

# G3996

In-Line Process Pumps

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# 3996

## In-Line Process Pumps Designed for Total Range of Industry Services

- Capacities to 1400 GPM (318m<sup>3</sup>/h)
- Heads to 700 feet (213 m)
- Temperatures to 500° F (260° C)
- Pressures to 375 PSIG (2586 kPa)

## Performance Features for In-Line Services

### Extended Pump Life

- Integral pump bearings
- TaperBore™ Plus/BigBore™ seal chambers
- Precision fits for accurate alignment
- Flexibly coupled

### Ease of Maintenance

- In-line mounting
- Field alignment not required
- Back pull-out design
- External impeller adjustment

### Safety

- ANSI B15.1 coupling guard
- Ductile iron frame and motor support
- Fully serrated flanges

## Services

Caustic transfer Acid unloading Monomer/Polymer transfer Liquid nitrogen Liquid ammonia Reflux and light tower bottoms Waste acid recovery Pickle liquor circulation Chilled water Filter feed Condensate return



Goulds 3996 process pump line is specifically designed to provide superior performance for in-line services of the Chemical Process Industries.

# 3996

## HeavyDuty Design Features for a Wide Range of Services.

### FIELD ALIGNMENT NOT REQUIRED

Precision rabbet locks provide positive, built-in-alignment between pump and motor.

### FLEXIBLY COUPLED

Conventional flexible spacer coupling.

### CONTINUOUS HIGH PERFORMANCE

Original high efficiency, maintained by simple external adjustment resulting in long-term energy savings.

### MAXIMUM INTERCHANGEABILITY

All parts (shaft, sleeve, mechanical seals, etc.) except casing are fully interchangeable with Goulds Model 3196 STX and MTX.

### HEAVY DUTY SHAFT

Shaft designed for minimum deflection—less than .002 in. (.05 mm)—at seal faces.

STANDARD  
NEMA C-FACE  
NORMAL THRUST  
MOTOR

HIGH STRENGTH  
DUCTILE IRON  
MOTOR SUPPORT

Open on two sides for easy access to back pull-out assembly.

### INTEGRAL PUMP BEARINGS

All hydraulic loads carried by pump—not by motor. Bearings sized for 2-year minimum and 10-year average life under tough operating conditions. Regreaseable bearings standard, available with greased-for-life or oil mist lubrication.

### ANSI B73.1M SHAFT SEALING

Choice of large or standard bore seal chambers for maximum sealing flexibility to meet service conditions.

