# EQUIPMENT DATA SHEET
# (INCL PREDICTED PERFORMANCE CURVE)

| | | |
|---|---|---|
| CLIENT | : | Air Products Manufacturing LLC |
| PROJECT NAME/NO. | : | WEP Renewables |
| CLIENT PO NO | : | 4505605360 |
| HMD DOCUMENT NO | : | HMD-4505605360-C04-07 |
| CLIENT DOCUMENT NO | : | FI01/LF01 |
| HMD PUMP NO | : | 840055 & 840056 |
| EQUIPMENT TAG NO | : | 18-P-257A/18-P-257S |

| | | | | | |
|---|---|---|---|---|---|
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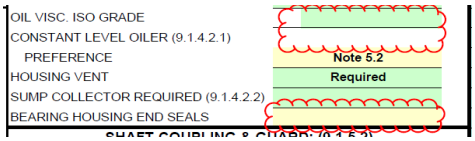
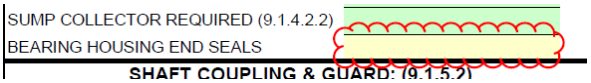
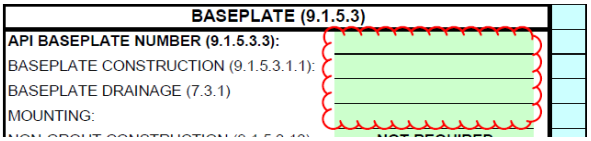
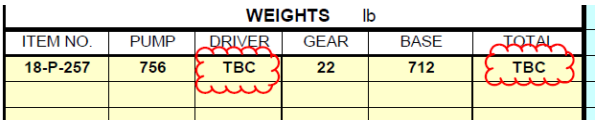
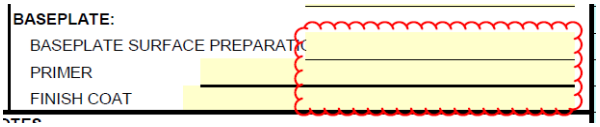
| | | | | | |
| | | | | | |
| 1 | 05/09/2022 | ISSUE FOR REVIEW | ARM | AFS | NW |
| 0 | 30/05/2022 | ISSUE FOR REVIEW | JLW | AFS | NW |
| REV | DATE | DESCRIPTION | PREPARED BY | CHECKED BY | APPROVED BY |

**NOTE:**

HMD KONTRO Sealless Pumps

# RESOLUTION SHEET

| Comment Number | Document Name: EQUIPMENT DATA SHEET (INCL PREDICTED PERFORMANCE CURVE) | | Revision from which comment first appeared | Comment Status: Open\Closed - (Date Closed:) |
|---|---|---|---|---|
| | CLIENT COMMENT | HMD RESPONSE | Current Rev: | |
| 1 | 33 ELEVATION (MSL) 69 ft BAROMETER: 14.7 psia<br>34 RANGE OF AMBIENT TEMPS: MIN / MAX 35 / 104 105<br>35 RELATIVE HUMIDITY: MIN / MAX AVG / 54 % | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 2 | 47 ~~centerline elevation above the pump foundation. A minimum NPSH ma~~<br>48 2.4 Pump Control Method: ~~Flow control valve~~ Level Control<br>49 2.5 Motor shall be rated for Class 1, Div 2, Gr B,C,D and Temperat | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 3 | , NH3 and CO2.<br>~~p of foundation. Pump Supplier shall adjust the NPSHa based on the actual pump~~<br>~~argin of 3 ft or 10%, whichever is higher, is required at 110% of Rated flow.~~<br>ature Code T3C.<br>A8KM-PP-000-400002-A, Structural Data for Mechanical Equipment, and<br>There is no Control Valve at pump discharge. Pump will operate on Level Control. At Feed Deoiler slop oil section HLL, P-257 is to start automatically and at LLL the pump is to stop. Pump is with auto start facility. Vendor to confirm that Pump is suitable for Auto Start. | Pump is suitable for Auto Start providing pump has not been drained, that is pump is still fully flooded with process fluid. Noted, Closed | 0 | Closed (05/09/2022) |
| 4 | 8 RATED CURVE BEP FLOW (at rated impeller dia.) 7.2 gpm<br>9 MIN. FLOW THERMAL: gpm STABLE : 3.6 gpm<br>10 PREFERRED OPERATING REGION: (6.1.11) 5.04 to 8.64 gpm | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 5 | 16 NPSH3 at RATED FLOW : 5.33 ft<br>17 CL PUMP TO U/S BASEPLATE: ft<br>18 NPSH MARGIN at RATED FLOW : 7.37 ft<br>19 SPECIFIC SPEED: (6.1.16) gpm,rpm,ft | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 6 | 38 EXTERNAL - -<br>39 2ND DRAIN 1 1/2" SW<br>40 3/4" as per GAD<br>41 GUSSET SUPPORT REQUIRED (6.3 | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 7 | 6 REDUCED HARDNESS MATERIALS REQ'D (6.10.1.11) YES<br>7 APPLICABLE HARDNESS STANDARD (6.10.1.11) MR0103<br>8 COPPER IN CONTACT W/ PROCESS FLUIDS Not Allowed<br>9 CASING & COVER: 316L Stainless Steel (ASTM A351 CF3M) | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 8 | 14 INNER MAG SHEATH/ROTOR LINE encapsulated)<br>15 BEARING SLEEVE:<br>16 BEARING BRUSHING<br>17 STATOR HOUSING/FRAME | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 9 | 55 INSULATION CLASS F<br>56 FULL LOAD AMPS<br>57 LOCKED MOTOR AMPS Specify Details<br>58 START CONDITION OPEN VALVE (FULLY-LOADED) | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 10 | PRESSURE CASING OR DRIVER (9.1.1.4): YES<br>DESIGN CONTAINMENT SHELL FOR VACUUM (6.2.4<br>CONTAINMENT SHELL VACUUM DESIGN: psig<br>MAGNETIC COUPLING TYPE: SYNCHRONOUS<br>MAGNETS: OUTER INNER<br>MAGNETIC MATERIAL Neodymium (fully encapsulated)<br>MOUNTING METHOD Bonded Bonded/Potted<br>Vendor to confirm that the Magnetic Material is in compliance to Table I.1 of API 685 | Confirm that the Magnetic Material is in compliance to API 685. Noted, Closed | 0 | Closed (05/09/2022) |
| 11 | TORQUE RATING (DECOUPLING) 46.46 ft-lb<br>MAX TORQUE REQ'D ON STARTING (9.1.3.7a) ft-lb<br>PUMP TORQUE AT RATED (+5%), (9.1.3.7b) ft-lb<br>DESIGN FOR FULL CURVE TORQUE REQUIREMENTS (9.1.<br>TORQUE REQ'D FOR FULL CURVE (120% BEP), (9.1.3.7c) ft-lb<br>REQUIRED/ACTUAL SERVICE FACTOR (9.1.3 / | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 12 | DRIVE MAGNET BEARING (TYPE/NUMBER): See Note 6.7 for additional requirem<br>RADIAL /<br>THRUST /<br>LUBRICATION METHOD: OIL BATH | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |

| Comment Number | Document Name: EQUIPMENT DATA SHEET (INCL PREDICTED PERFORMANCE CURVE) | | Revision from which comment first appeared | Comment Status: Open\Closed - (Date Closed:) |
|---|---|---|---|---|
| | CLIENT COMMENT | HMD RESPONSE | Current Rev: | |
| 13 |  | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 14 |  | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 15 |  | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 16 |  | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 17 |  | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |
| 18 |  | Noted and updated. Noted, Closed | 0 | Closed (05/09/2022) |

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**WORLD ENERGY PARAMOUNT**
**World Energy Renewables Project**
**Paramount, California**

**MECHANICAL EQUIPMENT DATASHEET**
**Document Number: A8KM-18-089-540101-A**
**Rev. 1, 5-Sep-2022**
**HMD-4505605360-C04-07**

# WORLD ENERGY RENEWABLES PROJECT

## MECHANICAL EQUIPMENT DATA SHEET FOR 18-P-257 / 257S

## SLOP OIL PUMP

## Document No. A8KM-18-089-540101-A

## Fluor Project No: A8KM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
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| | | | | | | | |
| 1 | 5-Sep-2022 | ISSUE FOR REVIEW | 7 | ND | ARM | AFS | |
| 0 | 30-May-2022 | ISSUE FOR REVIEW | 7 | JLW | AFS | NW | |
| **REV** | **DATE** | **DESCRIPTION** | **PAGES** | **ORIG** | **CHK'D** | **APPV'D** | **CLIENT** |

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# SEALESS CENTRIFUGAL PUMP
# API 685, 2nd EDITION
# DATA SHEET

Note: This Data Sheet has been modified from that in Annex R of API 685, Second Edition.

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-257 / 257S | | |
| Revision: | 1 | Date: | 5-Sep-22 |
| Unit: | SWSPlus Unit | | |
| Doc. No.: | A8KM-18-089-540101-A | | |
| Inquiry No.: | A8KM-4-616 | | |
| Sheet | 2 of 7 | | |

REV

CLIENT: **World Energy Paramount**

SERVICE: **Slop Oil Pump** PLANT: **World Energy Renewables Plant** SITE: **Paramount, CA**

NO. REQ'D : **1 (Note 2.1)** PUMP SIZE : **801S Frame 1** TYPE: **MAGNETIC DRIVEN** NO. STAGES : **1**

MANUFACTURER: **Sundyne HMD Kontro** MODEL: **LMV801S DA1 ZL** SERIAL NO.: 840055-056

APPLICABLE TO : ● PURCHASE

INFORMATION BELOW TO BE COMPLETED: ○ BY PURCHASER ■ BY SUPPLIER ◯ BY EITHER

## LIQUID CHARACTERISTICS

LIQUID TYPE OR NAME: **Slop Oil**

| | UNITS | MAXIMUM | NORMAL | RATED |
|---|---|---|---|---|
| VAPOR PRESSURE: | psi (a) | | | **14.7** |
| SPECIFIC GRAVITY: | | | | **0.89** |
| SPECIFIC HEAT: | BTU/lbm ºF | | | **0.5** |
| VISCOSITY: | cP | | | **0.60** |

NOTE: Max, Min, & Rated values refer only to the property listed

## OPERATING CONDITIONS (6.1.2)

| | UNITS | MAXIMUM | RATED | NORMAL | MINIMUM |
|---|---|---|---|---|---|
| NPSHa Datum | | **C.L. IMPELLER - 3' Above Grade** | | | |
| PUMPING TEMP.: | °F | **150.0** | **100.0** | **100.0** | |
| FLOW: | gpm | | **6.7** | **6.1** | |
| DISCHARGE PRESS: (6.3.2) | psig | | **23.9** | | |
| SUCTION PRESSURE: | psig | **83.0** | **4.9** | | |
| DIFFERENTIAL PRESSURE: | psi | | **19.0** | | |
| DIFFERENTIAL HEAD: | ft | | **49.0** | | |
| $NPSH_A$: | ft | | **12.7** | **Excludes required 3' margin** | |
| HYDRAULIC POWER: | HP | | **0.87** | | |

## OPERATING CONDITIONS - CONTINUED

| | |
|---|---|
| SERVICE : | **CONTINUOUS** |
| *IF INTERMITTENT NO. OF STARTS / D | |
| PUMPS OPERATE IN: | |
| TEMPERATURE - VAPOR PRESS. CUR | |
| CORROSION DUE TO: (6.10.1.8) | **Note 2.2** |
| EROSION DUE TO: (6.10.1.8) | |
| $H_2S$ CONCENTRATION (ppmw): (6.10.1. | **Design for Wet H2S** |
| CHLORIDE CONCENTRATION (ppmw): | |
| PARTICULATE SIZE (DIA. IN MICRONS) | |
| PARTICULATE SIZE DISTRIBUTION: | |
| PARTICULATE CONCENTRATION (ppm | |
| PARTICULAR HARDNESS: | |
| THERMAL CONDUCTIVIT Btu/(h-ft-°F) | |
| THERMAL EXPANSION: in/in/°F | |
| POLYMERIZATION CHARACTERISTICS: (6.1.3.3) | |

## SITE AND UTILITY DATA

LOCATION: **OUTDOOR** **UNHEATED**

MOUNTED AT: **GRADE** ○ TROPICALIZATION REQ'D

ELECTRICAL AREA CLASSIFICATION: ○ NON CLASSIFIED

CLASS: **I** GROUP: **B,C,D** DIVISION: **2**

ZONE: GROUP: TEMP. CLASS **T3C**

SITE DATA:

