



PERFORMANCE TEST REPORTS

CLIENT	:	Air Products Manufacturing LLC
PROJECT NAME/NO.	:	WEP Renewables
CLIENT PO NO	:	4505605360
HMD DOCUMENT NO	:	HMD-4505605360-K01-01
CLIENT DOCUMENT NO	:	
HMD PUMP NO	:	839916 A/B
EQUIPMENT TAG NO	:	18-P-250 A/B

2	13/01/2023	ISSUE FOR REVIEW	GC	AFS	NW
1	12/01/2023	ISSUE FOR REVIEW	GC	AFS	NW
0	05/12/2022	ISSUE FOR REVIEW	GC	AFS	AFS
REV	DATE	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY

NOTE:

RESOLUTION SHEET				
Comment Number	Document Name: Performance Test Reports		Revision from which comment first appeared	Comment Status: Open\Closed - (Date Closed:)
	CLIENT COMMENT	HMD RESPONSE	Current Rev:	
1	As per datasheet is it 6.3 Inches. Why it is changed?	6.1 inches is the as built diameter. 6.3 inches was predicted	0	Closed (12/01/2023)
2	As per datasheet, rated speed is 3480	3520 is the motor nameplate speed	0	Closed (12/01/2023)
3	What is FLC?	Feet Liquid Column	0	Closed (12/01/2023)
4	Why it is different than test speed & frequency ?	This has been corrected to 3520rpm – 60 HZ as per test conditions	0	Closed (12/01/2023)
5	Customer name on vibration report is incorrect. Please recheck and confirm attached report is it for AP order or different user?	I have updated the name to ready correctly, we use a template for the reports so another name was showing originally	1	Closed (13/01/2023)

HMD SEAL/LESS PUMP H/Q/P PERFORMANCE TEST SHEET

HMD SEAL/LESS PUMPS LTD.
HAMPDEN PARK INDUSTRIAL ESTATE
EASTBOURNE,
EAST SUSSEX
BN22 9AN
ENGLAND

TELEPHONE : (01323) 452000
FAX : (01323) 503369
EMAIL : pumps@hmdpumps.com

CLIENT:	Air Products Manufacturing LLC	ORDER N°:	4505605360
HMD JOB N°:	839916A	PUMP SPEED:	3520 RPM
PUMP MODEL:	GSP 3x1.5x6H DA6 (40BAR)	IMPELLER DIA:	6.10 Inches
ORIFICE PLATE:	Inches	ITEM NUMBER:	18-P-250A
BALANCE KEYS:		BALANCE HOLES:	5@7.5 mm
DUTY REQUIREMENTS:-		LIQUID DETAILS:-	
DUTY FLOW:	151.02 (US)GPM	LIQUID PUMPED:	Acid Gas Stripper Bottoms
DUTY HEAD:	146.98 FT		
HYD TEST PRESSURE:	870 PSI	SG:	0.900
JACKET TEST PRESS:	PSI	TEMPERATURE:	380 ° F
NPSHA:	16.73 FT	VISCOSITY:	0.18 cSt
MOTOR DETAILS:-		SERIAL N°:	Z2205310297
MANUFACTURER:	Baldor	RATED PWR:	15.02 HP
SUPPLIED BY:	HMD	FRAME SIZE:	256 T
RATED SPEED:	3520 RPM	QUOTED ABS PWR:	11.40 HP
SUPPLY:	460 V / 3~ / 60 Hz		

PERFORMANCE TESTED TO :

API 685

READING	1	2	3	4	5	6	7	8
FLOW in (GPM)	0.00	16.38	83.70	143.45	151.02	177.96		
DIFFERENTIAL HEAD in FT	166.67	164.50	166.44	153.98	148.82	143.92		
POWER (hp)	8.18	8.31	9.79	11.26	11.53	12.20		
PUMP EFFICIENCY	0.00	8.18	35.94	49.51	49.21	53.00		
Discharge readings M H2O	51.00	50.00	49.00	43.00	41.00	38.00		
Correction gauge FLC	167.32	164.04	160.76	141.08	134.51	124.67		
Suction Head M H2O	0.50	0.20	-0.40	-0.60	-0.70	-0.90		
Correction gauge FLC	1.64	0.66	-1.31	-1.97	-2.30	-2.95		
Wattmetre reading (hp)	8.18	8.31	9.79	11.26	11.53	12.20		
Motor Efficiency (%)	100.0	100.0	100.0	100.0	100.0	100.0		
Motor speed rpm	3520	3520	3520	3520	3520	3520		
Impeller speed rpm	3520	3520	3520	3520	3520	3520		
Slip rpm	0	0	0	0	0	0		
Thrust (lbs)								
Datum correction (FT)	0.98	0.98	0.98	0.98	0.98	0.98		
Suction Bore (INCHES)	2.95	2.95	2.95	2.95	2.95	2.95		
Discharge Bore (INCHES)	1.50	1.50	1.50	1.50	1.50	1.50		
vel suc ² /2 x g (FLC)	0.000	0.009	0.239	0.702	0.778	1.080		
vel dis ² /2 x g (FLC)	0.000	0.139	3.626	10.649	11.804	16.391		

TESTED BY : T FEAR

SIGNATURE 

FOR : Air Products Manufacturing LLC

DATE OF TEST : 17-Nov-22

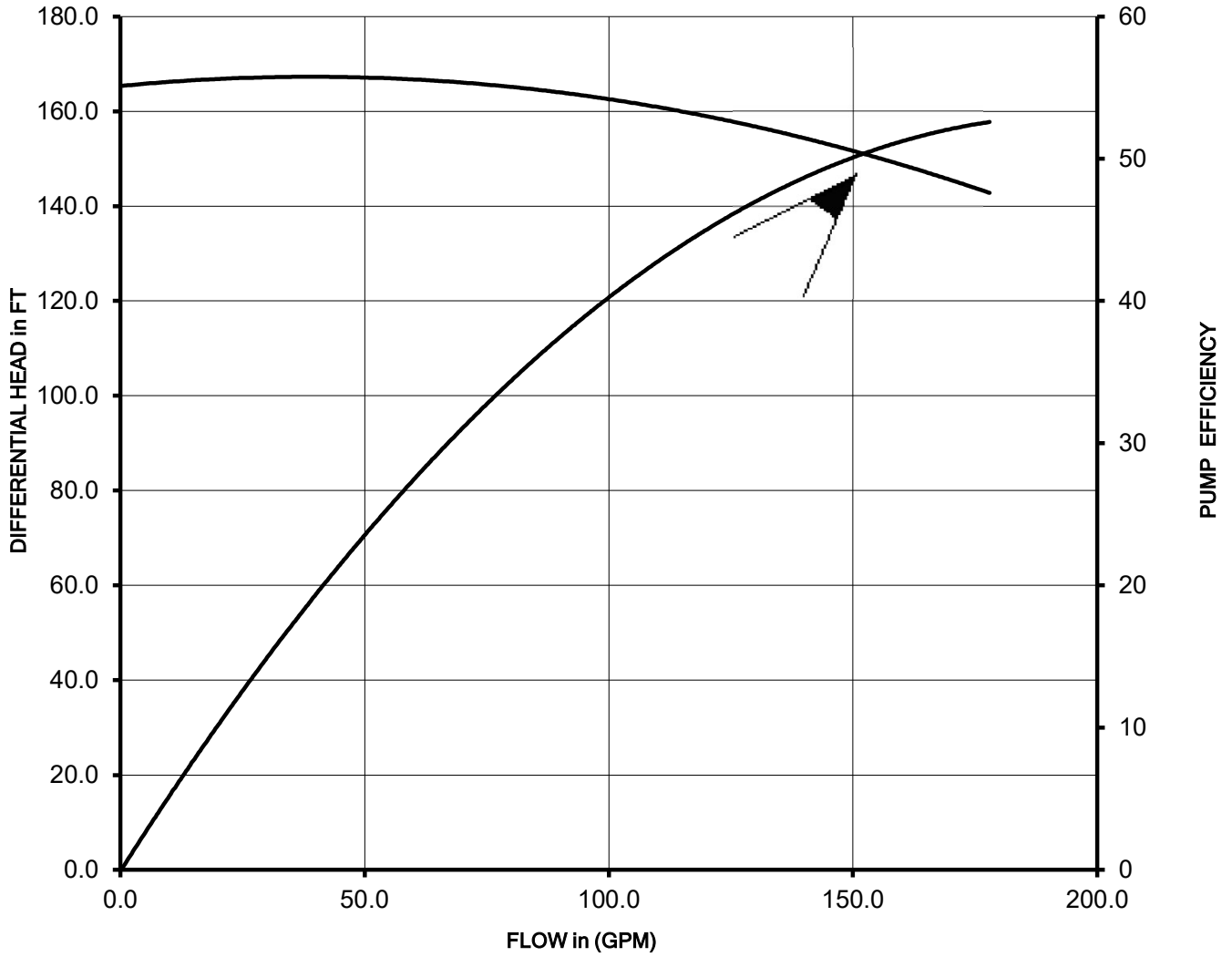
WITNESSED BY :

