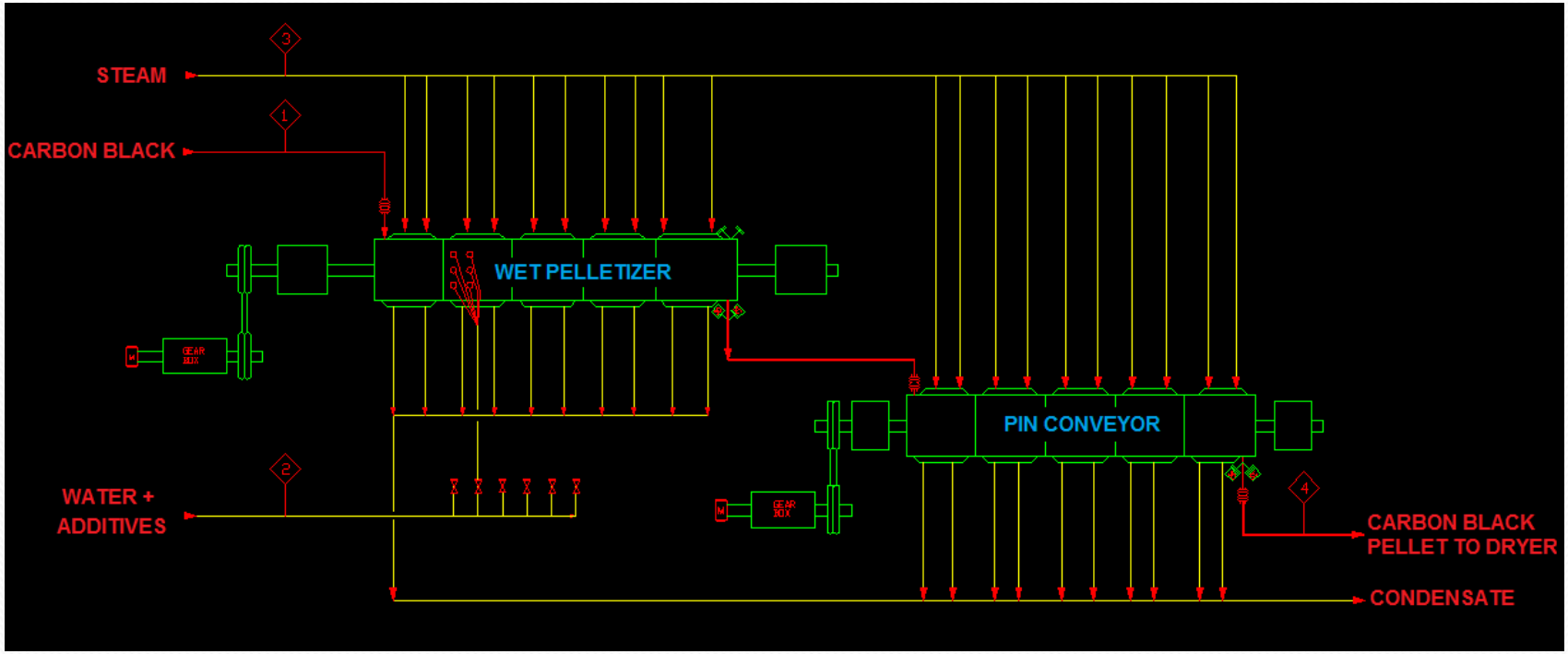
Carbon Black Pelletizing

Typical Flow Diagram



1	Carbon black	kg/h	4770
2	Water + Additives	kg/h	4770
3	Steam, 4-6 barg	kg/h	800
4	Carbon Black pellets	kg/h	9540
5	Condensate	kg/h	800

Carbon Black Process

Wet Pelletizer is used for pelletization of carbon black powder.
Wet Pelletizer is fed with Carbon black powder from Dense tank.

Wet Pelletizer consists of a shell (mixing box) with jacket and mixing shaft with radially extending rows of pins on a helical pattern rotating inside the shell.
The numerous rods / pins extending outward from the mixing shaft maintains the clearance between the pin tip and inner casing.
The mixing shaft is driven by an electrical motor (Variable frequency drive) with variable speed and fluid coupling arrangement.
Process water and additive agent are added to carbon black powder inside the Wet Pelletizer.
The contents are mixed by rotating shaft and are heated by passing LP steam through jacket.
Pelletized carbon black is finally discharged through outlet nozzle, which is sent to Pin Conveyor or directly to rotary dryer.

Pin Conveyor is used for fine polishing and pellet shape improvement of carbon black pellets coming from Wet Pelletizer.
Downstream Pin Conveyor shell carbon black is then conveyed inside the carbon black dryer.

Pin Conveyor consists of a shell with steam heated jacket and a shaft with radially extending rows of pins on a helical pattern rotating inside the shell.
The numerous rods / pins extending outward from the mixing shaft maintains the clearance between the pin tip and inner casing.
The mixing shaft is driven by an electrical motor (sometimes with Variable frequency drive) and fluid coupling arrangement.
Polished carbon black is finally discharged through outlet nozzle, which is sent to rotary dryer.