ELEVATION (MSL) **69** ft BAROMETER: **14.7** psia

RANGE OF AMBIENT TEMPS: MIN / MAX **35** / **105** °F

RELATIVE HUMIDITY: MIN / MAX **AVG** / **54** %

UNUSUAL CONDITIONS:

UTILITY CONDITIONS:

| ELECTRICITY: | DRIVERS | HEATING | CONTROL | Instruments |
|---|---|---|---|---|
| VOLTAGE | **460** | **120** | **120** | **24V** |
| PHASE | **3** | **1** | **1** | |
| HERTZ | **60** | **60** | **60** | |

**COOLING WATER: IF APPLICABLE**

| | | INLET | RETURN | | MECH. DESIGN |
|---|---|---|---|---|---|
| TEMP | °F | - | - | MAX | - |
| PRESSURE | psig | - | - | MIN | - |
| SOURCE | | **Cooling Tower** | | | |
| COOLING WATER CHLORIDE CONCENTRATI | | **<840** | ppmw | | |

**INSTRUMENT AIR** MAX: **N/A** psig MIN: **N/A** psig

**NITROGEN:** MAX: psig MIN: psig

| **STEAM** | | | DRIVERS | HEATING |
|---|---|---|---|---|
| TEMP | °F | MAX | | |
| | | MIN | | |
| PRESS. | psig | MAX | | |
| | | MIN | | |

## NOTES

**2.1 1 x 100% pumps. One (1) operating & one (1) warehouse spare (pump only).**

**2.2 Design for wet H2S service. Corrosion is caused by wet H2S, NH3 and CO2.**

**~~2.3 Pump centerline is assumed to be 3'-0" above grade and 27" above top of foundation. Pump Supplier shall adjust the NPSHa based on the actual pump centerline elevation above the pump foundation. A minimum NPSH margin of 3 ft or 10%, whichever is higher, is required at 110% of Rated flow.~~**

**2.4 Pump Control Method: Level Control (Auto Start Function)**

**2.5 Motor shall be rated for Class 1, Div 2, Gr B,C,D and Temperature Code T3C.**

**2.6 Pump supports shall meet design load requirements per Project Spec. A8KM-PP-000-400002-A, Structural Data for Mechanical Equipment, and A8KM-PP-000-200001-A, Plant Site Data Sheet.**

**2.7 18-P-257 has two destinations:**

**a) Slop Oil Tank, T-3001. This is the governing case and conditions are shown above**

**b) New API Separator. Conditions are as listed below:**

**Flow (gpm): Min 2.4, Norm 6.1, Rated 6.7** **Suction Pressure (psig): Max 83.0, Rated 4.9**

**Discharge Pressure (psig): 18.4** **Differential Head (ft): 35.0** **Hydraulic Power (hp): 0.1**

**Differential Pressure (psi): 13.5** **NPSHa (ft): 12.7**

**The liquid conditions are the same between both cases.**

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# SEALESS CENTRIFUGAL PUMP
# API 685, 2nd EDITION
# DATA SHEET

Note: This Data Sheet has been modified from that in Annex R of API 685, Second Edition.

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-257 / 257S | | |
| Revision: | 1 | Date: | 5-Sep-22 |
| Unit: | SWSPlus Unit | | |
| Doc. No.: | A8KM-18-089-540101-A | | |
| Inquiry No.: | A8KM-4-616 | | |
| Sheet | 3 of 7 | | |

REV

## PERFORMANCE

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PROPOSAL CURVE NO.: | NIL | RPM | 1780 | | | | | |
| As Tested Curve No.: | | | | | | | | |
| IMPELLER DIA.: RATED: | 6.12 | MAX: | 6.375 | MIN: | 5.812 | in | | |
| HYDRAULIC EFFICIENCY AT RATED POINT: | | | | | 8.5 | % | | |
| HYSTRERESIS & MECHANICAL LOSSES: | | | | | - | HP | | |
| RATED POWER: | 0.87 | HP | EFFICIENCY: | | 8.5 | % | | |
| RATED CURVE BEP FLOW (at rated impeller dia.) | | | | | 7.2 | gpm | | |
| MIN. FLOW THERMAL : | 3.6 | gpm | STABLE : | | 3.6 | gpm | | |
| PREFERRED OPERATING REGION: (6.1.11) | 5.04 | to | 8.64 | gpm | | | | |
| ALLOWABLE OPERATING REGION: | 0.82 | to | 3.6 | gpm | | | | |
| MAX. HEAD @ RATED IMPELLER: | | | | | 52.14 | ft | | |
| MAX. POWER @ RATED IMPELLER: | | | | | 0.88 | HP | | |
| PERCENT RISE TO SHUTOFF: | | | | | 6 | % | | |
| ORIFICE USED TO STEEPEN CURVE OR GIVE CONT. R | | | | | NO | | | |
| NPSH3 at RATED FLOW : | | | | | 5.33 | ft | | |
| CL PUMP TO U/S BASEPLATE: | | | | | 1.425 | ft | | |
| NPSH MARGIN at RATED FLOW : | | | | | 7.37 | ft | | |
| SPECIFIC SPEED: (6.1.16) | | | | gpm,rpm,ft | 287.5 | | | |
| SUCTION SPECIFIC SPEED LIMIT: | | | | | 9,000 | | | |
| SUCTION SPECIFIC SPEED: | | | | gpm,rpm,ft | 2441 | | | |

| | | | |
|---|---|---|---|
| ROTOR CHAMBER TEMP RISE OPERATING: | | | |
| AT RATED CONDITIONS | | °F | |
| AT MAXIMUM PUMP FLOW | | °F | |
| ROTOR CHAMBER TEMP RISE ON SHUTDOWN: | | °F | |
| SOUND LEVELS (AT 3 FT) | | | |
| MAX ALLOWABLE SOUND PRESSURE LEVEL | 85 | dBA | |
| ESTIMATED MAX SOUND PRESSURE LEVEL | 75 | dBA | 1 |

