3.1.1.4.2 – Technojet MH50-80/5 150HP 3600RPM

TECHNOJET

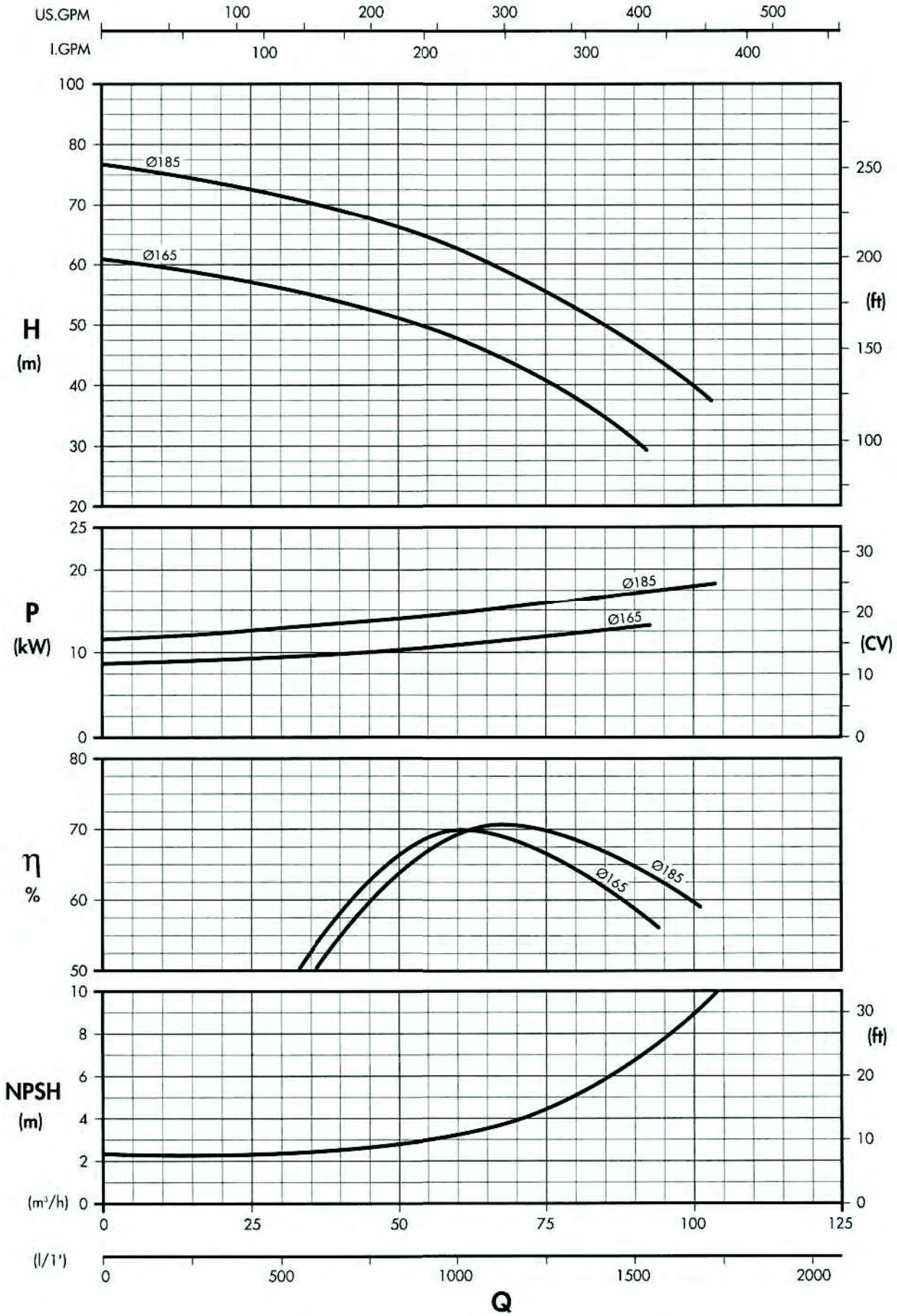
MH 50-80

Characteristic curves at 3500 r.p.m. - *Characteristic curve for each stage with liquid at specific weight 1*

Courbes caractéristiques à 3500 tours/min. - Courbe caractéristique pour chaque étape avec liquide de poid spécifique 1