SIGNATURE

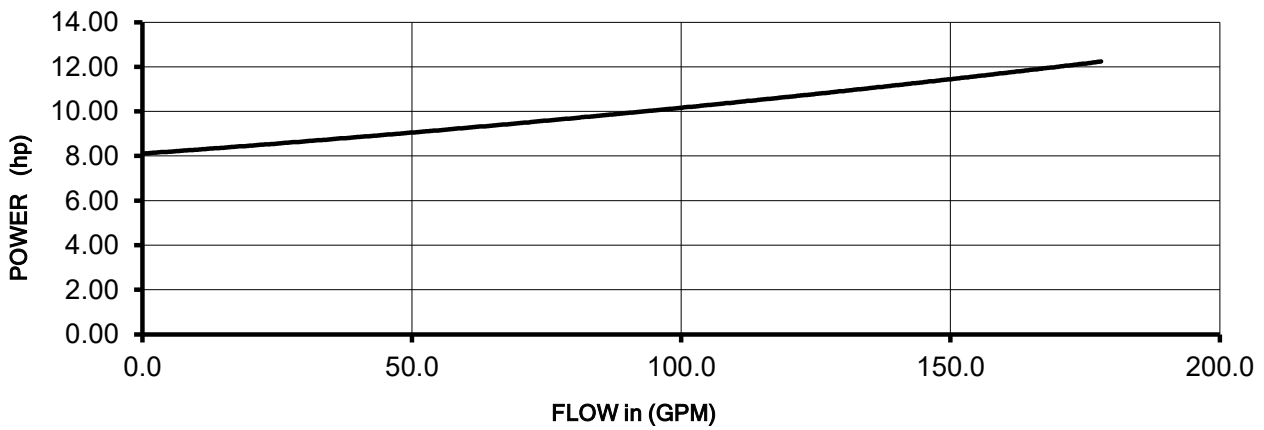
Pump Model: GSP 3x1.5x6H DA6 (40BAR)
Speed: 3520 **RPM**
Impeller Dia: 6.10 **Inches**
Orifice Plate: **Inches**

HMD Serial No: 839916A
Item No: 18-P-250A

HQ PERFORMANCE CURVE



POWER CURVE



HMD SEAL/LESS PUMP H/Q/P SG CORR PERFORMANCE TEST SHEET

HMD SEAL/LESS PUMPS LTD.
HAMPDEN PARK INDUSTRIAL ESTATE
EASTBOURNE,
EAST SUSSEX
BN22 9AN
ENGLAND

TELEPHONE : (01323) 452000
FAX : (01323) 503369
EMAIL : pumps@hmdpumps.com

CLIENT:	Air Products Manufacturing LLC	ORDER N°:	4505605360
HMD JOB N°:	839916A	PUMP SPEED:	3520 RPM
PUMP MODEL:	GSP 3x1.5x6H DA6 (40BAR)	IMPELLER DIA:	6.10 Inches
ORIFICE PLATE:	Inches	ITEM NUMBER:	18-P-250A
BALANCE KEYS:		BALANCE HOLES:	5@7.5 mm
DUTY REQUIREMENTS:-		LIQUID DETAILS:-	
DUTY FLOW:	151.02 (US)GPM	LIQUID PUMPED:	Acid Gas Stripper Bottoms
DUTY HEAD:	146.98 FT		
HYD TEST PRESSURE:	870 PSI	SG:	0.900
JACKET TEST PRESS:	PSI	TEMPERATURE:	380 ° F
NPSHA:	16.73 FT	VISCOSITY:	0.18 cSt
MOTOR DETAILS:-		SERIAL N°:	Z2205310297
MANUFACTURER:	Baldor	RATED PWR:	15.02 HP
SUPPLIED BY:	HMD	FRAME SIZE:	256 T
RATED SPEED:	3520 RPM	QUOTED ABS PWR:	11.40
SUPPLY:	460 V / 3~ / 60 Hz		

PERFORMANCE TESTED TO :**API 685**

READING	PUMP PERFORMANCE ON SITE SG (Acid Gas Stripper Bottoms) - NOT VISC CORRECTED							
	1	2	3	4	5	6	7	8
FLOW in (GPM)	0.00	16.38	83.70	143.45	151.02	177.96		
DIFFERENTIAL HEAD in FT	166.67	164.50	166.44	153.98	148.82	143.92		
POWER (hp)	7.36	7.48	8.81	10.14	10.38	10.98		
PUMP EFFICIENCY	0.00	8.18	35.94	49.51	49.21	53.00		

READING	PUMP PERFORMANCE ON SITE SG AND VISCOSITY (Acid Gas Stripper Bottoms)							
	1	2	3	4	5	6	7	8
FLOW in (GPM)	0.00	16.38	83.70	143.45	151.02	177.96		
DIFFERENTIAL HEAD in FT	166.67	164.50	166.44	153.98	148.82	143.92		
POWER (hp)	7.36	7.48	8.81	10.14	10.38	10.98		
PUMP EFFICIENCY	0.00	8.18	35.94	49.51	49.21	53.00		

Note:

All pump efficiency figures stated are OVERALL and include magnetic coupling loss.

Viscosity Correction Factors	
Cq =	1.00
Ch =	1.00
Ce =	1.00

TESTED BY : T FEAR

SIGNATURE 

FOR : Air Products Manufacturing LLC

DATE OF TEST : 17-Nov-22

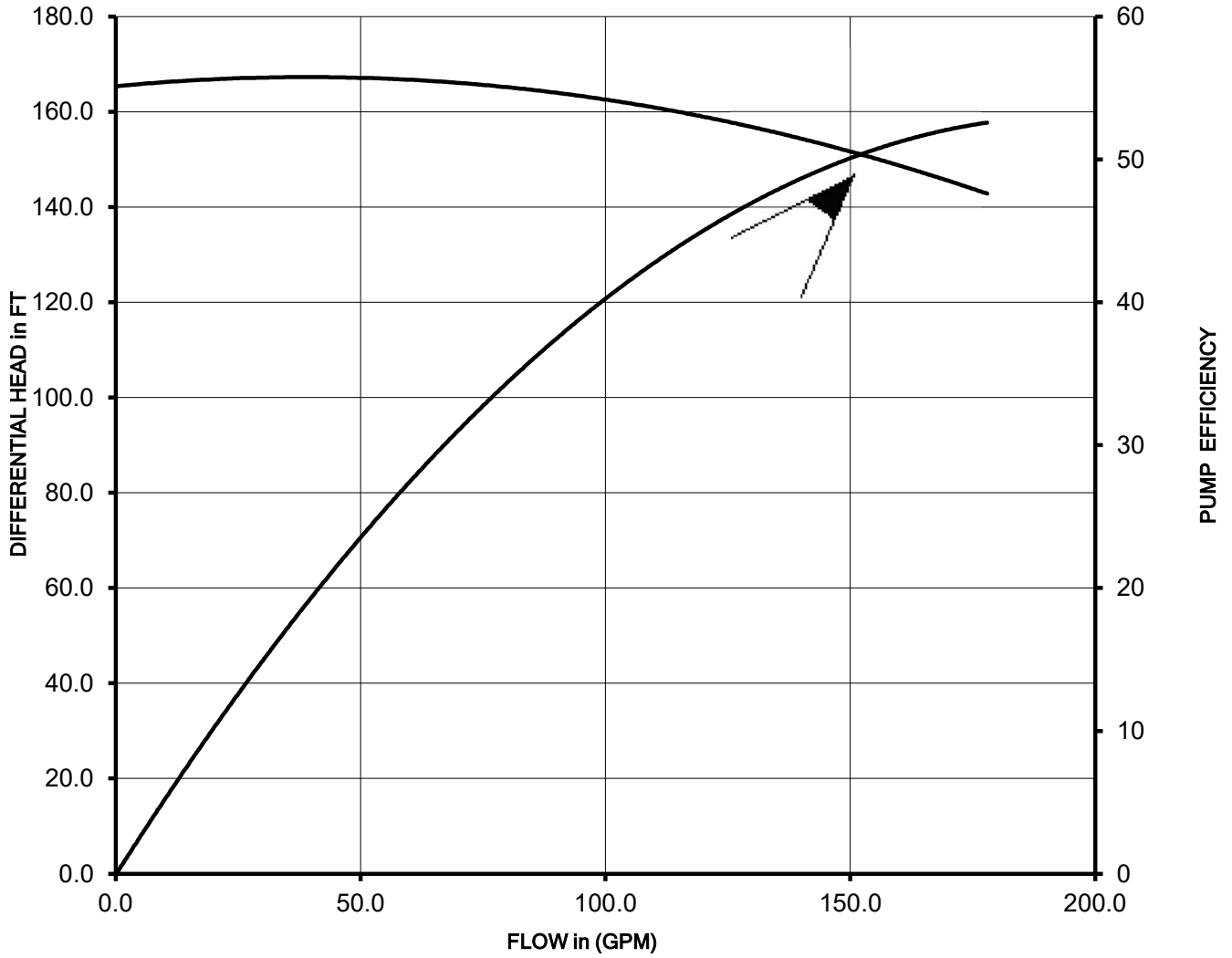
WITNESSED BY :

