



24 MW Power Plant
50Hz 11kV

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Introduction

- Containerised re-deployable HFO power plant.
- 24MW capacity currently in stock.
- Solution for utilities or mining / industrial clients.
- Straightforward foundations for Gensets.
- Balance-of-plant has been designed and installed into standard shipping containers.
- Easy to Transport.
- Modular assembly – minimizing time and cost on site.
- Commercial Operation – 3 to 4 months from arrival at site.

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MAN Diesel 4MW Gensets

Modular Plant

- Each 12MW block consists of three 4MW generator sets with fuel processing equipment, lubrication oil treatment and electrical switchgear interconnection.
- There are two 12MW blocks making up the 24MW plant.
- Containerised and modular equipment – bolt-together construction.
- Modular pipework and cabling for quick assembly.
- Common plant control room

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Typical 12MW plant standard layout

Components from Leading Suppliers

- MAN-Diesel 18V28/32 Generator Sets
 - excellent 10 year track-record
- Siemens Control and Instrumentation
- Alfa Laval fuel processing equipment
- Chubb fire protection



Generator Sets

The MAN 18V28-32S genset is a well-proven medium-speed unit providing over 4MW at ISO conditions. It is conservatively rated and offers exceptional reliability and operating economics.

The prime mover for the generating sets is a MAN 28 cm bore medium-speed diesel engine with 18 cylinders in vee configuration. The engine is turbocharged and intercooled and is conservatively rated; both in terms of its piston speed and its operational pressures and temperatures.

The engine runs at 750 rev/min, and is suitable for continuous baseload operation on heavy fuel oil with viscosity up to 700 centistokes (cSt) at 50 deg C and with a sulphur content up to 3.5%.

Engine jacket and fuel oil heating systems enable the engines to operate without delay on heavy fuel oil, reducing the consumption of expensive light diesel fuel to an absolute minimum. Integral fuel injector cooling systems are provided, preventing the build up of fuel deposits and cold corrosion on the injector nozzle tips.

This solution is constructed so that groups of three gensets share fueling and other auxiliary systems to reduce both set up costs and installation time. These “M3” plants can be linked together to create power plants from 12 to 72 MW.

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Civil Works – Preparing Foundations



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Loading Gensets



Acoustic Genset Enclosures

Each generating set is installed within a purpose designed and built enclosure that achieves a reduction in plant noise levels by up to 50 db(A). The enclosures are of sufficient size to enable all plant servicing and major overhauls to be carried out within the protected environment of the enclosure

The enclosure is designed to be transportable within ISO 40ft containers and then easily constructed at the generation site piece by piece.

They are currently being stored and are ready for deployment.



Acoustic enclosure roof panels in storage

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Site Assembly



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MV/LV Electrical Module



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Black Start Generator – Electrical Module



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Switchgear – Electrical Module

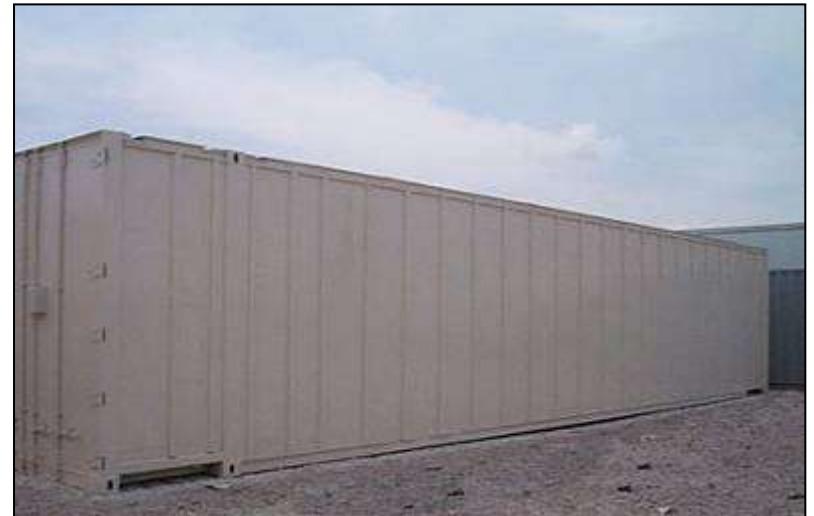


HFO Fuel Buffer Tank

Based upon a standard ISO 40-foot container this module provides sufficient fuel to operate each group of three MAN generating sets at maximum continuous output for approximately 24 hours. A number of tanks could be grouped together, and stacked, to increase fuel storage capacity.

