GOULDS PUMPS

Goulds 3393

High Pressure, Multistage Ring Section Pump

ITT

ENGINEERED FOR LIFE

Goulds 3393

Lower Total Cost of Ownership (TCO) for demanding, high-pressure applications

Everything about the ITT Goulds 3393 multistage ring section pump is designed to minimize your Total Cost of Ownership. Simply put, it's more efficient, more reliable, and less expensive to maintain than conventional high-pressure pumps. Here's why:

Lower Energy Costs

The 3393 conserves energy by delivering maximum pump efficiency. The integrated diffuser and interstage casing are cast as a single component rather than as two separate pieces. This results in smoother flow transition, which significantly reduces hydraulic losses.

Performance testing on the 3393 has shown a two- to three-point improvement over traditional designs. This added efficiency can mean big energy savings because the same job can be done using less horsepower. For example, a 3393 in continuous operation that consumes 20 less horsepower (15 kW) will save $65,000 over a five-year period if energy costs are $0.10/kWh.

Plus, the 3393 doesn't just start efficient, it stays efficient. Standard casing rings provide an easily replaceable wear surface to restore original efficiencies.

Lower Maintenance Costs

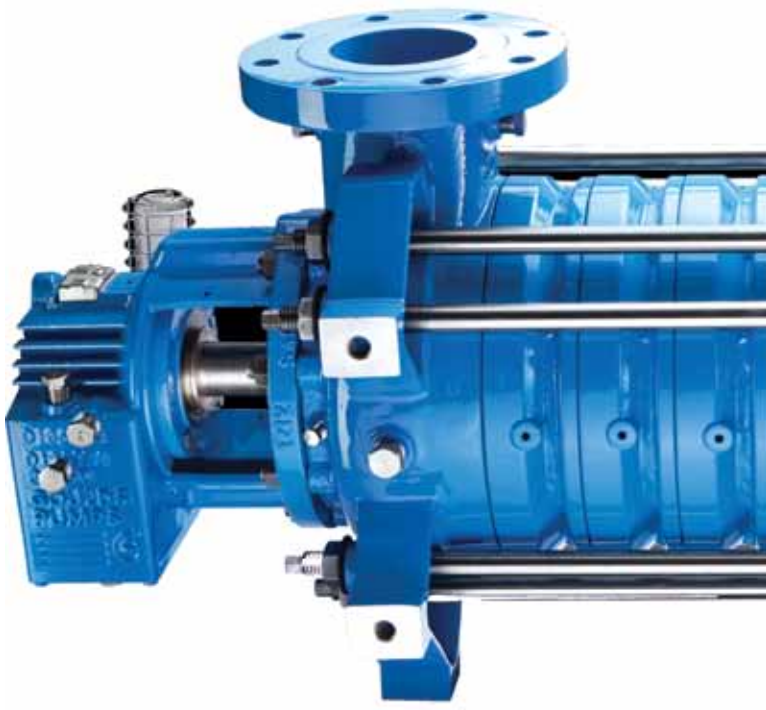
Maintenance and inspection are simplified in the 3393 because the balance drum is accessible and removable from the discharge side of the pump. To further aid disassembly, puller holes are provided in the major components.

When you examine all the factors, it's clear that the Goulds 3393 from ITT delivers the kind of total cost of ownership savings that desalination plants and other industrial facilities need today.

Higher Reliability

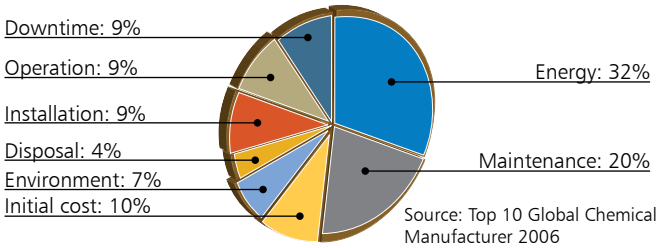
Every Goulds 3393 is equipped standard with *i-ALERT*,™ an onboard condition monitoring device. It provides a visual indication if vibration and temperature limits are reached. This highly reliable early-warning device can avoid a great deal of unplanned downtime and process disruption costs over the life of the pump.

In addition the 3393 has an integrated diffuser and interstage casing which eliminates the fit and machining tolerance between the two parts. A shorter bearing span provides a stiffer shaft with less sag and less chance of wear surface contact at start up. And impellers can be machined to accept impeller wear rings to improve wear resistance and increase useful impeller life. All these things contribute to a more reliable pump.



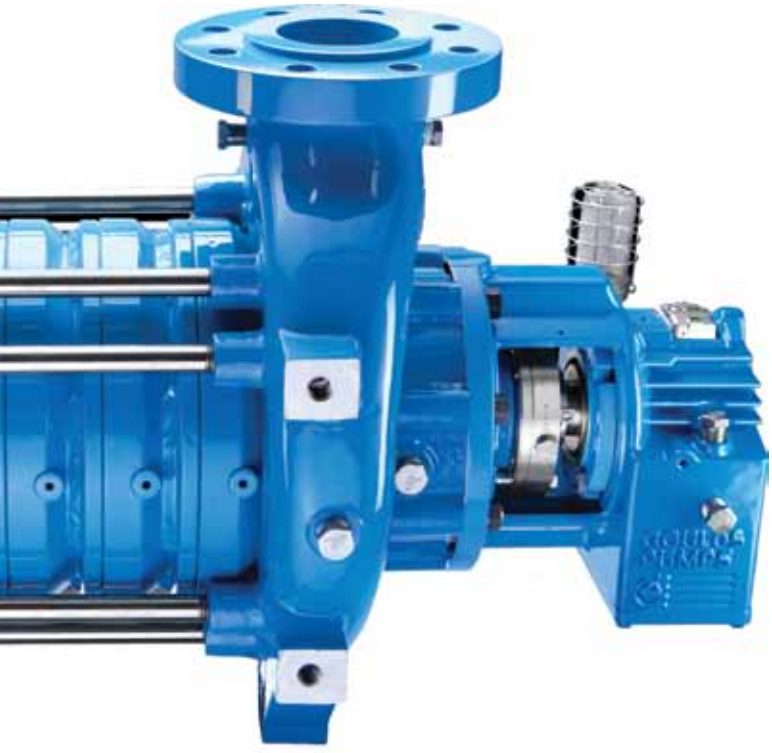
Choose ITT to always lower your total cost of ownership.