### POSITIVE SEALING

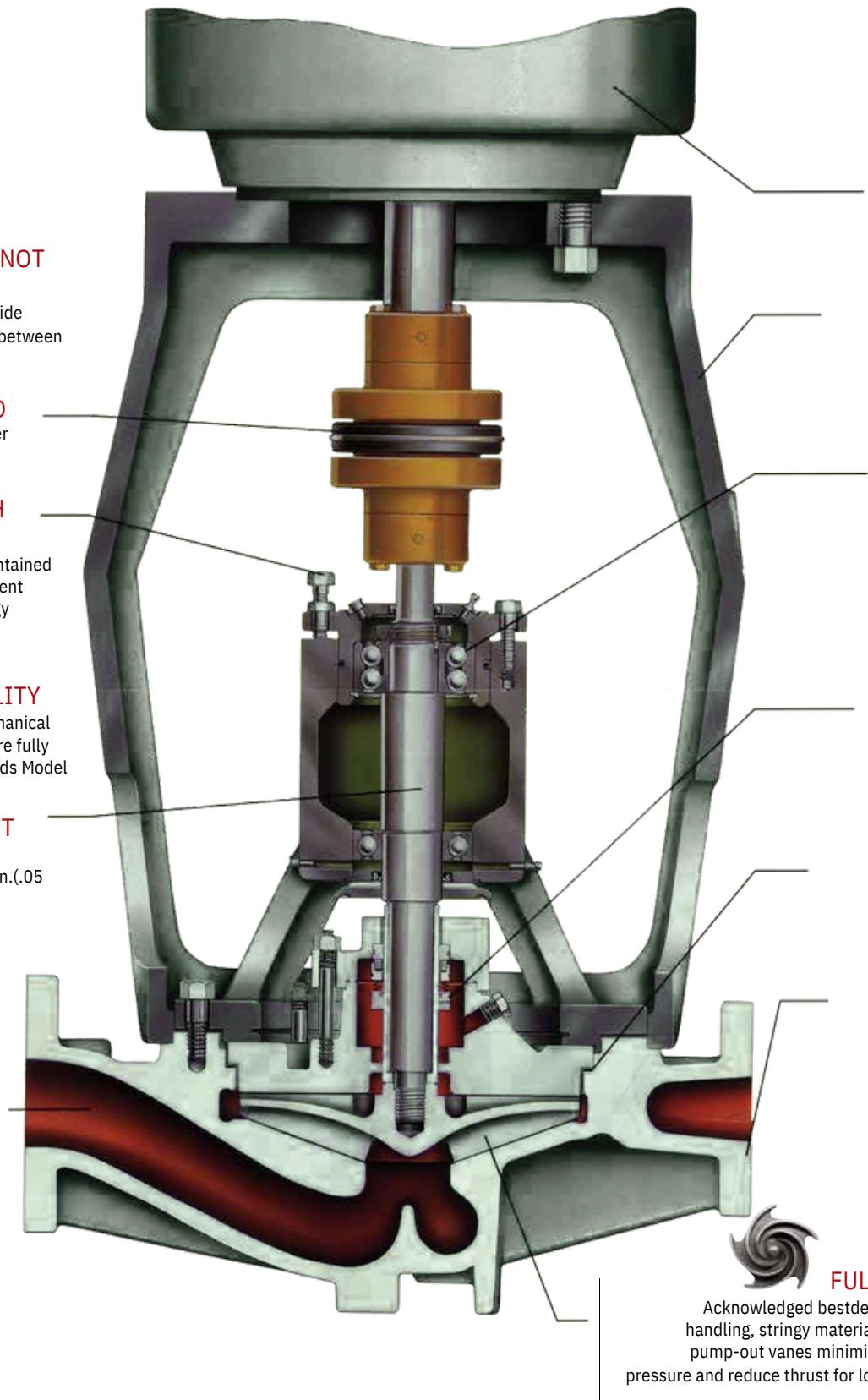
Fully confined gasket at casing joint protects alignment fit from liquid.

### HEAVY WALLED CASING

With ribbed suction and discharge nozzles support pump and driver and resist pipe strain without distortion. ANSI class 150 flanges standard, class 300 flanges optional.

### FULLY OPEN IMPELLER

Acknowledged best design for C.P.I. services—solids handling, stringy material, corrosives, abrasives. Back pump-out vanes minimize stuffing box/seal chamber pressure and reduce thrust for longer bearing and seal life.



# 3996

## In-Line Design

### For Cost Savings

In-line pumps have become increasingly popular with users due to minimal floor space required and reduced installation costs.

Installation is simple since the unit is mounted directly in the line like a valve. Field alignment is not required and the unit is not subject to misalignment due to pipe strain or temperature changes.



### Setting The Standards For Reliability

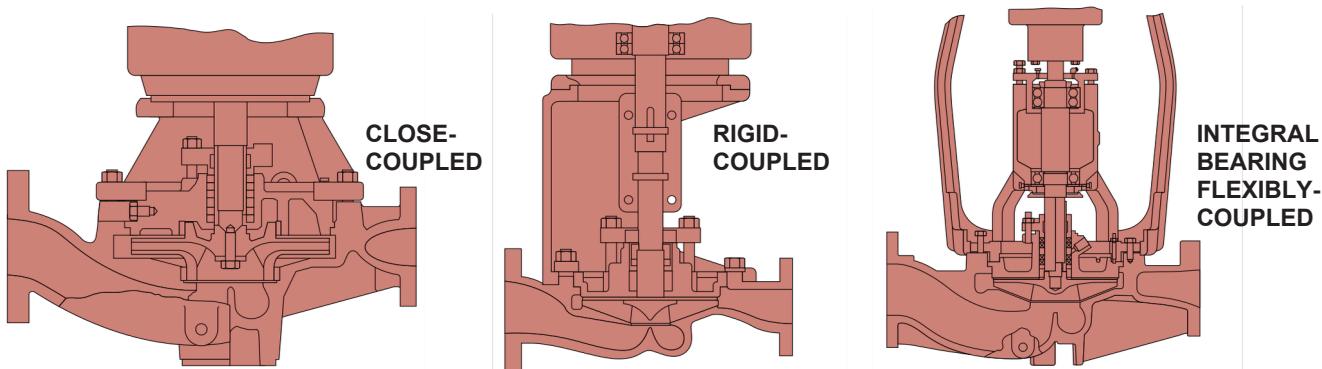
The 3996 is designed for optimum reliable service... shaft size and overhang are optimized to provide maximum seal and bearing life... precision fits provide built-in alignment between pump and motor (field alignment not required). Hydraulic and mechanical loads are carried by the pump, not by special motors (the 3996 uses standard C-face motors).



