Bulletin HRC
September 2005

HRC • HAS • HAR Series

Sealless Centrifugal Refrigeration and Absorption Pumps

- Capacities to 220 GPM
- Heads to 250 Feet
- Temperatures from -95°F

MTH PUMPS

Typical Installation

The diagram shows the typical piping of a reverse circulation HRC Series pump. Although the HRC reverse circulation pumps are designed to remove entrained gas from the fluid, careful adiabatic analysis of the entire system is required for successful operation. In addition, the following recommendations are very important for efficient operation and maximum service life of the product.

We recommend that the tank and piping be designed to provide the pump 1.5 times more NPSH availability (NPSHA) than that required by the pump (NPSHR).

To maintain NPSHA, it is highly recommended that the selected suction piping should be twice the diameter of the pump suction all the way from the tank to the pump inlet, and that elbows and bends should be minimized as much as possible.

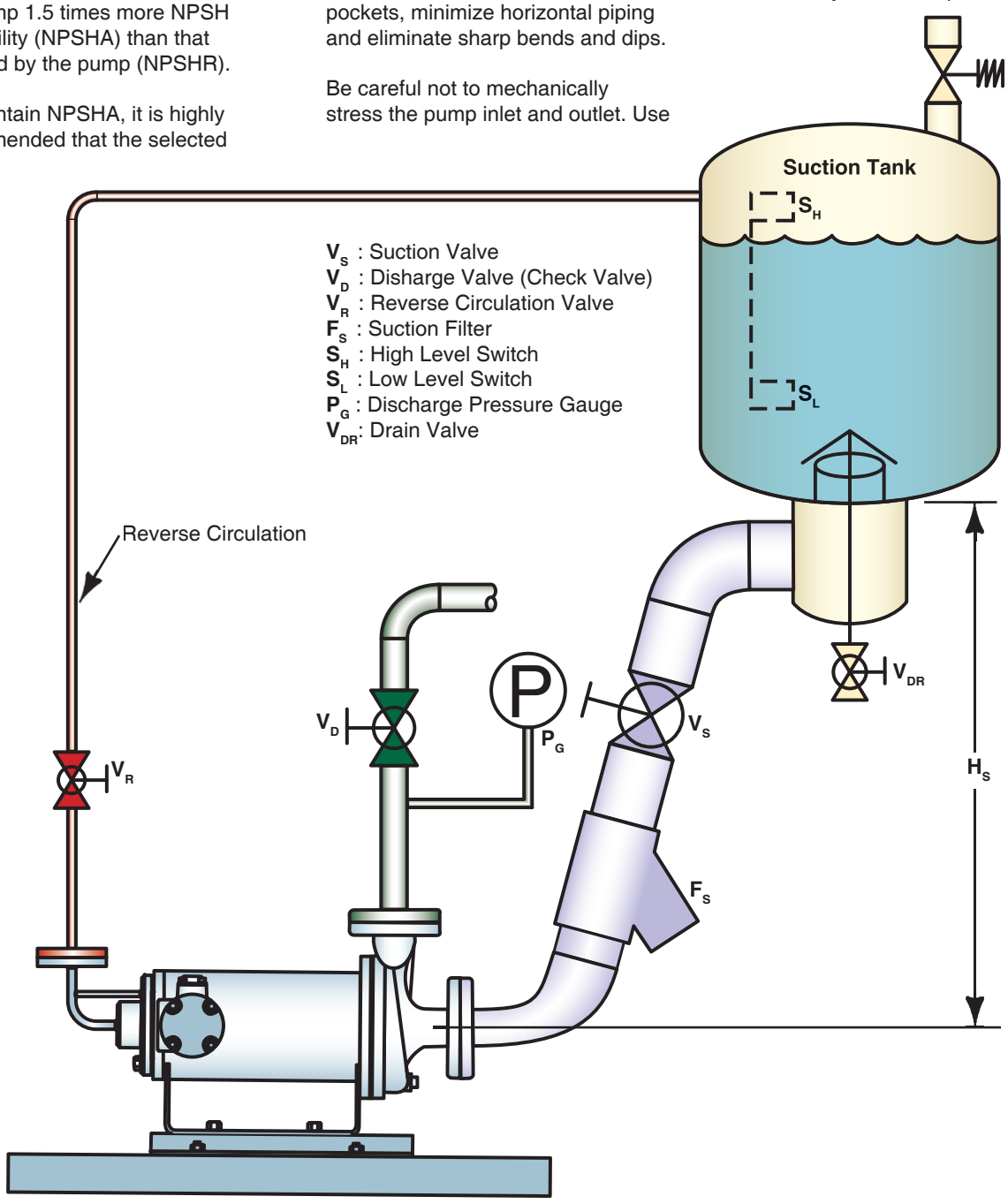
Carefully consider the size and selection of valves and filters used in the suction pipe since these are typical sources of flow disruptions that increase flow resistance and cavitation effects.

To prevent the formation of gas pockets, minimize horizontal piping and eliminate sharp bends and dips.