Total cost of ownership is the most comprehensive way to identify the true expenses associated with operating and maintaining pumps and related equipment. Initial price is a small fraction—on average just 10 percent—of what you'll spend to operate equipment over its lifetime.



Source: Top 10 Global Chemical Manufacturer 2006

Of the remaining costs, the majority can be minimized by careful attention to all aspects of owning and operating a pump. Nobody does this better than ITT. Let's take a closer look to see how:



Reliability

With over 160 years of pumping experience, ITT sets the standard for increasing mean time between failures. Plus, with our worldwide sales and service reach you have access to industry experts to resolve your process needs or to evaluate and upgrade your equipment.

What's more, ITT offers innovative ways to keep you in touch with your pumps so you can keep them operating reliably. Our patented *i-ALERT*™ provides a simple, early indication of change in a pump's operational signature. PumpSmart® and ProSmart® systems deliver continual feedback and control.

Maintenance

ITT is unrivaled in supplying parts globally. And, because our equipment is easier to inspect and repair than many competitors', you can get up and running quickly and minimize production losses. When repairs are necessary, our modular designs reduce inventory costs while covering a wide hydraulic window. ITT's worldwide presence puts aftermarket services where you most need them to keep your equipment running at peak performance.

Energy

ITT designs for the highest efficiency. Our wide range of models and sizes coupled with multiple hydraulic selections allows us to tailor pump performance to your process. The right pump saves energy and lowers your costs.

These factors are just the beginning. ITT has carefully thought out every aspect of Total Cost of Ownership to provide maximum value with every purchase. In addition, we offer a full suite of Plant Performance Services designed to reduce your ownership costs even more.

Specifications

General
- Radially split, segmented casing, multistage pump
- Modular interstage components
- Radial and end suction configuration
- Materials: carbon steel, 12% chrome, duplex and super duplex stainless steels
- High efficiency

Pressure and Temperature Limits
- All: 350°F
- Top (ES) or top-top (RS) arrangement must be used for temperatures over 250°F
- All: 350 psig suction pressure
- Carbon steel: 1036 psig discharge pressure
- Duplex/super duplex: 1480 psig discharge pressure
- 12% chrome: 1687 psig discharge pressure

Suction and Discharge Casings
- Flanges raised face per ANSI/ISO or EN/DIN specifications
- Radial and end suction available for suction casing
- Product lubricated silicon carbide sleeve bearing for end suction pump
- Dual volute type discharge casing
- Radial suction and discharge casing nozzles positioned in 90° increments.
- Casing wear rings standard

Interstage Casings
- Rigid, heavy duty parts
- One piece combined continuous channel mulitvane diffuser and stage piece
- Casing wear rings standard

Impellers
- Enclosed type
- Precision investment cast
- Keyed to the shaft
- Dynamically balanced
- Two impeller designs (min) for each pump size
- Optional impeller wear rings

Shafts
- Impeller keyways staggered for better balance

Balancing Device
- Involute balance drum for axial thrust balance
- Dual step surface for closer running clearance
- Accessible and removable from the discharge side of the pump

Instrumentation
- Bearing frames pre-machined for temperature and vibration sensors
- *i-ALERT*™ standard

Seals and seal systems
- Single and double cartridge mechanical seals
- Standard seal flush plan modified plan 11/13
- Seal chamber accepts a mechanical seal with pumping ring
- Plan 11, 23 as options

Bearing housings
- Radial suction pump bearing housings identical on suction and discharge ends
- Inpro VBXX-D™ labyrinth seals are standard
- Bearing housings are finned and fanned for additional cooling

Bearings
- End suction sleeve bearing supported in the suction casing
- Heavy duty anti-friction bearings in bearing housings
- Oil lubricated anti-friction bearings

Couplings
- Disc type spacer coupling standard

Coupling guards
- Standard
- Comply with OSHA and EN requirements

Shaft guards
- 304SS expanded metal shaft guards cover bearing housing openings

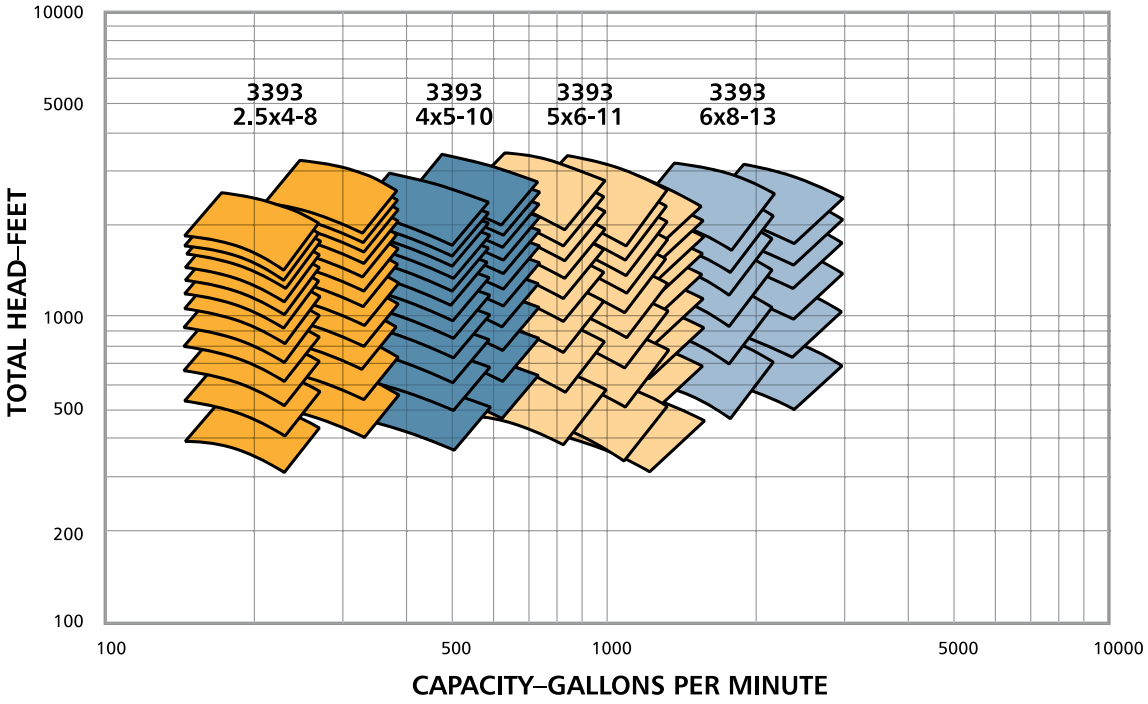
Baseplates
- Rigid fabricated steel design
- Reduced vibration
- Assured positive alignment