## SYSTEM DESCRIPTION

| | | |
|---|---|---|
| SUCTION VESSEL: | CLOSED | |
| PUMP LOCATION: | BELOW LIQUID LEVEL | |
| SUCTION VESSEL ON LEVEL CONTROL? | YES | |
| PRESSURE SENSOR ON SUCTION VESSEL? | YES | |
| SUCTION VESSEL PRESSURE MAINTAINED BY LIQUID LEVEL PI | | |
| FLUID VAPOR PRESSURE | | |
| IF FLUID LEVEL OR TANK PRESSURE DROPS TOO LOW, WILL | | 1 |
| SYSTEM AUTOMATICALLY STOP THE PUMP? | YES | |
| WILL THE PUMP RUN DRY IN NORMAL OPERATION? | NO | 1 |
| REMARKS: | | |

## CONSTRUCTION

**API PUMP TYPE:** OH5 [Based on API 610 Definitions]

**NOZZLE CONNECTIONS:** (6.4.5)

| | SIZE | FACING | RATING | POSITION |
|---|---|---|---|---|
| SUCTION | 3" | RF | 600 | IN-LINE |
| DISCHARGE | 2" | RF | 600 | IN-LINE |

FLANGE THICKNESS REQ'S NON-STD BOLT LENGTH

**PRESSURE CASING AUXILIARY CONNECTIONS:** (6.3.3)

| | NO. | SIZE | TYPE | FACING | RATING | POSITION |
|---|---|---|---|---|---|---|
| PURGE/FLUSH OUT | - | - | - | - | - | - |
| DRAIN | 1 | 1" | SWF | RF | 600 | SIDE |
| VENT | 1 | 1/2" | SWF | RF | 600 | SIDE |
| PRESSURE SENSOR | 1 | 1/2" | SWF | RF | 300 | SIDE |
| TEMP SENSOR | - | - | - | - | - | - |
| WARM-UP LINE | - | - | - | - | - | - |
| EXTERNAL | - | - | - | - | - | - |
| 2ND DRAIN | 1 | 3/4" | SWF | RF | 300 | SIDE |

| | |
|---|---|
| GUSSET SUPPORT REQUIRED (6.3.3.5): | YES |
| DRAIN CONNECTION FOR SECONDARY CASING | NO |
| ROTOR CAVITY DRAINABLE THROUGH 2ND DRAIN: | N/A |
| DRAIN VALVE SUPPLIED BY: | PURCHASER |
| VENT VALVE SUPPLIED BY: | |
| NO THREAD CONS TO SECONDARY CASING: | NO |
| SPECIAL FITTINGS FOR TRANSITIONING (6.3.3.2): | NO |
| CYLINDRICAL THREADS REQUIRED (6.3.3.11.3): | NO |
| MACHINED AND STUDDED CONNECTIONS (6.3.3.7): | NO |

| | | | | | |
|---|---|---|---|---|---|
| CASING MOUNTING: | INLINE | | | | |
| CASING TYPE: (6.3.10) | SINGLE VOLUTE | | | | |
| ROTATION: (VIEWED FROM COUPLING END) | CW | | | | |
| CASE PRESSURE RATING: | | | | | |
| MAWP: (6.2.2) | 564 | psig | @ | 170 | °F |
| HYDROTEST: | 870 | psig | @ | 100.04 | °F |
| TYPE BOLTING USED ON PUMP (6.1.31.1): | | | | | |
| AUXILIARY CIRCULATION PIPING PLAN | | | | | |
| PIPING FORM: | | | | | |
| PIPING MATERIAL: | | | | | |
| PIPING ASSEMBLY: | | | | | |
| IF FLANGED: | | | | | |
| COOLING WATER REQUIREMENTS: | NOT APPLICABLE | | | | |
| COOLING WATER PIPING PLAN | | | | | |
| PIPING FORM: | | | | | |
| PIPING MATERIAL: | | | | | 1 |
| PIPING ASSEMBLY: | | | | | |
| IF FLANGED: | | | | | |
| FOR: JACKET | | gpm | | | |
| HEAT EXCHANGER | | gpm | | | |
| TOTAL COOLING WATER | | gpm | | | |
| HEATING REQUIREMENTS: | NOT APPLICABLE | | | | |
| HEATING MEDIUM | | gpm | | | |
| HEATING PIPING | | MATERIAL: | | | |
| ROTOR: | | | | | |
| IMPELLER TYPE | SEMI-OPEN | | | | |
| RENEWABLE IMPELLER WEAR RINGS REQUIRED | N/A | | | | |
| RENEWABLE CASE WEAR RINGS REQUIRED | N/A | | | | |
| COMPONENT BALANCE TO ISO 1940 G1.0 | YES | | | | |

## NOTES

**3.1 Flanges for spiral wound gaskets shall have flange surface finish of 125 µin Ra to 250 µin Ra maximum. Finishes shall be judged by visual compar surface roughness standards conforming to ASME B46.1**

**3.2 Reduced hardness materials are required in accordance with API 685, 2nd Edition, Section 6.10.1.11**

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# SEALESS CENTRIFUGAL PUMP
# API 685, 2nd EDITION
# DATA SHEET

Note: This Data Sheet has been modified from that in Annex R of API 685, Second Edition.

| | | | |
|---|---|---|---|
| Contract: | A8KM | | |
| Item No: | 18-P-257 / 257S | | |
| Revision: | 1 | Date: | 5-Sep-22 |
| Unit: | SWSPlus Unit | | |
| Doc. No.: | A8KM-18-089-540101-A | | |
| Inquiry No.: | A8KM-4-616 | | |
| Sheet | 4 of 7 | | |

REV

## CONSTRUCTION (CONT'D)

### MATERIAL (6.10.1.1)

| | |
|---|---|
| APPENDIX H CLASS: | A-8: 316 SS / 316 SS |
| MINIMUM DESIGN METAL TEMP (6.10.4.1 | psig @ 32 °F |
| IMPACT TEST SPECIFICATION | |
| REDUCED HARDNESS MATERIALS REQ'D (6.10.1.11 | YES |
| APPLICABLE HARDNESS STANDARD (6.10.1.11) | MR0103 |
| COPPER IN CONTACT W/ PROCESS FLUIDS | NOT ALLOWED |
| CASING & COVER: | 316L Stainless Steel (ASTM A351 CF3M) |
| IMPELLER: | 316L Stainless Steel (ASTM A351 CF3M) |
| SHAFT: | 22% Chr Duplex St St (ASTM A276 UNS S31803) |
| WEAR RINGS: | N/A for Barske Impeller |
| CONTAINMENT SHELL/STATOR LINI | PEEK Composite |
| INNER MAG SHEATH/ROTOR LINE | Neodymium Iron Boron (fully encapsulated) |
| BEARING SLEEVE: | Silicon Carbide |
| BEARING BRUSHIN( | Silicon Carbide |
| STATOR HOUSING/FRAME | N/A |
| INSPECTION CLASS | LEVEL 2 |

