

GENERAL SPECIFICATION

ROTATING MACHINERY

GS EP MEC 214

Fuel Treatment Units

05	05/2012	Update
04	01/2012	Update
03	01/2011	Update
02	10/2009	Update
00	10/2005	First issue
Rev.	Date	Purpose of the revision

Owning entity: DEV/TEC	Managing entity: DEV/TEC/MTH
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General Specification		GS EP MEC 214
Fuel Treatment Units		
Rev.: 05	Effective date: 05/2012	Page: 2 of 15

Contents

1. Scope	3
2. Reference documents.....	3
3. Source(s) of fuel gas.....	3
3.1 Source of gas available with pressure compatible with gas turbines requirements.....	3
3.2 Source of gas available with pressure not compatible with gas turbines requirements	4
4. Characteristics of the gas after treatment	5
4.1 Composition	5
4.2 Pressure	5
4.3 Heating value	5
4.4 Temperature	5
5. Stages of treatment of fuel gas.....	6
5.1 Isolating ESDVs.....	6
5.2 Pressure Control with two 100% PCVs in parallel	6
5.3 One fuel gas receiver	6
5.4 Two 100% coalescing filters in parallel.....	6
5.5 Two 100% electrical heaters in parallel	6
5.6 Two 100% fine filters in parallel.....	6
5.7 Adjustment of pressure level	7
6. Construction of fuel gas treatment units	7
6.1 General rules	7
6.2 Instrumentation and safety devices	8
6.3 Inspections and tests	8
7. Diesel oil treatment	8
Bibliography.....	12
Appendix 1 Typical measurements and control functions.....	13
Appendix 2 Typical PFD of gas fuel treatment unit.....	14
Appendix 3 Typical Diesel Oil Network.....	15

General Specification		GS EP MEC 214
Fuel Treatment Units		
Rev.: 05	Effective date: 05/2012	Page: 3 of 15

1. Scope

This specification indicates the minimum requirements for design and construction of fuel treatment units for gas turbines (equipped with both single and dual fuel engines), gas engines and diesel engines.

The analysis and physical properties of the fuel gas and diesel oil before treatment are given in project specifications.

The purpose of this general specification is to define the characteristics of fuel treatment units. These characteristics must be considered as technical minima, and any requirements of project specifications must be met. The control system of fuel treatment units shall be hooked up directly to the plant DCS.

The fuel treatment unit shall be supplied by the EPC Contractor.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
ISO 16889	Hydraulic Fluid Power - Filters - Multi-Pass Method for Evaluating Filtration Performance of a Filter Element

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
Not applicable	

3. Source(s) of fuel gas

3.1 Source of gas available with pressure compatible with gas turbines requirements

If a permanent source of fuel gas, which maybe the HP separation gas, is available with associated pressure such that it can be utilized to feed the gas turbines and/or the gas engines, then this source may be considered as the main fuel gas supply and treated as described in this specification. In this case, one source of fuel gas only is sufficient to operate the gas turbines.

General Specification		GS EP MEC 214
Fuel Treatment Units		
Rev.: 05	Effective date: 05/2012	Page: 4 of 15

The black start-up procedure shall then be as follows:

- Start-up of the Emergency Diesel generator to feed the turbo generators auxiliaries
- Start-up of one turbo generator on liquid fuel
- When production gas is available, fuel gas must be produced and treated as described in this specification
- Switch over the turbo generator fuel source from liquid fuel to gas fuel
- Achieve plant start-up, including the gas compressors, either gas turbine or electrical motor driven.

3.2 Source of gas available with pressure not compatible with gas turbines requirements

If the permanent source of gas, which maybe the HP separation gas, has a pressure that is not high enough to feed the gas turbines and/or the gas engines, one "utility" source must be provided in addition to other "process" sources, as follows:

- One "utility" source coming from the HP separator, compressed and treated as described in this specification
- One or more "process" source(s), taken off downstream the process compression network or from an interconnected adjacent plant.

The black start-up procedure shall then be as follows:

- Start-up of the Emergency Diesel generator to feed the turbo generators auxiliaries
- Start-up of one turbo generator on liquid fuel
- When production gas is available, fuel gas must be produced, compressed by dedicated fuel gas compressors and treated as described in this specification. The fuel gas compressor shall have a capacity sufficient to start-up the plant so that one process gas compressor at least can produce the process fuel gas source
- Switch over the turbo generator fuel source from liquid fuel to gas fuel
- Achieve plant start-up, including the gas compressors, either gas turbine or electrical motor driven
- Then, if required, the fuel gas source may be switched over to the "process" source taken off one of the compression stages.

Note: In case of electrical driven gas compressors only, the turbo generators may remain fed with liquid fuel and provide power to start-up the main process compressors which, in turn, may generate the "process" source of fuel gas allowing the turbo generators switch over from liquid to gas.

General Specification		GS EP MEC 214
Fuel Treatment Units		
Rev.: 05	Effective date: 05/2012	Page: 5 of 15

4. Characteristics of the gas after treatment

4.1 Composition

The composition given in the project specification for the fuel gas upstream of the fuel gas treatment unit shall detail all the components up to C14.

Based on fuel gas composition upstream the fuel gas treatment skid, the EPC Contractor will perform all necessary engineering studies to reduce the contaminants down to the specified gas turbine or gas engine criteria.

When sulphur is present, the amount of H₂S after fuel gas treatment shall not exceed 10 ppmv.

The engineering study results will be presented to Company for review and comments.

Gas fuel analysis sampling device shall be installed downstream the fuel gas treatment skid and shall allow sampling without any disturbance of gas turbine or gas engine operation.

4.2 Pressure

The delivery pressure of the gas treatment unit shall be sufficient to feed the gas turbine and the gas engine at 120% of their maximum required fuel flow.

The nominal pressure requirement at the gas turbines and gas engine skid edge is stated in the equipment data sheet.

- The pressure control valve(s) and associated controller shall be such that the pressure variations in steady conditions do not exceed $\pm 1\%$ of the nominal value requested at the fuel gas treatment unit outlet.
- During transient operating conditions such as starting up, acceleration, and deceleration of the gas turbine, the pressure variations shall not exceed $\pm 5\%$ of the nominal value.

4.3 Heating value

The fuel gas Lower Heating Value (LHV) and the Wobbe Index shall be calculated on the basis of the fuel gas composition downstream of the fuel gas treatment unit.

The fuel gas treatment unit shall have provision to accommodate possible variations of raw gas compositions resulting in a low heating value variation of $\pm 10\%$.

4.4 Temperature

The temperature of the fuel gas at gas turbine skid edge before the last chance scrubber supplied by the gas turbine Manufacturer or at the skid edge of the gas engine (refer to Appendix 1) shall meet all of the following requirements:

- Temperature such that no hydrate forms during the successive expansions in the circuits of the driving machine.
- Temperature 30°C (or higher value if required by the gas turbine or gas engine Manufacturer) higher than the dew points of water and hydrocarbons at any operating conditions between start up and maximum load.