



— An ITT Brand

Goulds LF 3196 i-FRAME[®]

Low Flow ANSI Process Pump with
i-ALERT[®] Patented Intelligent Monitoring



LF 3196 i-FRAME®

Low Flow ANSI Process Pumps Designed for Total Range of Industry Services

- Capacities to 220 GPM (50 m³/h)
- Heads to 925 feet (282 m)
- Temperatures to 700° F (371° C)
- Pressures to 450 PSIG (3102 kPa)

Performance Features for Low Flow Services

Extended Pump Life

- Concentric (Circular) casing
- Radial vane impeller
- TaperBore™/ Big Bore™ Seal Chambers
- i-ALERT® Power Ends
- Optional centerline mounted casings

Ease of Maintenance

- Back pull-out design
- Parts interchangeable with Goulds 3196 i-ALERT®
- External impeller adjustment
- Easy retrofit

Safety

- ANSI B15.1 coupling guard
- Ductile iron frame adapter
- Raised face flanges
- Optional shaft guard

Applications

- Specialty chemicals
- Batch chemical process
- Reactor feed
- Shower service
- Boiler feed
- Condensate
- High pressure process
- Column reflux
- Column bottoms
- Hot oil
- Seal water



LF 3196 i-ALERT® *STi*
(1x1½-4, 1x1½-8)

The LF 3196 i-ALERT® process pump line is specifically designed to provide superior performance for low flow services of the Chemical Process Industries.



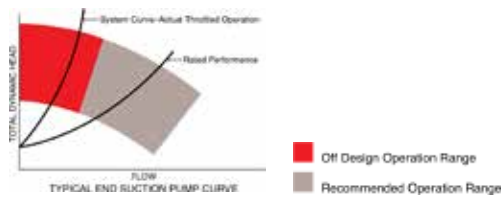
LF 3196 i-ALERT® *MTi/LTi*
(1 x 2-10 *MTi/LTi*, 1½ x 3-13 *LTi*)

LF 3196 i-FRAME®

Designed for Low Flow Services

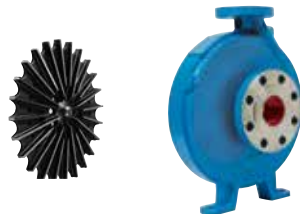
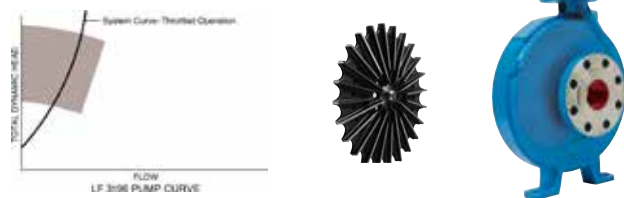
Not All End Suction Pumps are Designed for Low Flows

Many users throttle pumps to attain desired low flow performance. Because these pumps are not designed to operate continuously in this range, the resultant higher radial loads and increased shaft deflection lead to premature bearing and mechanical seal failure. Unscheduled downtime and higher maintenance costs are the consequence.



LF 3196 i-FRAME® Designed Specifically for Trouble-Free Operation At Low Flows

Goulds LF 3196 i-ALERT® concentric (circular volute) casing and open radial vane impeller are designed to eliminate hydraulic and mechanical problems at throttled low flows.



Maximum Interchangeability

Low Flow Retrofit

Pump Replacement

Since the LF 3196 i-ALERT® meets ANSI dimensional standards, retrofitting ANSI pumps not designed for operation at low flows is easy. Simply replace the troublesome pump with the equivalent ANSI size LF 3196 i-ALERT®.

Pump Retrofit

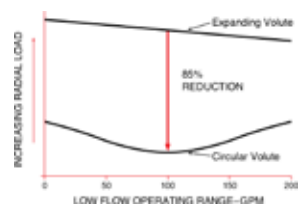
Since the LF 3196 i-ALERT® meets ANSI dimensional standards, retrofitting ANSI pumps not designed for operation at low flows is easy. Simply replace the troublesome pump with the equivalent ANSI size LF 319 i-ALERT®.

A CV 3196 i-ALERT® retrofit kit (casing and impeller) easily converts an existing 3196.



Reduced Radial Loads for Optimum Reliability

Radial loads are reduced by as much as 85% compared to end suction expanding volute pumps at low flows. Bearing, mechanical seal and overall pump life are optimized.



