

PART 1 - GENERAL

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| <u>1.1 RELATED SECTIONS</u> | <ul style="list-style-type: none">.1 Section 23 05 05 - Installation of Pipe Work..2 Section 23 05 19.01 - Thermometers and Pressure Gauges - Piping Systems. |
| <u>1.2 REFERENCES</u> | <ul style="list-style-type: none">.1 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)<ul style="list-style-type: none">.1 ANSI/NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection..2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).<ul style="list-style-type: none">.1 Material Safety Data Sheets (MSDS). |
| <u>1.3 SYSTEM DESCRIPTION</u> | <ul style="list-style-type: none">.1 Design Requirements: .1 Select fire pump to satisfy fire protection system requirements and ANSI/NFPA 20..2 Water Supply:<ul style="list-style-type: none">.1 Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for basis of design including NPSH available, and in accordance with ANSI/NFPA 20..2 Base design on ANSI/NFPA 20. |
| <u>1.4 SUBMITTALS</u> | <ul style="list-style-type: none">.1 Product Data:<ul style="list-style-type: none">.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.<ul style="list-style-type: none">.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures..2 Shop Drawings:<ul style="list-style-type: none">.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.<ul style="list-style-type: none">.1 Shop Drawings, Indicate:<ul style="list-style-type: none">.1 Materials..2 Finishes..3 Method of anchorage..4 Number of anchors. |

1.4 SUBMITTALS
(Cont'd)

.2 Shop Drawings: (Cont'd)
.1 (Cont'd)

- .5 Supports.
- .6 Reinforcement.
- .7 Assembly details.
- .8 Accessories.
- .9 Indicate hydraulic and electrical characteristics including Net Positive Suction Head (NPSH) required, make and model number.
- .2 Provide power and control diagrams

1.5 QUALITY
ASSURANCE

.1 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

.1 Test Reports:

- .1 Submit certified test reports for packaged fire pumps from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .2 Test each pump/driver package at factory to provide detailed performance data and to demonstrate compliance with ANSI/NFPA and specification. Submit certified test curves for approval of Departmental Representatives.
- .3 Test hydrostatically to meet requirements of fire protection system to which it will be connected.
- .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .3 Instructions: submit manufacturer's installation instructions.
- .4 Manufacturer's Field Reports: manufacturer's field reports specified.

.2 Closeout Submittals:

- .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.

.3 Health and Safety:

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

- 1.6 MAINTENANCE .1 Extra Materials:
- .1 Furnish spare parts for each pump in accordance with Section 01 78 00 - Closeout Submittals and as follows:
 - .2 One set of packing.
 - .3 One casing joint gasket.

- 1.7 DELIVERY, STORAGE AND HANDLING .1 Packing, shipping, handling and unloading:
- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

PART 2 - PRODUCTS

- 2.1 ENGINE DRIVEN FIRE PUMP-CONTROLLER .1 Automatic engine-driven microprocessor based fire pump controller: to NFPA No. 20 and equipped as follows:
- .1 Pressure-switch transducer start.
 - .2 Fire protection equipment start.
 - .3 Main ac power failure relay connected either to start engine or to actuate remote trouble alarm.
 - .4 Common local alarm bell and individual trouble lamps or annunciator to indicate:
 - .1 Low oil pressure.
 - .2 High cooling water temperature.
 - .3 Engine failure to start.
 - .4 Shut down from over speed.
 - .5 Shut down from pump operation.
 - .6 Shut down from trouble on controller or engine.
 - .7 Shut down from loss of ac power.
 - .8 Battery failure for each battery.
 - .9 Battery charger failure.
 - .10 Low suction.
 - .11 Low fuel level.
 - .12 Water reservoir low.
 - .13 Water reservoir empty.
 - .14 Low pump room temperature.
 - .15 High fuel level.
 - .16 Main switch in auto.
 - .17 Engine run.
 - .18 Failure when running.
 - .5 Provision for selectable automatic alternate use of two separate storage batteries. With alarm if battery fails and prevention of use of defective battery on startup.

