FLUOR

world energy

CENTRIFUGAL BLOWER
Data Sheet

Document Number A8KM-19-074-540018-A

Contract: A8KM
Item No.: **19-F-754A/B**
Unit: PreTreat Unit
P.O. No.:
Inquiry No.: 4-306-RQ
Engineer:

Rev:	By:	Date:
D1	JA	6-Jul-22

Mech:
Sheet No.: 2 of 5

Applicable To: ○ Proposal ○ Purchased ◉ As Built

Rev

Client **World Energy Paramount** Project **World Energy Renewables Project**
Service **Vent Gas Blower** Facility: **World Energy Renewables Plant** Site: **Paramount, CA**
No. Required **2x100% (Note 2.1)**
Gas Handled **Air** Corrosives Present Note 2.9 Mfg. / Model Continental Blower / 151A.02 D1
Serial Nos.: 221510008/ 221510009

NOTE: ○ *INDICATES DATA BY PURCHASER* ☐ *BY VENDOR* ◯ *BY VENDOR OR PURCHASER*

Operating Conditions (each unit)			Design	Start-up
● Capacity, weight flow (Note 3.1)	lb/hr		9,849	10,341
○ Capacity, inlet. vol. flow (Note 3.1)	ICFM		2,624	2,514
○ Specific Gravity (Air =1)				
● Inlet Pressure (Note 2.2)	psia		13.84	13.84
● Discharge Pressure	psia		15.44	15.58
● Differential Pressure	psi		1.60	1.74
● Inlet Temperature	°F		122	80
☐ Discharge Temperature	°F		148.2	≈106
○ Relative Humidity	%			
● Density of Mixture	lb/ft³		0.063	0.069
■ "K" Value, Cp/Cv			1.393	1.400
● Elevation (MSL)	ft	69		
● Barometric Pressure	psia	14.7		
☐ Speed	RPM		3540	3540
☐ Power (including losses)	BHP		25.8	27.7
● Molecular Weight			28.06	28.67
☐ Polytropic Efficiency	%		73.9	73.5

Gas Composition			Design	Start-up
Component	MW	Mol %	Mol %	Mol %
Nitrogen	28.01		71.66	76.02
Oxygen	32.00		19.22	20.39
Carbon Dioxide	44.01		0.03	0.03
Argon	39.94		0.86	0.91
Water	18.02		8.23	2.65
(Note 2.9)				
Total	Mol %	0.00	100.00	100.00

☐ Max. Capacity @ Inlet, SCFM Max Power HP
☐ Surge Pt. SCFM Max. Cont. Speed
☐ Blower: 1st Critical 16,398 2nd Critical
● Control:
Outlet Dampers ○ Std. ○ Streamflow
Var. Inlet Vanes: ○ Optional ○ Auto
Var. Speed Drive ○ Optional ● No
Var. Pitch Blades ○ Manual ○ Auto

● **Drivers:** ● Motor *(See Sheet 4)* ○ Turbine
○ Make ○ Type
☐ Rated HP ☐ RPM
☐ Weight

○ **Belt Drive** ○ Yes ● No
○ Pulley Size ○ Weight
○ Guard Fully Encl. ○ Static Cond
○ Other

◯ **Construction Details:** ☐ Arrangement DD
☐ Between Bearing ☐ Overhung D1
■ No. Stages 2 ■ Casing Split VERTICAL D1
■ Impeller Type CLOSED ■ Impeller Diameter, 25 in
■ Maximum Tip Speed 386.8 ft/sec D1
☐ Impeller Fabrication Method D1
☐ Balance Piston ☐ Yes ■ No D1
☐ Casing Fabrication Method CAST Wall Thickness in D1
☐ MAWP psig ☐ Max. Allowable Temp. °F D1
■ Hydrotest Pressure 12 psig
☐ Shaft: Dia. at Wheel in Dia. at Brgs in D1
Span in Overhang in D1
■ Bearings: ☐ Internal ■ External
Radial: ■ Ball ☐ Roller ☐ Sleeve
Thrust ■ Ball D1
Lubrication: ■ Ring Oil ☐ Pressure Lube D1
☐ Grease ☐ Flood D1
☐ Pure Oil Mist ☐ Purge Oil Mist - D1
■ Bearing Housing Seals Inpro or equal
■ Other 10 vanes per impeller
● Seals: Type: Double Carbon Ring
● Purge Required: Yes D1
Rot. Facing Fan Drive End ■ CW ☐ CCW D1

