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Data Sheet For Cleaner Flotation Cells
(CL),3/4-33-3102-01 ~ 03

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Sheet	Revisions							Sheet	Revisions						
	00	01	02	03	04	05			00	01	02	03	04	05	
1	X	X						31							
2	X	X						32							
3	X	X						33							
4	X	X						34							
5	X	X						35							
6	X	X						36							
7	X	X						37							
8	X	X						38							
9	X	X						39							
10	X	X						40							
11		X						41							
12		X						42							
13		X						43							
14		X						44							
15		X						45							
16		X						46							
17		X						47							
18		X						48							
19		X						49							
20								50							
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1. CLEANER FLOTATION CELLS & AGITATOR DATASHEET

No.	Description	Units	Value
General data			
1	Quantity	#	3 Operational & 0 Standby
2	Tag No. / Location (indoors/ outdoors)	-	CL 3-33-3102-01~03 /Indoor AG 3-33-2403-01~03/Indoor
3	Application Description	-	CLEANER FLOTATION CELL
Process / Operating Conditions			
Material Processe			
4	Type of cell	-	force-air supply (VTC)
5	Cell arrangement	-	1*F-1-1-1
6	aeration	%	85
7	Bank design residence time (Nominal- Design)	mins	15.6-18
8	Number of cells	#	3
9	Number of banks	#	1
10	Number of cells per each bank	#	3
11	Total each bank volume	m ³	600 (VTC)
12	Cell volume	m ³	200 (VTC)
13	Air flow per cell	Nm ³ /h	VTS
14	Total Air Required	Nm ³ /h	VTS
15	Air pressure	kPa	VTS
Feed			
16	Mineralogy	-	Copper ore
17	Particle size d80	µm	38
18	Slurry pH	-	12.5
19	Slurry Density	t/m ³	1.15

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No.	Description	Units	Value
20	Solid Density	t/m ³	3
21	Solid content	%(m/m)	19.35-19.47
22	Solid rate total per bank (design)	dmt/h	435.33
23	Solid rate total per bank (nominal)	dmt/h	377.29
24	Slurry rate total per bank (design)	m ³ /h	1946.2
25	Slurry rate total per bank (nominal)	m ³ /h	1698.71
Concentrate			
26	Recovery	%	90
27	Solid rate total per bank (design)	dmt/h	75.52
28	Solid rate total per bank (nominal)	dmt/h	65.45
29	Slurry rate total per bank (design)	m ³ /h	389.15
30	Slurry rate total per bank (nominal)	m ³ /h	337.26
31	Solid content	%(m/m)	17
Tails			
32	Solid rate total per bank (design)	dmt/h	359.81
33	Solid rate total per bank (nominal)	dmt/h	311.83
34	Slurry rate total per bank (design)	m ³ /h	1672.87
35	Slurry rate total per bank (nominal)	m ³ /h	1449.83
36	Solid content	%(m/m)	18-20
37	Reagents		Not Required (WFL)
38	C4132	g/t	-
39	C2430	g/t	-
40	MIBC	g/t	-
41	F742	g/t	-
42	FUEL OIL	g/t	-

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No.	Description	Units	Value
43	SIPX	g/t	-
Mechanical Information			
Tank specs			
44	Type	-	cylindrical (VTC)
45	Height/diameter (overall)	mm	VTs
46	Height (Wetted)	mm	VTs
47	Cell Dimension	mm	VTs
48	Internal Wear Lining type	-	Rubber
49	Shell Thickness	mm	10 (VTC)
50	Base Thickness	mm	14 (VTC)
51	Discharge Nozzles	#	VTs (See NOTE 19)
52	Discharge Nozzle Size	mm	VTs (See NOTE 19)
53	Drain Nozzle Size	mm	VTs (See NOTE 19)
54	External Tank Surface Protection type	-	VTs
55	Internal wear Lining Thickness	mm	VTs
56	Launder Spray System-	-	Included (VTC)
57	Launder Spray System type	-	Water Spray (VTC)
58	Overflow (double or single)	-	Single (VTC)
59	Overflow arrangement	-	VTs
60	Frothing paddle	Yes/No	VTs
61	Min. Head Room Required for Installation	mm	VTs
62	Another requirement	-	According to Cu grade in last cleaner cells and first cleaner-scavenger cells, number of cleaner and cleaner-scavenger cells could be changed to 4-3 or 3-4 cells. (VTC)