EXPANDING VOLUTE PUMP

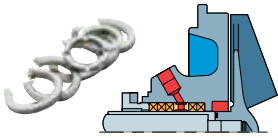


LF 3196 i-ALERT® CIRCULAR VOLUTE PUMP

LF 3196 i-FRAME®

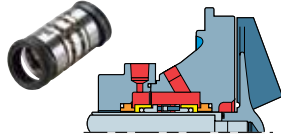
Maximum Sealing Flexibility

To meet ANSI B73.1M specifications, Goulds provides the best choice of stuffing box or seal chamber and a wide range of sealing arrangements. Your Goulds representative will gladly recommend the best sealing solution for your service... some of which are illustrated below.



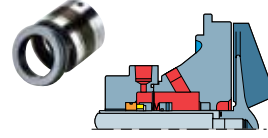
PACKED BOX

- PTFE-Impregnated Fiber Packing
- Standard Bore Stuffing Box



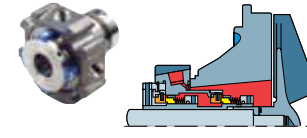
CONVENTIONAL DOUBLE SEAL

- BigBore™ Seal Chamber



SINGLE INSIDE SEAL

- Stuffing box design
- Flush gland
- By-pass flush



TANDEM SEAL

- TaperBore™ Seal Chamber (use BigBore™ if throat bushing required).

Goulds i-FRAME® Power Ends

Designed for Reliability, Extended Pump Life Condition Monitor

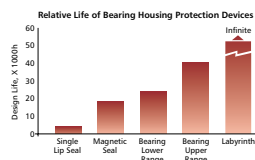


The heart of the i-ALERT®, the condition monitor unit continuously measures vibration and temperature at the thrust bearing and automatically indicates when pre-set levels of vibration and temperature have been exceeded, so that changes to the process or machine can be made before failure occurs.

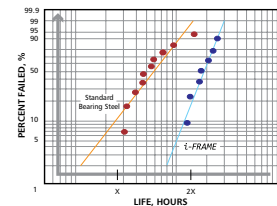
A visual indication of pump health makes walk-around inspections more efficient and accurate. The result is a more robust process to monitor and maintain all your ANSI pumps so that your plant profitability is maximized.

Inpro VBXX-D Hybrid Bearing Isolators

Most bearings fail before reaching their potential life. They fail for a variety of reasons, including contamination of the lubricant. INPRO VBXX-D has long been considered the industry standard in bearing lubricant protection. The i-ALERT® now improves upon that design by offering stainless steel rotors, for maximum protection against contaminants and the corrosive effects of seal leakage or environmental conditions. These seals are non-contacting and do not wear.



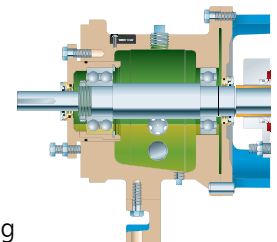
Shaft and Bearings Engineered for Maximum Reliability



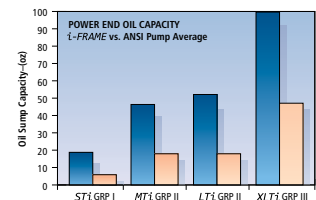
Fatigue life more than double that of conventional bearing steels.

Optimized Oil Sump Design

Internal sump geometry is optimized for longer bearing life. Sump size increased by 10% -20% results in better heat transfer and cooler bearings. Contoured design directs contaminants away from bearings, to the magnetic drain plug for safe removal.



Larger Means Cooler
 GOULDS
 Industry Average



LF 3196 i-FRAME®

Low Flow ANSI Process Pumps

Featuring i-ALERT® Patented Monitoring

i-ALERT® CONDITION MONITOR (Patent Pending)

Constantly measures vibration and temperature at the thrust bearing. Colored LED's indicate general pump health. Provides early warning of improper operation before catastrophic failure occurs.

INPRO VBXX-D HYBRID LABYRINTH SEALS

Prevents premature bearing failure caused by lubricant contamination or loss of oil. Stainless steel rotors for optimal performance in corrosive environments.

CONTINUOUS PERFORMANCE

Original flow, pressure and efficiency are maintained by simple external adjustment resulting in long-term energy and repair parts savings.

PREMIUM SEVERE-DUTY THRUST BEARINGS

Increase bearing fatigue life by 2-5X that of conventional bearing steels.

HEAVY DUTY SHAFT AND BEARINGS

Rigid shaft designed for minimum deflection at seal faces — less than 0.002 in. (.05 mm). Bearings sized for 10-year average life under tough operating conditions. Available with or without shaft sleeve.

OPTIMIZED OIL SUMP DESIGN

Increased oil capacity provides better heat transfer for reduced oil temperature. Bearings run cooler and last longer. Contaminants directed away from bearings to magnetic drain plug.

ONE-INCH BULL'S EYE SIGHT GLASS

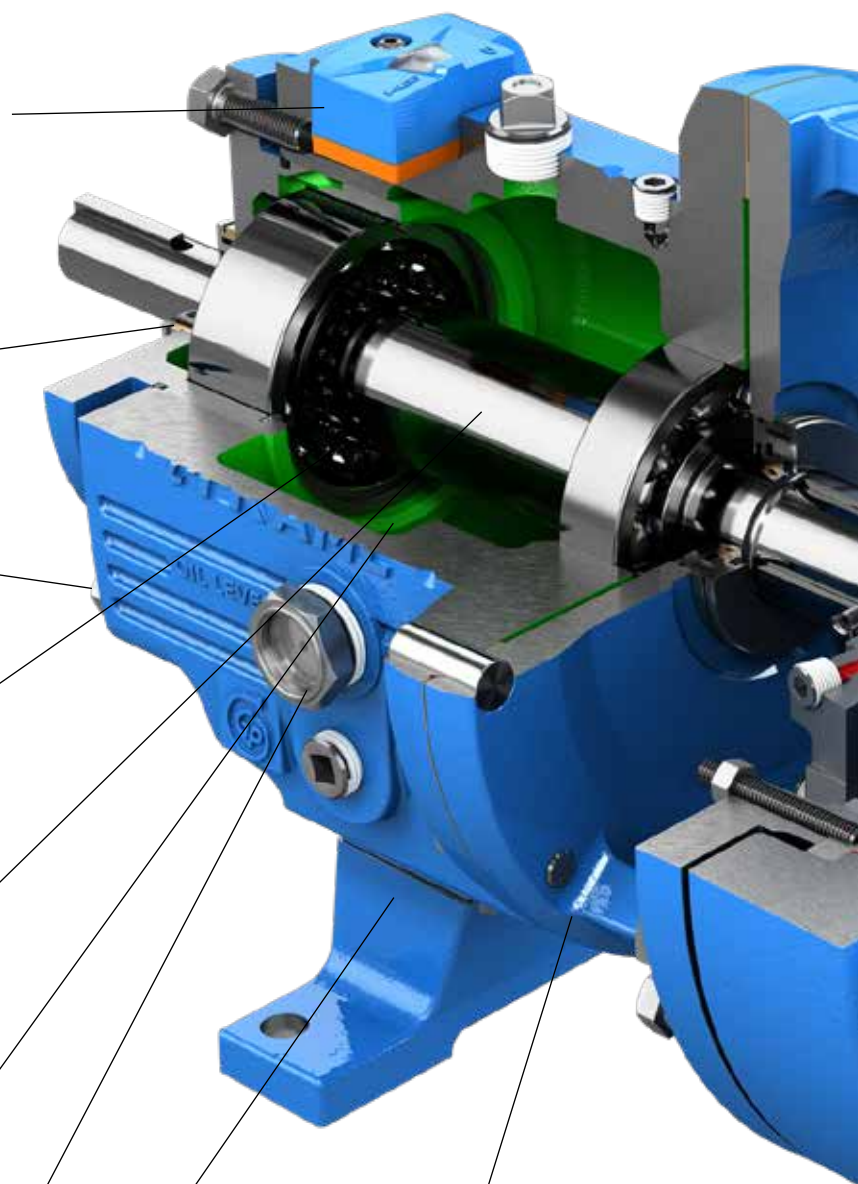
Assures proper oil level critical to bearing life. Can be mounted on either side of pump for installation flexibility.

i-FRAME® POWER END

Designed for reliability and extended pump life, backed with a 5-year warranty.

MAGNETIC DRAIN PLUG

Standard magnetic drain plug helps protect bearings and prolong life.



DUCTILE IRON FRAME ADAPTER

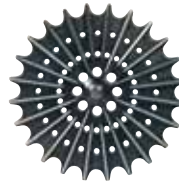
Material strength equal to carbon steel for safety.

SEALING FLEXIBILITY

Wide range of sealing arrangements available to meet service conditions. Engineered seal chambers improve lubrication and heat removal (cooling) of seal faces for extended seal life and pump uptime.

GOULDS LOW FLOW IMPELLER

Multiple open radial vanes reduce pulsations, vibration and vane stress. Full shroud for superior vane strength when operating at extreme low flows. Balance holes reduce axial thrust, minimize stuffing box/seal chamber pressure for longer bearing and seal life.



CIRCULAR VOLUTE CASING

Reduces radial loads during low flow operation. Mechanical seal and bearings last longer. Fully machined discharge and volute provide maximum efficiency and precise control of hydraulics at low flows.

POSITIVE SEALING

Fully confined gasket at casing joint protects alignment fit from liquid, makes disassembly easier.

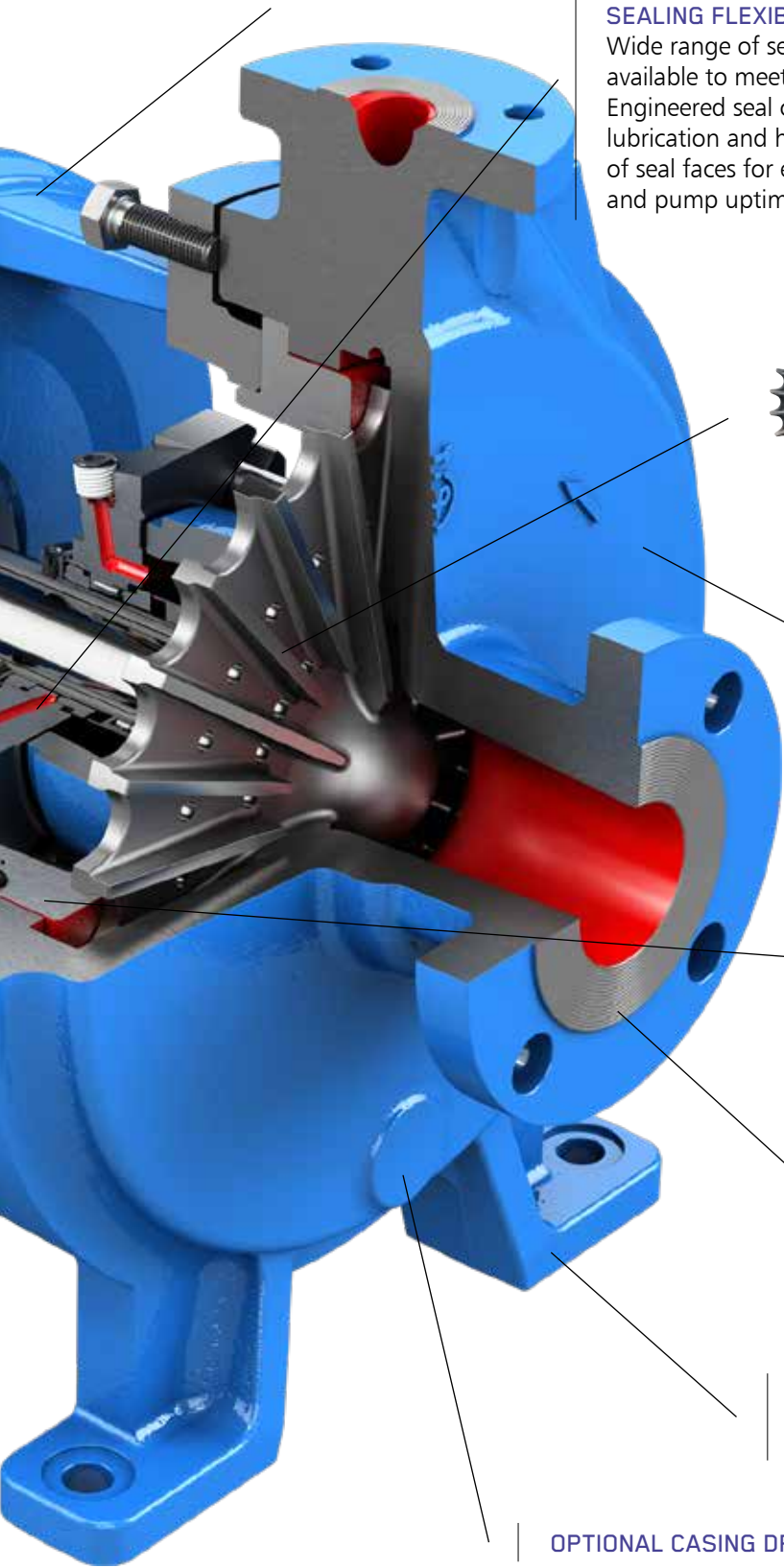
RAISED FACE FLANGES

Serrated for positive sealing against leakage. Meets ANSI B16.5 requirements. Class 150 RF standard. Class 300 RF optional. (13" casing – 300 RF flanges standard.)