### Goulds 3996...The Preferred In-Line Design

Variations-line pumps are available including close coupled, rigid-coupled, and flexibly coupled/integral bearing designs. Only the flexibly-coupled design such as the 3996 is built without compromise.

Close-coupled units are difficult to service and rigid coupled models have long, unsupported shafts which are subject to runout, deflection and imbalance... leading to shortened bearing and seal life.



		MATERIAL							
Item Number	Part Name	Ductile Iron* 316SS Impeller	316SS	CD4MCuN	Alloy 20	Monel	Nickel	Hastelloy B&C	Titanium
100	Casing	Ductile Iron	316 SS	CD4	Alloy20	Monel	Nickel	Hastelloy	Titanium
101	Impeller		316 SS	CD4	Alloy20	Monel	Nickel	Hastelloy	Titanium
105	Lantern Ring				Glass Filled PTFE				
106	S.B. Packing				PTFE Impregnated Fibers				
112	Thrust Bearing				Double Row Angular Contact				
122	Shaft-Less Sleeve (Optional)	SAE 4140	316SS		Alloy20	Monel	Nickel	Hastelloy	Titanium
122	Shaft-With Sleeve		4140 Steel					316 SS	
126	Shaft Sleeve	316 SS		Alloy 20		Monel	Nickel	Hastelloy	Titanium
136	Bearing Locknut and Lockwasher				Steel				
168	Radial Bearing				Single Row Deep Groove				
184	Seal Chamber/S.B. Cover (Mechanical Seal or Packed Box)	Ductile Iron	316 SS	CD4	Alloy20	Monel	Nickel	Hastelloy	Titanium
228	Bearing Frame				Ductile Iron				
239	Casing Support				ST = Steel / MT = Ductile Iron				
240	Motor Support				Ductile Iron				
250	Gland	316 SS		CD4	Alloy20	Monel	Nickel	Hastelloy	Titanium
262	Repeller/Sleeve (Dynamic Seal Option)		CD4MCuN		Alloy20	Monel	Nickel	Hastelloy	Titanium
264	Gasket, Cover to Backplate				PTFE				
265A	Stud/Nut - Cover to Frame				304SS				
332A	Grease Seal - Outboard				Buna Rubber				
333A	Grease Seal - Inboard				Buna Rubber				
351	Casing Gasket				Aramid Fiber with EPDM Rubber				
358A	Plug-Casing Drain	Carb Steel	316 SS	CD4	Alloy 20	Monel	Nickel	Hastelloy	Titanium
370H	Cap Screw - Frame to Casing	Steel			304 SS				
412	Stud, Cover to Adapter				Glass Filled PTFE				
418	Jacking Bolt				304 SS				
444	Backplate (Dynamic Seal Option)	Ductile Iron	316SS	CD4	Alloy20	Monel	Nickel	Hastelloy	Titanium
469B	Dowel Pin				Steel				
496	O-ring Bearing Housing				Buna N				