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No.	Description	Units	Value
Launder Specs			
63	Launder Type (outside/inside)	-	VTs
64	Radial Launderers	-	Yes or no
65	Radial Launderers per Tank	#	VTs
66	Radial Launder Lip Length	mm	VTs
67	Total Available Lip Length (approx.)	mm	VTs
68	Launder Dimension	mm	VTs
69	Diameter	mm	VTs
70	Slope to Discharge	degree	VTs
71	Wear Lining type	-	VTs
72	Wear Lining Thickness	mm	VTs
73	Junction Box Dimension (L/W/H)	mm	If needed (VTs)
74	Tail Box Dimension (L/W/H)	mm	VTs
75	Elevation Drop Between Cells	mm	VTs
Feedbox specs			
76	Shape	-	Square or cylindrical (VTs)
77	Height	mm	VTs
78	Diameter	mm	VTs
79	Wear Lining type	-	Rubber
80	Wear Lining Thickness	mm	6 (VTC)
81	Mass	kg	VTs
82	Pulp Height Above Cell Pulp	mm	VTs
83	Inlet Nozzle Type	-	Nozzle or Square Flange or etc. (VTs) (See NOTE 19)
84	Inlet Nozzle Dimensions	mm	VTs (See NOTE 19)
85	Outlet Nozzle Type	-	Nozzle or Square Flange or etc. (VTs) (See NOTE 19)

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No.	Description	Units	Value
86	Outlet Nozzle Dimensions	-	VTS (See NOTE 19)
Cell discharge valves			
87	Number of Discharge Valves Per Cell	#	2 (VTC)
88	Valve type	-	External Dart (VTC)
89	Valve size	-	VTS
90	Valve Seat Materials of Construction	-	VTS
91	Valve cone Material	-	VTS
92	Valve Materials of Construction	-	VTS
Bearings			
93	Type / brand	-	VTS
94	Diameter	mm	VTS
95	Life	hours	VTS
V-belt drive (IF REQUIRED)			
96	Supplier & Model	-	VTS
97	Reduction Ratio	-	VTS
98	Safety Factor on Motor	-	VTS
Agitator & Stator			
99	Rotor type	-	VTS
100	Installed Power (each cell)	kW	VTS
101	Total Power (for all cells)	kW	VTS
102	Rotor Size	mm	VTS
103	Stator size	mm	VTS
104	Speed	rpm	VTS
105	Peripheral speed	m/s	VTS
106	Rotating Direction	-	Bidirectional (VTC)
107	Agitator Material	-	VTS
108	Stator Material & Thickness	-	VTS
109	Shaft Diameter	mm	VTS
110	Shaft length	mm	VTS

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No.	Description	Units	Value
111	Shaft Material	-	VTS
Plate work			
112	Tank Wall Thickness	mm	VTS
113	Tank Bottom Thickness	mm	VTS
114	Junction Box Plate Thickness	mm	VTS
115	Plate Material	-	VTS
116	Liner Material	-	VTS
Coating specification			
117	Wetted & Non-Wetted Parts	-	VTS
weights			
118	Tank	kg	VTS
119	Mechanism	kg	VTS
120	Motor	kg	VTS
121	Heaviest Item During Installation	kg	VTS
122	Heaviest Item During Maintenance	kg	VTS
I&C information			
Instrumentation			
123	Level control system	-	Required (VTC)
124	Level Control Valve Type	-	Vertical (VTC)
125	Dart Valve Size	mm	VTS
126	Dart Valve Shape	-	VTS
127	Number of Dart Valve per cell	#	VTS
128	Actuator Manufacturer	-	According to AVL
129	Actuator Model	-	VTS
130	Actuator Type	-	Linear (VTC)
131	Level Instrument Type	-	VTS
132	Level Instrument Model	-	VTS

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No.	Description	Units	Value
133	Flow meter for air	-	Required or not required (VTS)
134	Air Control Valve type	-	VTS
135	Temperature for air (flow compensation)	-	Required or not required (VTS)
136	pressure for air (flow compensation)	-	Required or not required (VTS)
137	Air Control Valve Manufacturer	-	VTS
138	Air Control Valve Size	mm	VTS
139	Actuator Manufacturer	-	VTS
140	Actuator Model	-	VTS
141	Actuator Type	-	VTS
142	Density measurement system	-	Not required (VTC)
143	Bubble size detector and control system (froth vision)	-	Required or not required (VTS)
144	Conductivity measurement system	-	Not required (VTC)
145	Temperature measurement system	-	Not required (VTC)
146	pH measurement system	-	Not required (VTC)

ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
1. General				
1.1	Equipment tag No		AG 3-33-2403-01~03	
1.2	Equipment Name		CLEANER FLOTATION CELL	
1.3	Application Description		FLOTATION MACHINE	
1.4	Quantity		3	
1.5	Equipment Supplier			
2. ELECTRICAL CHARACTERISTICS				

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ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
2.1	Cable Entry info.		Will be Informed to Vendor after contract	
2.2	Industrial Type		Heavy Duty	
2.3	Earthing System		Solidly Earthed-TN -S	
2.4	Location / Service		Outdoor/Indoor Area	
2.5	Installation		Horizontal/Vertical	
2.6	Torque Characteristics		See Note 10	
2.7	Service Factor		1.15 (VTC)	
2.8	Motor Type		Squirrel Cage Induction Motor	
2.9	Manufacturer		As per Approved Vendor List (In otherwise acc. to project agreements)	
2.10	Stator Winding		6 lead (suitable for wye-delta starting)	
2.11	Winding Material (Stator/ Rotor)		Copper (See Note 8)	
2.12	Winding Type (Form/Random)		Form	
2.13	Duty Cycle		S1 (Continuous)	
2.14	Insulation Class / Temp. Rise		F/B	
2.15	Voltage, Variations	V	400V±5%, 3ph (VTC)	
2.16	Frequency, Variations	HZ	50HZ±2% (VTC)	
2.17	Rated Current	A	By vendor	
2.18	Number of Poles		By vendor	
2.19	Power Rating (Name Plate Rating)	kW	See Note 1, NOTE 19	
2.20	Absorbed Power	kW	VTS	
2.21	Power Factor	%		
	@2/4 Load		VTS	
	@3/4 Load		VTS	
	@Full Load		VTS	
	Locked Rotor		VTS	
2.22	Efficiency	%	Premium Efficiency	
	Efficiency Classification (IE Code)		Min. IE3	
	@2/4 Load		VTS	
	@3/4 Load		VTS	

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ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
	@Full Load		VTs	
	Locked Rotor		VTs	
2.23	Speed	rpm		
2.24	Starting Method		▪D.O.L □ VFD (See Note 3)	
2.25	Starting Current (L.R.C)	A	VTs	
2.26	Acceleration Time	Sec	VTs	
2.27	Full Load Torque	N.m	VTs	
2.28	Starting Torque	% FLT	VTs	
2.29	Max.Torque	% FLT	VTs	
2.30	Pull-Up Torque / Break Down Torque	%	VTs	
2.31	Driven load moment of inertia GD2		VTs	
	Rotor	Kg.m ₂	VTs	
	Load	Kg.m ₂	VTs	
2.32	Withstand Fault Current		VTs	
	Main Terminal Box	(kA) / Durati on Time	VTs	
	Auxiliary Terminal Box	(kA) / Durati on Time	VTs	
2.33	No. of Starting per Hour		(See Note 15)	
	From Cold		3 (VTC)	
	From Hot		2 (VTC)	
2.34	Time interval between two Consecutive starts			
	From Cold		VTs	
	From Hot		VTs	
2.35	Permissible locked rotor time (s)			
	@ 100% voltage		VTs	
	@ 80% voltage		VTs	

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ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
2.36	Torque-Speed Characteristics Curves (At 100% & 80% Rated Voltage)		VTs	
2.37	Current-Speed Characteristics Curves (At 100% & 80% Rated Voltage)		VTs	
2.38	Thermal Limit Curves (At 100% & 80% Rated Voltage)		VTs	
2.39	Power factor versus speed curves (At 100% & 80% Rated Voltage)		VTs	
2.40	Max Locked Rotor Current at Rated Volts (%FLA)		ACC. To IEC60034-6	
3. PROTECTION AND MEASUREMENT				
3.1	Motor Enclosure IP			
	Hazardous Area		IP65, explosion proof as per area classification (See Note 9)	
	Non-Hazardous Area		IP55 according to IEC 60034-5 (See Note 9)	
3.2	Terminal Boxes IP		IP55	
3.2	PT100 / PTCs (Thermistors) For Motor Windings		A) 45KW ≤ Motors ≤ 132KW → 3×PTC B) 132KW < Motors → 6×PT100 (See Note 5)	
3.3	PT100 for Motor Bearing		132KW < Motors → 2×PT100 (See Note 5)	
3.4	Setpoint Data for Winding PTCs			
	Alarm	°C	130	
	Trip	°C	150	
3.5	Noise Level		Less than 85 dBA @ 1m	
4. MECHANICAL CHARACTERISTIC				