Drivers
- Electric motor
- Steam turbine
- Diesel engine
- Speed increasing or reducing gears

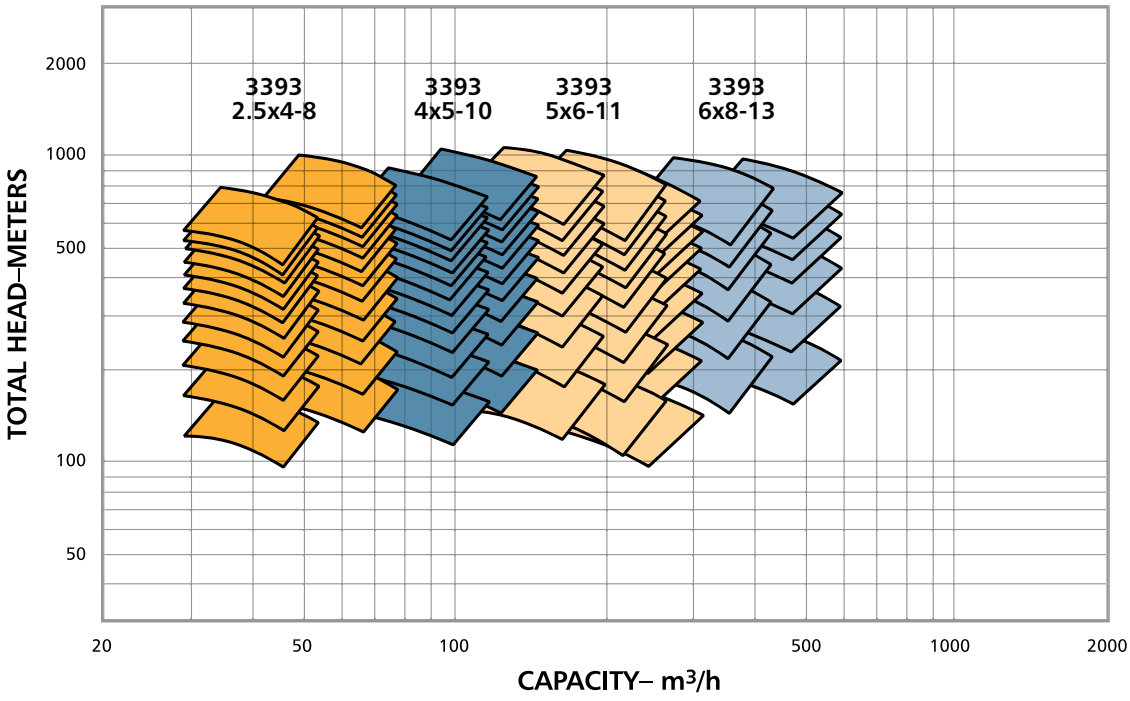
Certifications
- CE marking and ATEX certification