Multistage pumps

Pompes multicellulaires



Technical Documentation

PDH15025

Optim TEFC | AEHH8N

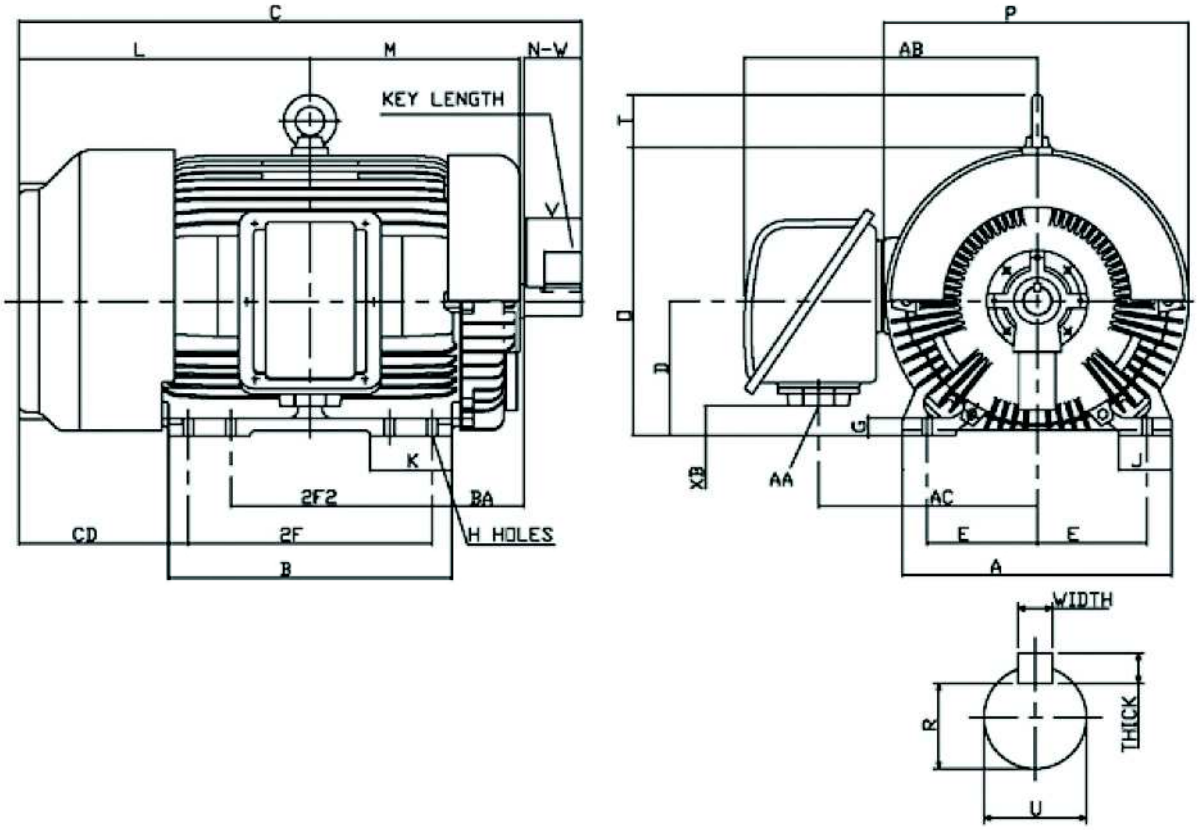
Date: July 10, 2017

TECO Westinghouse
MOTORS (CANADA) INC.

Date: July 10, 2017

Dimensional Drawing

Catalogue	Model	HP	Pole	kW	Rating	Voltage	Hz	RPM
PDH15025	AEHH8N	150	2	112	Continuous	575 V	60	3600



Frame Size	Mounting					A	B	C	CD	D
	E	2F	2F2	H	BA					
445TS	9	16.5	14.5	0.81	7.5	22.05	19.5	42.65	13.9	11

G	J	K	L	M	O	P	T	Key			Keyseat
								Width	Thick	Length	R
1.4	4.35	5.1	22.15	15.4	23.55	24.75	4.35	0.625	0.625	3.03	2.021

Terminal Housing				Aux Box		C/D Flange					
AA	AB	AC	XB	AE	AX	BB	AH	AK	BD	AJ	BF
3 NPT	24	17.9	2.4								

Shaft Extension			Bearings		Approx. Weight Lbs	SPL dBA/3ft	Ins. Class	S.F.	Drive Method	Dimensions
N-W	U	V	DE	NDE						
4.75	2.375	4.5	6314C3	6314C3	1696	83	F	1.15	Direct Coupling	Inches

TECO Westinghouse
MOTORS (CANADA) INC.

Date: July 10, 2017

Technical Data Sheet

Motor Type: AEHH8N	Catalogue No: PDH15025

Nameplate Information

HP	Pole	RPM	Frame	Voltage	Hz	Phase
150	2	3570	445TS	575	60	3
Enclosure	Ins. Class	Service Factor	Time Rating	NEMA Design	Rated Amb.	Rated Altitude
TEFC	F	1.15	Continuous	B	-40 to 40 °C	<3300 ft

Typical Performance

Efficiency (%)				Power Factor (%)		
Full Load		3/4 Load	1/2 Load	Full Load	3/4 Load	1/2 Load
Nom.	Min.					
95.0	94.1	94.5	93.6	87.0	84.5	81.0

Torque				Current (A)		
Full Load (lb-ft)	Locked Rotor (% FLT)	Pull Up (% FLT)	Break Down (% FLT)	No Load	Full Load	Locked Rotor
220.00	110	88	220	33.6	136.0	868

NEMA KVA Code	Inertia (WR^2)			Safe Stall Time (s)		Noise Level Sound Press. dB(A)
	Rotor ($lb\text{-}ft^2$)	NEMA Load ($lb\text{-}ft^2$)	Max. Allowable ($lb\text{-}ft^2$)	Cold	Hot	
0	20.000	133.0	133.0	28	19	83

VFD Duty Information

Speed Range			VFD		S.F.
Constant Torque	Variable Torque	Constant Power	Carrier	Type	
12-60Hz	3-60Hz	60-60Hz	≤ 5 kHz	VPWM or CPWM	1.0 Only

Additional Information

Bearings		Approx. Weight
DE	NDE	lbs
6314C3	6314C3	1696

Hazardous Locations Information

CSA Certified	
Class I, Div 2, Groups B, C & D Class I, Zone 2, Groups IIB+H2, IIB & IIA	
Temp Code (Sinewave / VFD)	T3C / T3

TECO Westinghouse
MOTORS (CANADA) INC.