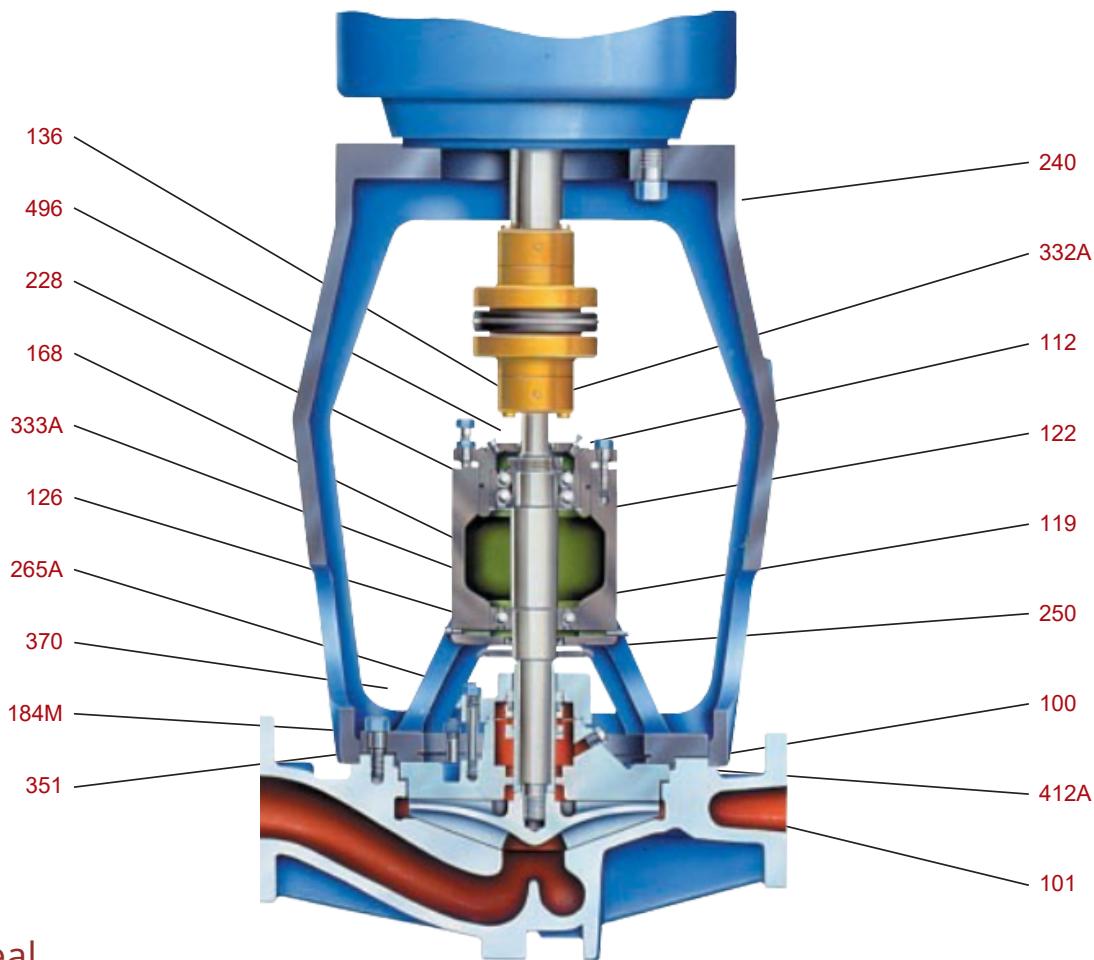
\*Ductile Iron Casing available with 150# FF or RF only. 300# Flange is Not Available. ° E.I.

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## Construction Details All dimensions in inches and (mm)

		ST	MT
Shaft	Diameter at Impeller	.75 (19)	1 (25)
	Diameter in Stuffing Box/Seal Chamber (Less Sleeve) (With Sleeve)	1.375 (35) 1.125 (29)	1.75 (45) 1.5 (38)
	Diameter Between Bearings	1.5 (38)	2.125 (54)
	Diameter at Coupling	.875 (22)	1.125 (29)
	Overhang	6.125 (156)	8.375 (213)
	Maximum Shaft Deflection	0.002 (0.05)	
Sleeve	O.D. thru Stuffing Box/Seal Chamber	1.375 (35)	1.75 (45)
Bearings	Radial	SKF 6207	SKF 6309
	Thrust	SKF 5306 A/C3	SKF 5309 A/C3
	Bearing Span	4.125 (105)	6.75 (171)
	Average L/10 Bearing Life	87,600 hours	
	Bore	2.875 (73)	3.5 (89)
BigBore Seal Chamber	Bore	2 (51)	2.5 (64)
Stuffing Box	HP (kW) per 100 RPM	1.1 (.82)	3.4 (2.6)
Power Limits	Grease Lubrication without Cooling	250° F (121° C)	
	Grease Lubrication with Heat Flinger	450° F (232° C)	
	Oil Mist Lubrication with Heat Flinger and Cooling	500° F (260° C)	
	Corrosion Allowance	.125 (3)	
Casing			