Hydraulic Coverage

60 Hz



50 Hz

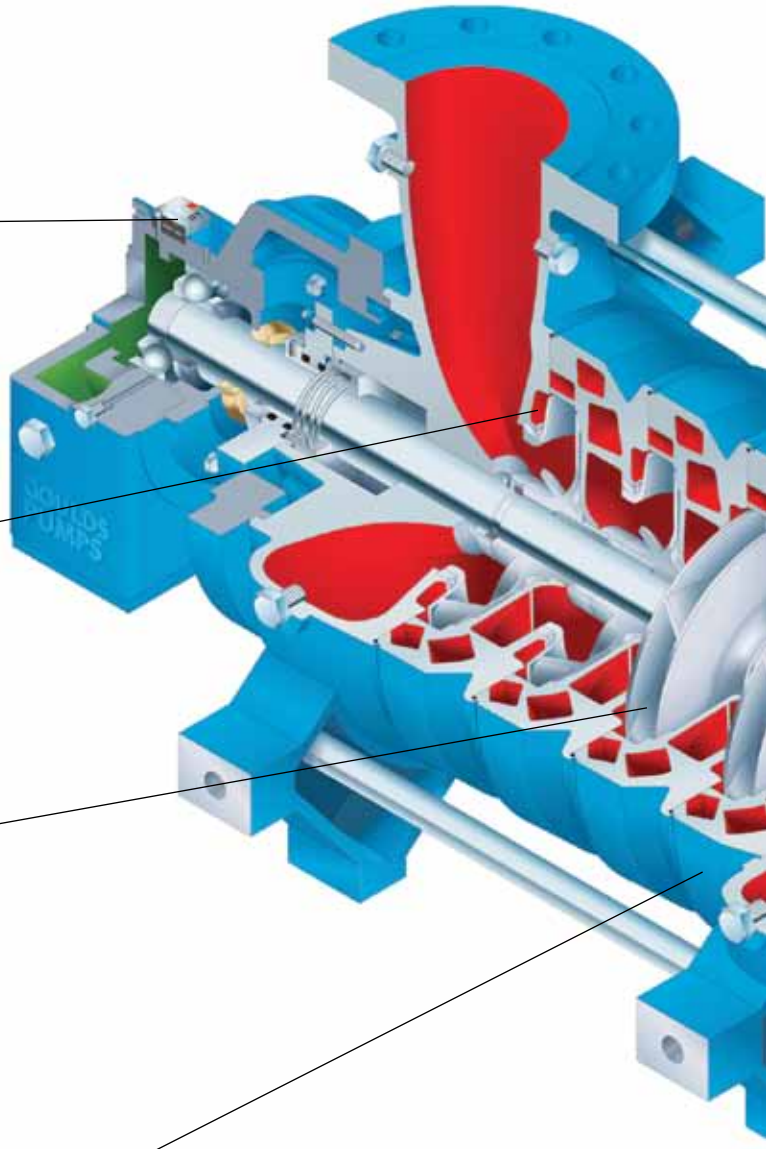


Goulds 3393

High Pressure, Multistage Ring Section Pumps

i-ALERT™ CONDITION MONITOR

- Proprietary on-board condition monitoring integrated with bearing housings is standard
- Early visual indication of operating performance facilitates proactive maintenance practices



CASING WEAR RINGS

- Standard on all pumps

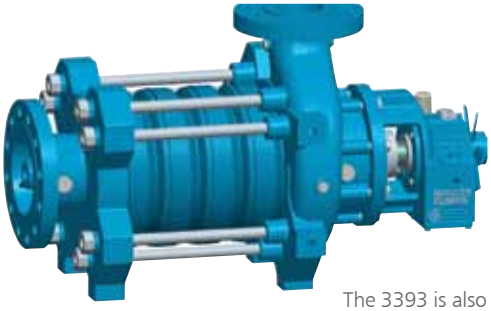
PRECISION CAST IMPELLER

- Optional impeller wear ring renews efficiencies to as-new condition
- Multiple hydraulic designs maximize efficiency for customer applications

PRECISION CAST CONTINUOUS CHANNE

DIFFUSER/STAGE CASING

- Integrated design simplifies alignn for ease of maintenance
- Smooth flow transition reduces hydraulic losses



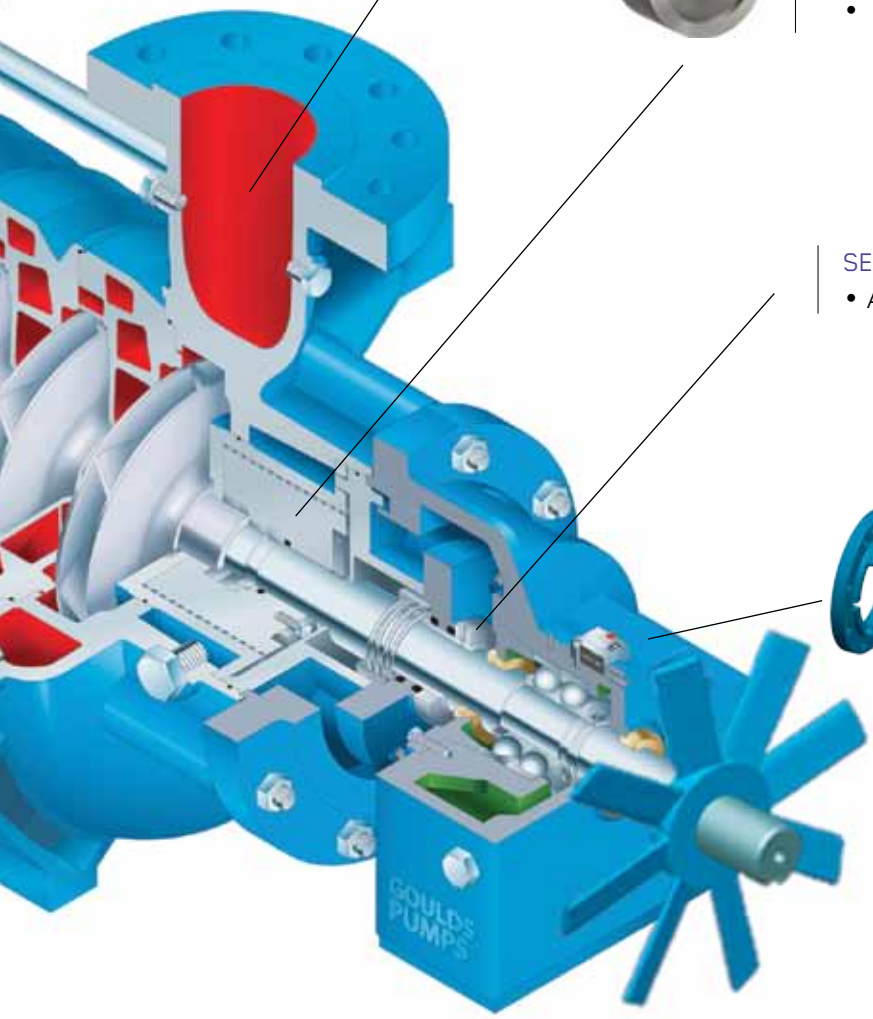
The 3393 is also available in end suction configuration.

DUAL VOLUTE TYPE DISCHARGE CASING

- Improved efficiency
- Lower Radial Loads

INVOLUTE BALANCE DRUM

- Involute configuration reduces installation footprint
- Accessibility from discharge side simplifies maintenance
- Dual step surface yields reliability under all conditions



SEAL CHAMBER

- Accepts a range of mechanical seals and piping plans

RUGGED BEARING HOUSING

- Finned and fanned for additional cooling
- Instrumentation ready
- Heavy duty anti-friction bearings