Date: July 10, 2017

Nameplate Drawing

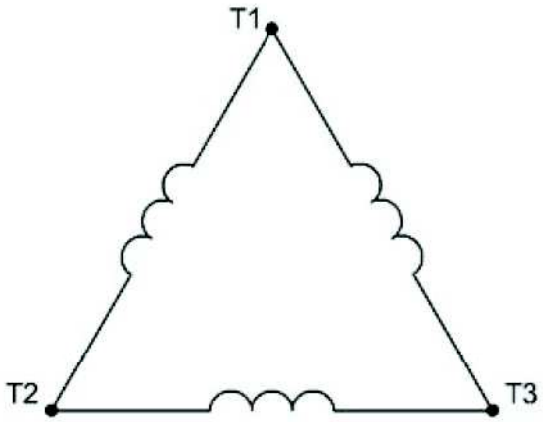
Optim TEFC

TYPE	AEHH8N	CAT. NO.	PDH15025		
OUTPUT	150 HP 112 kW	FRAME	445TS	TEFC	
R.P.M.	3570	POLE	2	INS.	F
VOLTS	575	PHASE	3	Hz	60
AMPS	136.0	CODE	0	S.F.	1.15
AMBIENT	40 °C	NOM. EFF. 95.0		MIN. EFF. 94.1	
BEARINGS	6314C3 / 6314C3			RATING Cont.	

SER. NO.	TBD	DESIGN	B	WT. 1696 LBS

PWM VFD DUTY	VT	CT	CP	S.F.
	3-60Hz	12-60Hz	60-60Hz	1.0 Only

Connection Diagram



3 LEAD SINGLE VOLTAGE DELTA					
VOLTAGE	CONN.	L1	L2	L3	
-	DELTA	1	2	3	

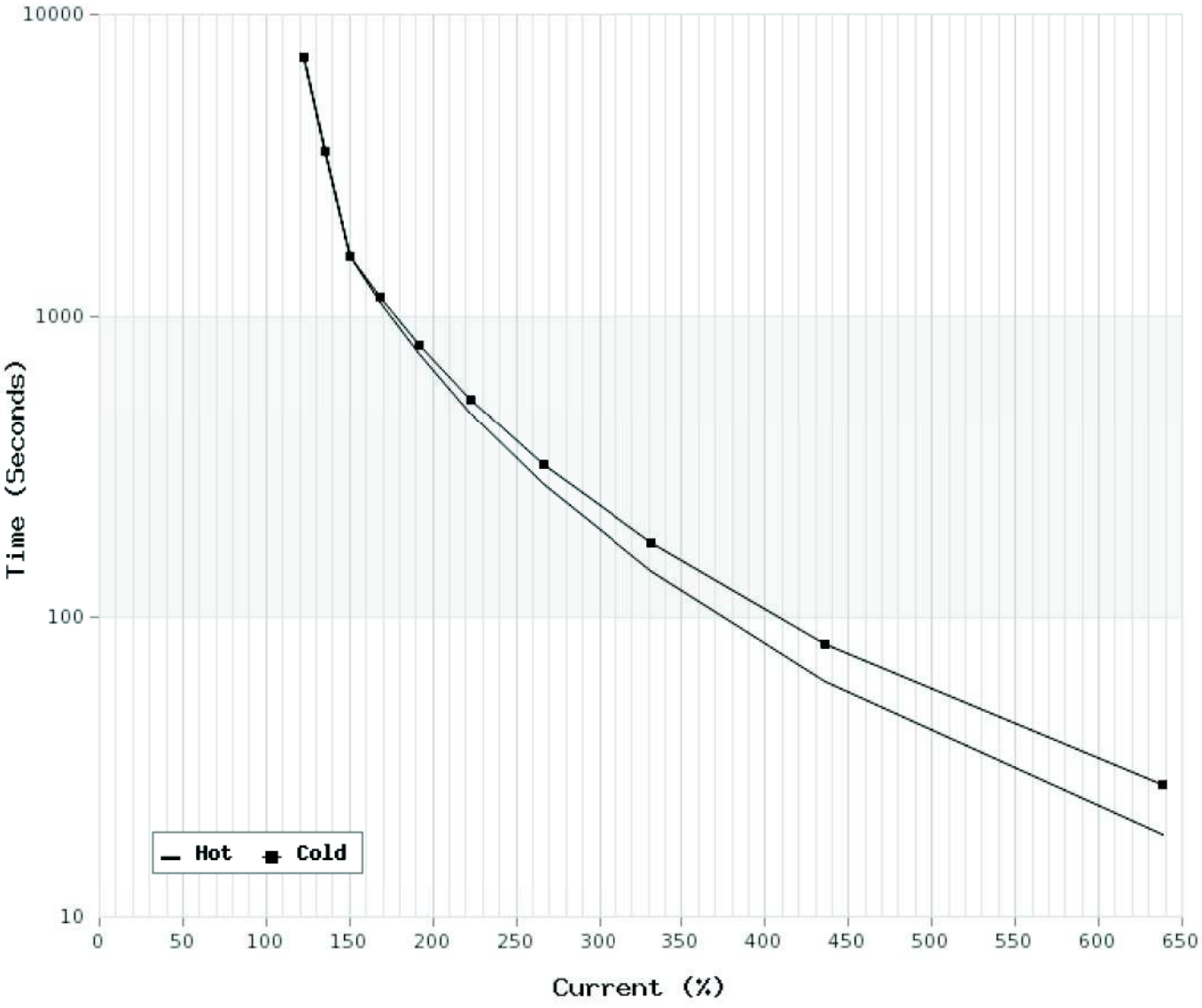
WD_3D

TECO Westinghouse
MOTORS (CANADA) INC.