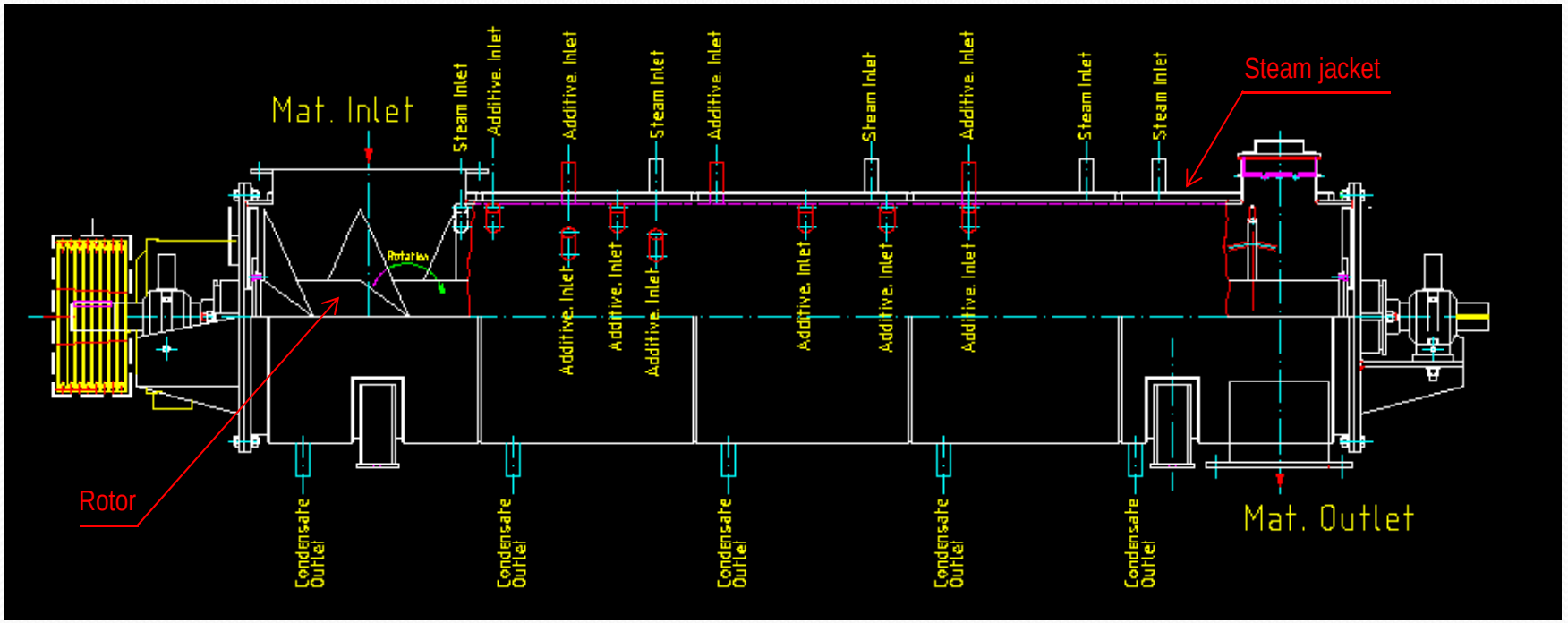
- **Wet Pelletizer** complete with
  - Shell (mixing box) assembly
  - Mixing shaft with pins and spirals
  - Stub shaft
  - Knife at inlet and outlet of feed
  - Jacket assembly for steam heating
  - Drive arrangement consisting of motor, coupling and V-belt drive
  - Common base frame for mounting all items listed
- Electric motor
- Variable Frequency Drive
- Skid mounted
- Thermal insulation
- Foundation bolts and nuts and other required hardware
- First fill of lubricants.
- Painting
- Performance testing of Wet Pelletizer.

- **Pin Conveyor** complete with:
  - Shell (mixing box) assembly
  - Mixing shaft with pins and spirals
  - Stub shaft
  - Knife at inlet and outlet of feed
  - Jacket assembly for steam heating
  - Drive arrangement consisting of motor, coupling and V-belt drive
  - Common base frame for mounting all items listed
- Electric motor
- Variable Frequency Drive
- Skid mounted
- Thermal insulation
- Foundation bolts and nuts and other required hardware
- First fill of lubricants.
- Painting
- Performance testing of Pin Conveyor.

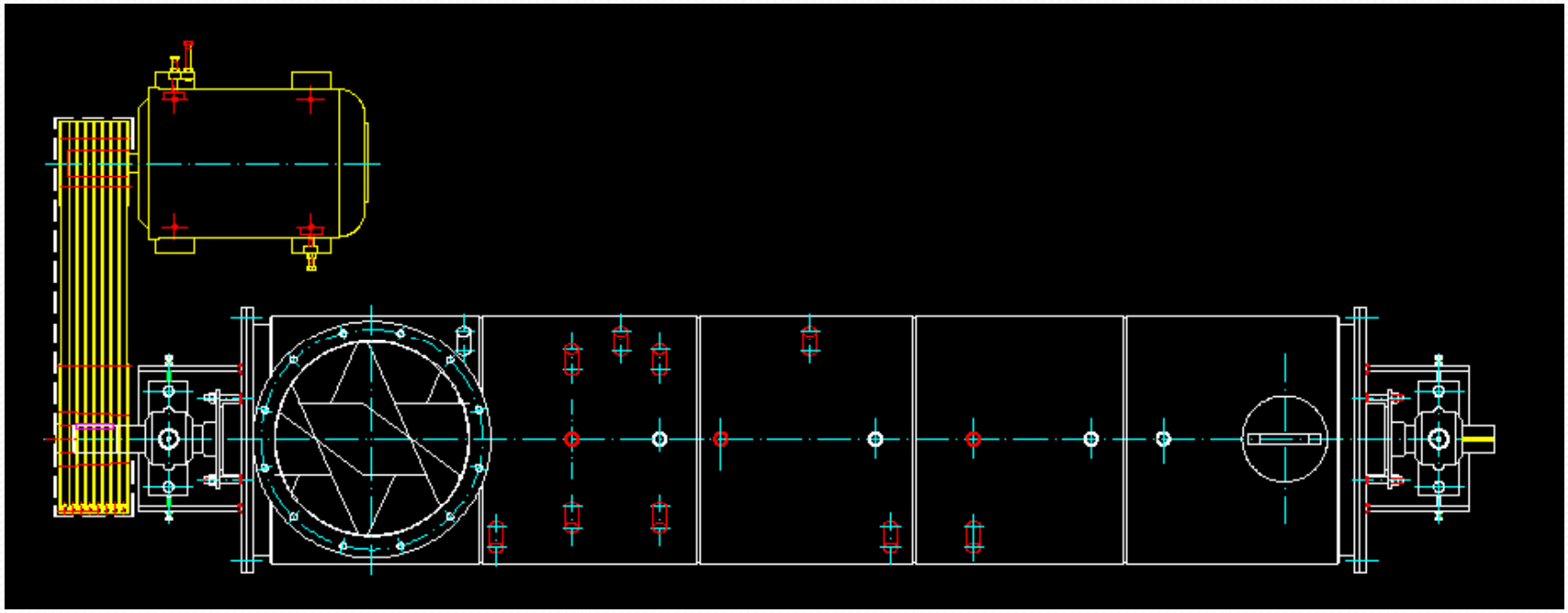
Wet Pelletizer and **Pin Conveyor** are belt driven.
Gear Box can be used on demand
Shaft assembly is dynamically balanced
Idler and drive stubs to be expansion fitted into the mixing shaft.
Shell is fabricated from steel plate and machined.
Shell inside surface is machined after fabrication to ensure precision tolerance on diameter and circularity.

