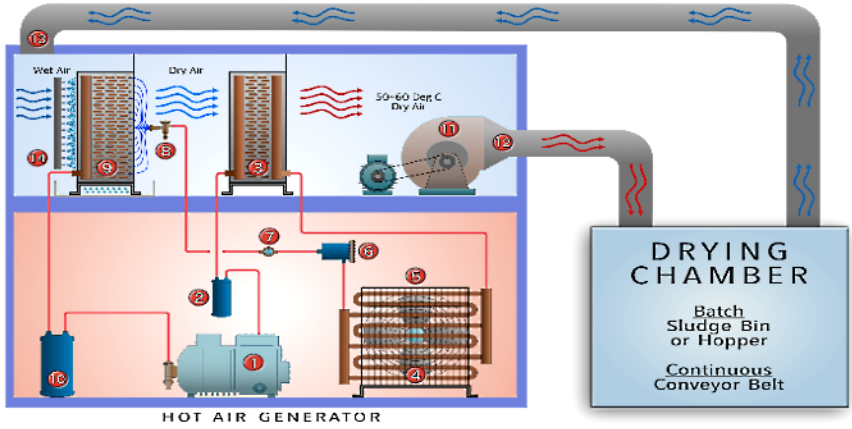
WATTERSON TECHNOLOGY sdn bhd
(787102 - X)
GST Reg. No. 001232130048

Sludge Dryer

Okada Sludge Dryer functions as a second tier dryer after the mechanical dewatering (filter press, belt press & decanter). It is design to further reduce the weight and moisture of the wet sludge in an intrinsically safe operation, thereby eliminating the fire hazard risk. The results of reducing the sludge weight will significantly lower the disposal cost. With more than 10 years in sludge drying manufacturing, Okada Sludge Dryer aims to bring cost-effective solutions to customers around the world and continue to preserve the environment for future generations.

Sludge Dryer >> *Schematics description*



1. Refrigerant Heat Pump
2. Oil Separator
3. Primary Condenser
4. Secondary Condensor
5. Exhaust Fan
6. Filter Drier
7. Sight Glass
8. Expansion Valve
9. Evaporator Coil
10. Suction Accumulator
11. Centrifugal Blower
12. Hot Air Supply Duct
13. Wet Air Return Duct
14. Coil Autowash Nozzle

Okada Sludge dryer operates by generating dry warm air thru a refrigerant heat pump without the use of any combustible fuel or gases, thermal oil and electric heating element. The dried warm air is circulated thru the wet sludge in a closed loop system, extracting the moisture from the wet sludge which then be channelled to a dehumidifying cooling coil. The dehumidifying coil will removed the moisture from the air thru condensation process, thereby producing dry air again. Following that, another condenser coil will act as a heat source to increase the temperature of the dried air to 45~55deg Celsius. The use of refrigerant cycle to create dry air and as a heating source, give an advantage of energy equilibrium in an intrinsically safe environment and energy efficient compared to conventional dryer.

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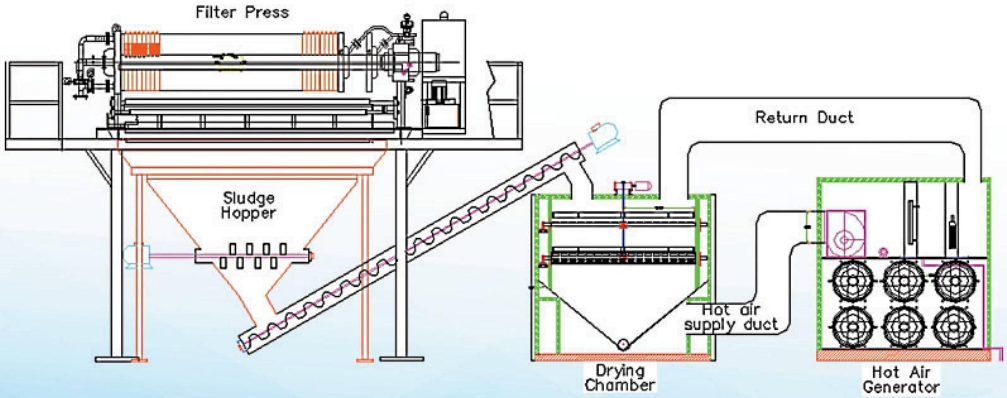
Batch Dryer

