

**REPLACEMENT PARTS FOR FURNACE 15 CAR/DOOR UPGRADE
(DOOR POSITION CONTROL SYSTEM)**

The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of an invitation for bids or a request for proposals shall apply.

THE CODE OF FEDERAL REGULATIONS

- 29 CFR 1910 Occupational Safety and Health Standards
- 40 CFR 261 Identification and Listing of Hazardous Waste

(Application for copies should be addressed to Superintendent of Documents, Government Printing Office, Washington, DC 20402)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 National Electric Code
- NFPA 79 Electrical Standards for Industrial Equipment

(Application for copies should be addressed to National Fire Protection Association, 470 Atlantic Ave., Boston, MA 02210)

NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION (NEMA)

- ICS Industrial Controls and Systems
- MGI Motors and Generators

(Application for copies should be addressed to the National Electrical Manufacturers' Association, 2101 L Street, NW, Washington, DC 20037)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 4413 Hydraulic Fluid Power General Rules and Safety Requirements for Systems and Their Components

(Copies available online at: http://www.iso.org/iso/iso_catalogue.htm or American National Standards Institute, 11 West 42nd St, New York, NY 10036)

AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI)

- ANSI B11.15 Safety Requirements for Pipe, Tube and Shape Bending Machines
- ANSI Z535.4 Product Safety Signs and Labels

(Copies available at: <http://webstore.ansi.org> or ANSI Attn: Customer Service Department, 25 W 43rd Street, 4th Floor, New York, NY 10036)

PSNS&IMF OCCUPATIONAL SAFETY AND HEALTH MANUAL

- OSH-II-9 Hazardous Energy Control, Lock Out/Tags Plus (LOTP)

1. General Equipment Requirements

Specifications and Required Features for the Furnace 15 Door Position Control System shall have the following **minimum** salient characteristics:

Operational:

- All parts shall be compatible with the existing GM car-bottom heat treatment furnace (serial number 1302) located in Puget Sound Naval Shipyard (PSNS) Building 452.
- With door open to a minimum height such that the car will not physically contact the door, the car shall be able to be moved in and out
 - i.e., the door does not need to be fully open in order to move the car in or out

Electrical Design Requirements (Certification Documentation Required)

- UL or NEC Approved (NRTL)
- NFPA 86 Compliant
- OSHA Compliant
- Control and Instrumentation housed in a NEMA 12 Enclosure

Control System

All Door Position Control System parts provided shall facilitate positioning and maintaining the furnace door within five (5) inches of the desired height. Components shall include, at a minimum:

- Enclosures and mounting hardware for new components
- Door control switches: UP / DOWN / STOP (HOLD)
 - HMI for door control may also be keypad or touchpad, and facilitate input of specific door position
 - Separate “STOP (HOLD)” control only required if releasing UP and DOWN controls does not cause door to stop
- Door position monitoring electronics
- Pneumatic control valves capable of holding the pneumatic cylinder in the desired position
- All wiring, connectors, switches, processors, relays, and other electrical components necessary to complete door control system
- New control system may use existing components (controls, enclosures) to the extent determined most beneficial by the contractor

Additional requirements

- HMI (new control equipment) shall be mounted near existing door and car controls
- Installation, start-up, and commissioning of door control system
 - Installation will not be considered satisfactory until three full cycles of door operation are completed. Each cycle will consist of full opening, full closing, and one stop of the door at a mid-position.
 - Contractor shall remove, immobilize, or otherwise render inoperable any existing control buttons and switches that are rendered inoperable by this work.

1.1 All electrical components including motors, starters, relays, switches, and wiring shall conform to and be located in accordance with the applicable NFPA, NEMA, and ANSI standards for the intended application.

1.2 Motors. Motors shall be rated for continuous duty and shall be equipped with ball or roller bearings of the sealed and permanently lubricated type. Alternating current (AC) motors shall be designed to operate on 60-HZ. All electrical motors shall meet NEMA-MG 1 requirements. Each motor shall have an identification plate to identify the manufacturer, model identification, serial number, voltage, amperage, horsepower, phase, and frequency.

1.3 Bearings. All bearings contained within this machine and the entire system shall be U.S. or Canadian manufactured. If they are not U.S. or Canadian manufactured bearings, the vendor must provide a list of exact U.S. or Canadian made equivalent bearings that can be used for replacement of each bearing within this equipment or system. This requirement is in accordance with Defense Federal Acquisition Regulation Supplement (DFARS 252.225-7016).