Date: July 10, 2017

Thermal Limit Curves

Motor Type: AEHH8N		Catalogue No: PDH15025		Family: Optim TEFC	
HP	150	Safe Stall Time		Full Load A	0.0 / 136.0 A
Voltage	0 / 575V 60Hz	Hot	19 s	Locked Rotor A	638 %
RPM	3600	Cold	28 s	Locked Rotor A	0.0 / 868 A

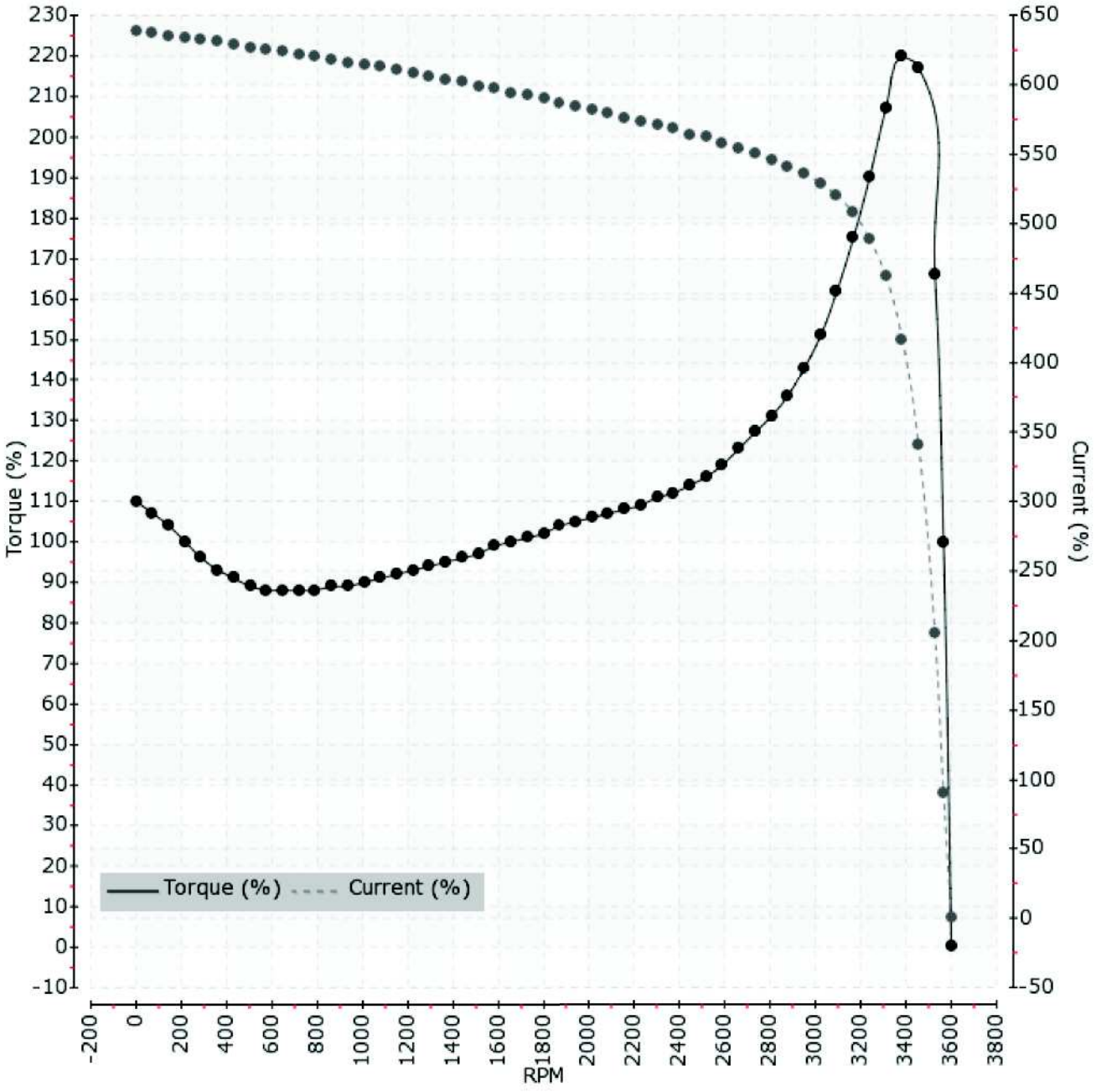


TECO Westinghouse
MOTORS (CANADA) INC.