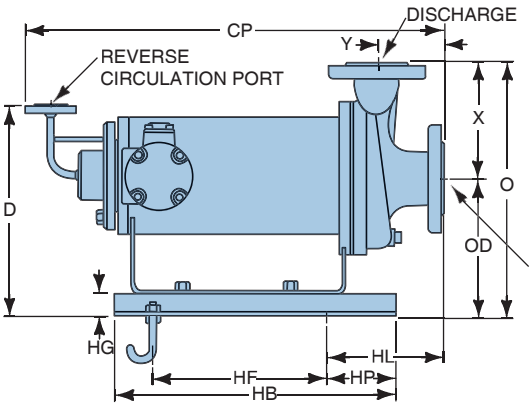
Be careful not to mechanically stress the pump inlet and outlet. Use properly supported piping with stress buffers like expansion joints or other means to support the weight of piping and reduce the possibility of thermal pipe expansion strain.

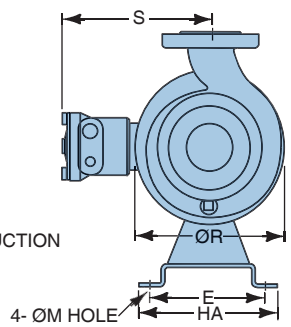
Where excessive pump discharge capacity is expected, the careful use of an orifice plate on the pump discharge can resolve the problem.

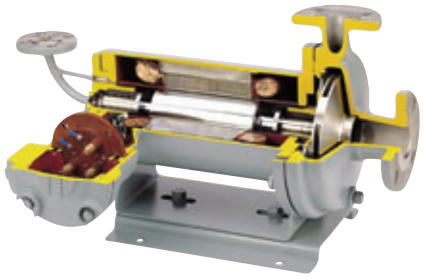
Make a positive confirmation that each piping connection is leak free before full system startup.



