

# EQUIPMENT LIST

## Project: Granulation Plant

Equipment Tag	Description	Service	Material	Specifications	Rated Power [kW]	Inverter	Comments
D1	Raw Material Feed Hopper	Storage of raw material loaded by wheel loader.	Carbon Steel	Length: 4320 mm Width: 2400 mm Height: 2800 mm Volume: 9 m <sup>3</sup>	n.a.		1. The hopper is equipped with 4 compression load cells.
D2	Water Storage Tank	Storage of water supplied from the well.	AISI 304	Diameter: 1000 mm Height: 2098 mm Volume: 1.5 m <sup>3</sup>	n.a.		2. The water tank is equipped with a level transmitter and a level switch.
D3	Discharge Hopper for Material from R1	Temporary storage of the material discharged from R1.	Carbon Steel	Length: 2370 mm Width: 2890 mm Height: 2800 mm Discharge Angle: 38° Volume: 10 m <sup>3</sup>	n.a.		3. The hopper must be internally lined to allow easier discharge of the wet material. Manholes or hand-holes are to be provided for maintenance and inspection.
D4	Recycle Product Surge Tank	Temporary storage of product to be recycled (dried granules <2mm and >5mm, milled).	AISI 304	Length: 1340 mm Width: 1240 mm Height: 1100 mm Volume: 0.7 m <sup>3</sup>	n.a.		4. The hopper is equipped with a level switch.
D5	Binder Dosing Hopper	Weighing hopper for binder storage.	AISI 304	Diameter: 1400 mm Height: 2010 mm Discharge Angle: 21° Diameter discharge outlets: 300 mm Volume: 1.5 m <sup>3</sup>	n.a.		5. The hopper is equipped with 3 load cells positioned at 120° from each other. The hopper is internally lined to allow easier discharge of the wet material.
D6	Recycle Product Dosing Hopper	Weighing hopper for storage of the product to be recycled.	AISI 304	Diameter: 1400 mm Height: 2810 m Discharge Angle: 21° Diameter discharge outlets: 300 mm Volume: 1.9 m <sup>3</sup>	n.a.		7. The hopper is equipped with 3 load cells positioned at 120° from each other. The hopper is internally lined to allow easier discharge of the wet material. The hopper is equipped with a frame with a walkway platform and access via a ship's ladder.
D7	Dried Compressed Air Storage Tank	Storage of dried compressed air.	Painted Carbon Steel	Diameter: 1000 mm Height: 2305 mm Volume: 1.5 m <sup>3</sup>	n.a.		
D8	Big Bag Emptying Structure	Storage and dosing of the binder.	AISI 304	Length: 1650 mm Width: 1650 mm Height from the ground: 4.515 mm	n.a.		10. In the height calculation, approximately 250 mm have been allowed for big bag insertion. Maximum big bag dimensions: 1.1x1.1 m; height: 1.8 m with extended straps. 11. Maximum big bag weight: 1500 kg. The machine has a kneading/massaging system controlled by a dedicated control unit, and an electric vibrator VDB.
D9	Horizontal LPG Storage Tank	Underground storage of LPG (liquid phase).	Carbon Steel	Length: 5900 mm Diameter: 1700 mm Height: 1850 mm Volume: 12.5 m <sup>3</sup>	n.a.		13. The tank is above sea level but buried; externally there are a vaporizer, a boiler serving the vaporizer, plant connection piping, and a fiscal meter.
T1	Raw Material Extractor Conveyor from D1	Conveys raw material from D1 to P1.	Carbon Steel	Flow rate: 15 ton/hr Length: 5400 mm Outside Width: 720 mm Roller Diameter: 420 mm	7.5	X	14. Existing belt conveyor, refurbished and equipped with an inverter (VFD).
T2A	Raw Material Conveyor Belt	Conveys raw material from P1 to T2B.	Painted Carbon steel	Flow rate: 15 ton/hr Length: 6700 mm Width: 550 mm Inclination: 7° Height from the ground: 190 mm Height from ground to outlet: 850 mm	0.75	X	15. The conveyor belt is made of white polyurethane. The belt speed can be adjusted via inverter (VFD).