### PRESSURE VESSEL DESIGN CODE REFERENCES

| | |
|---|---|
| THESE REFERENCES MUST BE LISTED BY THE MANUFACTURER: | |
| SOURCE OF MATERIAL PROPERTIES | ASTM |
| | |
| CASTING FACTORS USED IN DESIGN (TABLE 3) | |

### WELDING AND REPAIRS

| | |
|---|---|
| ALTERNATE WELDING CODES AND STANDARDS | |
| WELDER QUALIFICATION | |
| WELD PROCEDURE QUALIFICATIOI | |
| MP OR LP EXAM OF PLATE EDGE | |
| POST WELD HEAT TREAT | |
| POST WELD HEAT TREAT OF CASI | |

**ALTERNATE STD/ACCEPT CRITERIA APPLIES**

| INSPECTION | METHOD | CASTINGS | FABRICATIONS |
|---|---|---|---|
| RADIOGRAPH | | | |
| ULTRASONIC | | | |
| MAG PARTICLE | | | |
| LIQ PENETRATE | | | |
| VISUAL | | | |

### MOTOR REQUIREMENTS APPLICABLE TO ALL (7.1.2), See Sheet 8

| | | |
|---|---|---|
| MANUFACTURER: | | BALDOR |
| FRAME OR MODEL: | | 215T |
| ORIENTATION: | | VERTICAL |
| NAMEPLATE POWER | HP | 7.5 |
| SERVICE FACTOR | | 1.15 |
| NOMINAL RPM | | 1780 |
| RATED LOAD RPM | | |
| VARIABLE SPEED REQUIRED | | NO |
| SOURCE OF VARIABLE SPEED | | |
| VOLTAGE | | 460 |
| PHASE | | 3 |
| HERTZ | | 60 |
| MINIMUM STARTING VOLTAGE | | 80% |
| INSULATION CLASS | | F |
| FULL LOAD AMPS | | 7.5 |
| LOCKED MOTOR AMPS | | 51.32 |
| START CONDITION | | OPEN VALVE (FULLY-LOADED) |

### MAGNETIC DRIVEN PUMP SPECIFIC (9.1)

| | | | |
|---|---|---|---|
| DRIVER TYPE | MOTOR | GEAR | NO |
| CLOSE COUPLED DESIGN APPROVED (9.1.1.2): | | | |
| DESIGN FOR REMOVAL OF DRIVE END WITHOUT DISTURBING THE PRESSURE CASING OR DRIVER (9.1.1.4): | YES | | |
| DESIGN CONTAINMENT SHELL FOR VACUUM (6.2.4 | | | |
| CONTAINMENT SHELL VACUUM DESIGN: psig | | | |
| MAGNETIC COUPLING TYPE: | SYNCHRONOUS | | |

| MAGNETS: | OUTER | INNER |
|---|---|---|
| MAGNETIC MATERIAL | Neodymium (fully encapsulated) | |
| MOUNTING METHOD | Bonded | Bonded/Potted |
| TEMP. LIMIT °F | 500 | 500 |
| HERMETIC. SEALED | No | Yes |
| NO. OF MAGNETS | Proprietary | Proprietary |

| | | | |
|---|---|---|---|
| PROTECTION OF OUTER MAG RING (9.1.3. | | | |
| STARTING REQUIREMENT: | ACROSS-THE-LINE | | |
| TORQUE RATING (DECOUPLING) | 46.46 | ft-lb | |
| MAX TORQUE REQ'D ON STARTING (9.1.3.7a) | NA | ft-lb | |
| PUMP TORQUE AT RATED (+5%), (9.1.3.7b) | 2.56 | ft-lb | |
| DESIGN FOR FULL CURVE TORQUE REQUIREMENTS (9.1. | YES | | |
| TORQUE REQ'D FOR FULL CURVE (120% BEP), (9.1.3.7c) | 2.6 | ft-lb | |
| REQUIRED/ACTUAL SERVICE FACTOR (9.1.3 | 1.25 / 18.15 | | |
| SUBMIT MAG-COUPLING TORQUE VS TEMP. CURVE | YES | | |
| SUBMIT SPEED VS TORQUE CURVE (9.1.3.10) | YES | | |

### BEARINGS AND LUBRICATION (9.1.4)

| | | | |
|---|---|---|---|
| DRIVE MAGNET BEARING (TYPE/NUMBER): | See Note 6.7 for additional requirem | | |
| RADIAL | / N/A | | |
| THRUST | / N/A | | |
| LUBRICATION METHOD: | N/A | | |
| OIL VISC. ISO GRADE | N/A | | |
| CONSTANT LEVEL OILER (9.1.4.2.1) | | | |
| PREFERENCE | N/A | | |
| HOUSING VENT | N/A | | |
| SUMP COLLECTOR REQUIRED (9.1.4.2.2) | N/A | | |
| BEARING HOUSING END SEALS | N/A | | |

### SHAFT COUPLING & GUARD: (9.1.5.2)

| | | | |
|---|---|---|---|
| COUPLING MANUFACTURER | NA (CLOSE COUPLED) | | |
| MODEL | | SPACER LENGTH | in |
| RATING (POWER / 100 RPM | | SERVICE FACTOF | |
| COUPLING BALANCED TO | ISO 1940-1G6.3 (9.1.5.2.3) | | |
| COUPLING TO ISO 14691 (9.1.5.2.9) | | | |
| COUPLING GUARD STANDARD (9.1.5.2.11) | | | |
| IGNITION HAZARD ASSESSMENT REQUIRED (9.1.5.2.11.5) | | | |
| SPARK RESISTANT MATERIAL (9.1.5.2.11.6) | | | |

### BASEPLATE (9.1.5.3)

| | |
|---|---|
| API BASEPLATE NUMBER (9.1.5.3.3): | N/A |
| BASEPLATE CONSTRUCTION (9.1.5.3.1.1): | FULL TOP DECKING |
| BASEPLATE DRAINAGE (7.3.1) | DRAIN PAN |
| MOUNTING: | CEMENTATIOUS GROUTED |
| NON-GROUT CONSTRUCTION (9.1.5.3.13) | NOT REQUIRED |
| OPEN DECK DESIGN (9.1.5.3.14): | |
| PROVIDE STAINLESS SPACER PLATE UNDER ALL EQUIP. FEET (9.1.5.3.6) | |
| OTHER | Furnish two (2) diagonally opposed grounding provisions, Note 6.3 |