# 3996 Sectional View



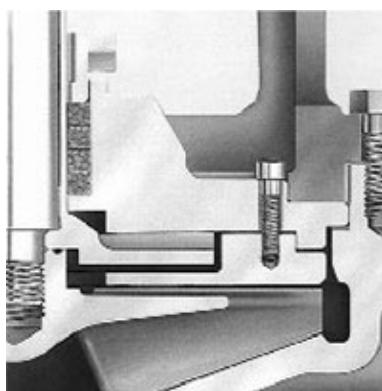
## Dynamic Seal

For Elimination of Sealing Problems—Reduced Maintenance Costs On tough pumping services, especially corrosives and slurries, mechanical seals require outside flush and constant, costly attention. Even then, seal failures are common, resulting in downtime. Goulds offers the ANSI PLUSTM Dynamic Seal which, simply by fitting a repeller between the stuffing box and impeller, eliminates the need for a mechanical seal. Benefits of Goulds Dynamic Seal:

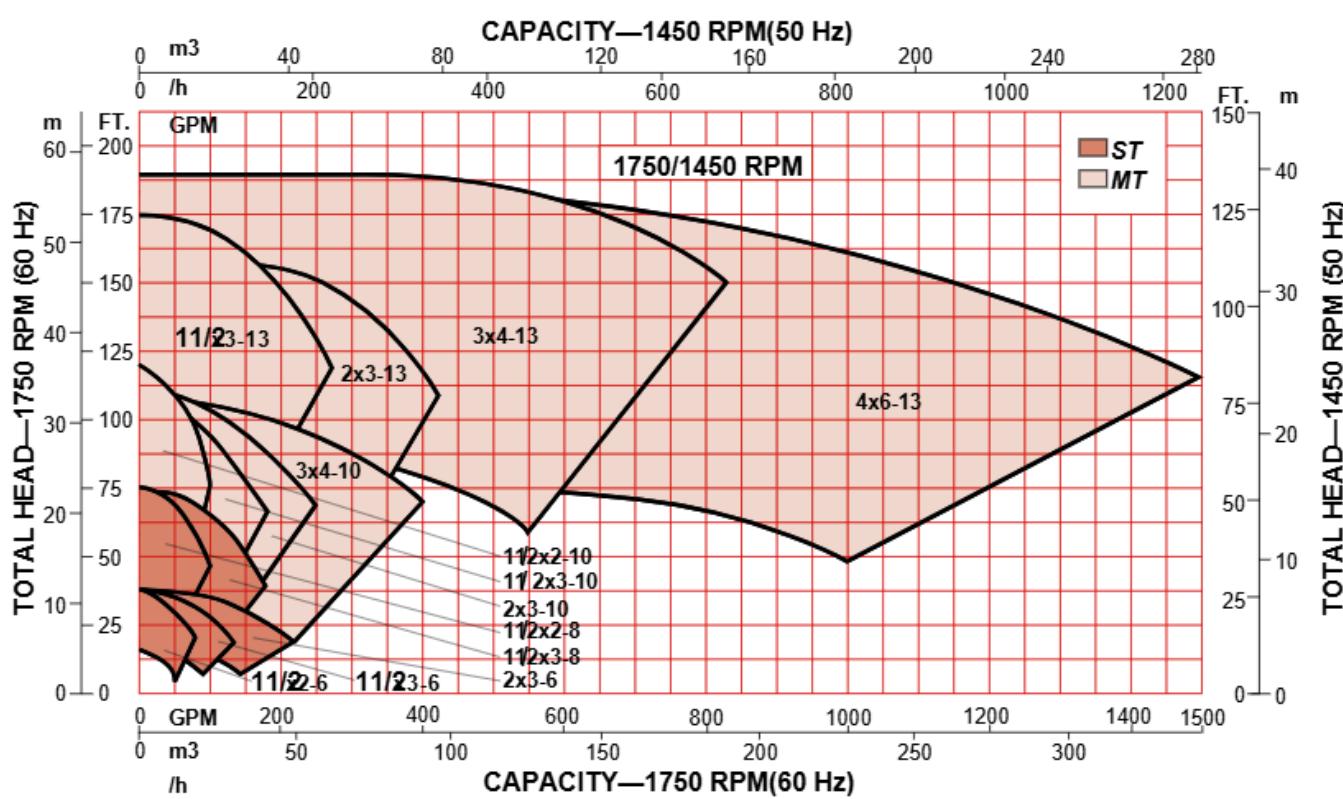
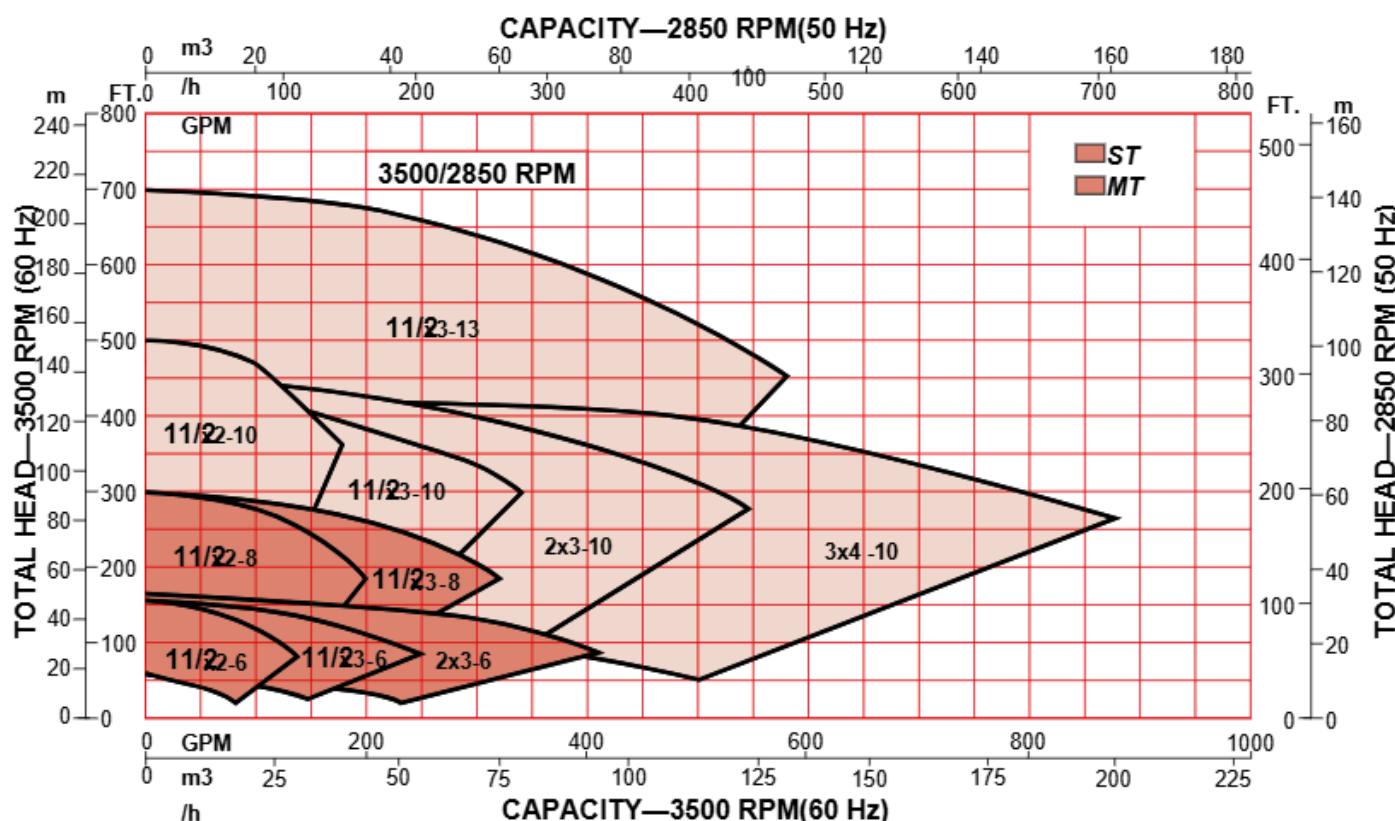
- External seal water not required
- Elimination of pumpage contamination and product dilution
- Reduces utility cost
- No need to treat seal water
- Eliminates problems associated with piping
- from a remote source