Dimensions

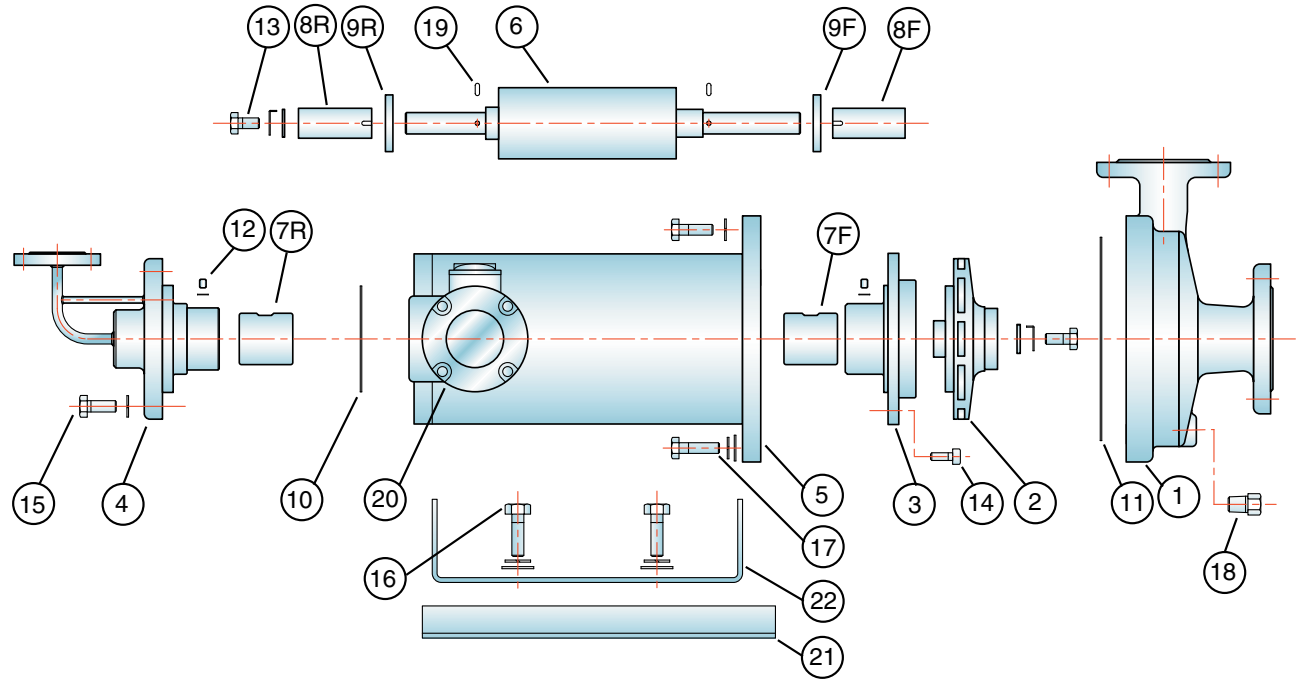






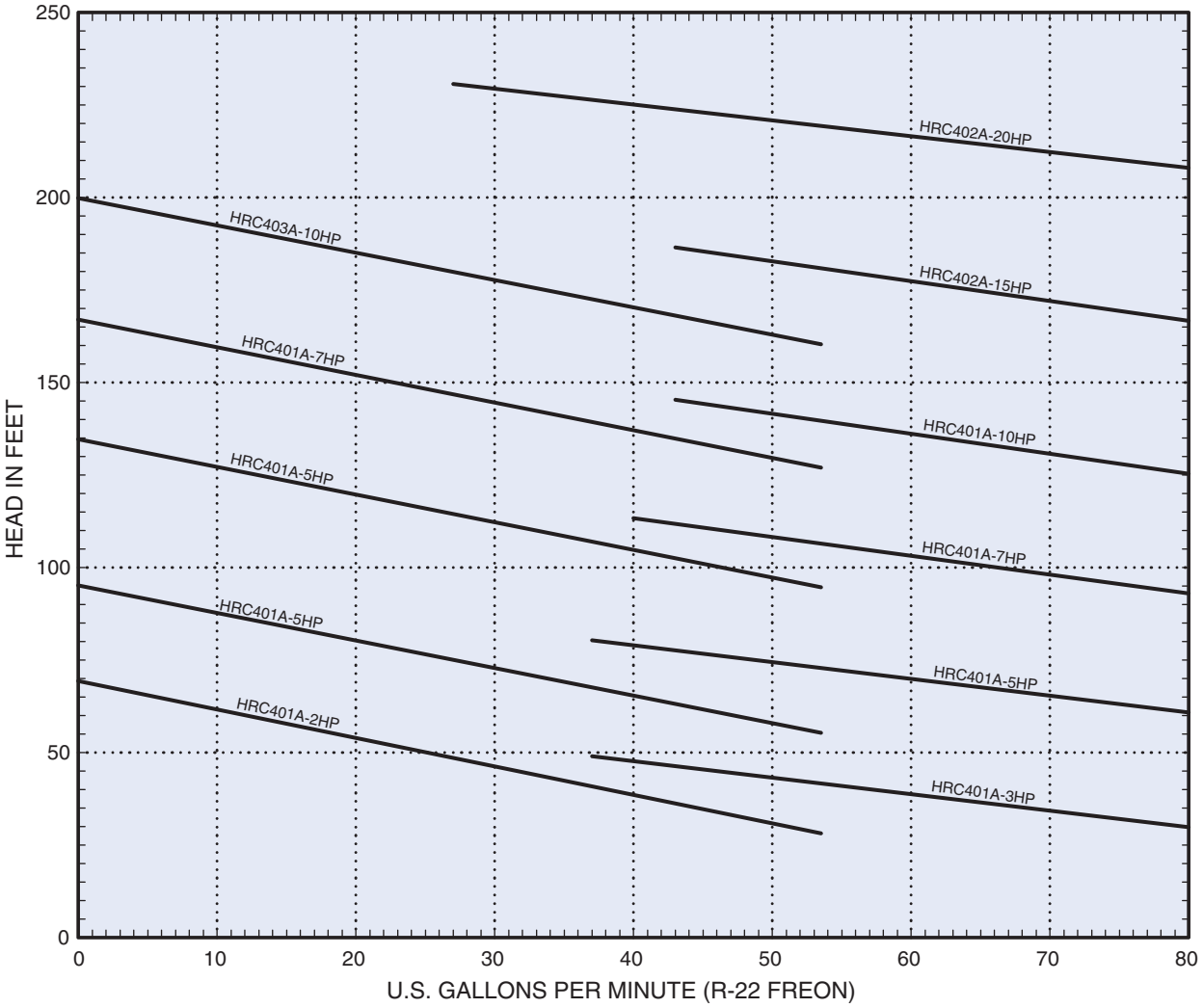
Casing No.	HP	Suction	Discharge	Imp. Ø	X	CP	Y	D	HG	HL	HF	HB	HP	E	HA	M	O	OD	R	S
HRC401A	2	1.5	1	6	6.5	24.2	3.9	10.0	1.0	6.5	8.3	12.2	2.0	7.5	8.7	0.6	13.0	6.5	9.5	11.6
HRC401A	3	1.5	1	6	6.5	24.2	3.9	10.0	1.0	5.7	8.3	12.2	2.0	7.5	8.7	0.6	13.0	6.5	9.5	11.6
HRC501A	2	2	1.5	6	7.1	24.2	3.9	10.0	1.0	6.3	8.3	12.2	2.0	7.5	8.7	0.6	13.0	6.5	9.5	11.6
HRC501A	3	2	1.5	6	7.1	24.2	3.9	10.0	1.0	6.3	8.3	12.2	2.0	7.5	8.7	0.6	13.6	6.5	9.5	11.6
HRC501A	5	2	1.5	7	7.1	24.8	3.7	10.2	1.2	6.3	10.2	15.0	2.4	7.5	8.7	0.6	13.8	6.7	9.5	12.2
HRC501A	6	2	1.5	7	7.1	25.6	3.7	10.2	1.2	5.3	11.0	15.0	2.4	7.5	8.7	0.8	13.8	6.7	9.5	12.2
HRC502A	5	2	1.5	8	8.3	24.4	3.9	12.4	1.2	5.9	11.0	17.3	3.2	9.3	11.0	0.8	17.1	8.9	11.2	12.2
HRC502A	6	2	1.5	8	8.3	24.4	3.9	12.4	1.2	5.9	11.0	17.3	3.2	9.3	11.0	0.8	17.1	8.9	11.2	12.2
HRC403A	7	1.5	1	8	7.9	25.6	3.9	12.3	2.0	5.9	11.0	17.3	3.2	9.5	11.0	0.8	16.6	8.7	20.1	12.2
HRC403A	10	1.5	1	8	8.7	26.4	3.9	12.3	2.0	5.9	11.0	17.3	3.2	9.5	11.0	0.8	16.6	8.7	20.1	12.2
HRC502A	7	2	1.5	8	8.3	25.8	3.7	12.3	2.0	6.1	11.0	17.3	3.2	9.5	11.0	0.8	16.6	8.7	20.9	12.2
HRC502A	10	2	1.5	8	8.3	26.6	3.7	12.3	2.0	6.1	11.0	17.3	3.2	9.5	11.0	0.8	16.6	8.7	20.9	12.2