Constructed with an integral bund wall to contain spills, and with integral heating coils, an HFO buffer tank is located adjacent to each group of generating sets. A local pumping chamber with duty/standby units transfers the fuel oil directly to the HFO treatment module.

These are currently being stored and are ready for deployment.



Water Pumping System

The engines have closed-circuit air-blast radiators and water consumption is for initial fill and occasional make-up only. The HFO and lube oil centrifuges use a small amount of water to maintain a gravity seal in the centrifuge bowls, but this water can be treated and re-used if required.

Fire pumps complying with current NFPA standards, and a reverse osmosis unit providing process and drinking quality water for the plant and domestic facilities are contained in Module 7.

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Fuel conditioning module



Alfa Laval Centrifuges



HFO Pump



ISO 40ft Container

HFO Module

Based upon a standard ISO 40-foot container, this module will continuously treat heavy fuel oil with viscosities ranging up to 380 centistokes at 50 deg C, and supply it to each group of three MAN generating sets.

The module equipment comprises the latest fuel treatment technology, including Alfa Laval duty/standby centrifuge filters and fuel forwarding units. Conservatively rated transfer and circulating pumps, pre and post centrifuge treatment tanks, and fuel oil heating units are an integral part of this module.

The module design is adequate for the treatment of heavy fuel oil at ambient temperatures down to 10 deg C, using either electric heaters or high temperature hot water produced by exhaust gas economisers.

Individually pumped ring mains supply the treated heavy fuel oil to the MAN generating sets. An individual generating set can be taken out of service for scheduled maintenance without impacting upon the security or reliability of the remaining running units.

These are currently being stored and are ready for deployment.

Multi-function Skids

The multi-function skid installed between the engine and the end wall of the acoustic enclosure contains the engine starting air supplies, air compressors, fuel changeover system, injector cooling module, dosing system for engine cooling water, lube oil centrifuges, and the emergency fuel shut-off system.

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Modular Radiators



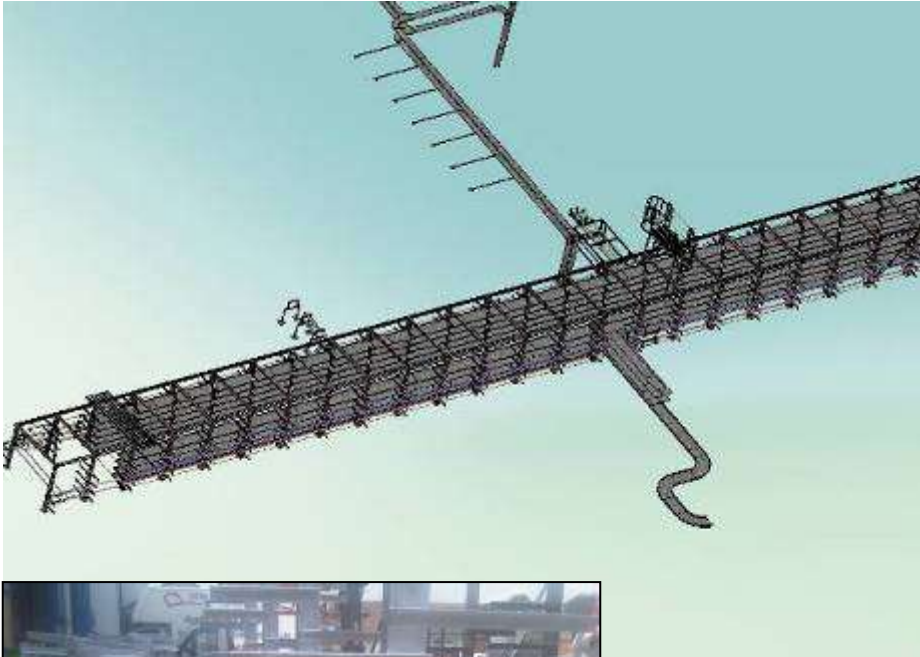
Radiators

The engine cooling radiators are a closed circuit, fan cooled design, with zero evaporation losses. They are suitable for continuous operation in high ambient and high humidity conditions. Fan operation is controlled thermostatically to optimise operational efficiency, and pipework and control cabling are already fitted into the modules. The vulnerable soft alloys necessary for efficient cooling are encased in a robust space-frame for transport. The frame then becomes the radiator support stand when the unit is mounted adjacent to the engine enclosure.