DESIGNED TO MINIMIZE YOUR TOTAL COST OF OWNERSHIP

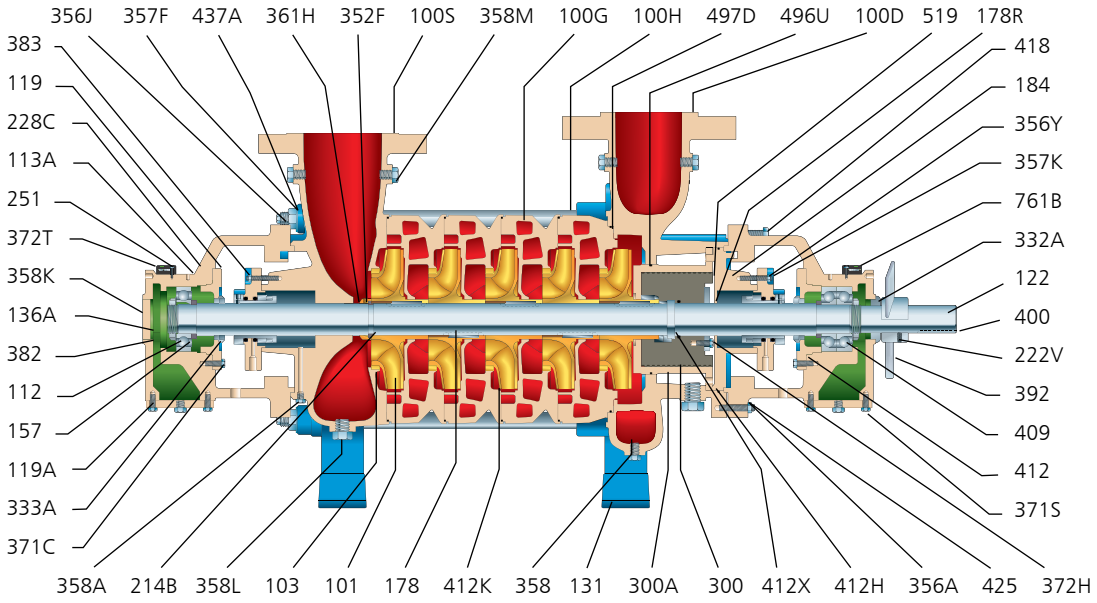
Features:

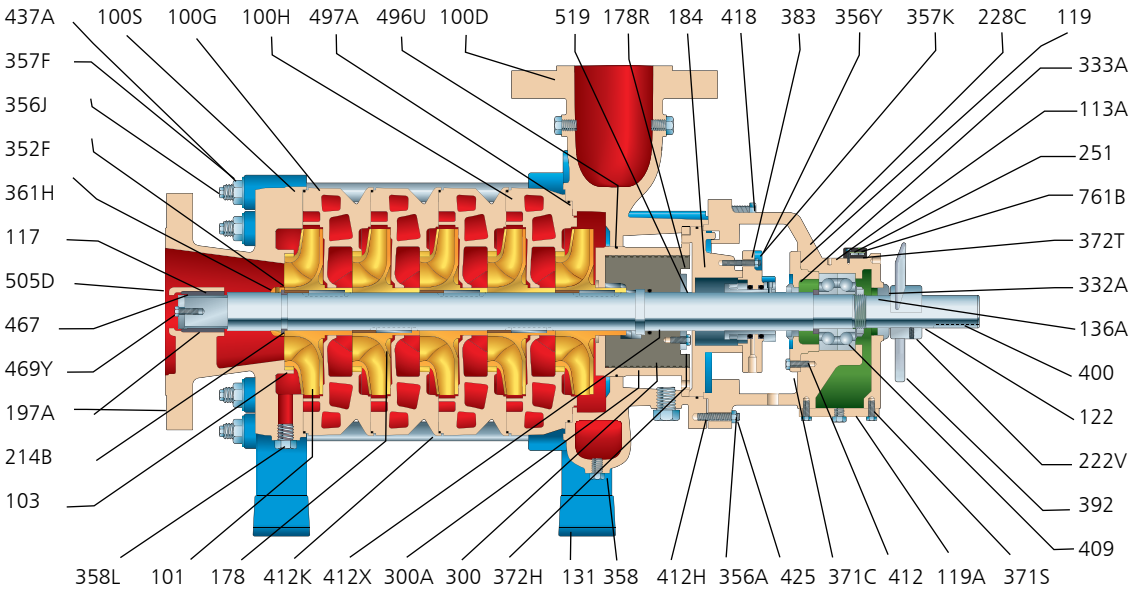
- Designed for world class efficiency and reliability
- Precision cast components
- Modular design
- End or radial suction configurations
- Multiple hydraulics
- Multiple nozzle orientations for radial suction pump

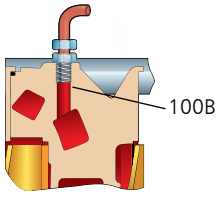
Applications:

- Reverse osmosis
- Boiler feed
- Cogeneration
- Shower / spray service
- Pressure boosting
- High pressure cleaning
- Snow making