● **Coupling:** D1
○ Make ● Type Flexible Disc D1
○ Model ● S.F. 1.5
● **Coupling guard** ● OSHA, NON SPARKING, FULLY ENCLOSED

■ **Connections**	Size	Facing	Rating	Orientation
Inlet	12"	RF	150#	TOP
Outlet	12"	RF	150#	TOP D1
Drains				

Testing	Required	Observed	Witnessed
Mechanical Run Test (w/ Vibration Analysis)	●	○	○
Mech Run Test - Spare Rotor(s)	○	○	○
Performance Test (w/ Noise Measurement)	●	○	○
Multiplane Dynamic Balance of Rotor	●	○	○
Residual Unbalance Check	○	○	○
Shop Inspection	●	○	○
Hydrotest	●	○	○
Hydrotest Water Quality (Certificate)	○	○	○
Control Panel Functional Test (if applicable)	○	○	○

ITEMS TO BE INCLUDED BY VENDOR: For each blower

● Common Baseplate
○ Blow-Off Silencer
○ Inlet Filter
○ Inlet Silencer (N/A)
○ Inlet duct and Plenum
○ Vibration sensors
○ Seal Purge Support System (316SS)
○ Inlet Expansion Joint
○ Outlet Expansion Joint
○ Pitot Array inlet flow sensor and transmitter
○ Optional Inlet damper
○ Optional Variable Frequency Drive for motor

Notes:

2.1 2 x 100% blowers; 1 operating and 1 spare.
2.2 A fresh air intake valve provides constant suction pressure control capability (by others).
2.3 A noise limit of 85 dBa at 3 ft shall be maintained. Vendor to propose sound insulation, acoustic hood and/or a suction silencer as necessary. If a suction silencer is required, the maximum pressure drop across the suction silencer shall be limited to 0.8 inches H2O at the normal flow rate.
2.4 Motor shall be sized for end of curve or low ambient temperature case, whichever is greater.
2.5 Vendor shall provide recommended Start-up Spare Parts List and 2-yrs. Operating Spares List, inclusive of coupling and motor parts.
2.6 Baseplate grounding tabs or lugs shall be 1/4" thick steel with at least one (1) 9/16" dia. hole provided. If two (2) are provided, they shall be 9/16" dia. spaced 1-3/4" on center. Where Stainless Steel grounding pads are provided, they shall be threaded with one (1) 1/2"-13 hole, or either two (2), or four (4), 1/2"-13 holes, all spaced 1-3/4" on center.
2.7 Nameplate shall specify MAWP at mechanical design temperature.
2.8 Removed. D1
2.9 The gas stream is mostly air containing traces of oil (i.e. tallow/soybean) vapor. Process gas may contain organic acids and chlorides.
2.10 "Start-up" operating case is Vendor estimated flow during startup. D1

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CENTRIFUGAL BLOWER
Data Sheet

Document Number A8KM-19-074-540018-A

Contract:	A8KM
Item No.:	19-F-754A/B
Unit:	PreTreat Unit
P.O. No.:	0
Inquiry No.:	4-306-RQ
Engineer:	
Mech:	JA
Sheet No.:	3 of 5

Rev:	By:	Date:
D1	JA	6-Jul-22

Rev

Client: **World Energy Paramount** Project: **World Energy Renewables Project**
Service: **Vent Gas Blower** Facility: **World Energy Renewables Plant** Site: **Paramount, CA**
No. Required: **2x100% (Note 2.1)**
Gas Handled: **Air** Corrosives Present: Note 2.9 Mfg. / Model: Continental Blower / 151A.02 D1
Serial Nos.: 221510008/221510009

NOTE: ○ *INDICATES DATA BY PURCHASER* ☐ *BY VENDOR* ◉ *BY VENDOR OR PURCHASER*

SITE AND UTILITY DATA

Location:
- ○ Indoor ○ Heated ○ Under Roof
- ◉ Outdoor Unheated ○ Partial Sides
- ◉ Grade ○ Mezzanine
- ◉ Elect. Area Class. CL I Gr B, C, D Div 2
- ○ Winterization Reqd. ○ Tropicalization Reqd. T-Code: T3C