T2B	Bucket Elevator Feeding R1	Conveys raw material from T2A to R1.	Painted Carbon steel	Flow rate: 15 ton/hr Lower horizontal side Length: 1895 mm Vertical central side Length: 8380 mm Upper horizontal Length: 4895 mm Width tunnel: 865 mm Height tunnel: 565 mm	1.5		The structure is equipped with 4.5 buckets per meter, with a capacity of 5.6 liters at 60% fill level. The buckets are made of A304 stainless steel. The bucket elevator speed is 12.5 m/min.
T3	Vibrating Extractor Below Hopper D3	Extracts wet granules from D3 to T3A.	Painted Carbon steel	Flow rate: 8 ton/hr Length totale ingombro: 1240 mm Width totale ingombro: 880 mm Overall Height: 1100	0.75 0.75		The vibrating extractor is equipped with 2 vibrating masses.
T3A	Wet Granule Conveyor Belt	Conveys wet granules from T3 to T3B.	Painted Carbon steel	Flow rate: 8 ton/hr Length: 8000 mm (circa) Width: 550 mm Inclination: 7° (circa) Height from the ground: 750 mm Height from ground to outlet: 500 mm (about)	0.75	X	The conveyor belt is made of white polyurethane. The belt speed can be adjusted via inverter (VFD).
T3B	Bucket Elevator Feeding Dryer B1B	Conveys wet granules from T3A to B1.	Painted Carbon steel	Flow rate: 8 ton/hr Lower horizontal side Length: 3945 mm Central vertical side Length: 3115 mm Upper horizontal side Length: 3945 mm Width tunnel: 618 mm Height tunnel: 565 mm Flow rate: 1 ton/hr	1.1		The bucket elevator is provided with two discharge outlets, one of which is an emergency outlet in case the granulated material does not meet the required specifications.

T4	Fine Dust Discharge Screw Conveyor from Filter F4	Conveys fine dust from filter F4 to rotary valve PD4.	S235 Steel	Feeding pipe Diameter: 250 mm horizontal Length : 2600 mm Load outlet Diameter (da F4): 2250 mm Discharge outlet Diameter (a PD4): 250 mm	0,75	
T5	Vibrating Tubular Duct with Inlet Ports from B1B and PD4	Conveys dried granules and fine dust from B1B and PD4 respectively to T6A.	Carbon Steel	Flow rate: 8 ton/hr Distance between load inlet and discharge outlet : 4135 mm Pipe Diameter: 250 mm Discharge outlet Diameter : 250 mm Height from the ground (vibration mass included): 890 mm	0,64 0,64	The tubular duct has 2 vibrating masses and 2 inlet ports (from the dryer and from the filter). There is also a 120 mm suction nozzle.
T6A	Conveyor Belt for Product to be Screened	Conveys product to be screened from T5 to T6B.	Ferro zincato	Flow rate: 8 ton/hr Length: 10500 mm Width: 400 mm Inclination: 6° Distance between loading inlet to the ground: 1132 mm Distance from discharge outlet and the ground: 1203 mm	1,5	
T6B	Redler (Chain Conveyor) for Product to be Screened to T7	Conveys product to be screened from T6A to T7.	Carbon Steel	Flow rate: 8 ton/hr Total Length (both tilted and straight segments): 6000 Mm Inclination Angle: 30° Case Dimension: 300x350 mm Feeding section Area: 300x110 mm Distance of the discharge outlet from the ground : 900 mm	1,1	Forged chain with 101.6 mm pitch, 3 guides in Hardox. 3 inspection hatches, 1 standard round inlet, 1 standard hopper-type outlet, 1 rotation sensor, and 1 high-level (overflow) sensor. The redler (chain conveyor) speed is 0.25 m/s.