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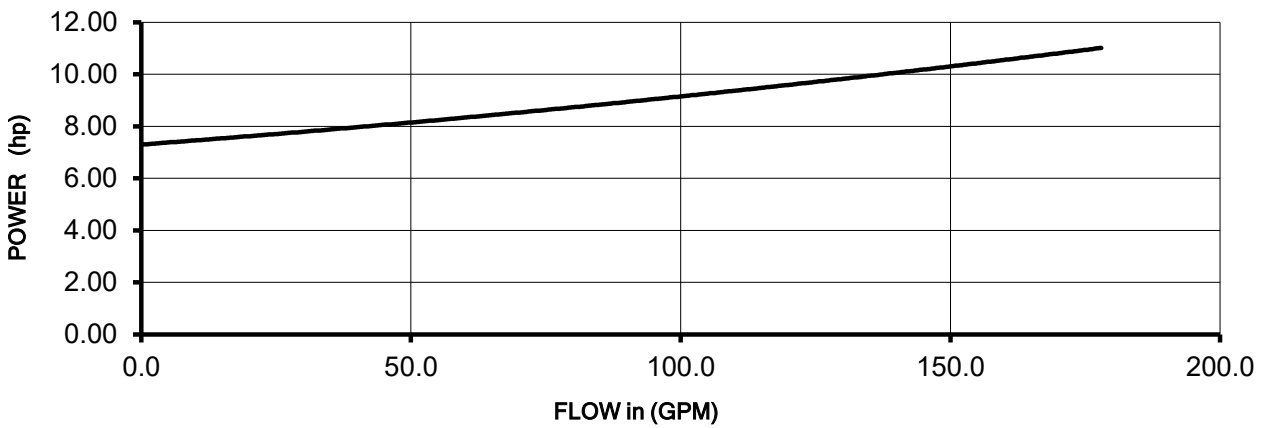
Pump Model: GSP 3x1.5x6H DA6 (40BAR)
Speed: 3520 **RPM**
Impeller Dia: 6.10 **Inches**
Orifice Plate: **Inches**

HMD Serial No: 839916A
Item No: 18-P-250A

HQ PERFORMANCE CURVE CORRECTED FOR SITE CONDITIONS



POWER CURVE CORRECTED FOR SITE CONDITIONS



HMD SEAL/LESS PUMP NOISE TEST SHEET

HMD SEAL/LESS PUMPS LTD.
HAMPDEN PARK INDUSTRIAL ESTATE
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BN22 9AN
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TELEPHONE : (01323) 452 000
FAX : (01323) 503369
EMAIL : pumps@hmdpumps.com

CLIENT :	Air Products Manufacturing LLC
CLIENT ORDER N° :	4505605360
CLIENT ITEM N° :	839916A
HMD JOB N° :	18-P-250A

PUMP UNIT TESTED :-	DESCRIPTION :-	
	PUMP MODEL :	GSP 3x1.5x6H DA6 (40BAR)
	DUTY FLOW :	151.02 GPM
	DUTY HEAD :	146.98 FT

MOTOR DETAILS :-	DESCRIPTION :-	
	RATED SPEED :	3520 RPM
	RATED POWER :	15.02 HP
	SUPPLY :	460 V / 3~ / 60 Hz
	SERIAL N° :	Z2205310297
	MANUFACTURER :	Baldor

ACOUSTIC CONTROL DEVICES :-	DESCRIPTION :-	

MEASURING EQUIPMENT :-	DESCRIPTION :-	
	SOUND METER :	Bruel&Kjaer
	SERIAL N° :	1824865

TEST RESULTS :- (dBA VALUES)

(AT DUTY POINT)

MICROPHONE POSITION	OVERALL	62.5	125	250	500	1k	2k	4k	8k
1	78.80	36.00	53.60	61.50	65.00	70.50	73.40	73.20	71.80
2	77.00	36.00	58.00	62.70	63.20	68.60	72.80	70.50	68.60
3	79.20	34.60	51.70	60.40	63.20	67.70	71.90	70.50	68.60
4	76.40	37.80	53.20	60.50	63.40	68.70	71.90	70.50	67.70
5	76.00	36.00	49.80	60.40	64.00	68.70	71.90	69.40	65.80
BACKGROUND NOISE, POST TEST	56.00	32.30	38.60	46.30	50.00	51.60	49.30	43.30	32.90

MEASURED SOUND PRESSURE LEVEL AVERAGED OVER SURFACE MEASURED
BACKGROUND SOUND PRESSURE LEVEL AVERAGED OVER MEASURED SURFACE
BACKGROUND NOISE CORRECTION
TEST ENVIRONMENT NOISE CORRECTION - BASED ON ISO 3744
CORRECTION FOR SET-UP (EG. TEST PIPING, VALVES, BASEPLATE ETC)
CORRECTED SOUND PRESSURE LEVEL AVERAGED OVER MEASURED SURFACE

77.48
56.00
0.00
-6.60
70.88

COMMENTS :-

TESTED BY : T FEAR

SIGNATURE 

FOR : Air Products Manufacturing LLC

DATE OF TEST : 23-Nov-22

WITNESSED BY :

SIGNATURE

HMD SEAL/LESS PUMP VIBRATION TEST SHEET

HMD SEAL/LESS PUMPS LTD.
HAMPDEN PARK INDUSTRIAL ESTATE
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ENGLAND

TELEPHONE : (01323) 452 000
FAX : (01323) 503369
EMAIL : pumps@hmdpumps.com

CLIENT :	Air Products Manufacturing LLC
CLIENT ORDER N° :	4505605360
CLIENT ITEM N° :	839916A
HMD JOB N° :	18-P-250A

<u>PUMP UNIT TESTED :-</u>	<u>DESCRIPTION :-</u>	
	PUMP MODEL :	GSP 3x1.5x6H DA6 (40BAR)
	DUTY FLOW :	151.02 GPM
	DUTY HEAD :	146.98 FT

<u>MOTOR DETAILS :-</u>	<u>DESCRIPTION :-</u>	
	RATED SPEED :	3520 RPM
	RATED POWER :	15.02 Hp
	SUPPLY :	460 V / 3~ / 60 Hz
	SERIAL N° :	Z2205310297
	MANUFACTURER :	Baldor

<u>ISOLATION DEVICES :-</u>	<u>DESCRIPTION :-</u>	
	MOUNTING TYPE :	
	NUMBER OF MOUNTS :	
	NOISE SHEILDING :	
	CONNECTIONS	

<u>MEASURING EQUIPMENT :-</u>	<u>DESCRIPTION :-</u>	
	ACCELEROMETER :	Vibrotip
	SERIAL N° :	0 5146
	FIXING METHOD :	

TEST RESULTS :- READINGS TAKEN AS R.M.S

VIBRATION LEVEL (inches/s)

TEST POINT	1	2	3	4	5	6	7	8
FLOW	16.38	83.70	143.45	151.02	177.96			
VERTICAL- V ₁	0.07	0.06	0.07	0.07	0.07			
TRANSVERSE- H ₁	0.03	0.02	0.04	0.05	0.07			
AXIAL- A	0.02	0.03	0.03	0.03	0.04			
VERTICAL- V ₂	0.06	0.06	0.05	0.06	0.06			
TRANSVERSE- H ₂	0.04	0.04	0.04	0.04	0.05			

COMMENTS :-

TESTED BY : T FEAR

SIGNATURE 

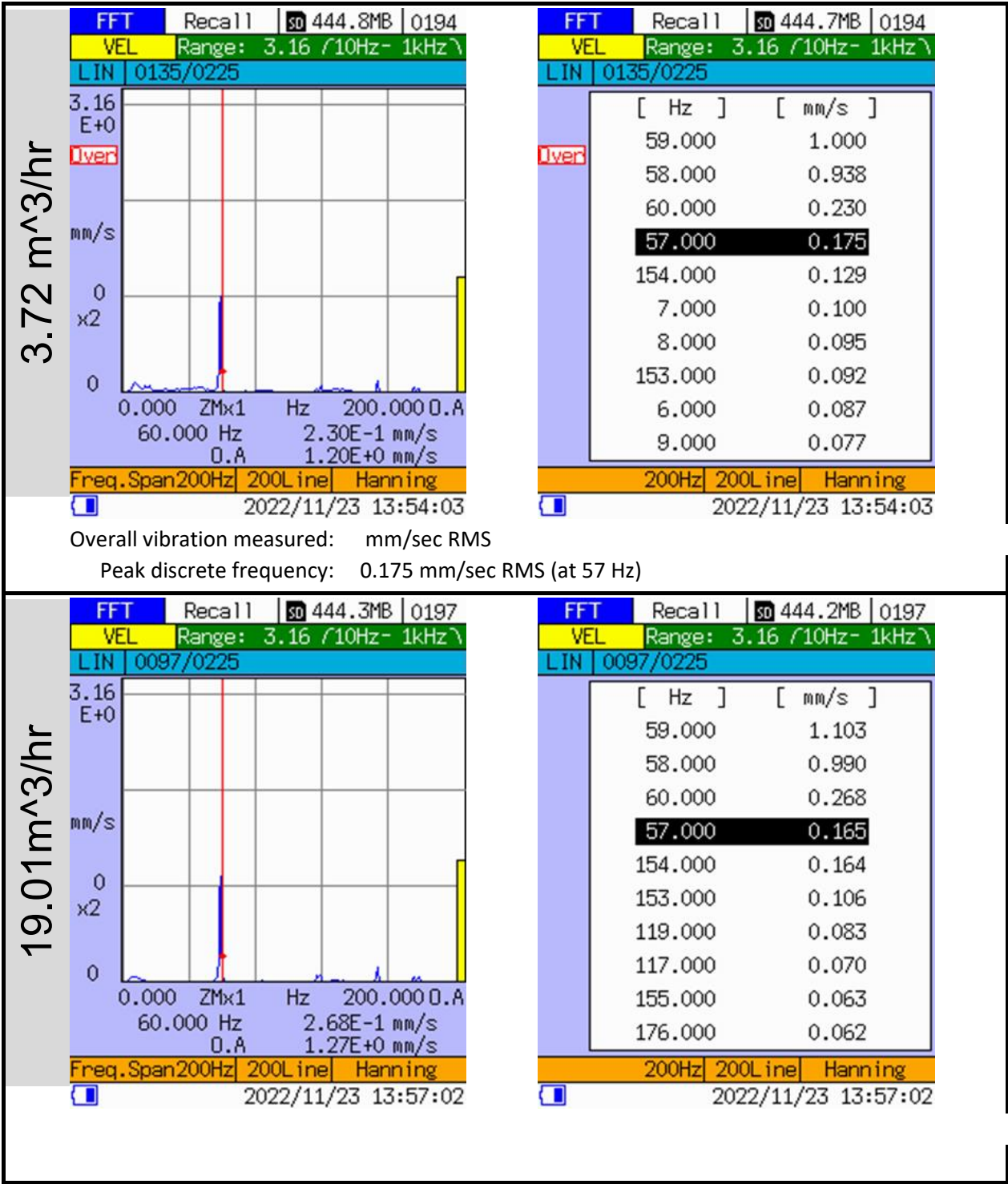
FOR : Air Products Manufacturing LLC

DATE OF TEST : 23-Nov-22



FFT VIBRATION TEST REPORT ON:

Customer: Air Products Manufacturing LLC
Pump / Item No: 839916 A
Instrument used: Vibration Analyzer, model VA-12, serial no. 00990032
Date: 24 November 2022
Sensor location & Position: Bearing housing & Radial / Vertical
Pump rotational speed: 3520rpm – 60 HZ
API 685 Acceptance levels: <3.0 mm/sec RMS (Overall)
Discrete frequencies Acceptance Level: <2.0 mm/sec RMS



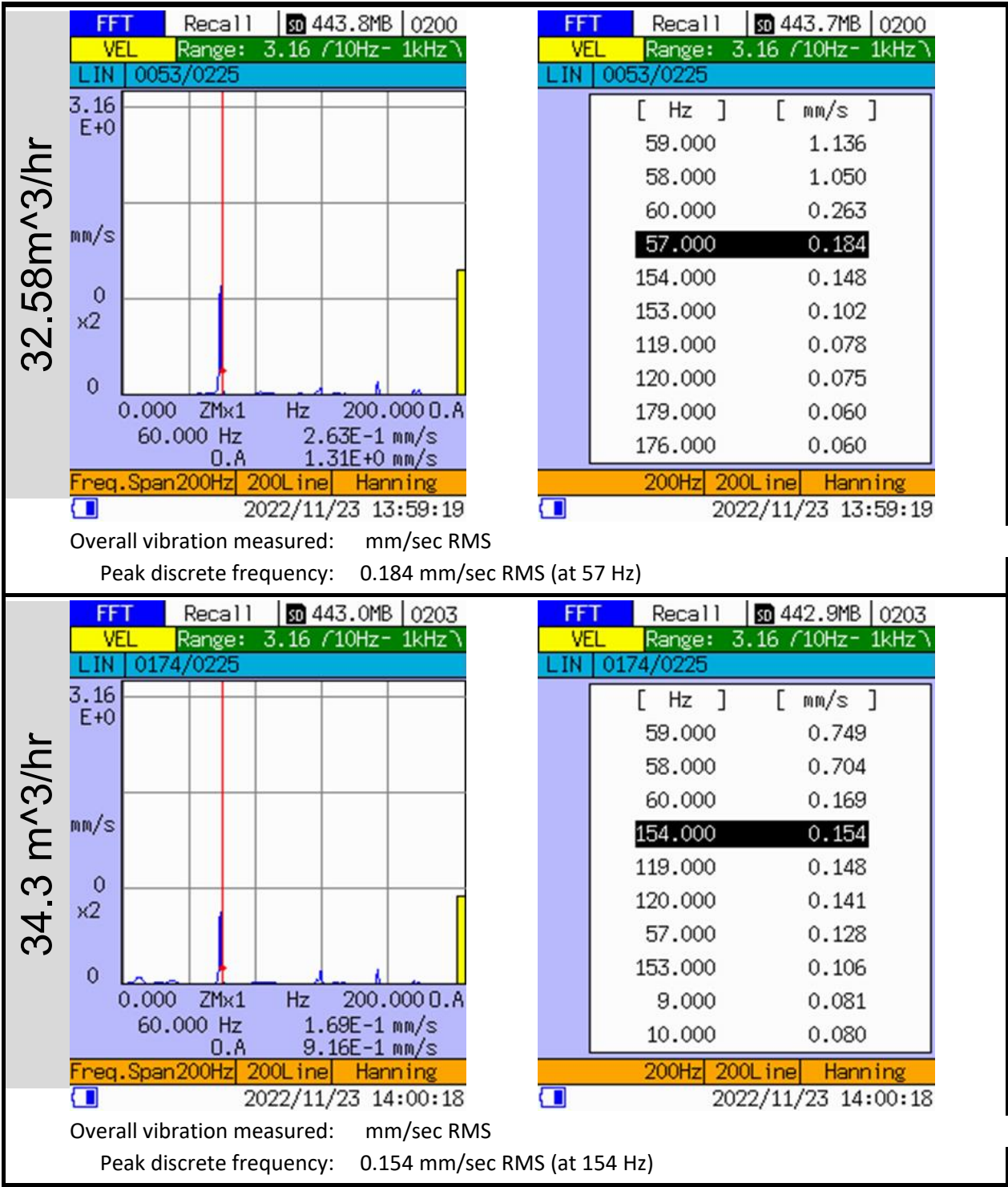
Tested by: R Baxter

Sign: _____



FFT VIBRATION TEST REPORT ON:

Customer: Air Products Manufacturing LLC
Pump / Item No: 839916 A
Instrument used: Vibration Analyzer, model VA-12, serial no. 00990032
Date: 24 November 2022
Sensor location & Position: Bearing housing & Radial / Vertical
Pump rotational speed: 3520rpm – 60 HZ
API 685 Acceptance levels: <3.0 mm/sec RMS (Overall)
Discrete frequencies Acceptance Level: <2.0 mm/sec RMS



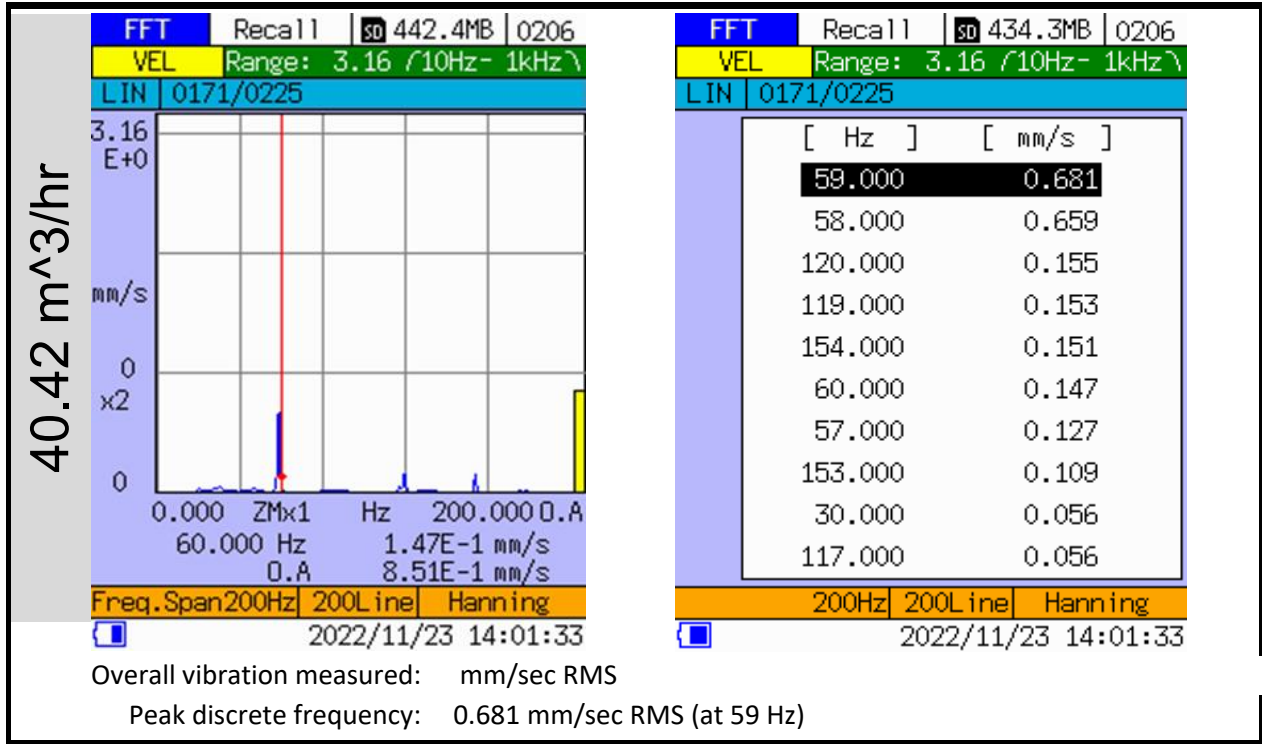
Tested by: R Baxter

Sign: _____



FFT VIBRATION TEST REPORT ON:

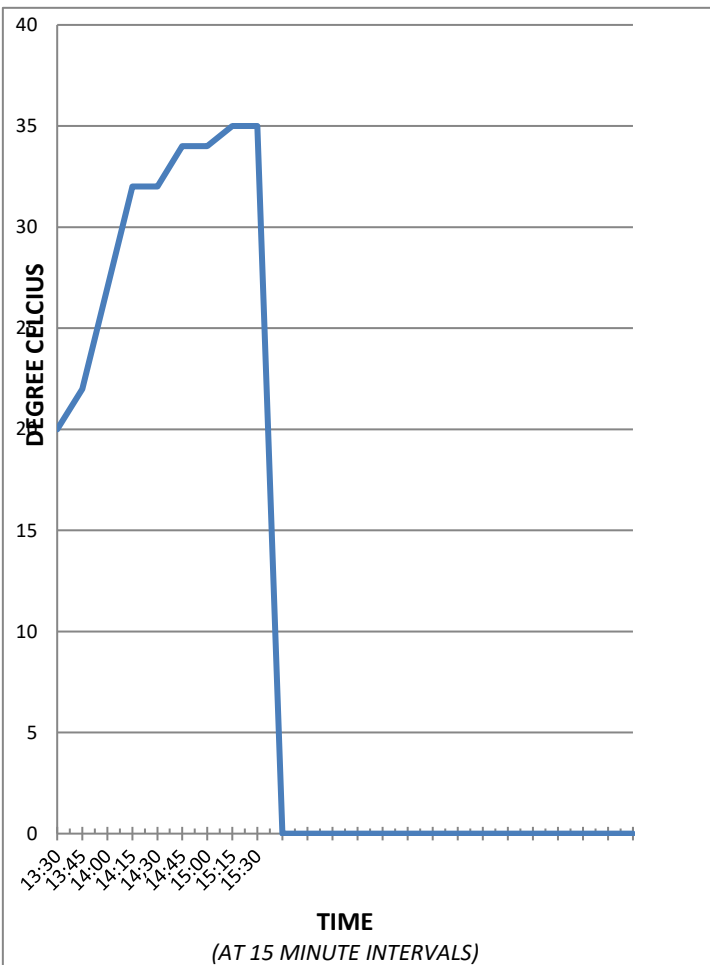
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Discrete frequencies Acceptance Level: <2.0 mm/sec RMS



Tested by: R Baxter

Sign: _____

Customer:	Air Products Manufacturing LLC
Pump / Item No:	839916A
Instrument/Re-Calibration Date:	InfraRed Thermometer: IR01
Date:	23 November 2022
Sensor location:	Bearing housing
Pump rotational speed:	3520rpm
Pump Test Start Time:	13:30

[illegible]

‘-+98

HMD SEAL/LESS PUMP H/Q/P PERFORMANCE TEST SHEET

HMD SEAL/LESS PUMPS LTD.
HAMPDEN PARK INDUSTRIAL ESTATE
EASTBOURNE,
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BN22 9AN
ENGLAND

TELEPHONE : (01323) 452000
FAX : (01323) 503369
EMAIL : pumps@hmdpumps.com

CLIENT:	Air Products Manufacturing LLC	ORDER N°:	4505605360
HMD JOB N°:	839916B	PUMP SPEED:	3520 RPM
PUMP MODEL:	GSP 3x1.5x6H DA6 (40BAR)	IMPELLER DIA:	6.10 Inches
ORIFICE PLATE:	Inches	ITEM NUMBER:	18-P-250B
BALANCE KEYS:		BALANCE HOLES:	5@7.5 mm
DUTY REQUIREMENTS:-		LIQUID DETAILS:-	
DUTY FLOW:	151.02 (US)GPM	LIQUID PUMPED:	Acid Gas Stripper Bottoms
DUTY HEAD:	146.98 FT		
HYD TEST PRESSURE:	870 PSI	SG:	0.900
JACKET TEST PRESS:	PSI	TEMPERATURE:	380 ° F
NPSHA:	16.73 FT	VISCOSITY:	0.18 cSt
MOTOR DETAILS:-		SERIAL N°:	Z2205310307
MANUFACTURER:	Baldor	RATED PWR:	15.02 HP
SUPPLIED BY:	HMD	FRAME SIZE:	256 T
RATED SPEED:	3520 RPM	QUOTED ABS PWR:	11.40 HP
SUPPLY:	460 V / 3~ / 60 Hz		

PERFORMANCE TESTED TO :

API 685

READING	1	2	3	4	5	6	7	8
FLOW in (GPM)	0.00	16.38	83.70	143.45	151.02	177.96		
DIFFERENTIAL HEAD in FT	167.98	166.47	161.85	151.35	147.51	140.97		
POWER (hp)	7.91	8.05	9.66	11.13	11.26	11.94		
PUMP EFFICIENCY	0.00	8.56	35.43	49.26	49.94	53.08		
Discharge readings M H2O	51.00	50.50	48.00	42.50	41.00	37.50		
Correction gauge FLC	167.32	165.68	157.48	139.44	134.51	123.03		
Suction Head M H2O	0.10	0.10	0.00	-0.30	-0.30	-0.50		
Correction gauge FLC	0.33	0.33	0.00	-0.98	-0.98	-1.64		
Wattmetre reading (hp)	7.91	8.05	9.66	11.13	11.26	11.94		
Motor Efficiency (%)	100.0	100.0	100.0	100.0	100.0	100.0		
Motor speed rpm	3520	3520	3520	3520	3520	3520		
Impeller speed rpm	3520	3520	3520	3520	3520	3520		
Slip rpm	0	0	0	0	0	0		
Thrust (lbs)								
Datum correction (FT)	0.98	0.98	0.98	0.98	0.98	0.98		
Suction Bore (INCHES)	2.95	2.95	2.95	2.95	2.95	2.95		
Discharge Bore (INCHES)	1.50	1.50	1.50	1.50	1.50	1.50		
vel suc ² /2 x g (FLC)	0.000	0.009	0.239	0.702	0.778	1.080		
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TESTED BY : M Wheeler

SIGNATURE 

FOR : Air Products Manufacturing LLC

DATE OF TEST : 24-Nov-22

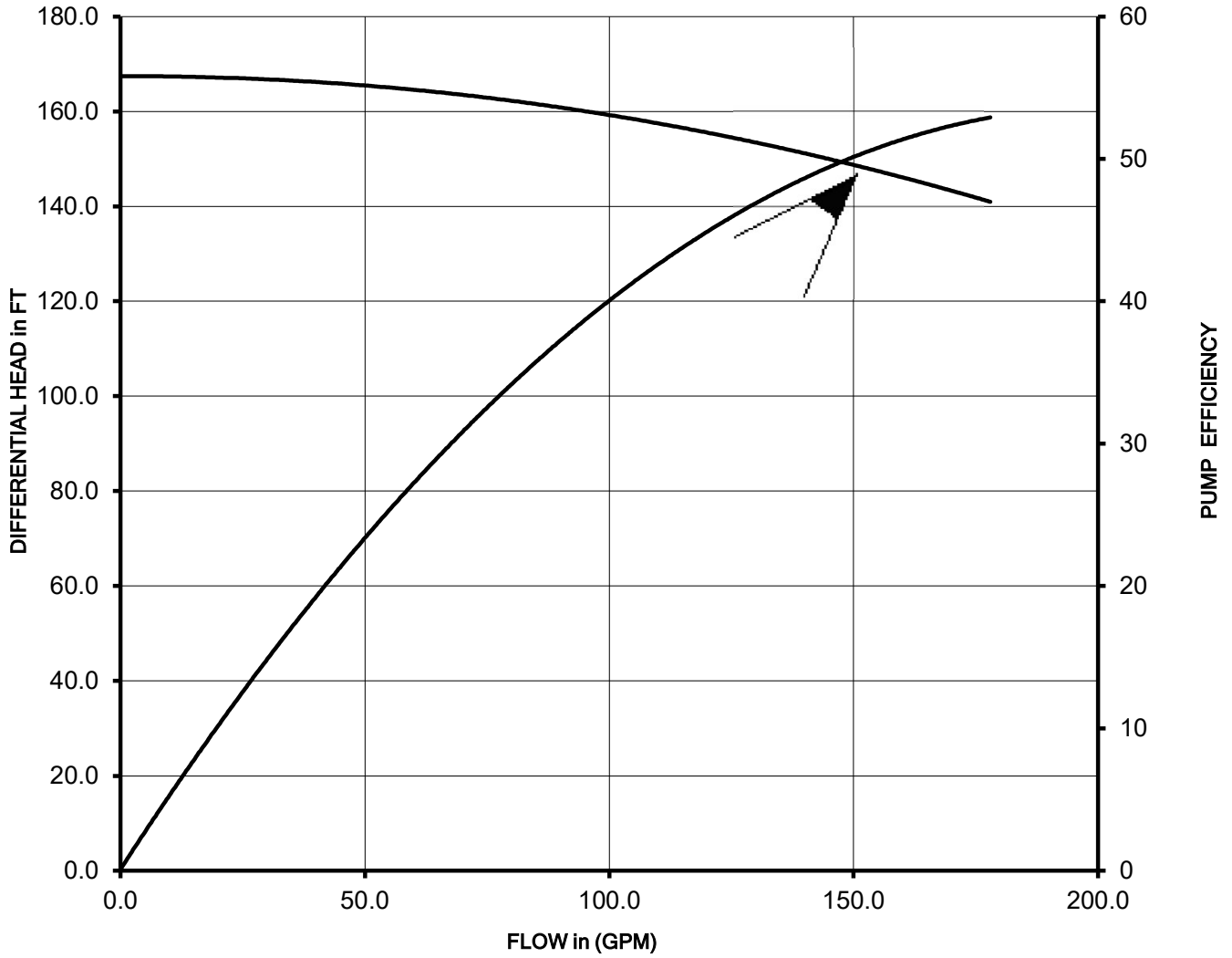
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SIGNATURE