Site Data:
- ◉ Elevation 69 ft ◉ Barometer 14.7 psia
- ◉ Range Of Ambient Temps: ◉ Min/Max 35 / 105 °F
- ◉ Relative Humidity ◉ Average 54 %

Unusual Conditions: ○ Dust ○ Fumes
- ○ Other -
- ○ Utility Conditions:

Steam:	Drivers		Heating	
Min:	psig	°F	psig	°F

Electricity:	Drivers	Heating	Control	Instruments
Voltage	460	120 (Note 4.2)	120	24VDC
Hertz	60	60	60	
Phase	3	1	1	

Cooling Water:
- Temp. Inlet 80 °F — Max. Return 120 °F
- Press. Norm. 50 psig — Design 150 °F 120 psig
- Min. Return psig — Max. Allow DP 20 psi
- Water Source COOLING TOWER — Chloride Concentration < 840 ppm

Instrument Air: Max / Min 80 / 110 psig (@ 100°F) Design: 150 PSIG @ 160°F

INSTRUMENTATION

☐ SUPPLIED BY VENDOR ○ SUPPLIED BY PURCHASER

Local Control Panel or Junction Box:
- ■ NEMA 4X-316 SS Jct Box ☐ Baseplate Mtd. ☐ Extra Cutouts
- ☐ Strip Heaters ☐ Totally Enclosed ☐ Air Purge System
- ☐ Customer Connections Brought Out To Terminal Boxes by Vendor

Anti Surge Control: ☐ By Vendor ◉ By Purchaser
Process Control: ☐ By Vendor ◉ By Purchaser
Vibration Detectors: ■ Accelerometer or Velometer
- ■ Location -1 Per Blower Bearing Housing ☐ Bently Nevada 1900/65 monitor

For the following: ○ Indicates Provided by Purchaser ☐ Indicates Provided by Supplier

Instrument Requirements:	Locally Mounted	Local Panel
Inlet Filter dP Transmitter	☐ ○	☐ ○
Discharge Pressure	☐ ◉	☐ ○
Discharge Temperature	☐ ◉	☐ ○
Radial Bearing Temp. - Blower	■ ○	☐ ○
Radial Bearing Temp.-Turbine	☐ ○	☐ ○
Radial Bearing Temp.- Motor	☐ ○	☐ ○
Inlet Pitot Array Flow transmitter	☐ ○	☐ ○

Alarm and Shutdown Requirements:		Alarm	Trip
Inlet Filter High dP	☐ ○		
High Discharge Temperature	☐ ○		
High Bearing Temp. - Blower	■ ○	X	
High Bearing Temp. - Motor	☐ ○		
High Bearing Temp. - Turbine	☐ ○		
High Vibration -			
Blower Bearing Housings	■ ○	X	
Low Flow Rate (Surge Protection)	☐ ◉	X	X
High Winding Temp. - Motor	☐ ○		

MATERIALS OF CONSTRUCTION

Casing Sections	Coated Cast Iron	Labyrinths	
In/Outlet Heads	Coated Cast Iron	Baffle Rings	
Impeller (s)	Coated Aluminum	Bearing Housing	
Shaft	Stainless Steel	Balance Piston	
Shaft Sleeves		Baseplate	Carbon Steel
Inlet Filter		Inlet Silencer	
Coupling Spacer		Blowoff Silencer	

◉ Material Certification Required For: Casing, Shaft, Impeller(s)
◉ Casing Repair Procedure Approval Required

WEIGHTS

Blower	lbs	Fan Sub Base	lbs	D1
Motor	lbs	Inlet Air Filter	N/A lbs	D1
Trans. Tee	lbs	Outlet Silencer	N/A lbs	
Total Weight (motor driven)			lbs	D1
Maximum Maintenance	lbs	Identify		D1

SURFACE PREPARATION AND PAINT

○ Manufacturers Standard Coating
◉ Other: A8KM-PP-000-500520-A

Blower:
○ Blower Surface Preparation
○ Primer ○ Finish Coat

Baseplate:
◉ Surface Preparation Suitable for Epoxy Grout
○ Primer ○ Finish Coat

Steam Turbine Drivers:
○ Surface Preparation
○ Primer ○ Finish Coat

Shipment: (Note 3.2)
◉ Domestic ◉ Export ○ Export Boxing Required
◉ Export 6 month outdoor storage

