimum gauge. All wire shall be insulated with THHN jacket or equivalent.
- 8.4.4 PLC I/O Wiring: All PLC input and output wiring shall be #18 AWG multi-strand machine tooling wiring with a 600 volt rating as a minimum. Wiring between PLC I/O point and terminal strip shall be THHN. Shielded cable is to be provided when TTL, 0-5V DC, or 0-24V DC is required for instrumentation logic. These cables must be run in separate conduits from machine supply and control voltage lines. Shielded cable runs must be continuous from the specific logic module to the field-mounted device.
- 8.4.5 Panel Wiring: Panel wiring must be mechanically supported when necessary to keep them in place. Wiring bundles and connecting devices in the panel shall be laid in a wiring channel. Channels shall be of adequate width and depth to allow necessary access for circuit tracing and wiring changes. For each control panel, spare wires equal to 10% of the total in use, with a minimum of two (2), shall be provided. Spare wires shall be numbered consecutively as S1, S2, etc.
- 8.4.6 Flexible Wire Bundles: control conductors, which terminate at devices mounted on the enclosure doors shall be bundled with tie wraps and made flexible at the hinged side of the enclosure door. Adequate length and flex should be allowed so that the door can swing to the full open position. There shall be 25% spare wires from the panel enclosure to the door. Spares must be bundled and marked appropriately. The wire bundle between the inside of the enclosure and the door shall have a protective wrap around the bundle.
- 8.4.7 All Single-phase transformers shall have a grounded neutral.
- 8.4.8 One wire from each terminal used on all limit switches, push buttons, and other devices shall be returned to the main control panel and shall be individually terminated at the terminal strips. No series wiring of any devices is allowed.
- 8.4.9 Ground reactors are to be installed on all resistance welding guns and connected to the secondary side of the transformer.

## 9. WELDER STANDARDS

- 9.1. Quality Requirements: When possible, Ridgeview will supply the weld quality requirements for a specific part welding application in the form of a part blueprint or a welding specification sheet. If these requirements are not supplied by Ridgeview, it is the supplier's responsibility to conform to the standards for weld quality as set forth by the American Welding Society (AWS) or the customer specific welding standards (e.g., Chrysler, Ford, GM, Honda, etc.). The following characteristics will be considered as part of the overall weld quality:
- 9.2 Resistance Welding Circuits: It will be the responsibility of the welding equipment supplier to ensure the proper design of the secondary welding circuit. The following Standards must be followed whenever suitable to the specific welding process application.
- 9.2.1. 9.2.1.1. The secondary circuit voltage and current will be supplied by a properly sized and rated resistance welding transformer.
- 9.2.1.2. If it is the supplier's intention to supply rebuilt/reconditioned transformers it must be clearly stated in the vendor's quotation as an option for Ridgeview to select.
- 9.2.1.3. Only non-magnetic fixture materials and components will be used in the throat of the welder or secondary field.
- 9.2.2 Fasteners for current carrying shunt cables and copper electrodes shall be of stainless steel or brass material. The shunts must be sized to protect against premature failure and must not contact moving components in the welder.