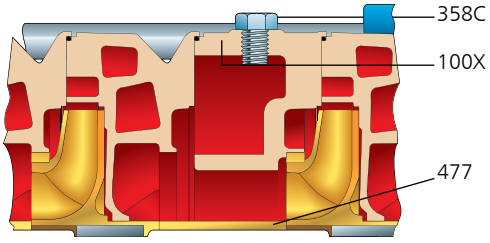
Sectional View



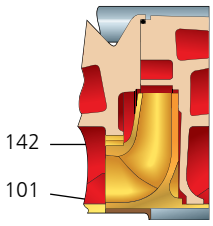




3393 Optional Tapping



3393 Optional Interstage

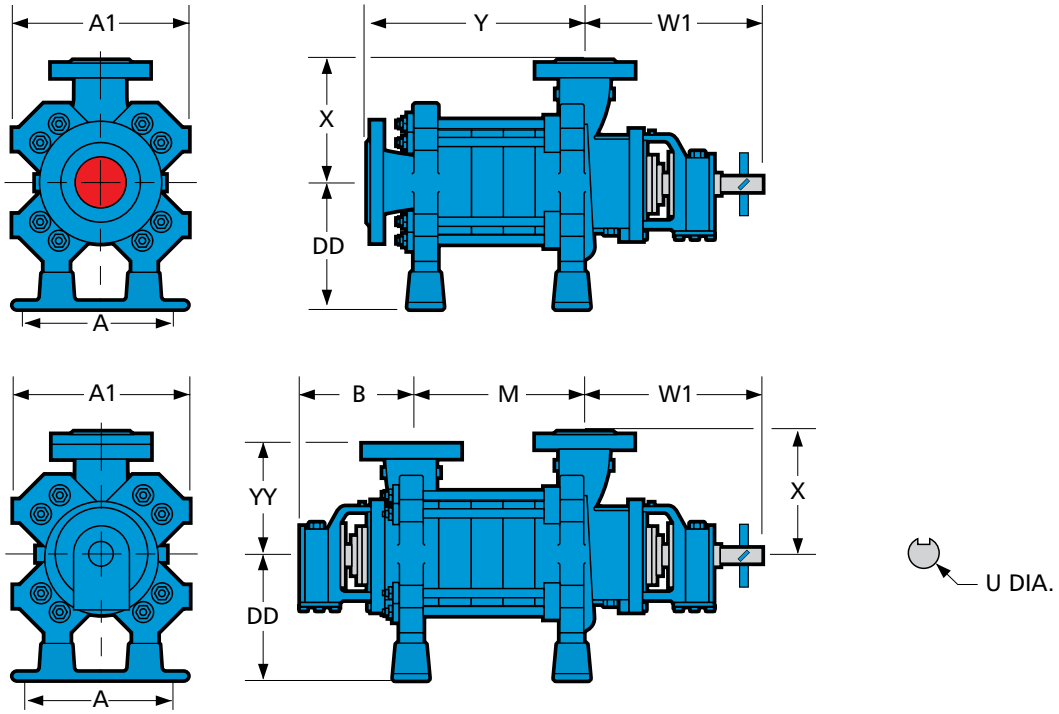


3393 Optional Impeller Wear Rings

Parts List and Materials of Construction

Item Number	Description	Materials				
		Duplex	Super Duplex	Chrome Steel	Carbon Steel chrome fitted	Carbon Steel
100B	1st Stage Remachine for Plan 11 takeoff	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
100D	Casing (Discharge)	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
100G	Diffuser Stage Casing	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
100H	Diffuser Final Stage Casing	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
100S	Casing (Suction)	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
100X	Casing (Destaging and Takeoff - Optional)	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
101	Impellar (Series)	Duplex SS	Super Duplex SS	12 Chrome		Carbon Steel
103	Case Wear Ring (Standard Clearance)	PEEK		Nitronic 60 + PEEK		
112	Ball Bearing (Radial)	Steel				
113A	Breather	Steel				
117	Bearing Sleeve (End Suction Only)	Silicon Carbide				
119	Cover (Bearing Housing)	Ductile Iron				
119A	Cover (Bearing Housing Sump)	Steel				
122	Shaft	Duplex SS		17-4 PH		
131	Foot	Steel				
136A	Bearing Lock Nut	Steel				
142	Impellar Wear Ring (Optional)	Duplex SS		17-4 PH		
157	Bearing Spacer	Carbon Steel				
178	Key (Impeller)	Duplex SS		17-4 PH		
178R	Key (Balance Drum)	Duplex SS		17-4 PH		
184	Seal Chamber	Duplex SS	Super Duplex SS	12 Chrome	Carbon Steel	
197A	Bearing Bushing (End Suction Only)	Silicon Carbide				
214B	Split Ring	Duplex SS		17-4 PH		
222V	Set Screw (Fan) On 5"(125) and 6"(150) Pumps Only	316 SS				
228C	Bearing Housing	Ductile Iron				
251	Oiler (Constant Level)	Aluminum/Glass				
300	Balance Drum	Duplex SS	Super Duplex SS	12 Chrome		Carbon Steel
300A	Balance Drum Stator	Duplex SS	Super Duplex SS	12 Chrome		Carbon Steel
332A	Bearing Isolator (Outboard)	Bronze/Viton				
333A	Bearing Isolator (Inboard)	Bronze/Viton				
352F	Set Screw (Retaining Ring)	20Cb3 SS		316 SS		
356A	Stud (Bearing Housing to Suction/Discharge Casing)	Alloy Steel				
356J	Tie Rod	4140 Steel				
356Y	Stud (Seal Chamber)	316 SS				
357F	Nut (Tie Rod)	Alloy Steel				
357K	Nut (Seal Chamber)	316 SS				
358	Drain Plug (Casing)	20Cb3 SS		316 SS	Carbon Steel	
358A	Plug (Seal Chamber Flush)	20Cb3 SS		316 SS	Carbon Steel	
358C	Plug (Destage Casing)	20Cb3 SS		316 SS	Carbon Steel	
358K	Plug (Bearing Housing Opening)	Carbon Steel				
358L	Plug (Balance Return)	20Cb3 SS		316 SS	Carbon Steel	
358M	Plug (Casing Branch Tapping)	20Cb3 SS	20Cb3 SS	316 SS	Carbon Steel	
361H	Retaining Ring	Duplex SS		17-4 PH		
371C	Cap Screw (Bearing Housing Cover)	316 SS				
371S	Cap Screw (Bearing Housing Sump Cover)	316 SS				
372H	Cap Screw (Bearing Drum Locking Plate)	20Cb3 SS		316 SS		
372T	Cap Screw (i-ALERT to Bearing Housing)	316 SS				
382	Bearing Lock Washer	Steel				
383	Mechanical Seal					
392	Fan (Brg. Cooling)	Aluminum				
400	Key (Coupling)	1018 Steel				
409	Ball Bearing (Thrust)	Steel				
412	O Ring (Bearing Housing Cover)	Buna-N				
412H	O Ring (Seal Chamber)	EPDM				
412K	O Ring (Diffuser Stage Casing)	EPDM				
412X	O Ring (Balance Drum)	EPDM				
418	Cap Screw (Bearing Housing Jacking)	316 SS				
424	Screw (Shaft Guard - Optional)	304 SS				
425	Nut (Bearing Housing to Suction/Discharge Casing)	Alloy Steel				
437A	Washer (Tie Rod)	Carbon Steel				
467	Retaining Plate (Bearing Bushing) End Suction Only	Duplex SS		17-4 PH		
469Y	Cap Screw (Retaining Plate to Shaft) End Suction Only	20Cb3 SS		316 SS		
477	Sleeve (Destaging and Takeoff)	Duplex SS		17-4 PH		
496U	O Ring (Balance Drum Stator)	EPDM				
497D	O Ring (Discharge Casing)	EPDM				
499	Guard (Shaft - Optional)	304 SS				
505D	Tolerance Ring (Bearing Sleeve) End Suction Only	Hastelloy C				
519	Locking Plate (Balance Drum)	Super Duplex SS		12 Chrome		
534C	Bolt Retainer (Guard to Bearing Housing)	Steel				
569F	Cap Screw (Guard to Bearing Housing)	316 SS				
761B	i-ALERT™	Stainless Steel/Epoxy				