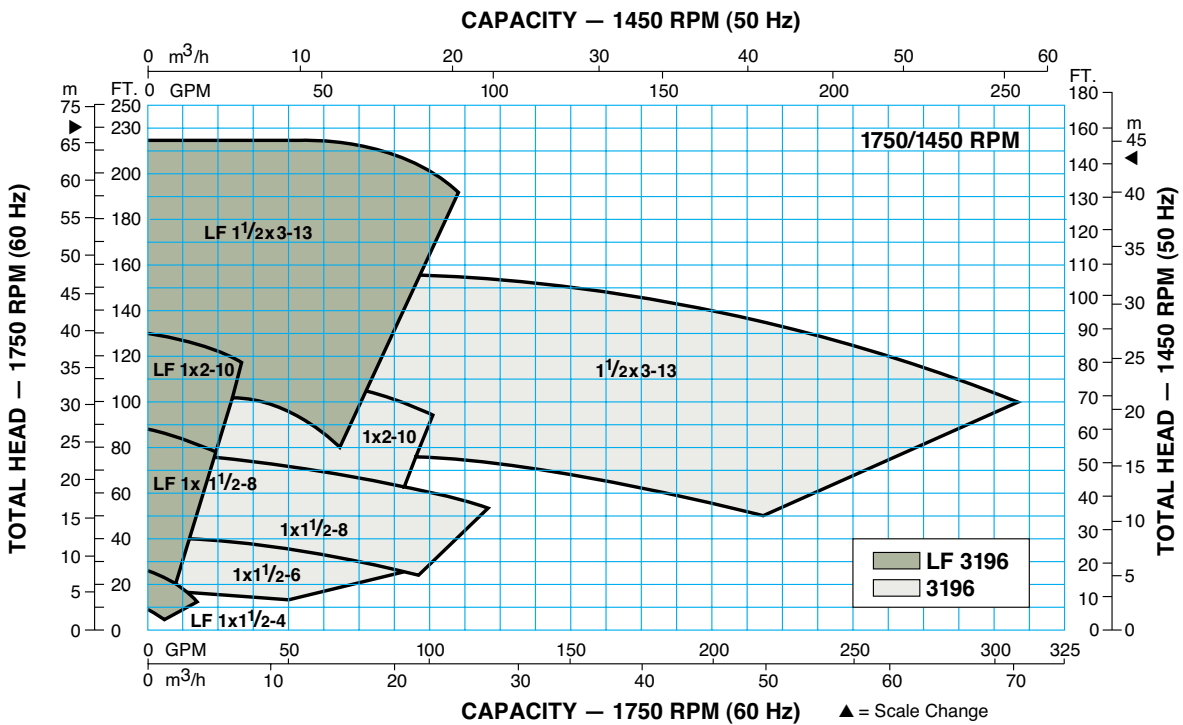
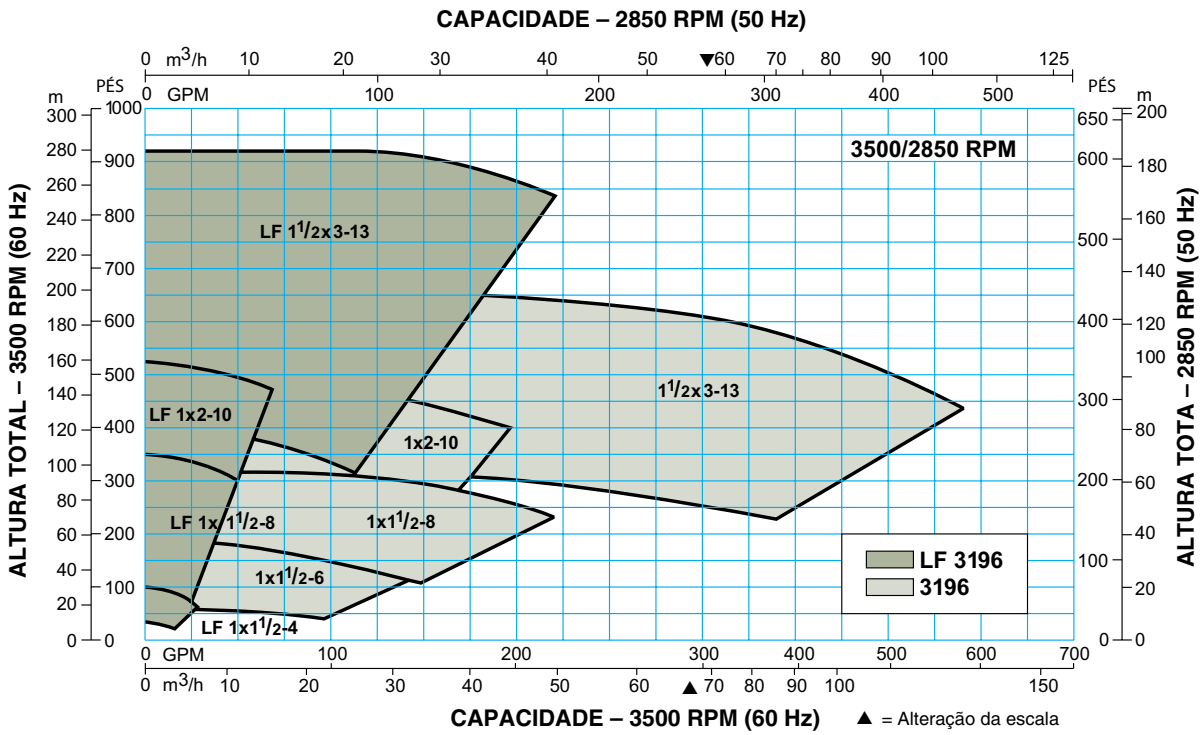
RIGID FRAME (AND CASING) FEET

Reduce effects of pipe loads on shaft alignment; pump vibration reduced.