Model T1500

Model T1000

Continuous Dryer

Sludge Dryer Schematics



>> How does it works

Filter Press

Sludge from Filter Press
~ 70 ± 5% Moisture content

kada Sludge Dryer

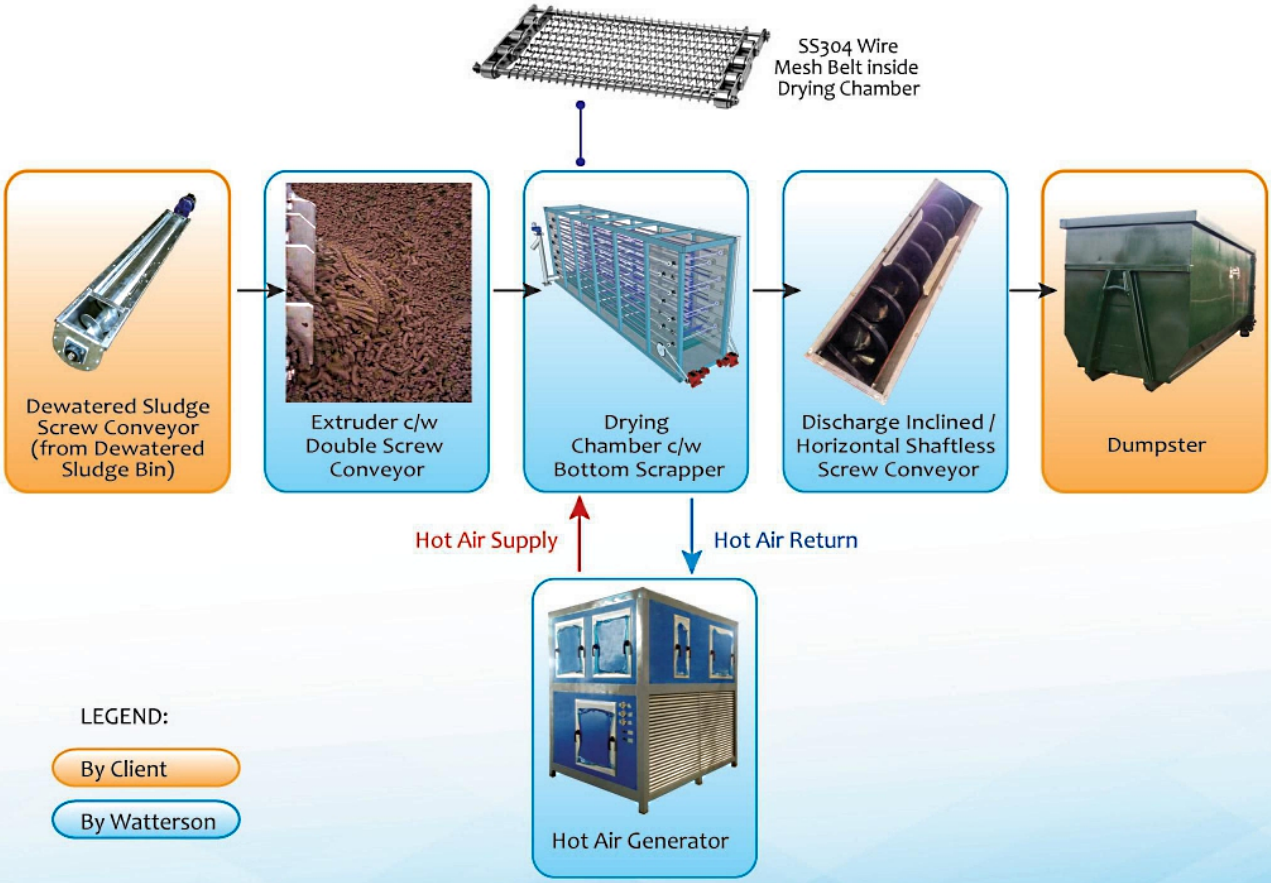
Dried Sludge
~ 50 - 60% Weight reduction
~ 15 ± 5% Moisture content

>> Key Advantages

- The dryer operates in a close loop system with no air emission, hence does not required any legal application.
- Conserving low energy requirement.
- Minimal maintenance.
- Environmental benign - no utilization of CFC.
- Simple and automated operation with timer control.
- Low labour requirement.
- Alternative to conventional drying method with minimal dust generation.
- No fine hazard.

>> Process Flow Diagram

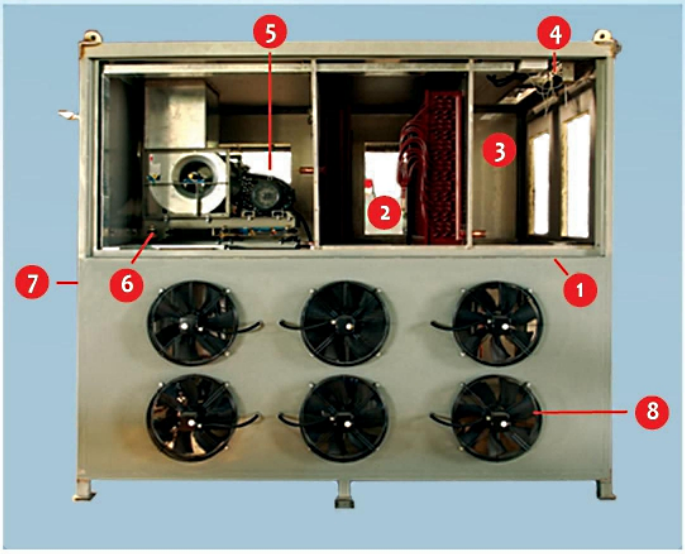
(Continuous Belt Sludge Dryer)



