Goulds 3198 i-FRAME™
PFA Teflon®-Lined Process Pumps

Engineered for life
The 3198 i-FRAME PFA Teflon®-lined process pump line is specifically designed to provide superior performance for low flow services of the Chemical Process Industries.

**Goulds 3198 i-FRAME™**

**PFA Teflon®-Lined Process Pumps Designed for Total Range of Severe Corrosive Services**
- Capacities to 800 GPM (182 m³/h)
- Heads to 450 feet (137 m)
- Temperatures to 300° F (149° C)
- Pressures to 225 PSIG (1552 kPa)

**Performance Features for Severe Corrosive Services**

**Extended Pump Life**
- Virgin PFA Telfon® lining
  - Optimum lining thickness
  - Superior corrosion resistance
- i-FRAME Power Ends
- Fully open impeller

**Ease of Maintenance**
- Back pull-out design
- External impeller adjustment
- Parts interchangeable with Goulds 3196 i-FRAME
- Easy retrofit
- ANSI standard dimensions

**Safety**
- ANSI B15.1 coupling guard
- Ductile iron frame adapter

**Services**
- Hydrochloric acid
- Hydrofluoric acid
- Ferric chloride
- Pickling acid
- Plating acid
- Plating solutions
- Chlorinated brine
- Chlorinated hydrocarbons
- Sodium hypochlorite
- Chlorine dioxide
Goulds 3198 i-FRAME™ Designed for Severe Corrosive Services

Goulds 3198 i-FRAME™...An Economical Solution
For severe corrosive services, users have traditionally specified pumps constructed of exotic alloys such as titanium, zirconium and monel. The high cost of these alloys, plus the difficulty in making the proper selection, have prompted pump users to seek alternatives.

The 3198 i-FRAME is an economical solution. For less than the price of an exotic alloy ANSI process pump, the 3198 i-FRAME can be reliably used for handling a wide range of severe corrosives.

The 3198 i-FRAME is constructed for optimum reliability. Every day it proves itself in demanding installations, standing up to tough services – and lasting!

Virgin PFA Teflon®-Lined Construction

Corrosion Resistance
The PFA Teflon® lining is resistant to most industrial chemicals and solvents with the exception of molten alkali metals and related compounds. It’s the acknowledged material of choice for handling severe corrosives.

Outstanding Strength
Ductile iron and carbon steel backing provide strength equal to all-metal pump components. Outstanding strength reduces the effect of pipe loads on shaft alignment (flange loading capability is the same as all-metal 3196).

True volute casing provides performance and efficiencies similar to the standard of the industry—Goulds 3196.

Bonus Interchangeability
i-FRAME™ Power Ends Fit 7 Different Process Pumps
Minimize inventory, reduce downtime.

Virgin PFA Teflon®-Lined Process Pumps
CV 3196 Non-Clog Chemical Process Pumps
HT 3196 High-Temperature Chemical Process Pumps
LF 3196 Low Flow ANSI Process Pumps
3198 PFA Teflon®-Lined Process Pumps
3796 Self-Priming Process Pumps
3996 In-Line Process Pumps
Maximum Sealing Flexibility

A wide range of sealing arrangements are readily available to meet specific user requirements. Your Goulds representative can recommend the best solution for any service. Some are illustrated here.

**SINGLE OUTSIDE SEAL**
- Stuffing box design
- Flush gland
- By-pass flush

**CONVENTIONAL DOUBLE SEAL**
- Backplate design
- Seal chamber
- External flush or CPI Plan 7353

**CONVENTIONAL SINGLE SEAL**
- Stuffing box design
- Flush gland
- By-pass flush

**DOUBBLE CARTRIDGE SEAL**
- BigBore™ seal chamber
- Flush gland
- Tefzel® Lined

Goulds *i-FRAME™* Power Ends

**Condition Monitor**

The heart of the *i-FRAME*, 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.

**Shaft and Bearings Engineered for Maximum Reliability**

Fatigue life more than double that of conventional bearing steels.