- 9.2.3 All fixture/machine components contacting the part shall be insulated and isolated from ground conductance. The use of a micarta-type material for insulation between horizontal plates and nylon-type bushings for insulation of bolts, shafts, and rods are considered acceptable methods for ground conductance isolation.
- 9.2.4 The welding electrodes, holders, shanks, and tips must be of the proper material grade and sizes for the resultant spot or projection weld to meet all weld quality requirements. Offset electrode shanks will not be allowed. Copper blocks with tapped holes and adjustable lower back-up electrodes to be no less than RWMA Class 2, with RWMA Class 3 being preferred. 1 extra set of welding consumables must be supplied with equipment.
- 9.3 Electrical Circuit:
- 9.3.1 Resistance welding machines shall be controlled by Medar Weld Controller, compatible rack mounted type with current monitors.
- 9.3.2 The welder electrical circuit design and sequence must provide the capability to initiate, monitor, and adjust each weld point individually. If multiple jobs all must have their own programs and weld settings, no sharing allowed.
- 9.3.3 Multi-function welders must be supplied with a Programmable Logic Controller (PLC) to perform the necessary machine control functions.
- 9.3.4 All weld guns to include the use of a separate pressure switches to initiate welding sequence and linear transducers for gun position.
- 9.3.5 Welding equipment and fixtures should be designed to incorporate the use of limit switches, proximity switches or photo-eye switches for part and position sensing. The sensors should be programmed to be self-monitoring (e.g., the sensor should sense a part only some of the time, not all of the time. Quick-disconnect type electrical connectors are to be used for switches and sensors when possible to allow for quick replacement.
- 9.3.6 Limit switches, proximity switches, photo-eyes, and their associated electrical cables must be adequately guarded and shielded to protect against damage from weld sparks. These devices must also be rated as weld field immune.
- 9.3.7 Weld cylinders/guns shall have full open or returned detection where index of cylinder/gun or fixturing can cause damage if they remain in a closed position. If no damage can happen we will allow movement as long as we know the gun is clear to save cycle time.
- 9.3.8 The welding machine must be supplied with two (2) production counters and (1) Tip change counter. One counter will be designated and clearly labeled as the “total” counter. The other counter will be designated and clearly labeled as the “batch” counter. We will need a button in the control panel that is called “Test Part” that when pushed it will not count or eject the part. We will also need a button for “Tip change continue”. This button will allow them to reset the welder and continue to run for a set amount of cycles while waiting for Weld Tech.
- 9.4 Pneumatic Circuit:
- 9.4.1 Welding equipment shall have all weld guns supplied with a separate solenoid valve and pressure regulator for each gun (**not in a manifold**). This feature will provide independent control of the weld gun actuation and output force. All weld guns and solenoid valves must be clearly labeled in accordance with pneumatic circuit schematics provided with the machine.
- 9.4.2 All weld guns shall be clearly labeled with the weld gun number.

## 9.5 Cooling Circuit:

- 9.5.1 Coolant flow rate through weld guns should be those recommended by the gun manufacturer with an average supply differential of 30 PSIG provided at the drops. Guns should not be piped in series.
- 9.5.2 Coolant flow to be PLC certified. Water lines to be 3/8" minimum.
- 9.5.3 Coolant systems shall use a PLC controlled water saver valve. (ASCO 3/4")
- 9.5.4 All fittings to be brass.

## 9.6 Welding Fixturing:

- 9.6.1 Weld fixture designs must incorporate modular construction and assembly techniques. These sub-basis must be accurately doweled and bolted to the machine frame. The part specific fixturing must be accurately doweled and bolted to the sub-bases.
- 9.6.2 Dowels must locate components and details that are subject to replacement or changeover. Quick-change features must be incorporated when a component or detail must be consistently repositioned within the fixture.
- 9.6.3 Air lines and coolant lines that are subject to weld spatter should be copper or steel tubing, or have adequate shielding to protect the hoses from the weld spatter.
- 9.6.4 The weld fixture design should utilize the defined part datum holes for locating the individual components. All critical area's must be protected from weld flash.

## 9.7 MIG Welding:

- 9.7.1 All robotic MIG welding machines must be supplied with the following equipment:
  - Fanuc Robot
  - Lincoln Power Supply
  - Tregaskiss Weld Torches
  - Genesis System Platform
- 9.7.2 Robotic MIG welding machine cells must be rigidly connected to provide stability or designed to incorporate a common machine base to include the robot, the positioning equipment, and all part fixturing devices.
- 9.7.3 The fixture designs for MIG welding machines must accommodate common welding practices such as torch angle, maintenance, and current flow. Work holding fixtures must present the work piece seam to the weld torch in an attitude that allows a proper torch angle and wire stick out (1/2") to be maintained throughout the entire weld. The fixtures must provide the means for current flow to ground as close to the work piece as possible. Grounding paths are not permitted through bushings, bearings, toggle clamps, etc.
- 9.7.4 The work holding, indexing, and positioning devices must be capable of presenting the work piece to the weld torch within a tolerance, which is less than or equal to one half of the diameter of the welding wire being used.
- 9.7.5 The specified equipment for the welding power supply, electrode filler wire type, and shielding gas specified for a MIG welding process must be reviewed and approved by the assigned responsible engineer.
- 9.7.6 MIG welding equipment shall be supplied with an adequate torch "cleaning" system consisting of a torch lubricator/reaming system. See Standard Materials List