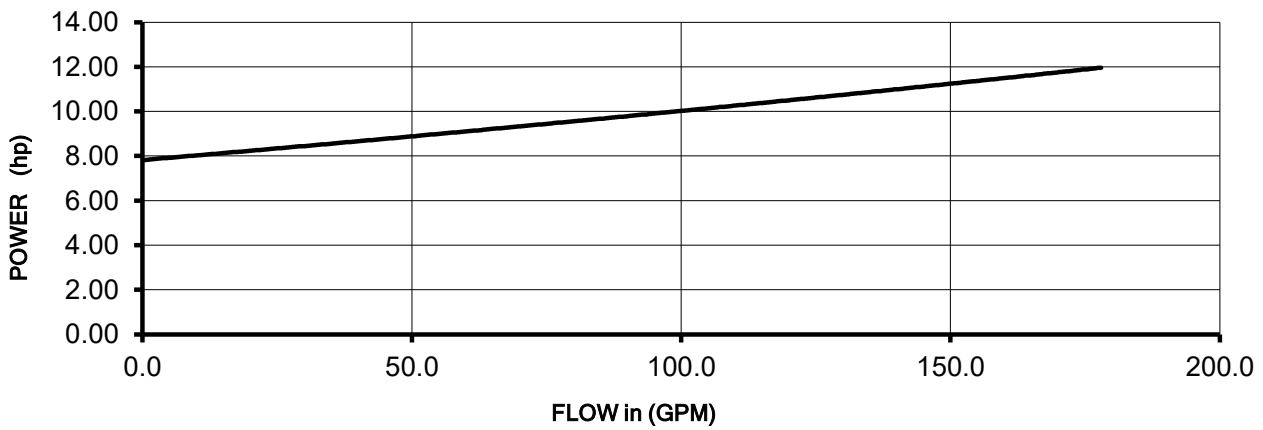
Pump Model: GSP 3x1.5x6H DA6 (40BAR)
Speed: 3520 **RPM**
Impeller Dia: 6.10 **Inches**
Orifice Plate: **Inches**

HMD Serial No: 839916B
Item No: 18-P-250B

HQ PERFORMANCE CURVE



POWER CURVE



HMD SEAL/LESS PUMP H/Q/P SG CORR PERFORMANCE TEST SHEET

HMD SEAL/LESS PUMPS LTD.
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HMD JOB N°:	839916B	PUMP SPEED:	3520 RPM
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JACKET TEST PRESS:	PSI	TEMPERATURE:	380 ° F
NPSHA:	16.73 FT	VISCOSITY:	0.18 cSt
MOTOR DETAILS:-		SERIAL N°:	Z2205310307
MANUFACTURER:	Baldor	RATED PWR:	15.02 HP
SUPPLIED BY:	HMD	FRAME SIZE:	256 T
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SUPPLY:	460 V / 3~ / 60 Hz		

PERFORMANCE TESTED TO : API 685

READING	PUMP PERFORMANCE ON SITE SG (Acid Gas Stripper Bottoms) - NOT VISC CORRECTED							
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FLOW in (GPM)	0.00	16.38	83.70	143.45	151.02	177.96		
DIFFERENTIAL HEAD in FT	167.98	166.47	161.85	151.35	147.51	140.97		
POWER (hp)	7.34	7.46	8.91	10.23	10.36	10.96		
PUMP EFFICIENCY	0.00	8.31	34.57	48.21	48.89	52.03		

READING	PUMP PERFORMANCE ON SITE SG AND VISCOSITY (Acid Gas Stripper Bottoms)							
	1	2	3	4	5	6	7	8
FLOW in (GPM)	0.00	16.38	83.70	143.45	151.02	177.96		
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PUMP EFFICIENCY	0.00	8.31	34.57	48.21	48.89	52.03		

Note:

All pump efficiency figures stated are OVERALL and include magnetic coupling loss.

Viscosity Correction Factors	
Cq =	1.00
Ch =	1.00
Ce =	1.00

TESTED BY : M Wheeler

SIGNATURE

FOR : Air Products Manufacturing LLC

DATE OF TEST : 24-Nov-22

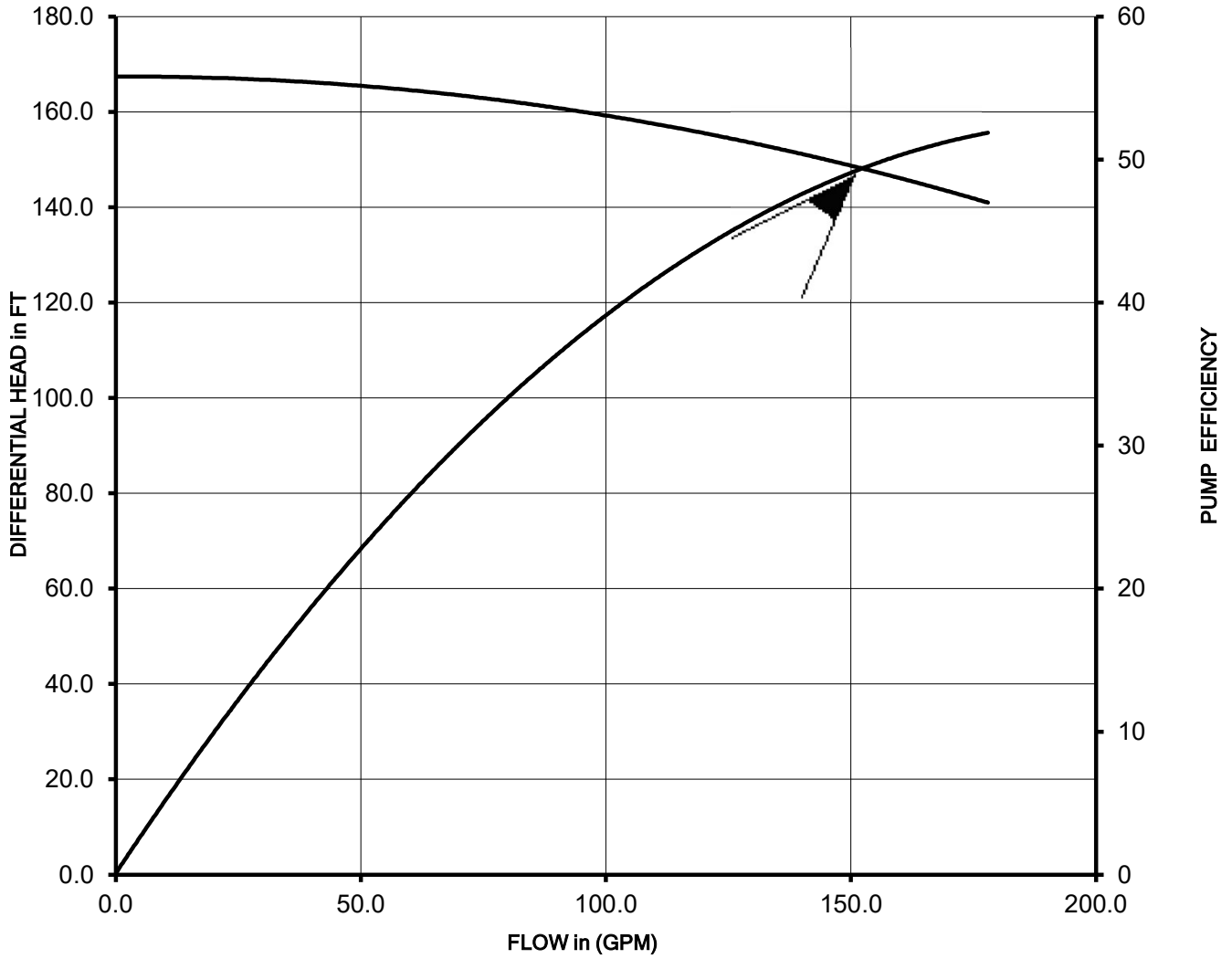
WITNESSED BY :

SIGNATURE

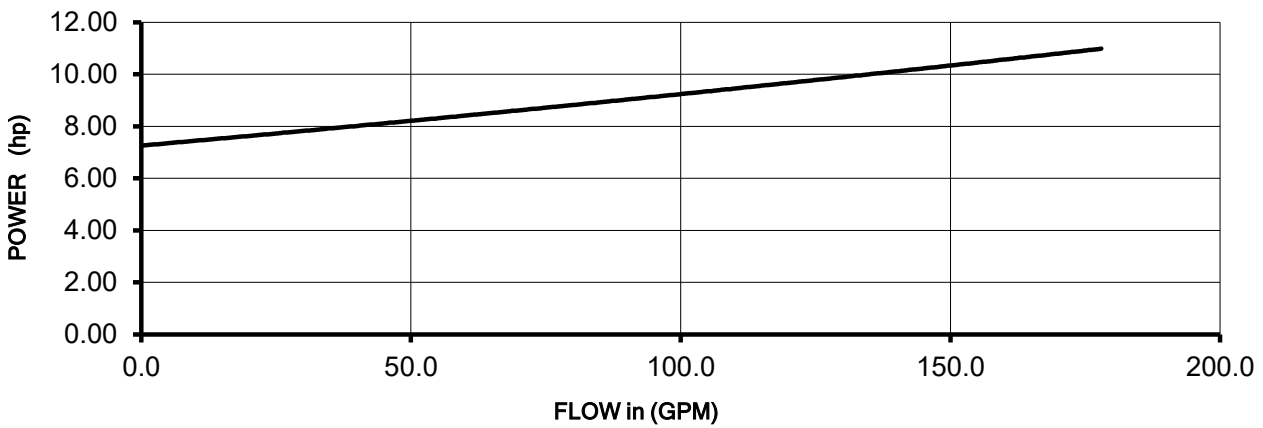
Pump Model: GSP 3x1.5x6H DA6 (40BAR)
Speed: 3520 **RPM**
Impeller Dia: 6.10 **Inches**
Orifice Plate: **Inches**