2.1 ENGINE DRIVEN .1
FIRE PUMP-
CONTROLLER
(Cont'd)

- (Cont'd)
- .6 Intermittent cranking of engine with lock-out if engine fails to start on 6 crank periods of approximately 15 s duration separated by 5 rest periods of approximately 15 s duration.
 - .7 Provision for lock-out alarm if a battery is disconnected or becomes inoperative.
 - .8 Selector switch to bypass relay circuits and provide for manual starting.
 - .9 Provision for 10 s delayed start.
 - .10 Sequential timing device.
 - .11 Circuits for various engine mounted devices such as automatic chokes, anti-dieseling solenoid valve, cooling water line solenoid valve.
 - .12 Timing relay for automatic stop.
 - .13 Weekly timer for automatic weekly test run.
 - .14 Remove start switch relay.
 - .15 Auto-manual, selector.
 - .16 "Auto" position indicating lamp.
 - .17 Manual, start-stop pushbuttons.
 - .18 Recording pressure gauge with 7 day chart.
 - .19 Two built-in automatic battery chargers.
 - .20 Transformer to feed 115 V panel.
 - .21 Control cabinet strip heater.
 - .22 NEMA 3R enclosure.
 - .23 Mark "FIRE PUMP CONTROLLER".
 - .24 Where multiple pumps are provided, indicate area or zone served by each pump.
 - .25 Remote alarm contacts rated at 10 amp, 125 VAC for:
 - .1 Overspeed
 - .2 Fail to start
 - .3 Low oil pressure
 - .4 High coolant temperature
 - .5 Failure when running
 - .26 Provision for deluge valve, start, remote.
 - .27 Operator control panel and annunciator to incorporate.
 - .1 Individual charger voltmeter and ammeter readout, charger mode indication.
 - .2 Individual cut-in, cut-out and system pressure.
 - .3 Lamp test/silence, run test, print and paper feed test buttons.
 - .4 Individual battery manual crank push button.
 - .28 Controller to shut down engine for low oil pressure or high coolant temperature during exercise cycle but restart in case of water pressure drop.

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- 2.1 ENGINE DRIVEN FIRE PUMP-CONTROLLER (Cont'd)
- .1 (Cont'd)
 - .29 Engine overspeed shutdown without time delay and lockout until manually reset.
 - .30 Include low fuel level float switch, high fuel level float switch, low pump room temperature thermostat, low suction pressure switch mounted inside controller.
- 2.2 AUTOMATIC TRANSFER SWITCH
- .1 When automatic transfer switch is required, include in NEMA 3 enclosure mechanically attached to full service for pump control enclosure.
 - .2 Individual dry alarm contacts for:
 - .1 Generator start
 - .2 Isolating switch in off position
 - .3 Automatic transfer switch in normal position
 - .4 Automatic transfer switch in emergency power position
 - .3 Transfer switch to be provided with:
 - .1 Voltage sensing each phase of normal power supply for generator start contact.
 - .2 Voltage and frequency of emergency power source to transfer to emergency power.
 - .3 Timing function to override momentary normal outages.
 - .4 Timing function to delay transfer to normal power supply.
 - .5 Timing function to allow generator cool down after transfer to normal power.
 - .6 Voltage sensing on all phases of normal power to retransfer to normal power.
- 2.3 FIRE PUMP REMOTE ALARM PANEL
- .1 Fire pump remote alarm panel: to NFPA No. 20, sheet steel, wall mounting, finished red, hinged front access door. Audible and visual alarm equipment indicating pump power failure, pump operating, supervisory power failure, controller engine trouble. Coloured indicating lamps, pushbuttons, gong, control relays, terminals, completely factory installed and wired.
 - .2 Each abnormal pump condition to light appropriate lamp and to sound audible gong alarm. Gong to be push button silenced, light to remain on until abnormal condition removed, except that in event of supervisory power supply failure, gong cannot be silenced until restored.
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PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTION

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install in accordance with ULC listing, ANSI/NFPA 20, manufacturer's instructions and approved shop drawings.
- .2 Install engine cooling system.
- .3 Insulation exhaust system, cooling system muffler in accordance with Section 21 07 19 - Thermal Insulation for Piping.
- .4 Align pump and motor shafts to within manufacturer's recommended clearances prior to start up.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .2 Schedule site visits, to view Work, as directed in PART 1 - QUALITY ASSURANCE.
- .2 Site Tests:
 - .1 Field test each fire pump, driver and controllers in accordance with ANSI/NFPA 20. Testing shall include:
 - .1 Verification of proper installation system initiation adjustment and fine tuning.
 - .2 Verification of the sequence of operation and alarm systems.
 - .2 Testing to be witnessed by authority having jurisdiction.
 - .3 Develop, with Owner's Representative's assistance, detailed instructions for O & M of this installation.

- 3.4 CLEANING .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- 3.5 COMMISSIONING .1 Field test each fire pump, driver and controllers in accordance with ANSI/NFPA 20.
- .2 Testing to be witnessed by authority having jurisdiction.
- .3 Provide Departmental Representative assistance, detailed his installation.