Spare Rotor Assembly Packaged For:
○ Horizontal Storage ○ Vertical Storage

MISCELLANEOUS

- ◉ Review Vendor's QA Program
- ◉ Coordination Meeting Required
- ○ Vendor Review Purchaser's Foundation Drawings
- ○ Vendor Review Purchaser's Piping Drawings
- ◉ Vendor Review Purchaser's Surge Control Scheme
- ◉ Vendor Review Purchaser's Process Control Scheme
- ○ Progress Reports Required
  - ○ Weekly ◉ Monthly
- ◉ Performance Curve Approval Prior to Release For Shipment
- ◉ Baseplate Provided With Vertical Leveling Screws @ Each Bolt hole Location sub base to be provided
- ◉ Baseplate Provided with Alignment Positioning Screws In The Longitudinal and Transverse Horizontal Directions for All Mounted Equipment
- ○ Other -

Notes:

3.1	Start-up case, and all Inlet Volume Flow capacity values are from the vendor's	D1
	performance curve and are provided for reference. The weight flow rate of 9,849 lb/hr at	D1
	the design conditions is the contractually required flow rate.	D1
3.2	See commercial Purchase Order for Shipping and storage requirements.	
3.3	Base supports shall meet design load requirements per Project Spec. A8KM-PP-000-40002-A,	
	Structural Data for Mechanical Equipment, and A8KM-PP-000-200001-A, Plant Site Data Sheet.	
3.4	Cast Iron or Carbon Steel are acceptable if wetted internal components are coated.	
	Manufacturers' standard internal coating shall be provided (subject to purchaser's approval).	
	Internal coating not required for stainless steel componets.	

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FLUOR / world energy	**LOW VOLTAGE MOTOR (IEEE 841) DATA SHEET U.S. CUSTOMARY UNITS**	**Contract:**	**A8KM**
		Item No:	**19-F-754AM/BM**
		Revision:	**D1** **Date:** **6-Jul-22**
	APPLICABLE MOTOR SPECIFICATION A8KM-PP-000-50670-A	**Unit:**	**PreTreat Unit**
		RFQ No.:	**4-306-RQ**
	Document Number A8KM-19-074-540018-A	**Sheet**	4 **of** 5

Rev

APPLICABLE TO PROPOSAL ○ PURCHASE ◉ AS BUILT

CLIENT: **World Energy Paramount** SERVICE **Vent Gas Blower**

PLANT: **World Energy Renewables Plant** MOTOR TAG NO. / NO. REQ'D **19-F-754AM/BM** / **Two (2)**

SITE: **Paramount, CA** DRIVEN EQUIPMENT TYPE / TAG NO. **Centrifugal Blower** / **19-F-754A/B**

DESIGN DATA AND ACCESSORY EQUIPMENT

NAMEPLATE **30** HP **1.15** S.F. **3600** RPM POWER (VOLTAGE/PHASE/HERTZ) **460** / **3** / **60** D1

ROTATION (WHEN FACING MOTOR OPPOSITE DRIVE END): ○ CW ○ CCW **Fans shall be bi-directional**

INSULATION CLASS: ○ B ● F ○ H ○ VPI TEMP. RISE **CLASS B** / ____ °C over **40.6** **°C** **AMBIENT**

AREA CLASSIFICATION: ● CLASS **I** , GROUP **B/C/D** DIV. **2** ● T-RATING **T3** / ____ °F

○ UNCLASSIFIED ○ ____

LOCATION: ○ INDOOR ● OUTDOOR ○ SHELTERED UNUSUAL CONDITIONS: ○ DUST ○ OTHER ____

AMBIENT TEMPERATURE: MAX **105** °F / MIN. **35** °F ALTITUDE **69** ft

ENCLOSURE: ● TOTALLY-ENCLOSED FAN-COOLED ○ TOTALLY-ENCLOSED NONVENTILATED ○ EXPLOSION PROOF

MOUNTING METHOD: ● FOOT ○ FLANGE, TYPE: ____

MOUNTING ARRANGEMENT: ● HORIZONTAL ○ VERTICAL SHAFT DOWN ○ VERTICAL SHAFT UP

BEARING TYPE: ● BALL ○ ROLLER BEARING LUBRICATION: ● GREASE ○ OIL ○ PURE OIL MIST

CONNECTION TO LOAD: ● DIRECT CONNECTED ○ V-BELT ○ THROUGH GEAR ○ CLOSE COUPLED

EQUIPMENT OPERATION: ● CONTINUOUS ○ SPARED CONTINUOUS ○ INTERMITTENT-CYCLES / DAY ____

SOUND PRESSURE LEVEL REQUIREMENTS: **85** dBA @ **3** FEET

STARTING: ● FULL VOLTAGE ● REDUCED VOLTAGE, **80** % OF VOLTAGE **Starting Voltage Dip Allowance**