T7	Bucket Elevator Feeding P5	Conveys product to be sieved from T6B to P5.	Carbon Steel	Flow rate: 8 ton/hr Lower horizontal side Length: 1936 mm Central vertical side Length: 7610 mm Upper horizontal side Length: 1950 m Width tunnel: 415 mm	0,37	
T8	Finished Product Conveyor Belt	Conveys finished product from P5 to the storage bay.	Carbon Steel	Flow rate: 6 ton/hr Length: 10840 mm Width: 800 mm Height: 970 mm Height from the ground 2500 mm	1,5	The conveyor is equipped with load cells to monitor the amount of product obtained per batch.
T8A	Screw Conveyor for Product to be Recycled	Conveys product to be recycled from D4 to T9.	AISI 304	Flow rate: 6 ton/hr Pipe4 section Diameter s: 206 mm Horizontal part Length : 2550 mm Load outlet Diameter (da D4): 306 mm Discharge outlet Diameter (a T19): 200 mm	2,0	A proximity-type rotation sensor is present.
T9	Aeromechanical Elevator Conveyor to D6	Conveys product to be recycled from T8A to D6.	AISI 304	Flow rate: 6 ton/hr Tilted segment's Length : 6000 mm Height to inclined outlet d78 mm from the ground): 5800 m Pipes Diameter (2): 114 mm Width: 550 m Load outlet Diameter (da T8A) e Outlet D6): 200 mm	3,0	A proximity-type rotation sensor is present.
T10A	Connecting Screw Conveyor from D6	Conveys product to be recycled from D6 to T11.	AISI 304	Flow rate: 6 ton/hr Pipe Diameter 200 mm horizontal part Length: 2000 mm Load outlet Diameter (da D6): 300 mm Discharge outlet Diameter (a T11): 200 mm	2,2	A proximity-type rotation sensor is present.
T10B	Connecting Screw Conveyor from D5	Conveys binder from D5 to T11.	AISI 304	Flow rate: 6 ton/hr Feeding pipe Diameter: 200 mm horizontal part Length: 2000 mm Load outlet Diameter (da D5): 300 mm Discharge outlet Diameter (a T11): 200 mm	2,2	A proximity-type rotation sensor is present.
T11	Horizontal Aeromechanical Conveyor for Product to be Recycled and Binder	Conveys, in alternating phases, the product to be recycled coming from T10A and the binder coming from T10B, up to T12.	AISI 304	Flow rate: 12 ton/hr Total horizontal Length: 6730 mm Pipe Diameter (2): 114 mm Width: 546 mm Load outlet Diameter (da T10A, T10B) e scarico (a T12): 200 mm	3,0	A proximity-type rotation sensor is present, along with provision for a pneumatic vibrator.
T12	Aeromechanical Elevator Conveyor for Product to be Recycled and Binder from T11	Conveys, in alternating phases, the product to be recycled and the binder coming from T11, up to T13.	AISI 304	Flow rate: 12 ton/hr Length totale (in verticale): 8800 m Pipe Diameter (2): 114 mm Width: 546 mm Load outlet Diameter (from T11) Outlet (at T13): 200 mm	3,0	A proximity-type rotation sensor is present.
T13	Aeromechanical Conveyor for Product to be Recycled to R1	Conveys, in alternating phases, the product to be recycled and the binder coming from T12, up to R1.	AISI 304	Flow rate: 12 ton/hr Total Length (alongside inclination) : 7120 mm Inclinazione: 60° (circa) Pipes Diameter (2): 114 mm Width: 546 mm Load outlet Diameter (from T12) and Outlet (at R1): 200 mm	3,0	A proximity-type rotation sensor is present, along with provision for a pneumatic vibrator.
T14	Binder Screw Conveyor from D8	Conveys binder from D8 to T15.	AISI 304	Flow rate: 12 ton/hr Feeding pipe Diameter: 200 mm horizontal part Length: 1450 mm Vertical part Length: 500 mm Load outlet Diameter (from D8): 400 mm Discharge outlet Diameter (a T15): 200 mm	2,2	A proximity-type rotation sensor is present.