OPTIONAL CASING DRAIN



Hydraulic Coverage



LF 3196 i-FRAME®

Parts List and Materials of Construction

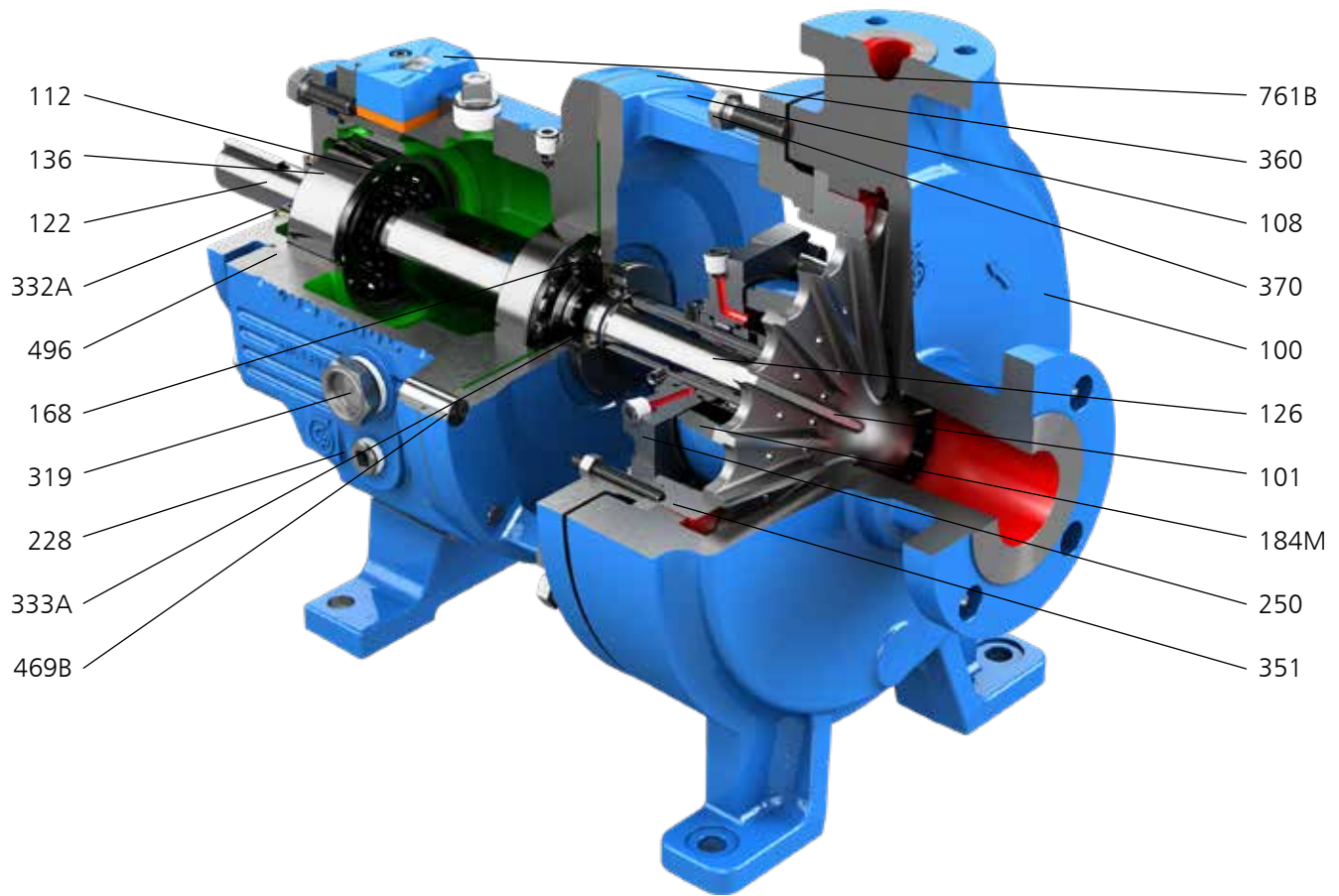
Item Number	Part Name	Material				
		Ductile Iron/ 316SS Trim	316SS	CD4MCu	Alloy 20	Hastelloy B & C
100	Casing	Ductile Iron	316SS	CD4MCu	Alloy 20	Hastelloy
101	Impeller	316SS	316SS	CD4MCu	Alloy 20	Hastelloy
105	Lantern Ring (Not Illustrated)	Glass-Filled PTFE				
106	Stuffing Box Packing (Not Illustrated)	PTFE Impregnated Fibers				
108	Frame Adapter	Ductile Iron				
112	Thrust Bearing	Double Row Angular Contact Conrad**				
122	Shaft—Less Sleeve (Optional)	SAE4140	316SS		Alloy 20	Hastelloy
122	Shaft—With Sleeve	SAE4140				316SS
126	Shaft Sleeve	316SS		Alloy 20		Hastelloy
136	Bearing Locknut and Lockwasher	Steel				
168	Radial Bearing	Single Row Deep Groove				
184	Stuffing Box Cover (Packed Box)	Ductile Iron	316SS	CD4MCu	Alloy 20	Hastelloy
184M	Seal Chamber (Mechanical Seal)	Ductile Iron	316SS	CD4MCu	Alloy 20	Hastelloy
228	Bearing Frame	Cast Iron (Ductile Iron for STX Group)				
250	Gland	316SS		CD4MCu	Alloy 20	Hastelloy
262	Repeller/Sleeve (Dynamic Seal Option)	CD4MCu			Alloy 20	Hastelloy
264	Gasket, Cover-to-Backplate (Dynamic Seal)	PTFE				
265A	Stud/Nut, Cover-to-Adapter	304SS				
319	Oil Sight Glass	Glass/Steel				
332A	Inpro® vbxx-d Labyrinth Oil Seal (Outboard)	Stainless Steel/Bronze				
333A	Inpro® vbxx-d Labyrinth Oil Seal (Inboard)	Stainless Steel/Bronze				
351	Casing Gasket	Aramid Fiber with EPDM Rubber				
358A	Casing Drain Plug (Optional)	Steel	316SS	CD4MCu	Alloy 20	Hastelloy
360	Gasket, Frame-to-Adapter	Buna				
370	Cap Screw, Adapter-to-Casing	Steel	304SS			
418	Jacking Bolt	304SS				
444	Backplate (Dynamic Seal Option)	Ductile Iron	316SS	CD4MCu	Alloy 20	Hastelloy
469B	Dowel Pin	Steel				
496	O-ring, Bearing Housing	Buna Rubber				
496A	O-ring, Impeller	Glass-Filled PTFE				
761B	i-ALERT™ Condition Monitor	Stainless Steel/Epoxy				