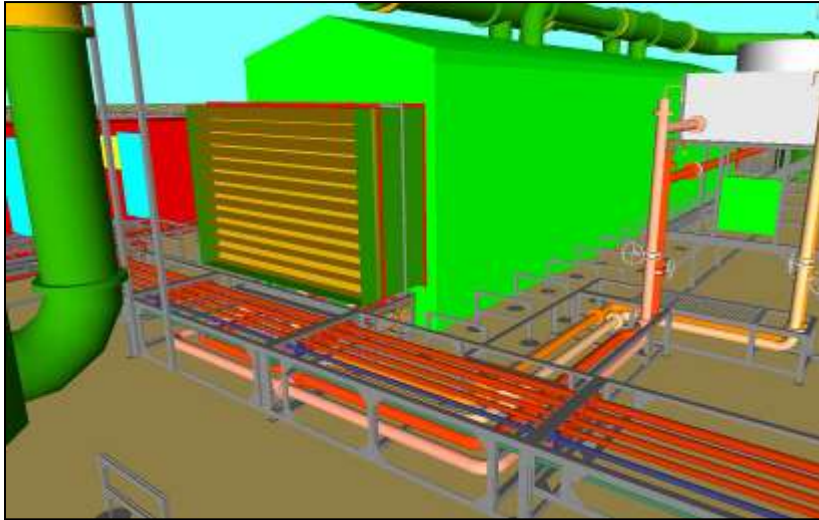


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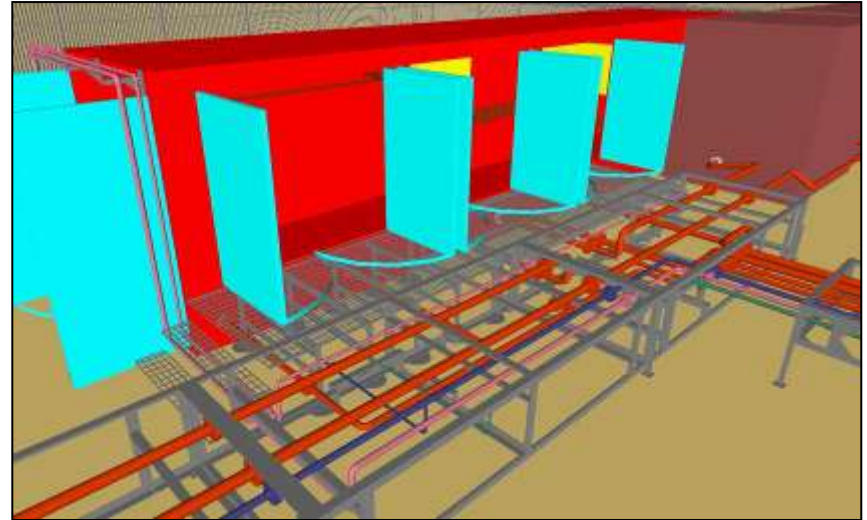
Pre-configured Spinal Pipework and Racks



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Prefabricated pipe work sections



Prefabricated pipe work sections



Standard MAN pipe connections

Standard Pipe work and Connections

The pipe modules link the different items of plant to enable them to run as a fully-integrated power station. The size of the individual modules and their connection systems have been designed and manufactured to minimise site work and to achieve the fastest possible installation times.

These modules carry the fuel oil, both light and heavy, from the client's bulk storage facility to the fuel treatment and forwarding plant and on to the engines. They also carry the engine cooling water to the radiators and the site support services:- Fire Main, Domestic (Potable) Water and Compressed Air.

In addition we build in flexibility to allow for possible increases in plant capacity at a later date.

Exhaust System

Exhaust gas from the engines is routed through an economiser to achieve high operating efficiency. The silencer achieves approximately 45 dB(A) reduction in noise levels and the height of the stack can be adjusted to meet gas dispersion requirements.



Control Centre

Based upon an ISO 40-foot container, this module provides the air-conditioned heart of the power plant. All generating operations are controlled from this point, including energy dispatch to the power purchaser, data logging and trend analysis of all key operating functions, communications with local and national control centres, and starting and stopping of the individual generating sets.

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Recent Progress – 36MW Plant



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+1-888-515-USPE (8773)

info@uspowerco.com

<http://www.uspowerco.com>