9.8 Miscellaneous Welding Issues:

- 9.8.1 All welding equipment must be provided with adequate provisions for securing and leveling the machine in place. This provision will consist of leveling plates and hold down screws.
- 9.8.2 All controls for the robots will be placed in a position to allow service personnel to have access to it from the outside of the cell. The teach pendant will be accessible from outside the cell and able to be carried into the cell.
- 9.8.3 All critical areas must be protected from weld flash.
- 9.8.4 Each Robot and related equipment shall be labeled with 4" minimum numeric identification. RVI to supply ID number.

**10. EQUIPMENT CAPABILITY AND ACCEPTANCE PROCEDURE – ECAP**

As applicable, the following procedures and requirements must be met by the machine supplier prior to the equipment being acknowledged as acceptable and eligible for final payment by Ridgeview.

- 10.1 Machine Run-Off: As determined by Ridgeview and the assigned responsible engineer, the equipment may be subject to the following machine run-off requirements. It is the vendor's responsibility to ensure the equipment's conformance to these run-off requirements.
  - 10.1.2 2-Hour Production Run-off at Vendor Facility: The assigned responsible engineer and representatives of Ridgeview's production facility will be present at the vendor facility for the machine production run-off. During the two (2) hour run the machine should be in full production mode. All machine functions, Sensor capability study, set-up requirements, cycle times, and quality requirements will be verified and compared to the specified and design criteria. The machine vendor will provide a completed check off sheet to the assigned responsible engineer, who will then determine if the machine is acceptable to Ridgeview.
  - 10.1.4 3 Hour or Minimum 33% daily requirement, Production Run-off at Ridgeview's Facility: The machine builder is required to be present at Ridgeview for the machine production run-off. The negotiated production run-off will be performed with the machine in a full production mode. All machine functions, set-up requirements, changeovers, machine cycle times, and quality requirements will be verified and compared to the specified and design criteria for final equipment signoff through an equipment check off sheet by Ridgeview.

**11. RVI Standard Materials List**

**MECHANICAL:**

Leveling mounts:-----Barry Controls LM-1, LM-2 or RVI Approved

Fixtures shall use Douglas shim packs and blocks for X, Y, and Z adjustments of part locators:

- Douglas #DSCH037-size (2-slot)
- Douglas #DSCH038-size (3-slot)
- Douglas #DSCH039-size (4-slot)
- Douglas #DSCH040-size (5-slot)

**PNEUMATIC:**

- Cylinders with Magnetic Pistons:-----Clippard, Bimba, Numatics, SMC
- Tie Rod Style Cylinders (Pneumatic):-----Miller, Parker
- Tie Rod Style Cylinders (Hydraulic):-----Miller, Parker, Milwaukee
- Hydraulic Shock Absorbers:-----Ace
- Toggle Clamps:-----Destaco, SMC
- Slides & Ball Screw Packages:-----Thompson, SMC, THK, PHD
- Index Tables:-----Weiss
- Air Filters, Lubricators, Regulators:-----Norgren, SMC, Parker
- Air Directional Valves:-----Mac
- Air Logic:-----Clippard
- Air fitting components:-----Parker or equivalent
- Flow Control Components:-----Parker, SMC

**HYDRAULIC:**

- Pumps and Motors:-----Vickers, Continental
- Cylinders:-----Parker, Milwaukee, Miller
- Valves:-----Vickers, Continental
- Hoses and Fittings:-----Parker, or RVI Approved
- Accumulators:-----Parker or RVI Approved