**LTX Power End features Duplex Angular Contact All dimensions in inches and (mm).

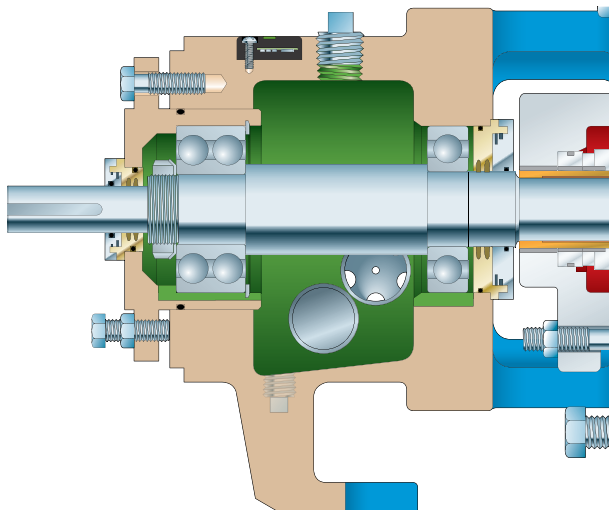
Construction Details

		STi	MTi	LTi
Shaft	Diameter at Impeller	.75 (19)	1 (25)	1.25 (32)
	Diameter in Stuffing Box/Seal Chamber (Less Sleeve) (With Sleeve)	1.375 (35)	1.75 (45)	2.125 (54)
		1.125 (29)	1.5 (38)	1.875 (48)
	Diameter Between Bearings	1.5 (38)	2.125 (54)	2.5 (64)
	Diameter at Coupling	.875 (22)	1.125 (29)	1.875 (48)
	Overhang	6.125 (156)	8.375 (213)	8.375 (213)
	Maximum Shaft Deflection		0.002 (0.05)	
Sleeve	O.D. thru Stuffing Box/Seal Chamber	1.375 (35)	1.75 (45)	2.125 (54)
Bearings	Radial	SKF 6207	SKF 6309	SKF 6311
	Thrust	3306	3309	7310
	Bearing Span	4.125 (105)	6.75 (171)	6.875 (164)
BigBore™ Seal Chamber	Bore	2.875 (73)	3.5 (89)	3.875 (98)
Stuffing Box	Bore	2 (51)	2.5 (64)	2.875 (73)
Power Limits	HP (kW) per 100 RPM	1.1 (.82)	3.4 (2.6)	5.6 (4.2)
Maximum Liquid Temperature	Oil/Grease Lubrication without Cooling		350° F (177° C)	
	Oil Lubrication with Finned Cooler		500° F (260° C)	
	Oil Lubrication with High Temperature Option		700° F (371° C)	
Casing	Corrosion Allowance		.125 (3)	

