

<b>ALSTOM</b>	<b>Power</b> Environment Control System	<b>TECHNICAL INSTRUCTION</b>	<b>BR-5073-D-000-0006</b>
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3 TECHNICAL DATA

3.1 Specification of parts

One (1) ALSTOM ELECTROSTATIC PRECIPITATOR PLANT, type FTA, each consisting of Three (03) electrical fields in series with one (01) bus section.  
Each electrostatic precipitator is single wall design and includes:

Quantity	Item
1	<b>Precipitator casing</b> as prefabricated panels made of 4.75 mm ASTM A-36 steel
1	<b>Set of Load Slide Bearing</b> for Casing,
1	<b>Inlet funnel</b> as prefabricated panels for the precipitator casing, with required stiffening - 4.75 mm ASTM A-36 steel,
1	<b>Gas distribution screens</b> located at the inlet of the precipitator,
1	<b>Rapping mechanism</b> for the gas distribution screen, including drive arrangement with gear reducer and motor
1	<b>Outlet funnel</b> as prefabricated panels for the precipitator casing, with required stiffening - 4.75 mm ASTM A-36 steel,
1	<b>Outer roof</b> as prefabricated checker panels, made of 4 mm carbon steel,
3	<b>SCRAPER BOTTOMS</b> with drag chain arrangement running TRANSVERSELY to the gas flow and complete with drive arrangement, gear reducer and motor,
3	<b>Emitting system</b> as separate parts with <b>MULTIPEAK</b> emitting electrodes, high voltage support insulators and bushing insulators
3	<b>Rapping mechanism</b> for the emitting electrodes with insulating shaft including drive arrangement with gear reducer and motor
525	<b>Collecting electrodes</b> with suspension arrangement, plate thickness 1.25mm
3	<b>Rapping mechanism</b> for collecting electrodes including drive arrangement with gear reducer and motor
1	<b>Baffle plates</b> inside the ESP to prevent gas from sneaking from the collecting area
1	<b>Air flushing system</b> with fan, motor, ducts and heating element for support Insulators
12	<b>Heating elements</b> for support insulators,
3	<b>Heating elements</b> for insulating shafts,
7	<b>Hinged inspection doors</b>
1	<b>Outlet gas distribution screen</b> , made of 2 mm carbon steel,
3	<b>High voltage bus duct connection</b> between the rectifiers and the emitting system
1 Set	<b>Auxiliary equipment</b> comprising grounding rods and signs,
1	<b>Stairs &amp; Walkways</b> , galvanized, for access to the electrostatic precipitator roof, rapping drives and inspection doors, hand rail made of galvanized carbon steel,
1	<b>KEY INTERLOCKING SYSTEM</b>
1	<b>INTERNAL COLLECTION CHAIN CONVEYOR</b> , complete with drive arrangement, gear reducer and motor

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1	<b>ROTARY FEEDER</b> , complete with drive arrangements, gear reducer and motor, made of carbon steel,
1	<b>DISC DAMPER</b> , type DTPC with electrical drive and limit switches at ESP Inlet
1	<b>DISC DAMPER</b> , type DTPC with electrical drive and limit switches at ESP Outlet
3	<b>High voltage silicon diode Transformer rectifiers</b> , immersed with mineral oil.
3	<b>Control Cubicles</b> for transformer-rectifiers and rapping motors, each equipped with ALSTOM microprocessor based EPIC III emission optimization and control unit, including one common remote terminal unit RTU for T/Rs
1	<b>EPIC III communication</b> available is ETHERNET MODBUS/TCP
1	<b>Inductive sensor</b> for rotary feeder speed
1	<b>Temperature sensor</b> for air flushing system

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3.2 Initial and limit data

3.2.1 INITIAL DATA (DATA AND SERVICE REQUIREMENTS)

Location	Outdoors
Number of Fields	3
Total length included inlet /outlet pieces. (m)	According to lay-out BR-5073-M-000-0101
Efficiency	<b>Operation Point 1</b> <b>Operation Point 2</b>
	99,77 %    -
Inlet dust concentration	25 g/Nm <sup>3</sup> 25 g/Nm <sup>3</sup>
Outlet dust concentration	50 mg/Nm <sup>3</sup> To inform
Gas Flow	63 m <sup>3</sup> /s    81 m <sup>3</sup> /s
Gas Temperature (°C)	215    215
Moisture content in gas (%V)	25    25

3.2.2 Process Limits

Item	Unit	Value
Maximum pressure allowed	Pa	+5,000
Minimum pressure allowed	Pa	-5,000
Maximum allowed temperature	°C	+250
Minimum operation temperature	°C	Above dew point