1.4 Electrical System. Electrical components including motors, starters, relays, switches, and wiring shall conform to and be located in accordance with NFPA 79. Electricity available at the installation site is 230 VAC, 3 Phase, 60 Hz. The equipment shall be designed to operate on the available electric utilities. The electrical system shall be complete including any electrical transformer(s) required to modify the existing source voltage to the proper operating voltage of the equipment. A properly rated and fused single disconnect device shall be provided on the machine with a means of lockout. All electrical components shall conform to applicable NEMA ICS 1 standards.

1.5 Energy Isolating Devices. The equipment shall be provided with energy isolation devices (e.g. power switches, safety devices, circuit breakers, valves, etc.) that protect personnel from the release of hazardous energy. Hazardous energy includes electrical, mechanical, hydraulic, pneumatic, gravity, or other energy that could harm employees involved in servicing or maintenance of the equipment. The devices shall be installed as the first energy control device on all major components of the system such that the component can be isolated at the component level. The devices shall be designed and manufactured such that they can be padlocked in the user-selected position (ON or OFF, OPEN or CLOSED) to prevent inadvertent or unauthorized change.

1.6 Electrical Connections. Electrical connections within the equipment shall be complete and shall be made via terminals on the components, terminals, or circuit boards and bussing. Splices between terminations are not permitted. Connections and terminals shall be supported and spaced without the dependence upon the wiring in the components and braced as necessary to assure withstanding the distortion forces associated with available short-circuit currents. Proper identification of wiring, bussing, terminals and circuits for function, polarity, phasing, etc., shall be adhered to throughout the equipment. Identification shall be in the form of wire markers, color coding, permanently engraved plates, and permanent markings on the devices. Adequate spacing shall be maintained throughout to avoid excessive bending of cabling and wiring, to maintain adequate separation and creepage distance between electrical potentials and between these potentials and ground, and to permit ease in disconnecting wiring and cabling during trouble-shooting and repair. In no instance shall clearances and creepage distances be less than those described under NEMA ICS, Part ICS 1-111.

1.7 Grounding. Exposed, non-current carrying metal parts shall be maintained at common, zero ground potential. A grounding stud/lug shall be provided as a means for grounding the equipment. For cord connected equipment, a NEMA type grounding plug which effectively grounds the equipment for the safety of personnel shall be acceptable in lieu of a ground stud or lug on the equipment.

1.8 Electrical Enclosure. Electrical components of the equipment shall be contained in an enclosure(s) of structural and sheet steel. Provisions shall be made for power cable entrance. The enclosure(s) shall be of drip-proof construction and of minimum size consistent with good design practices and ventilation of components.

1.9 Emergency Stop Buttons. The equipment specified herein shall be provided with emergency stop buttons (switches) at the equipment control panel. These stop buttons shall be the mushroom type, shall be colored red with a yellow background, and shall be labeled as such. When activated, the emergency stop buttons shall disconnect all electrical power to the equipment such that all operations or functions will immediately stop or cease.

1.10 Hydraulic Systems. Hydraulic systems shall include filtration, protection from over pressurization, and comply with requirements of ISO 4413. The system shall be complete, including all pumps, valves, piping, cylinders, and pressure controls. Overpressure protection shall be provided to prevent damage to components and fluid conductors. A filter system shall be provided to insure delivery of clean fluid to the system. Where ventilation of the hydraulic unit is necessary for lubrication or hydraulic purposes, tall vents shall be filtered and located in a position that will prevent contamination or loss of lubricant. The hydraulic pump inlet shall be protected with an inlet strainer. Reservoirs used for lubrication or hydraulic fluid, shall have a means of visually determining fluid level, temperature and over pressurization, as well as a drain plug for routine maintenance and cleaning. All reservoirs used as a holding tank, shall be tested and certified to prevent leakage. Lubrication and hydraulic systems having reservoirs located in the bed or base shall have filters mounted outside the bed or base to facilitate maintenance and prevent inadvertent contamination. A positive means of fluid temperature control shall be provided to prevent the system from exceeding 130°F under normal operating conditions.

1.11 Painting. All surfaces shall be painted in conformance with the manufacturer's standard practices and good workmanship. Painting shall result in a highly wear-resistant finish that guarantees continued protection to surfaces in an indoor environment with a temperature range of 15° to 110° F, up to 100% Non-condensing relative humidity. The manufacturer's standard color shall be provided. **Lead or chromium base paints are prohibited.**

1.12 Controls and Instrumentation. Operator controls, instrumentation and indicators shall be mounted convenient to operating personnel. Such devices shall be clearly and legibly marked for function and identification. Controls shall be fitted with suitable handles, pushbuttons, or control knobs, as applicable. Gauges and instruments shall be designed for recalibration. Pressure gauges shall be calibrated in the U.S. system of measurement.