Date: July 10, 2017

T-N and I-N Curves

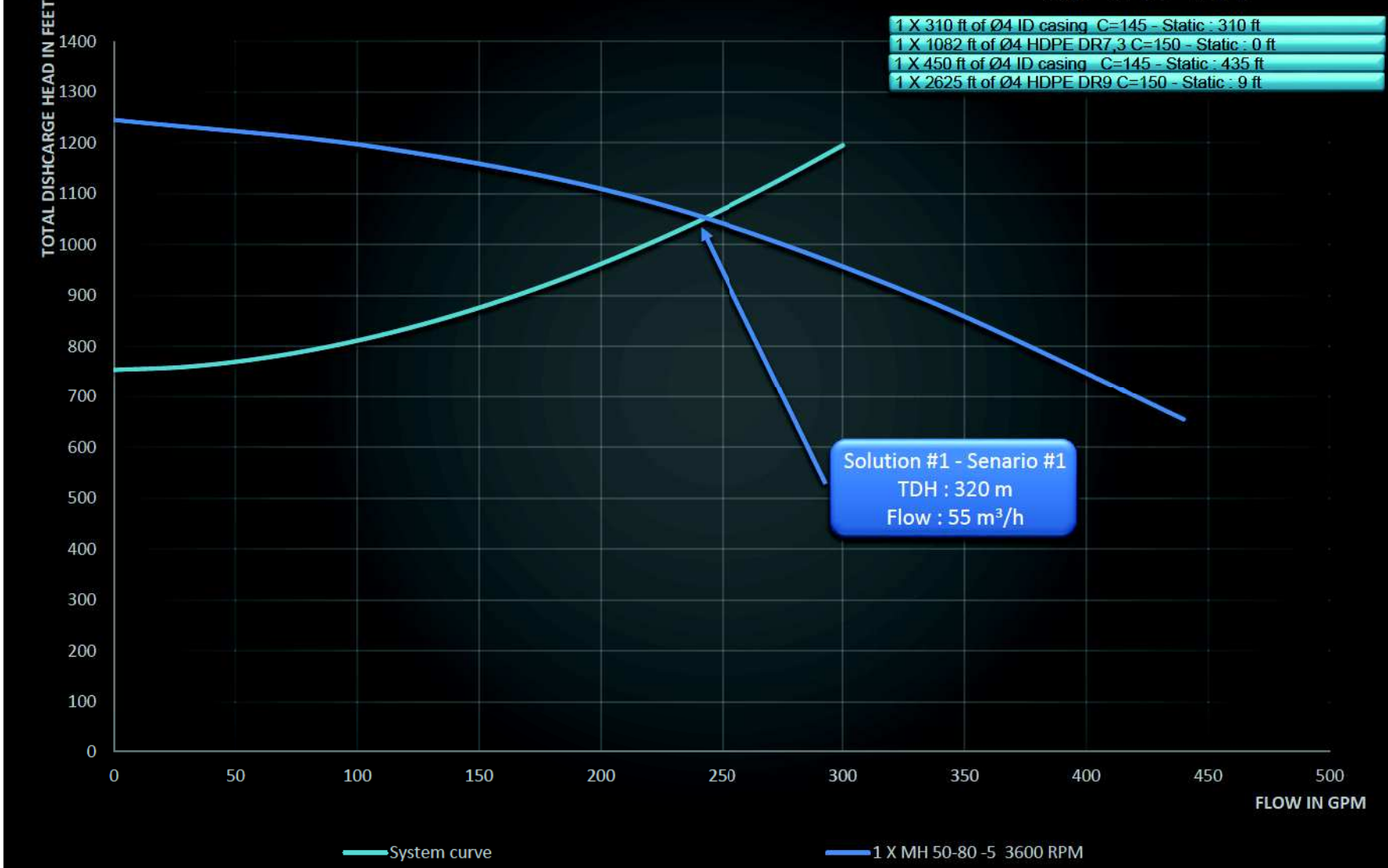
Motor Type: AEHH8N		Catalogue No: PDH15025		Family: Optim TEFC	
HP	150	Full Load T	220.00 lb-ft	Full Load A	136.0 A
Voltage	575V 60Hz	Locked Rotor T	110 %	Locked Rotor A	868.0 A
RPM	3600	Pull Up T	88 %	Break Down T	220 %



Techn sub
INDUSTRIAL PUMPS
DEWATERING SOLUTIONS

Total Discharge Head in function of Flow rate V2

Customer: Agnico-Eagle
Project: Meliadine
Description: Level 200 @ Surface
Done by: M.Bergeron
2017-07-10 - REV 0



3.1.1.4.3 – 150HP Soft-Start Control Panel

BENSHAW
ADVANCED CONTROLS & DRIVES

Technosub

SPECIFICATIONS

ITEM	QTY	DESCRIPTION
A	1	**TEC-150-600-04-10000 c/w** **0000- Will change depending on options chosen** **RB = Solid State Reduced Voltage Non Reversing Motor Starter With Built - In Bypass Contactor** **2** = MX^2 Control, **1** = Integrated Bypass Contactor , **S** = Standard Withstand Rating (18K), **150** = Horsepower Rated **600** = Voltage, **S** = Power Rating (350% for 30 Seconds), **04** = NEMA Enclosure **CB** = Circuit Breaker, **OP** = Options Included (RB2-1-S-156A-14C) **Circuit Breaker** (Square 'D', 14KIC / **NON VISI**) **- Flange Handle** **Starter with Breaker Withstand Rating: 18 KA** (consult Benshaw for higher rating) **Class 10 = 350% Current for 30 Seconds, 115% Continuously Rated** **156 Amp Rated (600 Volts, 3 Phase, 50 / 60 Hertz)** **Microprocessor Based Control** (Switch Mode Power Supply) - **Integrated Card Mounted Display** - L.E.D.. (4 Digit 7 Segment) Status & Diagnostics Parameter, Down, Up, Enter, Reset Push Buttons = Buttons have Tactile Feedback **Card displays** - Starter Status, Operation Parameters, Condition Codes, Alarm / Fault Codes, Thermal Overload Content, Phase Rotation , Metering - Universal Line Voltage 100 - 650 Volts (optional 1,000 Volts), Line Frequency Tracking (23 - 72 Hertz), Control (50 / 60 Hertz) - All Wires Numbered At Each End With Permanent Lettering **Control Function Features** - Remote 120 VAC Start / Stop Control Provisions (Optional 240 VAC) - **Local / Remote Source:** Keypad, Terminal or Source - **Start Mode:** Voltage, Current, Torque or KW - **Stop Mode:** Coast, Voltage, Torque or Braking **I/O Group:** - One Digital Input fixed for start - **3 Programmable Digital Inputs:** Off, Stop, Fault High, Fault Low, Fault Reset, Disconnect, Inline Confirm, Bypass Confirm, E O/L Reset Local / Remote, Heat Disable, Heat Enable, Slow Speed Forward, Slow Speed Reverse, Brake Enable - **Analog Input:** 0-5 / 10Vdc, 0/4-20mA - Analog input trip type: Off, Low, Hi Trip Level: 0-100% Trip Time: 0.1 - 90.0 sec. - **Analog Output:** 0-5/10Vdc, 0/4-20mA - Off, 0-200/800% Current, 0-150% Voltage, 0-10kW, 0-100kW, 0-1MW, 0-10MW 0-100%Ain, 0-100% Firing, Calibration **Continued on next page**