**ELECTRICAL:**

- Control Panel Disconnect Switches: -----Allen Bradley / Square-D
- Magnetic Starters: -----Allen Bradley / Telemecanique
- Relays: -----Allen Bradley / Idec
- Terminal Blocks: -----Allen Bradley (only screw type wire terminals Allowed)
- PLC Constant Voltage Source: -----Sola Transformer
- Programmable Logic Controllers: -----Allen Bradley Family
- Push Buttons, Selector Switches, Indicating Lights: -----Allen Bradley (size 30.5 mm)
- Cycle Initiate Buttons: -----Banner Opto-Touch (machine initiation)
- Limit Switches: -----Allen Bradley
- Proximity Switches: -----Turk
- Photo-eye Switches: -----Keyence
- Pressure Switches: -----SMC
- Light Curtains: -----Banner / Keyence
- Operator interface: -----Allen Bradley Family
- Safety Component Brands : -----Allen Bradley Guard Master
- Current Breaker: -----Eton or Allen Bradley

**RESISTANCE WELDING:**

The lower fixturing part contacting electrodes for spot welding are to be the flat type with a hex-shaped body and 3/8 – 16 male threads.  
RVI stock CLH3-78-37C

For nut and stud welding use centerline CLB 200, 300 or 400 series holders, Standard springs are to be used to hold the weld nut pins up,  
DO NOT use o-rings style weld pins.

Electrodes, Holders, Shanks and Tips: -----Tuffaloy, Centerline, Savair and CMW

**MIG WELDING:**

Fanuc Robot *Model and Type to be reviewed and approved by RVI, Full set of Manuals if Vender supplies*  
 Lincoln Weld Equipment (unless otherwise specified) *Model and Type to be reviewed and approved by RVI*  
 Tregasskiss Weld Torch (unless otherwise specified) *Model and Type to be reviewed and approved by RVI*  
 Nasarc Reamer (Torch Reamer and Anti Spatter Mister)  
 Nozzle Detection Sensor  
 Genesis Systems Style Torch alignment stand  
 Fanuc TorchMate Software and Block

**12. Revision Level and Changes**

RV. Level 5/16/2013

Update standards from 4/23/2004 with help from Nate S., Josh K., Randy M., Kevin R., Dave C. and Joe T.  
 Added a RVI Standard Materials List

RV. Level 9/19/2013

Added to section 3.3: All equipment must have a automated routine for performing sensor checks

RV. Level 10/23/13

9.3.4 All weld guns to include the use of a separate pressure ~~transducers~~ switches to initiate welding sequence and linear transducers for ~~stud and nut sensing~~ gun position.

RV. Level 1/23/14

8.2.1 Control systems using Ethernet communications need to be Compact Logix or higher. (Ethernet connectivity is encouraged but requires RVI review prior to build) SLC platform is acceptable if Ethernet connectivity is not used.

RV. Level 4/3/2014

2.5

- The machine PLC ~~ladder logic~~ program and documentation must be supplied on a Memory Stick or CD, in a File format which can be imported to Allen Bradley software. Programs must be “fully documented.”
- A clearly documented procedure that outlines the steps required to properly set-up and operate the equipment, including any critical sensor adjustments.

3.3

- All welding and assembly equipment must contain part presence sensing devices that comply with Ridgeview’s standards. The equipment must detect that all parts are present/ not present before beginning the current operation. Whenever the assembly is removed from one assembly fixture and placed in subsequent assembly fixtures, that equipment must detect that all of the previous operations are complete. When the equipment detects that a part is not present or the previous operation is not complete, the equipment will not allow the part to be removed from the assembly fixture until the equipment is key reset. The operator will be notified of all faults through the operator control panel. All equipment must have a automated routine for performing sensor checks and must satisfy project PFMEA and Poke-e-Yoke plan as determined by RVI Launch Team ( Q.E, M.E. and C.E.).

3.4.

- Sensors that are used for part presence and/or operation complete should be wired and/or programmed in such a manner as to ensure proper operation of the sensing device during every cycle of the machine, including on a turntable in the load station to be off when the table stops and on when parts are loaded.

4.8. Sensing of any moving parts (cylinders, clamps, slides, etc.) **Must** be done off the attached detail and not off the motion device, including documented procedure/gage for any critical sensor adjustments.