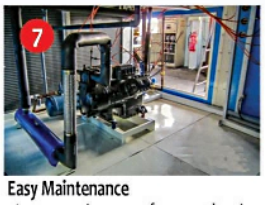
>> How does it works

PU Panel with Stainless Steel Surface
- Reduce maintenance cost as stainless steel surface is used
- PU foam traps the hot air, thus increase efficiency & reduce energy usage.
- Premium feel and touch

Anti- Corrosion Coating
- Prevent corrosion on Coils



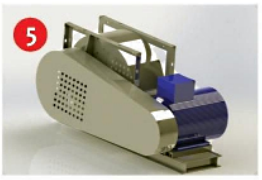
Blower Vibration Dampener
- Reduce vibration on machine and other sensitive parts.
- Reduce wear and tear on blower and machine structure



Easy Maintenance
- Large spacious area for easy cleaning and maintenance.

Auto-wash System
- Remove Dust & Corrosive chemical build up
- Reduce the need for maintenance

Isolation Valve
- Reduce risk of malfunction and increase in safety usage
- Easier parts replacement



Easy Maintenance Blower
- Easy maintenance for greasing and change of bearing

Pneumatic Jack System
- Keep system in enclosed loop
- High durability with High pneumatic lifting loop (Batch Dryer Only)

>> Sludge Bin Key Features

Tote Dumping System
- Design specifically to unload massive amount of sludge bin

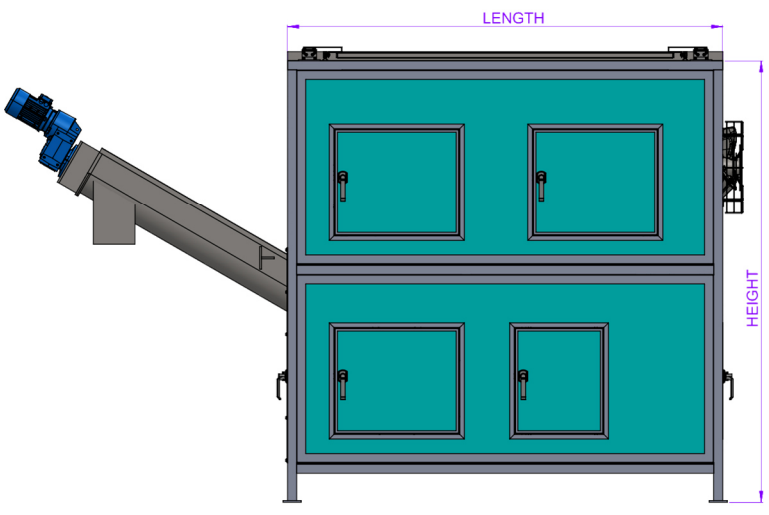
*Available for T1500 onwards
**Optional for T1000

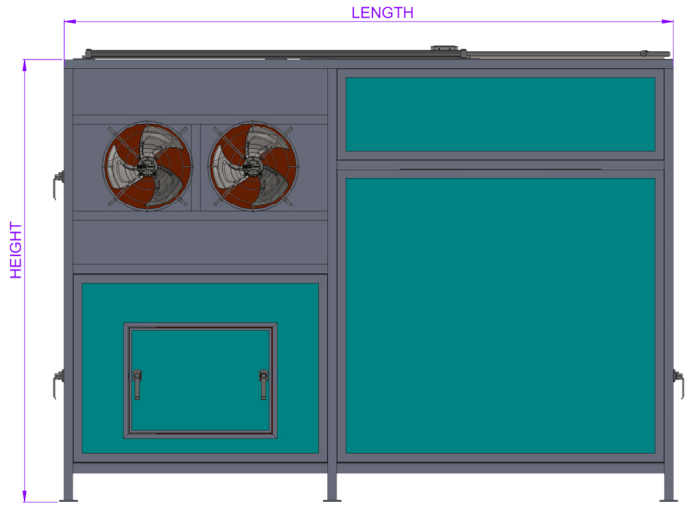
J-Hook System
- Enables faster unloading of dried sludge
- Equipped using forklift

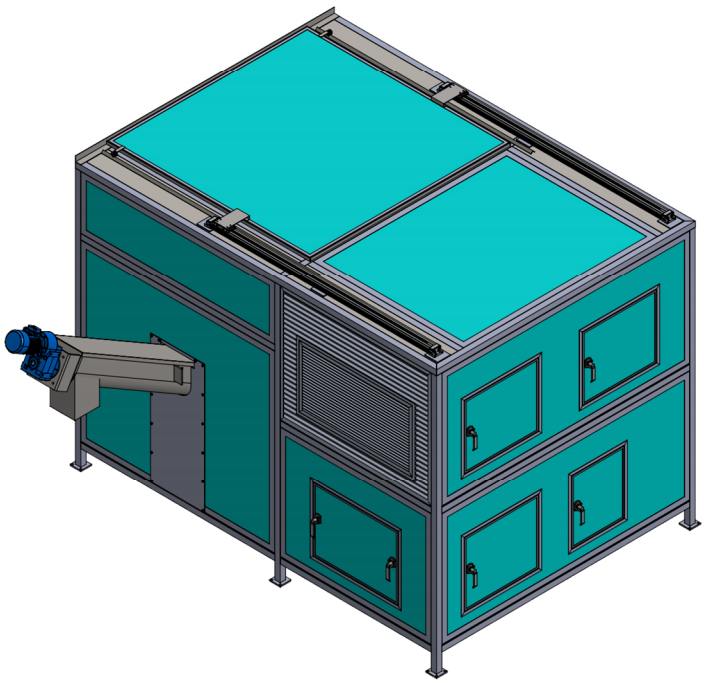
*Available for T500
**Optional for T1000