3.3 PRECIPITATOR DATA

3.3.1 General

Item	Unit	Value
<b>General</b>		
Precipitator type		FTA - 3X35H - 72 - 115 – A7
Number of Chambers		01
Number of Fields / Chamber		03
Field length	mm	3,500
Field width	mm	7,200
Field height	mm	11,500
Collecting area	M <sup>2</sup>	5,790
Gas velocity	m/s	0,76    0,98
Retention time	s	13,8    10,7
<b>Casing</b>		
Type		Single wall
Material		Mild steel
Plates thickness	mm	4,75
<b>Inlet</b>		
Type		Top Inlet
Inlet passages		01
Inlet distribution screens		02 Holed plates
Inlet screens material		Carbon steel – 1,5 mm
Inlet connection		Rectangular flange included
<b>Outlet</b>		
Outlet passages		01
Outlet distribution screens		01
Outlet screens material		Carbon steel – 1,5 mm
Outlet connection		Rectangular flange included
<b>Hopper</b>		
Type		Flat
Material		Mild steel
Plates thickness	mm	8
<b>Insulators</b>		
Support insulators	units	12



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Shaft Insulators	units	03
Bush Insulators	units	03
Heating		Support and shaft insulators by heating elements
<b>Emitting electrodes</b>		
Type		Multipeak
Material		DIN – 2394
Spacing	mm	300 x 500
<b>Collecting electrodes</b>		
Type		ALSTOM G-profile
Material		Carbon steel - 1,5 mm
Spacing	mm	300
<b>Rapping system / Chamber</b>		
Type		Tumbling hammers
Drives, coll. System		01 per field, total 03
Drives, emitting system		01 per field, total 03
Rapping control logic		Included in ALSTOM EPIC® III
<b>Ash Handling System – Internal Chain Conveyor</b>		
Type		Chain
Quantity		1
Capacity	Ton/h	5,0
<b>Ash Handling System – Rotary Valve</b>		
Type		Rotary Feeder
Quantity		1
Capacity	Ton/h	5,5

3.3.2 Component features

- Transformer / Rectifier Data

Item	Unit	Value
Quantity		01 per field, total 03
Type of Control (please see our technical brochure for details)		ALSTOM EPIC® III
Secondary voltage (peak)	kV	90
Secondary current (rated maximum)	mA	1000
Ambient temperature	oC	Max. 55 °C (short duration); Daily mean 40 °C; Annual mean 30 °C. Min. – 30 °C (with heating element on)
Secondary voltage measurements		
Voltage	kV DC	0...90
Current	mA	0...1000
Measuring Transducers Output	mA	4...20

3.3.3 Power Supply

Item	Unit	Value
Rectifiers units		
Frequency	Hz	50
3-phase main voltage	V	380
1-phase control voltage	V	110
Number of inputs		1
Auxiliaries		
Frequency	Hz	50
3-phase main voltage	V	380
1-phase control voltage	V	110
Number of inputs		1

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**3.3.4 Electrical Data & Consumer List**

	<b>Item</b>	<b>Unit</b>	<b>Value</b>
Motors	Inlet Screen Rapping	kW	01 x 0.37
	Discharge system rapping	kW	03 x 0.37
	Collecting system rapping	kW	03 x 0.37
	Air flushing fan	kW	01 x 3.0
	Scraper	kW	01 x 4.0
	Chain Conveyor	kW	01 x 4.0
	Rotary Feeder	kW	01 x 4.0
	Inlet Dics Damper Actuator	kW	01 x 1.5
	Outlet Disc Damper Actuator	kW	01 x 1.5
Auxiliaries	Rectifier units	KW	03 x 69.3
	Support insulators heating	KW	12 x 1.0
	Shaft insulators heating	KW	03 x 1.0
	Air flushing	KW	01 x 20

**Conditions for availability guarantee**

The guarantee presupposes that the purchaser has spare parts in the extent recommended by the supplier, and that the purchaser's normal repair personnel are available.

Normal shutdowns are efficiently utilized by the supplier for carrying out service and maintenance measures as stated in the instructions for operation and maintenance.

The time of breakdowns caused by the fact that the plant has been operated against the instructions, and time when the plant is out of operation for reasons due to the purchaser, including e.g. planned rebuilds or production and economical reasons, are not considered as operating interruptions.

The purchaser is obliged, at his own initiative, together with the supplier, to try to continue the operation and to reduce the interruptions to the minimum. The purchaser shall also keep a record of the breakdowns and operating interruptions, and report them to the supplier. Any unreported breakdowns or operating interruptions are not included in the availability guarantee.

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**3.4 Guarantee**

The seller gives a guarantee on the electrostatic precipitator as provided in the contract, concerning performance data, durability of the equipment and faultlessness of the materials.

The guarantee presupposes that the precipitator is maintained and inspected according to the instructions for operation and maintenance, and that inspections and maintenance work are recorded in a logbook so that the measures taken are documented for later examination.

The logbook could be like this:

**LOGBOOK**

Date	Maintenance	Supervisor
dd.mm.yyyy	Internal inspection and cleaning of the Electrostatic precipitator. All internals have been inspected visually and the rappers tested for approx. 5 min each. According to a visual inspection, the distances between the electrode systems are correct, and there are no dust deposits on the electrodes. The salt conveyors have been tested for approx. 30 min, and they work normally. The work was completed at 16.00.	[Name]
dd.mm.yyyy	The precipitator was started up at 02.00. All the equipment works normally.	[Name]