○ UNLOADED ● LOADED ○ CAPACITORS FOR POWER FACTOR CORRECTION

● SPACE HEATERS **120/240** V **1** PHASE ____ °F MAX. TEMP

● OVERSIZE TERMINAL BOX ● DRAIN PLUGS

● SS NAMEPLATE ○ AUXILIARY NAMEPLATE

TEST ● ROUTINE ○ COMPLETE ● VIBRATION ● REPORT ● FOOT FLATNESS

REMARKS: **4.1) This data sheet applies to motors 1/2 hp through 500 hp with anti-friction bearings.**

4.2) Space heaters are required for 100 hp and above. Space heaters shall be rated at 240V/1 ph./60Hz for operation at 120V.

4.3) IP55 degree of protection is required. 4.4) Average relative humidity is 54%.

4.5) (omitted)

INFORMATION BELOW TO BE COMPLETED BY VENDOR

MOTOR MFR. **Per AVL** MODEL ____ SERIAL NO. ____ D1

NAMEPLATE HP **30** FULL LOAD RPM ____ FRAME ____ WEIGHT **0** LB D1

MOTOR OUTLINE DRAWING NO. ____

ROTOR CAGE MATERIAL OF CONSTRUCTION ____ MOTOR WINDING MATERIAL ____

BEARING MANUFACTURER ____ SIZE ____

VERTICAL MOTOR THRUST BEARING: TYPE ____ CAPACITY: UP ____ LBS DOWN ____ LBS LOCATION ____

LOAD	FULL	3/4	1/2	OTHER
AMPERES				
EFFICIENCY, %				
POWER FACTOR				
SPEED, RPM				

LOCKED ROTOR AMPS* ____ AMPS

FULL LOAD TORQUE* ____ FT-LB

LOCKED ROTOR TORQUE* ____ %

PULL UP TORQUE* ____ %

BREAKDOWN TORQUE* ____ %

ACCEL. TIME W/ LOAD (0 TO FULL SPEED)* ____ SEC.

SOUND LEVEL: GUARANTEED ____ dBA / EXPECTED ____ dBA

STALL TIMES AT ZERO RPM* - HOT / COLD ____ / ____ SEC.

FAN MATERIAL ____ (NON-SPARKING)

NUMBER OF CONSECUTIVE STARTS* ____

* INDICATED AT RATED VOLTAGE

INFORMATION BELOW TO BE PROVIDED BY VENDOR AFTER PURCHASE (REFER TO RFQ/PO DOCUMENTS)

● SAFE TIME - CURRENT CURVE

● SPEED - TORQUE CURVE

● SAFE LOCKED ROTOR TIME HOT ____ COLD ____

MAX. SURFACE TEMP. DURING NORMAL STARING OR OPERATION OF:

○ ROTOR ____ °F ○ STATOR ____ °F ○ ENCLOSURE ____ °F

NOTES:

4.6 **Motor nameplate shall indicate service factor, area classification and T-rating. T-rating relates to both external and internal components.**

4.7 **Provide accessory loads on submittal documents, e.g. Volts, HP, kVA, etc.**

4.8 **Motor shall be rated for Cl. I, Div. 2, Gr. B,C,D and a T3C temperature code for Project uniformity.**

4.9 **Motor shall have oversized terminal boxes.**

4.10 **Motor shall have additional external grounding lug on main motor terminal box.**