HMD Serial No: 839916B
Item No: 18-P-250B

HQ PERFORMANCE CURVE CORRECTED FOR SITE CONDITIONS



POWER CURVE CORRECTED FOR SITE CONDITIONS



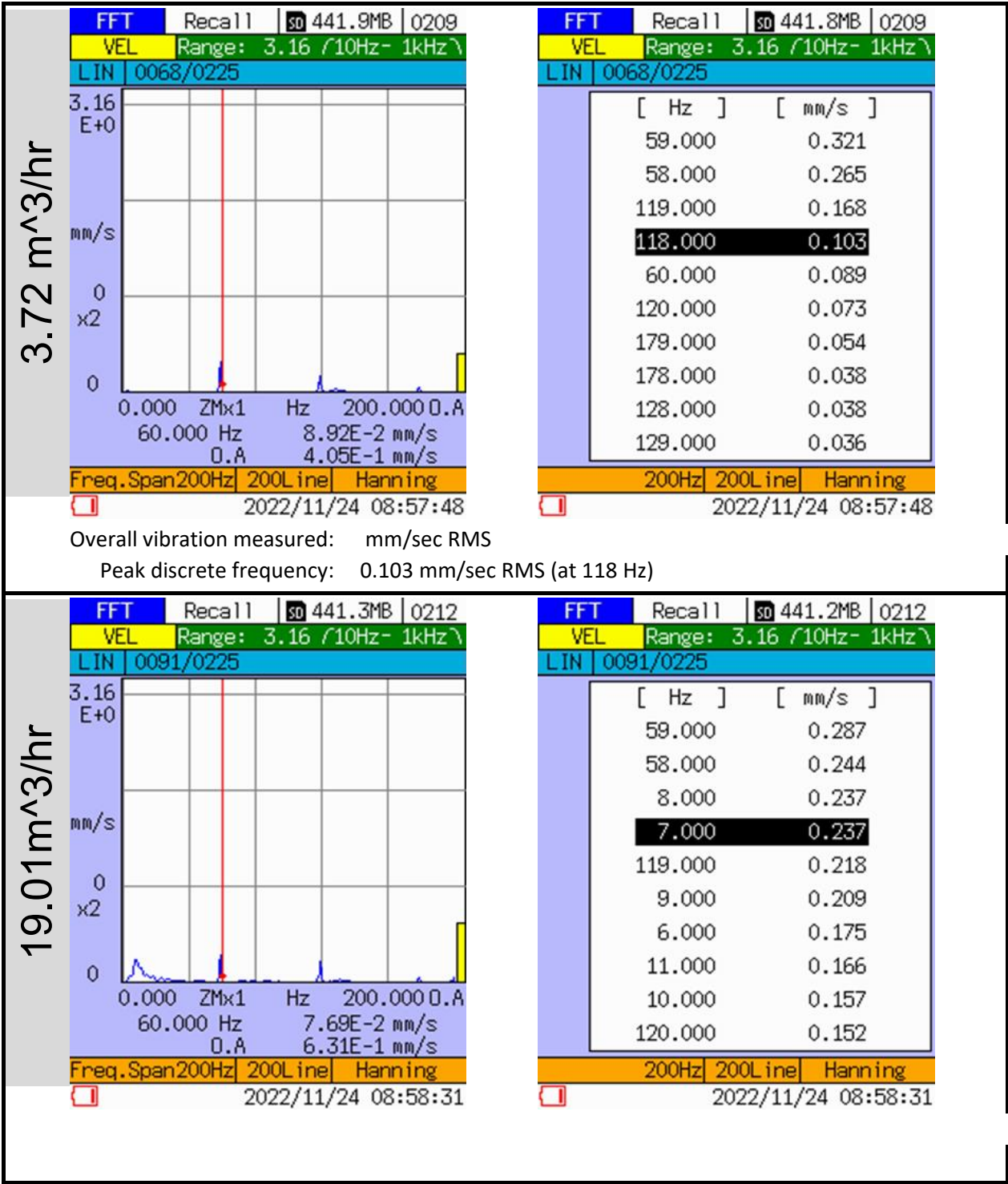
HMD SEAL/LESS PUMP NOISE TEST SHEET									
HMD SEAL/LESS PUMPS LTD. HAMPDEN PARK INDUSTRIAL ESTATE EASTBOURNE, EAST SUSSEX BN22 9AN ENGLAND					TELEPHONE : (01323) 452 000 FAX : (01323) 503369 EMAIL : pumps@hmdpumps.com				
CLIENT : CLIENT ORDER N° : CLIENT ITEM N° : HMD JOB N° :		Air Products Manufacturing LLC 4505605360 839916B 18-P-250B							
<u>PUMP UNIT TESTED :-</u>		<u>DESCRIPTION :-</u>							
		PUMP MODEL : DUTY FLOW : DUTY HEAD :			GSP 3x1.5x6H DA6 (40BAR) 151.02 GPM 146.98 FT				
<u>MOTOR DETAILS :-</u>		<u>DESCRIPTION :-</u>							
		RATED SPEED : RATED POWER : SUPPLY : SERIAL N° : MANUFACTURER :			3520 RPM 15.02 HP 460 V / 3~ / 60 Hz Z2205310297 Baldor				
<u>ACOUSTIC CONTROL DEVICES :-</u>		<u>DESCRIPTION :-</u>							
<u>MEASURING EQUIPMENT :-</u>		<u>DESCRIPTION :-</u>							
		SOUND METER : SERIAL N° :			Bruel&Kjaer NV01				
TEST RESULTS :- (dBA VALUES)									
(AT DUTY POINT)									
MICROPHONE POSITION	OVERALL	62.5	125	250	500	1k	2k	4k	8k
1	78.70	31.00	50.40	60.70	64.60	70.80	72.50	73.30	72.40
2	77.80	31.60	52.20	62.70	64.30	69.30	72.60	72.50	70.20
3	77.90	30.70	52.50	63.20	64.00	67.40	73.20	72.70	70.40
4	77.30	34.60	51.70	61.70	64.80	69.30	72.70	71.40	68.70
5	75.50	31.40	48.90	60.10	64.60	68.40	71.20	68.70	65.70
BACKGROUND NOISE, POST TEST	56.70	29.30	35.30	44.90	54.00	49.40	48.60	43.10	33.10
MEASURED SOUND PRESSURE LEVEL AVERAGED OVER SURFACE MEASURED									77.44
BACKGROUND SOUND PRESSURE LEVEL AVERAGED OVER MEASURED SURFACE									56.70
BACKGROUND NOISE CORRECTION									0.00
TEST ENVIRONMENT NOISE CORRECTION - BASED ON ISO 3744									-6.90
CORRECTION FOR SET-UP (EG. TEST PIPING, VALVES, BASEPLATE ETC)									
CORRECTED SOUND PRESSURE LEVEL AVERAGED OVER MEASURED SURFACE									70.54
COMMENTS :-									
TESTED BY : M Wheeler					SIGNATURE				
FOR : Air Products Manufacturing LLC					DATE OF TEST : 24-Nov-22				
WITNESSED BY :					SIGNATURE				

HMD SEAL/LESS PUMP VIBRATION TEST SHEET																																																																											
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<u>ISOLATION DEVICES :-</u>	<u>DESCRIPTION :-</u>	MOUNTING TYPE : NUMBER OF MOUNTS : NOISE SHEILDING : CONNECTIONS																																																																									
<u>MEASURING EQUIPMENT :-</u>	<u>DESCRIPTION :-</u>	ACCELEROMETER : VIB2 SERIAL N° : 5146 FIXING METHOD :																																																																									
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READINGS TAKEN AS R.M.S																																																																											
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="9" style="text-align: left; padding: 5px;">VIBRATION LEVEL (inches/s)</th> </tr> <tr> <th style="width: 30%; padding: 5px;">TEST POINT</th> <th style="width: 5%; padding: 5px;">1</th> <th style="width: 5%; padding: 5px;">2</th> <th style="width: 5%; padding: 5px;">3</th> <th style="width: 5%; padding: 5px;">4</th> <th style="width: 5%; padding: 5px;">5</th> <th style="width: 5%; padding: 5px;">6</th> <th style="width: 5%; padding: 5px;">7</th> <th style="width: 5%; padding: 5px;">8</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">FLOW</td> <td style="text-align: center;">16.38</td> <td style="text-align: center;">83.70</td> <td style="text-align: center;">143.45</td> <td style="text-align: center;">151.02</td> <td style="text-align: center;">177.96</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">VERTICAL- V₁</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">TRANSVERSE- H₁</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.03</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.03</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">AXIAL- A</td> <td style="text-align: center;">0.01</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.01</td> <td style="text-align: center;">0.02</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">VERTICAL- V₂</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">TRANSVERSE- H₂</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.03</td> <td style="text-align: center;">0.03</td> <td style="text-align: center;">0.02</td> <td style="text-align: center;">0.02</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				VIBRATION LEVEL (inches/s)									TEST POINT	1	2	3	4	5	6	7	8	FLOW	16.38	83.70	143.45	151.02	177.96				VERTICAL- V ₁	0.02	0.02	0.02	0.02	0.02				TRANSVERSE- H ₁	0.02	0.03	0.02	0.02	0.03				AXIAL- A	0.01	0.02	0.02	0.01	0.02				VERTICAL- V ₂	0.02	0.02	0.02	0.02	0.02				TRANSVERSE- H ₂	0.02	0.03	0.03	0.02	0.02			
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FFT VIBRATION TEST REPORT ON:

Customer: Air Products Manufacturing LLC
Pump / Item No: 839916 B
Instrument used: Vibration Analyzer, model VA-12, serial no. 00990032
Date: 24 November 2022
Sensor location & Position: Bearing housing & Radial / Vertical
Pump rotational speed: 3520rpm – 60 HZ
API 685 Acceptance levels: <3.0 mm/sec RMS (Overall)
Discrete frequencies Acceptance Level: <2.0 mm/sec RMS



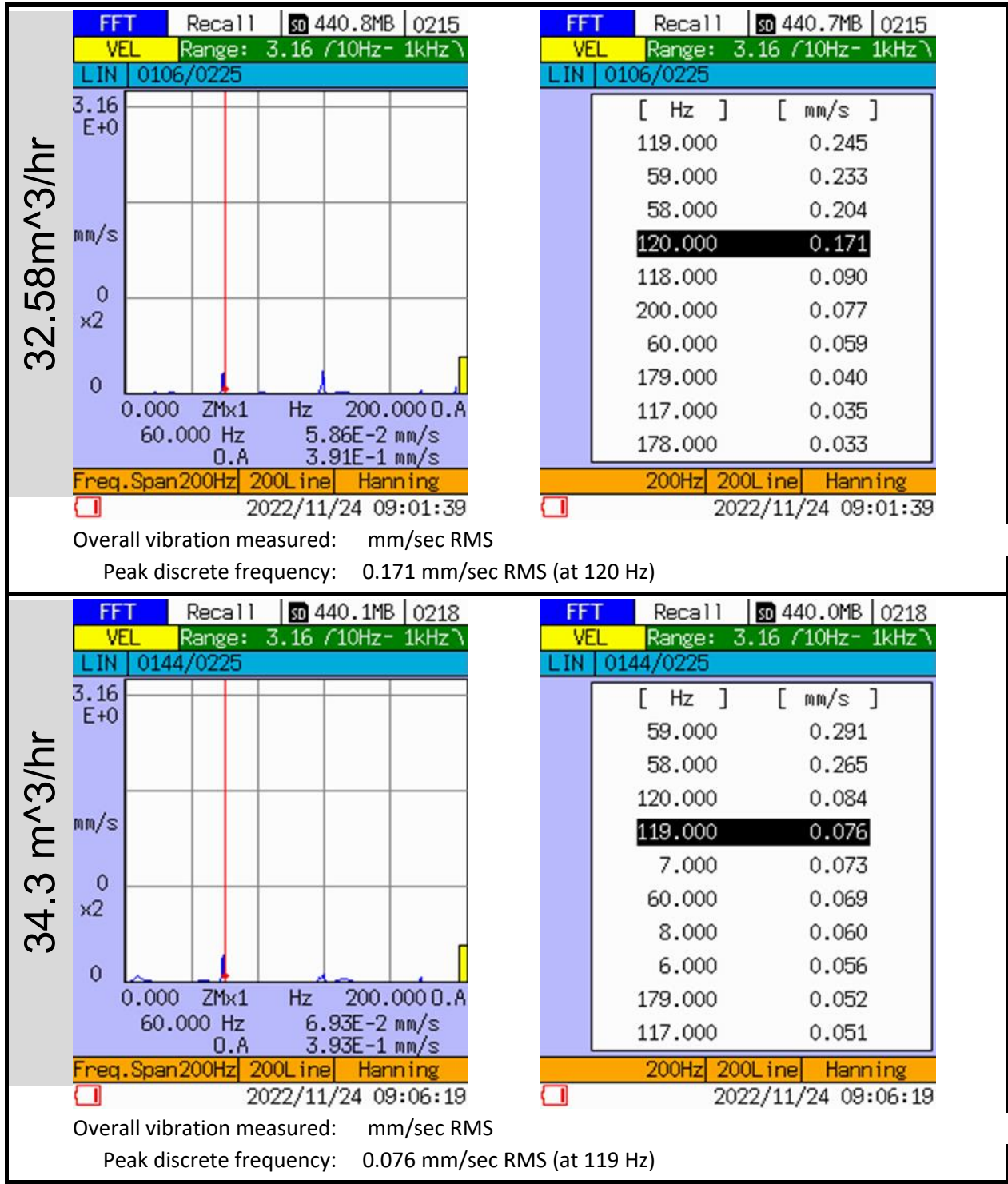
Tested by: R Baxter

Sign: _____



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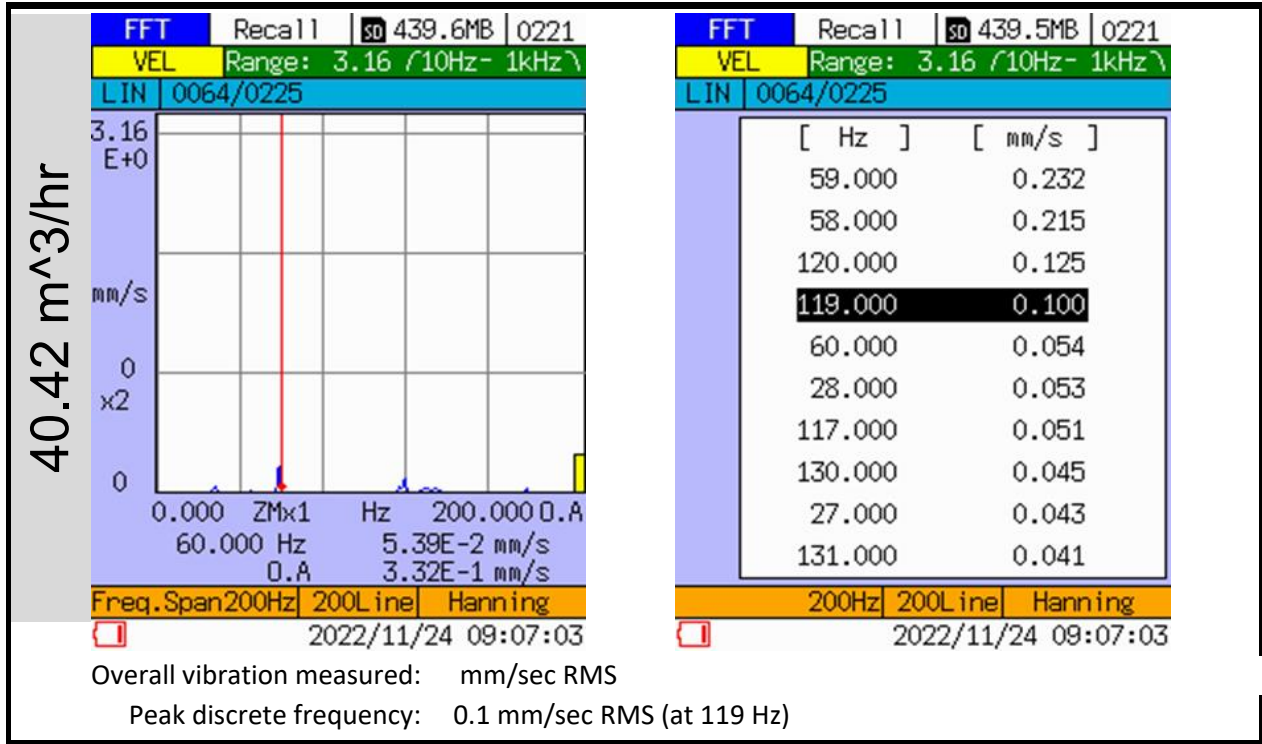
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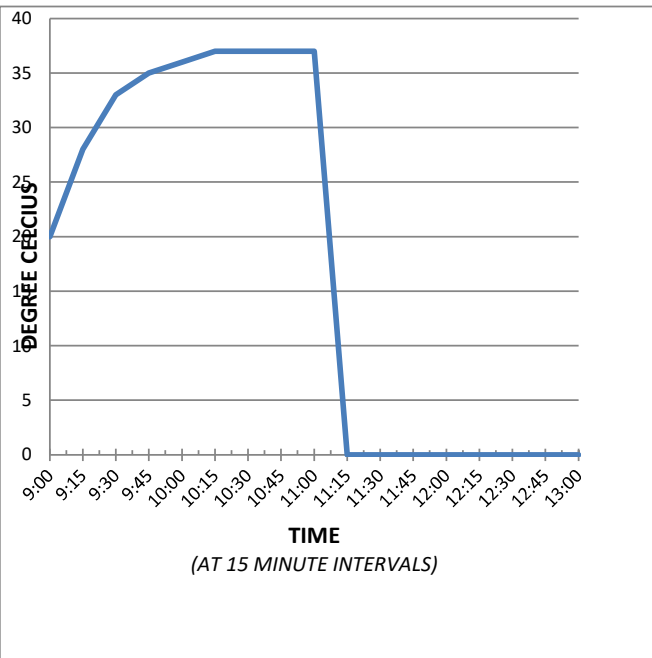
Sign: _____



BEARING TEMPERATURE RISE CERTIFICATE

Customer: Air Products Manufacturing LLC
Pump / Item No: 839916B
Instrument/Re-Calibration Date: InfraRed Thermometer: IR01
Date: 24 November 2022
Sensor location: Bearing housing
Pump rotational speed: 3520
Pump Test Start Time: 9:00

TEST TIMES:	TEMPERATURE: S/T
9:00	20
9:15	28
9:30	33
9:45	35
10:00	36
10:15	37
10:30	37
10:45	37
11:00	37
11:15	
11:30	
11:45	
12:00	
12:15	
12:30	
12:45	
13:00	



12

TESTED BY : M Wheeler

SIGNATURE:

+98

FOR : Air Products Manufacturing LLC

WITNESSED BY :

SIGNATURE: