Technical specification: diesel generating set

Editable template for a Data centre project

This is a neutral, standards-based template. Values in [square brackets] are proposals and must be completed or confirmed by the employer or the design engineer for the actual project.

No manufacturer, brand or product name is specified. Any generating set that meets the requirements below and is proven by the documents listed in section 10 is acceptable.

Delete this guidance box before issuing the document.

1. Scope

- Supply of [number] diesel generating set(s) with automatic mains failure (AMF) control and automatic transfer switch (ATS) for the data centre at [site address].
- The scope includes the generating set, enclosure, fuel tank, control panel, ATS, documentation and the factory test described in section 11. Installation, cabling and site work are [included / excluded].

2. Standards

- ISO 8528 series (reciprocating internal combustion engine driven AC generating sets), in particular parts 1, 3, 4, 5, 6 and 10; ISO 8528-12 where the set supplies safety services.
- ISO 3046-1 (reciprocating engines: declaration of power).
- IEC 60034-1 (rotating electrical machines) for the alternator.
- IEC 61439-1/-2 for low-voltage switchgear assemblies and IEC 60947-6-1 for the transfer switch.
- Noise measured to ISO 3744 or ISO 8528-10.
- Local electrical, fire, emission and environmental regulations applicable at the site: [list].

3. Site conditions

- Ambient temperature: minimum [-10] °C, maximum [+40] °C. Altitude: up to [1000] m above sea level. Relative humidity: up to [90] %.
- Installation: [outdoor, in a weatherproof canopy / indoor, in a generator room].
- The bidder shall state the available output at the site conditions above (derating according to ISO 8528-1 and ISO 3046-1).

4. Rating and performance

- Output: at least [___] kVA data centre power (DCP) or prime rated power (PRP) according to ISO 8528-1, at power factor 0.8, after derating for the site conditions. The emergency standby power (ESP) shall also be stated.
- Voltage and frequency: [400/230] V, 3 phases + neutral, [50] Hz, [1500] rpm.
- Performance class: ISO 8528-5 class G3.
- Load acceptance: the set shall accept a sudden load of [50] % of the rated output in one step and stay within the G3 limits. The bidder shall state the permissible load steps (ISO 8528-5).

5. Engine

- Four-stroke diesel engine, water-cooled, with an electronic or mechanical governor able to meet class G3.
- Engine emissions as required by the local regulation: [state stage or class, if any].
- Electric starting at 24 V or 12 V DC with batteries and an automatic battery charger; jacket water heater with thermostat for reliable starting at the minimum ambient temperature.
- Protections: low oil pressure, high coolant temperature, overspeed, fail to start, low coolant level, battery charge failure.

6. Alternator

- Brushless, self-excited or with permanent magnet generator (PMG) excitation, with automatic voltage regulator (AVR).
- Insulation class H, temperature rise not exceeding class [H/F]; degree of protection at least IP23.
- Steady-state voltage deviation within the G3 limit of ISO 8528-5.

7. Enclosure and noise

- Sound-attenuated, weatherproof steel canopy with lockable doors, internal residential-type silencer and corrosion protection suitable for the site (powder coating or equivalent).
- Sound pressure level: not more than [75] dB(A) at 7 m in free field at [75] % load, measured to ISO 3744 or ISO 8528-10. The bidder shall submit the measurement method and value for the offered model.
- Lifting points and a base frame suitable for transport by crane and forklift.

8. Fuel system

- Base fuel tank (double-wall or bunded) for at least [24] hours of operation at [75] % of the rated output; the bidder shall state tank capacity and fuel consumption at 50, 75 and 100 % load.
- Fuel level sensor with low-level alarm, fuel/water separator and drain valve. Connection for an external tank: [required / not required].

9. Control panel, AMF and ATS

- Microprocessor controller with AMF function: automatic start on mains failure, transfer to the set, retransfer on mains return and cool-down run.
- Load transferred to the set within [15] seconds of mains failure.
- ATS: [4]-pole, rated for at least the full-load current of the set, mechanically and electrically interlocked, according to IEC 60947-6-1.
- Communication: Modbus RTU (RS485) and/or Modbus TCP (Ethernet) for the building management system; remote monitoring of status, alarms and measurements; event log of at least [100] events.
- Display of voltage, current, frequency, kW, kVA, power factor, operating hours, oil pressure, coolant temperature and battery voltage.

10. Documentation

- Technical data sheet of the offered model, with ratings according to ISO 8528-1.
- Wiring diagrams, dimension drawing, operation and maintenance manual in [language], and recommended spare parts list.
- Factory test report (section 11), manufacturer's declaration of conformity and certificate of origin.

11. Factory test

- Each set shall be load-tested at the factory before shipment: at 25, 50, 75 and 100 % of the rated output, and at [110] % for [1] hour where the rating allows overload.
- Test of protections, AMF and ATS functions; voltage, frequency and transient response recorded.
- The employer may witness the test or appoint an inspector: [yes / no].

12. Warranty, spare parts and training

- Warranty: [___] months or [___] operating hours from delivery, whichever comes first.
- Availability of spare parts for at least [___] years; consumables for the first [___] operating hours: [included / excluded].
- Operator training: [___] persons, [___] hours.

Additional requirements for this facility

- Configuration: [N+1] generating sets in parallel with synchronising controllers and load sharing; one set out of service shall not reduce the supply to the critical load.
- Load steps and transfer sequence shall be coordinated with the UPS system; the bidder shall state

the load step behaviour of the set.

- Rating: data centre power (DCP) according to ISO 8528-1:2018, or prime rated power where DCP is not declared.

Compliance table (to be completed by the bidder)

Requirement	Required	Offered	Compliant (yes/no)	Remarks
Output, DCP / PRP at site conditions	[___] kVA			
Performance class (ISO 8528-5)	G3			
Voltage / frequency	[400/230] V, [50] Hz			
Sound pressure at 7 m	≤ [75] dB(A)			
Fuel autonomy at 75 % load	≥ [24] h			
Transfer time	≤ [15] s			
Controller communication	Modbus RTU / TCP			
Factory load test report	Yes			

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