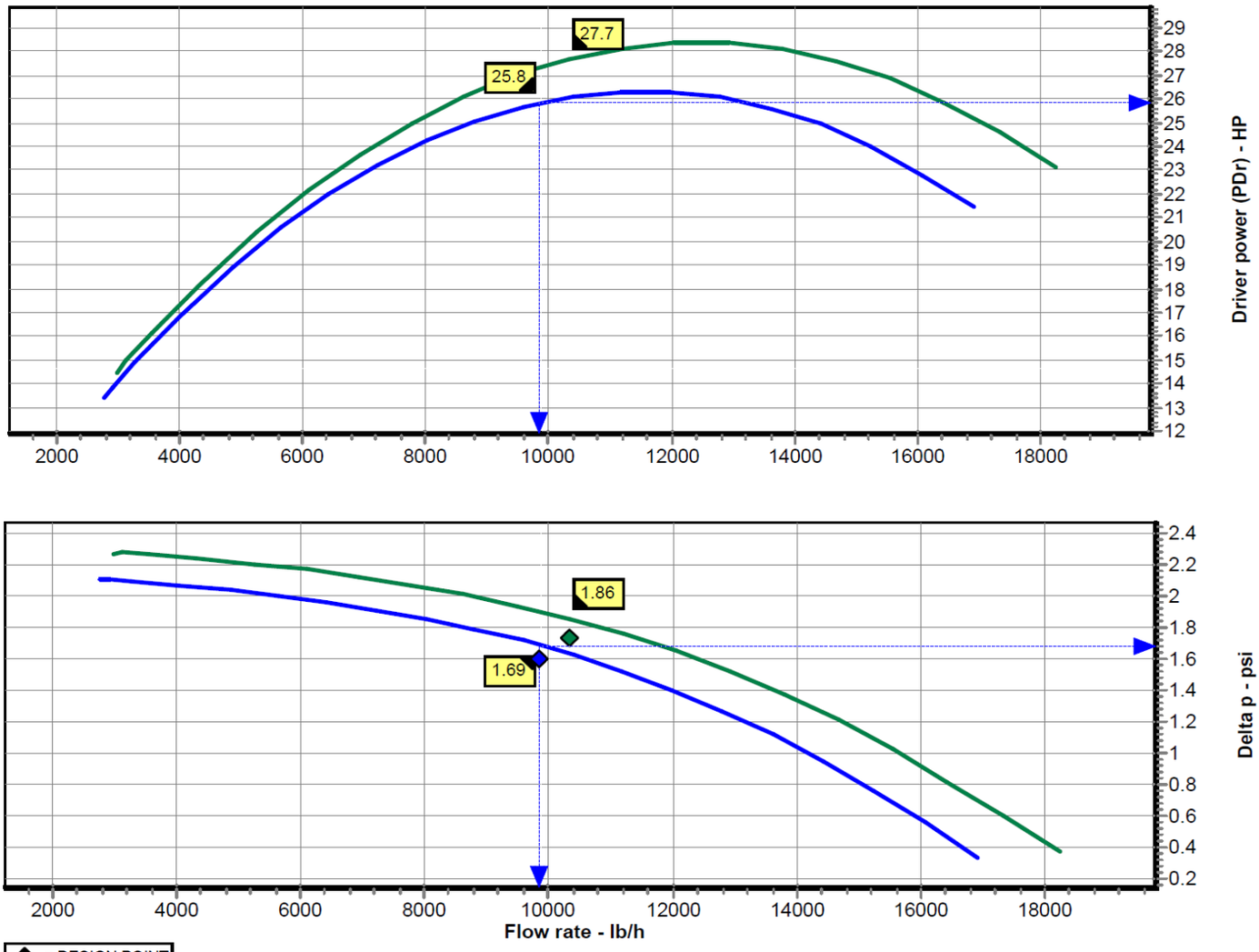
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		Item No:	19-F-754AM/BM			
		Revision:	D1	Date:	6-Jul-22	
	DATA SHEET ANNEX	Unit:	PreTreat Unit			
		RFQ No.:	4-306-RQ			
	Document Number A8KM-19-074-540018-A	Sheet	5 of 5			Rev

PROPOSAL BLOWER CURVE

D1

151A.02 - 2x6201 — 3540 RPM — 3540 RPM



◆ = DESIGN POINT

GAS : t1 = 122.0 °F pBar = 14.657 psia RH / inlet = 63.68 % rho1 = 0.062 lb/ft3 Cp1 = 1048.97 J/(kg K)

GAS : t1 = 80.0 °F pBar = 14.657 psia RH / inlet = 100.00 % rho1 = 0.067 lb/ft3 Cp1 = 1048.97 J/(kg K)

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