

Document number:

LMF-SPEC-035

Description Revision

Update

Release date:

7 September 2022

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Revision:

2

Specification 035

Dryer Gas Treatment system 500+

Requested by

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September 2022

Version	Author	Date	Status	Remarks
1	PN	September 5, 2022	Concept	
1	MVS	September 9, 2022	Approved	
2	MVS	September 30, 2022	Updated	
		Click here to enter a date.	Choose an item.	
		Click here to enter a date.	Choose an item.	
		Click here to enter a date.	Choose an item.	

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1. Introduction

This document describes the specific and technical specifications for the Dryer Gas Treatment system 500+

This document is part of the Request for Quotation LMF-RFQ-020 - Dryer Gas Treatment system 500+

The scope consists globally of two filter systems, pumps, valves, instrumentation, and tubing.

2. System Overview

2.1 Objective

The purpose of the system is to filter the off-gas stream from the dryer. The off-gas contains air, water (damp/vapour) and dust particles. Since this is a pilot-plant, multiple routings through the dryer gas treatment system shall be tested to determine the most effective filtering method.

The dryer gas treatment system may consist of 4 process steps:

- a) Wet scrubber: remove pollutants from the water vapour that is released by a thermal dryer system
- b) Heating element (if required): re-heat the air flow to avoid condensation of water vapour in the dust filter
- c) Dust filter: remove pollutants from the wet air
- d) Fan (if required): extract air from the dryer/scrubber and discharge treated gas into the air / recirculate into dryer system

There are 2 potential outlets of the dryer gas treatment system:

- A) Discharge the treated gas into the air
- B) Recirculate the treated gas into the dryer system as sweep gas

The different routing options should consist of the following:

- 1) Wet scrubber → Discharge to the air.
- 2) Wet scrubber → Recirculate to the dryer system.
- 3) Wet scrubber + Heater + Dust filter → Discharge to the air
- 4) Wet scrubber + Heater + Dust filter → Recirculate to the dryer system
- 5) Dust filter → Discharge to the air
- 6) Dust filter → Recirculate to the dryer system
- 7) Untreated → Discharge to the air

The different options of the off-gas streams will be regulated with hand operated valves.

LMF-DWG-011-PFD Dryer Gas Treatment system 500+ shows the schematic view of the desired off-gas treatment system.

2.2 Dryer gas treatment system

This specification applies to the following equipment items:

- 1) Pos. 500 Scrubber
 - a. Air flow in: ± 116 Air kg/h + 290 kg/h water + 10 kg/h dust particles
 - b. Temperature in: $\pm 105^{\circ}\text{C}$
 - c. Cooling spray water in: $\pm 40^{\circ}\text{C}$
 - d. Condensate will recirculate and excess water will be directed to the dewatering
 - e. Air flow out will go to:
 - i. Direct exhaust
 - ii. Recirculated back to the dryer as sweep gas
 - iii. Dust filter
- 2) Pos. 520 Dust filter:
 - a. Air flow in:
 - i. By-pass Pos.500 Scrubber: ± 116 Air kg/h + 290 kg/h water + 10 kg/h dust particles
 - ii. Exhaust from Pos.500 Scrubber: To be determined by supplier
 - b. Temperature in:
 - i. By-pass Pos. 500 Scrubber: $\pm 105^{\circ}\text{C}$
 - ii. Exhaust from Pos. 500 Scrubber: $50-60^{\circ}\text{C}$ (estimated)
- 3) Pos. 510 Heating element:
 - a. If necessary for a better functionality of the dust filter.
- 4) Pos. 530 Fan:
 - a. Exhaust and/or recirculation
- 5) Pos. 540 Fan:
 - a. Exhaust and/or recirculation

A quotation of the complete assembly or the selection of the offered equipment items should be given.

2.3 Scope

- Engineering of complete assembly or the selection of the offered equipment items is included in the scope.
- Fabrication, assembly and installation of all equipment, tubing, valves, instrumentation, and auxiliaries is included in the scope.
- Installation includes making all connections to up-/downstream equipment and supports for tubing, and equipment.

3. Product characteristics

3.1 Output: dust emissions into open air

The residual dust emission after dryer gas treatment shall be well below the dust emission limit value of 5 mg/Nm³.

3.2 Input: Off-gas from Dryer

Off-gas	±116 Air kg/h + 290 kg/h water + 10 kg/h dust
Flow	500 m ³ /h
Temperature	±105°C
Dust	Treated bottom ash
Dust particle size: mean	12 µm
Dust particle size: D90	18 µm
Dust particle size: D50	7 µm
Dust particle size: D10	1.8 µm
Dryer pressure	-1 mbarg - -4 mbarg

4. Capacity & Dimensions characteristics

4.1 General

Detailed construction engineering, in full accordance with the requirements of the applicable National and European directives (e.g. Machinery Directive 2006/42/EC).

Material:	The material used must be resistant to product characteristics and process conditions.
Features:	Designed for full automation and minimal human interference. The system components must be easy to clean and maintain. Preference for automatic cleaning.
Supports:	Support for tubing, and equipment.
ATEX:	No ATEX requirements ATEX safety studies is still ongoing, if safety studies conclude that ATEX requirements are applicable, this will be considered a scope change.

5. Deliverables

5.1 Engineering & fabrication

Detailed engineering, procurement, fabrication, installation of Dryer gas treatment system 500+. In accordance with the Machinery Directive 2006/42/EC, applicable standards and specifications.

Preservation, according to the specification 'Preservation', optional supplier standard

Required/recommended spare/wear parts.

Motors: make SEW (preferred), optional supplier standard

5.2 Documents

- Documentation & certificates & EC Declaration of Conformity according to Machinery Directive 2006/42/EC.
- Document deliveries according to specification LMF-SPEC-001 – Documentation and Drawings Rev.#.