### SEPARATE MOTOR DRIVER, See Sheet 7

| | | | |
|---|---|---|---|
| APPLICABLE SPEC: | | ENCLOSURE | |
| INCLUDE: SPACE HEATE | | VIB. SENSOR | |
| LUBRICATION: | | | |
| DRIVER MOTOR BEARING (TYPE / NUMBER): | | | |
| RADIAL | / | | |
| THRUST | / | | |

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# SEALESS CENTRIFUGAL PUMP
# API 685, 2nd EDITION
# DATA SHEET

Note: This Data Sheet has been modified from that in Annex R of API 685, Second Edition.

| | |
|---|---|
| Contract: | A8KM |
| Item No: | 18-P-257 / 257S |
| Revision: | 1 Date: 5-Sep-22 |
| Unit: | SWSPlus Unit |
| Doc. No.: | A8KM-18-089-540101-A |
| Inquiry No.: | A8KM-4-616 |
| Sheet | 5 of 7 |

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## CANNED MOTOR PUMP SPECIFIC (9.2)

| | |
|---|---|
| MOTOR WINDING INSULATION CLASS (9.2.2.8) | |
| SOLID OR LIQUID HEAT TRANS. MEDIA ALLOWED IN STATOR? | |
| DESIGN MOTOR FOR FREQUENT STARTS (9.2.2.9) | |
| STARTS PER | |
| IMPACT ON LIFE: | |
| DESIGN MOTOR FOR (9.2.2.9): | |
| UL, FM, ATEX OR EQUIVALENT REQUIRED (9.2.2.10) | |
| CERTIFICATION OF IEEE 252 TEST REQUIRED (5.2.7.1) | |
| DESIGN STATOR LINE FOR VACUUM (6.2.4) | |
| STATOR LINER VACUUM DESIGN: | psig |
| DECONTAMINATION CONNECTION ON STATOR (9.2.2.11) | |

## SECONDARY CONTROL / CONTAINMENT

NFPA RATING:

HEALTH: FLAMMABILITY: INSTABILITY:

| | |
|---|---|
| USE ANNEX B HAZARD BASED PROCEDURE | |
| HAZARD STATEMENT | |
| RISK PHRASE | |
| HAZARD GROUP | |
| REQUIRED MEASURE: | |

**SECONDARY CONTROL (3.67)**

| | |
|---|---|
| MAX LEAKAGE ON PRIMARY FAILURE: | gpm |
| FLOW RESTRICTION: | **DRY-RUN MECHANICAL SEAL** |
| DEVICE MANUFACTURER: | Propriatory information |
| MATERIAL: | Propriatory information |
| ELASTOMERS: | Propriatory information |
| MANUFACTURER CODE: | Propriatory information |

**SECONDARY CONTAINMENT (3.65)**

| | |
|---|---|
| SECONDARY SEAL: | |
| DESIGN PRESSURE: | psig |

## INSTRUMENTATION (7.4.2)

| | |
|---|---|
| DETECT OPER. OUTSIDE ACCEPT. RANGE OR DECOUPLE (7.4.2.1) | |
| **NOT REQUIRED** METHOD: | |
| LOCATION: | |
| IF LOCAL PROVIDED BY: | |
| USE FOR: | |
| MONITOR LEAKAGE INTO SECOND CASING: | **YES** |
| METHOD: | **PRESSURE** |
| SENSOR BY: | **SUPPLIER** |
| TYPE: | **TRANSMITTER** |
| USE FOR: | **ALARM** |
| MONITOR VIBRATION: | **NOT REQUIRED** |
| METHOD: | |
| PROVISION REQUIRED: | |
| SENSOR BY: | |
| IF FULL TIME, USE FOR: | |
| MONITOR TEMPERATURE OF: | **NOT REQUIRED** |
| METHOD: | |
| SENSOR BY: | |
| TYPE: | |
| USE FOR: | |

## PREPARATION FOR SHIPMENT (8.4.1)

| | |
|---|---|
| TYPE OF SHIPMENT (8.4.1): | **EXPORT** |
| EXPORT BOXING | **Timber Box (Certified wood)** |
| N2 PURGE DURING SHIPPING (9.2.8.4) | |
| OUTDOOR STORAGE MORE THAN 6 MONTHS | **YES IF EXPORT** |
| PURGE DURING STORAGE (9.2.8.4) | **NO** |
| DETAILS OF LIFTING DEVICE | |

## SPARE PARTS (include cost & details w/ proposal)

| | |
|---|---|
| START - UP | **YES** |
| NORMAL MAINTANANCE | **YES** |
| SPARE ASSEMBLY: | |
| OTHER: | **Provide warehouse spare (bare pump)** |

## WEIGHTS lb

| ITEM NO. | PUMP | DRIVER | GEAR | BASE | TOTAL |
|---|---|---|---|---|---|
| **18-P-257** | **756** | **211** | **22** | **712** | **1701** |
| | | | | | |
| | | | | | |
| | | | | | |

## OTHER PURCHASER REQUIREMENTS

| | |
|---|---|
| COORDINATION MEETING REQUIRED (10.1.3) | **YES** |
| CASTING REPAIR WELD PROCEDURE APPR REQ'D (6.10.2. | **Note 5.1** |
| MAXIMUM DISCHARGE PRESSURE TO INCLUDE (6.2.3): | |
| MAX RELATIVE DENSITY | **YES** |
| OPERATION TO TRIP SPEED | |
| MAX DIAM. IMPELLERS | **YES** |
| CONNECTION DESIGN APPROVAL (6.10.3.4.4) | |
| DEMONSTRATE CO-PLANAR MOUNTING PAD SURFACES IN PUMP VENDOR SHOP (9.1.5.3.5) | **NONE** |
| DYNAMIC BALANCE TO ISO 1940-1 gr. G1.0 (6.8.4.2) | **YES** |
| INSTALLATION LIST IN PROPOSAL (10.2.3.1) | |
| INCLUDE PLOTTED VIBRATION SPECTRAS (6.8.3.2.1) | **YES** |
| CONNECTION BOLTING COATING | **PAINTED** |
| SUBMIT EST. SPL BY OCTAVE BAND | **REQUIRED** |
| MATERIAL CERTIFICATION REQUIRED (6.10.1.7) | |
| CASING | **YES** |
| IMPELLER | **YES** |
| SHAFT | **YES** |
| OTHER: | **All wetted pressure containing components** |
| VENDOR SUBMIT TEST PROCEDURES (8.3.1.1) | **YES** |
| ADDITIONAL DATA REQUIRING 20 YEARS RETENTION (8.2.1.1G) | |

