



Customer Document title:

## Flowserve Hydraulic Data Sheet

Flowserve Document title: **Flowserve Hydraulic Data Sheet**Flowserve Document No.: **1400944-011-5008-01**Document Revision No.: **A**Flowserve Order No.: **1400944**Flowserve Serial No.: **1400944CHP011A/D**Pump Type/Size: **MARK 3 STANDARD / 2K4X3-10HRV**Quantity: **4**Customer Name: **DESMET BALLESTRA NORTH AMERICA**

Customer Tag No: **DESMET TAG#: P635A.1/1, World Energy TAG#: 19-P-761A, DESMET TAG#: P635A.1/2, World Energy TAG#: 19-P-761B, DESMET TAG#: P635A.2/1, World Energy TAG#: 19-P-861A, DESMET TAG#: 635A.2/2, World Energy TAG#: 19-P-861B**

Customer PO No.: **28493**End User: **DESMET BALLESTRA NORTH AMERICA**

### Please complete and return:

Document Reviewed by:

Document Reviewed date:

- ☐ **APPROVED. NO ACTION REQUIRED**  
☐ **APPROVED. RE-SUBMIT AS FINAL**  
☐ **APPROVED WITH COMMENTS.** DOCUMENT WILL BE MODIFIED AND RESUBMITTED AS FINAL.  
☐ **REJECTED.** CORRECT AND RE-SUBMIT FOR APPROVAL.  
☐ **FOR INFORMATION.** REVIEW NOT REQUIRED  
☐ **AS-BUILT**

- Return any documents sent for review with your comments by the stated return date. All documents not returned two weeks after requested Return date will be considered Approved, no action.
- Purchaser's comments and/or corrections within the scope of contract will be made on the first completed document submitted by Flowserve Corp. and returned.
- Corrections, alterations, additions and/or modifications outside scope of contract or made after first submittal may require an additional engineering service charge.
- Items conditionally approved or with deferred approval by purchaser must be specifically stated otherwise delivery may be affected.

Rev	Revision Description	Released	Release Date
	For Information	Morris, Tamika	04-Feb-22

Customer	: DESMET PROCESS & TECHNOLO...	Pump / Stages	: 2K4x3-10HRV M3 ST / 1
Customer reference	: WORPAR	Based on curve no.	: MII17600CV
Item number	: P635A.1/1, 1/2, 2/1, 2/2	Flowserve reference	: 1989206898
Service	: Oil/Earth Reactor Discharge	Date	: August 26, 2021

	Unit	Oil/Earth Reactor D...	Alternate 1	Alternate 2	-
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Operating Conditions					
Capacity	USgpm	449.3	350.0	250.0	-
Water capacity / CQ	USgpm	450.4 / 1.00	351.4 / 1.00	251.6 / 0.99	- / -
Normal capacity	USgpm	-	-	-	-
Total developed head	ft	90.00	61.50	40.00	-
Water head / CH	ft	90.18 / 1.00	61.69 / 1.00	40.18 / 1.00	- / -
NPSH available (NPSHa)	ft	35.8	35.8	35.8	-
NPSHa less NPSH margin	ft	-	-	-	-
Maximum suction pressure	psig	0.0	0.0	0.0	-
Rated suction pressure	psig	0.0	0.0	0.0	-

Liquid					
Liquid type		Other	Other	Other	-
Liquid description		Oil/Earth Reactor Dis...	Oil/Earth Reactor Dis...	Oil/Earth Reactor Dis...	-
Temperature / Specific gravity	°F/	184 / 0.880	184 / 0.880	184 / 0.880	- / -
Solid Size - Actual / Limit	in/in	- / 0.7810	- / 0.7810	- / 0.7810	- / -
Viscosity / Vapor pressure	cP/psia	11.54 / -	11.54 / -	11.54 / -	- / -

Performance					
Actual head	ft	90.00	61.50	40.00	-
Hydraulic power	hp	8.99	4.78	2.22	-
Pump speed	rpm	1,730	1,422	1,136	-
Pump overall efficiency (CE=0.95)	%	65.0	59.4	49.5	-
NPSH required (NPSH3)	ft	5.2	3.2	1.7	-
Rated brake power	hp	13.8	8.06	4.50	-
Maximum brake power	hp	16.9	9.90	5.58	-
Driver power rating	hp / kW	20.0 hp / 14.9 kW	20.0 hp / 14.9 kW	20.0 hp / 14.9 kW	-
Casing working pressure	psig	37.6	25.4	16.2	-
(based on shut off @ cut dia/rated SG)					
Maximum allowable	psig	241.6	241.6	241.6	-
Hydrostatic test pressure	psig	413.0	413.0	413.0	-
Estimated rated seal chamber pressure	psig	0.8	0.8	0.8	-
Impeller diameter, Rated	in	10.00	10.00	10.00	-
Impeller diameter, Maximum/Minimum	in/in	10.00 / 6.00	10.00 / 6.00	10.00 / 6.00	- / -
Ns / Nss	(US units)	1,504 / 8,210	1,504 / 8,210	1,504 / 8,210	- / -
Minimum continuous flow	USgpm	57.3	47.1	37.7	-
Maximum head at rated diameter	ft	98.70	66.69	42.56	-
Flow at BEP	USgpm	571.0	471.8	380.5	-
Flow as % of BEP	%	78.7	74.2	65.7	-
Efficiency at normal flow	%	-	-	-	-
Impeller diameter ratio (rated/max)	%	100.0	100.0	100.0	-
Head rise to shut off	%	9.7	8.4	6.4	-
Total head ratio (rated / max) / (max / rated)	%	91.5 / 109.3	60.0 / 166.7	37.9 / 263.7	- / -

Materials / Specification					
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Material column code	: D4	Pump specification	: ANSI B73.1
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Other Requirements					
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Hydraulic selection : No specification	Seal configuration : Double Seal
Construction : No specification	
Test tolerance : ANSI/HI 14.6 Grade 1B	
Variable Speed - Maximize Efficiency	
Driver Sizing : Max Power (SO to EOC) not using SF	