Stainless Steel Perforated Plate
- Reduce air flow turbulence
- Increase flow of hot air
- Corrosion resistant

Sludge Dryer Specification







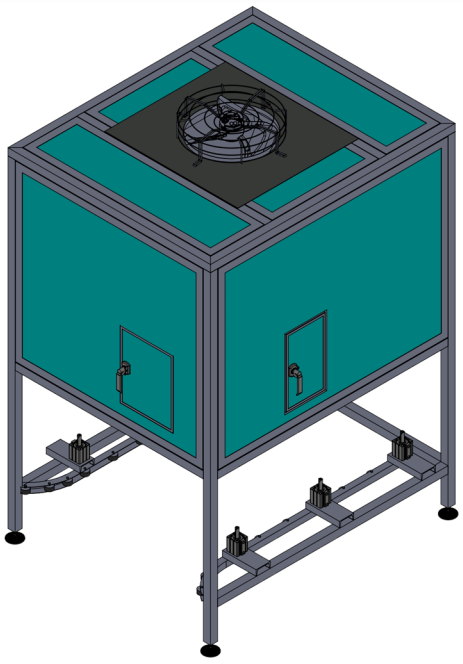
CT500 & CT1000 Model

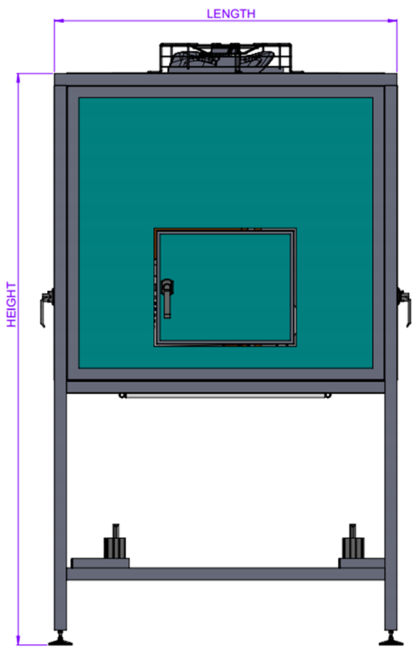
Dryer Specification(Batch)

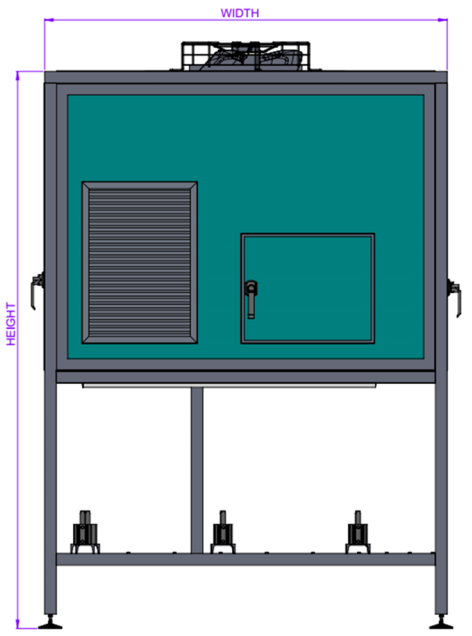
Model	T 500	T 1000	CT 500	CT 1000	T 1500	T 2000	T 3000
Operation method **(cycle/day)***	**2**	**2**	**1**	**2**	**2**	**2**	**2**
Power Supply requirement **(Amps)**	**20**	**40**	**30**	**60**	**80**	**110**	**125**
Air Supply requirement **(Pressure only, bar)**	**6.0 @ dry air at 15 to 20°C or ½" connection**						
Water supply requirement	**35 liter/min @ 2 bar or 1" water supply @ 2 bar**						
Condensate water to WWTP **(gravity flow type)**	**1-1/2" PVC piping**				**2" PVC piping**		
Noise **(Decibels)***	**80 to 90 DB**						
Panel control*	Panel c/w selector switch and indicator alarm				Panel c/w HMI flow diagram and monitoring parameter and setting		
Wet sludge input capacity (**kg/day)***	500	1000	500	1000	1500	2000	3000
Moisture infeed **(%)**	**60 to 75**						
Weight reduction **(%)**	**40 to 60**						
Operation Consumption **(kwhr/kg wet sludge)**	**0.233 to 0.364**						
Power Consumption **(kwhr/day)**	132	233	185	286	546	636	852
Water Removal Rate **(kwhr/kg water)**	0.52	0.46	0.74	0.57	0.72	0.63	0.56
Dryer – Height (**mm**)	2300	3000	2515	2515	2800	2800	2800
Dryer – Width (**mm**)	1450	1900	2515	2515	2100	2100	2100
Dryer – Length (**mm**)	1750	1950	3350	3350	2600	2600	2600

