Capability profile in Manufacturing ASH handling system

Contents

BRIEF OVERVIEW

The Ash Handling System consists of Bottom Ash, Fly Ash conveying systems & Ash Disposal system

Fly Ash Vacuum systems are designed to convey free flowing Fly Ash for Unit # 1 & 2 for ESP Ash, Economizer Ash and Air Heater Ash. The Fly Ash system also includes common Fly Ash Storage Silo for Unit # 1 & 2 with silo fluidizing system, silo unloading arrangement during emergency condition consisting (1) Dry telescopic unloading & (1) Wet Paddle mixer unloading System. (2) Ash transfer tanks are provided below FA Silo with Fly Ash Jetpulsion Pump arrangement to convey Fly Ash slurry to slurry pit during normal operation.

Bottom Ash System is designed to convey Bottom Ash through Submerged Scraper Conveyor and Bottom Ash Belt conveyor to carry to the Bottom Ash silo. Bottom Ash Unloading system is provided with reversible belt conveyor to either load on to open trucks or Jet pump system for disposing the Bottom ash to the slurry pit.

All Bottom Ash and Fly Ash be gathered in the slurry pit and transported to the Ash disposal pond by the Slurry Pumps. Water separated from Ash in the Ash disposal pond and be circulated to the Feed Water pit by the Return Water Pumps.

Submerged Flight Conveyor

Bent Section & Ramp Section

Standard Section

Submerged Drag Chain Conveyor (SDCC) is a mechanical ash conveyor that removes wet ash from the water- impounded section of the Submerged Drag Conveyor by using chain driven flights. Ash, as it falls into the water in the hopper section, settles, and collects between the flights of the SDCC. The ash is continuously removed from the SDCC as the flights move through the trough of the SDCC. The ash is discharged at the end of the SDCC by gravity, dropping on to the Belt Conveyor.

Conveying Material	
Name	Bottom Ash
Normal Conveying capacity	12.5 t/h(Dry Ash Basis)
Max Conveying capacity	25 t/h(Dry Ash Basis)
Bulk density	0.98 t/m^3
Moisture	<30%
Max clinker size	1000mmx600mmx200mm
External temperature	<60 degC
Drive	
Drive type	Flanged Motor
Power source	400VAC, 3ø, 50Hz
Motor pwr, spd, poles	18.5kW, 1460rpm, 4P
Inverter / Reversible	YES / YES
Operation condition	
Chain size	26mmx100mm
Scraper Pitch	1200 mm
Horizontal length	50 m
Lifting height from FFL	9.08 m
Conveyor speed (max)	3.2 m/min
Conveyor speed (normal)	1.6 m/min

Bottom Ash Belt Conveyor

The bottom ash transportation conveyor provided to transport the ash from boiler to bottom ash silo.

Conveying Material	
Name	Bottom Ash
Conveying capacity	25 MTPH
Bulk density	0.72 t/m^3
Moisture	<30%
Particle size	Max.30 mm
External temperature	<50degC
Drive	
Drive type	Motor Foot-mounted
Power source	400VAC, 3Ph, 50Hz
Motor pwr, spd, poles	5.5kW, 1500rpm, 4 poles
Inverter / Reversible	Yes/No
Operation condition	
Belt width	600 mm
Horizontal C-C length	87.6m
Lifting Height	22.117 m
Belt speed	17 m/min
Type of frame	Girder
Type of belt	NN125 600Wx5px3.0x2.0

Bottom Ash Crusher

Clinker Grinders are specifcally designed for both wet and dry botom ash applicatons, ofering superior performance and high-level reliability. With decades of proven experience, clinker grinders efectvely reduce material size providing higher efciency in pneumatc, hydraulic and mechanical botom ash handling systems. With thousands of units in service, Clinker Grinders are the industry standard for utlity and industrial power plants across the world.

Specification	
Capacity (approx.)	15 to 100 TPH (dependent on ash type and size)
Input Partcle Size (max.)	4" x 9" x 20"
Discharge Partcle Size (max.)	2"
Internal Temp (max.)	1200 °F (dry) or 200 °F (wet)
Internal Pressure (max.)	20 psi
Operatng Speed	16 RPM
Drive Horsepower	10 HP
Inlet Opening	33" x 30"
Discharge Opening	18" x 30"
Body Material	Primed Carbon Steel or Stainless Steel
Side Liner - Body Armor (optonal)	Stainless Steel
Shaf Material	17-4PH Stainless Steel
Shaf Sleeve Material	Stainless Steel with Hard Coatng (replaceable)

Bottom Ash Discharge Conveyor

The bottom ash discharging conveyor provided to unload the ash from bottom ash silo to truck or slurry pump.

Conveying Material	
Name	Bottom Ash
Conveying capacity	75 t/h
Bulk density	0.72t/m^3
Moisture	30%
Particle size	Max.30 mm
External temperature	< 50 degC
Drive	
Drive type	Gear Motor
Power source	400VAC, 3Ph, 50Hz
Motor pwr, spd, poles	7.5 kW, 1500 rpm, 4 poles
Inverter / Reversible	Yes/Yes
Operation condition	
Belt width	1200 mm
Horizontal C-C length	6.58 m
Belt speed	2 - 11 m/min
Type of frame	Frame
Type of belt	NN125 1200Wx6px4.0x2.0

Bottom Ash Silo

BA Silo provides storage of Bottom ash, dewater the ash and discharge from Sluice Gate to Reversible Belt Conveyor which in turn feeds to either Bottom Ash Slurry Tank or truck.

BA Silo is provided with vibrators and dewatering elements .The purpose of dewatering element s are to remove supernatant water above the ash level. This water should be removed rapidly, but not fast enough to disturb the fines on top of pile .The discharge rate is controlled by an orifice in the dewatering line.

Storing Material	
Name	Bottom Ash
Bulk density	0.72 t/m^3 (Dry Ash Basis)
Moisture	<30%
Design temperature	60 degC
Silo	
Internal diameter	φ 8,000 mm
Height of vertical wall	6180 mm
Height of hopper	5730 mm
Size of top opening (for charging)	4,750 mm x 850 mm
Size of bottom opening (for discharging)	1000 mm x 380 mm
Storing capacity	284 m^3
Materials	SS400

Fly Ash Silo

Fly Ahs Silo is store for all ash conneted from ESP; ECO; AHP hopper.

Material	Fly Ash
Bulk density (for Volume)	0.72 t/m^3
Design temperature	95 degC
Silo	
Type	Flat Bottom welded steel silo
Internal diameter	18,000 mm
Height of Silo cylinder shell	18,300 mm
Design Pressue	0.5 kPa
Casing thickness	9; 12; 14; 16
Overall Silo Height	30,900 mm
Operation pressure	Atm (approx)
Size of silo inlet opening Diameter	φ 650 NB
Size of Silo outlet opening Diameter	for Slurry : (584.2 mm x584.2mm)x2
	for Wet Ash : 584.2 mm x584.2mm
	for Dry Ash : 584.2 mm x584.2mm
Effective Storage volume	3,500 m^3

Paddle Mixer

Paddle Mixer/Un loader conditions ash with water to minimize dust and feeds the conditioned ash to trucks or rail cars. Dry material passes through the ash feed device and into the paddle mixer/unloader. Spray nozzles installed in the paddle mixer domed cover provide the water for ash conditioning.
Angled mixing paddles, arranged in a helix on a pair of counter-rotating shafts, efficiently mix the ash with water and move the material toward the mixer/unloader discharge.

Specification			
Paddle Rotation Speed	37RPM		
Electric Motor	30 HP		
Paddle Diameter (feeding)	22”	25”	28”
Weight	4.5 tons (9.023 lbs)		
Mixer Body Height	44 in		
Overall Length	194 in		

Telescopic Spout

The Telescoping Dry Spout is provided with integral Filter and vent fan. The telescopic dry spout has inner and outer shell. The inner shell consists of a number of fabricated buckets which are designed to telescope together. The external shell is fabricated from a flexible fabric with creases to allow it to fold neatly when retracted. Ash flows down through the internal fabricated buckets into a closed disposal tanker. The Telescoping Dry Spout is raised and lowered by a motor driven winch.

Specification	
Capacity	150 mtph
Motor	1.5 kW
Principal Material	
Main case	Mild Steel
Inner cone	Abrasive resistant material
Outer Sleeve	Flexible
Discharge	Mild Steel

Vacuum Pump

The function of Vacuum Pump is provide vacuum presure to convey the ash from hopper (ESP; ECO; APH) to the fly ash silo. These Vacuum Pumps are positive displacement devices and therefore a vacuum relief valve is included to protect the Vacuum Pump and/or motor in case of a malfunction.

Pump Data	
PUMP SPEED	520 rpm
SITE ELEVATION	15.00 Feet (4.5 m) above sea level
Ambient Temperature Range	4^0C to 39^0C (40^0F to 103^0F)
Averaga Ambient Temperature	23^0C (73.4^0F)
MASS AIR FLOW	120.5 lb/mln.
INLET VAPOUR TEMP.	47^0C
POWER INPUT TO PUMP	105 BKW.
NOISE LEVEL	85 dBA at 1 Mtr. distance
VIBRATION	Vibration Testing as per ISO 2372,
SEAL WATER QTY.	140 lpm. @ 35^0C

Silo Vent Filter

The function of a Silo Vent Filter is to vent the air (dust free) from the ash storage silo to prevent over or under pressurization

Collecting material	
Name	Fly Ash
Bulk density	0.72 t/m^3
Ventilation Filter	
Type	Pulse jet type
Capacity	115 m^3/min
Operation time	24 hours/day
Temperature	95 degC
Material	Carbon steel
Pressure	(-2,0 to -1,0)kPa
Filtering cloth	
Area	92 m^2
Air to Cloth Ratio	1.25 $m^3/min/m^2$
Material	Nomex
Heat-resistant temperature	95 degC
Design Pressure	5000 mmH_2O
Casing thickness	14 OZ Nomex felt
Max DP of Filter Bag	203 WC
Weight of Nomex Bag	0.46 kg $/m^2$
Thickness of Bag	1.5 mm
Bag size & Qty	133.35 mm (5 1/4") Dia X 96" Long, 84 nos
Filter cage Material	SS
Weight	2.26 kg each
Exhaust emission	< 50 mg/ Nm^3

Filter separator

The Filter/Separator located on the FA Silo separates the ash from the air used to convey the ash, without interruption to the conveying operation.

Collecting material	
Name	Fly Ash
Bulk density	0.72t/m^3
Combination Collector	
Type	Pulse jet type
Capacity	109 Am^3/min
Operation time	4 hrs operation in 8 hrs
Inlet Temperature	105 degC
Pressure	16.3 Hga
Material	Carbon Steel
Filtering cloth	
Area	90.95 m^2
Material	Nomex
Max DP of Filter Bag	For permeability between 10 to 13 m3/min/m2 pressure drop is 0.013 kg/cm^2(g)
Weight of Nomex Bag	0.45 kg/m^2
Bag size & Qty	Length= 2438 mm Filter area=1.08 m^2 & 84 nos
Filter cage Material	SS
Weight	4535 kg
Exhaust emission	< 50 mg/m^3

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