Note: All dimensions in inches



No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION	No.	DESCRIPTION
1	CASING	7F/7R	BEARINGS	13	ROTOR BOLT	19	DRIVER PINS
2	IMPELLER	8F/8R	SHAFT SLEEVES	14	F.B.H. BOLTS	20	TERMINAL BOX
3	F.B. HOUSING	9F/9R	THRUST WASHERS	15	R.B.H. BOLTS	21	BASE
4	R.B. HOUSING	10	REAR GASKET	16	SUPPORT BOLTS	22	SUPPORT BRACKET
5	STATOR ASS'Y	11	FRONT GASKET	17	CASING BOLTS		
6	ROTOR ASS'Y	12	SET SCREW	18	DRAIN PLUG		

Performance Curves for Freon (R-22)

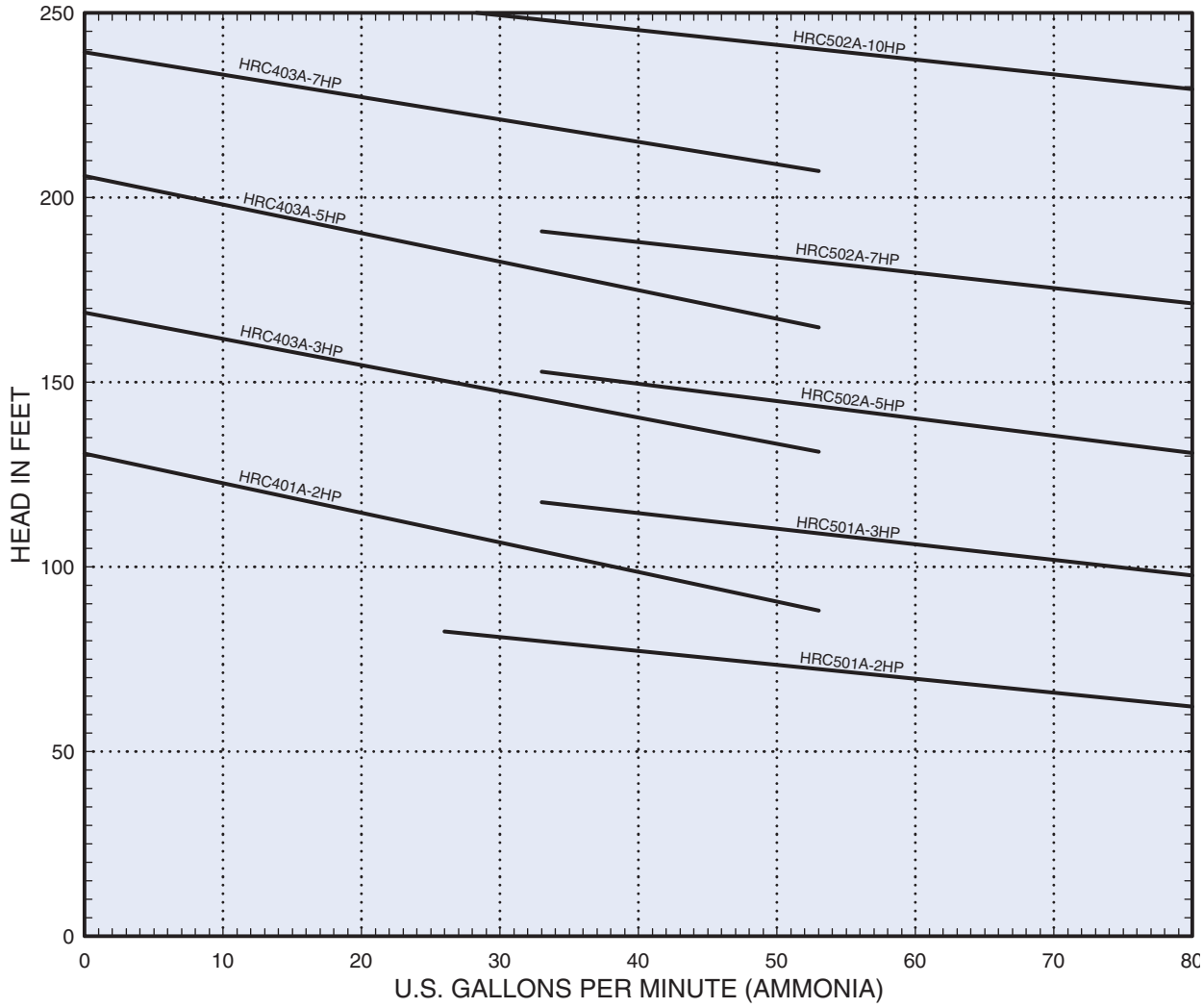


HRC SERIES TYPICAL SERVICE POINTS

Casing No.	HP	RPM	Fluid	Temp(°F)	Typical GPM	Typical Head (Ft)	230V Current (A)	Piping Dia. (Inches)		Imp. Ø
								Suction	Discharge	
HRC401A	2	3450	Freon (R-22)	-76	26.4	49	8.2	1.5	1	6
HRC401A	3	3450	Freon (R-22)	-76	26.4	75	10.5	1.5	1	6
HRC501A	3	3450	Freon (R-22)	-76	52.8	42	10.5	2	1.5	6
HRC401A	5	3450	Freon (R-22)	-76	26.4	114	15	1.5	1	7
HRC501A	5	3450	Freon (R-22)	-76	52.8	75	15	2	1.5	7
HRC401A	7	3450	Freon (R-22)	-76	26.4	147	22	1.5	1	7
HRC501A	7	3450	Freon (R-22)	-76	52.8	108	22	2	1.5	7
HRC403A	10	3450	Freon (R-22)	-76	26.4	180	30	1.5	1	8
HRC501A	10	3450	Freon (R-22)	-76	52.8	141	30	2	1.5	7
HRC502A	15	3450	Freon (R-22)	-76	52.8	180	44	2	1.5	8
HRC502A	20	3450	Freon (R-22)	-76	82.8	220	58	2	1.5	7

Note: 1) Standard Voltages: 3ø 230 or 460 VAC, Others upon request.
2) Frequency: 2 pole 60Hz (3450RPM) shown, Consult factory for 50Hz or 4 pole performance.
3) Connections: ANSI Flanges of customer specified rating are standard.
4) Standard construction is 304 Stainless Steel with Class E insulation
5) Other sizes, materials, and customized designs are available.