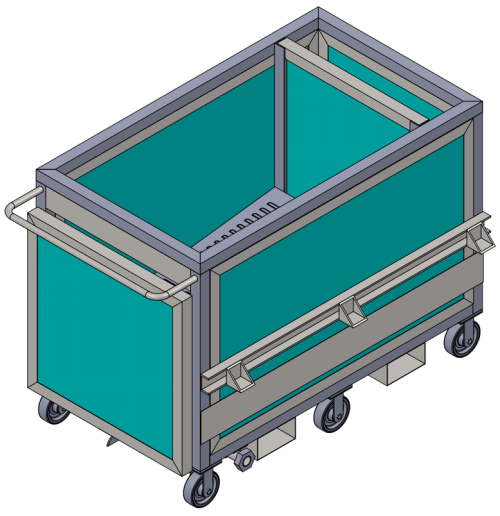
*Note:
1.Operation cycle refers to sludge dryer's 12 hours/operating cycle. 2.Noise measurement are measuring 1 meter from the machine. 3.Panel and equipment requirement and installed are for 415V/3 phase/50 Hz c/w neutral 4.Assume specific gravity of sludge is 1,150kg/m^3 @ moisture 75%. 5.A customized model will be produced if requirement defers from above specification.

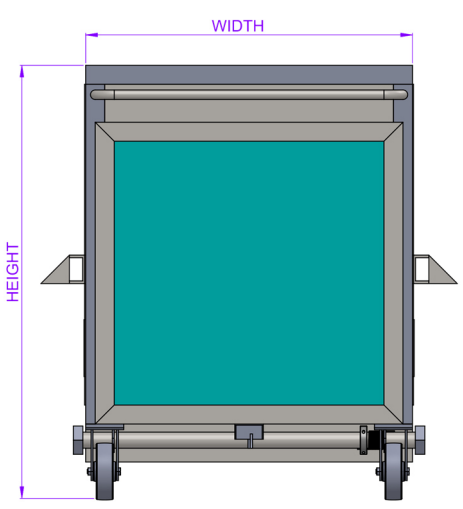
Sludge Dryer Specification

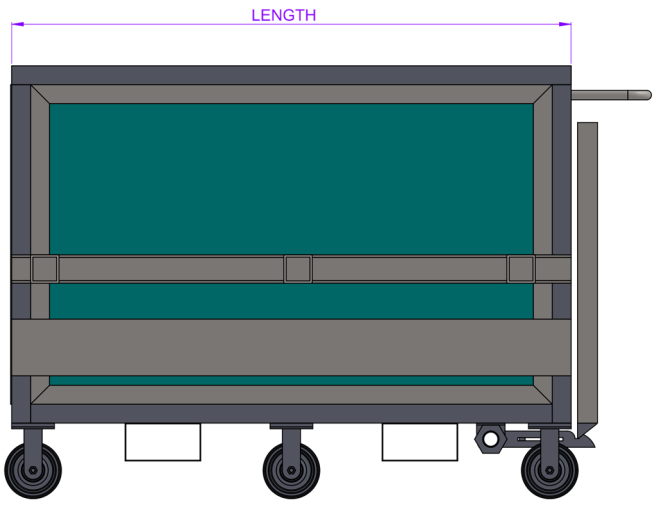












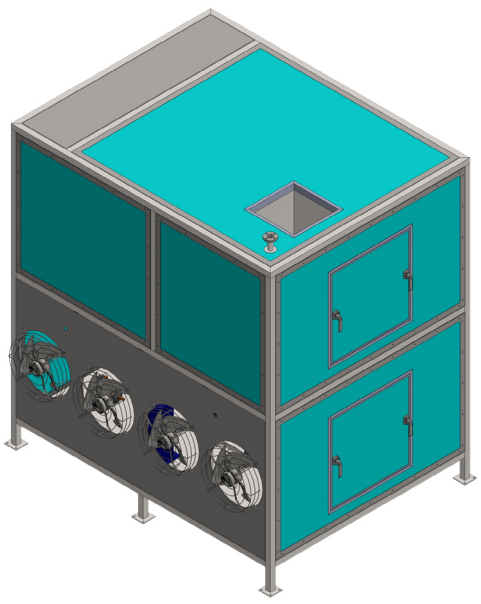
T500, T1000, T1500, T2000 & T3000 Model

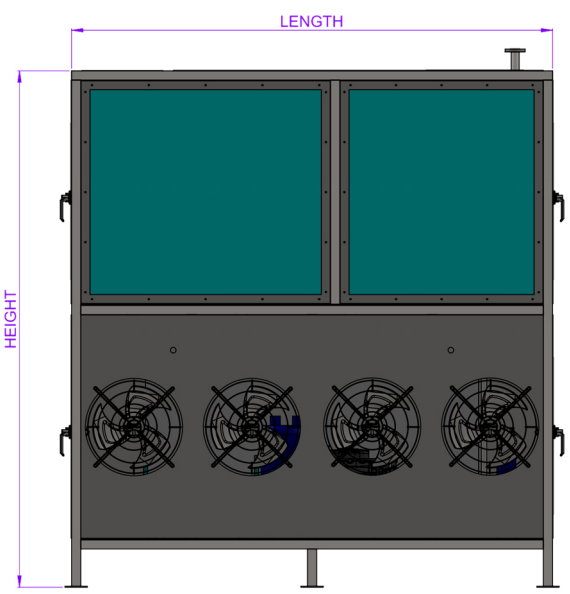
Dryer Specification(Batch)

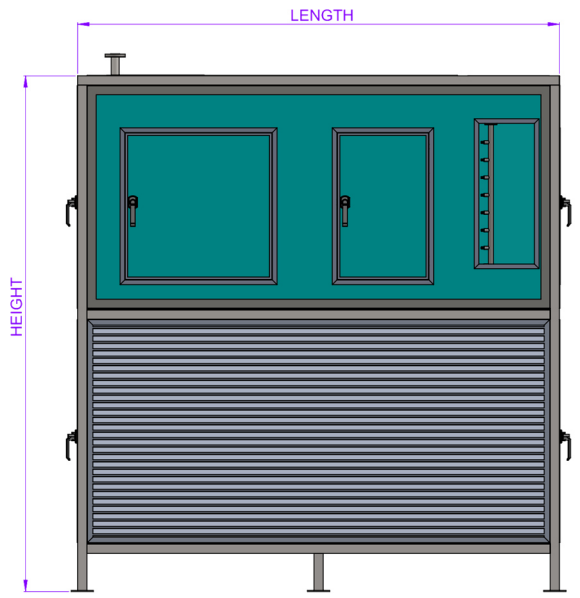
Model	T 500	T 1000	CT 500	CT 1000	T 1500	T 2000	T 3000
Quantity sludge bin or hopper*	2	2	1	1	4	6	8
Sludge bin Capacity **(Liters)**	310	605	650		450		
Table Frame **(Sets)**	Not Applicable				2	3	4