## SURFACE PREPARATION AND PAINT

| | |
|---|---|
| MANUFACTURER'S STANDARD | **YES** |
| | **MFR STD per A8KM-PP-000-500520-A** |
| **PUMP:** | |
| PUMP SURFACE PREPARATION | **Per A8KM-PP-000-500520-A** |
| PRIMER | **MFR std in compliance or exceed ISO 12944-C4** |
| FINISH COAT | **As Above** |
| **BASEPLATE:** | |
| BASEPLATE SURFACE PREPARATIC | **Per A8KM-PP-000-500520-A** |
| PRIMER | **MFR std in compliance or exceed ISO 12944-C4** |
| FINISH COAT | **As Above** |

## NOTES

**5.1 Minor defects of a surface nature in the pressure casting (amounting to less than 20% of the wall thickness and less than 10 in$^2$ in total area) may be repaired without Buyer's approval**

**5.2 ~~Bearing housing oilers shall be Trico 8-oz. constant-level sight feed. Provide a minimum 3.4" NPS bulls-eye level gauge.~~**

**5.3 ~~Pump Vendor shall provide the coupling from the OEM of their choice. If Rexnord is not Vendor's standard, then Vendor shall provide an optional quote for a Rexnord coupling.~~**

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# SEALESS CENTRIFUGAL PUMP
# API 685, 2nd EDITION
# DATA SHEET

Note: This Data Sheet has been modified from that in Annex R of API 685, Second Edition.

| | |
|---|---|
| Contract: | A8KM |
| Item No: | 18-P-257 / 257S |
| Revision: | 1 Date: 5-Sep-22 |
| Unit: | SWSPlus Unit |
| Doc. No.: | A8KM-18-089-540101-A |
| Inquiry No.: | A8KM-4-616 |
| Sheet | 6 of 7 |

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## INSPECTION AND TESTING

| | |
|---|---|
| **GENERAL (8.1)** | |
| DAYS IN ADVANCE NOTIFICATION OF WITNESSED OR OBSERVED TESTS AND INSPECTIONS | 10 |
| NOTIFICATION OF SUCCESSFUL PRELIMINARY SHOP PERFORMANCE TEST (8.1.1.3) | REQUIRED |
| SUBMIT INSPECTION CHECKLIST (8.1.6) | REQUIRED |
| **SHOP INSPECTION (8.2)** | |
| ADDITIONAL SUBSURFACE EXAMINATION (6.10.1.5) (8.2.1.3 | |
| PART / EXAM | |
| PART / EXAM | |
| PART / EXAM | |
| PART / EXAM | |
| PMI TESTING REQUIRED (8.2.1.4) | REQUIRED |
| PARTS TO BE TESTED: | Per A8KM-PP-000-500512-A |
| INSPECTION REQUIRED FOR CASTINGS (8.2.2.1) | |
| MAG PARTICLE | NO |
| LIQUID PENTRANT | YES |
| RADIOGRAPHY | NO |
| ULTRASONIC | NO |
| INSPECTION REQUIRED FOR CONNECTION WELDS (6.10.3.4.5) | |
| MAG PARTICLE | NO |
| LIQUID PENTRANT | YES |
| RADIOGRAPHY | NO |
| ULTRASONIC | NO |
| CLEANLINESS PRIOR TO FINAL ASSEMBLY (8.2.3.1) | NON-WIT |

## TESTING (8.3)

| | |
|---|---|
| HARDNESS TEST REQUIRED (8.2.3.2) | NON-WITNESS |
| FOR | |
| METHOD | |
| COMPONENTS TO BE TESTED | |
| IMPACT TEST TO | NOT REQUIRED |
| HYDROSTATIC TEST (8.3.2) | NON-WITNESS |
| WETTING AGENT INCLUDED (8.3.2.7) | |
| PERFORMANCE TEST (8.3.3) | NON-WITNESS |
| TEST DATA POINTS | PER 8.3.3.3 |
| PERFORMANCE CURVE & DATA APPROVAL PRIOR TO SHIPMENT (8.3.3.3.5) | REQUIRED |
| TEST W/ NPSHA LIMITED TO 110% SITE NPSHA | NO |
| RUN UNTIL TEMP STABILIZATION ACHIEVED | YES |
| 1 HR. MECH RUN TEST (8.3.4.2.2) | NON-WITNESS |
| THRUST BEARING LOAD TEST (8.3.4.3) | |
| NPSH3 TEST (8.3.4.4.1) | NO |
| COMPLETE UNIT TEST (8.3.4.5) | |
| SOUND LEVEL TEST (8.3.4.6) FOR INFORMATION ONLY | NON-WITNESS |
| AUXILIARY EQUIPMENT TEST (8.3.4.7) | |
| SECONDARY CONTROL SYSTEM HYDRO | NON-WITNESS |
| SECONDARY CONTAINMENT / CONTROL SYSTEM INSTRUMENT TEST (8.3.4.9) | |
| STATIC TORQUE TEST (9.1.6.1) | |
| RUN UNTIL OIL TEMPERATURE STABILIZED (9.1.6.3) | |
| RESIDUAL UNBALANCE TEST (J.4.1.2) | |
| OTHER: | |

## NOTES

**6.1 PMI of alloy pressure containment parts, including pipes & valves, is required per Project Specification A8KM-PP-000-500512-A Positive Material Identification (PMI).**

**6.2 Pressure containing parts (including auxiliaries shall be tested hydrostatically with liquid at a minimum 1.5 times the maximum allowable working pressure.**

~~**6.3 Baseplate grounding tabs shall be 1/4" thick steel with at least (1) 9/16" diameter hole provided. If two (2) are provided, they shall be 9/16" dia. spaced 1-3/4" on center. Where stainless steel grounding tabs are required, 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. Estimated skid size is 26" x 24" x 48"**~~

~~**6.4 Baseplate shall be constructed with top plate decking and a drain rim. The baseplate shall be epoxy grouted. Baseplate shall be rigid constructed to accommodate 2 X Allowable Nozzle Loads & Moments in API 685, 2nd Edition.**~~

**6.5 Motor requires oversized terminal box.**

~~**6.6 A Witnessed NPSH test is required if NPSH margin over quoted NPSHR is less than 3 ft. at 110% of Rated capacity. A minimum 3 ft. margin is preferred when possible.**~~

~~**6.7 An ESCO single piece sight glass is required for the oil drain. A magnetic drain plug in housing is also required.**~~

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# SEALESS CENTRIFUGAL PUMP
# API 685, 2nd EDITION
# DATA SHEET

Note: This Data Sheet has been modified from that in Annex R of API 685, Second Edition.