Performance Curves for Ammonia

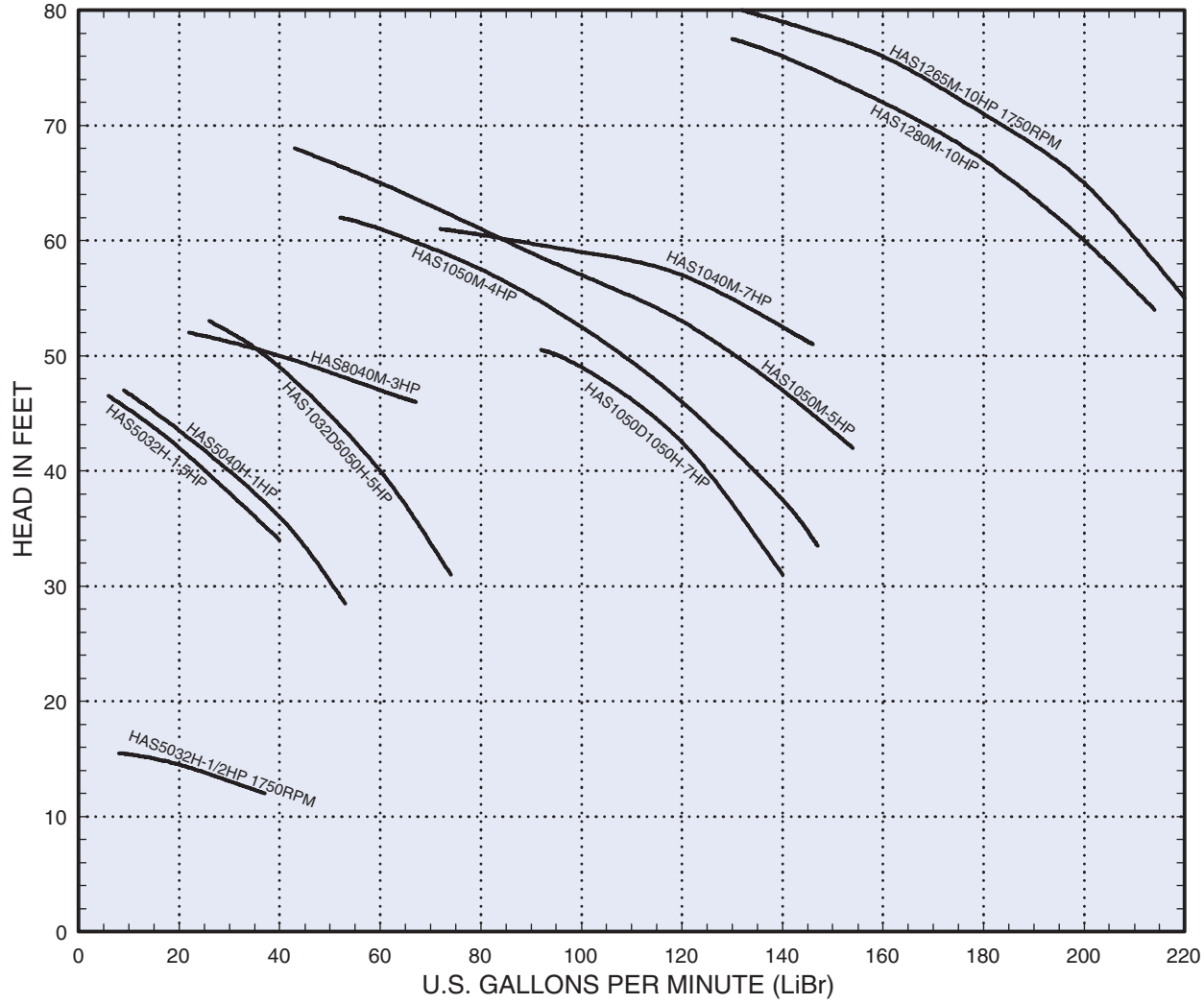


HRC SERIES TYPICAL SERVICE POINTS

Casing No.	HP	RPM	Fluid	Temp(°F)	Typical GPM	Typical Head (Ft)	230V Current (A)	Piping Dia. (Inches)		Imp. Ø
								Suction	Discharge	
HRC401A	2	3450	Ammonia	-76	26.4	101	8.2	1.5	1	6
HRC501A	2	3450	Ammonia	-76	52.8	65	8.2	2	1.5	6
HRC401A	3	3450	Ammonia	-76	26.4	141	10.5	1.5	1	6
HRC501A	3	3450	Ammonia	-76	52.8	101	10.5	2	1.5	6
HRC403A	5	3450	Ammonia	-76	26.4	170	15	1.5	1	8
HRC501A	5	3450	Ammonia	-76	52.8	131	15	2	1.5	7
HRC403A	7	3450	Ammonia	-76	26.4	210	22	1.5	1	8
HRC502A	7	3450	Ammonia	-76	52.8	167	22	2	1.5	8
HRC502A	10	3450	Ammonia	-76	52.8	223	30	2	1.5	8

Note: 1) Standard Voltages: 3ø 230 or 460 VAC, Others upon request.
2) Frequency: 2 pole 60Hz (3450RPM) shown, Consult factory for 50Hz or 4 pole performance.
3) Connections: ANSI 150#RF Flanges are standard.
4) Standard construction is 304 Stainless Steel with Class E insulation
5) Other sizes, materials, and customized designs are available.

Performance Curves for Absorption Solution (LiBr)