- All carbon steel parts are applied with suitable painting.
- Stainless steel parts are pickled and passivated.
- Motor is rated for a minimum 115% of shaft power.

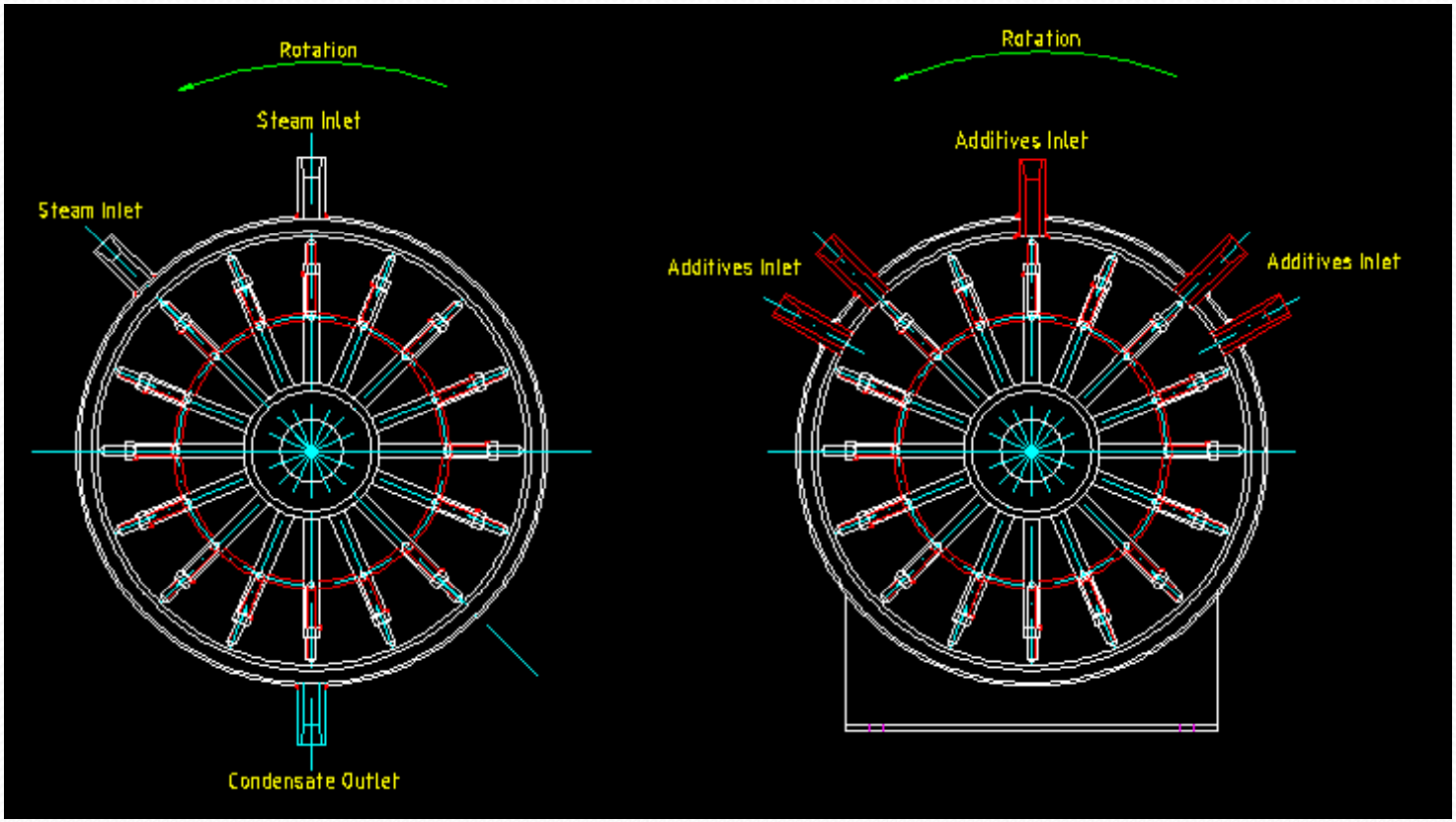
Wet Pelletizer - Assembly


Mat. Inlet
Steam Inlet
Additive. Inlet
Steam jacket
Rotation
Rotor
Condensate Outlet
Mat. Outlet

Front View

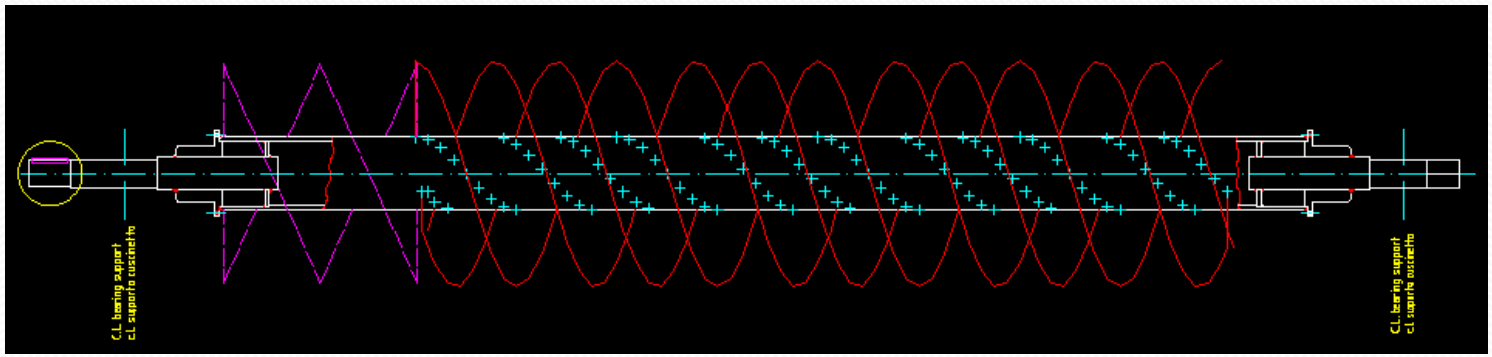


Plan View

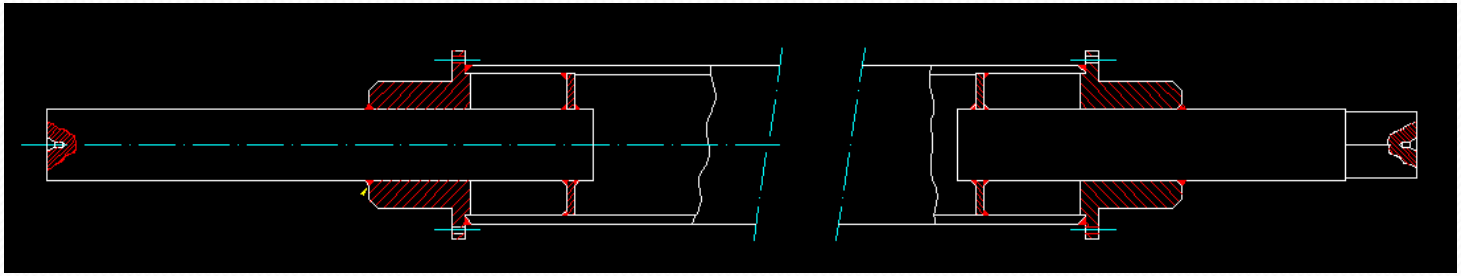

Rotation
Steam Inlet
Steam Inlet
Condensate Outlet
Rotation
Additives Inlet
Additives Inlet
Additives Inlet

Section

Wet Pelletizer - Rotor

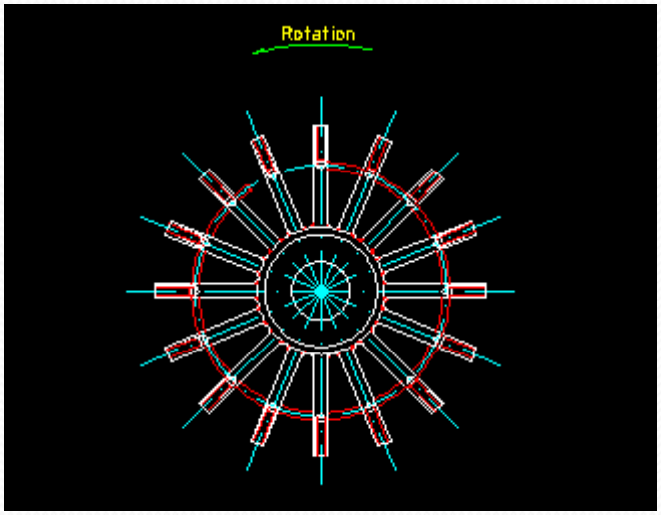


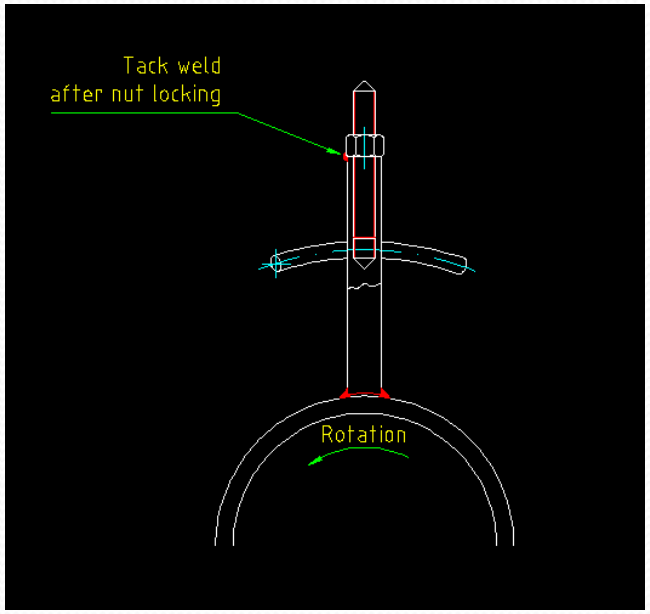
Shaft assembly



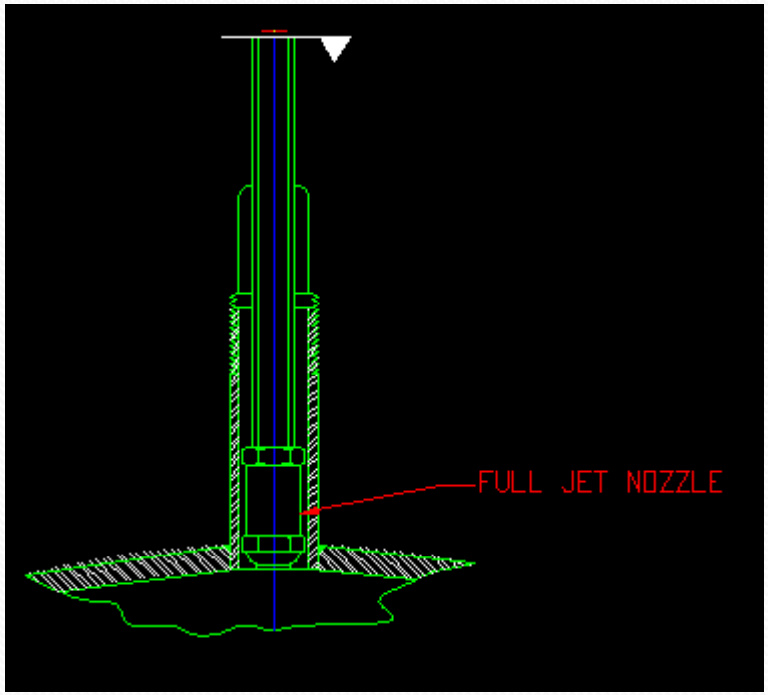
Shaft construction

Solid pin arrangement

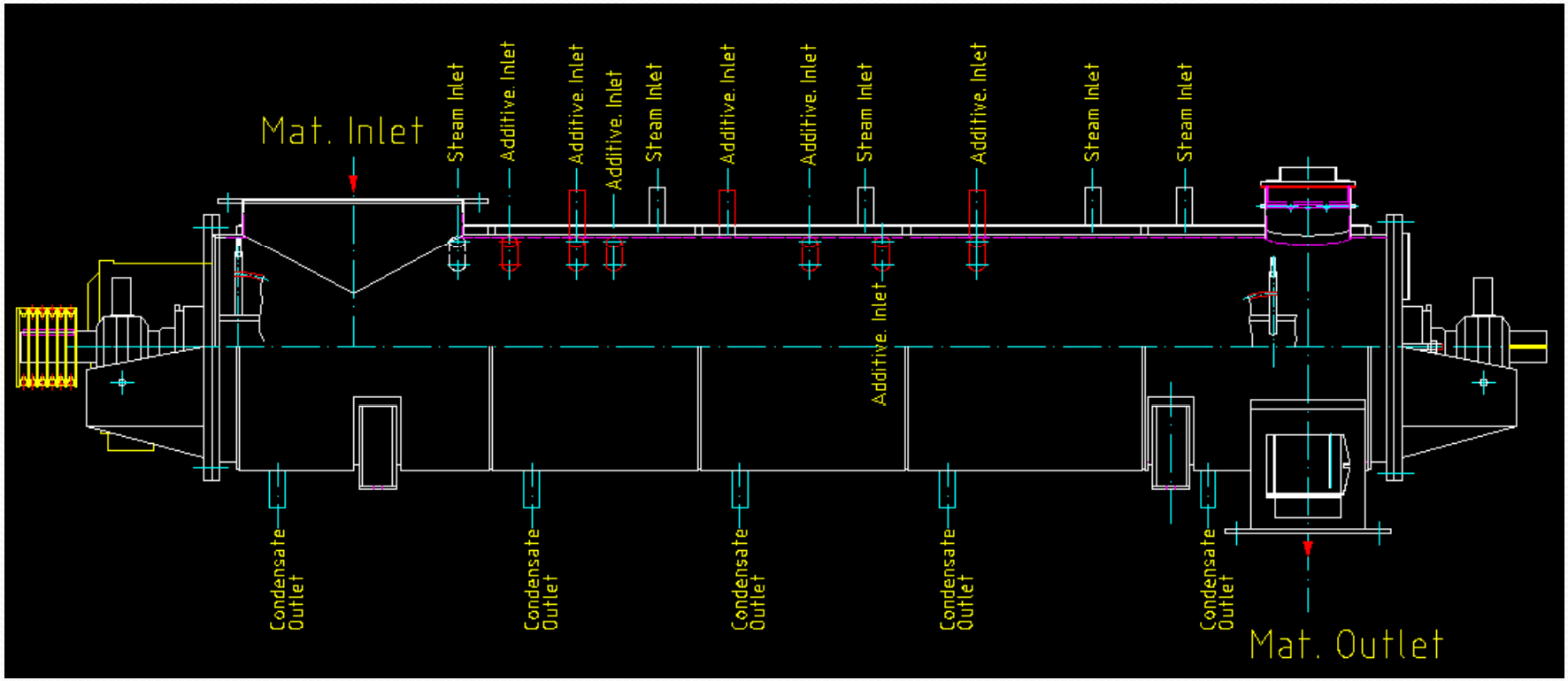




Water & additives injection



Pin Conveyor- Assembly


Mat. Inlet
Steam Inlet
Additive Inlet
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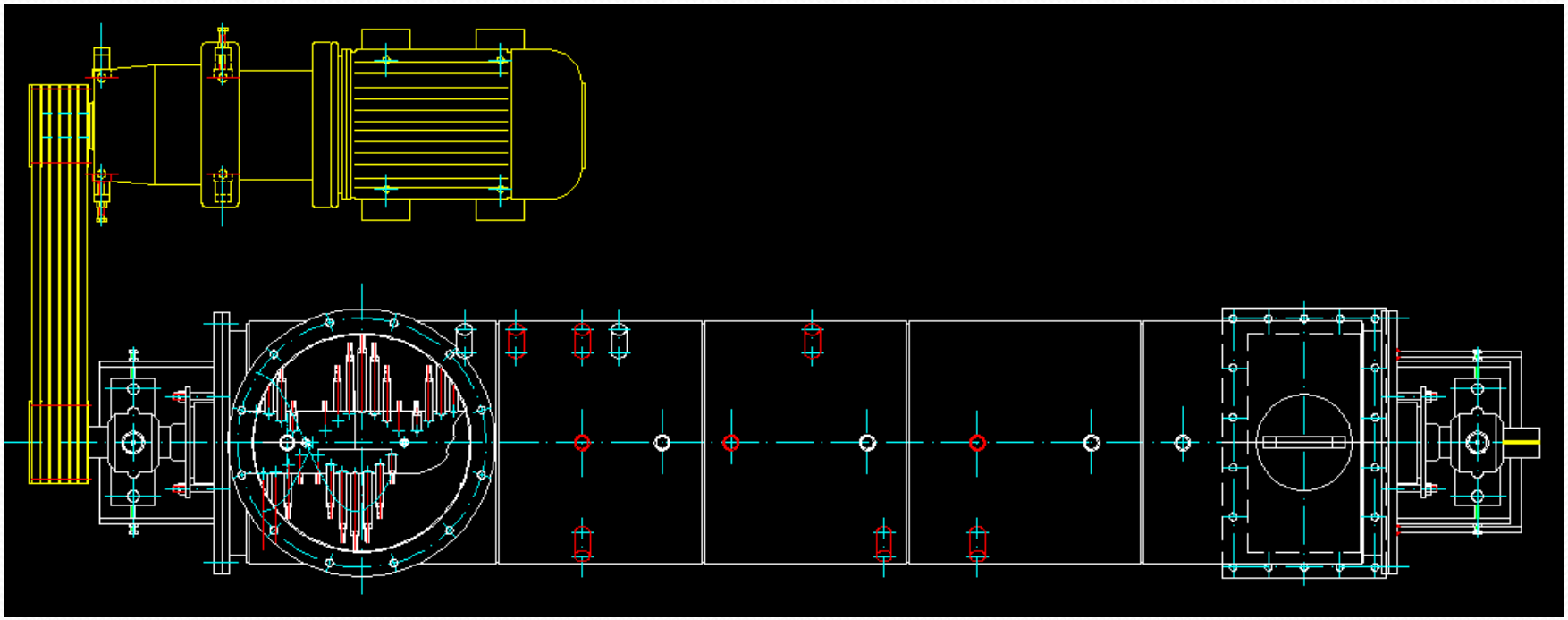
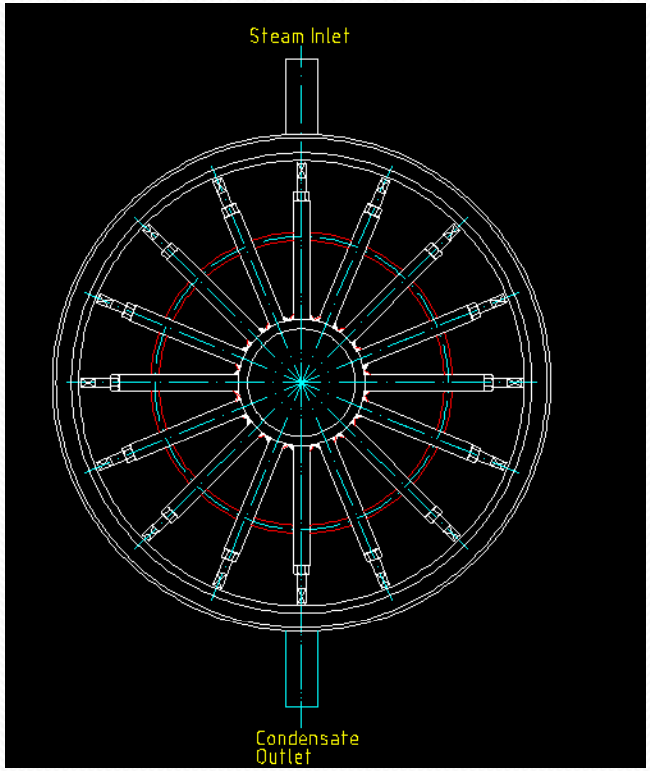
Condensate Outlet
Condensate Outlet
Condensate Outlet
Condensate Outlet
Condensate Outlet
Mat. Outlet