T15	Aeromechanical Binder Conveyor to D5	Conveys binder from T14 to D5.	AISI 304	Flow rate: 12 ton/hr Tilted segment Length : 5000 Mm Height to Outlet (68° inclination angle from the ground): 4800 mm Pipes Diameter (2): 114 mm	2,2	A proximity-type rotation sensor is present.

				Width: 550 mm Load outlet Diameter (from T14) e scarico (at D5): 200 mm			
P1	Breaker/Crusher	Breaks up any aggregates of various sizes present in the raw material from T1 to T2A.	Painted Carbon steel	Flow rate: 15 ton/hr Height: 1700 mm Length: 800 mm Width: 800 mm Height from the ground: 1000 mm Feeding section Area: 500 x 500 mm Load outlet Diameter (from T1) and Outlet (at T2A): 400 mm	4.0		
P2	Combustion Air Fan	Draws air from the external environment and sends it to the burner for combustion with the vaporized LPG.	S235 Steel	Gas Flow rate: 8500 m3/hr Propeller speed: 2944 rpm Suction/Discharge Pressure Differential: 3632 Pa	15.0	X	The fan is located outside the structure. The sound pressure level is 85 dB.
P3	Cooling Air Fan	Draws air from the internal environment and feeds it into the final section of the dryer to cool the dried product before discharge.	S235 Steel	Gas Flow rate: 6100 m3/hr Propeller speed: 2944 rpm Suction/Discharge Pressure Differential: 2852 Pa	7.5		The fan is located inside the structure. The sound pressure level is 85 dB.
P4	Extraction Fan F4	Extracts the exhaust combustion gas coming from F4 and sends it to stack B2.	S235 Steel	Gas Flow rate: 17800 m3/hr Propeller speed: 2944 rpm Suction/Discharge Pressure Differential: 3859 Pa	30.0	X	The fan is located inside the structure. The sound pressure level is 85 dB.
P5	Vibrating Screen	Sorts the dried granules coming from T7 into the following size ranges: >5 mm (to be milled and recycled); 2-6 mm (finished product); <2 mm (to be recycled).	Carbon Steel	Length: 1600 mm Width: 2250 mm Height: 2580 mm Inclination: 12° (circa) Feeding inlet Diameter to be measured Discharge outlet Diameter to be measured	Motor 1: 3.5 Motor 2: 3.5		
P6	Oversize Granule Grinding Mill	Mills the oversize granules (>5mm) coming from P5 before they are stored for recycling in D4.	Carbon steel casing, impeller made of 34NiCrMo16 steel	Flow rate: 3 ton/hr Overall Length including motor: 1930 mm Overall Width including motore: 1250 mm Height: 1300 mm Load outlet Diameter: 400 mm	37.0	X	The mill is a pin (hammer-pin) mill and is equipped with an inverter (VFD).
P7	Compressor	Draws in and compresses air from the internal environment.		Flow rate: 177 m3/hr Length: 1130 mm Width: 780 mm Height: 1250 mm Compression Rate (Suction/Discharge)=11 bar Propeller speed: 2940 rpm	22.0		The compressor is capable of delivering air at a nominal pressure of 11 bar absolute, but the discharge pressure at which it will operate in the plant will be 5 bar.
F4	Bag Filter After Dryer	Filters fine solid particles carried in the exhaust gases during drying and discharges most of them into T5.	S235 Steel (powder painted)	Filtering pockets Number: 135 Length: 3500 mm Width: 2300 mm Height: 9500 mm Filtration Area: 236 m2	n.a.		The filter bags have a diameter of 0.16 meters and a length of 3.4 meters. The filter bags are made of PES/PES 550. Automatic bag shaking/cleaning system using compressed air.