Method of Disposal	Forklift		Discharge Screw Conveyor		Forklift or tote dumping system*		
Table Frame Dimension							
Total Height (**mm**)	Not Applicable				1225	1225	1225
Total Width (**mm**)	Not Applicable				1725	1725	1725
Total Length (**mm**)	Not Applicable				2650	3750	5300
Sludge Bin Dimension (Per Unit Sludge Bin)							
Height (**mm**)	870	870	Not Applicable		945	945	945
Width (**mm**)	920	1300	Not Applicable		860	860	860
Length (**mm**)	1300	1610	Not Applicable		1480	1480	1480
Hopper Dimension							
Height (**mm**)	Not Applicable		1700		Not Applicable		
Width (**mm**)	Not Applicable		1800		Not Applicable		
Length (**mm**)	Not Applicable		1800		Not Applicable		

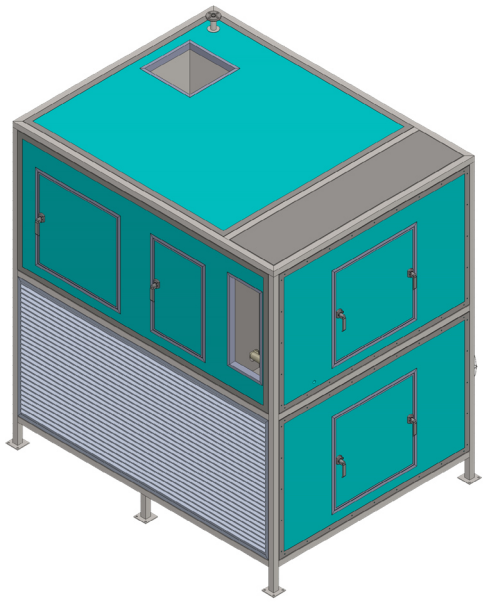
*Note:
1.Quantity sludge bin c/w duty and standby unit for use (Not applicable for CT model). 2.Assume specific gravity of sludge is 1,150kg/m^3 @ moisture 75%. 3.A customized model will be produced if requirement defers from above specification. 4.Tote dumping system are an optional equipment.