**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-FRAME* 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.

**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.

**Power End Oil Capacity**

Larger means cooler

- **Goulds**
- **Industry Average**

<table>
<thead>
<tr>
<th>Group</th>
<th>Power End Oil Capacity (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFE</td>
<td>100</td>
</tr>
<tr>
<td>MFE</td>
<td>90</td>
</tr>
<tr>
<td>LTE</td>
<td>100</td>
</tr>
<tr>
<td>XLT&amp;</td>
<td>100</td>
</tr>
</tbody>
</table>

Power End Oil Capacity *i-FRAME* vs. ANSI Pump Average
3198 i-FRAME™
Teflon® Process Pumps
Design Features for Wide Range
of Severe Corrosive Services

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

HEAVY DUTY SHAFT ANDBearings
Shaft designed for maximum deflection – less than .002 in (.05 mm) – at seal faces. Bearings sized for 2-year minimum and 10-year average life under tough operating conditions.

ONE-INCH OIL SIGHT GLASS
For easy monitoring of actual oil level and condition.

SHAFT SEALING
Goulds 3198 is available with backplate, stuffing box, or BigBore™ seal chamber. Accommodates conventional single inside, single outside, and double mechanical seals. BigBore™ seal chamber accommodates cartridge single and double seals.

RIGID FRAME (AND CASING) FEET
Reduce the effect of pipe loads on alignment.

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

DUCTILE IRON FRAME ADAPTER
Material strength equal to carbon steel for safety.

POSITIVE SEALING
Assured by renewable, confined Teflon® envelope casing gasket. Compressible filler assures positive seal with low bolt load and without need for retightening.

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.

FULLY OPEN IMPELLER
Acknowledged best design for chemical services – solids handling, stringy material, corrosives, abrasives. Back pump-out vanes minimize seal chamber pressure.

Impeller inserts provide uniform low-stress torque transfer and maximum PFA Teflon® material support. Assures close tolerances impeller-to-shaft alignment and fit. Metallic-to-metal impeller drive.

Teflon® impeller O-ring in controlled compression protects threaded area against corrosion.

THICK PFA TEFLON
Molded in place to ductile iron by high pressure molding technique and mechanically dovetail locked. PFA Teflon® is stress relieved to eliminate cracking.
## Parts List and Materials of Construction

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Part Name</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Casing</td>
<td>PFA Teflon® Lined Ductile Iron</td>
</tr>
<tr>
<td>101</td>
<td>Impeller (with insert)</td>
<td>PFA Teflon® Lined Steel</td>
</tr>
<tr>
<td>108</td>
<td>Frame Adapter</td>
<td>Ductile Iron</td>
</tr>
<tr>
<td>112</td>
<td>Thrust Bearing</td>
<td>Double Row Angular Contact</td>
</tr>
<tr>
<td>122</td>
<td>Shaft</td>
<td>316SS (Standard) Optional: Alloy 20, Hastelloy B &amp; C</td>
</tr>
<tr>
<td>126</td>
<td>Shaft Sleeve</td>
<td>Choice: PFA Teflon®, 316SS, Alloy 20, Hastelloy B &amp; C, Titanium, Zirconium</td>
</tr>
<tr>
<td>136</td>
<td>Bearing Locknut and Washer</td>
<td>Steel</td>
</tr>
<tr>
<td>159</td>
<td>Seal Chamber (Backplate Design)</td>
<td>316SS</td>
</tr>
<tr>
<td>168</td>
<td>Radial Bearing</td>
<td>Single Row Deep Groove</td>
</tr>
<tr>
<td>228</td>
<td>Bearing Frame</td>
<td>Cast Iron (Ductile Iron for STX)</td>
</tr>
<tr>
<td>319</td>
<td>Oil Sight Glass</td>
<td>Glass/Steel</td>
</tr>
<tr>
<td>332A</td>
<td>Labyrinth Seal (Outboard)</td>
<td>Stainless Steel/Bronze</td>
</tr>
<tr>
<td>333A</td>
<td>Labyrinth Seal (Inboard)</td>
<td>Stainless Steel/Bronze</td>
</tr>
<tr>
<td>351</td>
<td>Casing Gasket</td>
<td>Teflon® Envelope</td>
</tr>
<tr>
<td>356A</td>
<td>Stud–Casing to Frame or Frame Adapter</td>
<td>316SS</td>
</tr>
<tr>
<td>360</td>
<td>Gasket–Frame to Adapter</td>
<td>Vellumoid</td>
</tr>
<tr>
<td>370H</td>
<td>Stud and Nut–Backplate/Frame or Frame Adapter</td>
<td>304SS</td>
</tr>
<tr>
<td>383</td>
<td>Mechanical Seal</td>
<td>(As Specified)</td>
</tr>
<tr>
<td>418</td>
<td>Jacking Bolt</td>
<td>304SS</td>
</tr>
<tr>
<td>444</td>
<td>Backplate</td>
<td>PFA Teflon® Lined Ductile Iron</td>
</tr>
<tr>
<td>469B</td>
<td>Dowel Pin</td>
<td>Steel</td>
</tr>
<tr>
<td>496</td>
<td>O-ring—Bearing Housing</td>
<td>Buna Rubber</td>
</tr>
<tr>
<td>496A</td>
<td>O-ring—Impeller</td>
<td>PFA Teflon®</td>
</tr>
<tr>
<td>761B</td>
<td>Condition Monitor</td>
<td>Stainless Steel/Epoxy</td>
</tr>
</tbody>
</table>