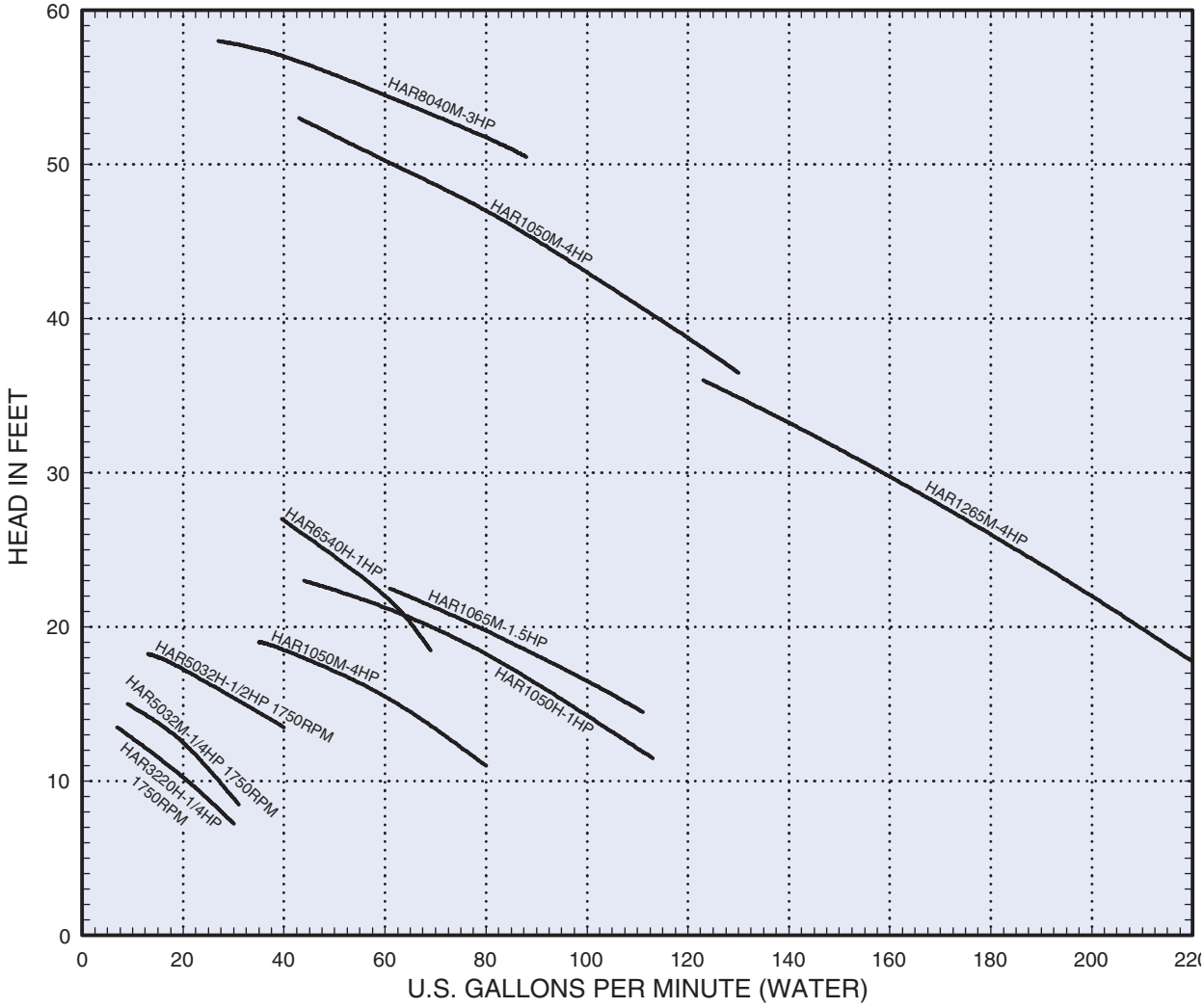


HAS SERIES TYPICAL SERVICE POINTS

Casing No.	HP	RPM	Fluid	Temp(°F)	Typical GPM	Typical Head (Ft)	Current (A) (230V)	Piping Dia. (Inches)		Imp. Ø
								Suction	Discharge	
HAS5032H	.5	1750	LiBr	266	23.8	11.5	3.5	2	1.25	3.94
HAS5040H	1	3450	LiBr	266	24.7	29.5	5.5	2	1.5	3.54
HAS5032H	1.5	3450	LiBr	266	27.8	32.8	6.8	2	1.25	3.54
HAS8040M	3	3450	LiBr	266	37.2	43.0	8.3	3	1.5	3.94
HAS8040M	4	3450	LiBr	266	57.2	59.1	16	3	1.5	3.94
HAS8040M	4	3450	LiBr	266	61.6	31.5	16	3	1.5	3.94
HAS8040M	4	3450	LiBr	266	62.1	59.1	16	4	1.5	3.94
HAS1050M	4	3450	LiBr	266	91.2	28.5	16	4	2	3.94
HAS1050M	4	3450	LiBr	266	102.2	26.9	16	4	2	3.94
HAS1050M	4	3450	LiBr	266	66.1	59.1	16	4	2	4.33
HAS1050M	4	3450	LiBr	266	144.9	29.9	16	4	2	4.33
HAS1050M	4	3450	LiBr	266	116.2	28.5	16	4	2	4.13
HAS1050M	4	3450	LiBr	266	140	31.5	16	4	2	4.53
HAS1050M	5	3450	LiBr	266	83.2	37.4	21	4	2	4.33
HAS1050M	5	3450	LiBr	266	104.4	39.4	19	4	2	4.33
HAS1050M	5	3450	LiBr	266	116.7	39.4	19	4	2	4.53
HAS1040M	7	3450	LiBr	266	98.6	48.2	28	4	1.5	4.53
HAS1040M	9	3450	LiBr	266	125.5	54.1	34	4	1.5	4.92
HAS1280M	10	3450	LiBr	266	175.3	65.6	36	5	3	5.51
HAS1280M	10	3450	LiBr	266	158.5	68.9	36	5	3	5.71
HAS1265M	10	1750	LiBr	266	169.1	72.2	47.3	5	2.5	6.30
HAS 1032D 5050H	5	3450	LiBr	266	63.4	52.5 32.8	21	4 2	1.25 2	3.94
HAS 1050D 1050H	7	3450	LiBr	266	126.8/105.7	52.5 32.8	27	4 4	2 2	4.53

Note: See notes 1, 2, 3, and 5 on the next page. Standard construction is carbon steel with class C insulation.

Performance Curves for Absorption Refrigeration (Water)



HAR SERIES TYPICAL SERVICE POINTS

Casing No.	HP	RPM	Fluid	Temp(°F)	Typical GPM	Typical Head (Ft)	Current (A) (230V)	Piping Dia. (Inches)		Imp. Ø	Inducer Ø
								Suction	Discharge		
HAR5032M	.25	1750	Water	104	26.4	6.6	2.6	2	1.25	2.76	---
HAR1050M	1	3450	Water	104	71.8	9.8	5.5	4	2	2.76	3.90
HAR1050M	1	3450	Water	104	57.2	9.8	5.5	4	2	2.76	3.90
HAR1065M	1.5	3450	Water	104	100.8	9.8	6.8	4	2	2.76	3.90
HAR1065M	1.5	3450	Water	104	100.8	9.8	6.8	4	2.5	2.76	3.90
HAR8040M	3	3450	Water	104	59	37.4	11	3	1.5	2.76	4.25
HAR1265M	4	3450	Water	104	177	19.7	16	5	2.5	2.76	4.25
HAR1265M	4	3450	Water	104	198.1	19.7	16	5	2.5	2.76	4.57
HAR1050M	4	3450	Water	104	86.3	38.7	16	4	2	2.76	4.33
HAR1050M	4	3450	Water	104	120.2	37.1	16	4	2	2.76	4.25
HAR1050M	4	3450	Water	104	99.5	36.4	16	4	2	2.76	4.25
HAR1050M	4	3450	Water	104	101.7	39.4	16	4	2	2.76	4.25
HAR3220H	.25	1750	Water	176	14.1	11.5	2.3	1.25	.75	4.45	---
HAR5032H	.5	1750	Water	176	26.4	11.5	3.5	2	1.25	3.82	---
HAR6540H	1	3450	Water	176	63.4	13.8	5.5	2.5	1.5	3.35	3.39
HAR1050H	1	3450	Water	176	101.3	9.8	5.5	4	2	---	3.88