1.13 Safety devices. All machine parts, components, mechanisms, and assemblies furnished on the unit shall comply with all specific requirements of "OSHA Safety and Health Standard (29 CFR 1910), General Industry" that are applicable to the equipment itself.

1.14 Safety signs and labels. Safety signs and labels in accordance with ANSI Z535.4 shall be securely attached to the equipment in visible locations, with any safety precautions to be observed by the operator or maintenance personnel permanently marked on the signs.

1.15 Informational Plates. The following informational plates shall be marked by engraving or photo imaging on wear and corrosion resistant metal and permanently affixed to the equipment.

1.15.1 Identification Plate. The following information shall be securely attached to the equipment on an identification plate: Nomenclature, Contractor's name, manufacturer's name, equipment model number, equipment serial number, electrical utilities (Volts, Full Load Amps, Frequency, and Phases), date of manufacture, contract number and any other pertinent information for identifying the part as a unique component of the system.

1.15.2 Caution and Warning Plates. "Caution" or "Warning" label plates shall be securely attached to the equipment in visible locations, with any safety precautions to be observed by the operator or maintenance personnel permanently marked on the plates.

1.16 Standard, Off The Shelf Components – All materials and parts comprising this system shall be new, of current design and manufacture and shall not have been in prior service except as required for factory testing. Standard, off the shelf components with proven reliability shall be used whenever possible to increase performance reliability and reduce costs. The equipment shall be one of the manufacturer's current production models which has been designed, engineered and sold, or is being offered for sale through advertisements or manufacturer's published catalogs or brochures. Products such as a prototype unit, pre-production model, or experimental unit DO NOT qualify as meeting this requirement. The equipment shall be complete, so that when connected to power, it can be used for the function for which it was designed and constructed.

1.17 Warranty. Supplies and services furnished shall be covered by warranty from defects in design, materials and workmanship. The warranty shall be the manufacturer's standard commercial warranty which shall conform to all the requirements of the contract. Acceptance of the manufacturer's standard commercial warranty shall not minimize the rights of the Government under clauses in the contract, and in any conflict that arises between the terms and conditions of the contract and manufacturer's warranty, the terms and conditions of the contract shall take precedence. The warranty period shall commence when final acceptance has been achieved as determined when all contract line item numbers have been processed through Wide Area Workflow (WAWF).

1.18 Technical manuals. A set of (3) three technical manuals is required to cover each specific make, model year, and serial numbered piece of equipment scheduled for delivery under the terms of the contract. The manuals shall provide instructions, illustrations, and other associated data for operations, maintenance, repair, overhaul, including a complete catalog of parts used in the assembly of the end item enabling an average journeyman mechanic to operate, program, maintain, repair, and overhaul the equipment. The manuals provided shall contain complete instructions and information for all equipment, components, assemblies, subassemblies, attachments, and accessories assemble in the end item. The contents of a complete set of technical manuals shall include, as a minimum, the following:

- a. Operating instructions including pre-operational checks, start-up, shut down, and emergency shutdown procedures
- b. Maintenance, service, and overhaul instructions, including all preventive maintenance schedules and lubrication chart
- c. Trouble-shooting guides

- d. Parts list containing: illustrations, part numbers, part nomenclature, original manufacturer, cross reference numbers, and recommended spare parts including quantities
- e. Energy control procedure, in accordance with 29 CFR 1910.47, OSHA Energy Control Standard to bring equipment to a zero energy state for service and maintenance
- f. All mechanical and electrical schematics showing discrete components/block diagrams/wiring diagrams with inputs and outputs identified/system electrical interface documents and drawings for the specific model of all machine equipment/drives/controls supplied
- g. Programming requirements
- h. Safety Data Sheets (in GHS-SDS Format) and Technical/Product Data Sheets for any Hazardous Material used on or in this machine.

2. **OSHA Approved Certification.**

2.1 The equipment specified herein shall be inspected and labeled by a Nationally Recognized Testing Laboratory (NRTL) as defined in 29 CFR 1910.7 and approved as defined in compliance with 29 CFR 1910. Approval shall be as specified under the "Approval" and "Acceptance" criteria in the OSHA regulations Subpart "O", Machinery and Machine Guarding paragraph 1910.212 and Subpart "S" Electrical, paragraph 1910.303 and paragraph 1910.399. A satisfactory NRTL Evaluation Report shall be provided to the receiving activity.