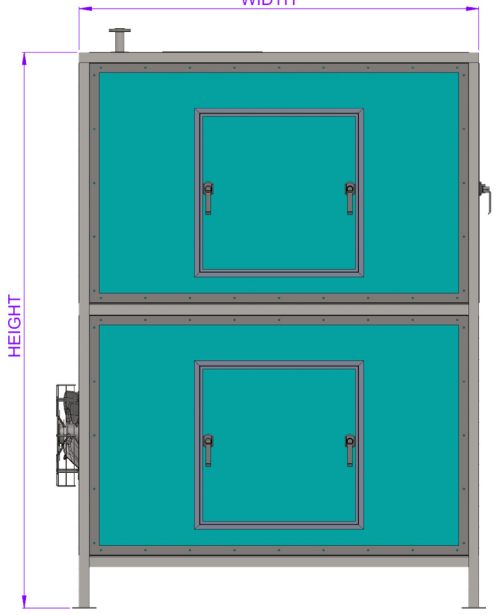
Sludge Dryer Specification

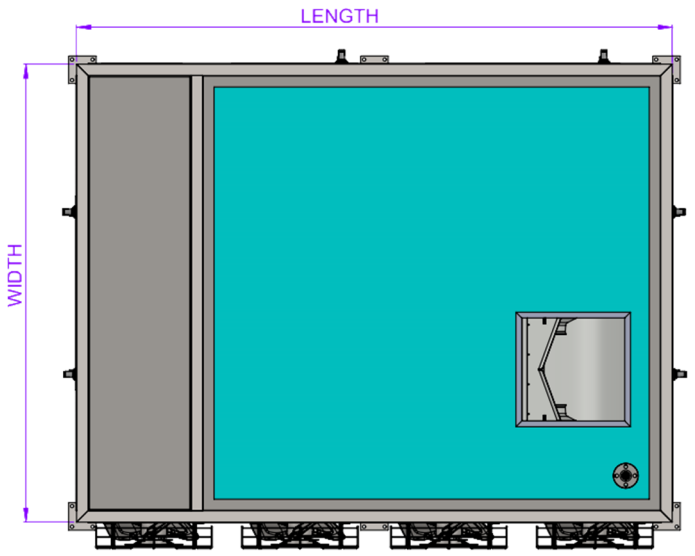












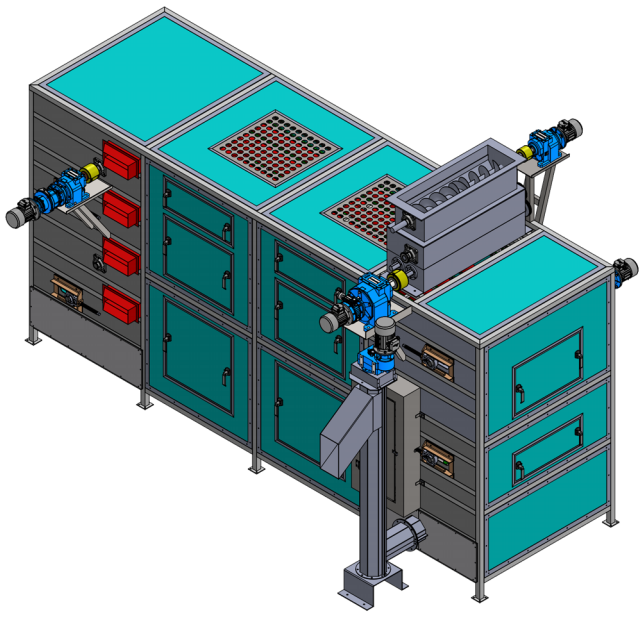
Continuous Dryer Hot Air Generator Model

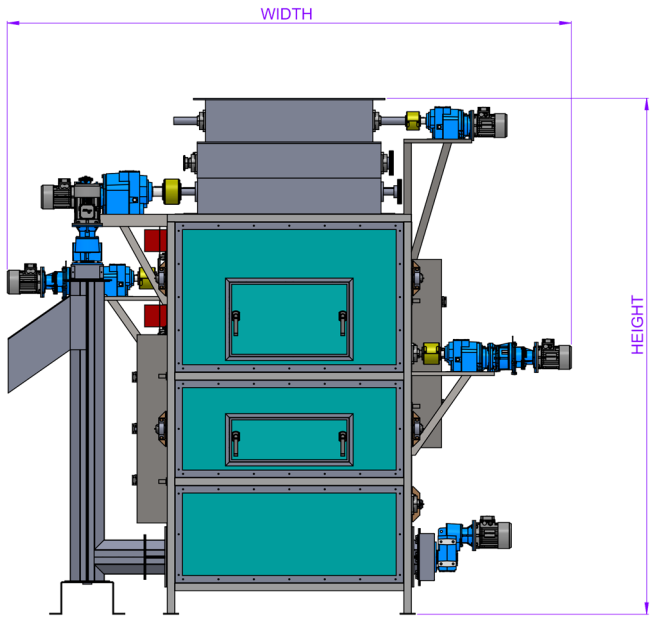
Dryer Specification(Continuous)