Dimensions



DIMENSIONS											
	Suction Flange (in.)		Discharge Flange (in.)	A	A1	U	DD	X	YY	W1	B
Size	ES	RS	ES / RS								
2.5x4-8A, B	5 (125)	4 (125)	2.5 (65)	14.25 (362)	17.32 (440)	1.46 (37)	12.50 (318)	10.43 (265)	10.43 (265)	19.00 (483)	13.36 (339)
4x5-10A, B	6 (150)	5 (125)	4 (125)	15.50 (394)	20.08 (510)	1.65 (42)	14.25 (362)	13.58 (345)	11.81 (300)	19.54 (496)	13.78 (350)
5x6-11A,B	8 (200)	6 (150)	5 (125)	17.50 (445)	23.23 (590)	2.05 (52)	16.00 (406)	15.55 (395)	13.98 (355)	23.13 (588)	15.02 (382)
5x6-11C	8 (200)	6 (150)	5 (125)	17.50 (445)	23.23 (590)	2.05 (52)	16.00 (406)	15.55 (395)	13.98 (355)	23.42 (595)	15.02 (382)
6x8-13A	10 (250)	8 (200)	6 (150)	19.75 (502)	28.75 (730)	2.60 (66)	18.25 (464)	17.52 (445)	17.24 (438)	24.92 (633)	16.97 (431)
6x8-13B	10 (250)	8 (200)	6 (150)	19.75 (502)	28.75 (730)	2.60 (66)	18.25 (464)	19.09 (485)	17.24 (438)	24.92 (633)	16.97 (431)

		NUMBER OF STAGES												
		2 in (mm)	3 in (mm)	4 in (mm)	5 in (mm)	6 in (mm)	7 in (mm)	8 in (mm)	9 in (mm)	10 in (mm)	11 in (mm)	12 in (mm)	13 in (mm)	14 in (mm)
2.5x4-8A	Y	9.35 (237)	11.64 (296)	13.92 (354)	16.20 (411)	18.49 (470)	20.77 (528)	13.05 (331)	25.34 (644)	27.62 (702)	29.90 (759)	32.19 (818)	34.47 (876)	36.75 (933)
	M	5.86 (149)	8.14 (207)	10.43 (265)	12.71 (323)	14.99 (381)	17.28 (439)	19.56 (497)	21.84 (555)	24.13 (613)	26.41 (671)	28.69 (729)	30.98 (787)	33.26 (845)
2.5x4-8B	Y	9.70 (246)	12.26 (311)	14.82 (376)	17.38 (441)	19.93 (506)	22.49 (571)	25.05 (636)	27.61 (701)	30.17 (766)	32.73 (831)	35.29 (896)	37.85 (961)	40.41 (1026)
	M	5.86 (149)	8.14 (207)	10.43 (265)	12.71 (323)	14.99 (381)	17.28 (439)	19.56 (497)	21.84 (555)	24.13 (613)	26.41 (671)	28.69 (729)	30.98 (787)	33.26 (845)
4x5-10A	Y	11.87 (301)	14.70 (373)	17.54 (446)	20.37 (517)	23.21 (590)	26.04 (661)	28.88 (734)	31.71 (805)	34.55 (878)	37.38 (949)	40.22 (1022)	43.05 (1093)	45.89 (1166)
	M	7.54 (192)	10.37 (263)	13.21 (336)	16.04 (407)	18.88 (480)	21.71 (551)	24.55 (624)	27.38 (695)	30.22 (768)	33.05 (839)	35.89 (912)	38.72 (983)	41.56 (1056)
4x5-10B	Y	12.19 (310)	15.33 (389)	18.48 (469)	21.63 (549)	24.78 (629)	27.93 (709)	31.11 (790)	34.23 (869)	37.38 (949)	40.53 (1029)	43.68 (1109)	46.83 (1189)	49.98 (1269)
	M	7.85 (199)	11.00 (279)	14.15 (359)	17.30 (439)	20.45 (519)	23.60 (599)	26.75 (679)	29.90 (759)	33.05 (839)	236.20 (5999)	39.35 (999)	42.50 (1080)	45.65 (1160)
5x6-11A	Y	14.65 (372)	18.58 (472)	22.52 (572)	26.46 (672)	30.39 (772)	34.33 (872)	38.27 (972)	42.20 (1072)	46.14 (1172)				
	M	9.53 (242)	13.46 (342)	17.40 (442)	21.34 (542)	25.28 (642)	29.21 (742)	33.15 (842)	37.09 (942)	41.02 (1042)				
5x6-11B	Y	14.65 (372)	18.58 (472)	22.52 (572)	26.46 (672)	30.39 (772)	34.33 (872)	38.27 (972)	42.20 (1072)	46.14 (1172)				
	M	9.53 (242)	13.46 (342)	17.40 (442)	21.34 (542)	25.28 (642)	29.21 (742)	33.15 (842)	37.09 (942)	41.02 (1042)				
5x6-11C	Y	10.06 (256)	14.39 (366)	18.72 (475)	23.05 (585)	27.38 (695)	31.71 (805)	36.04 (915)	40.37 (1025)	44.70 (1135)				
	M	14.65 (372)	18.58 (472)	22.52 (572)	26.46 (672)	30.39 (772)	34.33 (872)	38.27 (972)	42.20 (1072)	46.14 (1172)				
6x8-13A	Y	17.38 (441)	22.11 (562)	26.83 (681)	31.55 (801)	36.28 (922)	41.00 (1041)							
	M	11.38 (289)	16.10 (409)	20.83 (529)	25.55 (649)	30.27 (769)	35.00 (889)							
6x8-13B	Y	18.29 (465)	23.60 (599)	28.92 (735)	34.23 (869)	39.55 (1005)	44.86 (1139)							
	M	12.28 (312)	17.60 (447)	22.91 (582)	28.23 (717)	33.54 (852)	38.86 (987)							