At start-up, the repeller functions like an impeller, and pumps liquid and solids from the stuffing box. When pump is shut down, packing (illustrated) or other type of secondary seal prevents pumpage from leaking.

Besides being available as a complete unit, any Goulds 3996 can be easily field-converted to Dynamic Seal. Retrofit kits are readily available.

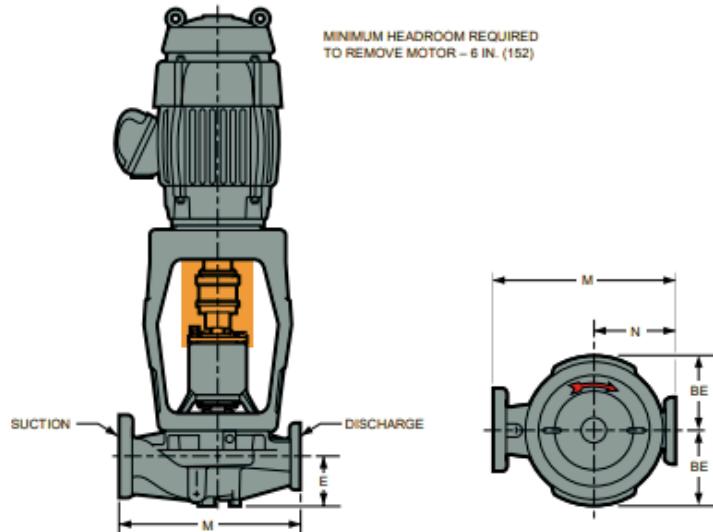


# 3996 Hydraulic Coverage



# 3996 Dimensions

All dimensions in inches and (mm). Not to be used for construction.



DIMENSIONS									
Group	Pump Size	ANSI Designation	Discharge	Suction	E	M	N	BE	Pump Weight (Less Motor) Lbs. (kg)
ST	1½x2-6	2015/15	1½	2	4¼ (108)	15 (381)	6¾ (171)	6¾ (162)	190 (86)
	1½x3-6	3015/15	1½	3	4⁷/₈ (124)	15 (381)	6¾ (171)		200 (91)
	2x3-6	3020/17	2	3	4⁵/₈ (1118)	17 (432)	7½ (191)		205 (93)
	1½x2-8	2015/17	1½	2	4¹³/₁₆ (122)	17 (432)	8 (203)		200 (91)
	1½x3-8	3015/19	1½	3	5¼ (133)	19 (483)	8³/₈ (213)		210 (95)
MT	1½x2-10	2015/19	1½	2	5¹/₈ (130)	19 (483)	9¹/₄ (235)	10 (254)	370 (168)
	1½x3-10	3015/19	1½	3	5 (127)	19 (483)	9¹/₄ (235)		380 (173)
	2x3-10	3020/20	2	3	5¹/₄ (133)	20 (508)	9½ (241)		390 (177)
	3x4-10	4030/25	3	4	6 (152)	25 (635)	11½ (292)		430 (195)
	1½x3-13	3015/24	1½	3	5⁵/₈ (143)	24 (610)	11½ (292)		460 (209)
	2x3-13	3020/24	2	3	5³/₄ (146)	24 (610)	11½ (292)		490 (223)
	3x4-13	4030/28	3	4	6⁷/₈ (175)	28 (711)	13 (330)		520 (236)
	4x6-13	6040/30	4	6	8½ (216)	30 (762)	14 (356)		610 (277)