ITEM	QTY	DESCRIPTION
		Relay Outputs: - Quantity 2 (1 N/O, Form C, 5 Amp 125VAC Resistive, 5 Amp 250VAC Resistive,5 Amp 30VDC, Make/Break VA 1250/125 (1 N/C, Form C, 3 Amp 125VAC Resistive, 3 Amp 250VAC Resistive,3 Amp 30VDC, Make/Break VA 750/75 - Quantity 1 (1 N/O, 1 N/C, Form C, 10 Amp 125VAC Resistive 10 Amp 30 , 250VAC Resistive, 30VDC Resistive, Make/Break VA 250 Confiugurable to the Following: - Off, Fault (fail safe), Fault (Non Fail Safe), Running, UTS, Alarm, Ready, Locked Out, Overcurrent, Undercurrent - OL Alarm, Shunt Trip (fail safe), Shunt Trip (Non Fail Safe), Ground Fault, Energy Saver, Heating, Slow Speed, - Slow Speed Forward, Slow Speed Reverse, DC Bracking, Cooling Fan - Keypad Stop Enable / Disable - Auto Start Power on / Start Selection **Protection Features** - **Solid State Overload: Indipendent Starting and Running** (Programmable Class 1, 2, 3,4 to 40 or OFF) - **Motor Overload Hot / Cold Ratio** - **Motor Overload Cooling Time** (1.0 to 999.9 sec.) - **Residual Ground Fault:** Off, 5 to 100% of F.L.A., (Trip Time: 3 sec.) - **Instantaneous Over-current Trip** (I.O.C.) - **Service Factor Adjustable** (1.00 to 1.99 in .01 Increments) - **Phase Rotation Selectable** (ABC, CBA, INS- Insensitive, SPH- Single Phase) - **Line Current Imbalance Detection** (5 - 40%), IEEE Negative Sequence Overload Biasing - Control Power Under Voltage Protection, Control Power L.E.D. Status Indication - Pre-Start Fault Indication, Shorted SCR Detection, Stalled / Blocked Rotor Detection (Adjustable 0 - 900 seconds) - **Parameter Pass code Protection** [OFF (disabled) or 0 thru 9,999] - **Programmable Undercurrent Trip Level** - 5% to 100%, (Trip Time Off 0.1 to 90 sec.) - Auto / Manual Reset - **Programmable Over current Trip Level** - 50% to 800%, (Trip Time Off 0.1 to 90 sec.) - Auto / Manual Reset - **Over / Under Voltage** (1 to 40% Trip Times: Off, 0.1 to 90 sec.) - Auto Reset (Reset Time Off, 1 to 900 sec.) -Auto Fault Reset Count Limit (OFF. 1-10 - Controlled Fault Stop (On - off) - 9 Event Fault Log ; each event recordes starter state, L1, L2,L3 Voltages and Currents, kW, Hz and Run Time. **Meters: (RMS Rated with 3% Accuracy)** - Status, Average Current, L1, L2, L3 Phase Current , Current Imbalance, Residual Ground Fault, Average Voltage, Overload, Phase Or - Average Volts, L1-L2, L2-L3, L1-L3 volts, P.F., Watts, VA, VARS, Line Frequency, KWh, MWh, Hz, Analog In & Out, Run Days, Run H - TruTorque%, Power (kW)% , Peak Starting Current, Starting Duration - Reset able meters: None, Run Time, kWh/MWh, Re-flash mode, Factory Reset **Quick Meters:** Status, Overload and Phase Order **Advanced Funtions:** **- Reflash Mode, Store Parameter, Load Parameter** - **Preset Slow Speeds** (Cycloconverter) 7 or 14 % Forward or Reverse - **Standard BIST** (Built In Self Test) - No line power supplied to starter - **Powered BIST** (Built In Self Test) - Line power supplied to starter. - **Motor Winding Heater** Level (0 to 25% of F.L.A..) - **Anti-Windmilling Brake** - **Energy Saver** - **Factory Parameters Group** - **Starter Type:** Single, Three-Phase, Inside Delta, ATL, Wye/Delta, Phase Control and Current Follower - **Variable Voltage Controller** = External Input: 0/4 - 20 mA, 0 - 5/10 VDC, 5 K Ohm Potentiometer - **10VDC Reference Supply** (max. 4mA) - **Overload Emergency Restart Capability** **Communications:** - RS485 ModBus RTU, Monitoring, Starting & Stopping from Computer (1.2, 2.4, 4.8, 9.6, 19.2 Kbps) **Continued on next page**