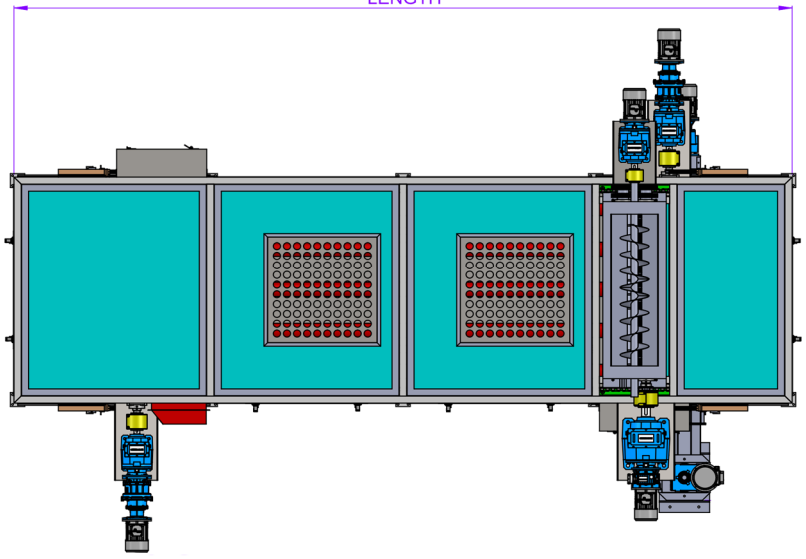
Model	C3.0T	C6.0T	C9.0T	C12.0T	C15.0T
Operation method	**Continuous**				
Power Supply requirement **(Amps)**	**85**	**160**	**250**	**350**	**400**
Air Supply requirement **(Pressure only, bar)**	**2-3bar @ dry air at 15 to 20°C or ½" connection**				
Water supply requirement	**35 liter/min @ 2 bar or 1" water supply @ 2 bar**				
Condensate water to WWTP **(gravity flow type)**	**2" PVC piping**				
Noise **(Decibels)***	**80 to 90 DB**				
Panel control*	**Panel c/w HMI flow diagram and monitoring parameter and setting**				
Wet sludge input capacity (**kg/day)***	3000	6000	9000	12000	15000
Moisture infeed **(%)**	**75 to 83**				
Weight reduction **(%)**	**40 to 60**				
Operation Consumption **(kwhr/kg wet sludge)**	**0.30 to 0.35**				
Power Consumption **(kwhr/day)**	1008	1860	2904	3768	4608
Water Removal Rate **(kwhr/kg water)**	0.672	0.620	0.645	0.628	0.614

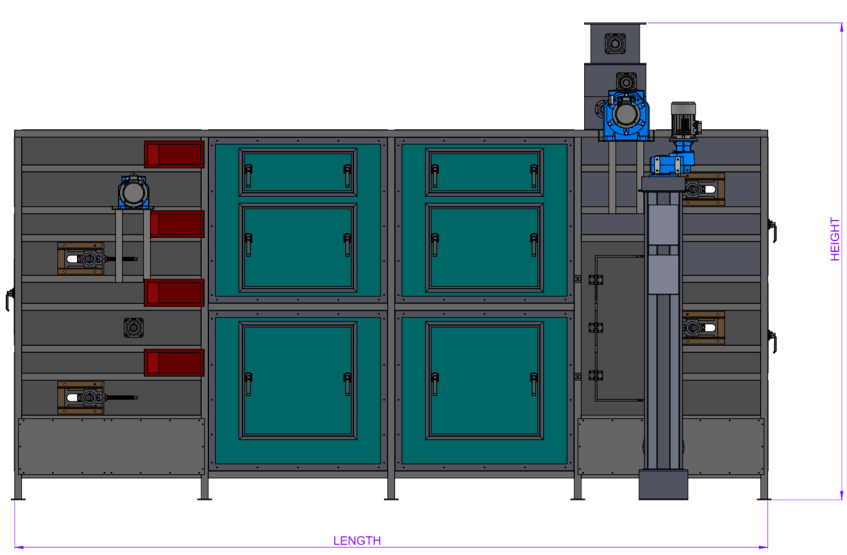
*Note:
1.Assume specific gravity of sludge is 1,150kg/m^3 @ moisture 83%. 2.Noise measurement are measuring 1 meter from the machine. 3.Panel and equipment requirement and installed are for 415V/3 phase/50 Hz c/w neutral. 4.A customized model will be produced if requirement defers from above specification.

Sludge Dryer Specification









Continuous Dryer Drying Chamber Model

Dryer Specification(Continuous)

Model	**C3.0T**	**C6.0T**	**C9.0T**	**C12.0T**	**C15.0T**
Quantity of Hot Air Generator (HAG)	1	2	3	4	5
Hot Air Generators*					
Total Height (**mm**)	2800	2800	2800	2800	2800
Total Width (**mm**)	2100	2100	2110	2110	2110
Total Length (**mm**)	2600	6000	9400	12,800	16,200
Quantity of Drying Chamber (DC)*	1	1	2	2	2
Height (**mm**)	3430	3430	3430	3430	3430
Width (**mm**)	3815	3815	3815	3815	3815
Length (**mm**)	4450	7450	5950	7450	8950
Quantity of sludge shredder	1	1	2	2	2
Quantity of discharge screw conveyor	2	2	3	3	3
Quantity of inter-DC screw conveyor	0	0	2	2	2
Quantity of gearmotor	6	6	11	11	11

*Note:
1.A customized model will be produced if requirement defers from above specification. 2.The total length and width arrangement are base on our Watterson suggested arrangement. Any plant lay-out which is differ, Watterson position the equipment accordingly.