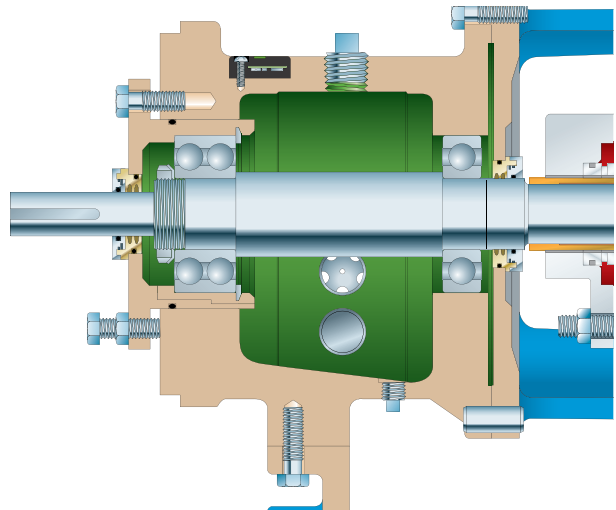
Sectional View



STi

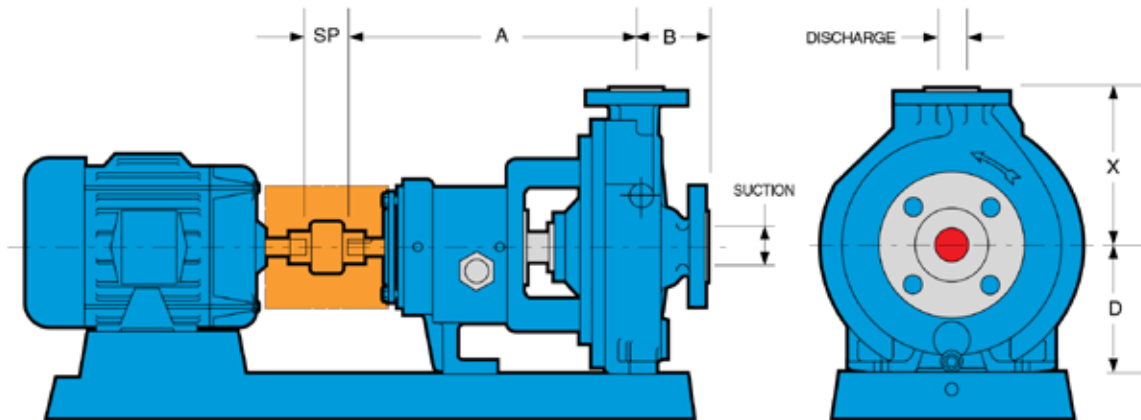


MTi



LF 3196 i-FRAME®

Dimensions



DIMENSIONS										
Group	Pump Size	ANSI Designation	Discharge Size	Suction Size	X	A	B	D	SP	Bare Pump Weight Lbs. (kg)
STĪ	1x1½-4	AA	1	1½	6.5 (165)	13.5 (343)	4.0 (102)	5.25 (133)	3.75 (95)	84 (38)
	1x1½-8	AA	1	1½	6.5 (165)	13.5 (343)	4.0 (102)	5.25 (133)	3.75 (95)	100 (45)
MTĪ	1x2-10	A05	1	2	8.5 (216)	19.5 (495)	4.0 (102)	8.25 (210)	3.75 (95)	200 (91)-MTX 245 (111)-LTX
LTĪ	1½x3-13	A20	1½	3	10.5 (267)	19.5 (495)	4.0 (102)	10.0 (254)	3.75 (95)	285 (129)

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

High Temperature LF 3196 i-FRAME®

For high temperature services (500°-700°F/ 260°-370°C), the LF 3196 i-ALERT® is furnished with the following standard features:

- Centerline-mounted casing
- Graphite casing gasket
- Graphite impeller O-ring
- Jacketed stuffing box
- High temperature bolting
- Stainless steel shaft
- Finned oil cooler



Locations



For more information Please Visit:
www.gouldspumps.com | www.ittproservices.com



— An ITT Brand

240 Fall Street
Seneca Falls, NY 13148
Phone: 315.568.2811
Fax: 315.568.2418
www.gouldspumps.com

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