ITEM	QTY	DESCRIPTION
		RSC-50 Benshaw Bypass Contactor (One Per Phase, 70 Amp Rated) Auxiliary Contacts 2 N/O & 2 N/C
		10A6 - 350 VA Control Power Transformer (Fused Primary)
		KPMX3CBL2M (2 X 16) Door Mount Display The remote L.C.D.. backlit keypad has the same basic functions with enhancements which allows using plain text instead of codes and a menu structure instead of a line of parameters. Start, Stop/reset, Up, Down, Left, Menu, Enter. Plus L.E.D.. status indicators: Run, Stop and Alarm **22A1 - Door Component Cover - 12" X 7" (A-31-DT)** - NEMA 4 Rated / Hinged - Clear
		1A1 - Stop Push Button (Raised), **1A2 - Start Push Button** (Flush) **3A2 - Three Position Selector Switch** (HAND / OFF / AUTO) **2A2 - Run Pilot Light** (Green) **2A3 - Fault Pilot Light** (Amber) **Customer Control Terminals** - for High / Low level float controls **1A8 - Emergency Stop Push Button** (Mushroom Head, Maintain)
		NEMA 4 Indoor Enclosure (Wall Mount, Polyester Powder Coated Beige Paint, 14 Gauge Fully Welded Construction)
		Line Power Top Entry Terminals (Connects to top of disconnect) **Load Power Top or Bottom Exit Terminal Pads** (Connects to top or bottom of the starter) **LG-200030-00 - Lug Kit** (Qty 3 = #6 - 350 Lugs)
		Dimensions 46"H X 30"W X 16"D
		Additional Options
A1		***Startco Ground Fault / Ground Check Monitoring*** **c/w** **36A2 - SE-105 Startco Ground-Fault Ground-Check Monitor** - Non-Hazardous Resistance-Ground Installation Unit, Shunt or Undervoltage Output Contact - Ground Fault Trip Times (0.1, 1.0, 2.0 Seconds), 5.6 V Zener Diode Supplied Loose **36A14 - RK-102 Remote Indication And Reset Assembley** - LED Ground Check Indicator, LED Ground Fault Indicator, Reset Push Button Switch **36A15 - Startco CT200** - 200:5 CT, 2.25" Window, 600 Volt Class **UV Trip contact added to Circuit Breaker** **10A20 - Transformer Feed Fusible Disconnect** (30amp / Three Pole - GS1DU3) **- Rotary**
A2		***Float Control Timers*** **Qty. of 2 - 12A4 - Analog Timer** (H3CR) - 0.05 - 300 hours, 2 set N/O - DPDT Delayed Contacts, 120 VAC
A3		**Heater Option for Technosub Packages** **17A2D - 250W Cabinet Strip Heater & Thermostat** (OS1212-250, 250 Watt, Cold Rolled Steel) **10A7 - 500 VA Control Power Transformer** (Fused Primary)
A4		**Heater Option for Technosub Packages** **17A2C - Cabinet space heater with thermostat & fan 800 Watts** (D-AH8001B) **10A10 - 1500 VA Control Power Transformer** (Fused Primary & Secondary)

ITEM	QTY	DESCRIPTION
A5		**33A3 - 30 Amp 600 Volt Class J Triple pole fuse holder** (Fuses Supplied) **Sales Note :** Dimensions 4" H x 4.65" W x 2.12" D (0 - 30 amp AJT's) (Ferraz - 60308J) **NOTE: Customer to notify size of fuses at time of order** 1HP = QTY 3 @ FU-AJT0001/5 (FUSE 1.5A 600V 200KAIR CLASS J) 3HP = QTY 3 @ FU-AJT0004/5 (FUSE 4.5A 600V 200KAIR CLASS J) 5HP = QTY 3 @ FU-723 (FUSE 8A 600V 200KAIR CLASS J)
		Gem Sensors - Supplied by Benshaw
A6		**Electrode System for start-stop requires 3 electrodes and 2 relays.** **Electrode 1 - Start, Electrode 2 - Stop and Electrode 3 - Reference.** **If pumps are installed in a pond an electrode has to be installed for reference.** **If installed in a steel pipe 2 Electrodes are required and the steel pipe is used as the reference.** **200 feet of cable per Electrode is supplied loose.**
A7		**Electrode System for Start-Stop and Alarm requires 4 electrodes and 2 relays. Electrode 1 – Start, Electrode 2 – Stop , Electrode 3 – Alarm and Electrode 4 - Reference.** **If pumps are installed in a pond an electrode has to be installed for reference.** **If installed in a steel pipe 3 Electrodes are required and the steel pipe is used as the reference.** **200 feet of cable per Electrode is supplied loose.**
A8		**Electrode System for redundant Start-Stop or redundant starters requires 5 electrodes and 3 relays. Electrode 1 – Start, Electrode 2 – Stop, Electrode 3 – Start, Electrode 4 . Stop, and Electrode 5. - Reference.** **If pumps are installed in a pond an electrode has to be installed for reference.** **If installed in a steel pipe 4 Electrodes are required and the steel pipe is used as the reference.** **200 feet of cable per Electrode is supplied loose.**
A9		**Enclosure Upgrade for Electrode Systems (46"X 30"X 16" Enclosure)** Note You will need this option if you require Relays & electrodes in the enclosure.
		Note 1 - If cable lengths are different than what is included please advise. **Note 2 - If application differs from above list of options please advise.** **Note 3 - If steel pipe is used as a reference please advise.**

AGNICO EAGLE

EQUIPMENT DATA SHEET

Treated water feed pump-Saline water treatment plant

WSP

Client	Agnico Eagle	Data Sheet Number	Revision	Date:	2018-04-11
Project	6515 - Meliadine	6515-132-REQ-018-265-EDS-001	R0	Prepared by	Paul Rivest, P. Eng.
#	151-06440-10			Verified by	Bertrand Fortin, P. Eng.