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|---|---|
| Contract: | A8KM |
| Item No: | 18-P-257 / 257S |
| Revision: | 1 Date: 5-Sep-22 |
| Unit: | SWSPlus Unit |
| Doc. No.: | A8KM-18-089-540101-A |
| Inquiry No.: | A8KM-4-616 |
| Sheet | 7 of 7 |

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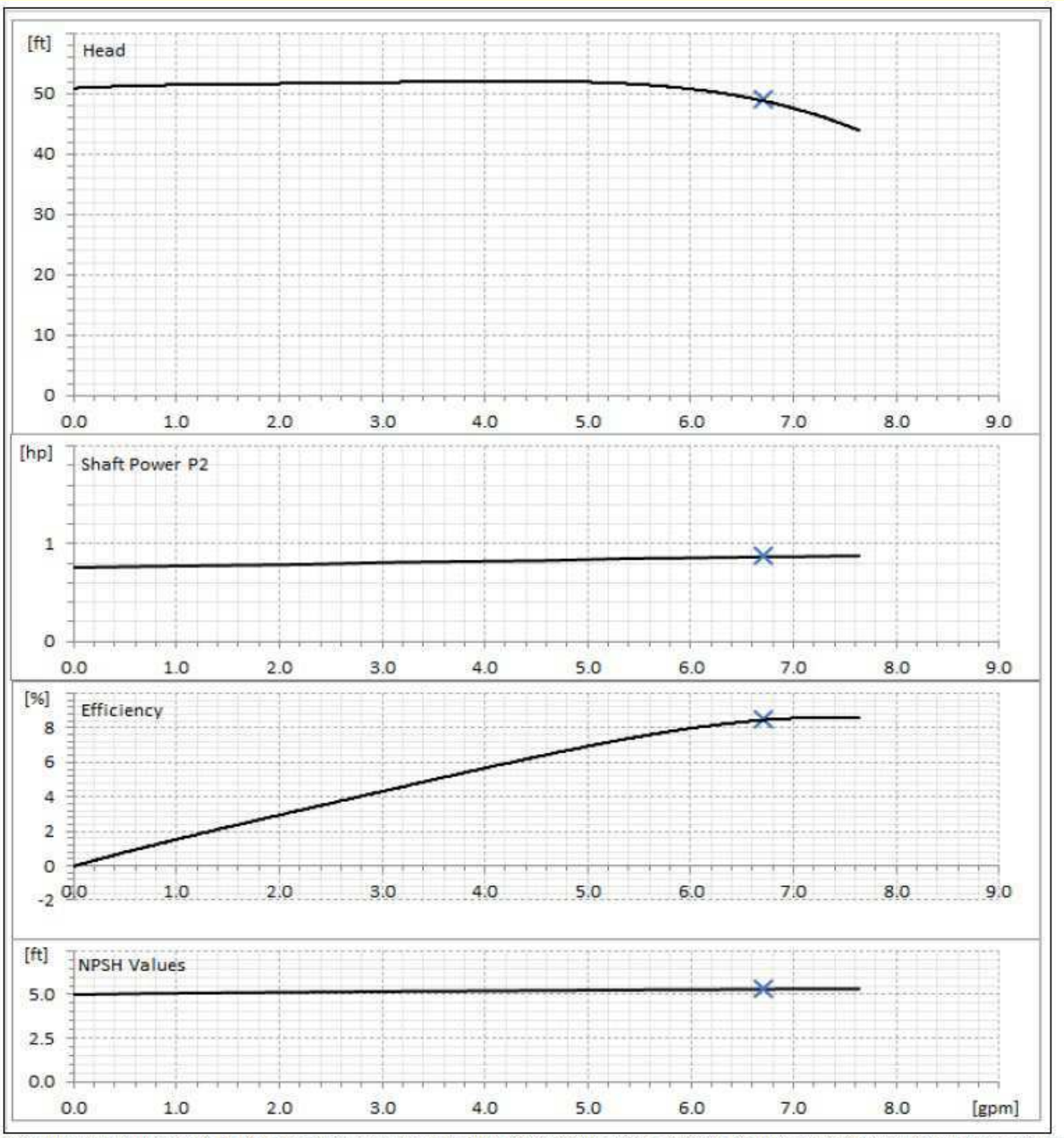
**Predicted Pump Curve:**

**Sundyne HMD Kontro:**

| | | | |
|---|---|---|---|
| Performance curve | | | |
| Impeller type | Barske Wheel | | |
| Direction of rotation | Anti-Clockwise from Drive End | | |
| Impeller construction | Semi-Open | | |
| Impeller Eye Area | | NSS (US unit) | 2441 |
| Frequency | 60 Hz Hz | Speed | 1780 rpm |

| | | | |
|---|---|---|---|
| Impeller Ø | Max. | inch | 6.375 |
| | Designed | inch | 6.12 |
| | Min. | inch | 5.812 |
| Flow | Nominal | US g.p.m. | 6.7 |
| | Max. | US g.p.m. | 7.63 |
| | Min. | US g.p.m. | 3.6 |
| Head | Nominal | ft | 49 |
| | at Max Flow- | ft | 43.66 |
| | at Min Flow- | ft | 52.14 |
| Head H(Q=0) | | ft | 51.04 |
| NPSH 3% | | ft | 5.33 |
| Shaft power | | hp | 0.87 |
| Max. shaft power sel. Impeller | | hp | 0.88 |
| Efficiency | | % | 8.47 |




Performance curve data is for reference only. For specific performance data refer to tabulated actual values and datasheet.

1