|  |  |  |
| --- | --- | --- |
| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | February 19, 2010 | Modified ‘Related Sources’ and approved suppliers |
| 3 | July 16, 2013 | Final Draft – Consolidated Comments Spec Update Project |
| 4 | August 6, 2014 | Changes to reflect renaming of commissioning specification and final review (AV) |
| **5** | **February 4, 2015** | **Finalized Specification – Reference eDOCS #5630501 v7 (AV)** |
|  |  |  |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GEneral

## General

### .1 The Contractor shall be familiar with the nominal facility power quality delivered to the Site and ensure that the electrical equipment and components related to power generating equipment will fully function under typical power quality levels as delivered by the Local Distribution Company (LDC) *[Consultant to insert name of LDC]*. The Contractor shall provide electrical devices to protect electrical components from sags and swells experienced at no additional cost to the Region.]

## Related Sections

### [Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

### Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

### Contractor is responsible for coordination of the Work. Contractor is responsible for being familiar with and incorporating all required elements of cross-referenced Specifications cited.

### [Consultant must ensure the Contractor is familiar with the nominal facility power quality delivered to the Site allowing electrical equipment and components related to power generating equipment will fully function under typical power quality levels as delivered by the Local Distribution Company (LDC). Consultant shall ensure the Contractor and equipment supplier shall provide electrical devices to protect electrical components from sags and swells experienced from LDC at no additional cost to the Region.]

### This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

### [List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### [List Sections specifying products installed but not supplied under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### [List Sections specifying related requirements.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

### Section 01060 – Regulatory Requirements

### Section 01425 - Computerized Maintenance Management System Data Requirements

### Section 01810 – Equipment Testing and Facility Commissioning

### Section 16233 – Diesel Electric Generating Units Factory Test Results

### Section 16496 – Automatic Transfer Switches – Low Voltage

### Design Standards Section 17 – Operation Manual Guideline.

### [Division 13 – SCADA and Instrumentation - insert applicable specifications]

### Product requirements for [item]... for installation under this Section.

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

### The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

### All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

*If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.*]

## Technical Data Form

### Submit, in addition to other data and details as outlined in other parts of this Section, the following technical data:

#### Information provided in accordance with Section 01425 - Computerized Maintenance Management System Data Requirements.

#### Information pertaining to diesel generating units in the relevant sections of the operation manual. Refer to Design Standards Section 17 – Operation Manual Guideline.

#### When completed, submit factory test reports in accordance with Section 16233 – Diesel Electric Generating Units Factory Test Results.

## Diesel Engine

### Make and type: [\_\_\_\_\_\_].

### Speed: [\_\_\_\_\_\_] r/min.

### Continuous mechanical power NTP rating: [\_\_\_\_\_\_] kW.

### Continuous mechanical power site rating: [\_\_\_\_\_\_] kW.

### Cycles: [\_\_\_\_\_\_].

### No. of cylinder: [\_\_\_\_\_\_].

### Cylinder arrangement: [\_\_\_\_\_\_].

### Bore and stroke: [\_\_\_\_\_\_] mm bore, [\_\_\_\_\_\_] mm stroke.

### Piston speed: [\_\_\_\_\_\_] m/s.

### Total displacement of cylinders: [\_\_\_\_\_\_] cm.

### BMEP at rated output: [\_\_\_\_\_\_] kPa.

### Naturally aspirated or supercharges: [\_\_\_\_\_\_].

### Make and type of turbo charger (if turbo charged): [\_\_\_\_\_\_].

### Cyclic irregularity: [\_\_\_\_\_\_].

### Make and type of governor: [\_\_\_\_\_\_].

### Approved Suppliers:

#### Caterpillar Inc.

#### Cummins Inc.

#### Harper Power Products Inc. (Detroit Diesel).

#### Approved Equivalent.

## Fuel System

### Make and type of fuel system: [\_\_\_\_\_\_].

### Fuel consumption at 1/2 load: [\_\_\_\_\_\_] litres/h.

### Fuel consumption at 3/4 load: [\_\_\_\_\_\_] litres/h.

### Fuel consumption at 4/4 load: [\_\_\_\_\_\_] litres/h.

### Number of fuel filters: [\_\_\_\_\_\_].

### Recommended fuel oil: [\_\_\_\_\_\_].

## Lubricating Oil System

### Lubricating oil cooler:

#### Make and type: [\_\_\_\_\_\_].

#### Capacity oil: [\_\_\_\_\_\_] litres/min.

#### Capacity water: [\_\_\_\_\_\_] litres/min.

#### Inlet oil temperature: [\_\_\_\_\_\_]°C.

#### Outlet oil temperature: [\_\_\_\_\_\_]°C.

### Engine driven oil pump:

#### Type: [\_\_\_\_\_\_].

#### Capacity: [\_\_\_\_\_\_] litres/min.

#### Type of drive: [\_\_\_\_\_\_].

### Pre-lubricating oil pump (where supplied):

#### Pump make and type: [\_\_\_\_\_\_].

#### Capacity: [\_\_\_\_\_\_] litres/min.

#### Motor make and type: [\_\_\_\_\_\_].

#### Motor power: [\_\_\_\_\_\_] 1W.

#### Motor voltage and phase: [\_\_\_\_\_\_] V. \_\_\_\_Ø

#### Motor speed: [\_\_\_\_\_\_] rpm.

### Filters:

#### Make and type: [\_\_\_\_\_\_].

#### Number: [\_\_\_\_\_\_].

### Lubricating oil:

#### Total capacity of system: [litres].

#### Recommended type of lubricating oil: [\_\_\_\_\_\_].

#### Recommended SAE viscosity number at 0°C: [\_\_\_\_\_\_].

#### Recommended SAE viscosity number at 20°C: [\_\_\_\_\_\_].

#### Recommended SAE viscosity number at 40°C: [\_\_\_\_\_\_].

#### Recommended operating temperature: [\_\_\_\_\_\_]°C.

#### Recommended operating pressure: [\_\_\_\_\_\_] kPa.

#### Lubricating oil consumption at rated output: [\_\_\_\_\_\_] 1/kW/h.

## Cooling System (Where liquid cooled unit supplied):

### Coolant:

#### Capacity: [litres].

#### Recommended operating temperature: [\_\_\_\_\_\_]°C.

### Engine driven circulating pump:

#### Make and type: [\_\_\_\_\_\_].

#### Capacity: [\_\_\_\_\_\_] litres/min.

#### Type of drive: [\_\_\_\_\_\_].

### Jacket heater:

#### Make and type: [\_\_\_\_\_\_].

#### Wattage: [\_\_\_\_\_\_] W.

#### Voltage and phase: [\_\_\_\_\_\_] V.

#### Thermostat make and type: [\_\_\_\_\_\_].

### Heater circulating pump (where supplied);

#### Pump make and type: [\_\_\_\_\_\_].

#### Pump capacity: [\_\_\_\_\_\_] litres/min.

#### Motor power: [\_\_\_\_\_\_] kW(bhp).

#### Motor voltage and phase: [\_\_\_\_\_\_].

#### Motor speed: [\_\_\_\_\_\_] rpm.

### Radiator:

#### Capacity: [1].

#### Radiator fan power: [\_\_\_\_\_\_] kW(bhp).

#### Radiator fan speed: [\_\_\_\_\_\_] rpm.

#### Number and type of belts: [\_\_\_\_\_\_].

#### Air required for cooling: [\_\_\_\_\_\_] cu.m/min.

#### Radiator fan motor voltage and phase: [\_\_\_\_\_\_] V.

## Exhaust System

### Silencer make and type: [\_\_\_\_\_\_].

### Silencer dimensions: [\_\_\_\_\_\_].

### Exhaust pipe size: [\_\_\_\_\_\_].

### Exhaust rate of flow and temperature at silencer:

#### Inlet for 100% load: [\_\_\_\_\_\_] cu.m/min.

#### Inlet for 75% load: [\_\_\_\_\_\_] cu.m/min.

#### Inlet for 50% load: [\_\_\_\_\_\_] cu.m/min.

### Pyrometer make and type (where supplied).

### Number of switch points.

### Provision of exhaust air quality parameters of diesel generators operating at nominal capacity in tabular format aligned with the Province of Ontario’s Ministry of Environment and Climate Change (MOECC) air quality parameters for the design criteria in accordance with the operational and regulatory requirements set out in Division 13 - SCADA and Instrumentation and the Process Narrative/Process Control Narratives included in the Contract’s SCADA appendices. *[Consultant to ensure that the Process Narrative/Process Control Narratives are attached as appendix documents to the Contract].*

### Details of air scrubbers (if applicable) required for compliance with MOECC air quality regulations. Refer to Section 01060 – Regulatory Requirements.

## Air Intake System

### Make and type of air cleaner: [\_\_\_\_\_\_].

### Air required for combustion: [\_\_\_\_\_\_] cu.m/min.

### Air required for cooling (where required): [\_\_\_\_\_\_] cu.m/min.

## Starting System

### Electric start

#### Starting motor:

#### Make and type: [\_\_\_\_\_\_].

#### Voltage: [\_\_\_\_\_\_] V.

#### Breakaway current at 0°C: [\_\_\_\_\_\_] A.

#### Breakaway current at 40°C: [\_\_\_\_\_\_] A.

#### Cranking current at 0°C: [\_\_\_\_\_\_] A.

#### Cranking current at 40°C: [\_\_\_\_\_\_] A.

### Battery

#### Make and type: [\_\_\_\_\_\_].

#### Nominal voltage: [\_\_\_\_\_\_] V.

#### Number of cells: [\_\_\_\_\_\_].

#### Capacity: [\_\_\_\_\_\_] Ah.

#### Discharge rate: [\_\_\_\_\_\_] h.

### Battery charger

#### Make and type: [\_\_\_\_\_\_].

#### Voltage - float: [\_\_\_\_\_\_] V.

#### Voltage - equalizer: [\_\_\_\_\_\_] V.

#### Maximum current: [\_\_\_\_\_\_] A.

## Generator

### Alternator

#### Make and type: [\_\_\_\_\_\_].

#### Model: [\_\_\_\_\_\_].

#### Phase and wire: [\_\_\_\_\_\_].

#### Power factor: [\_\_\_\_\_\_].

#### Voltage: [\_\_\_\_\_\_] V.

#### Current: [\_\_\_\_\_\_] A.

#### kVA and kW: [\_\_\_\_\_\_].

#### Speed: [\_\_\_\_\_\_] r/min.

#### Guaranteed efficiencies at rated power factor for:

##### 100% load: [\_\_\_\_\_\_] %.

##### 75% load: [\_\_\_\_\_\_] %.

##### 50% load: [\_\_\_\_\_\_] %.

#### Wave form deviation: [\_\_\_\_\_\_].

### Exciter

#### Make and type: [\_\_\_\_\_\_].

#### Model: [\_\_\_\_\_\_].

#### Voltage: [\_\_\_\_\_\_] V.

#### kW: [\_\_\_\_\_\_].

#### Filed resistance at 20°C: [\_\_\_\_\_\_] ohms.

### Voltage regulator

#### Make and type: [\_\_\_\_\_\_].

#### Input power:

##### Voltage: [\_\_\_\_\_\_] V.

##### Current: [\_\_\_\_\_\_] A.

##### Frequency: [\_\_\_\_\_\_] Hz.

##### Phase: [\_\_\_\_\_\_].

#### Input sensing:

##### Voltage: [\_\_\_\_\_\_] V.

##### Frequency: [\_\_\_\_\_\_] Hz.

##### Phase: [\_\_\_\_\_\_].

#### Output power:

##### Nominal voltage: [\_\_\_\_\_\_] V dc.

##### Forcing voltage: [\_\_\_\_\_\_] V dc.

##### Current (max. continuous): [\_\_\_\_\_\_] A dc.

##### Forcing current (maximum): [\_\_\_\_\_\_] A dc.

### Engine/generator coupling

#### Make and type: [\_\_\_\_\_\_].

## Transfer System

### Refer to Section 16496 – Automatic Transfer Switches – Low Voltage

### Make: [\_\_\_\_\_\_].

### Type: [\_\_\_\_\_\_].

### Voltage rating: [\_\_\_\_\_\_].

### Current rating:

#### Continuous: [\_\_\_\_\_\_].

#### Maximum interruption: [\_\_\_\_\_\_].

### Control voltage:

#### Closing coil: [\_\_\_\_\_\_].

#### Tripping coil: [\_\_\_\_\_\_].

## Engine - Generator - Controller

### Make and type: [\_\_\_\_\_\_].

## Bussing

### Rated current: [\_\_\_\_\_\_].

### Short circuit capacity: [\_\_\_\_\_\_].

### Rated voltage: [\_\_\_\_\_\_].

## Dimensions and Weights

### Overall unit length: [\_\_\_\_\_\_] m.

### Overall unit width: [\_\_\_\_\_\_] m.

### Overall unit height: [\_\_\_\_\_\_] m.

### Total weight of generator: [\_\_\_\_\_\_] kg.

### Total weight of engine: [\_\_\_\_\_\_] kg.

### Generator stator weight: [\_\_\_\_\_\_] kg.

### Generator rotor weight: [\_\_\_\_\_\_] kg.

### Radiator weight: [\_\_\_\_\_\_] kg.

### Total weight of unit: [\_\_\_\_\_\_] kg.

### Weight of heaviest item to be lifted by crane: [\_\_\_\_\_\_] kg.

### Head room required for removal of piston and connecting rod: [\_\_\_\_\_\_] m.

## Commissioning

### For all commissioning activities on systems where components of this Section are integral to functionality, refer to Section 01810 – Equipment Testing and Facility Commissioning. All inspection and testing activities shall be completed in accordance with the commissioning plan that shall be provided to the Consultant prior to the commencement of commissioning activities.

**END OF SECTION**