1	**GENERAL**			
2	Equipment Name / Number	-	Treated water feed pump #1	65PWA68103A
3			Treated water feed pump #2	65PWA68103B
4	Expected Equipment Life	years	25	
5	Site Location	-	Near Rankin Inlet, Nunavut Territory, CAN	
6	Equipment Location	-	Indoor, heated building	
7	Description	Units	3000 tpd 5500 tpd	*Required Vendor Information
8	**SERVICE CONDITIONS**			
9	Environment		Humid, dusty	
10	Ambient Temperature	°C	10 to 36	
11	Duty (365 days / year)	h/day	24	
12	Circuit availability	%	92	
13	Altitude Above Sea Level	m	62	
14	Quantity	-	2 (1 operating and 1 standby)	
15	Purpose phase 1 & 2		Treated Water from Saline Water Treatment Plant to CP1 Pond	
16	**PROCESS DATA**			
17	**Material Characteristics**			
18	Feed Material Description	-	Water	
19	Material Temperature	°C	10 to 35	
20	Material pH	-	7	
21	**Feed**			
22	Water Volume Flowrate (nominal)	m³/h	8,32	
23	**TECHNICAL DATA - GENERAL REQUIREMENTS**			
24	Operation	-	Continuous	
25	Expected Pump Type	-	Centrifugal - Heavy Duty	
26	VSD Driven	-	No	
27	Total Dynamic Head	m	110	
28	Maximum Static Head	m	4	
29	**Operation Paramaters 1**			
30	Minimum Dynamic Head	m		
31	Minimum Flowrate	m³/h		
32	Minimum Discharge Velocity	m/s		
33	**Operation Paramaters 2**			
34	Nominal Dynamic Head	m		
35	Nominal Flowrate	m³/h		
36	Nominal Discharge Velocity	m/s		
37	**TECHNICAL DATA - PUMP DATA**			
38	Manufacturer	-		*
39	Model	-		*
40	Pump Type	-		*
41	Pump Size	-		*
42	Pump Curve	-		*
43	Brake Power	kW		*
44	Shut-off Head	m		*
45	NPSH Required	m		*
46	Flowrate - Nominal	m³/h		*
47	Nominal Discharge Velocity	m/s		*
48	Seal Type	-	Mechanical seal	*
49	Gland Service Requirements	m³/h		*
50	Max. Allowable Casing Pressure	kPa		*
51	Operating Efficiency	%		*
52	HR-ER Ratio (ER valid if %v/v<20%)	-		*
53	Seal Arrangment	-		*
54	Noise Level	dB		*
55	**TECHNICAL DATA - IMPELLER**			
56	Impeller Type	-		*
57	Impeller Model	-		*
58	Impeller Diameter	mm		*
59	Impeller Speed	RPM		*
60	Impeller Tip Speed	m/s		*
61	Max. Stop Pressure	m		*
62	Impeller Attachment Method	-		*
63	**TECHNICAL DATA - SUCTION AND DISCHARGE**			
64	Suction Diameter	mm		*
65	Suction Flange			*
66	Discharge Diameter	mm		*
67	Discharge Flange			*
68	**TECHNICAL DATA - DRIVE**			
69	Drive Type	-	Direct Drive	*
70	**TECHNICAL DATA - MATERIAL**			
71	Casing	-		*
72	Casing Liners	-		*
73	Casing Liner Thickness	mm		*

Client	Agnico Eagle	Data Sheet Number	Revision	Date:	2018-04-11
Project	6515 - Meliadine	6515-132-REQ-018-265-EDS-001	R0	Prepared by	Paul Rivest, P. Eng.
#	151-06440-10			Verified by	Bertrand Fortin, P. Eng.

74	Casing Bolts	-			*
75	Impeller Material	-			*
76	Impeller Liner Materal	-			*
77	Impeller Liner Thickness	mm			*
78	Shaft	-			*
79	Shaft Sleeve	-			*
80	Packing (Seal)	-			*
81	Bearing Housing	-			*
82	Base Plate				*
83	**TECHNICAL DATA - WEIGHT**				
84	Pump	kg			*
85	Motor	kg			*
86	Base Plate	kg			*
87	Gearbox / Coupling	kg			*
88	Total Shipping Weight	kg			*
89	Heaviest Component for Maintenance	kg			*
90	**TECHNICAL DATA - MOTOR**				
91	Manufacturer	-			*
92	Motor Type	-			*
93	Service Factor	-			*
94	Control Type	-			*
95	Absorbed Power	kW			*
96	Installed Power	kW			*
97	**Notes**				
98	1) Depending on the application, this specification can be revised with the Engineer's approval only. Refer to the general specification.				
99	2) The Static Head and total Dynamic Head are not corrected according to the head ratio.				
100	3) The supplier is responsible of validating the head ratio and efficiency ratio for every application.				
101					
102					
103					
104					
105					

Rev.	Description	Prepared	Verified	Date
R0	For REQ	P.R.	B.F.	2018-04-11

Prepared by : Paul Rivest, P. Eng.	34 367		Paul Rivest ing.	2018-04-11
Verified by : Bertrand Fortin, P. Eng.	129 024	L2199	Bertrand Fortin P.Eng.	2018-04-11
Name and Title	OIQ N°	NAPEG N°	Signature	Date