Front View

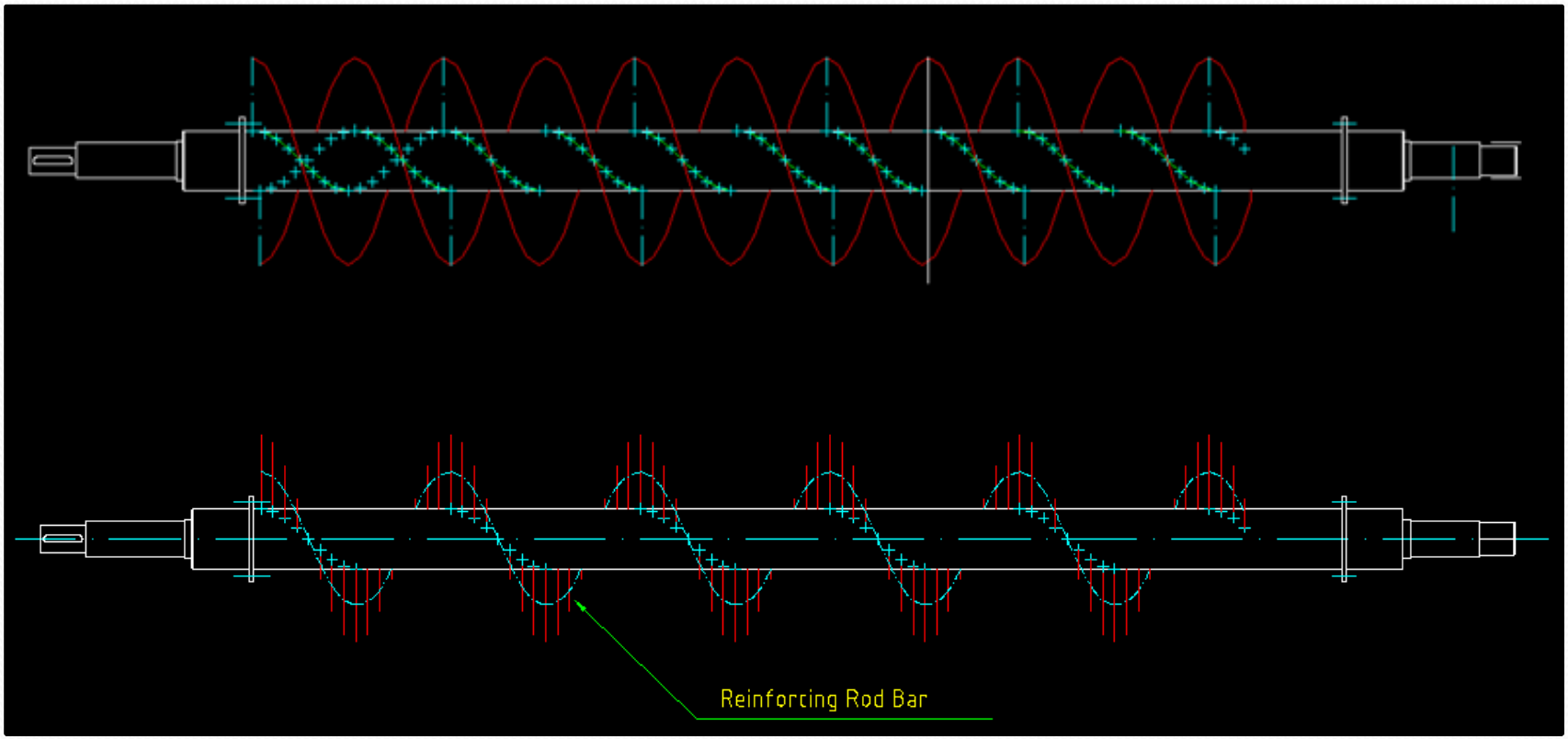


Plan View



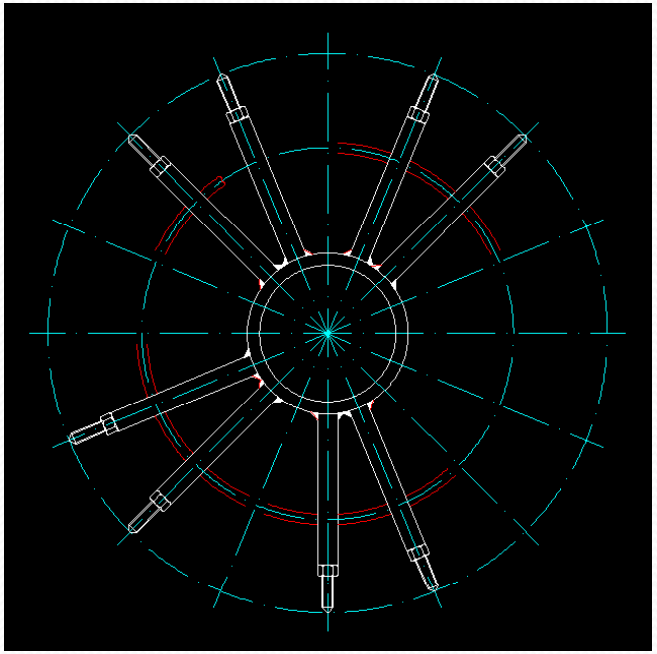
Section

Pin Conveyor - Rotor

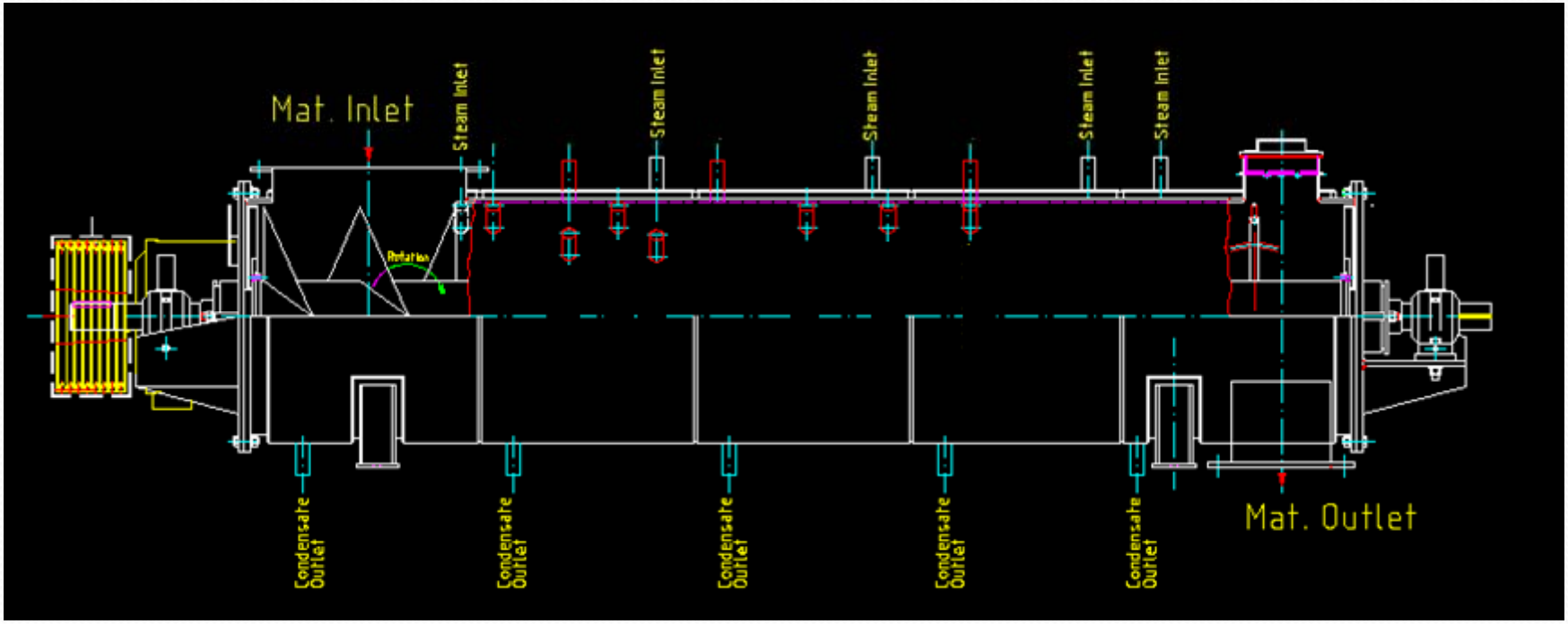


Shaft assembly

Solid pin arrangement



Steam Jacket



Shell tube configuration

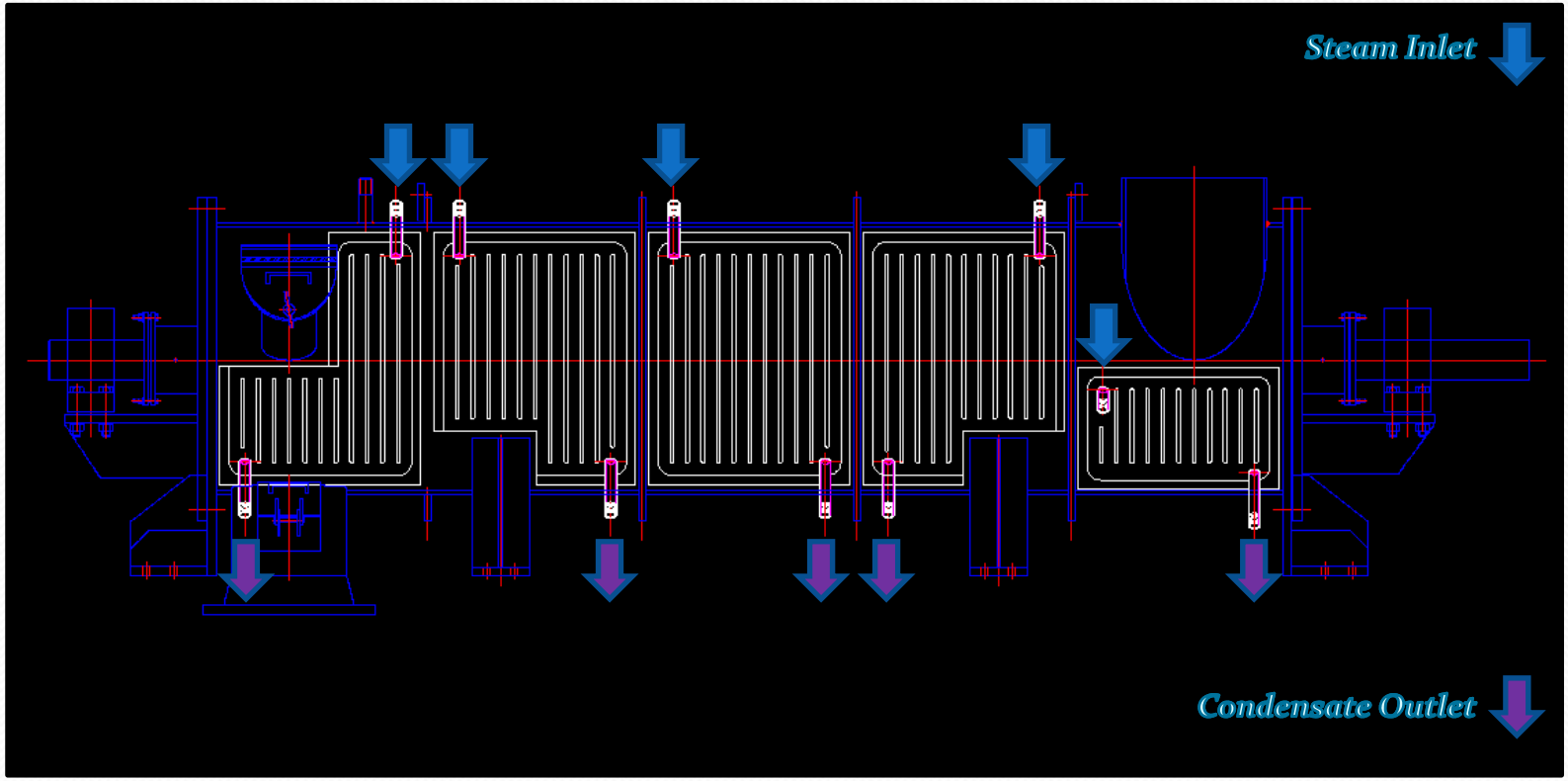


Plate heat exchanger configuration

Technical Data

Pelletizer/Pin Conveyor Sizes

MODEL	Internal diameter (mm)	Shaft diameter (mm)	Power (kW)
20”	500.0	168.3	30
24”	590.6	168.3	55
28”	683.5	219.1	75
30”	753.0	219.1	75

TYPICAL WORKING PARAMETERS FOR CARBON BLACK WET PELLETIZER		
Material to be pelletized		Carbon Black
Bulk density	kg/m^3	50-100
Size of feed carbon black powder	mm	0.020-0.350
Capacity (dry pellets)	(kg/hr)	4770
Size of equipment	inch	30
Operating temperature (shell)	° C	130±10
Operating temperature (jacket)	° C	151.2
Design temperature	° C	175
Design temperature	° C	185
Operating Pressure (shell)	mmwc	500
Operating Pressure (jacket)	kg/cm^2g	4
Design Pressure (shell)	mmwc	800