Full Portfolio of Multistage Pumps

Ring Section

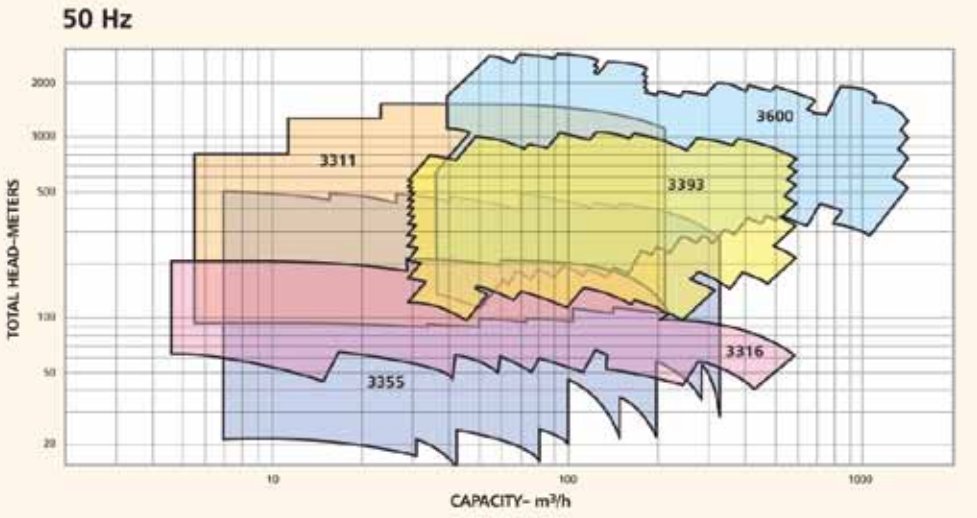
Model 3393
(End or radial suction)

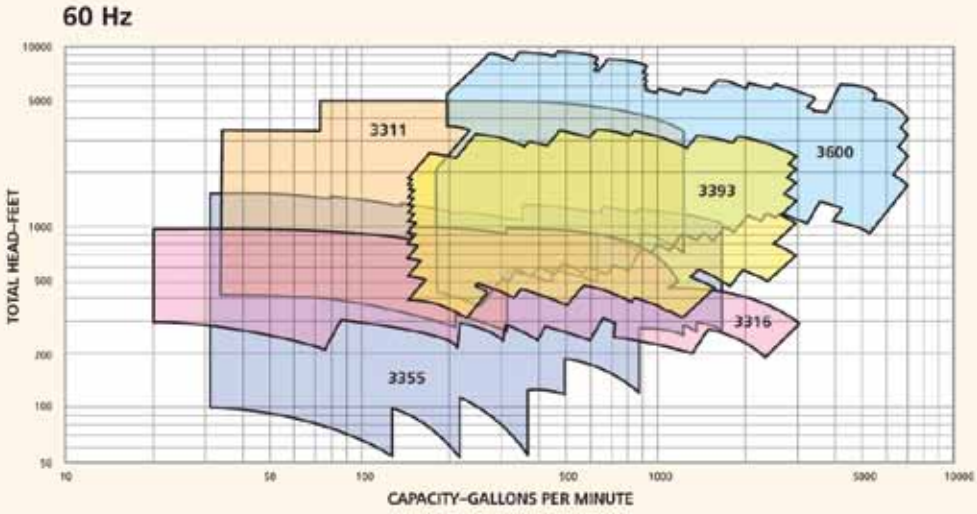
Model 3355
(End or radial suction)

Axially Split

Model 3600

Model 3316





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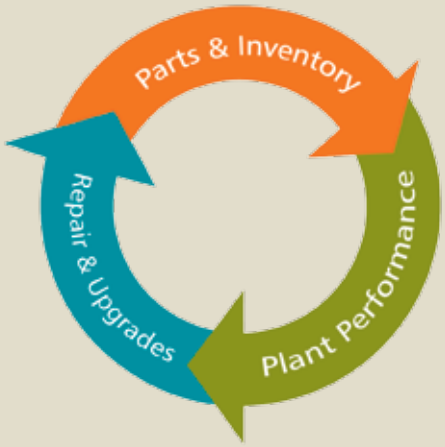
PRO services

Reliability has no quitting time.

Building on over 160 years of Goulds Pumps experience, **PRO Services** provides an array of services focused on reducing equipment total cost of ownership (TCO) and increasing plant output, including predictive monitoring, maintenance contracts, field service, engineered upgrades, inventory management, and overhauls for pumps and other rotating equipment.



Parts & Inventory

- Efficient and timely parts supply
- Engineered parts for obsolete equipment (ProCast)
- Reverse engineering and rapid pattern manufacturing
- Inventory analysis and management
- Replacement pumps
- Goulds Pumps parts

Plant Performance

- Equipment monitoring and control products and services to improve system reliability and up-time
- Full service maintenance contracts
- ITT on-site experts identify and resolve bad actor equipment issues through:
  - Root cause failure analysis
  - Energy performance audits and improvements
  - Maintenance, operator and management training

Repair & Upgrades

- Repair to OEM standards
- Field service
- Scheduled maintenance and plant shutdowns
- Engineered drop-in replacements
- Upgrades:
  - Upgrade pumps to the latest API standard editions
  - Hydraulic re-rates to operate pumps at the customer's required setting
  - Mechanical & material upgrades

ITT
ENGINEERED FOR LIFE

240 Fall Street
Seneca Falls, NY 13148
www.itt.com

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Form B3393 03/14