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ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
4.1	Motor Mounting		VTs	
4.2	Enclosure/Frames		Cast Iron	
4.3	Frame Reference		VTs	
4.4	Frame Earth Bus		Required	
4.5	Cooling Method		Cooling Method For Motor: TEFC (IC410 or IC411) Cooling Method For VFD Motor: (IC411 or IC416) (See Note 6)	
4.6	Rated Power for VFD Motor's External Fan	KW	VTs □400V □ 230V	
4.7	Fan material		Non-Sparking Design/ Corrosion Resistance/ Bi-directional/ Brass/Bronze/Aluminium	
4.8	Bearing Type and Material (For DE & NDE)		Anti-Friction type VTC	
4.9	Max. Bearing Housing vibration velocity	m/sec	Acc. to IEC 60034-14	
4.10	Max. Shaft vibration Displacement	mills p-p	Acc. to IEC 60034-14	
4.11	Bearing Life		Not less than 50,000 hours VTC (See Note 16)	
4.12	Lubricating			
	Grease/Oil/ Other		Grease with premium grade (For outdoor services it shall be selected based on the Minimum ambient temp.)	
	Self / Forced		Self- Lubricated	

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ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
	Grease Relief Port (For regreasable Bearings)		Required	
	Bearing Lubrication Interval (Hour)		VTs	
4.13	Power Terminal Box			
	Type		VTs	
	Cable Box Entry		ISO Metric Threaded	
	Location From DE (TOP/LHS/RHS)		(See Note 12)	
	Direction of Cable Entrance		(See Note 12)	
	Internal ground Stud		Yes	
4.14	Terminal Box for PTC/PT100 Sensors		Yes	
	Location From NDE (LHS/RHS)		By vendor	
	Direction of Cable Entrance		Bottom	
4.15	Terminal Box for Space Heater		Yes, Space Heater is required for Motors Above 132kw	
	Location From DE (LHS/RHS)		RHS	
	Direction of Cable Entrance		Bottom	
	Space Heater		230VAC	
4.16	Base Plate		VTs	
4.17	Outline Dimension	m	VTs	
4.18	Motor Weight	kg	VTs	
4.19	Lifting Eye		(See Note 13)	
4.20	Name plate		Stainless Steel	

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ITEM	Description	UNIT	PURCHASER'S REQUIREMENTS	VENDOR'S RESPONSE
4.21	Painting Colour		(See Note 17)	

2. RECOMMENDED BLOWER FOR FLOTATION CIRCUIT DATASHEET

Blower Specification for CLEANER CELLS				Vendor data
1	No. Blower Required	--	2 (VTC)	
2	No of Working / Standby	--	1 working / 1 standby (VTC)	
3	Blower Air Flow	Am3/h	5760 (VTC)	
4	Blowers Air Pressure	kPa	55 (VTC)	
5	Power:	kW	VTS	
6	Blower Type:	--	VTS	
7	VFD	--	Yes or no (VTS)	
Blower Specification for RE-CLEANER & RE-RE-CLEANER CELLS				Vendor data
1	No. Blower Required	--	2 (VTC)	
2	No of Working / Standby	--	1 working / 1 standby (VTC)	
3	Blower Air Flow	Am3/h	2940 (VTC)	
4	Blowers Air Pressure	kPa	30 (VTC)	
5	Power:	kW	VTS	
6	Blower Type:	--	VTS	
7	VFD	--	Yes or no (VTS)	

Notes:

- Rated Power shall be delivered at site condition or height & temperature de-rating factor shall be considered for sizing of motor.
- Rated Power shall be calculated as bellow:

$$P = (\text{Required Mechanical power}) * (\text{API factor})$$

$$\text{Required Mechanical power} < 22\text{KW} \rightarrow \text{API factor} = 1.25$$

$$22\text{KW} \leq \text{Required Mechanical power} < 55\text{KW} \rightarrow \text{API factor} = 1.15$$

$$55\text{KW} \leq \text{Required Mechanical power} \rightarrow \text{API factor} = 1.1$$

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3. For the motor starting method please refer to the related mechanical datasheet and process viewpoint. (D.O.L or V.F.D)
4. All motors controlled by VFD shall be equipped with insulated bearings at both drive and non- drive ends.
5. LV motors (above 8 kW controlled by VFD or where specifically is requested) shall have six (two per phase) PT100 on stator windings and two PT100 sensor for bearing.
6. For motor driven by VFD and rated power above 160KW, IC416 shall be considered. For motor that feed by VFD, cooling fan shall be driven by separate motor.
7. Exterior surface finish shall be the manufacturer's standard corrosion-resistant paint system.
8. The rotor cage shall be made of brazed copper or copper alloy and shall be free from excessive inherent axial thrust, and shall be laminated.
9. Motors to be used in hazardous areas shall be totally enclosed fan cooled (TEFC), IP65, explosion proof as per area classification. On explosion proof motors, means shall be provided for withdrawing end plates and cartridges housing (where fitted) in a manner which shall avoid damage to explosion proof flanges. Motors to be used in non-hazardous area, outdoor in non-process, shall be totally enclosed fan cooled (TEFC) with degree of protection IP55 according to IEC 60034-5. In non-hazardous area, indoor in non-process area, standard industrial type motors, with degree of protection IP55 according to IEC 60034-5 shall be used.
10. Motors shall have an equivalent NEMA design B torque characteristics for normal operating conditions. For high starting torque applications motors shall have an equivalent NEMA Design C characteristic. Motors for use with VFDs shall have IEC “N” (NEMA Design B) torque characteristics, unless specifically noted otherwise. Motor-driven equipment with a torque curve varying as the square of the speed shall, as a minimum, have a starting torque complying with design "N" as per IEC 60034-12. Motor-driven equipment with a constant torque shall, as a minimum, have a starting torque complying with design "H" as per IEC 60034-12.
11. in case of Using VFD Insulation class of windings shall be class H with temperature rise limited to the temperature of class B insulation, according to IEC standard.

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12. Motors shall have terminal boxes suitable for accepting cables from any of the four directions at right angles in the plane of the terminal box. Main terminal box shall be positioned on the right- hand side when viewed from the driving end.
13. All motors shall have forged lifting eyes or lugs. Motors above 20kg weight shall be provided with lifting lugs or hooks or in special cases, lifting equipment set.
14. Installation, Operation & Maintenance Instruction, Dimensional Outline Drawing, Certified Test Report & Written Statement shall be prepared by Vendor.
15. Motors shall be designed for at least the number of direct on line starts per hour as specified in the IEC Standards. Motors with the capability of at least 5 starts per hour, direct on line, are preferred. Bidders shall include starts per hour information for all motors in the proposal, and include in motor protection.
16. Bearing life, in belt drive applications, with loading in accordance with the data provided, shall be rated for 50,000 hours and 100,000 hours for direct drive applications.
17. Finishing paint shall be RAL7032 or manufacturer's standard and in accordance with the painting schedule which shall be prepared by manufacturer and shall be sent to the buyer for approval.
18. Vendor shall provide and issue the important data required to design the related structure / foundation.
19. The vendor should use ASME B16.5 nozzle flange standard Tie in/Out points and ASME B16.47B for sizes larger than 26 inches.
20. The type, SCH, rating and standard of flanges must be specified.
21. The size of the nozzles must be mentioned in inch unit.
22. NDE: Non-Drive End
23. DOL: Direct On-Line
24. V: Vertical Mounted
25. RHS: Right Hand Side
26. H: Horizontal Mounted
27. LRC: Locked Rotor Current
28. API: American Petroleum Institute
29. TEFC: Totally Enclosed Fan Cooled

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30. FLT: Full Load Torque

31. VFD: Variable Frequency Drive

32. VTS: Vendor to Specify

33. VTC: Vendor to Confirm

34. WFL: Will be Finalized

35. Motor equal or greater 250 kW shall be supplied by MV switchgear (6.6kV).