Design Pressure (jacket)	kg/cm^2g	8
Shell material		SS 316L
Jacket material		Carbon steel
Shaft/Knife material		SS316L
Pins material		SS 316L or Nitronic 60
Pin Holder/Lock Nut material		SS316L
Feed		Continuous
Duty	h/d	24
Mixing shaft speed	rpm	225- 450
Motor rating	kW	75

TYPICAL WORKING PARAMETERS FOR CARBON BLACK PIN CONVEYOR		
Material to be polished		Carbon Black Pellets
Bulk density	kg/m^3	300 - 530
Size of feed carbon black powder	mm	2 - 5
Capacity (dry pellets)	(kg/hr)	4770
Size of equipment	inch	24
Operating temperature (shell)	° C	130±10
Operating temperature (jacket)	° C	151.2
Design temperature	° C	175
Design temperature	° C	185
Operating Pressure (shell)	mmwc	500
Operating Pressure (jacket)	kg/cm^2g	4
Design Pressure (shell)	mmwc	800
Design Pressure (jacket)	kg/cm^2g	8
Shell material		SS 316L
Jacket material		Carbon steel
Shaft/Knife material		SS316L
Pins material		SS 316L or Nitronic 60
Pin Holder/Lock Nut material		SS316L
Feed		Continuous
Duty	h/d	24
Mixing shaft speed	rpm	250- 500
Motor rating	kW	30