F5	Bag Filter After Hopper D5	Filters fine solid particles carried in the exhaust gases during drying and discharges most of them into T5.	Carbon Steel/ AISI 304	Length: 328 mm Height: 912 mm Diameter: 378 mm Filtering Area: 1 m2	n.a.		Filter cartridge made of pleated non-woven polyester with nanofiber. Filter cleaning control unit equipped with FILCONTROL CONNECT with differential pressure monitoring.
E7	Compressed Air Dryer	Removes moisture from the compressed air produced in P7 and discharges it into D7.	Carbon Steel	Length: 780 mm Width: 740 mm Height: 950 mm	1.1		Non-industrial current and voltage rating: 6.3 A and 230 V.
B1A	Burner for Hot Gas Generation	Produces hot gas to be blown into the bottom of B1B.	Carbon Steel	Design heated gas Volume: 7900 Nm3/hr Length: 1300 mm Width: 850 mm Height (from the ground): 1300 mm	Total Design: 1000 kW (termica) Design: 920 kW (termica)		The fuel (in this case LPG from D9) must reach the burner gas train at a pressure of 200 to 350 mbar g.
B1B	Fluid Bed Dryer	Dries the wet granules coming from T3B.	Steel 14301 and S235 Steel	Length: 6800 mm Width: 1500 mm Height: 2450 mm Height (from the ground): 3200 mm	2.0 2.0	X	The dryer is sized to reduce the free moisture content of the incoming wet granules from 12% to 2%: the required nominal thermal power is 1000 kW. Two vibrating motors.
B2	Emission Discharge Stack from P4	Releases the exhaust gas to atmosphere (fine particulate content <10 mg/Nm3).	Carbon Steel	Flow rate: 17800 m3/hr Height from the ground: 13000 mm Diameter: 600 mm	n.a.		The exhaust gases discharged to atmosphere have a fine particulate content of <10 mg/Nm3, in accordance with applicable environmental regulations. 2 sampling ports are provided.
B3	Emission Discharge Piping from F5	Conveys the filtered air from F5 to atmosphere (fine particulate content <10 mg/Nm3).	Polipropilene	Height (from F5): 3000 mm (about) Diameter: 50 mm	n.a.		The filtered air discharged to atmosphere has a fine particulate content of <10 mg/Nm3, in accordance with applicable environmental regulations. 1 sampling port is provided.
R1	Mixer/Granulator R24	Mixes and granulates the raw material coming from T2B and discharges the wet product into D3.	Painted Carbon steel	Flow rate: 15 ton/hr Pan Diameter: 2.55 m Height to Inlet: 2 m Height totale: 3 m Inclination: 20° Volume: 2.25 m3	Motor1 del pan: 15 Motor2 del pan: 15 Rotor Motor: 55 Hydraulic power pack : 4 Fan: 1,1	X X X X	
PD4	Rotary Valve for Dust Discharge from Filter	Discharges the fine dust filtered by FP4 and conveyed from T4, into T5.	S235 Steel	Flow rate: 1 ton/hr Discharge outlet Diameter : 250 mm	0.75		
VD8	Electric Vibrator for D8	Facilitates the flow and dosing of the binder from D8 to T14.	AISI 304/AISI 316	Centrifugal Force: 407 Kg	0.27		
VD9	Electric Vibrator for T9	Facilitates the flow and dosing of the product to be recycled through T9.	AISI 304/AISI 317	Centrifugal Force: 66 Kg	0.09		
VD12	Electric Vibrator for T12	Facilitates the flow and dosing of the product to be recycled and the binder through T12.	AISI 304/AISI 318	Centrifugal Force: 66 Kg	0.09		
VD15	Electric Vibrator for T15	Facilitates the flow and dosing of the binder through T15.	AISI 304/AISI 319	Centrifugal Force: 66 Kg	0.09		
G1	Centrifugal Water Feed Pump	Conveys well water from D2 to R1.	Carbon Steel	Flow rate: 1.2 - 6 m3/hr Head: 22 - 54 m Propeller speed: 2900 rpm	1.1	X	The pump is equipped with a manual bypass control valve. There is also a spray nozzle located upstream of the discharge piping, inside R1.