Note: 1) Standard Voltages: 3ø 230 or 460 VAC, Others upon request.
2) Frequency: 60Hz (1750 and 3450RPM) shown. Consult factory for 50Hz performance
3) Connections: Welding sockets are standard.
4) Standard construction is 304 SS with Class C insulation.
5) Other sizes, materials, and customized designs are available.

Bearing Monitor Features

MTH Bearing Monitors take the guess work out of operating a canned motor pump. They continuously monitor the direction of rotation and critical running clearances between the stator and the rotor.

This bearing monitor system not only monitors the running clearance but also indicates bearing condition. This allows the operator to plan in advance for pump maintenance. The bearing monitor operates on the principle of induced voltage. A magnetic field is created in the monitor coils by the current flowing through the stator winding. When the rotor is perfectly centered in the stator, the magnetic fields are essentially concentric and balanced. When bearing wear or unequal running clearance occurs, and the rotor drifts off center, the flux created by the imbalance in the magnetic fields induces a voltage in the monitor coils. This voltage is displayed on the monitor volt meter as an indication of bearing condition. The meter is mounted on the pump terminal box as standard, but is also available in a remote panel mount package by customer request.

Bearing wear and Rotation indicator

Pump body or remote panel mounted

Engineering Specifications

HRC Series

The contractor shall furnish (and install as shown on the plans) an MTH HRC Series reverse circulation canned sealless (HORIZONTAL) (VERTICAL) (IN-LINE) centrifugal pump model _____ with inlet size _____" and outlet size _____" including a (_____ # ANSI RF FLANGE) (WELDING SOCKET) and constructed with internal wetted parts of (304 STAINLESS STEEL) (316 STAINLESS STEEL) (316L STAINLESS STEEL). Impeller will be of (OPEN) (CLOSED) design with a maximum diameter of ____". Unit (WILL) (WILL NOT) be furnished with a low NPSH Inducer to handle NPSHA as low as ___ feet. Back flushing (WILL) (WILL NOT) be provided. Each pump shall have a capacity of ____GPM when operating at a total head of _____feet. Suction pressure will be ____feet. A __HP integrated canned motor will be provided for (230) (380) (460) Volt operation at (50) (60) Hertz THREE phase with a terminal box compliant with a TELC type enclosure rating. Motor will be wound with a class (C)(E)(H) insulated wire suitable for a continuous application fluid temperature of ___ degrees F.

HAS Series

The contractor shall furnish (and install as shown on the plans) an MTH HAS Series absorption solution canned sealless (HORIZONTAL) (VERTICAL) (IN-LINE) centrifugal pump model _____ with inlet size _____" and outlet size _____" including a (_____ # ANSI RF FLANGE) (WELDING SOCKET) and constructed with internal wetted parts of (304 STAINLESS STEEL) (316 STAINLESS STEEL) (316L STAINLESS STEEL)) (CARBON STEEL). Impeller will be of (OPEN) (CLOSED) design with a maximum diameter of ____". Unit (WILL) (WILL NOT) be furnished with a low NPSH Inducer to handle NPSHA as low as ___ feet. Back flushing (WILL) (WILL NOT) be provided. Each pump shall have a capacity of ____GPM when operating at a total head of _____feet. Suction pressure will be ____feet. A __HP integrated canned motor will be provided for (230) (380) (440) Volt operation at (50) (60) Hertz THREE phase with a terminal box compliant with an _____ type enclosure rating. Motor will be wound with a class (C)(E)(H) insulated wire suitable for a continuous application fluid temperature of ___ degrees F.

HAR Series

The contractor shall furnish (and install as shown on the plans) an MTH HAR Series absorption refrigeration canned sealless (HORIZONTAL) (VERTICAL) (IN-LINE) centrifugal pump model _____ with inlet size _____" and outlet size _____" including a (_____ # ANSI RF FLANGE) (WELDING SOCKET) and constructed with internal wetted parts of (304 STAINLESS STEEL) (316 STAINLESS STEEL) (316L STAINLESS STEEL). Impeller will be of (OPEN) (CLOSED) design with a maximum diameter of ____". Unit (WILL) (WILL NOT) be furnished with a low NPSH Inducer to handle NPSHA as low as ___ feet. Back flushing (WILL) (WILL NOT) be provided. Each pump shall have a capacity of ____GPM when operating at a total head of _____feet. Suction pressure will be ____feet. A __HP integrated canned motor will be provided for (230) (380) (440) Volt operation at (50) (60) Hertz THREE phase with a terminal box compliant with an _____ type enclosure rating. Motor will be wound with a class (C)(E)(H) insulated wire suitable for a continuous application fluid temperature of ___ degrees F.

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