## Construction Details

All dimensions in inches and (mm).

<table>
<thead>
<tr>
<th>Lining Thickness</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing</td>
<td>.35 (9)</td>
<td>.2 (5)</td>
</tr>
<tr>
<td>Impeller</td>
<td>.25 (6)</td>
<td>.15 (4)</td>
</tr>
<tr>
<td>Stuffing Box Cover</td>
<td>.35 (9)</td>
<td>.2 (5)</td>
</tr>
<tr>
<td>Backplate</td>
<td>.35 (9)</td>
<td>.2 (5)</td>
</tr>
<tr>
<td>Shaft Sleeve</td>
<td>.25 (6)</td>
<td>.15 (4)</td>
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</table>

<table>
<thead>
<tr>
<th>Shaft</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter at Impeller</td>
<td>.75 (19)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Diameter in Seal Chamber (Less Sleeve) (With Sleeve)</td>
<td>1.375 (35)</td>
<td>1.75 (45)</td>
</tr>
<tr>
<td>Diameter Between Bearings</td>
<td>1.125 (29)</td>
<td>1.5 (38)</td>
</tr>
<tr>
<td>Diameter at Coupling</td>
<td>.75 (19)</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Overhang</td>
<td>6.125 (156)</td>
<td>8.375 (213)</td>
</tr>
<tr>
<td>Maximum Shaft Deflection</td>
<td>0.002 (0.05)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sleeve</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer Diameter thru Seal Chamber</td>
<td>1.375 (35)</td>
<td>1.75 (45)</td>
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</table>

<table>
<thead>
<tr>
<th>Bearings</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
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<tbody>
<tr>
<td>Radial</td>
<td>SKF6207</td>
<td>SKF6309</td>
</tr>
<tr>
<td>Thrust</td>
<td>SKF5309</td>
<td>SKF5309 A/C3</td>
</tr>
<tr>
<td>Bearing Span</td>
<td>4.125 (105)</td>
<td>6.75 (171)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Seal Chamber</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore</td>
<td>2 (51)</td>
<td>2.5 (66)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Power Limits</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP (KW) per 100 RPM</td>
<td>1.1 (1.8)</td>
<td>3.4 (5.6)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Maximum Liquid Temperature</th>
<th>3198 ST†</th>
<th>3198 MT†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>300˚F (150˚C)</td>
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</table>
Sectional View 3198 i-FRAME™
Dimensions Models 3107/3198 *i-FRAME™*

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

### DIMENSIONS

<table>
<thead>
<tr>
<th>Group</th>
<th>Pump Size</th>
<th>ANSI Designation</th>
<th>Discharge Size</th>
<th>Suction Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>X</th>
<th>Bare Pump Weight Lbs. (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3198 STL</td>
<td>1½ x 3-7</td>
<td>AB</td>
<td>1½</td>
<td>3</td>
<td>13½ (343)</td>
<td>4 (102)</td>
<td>3½ (95)</td>
<td>5½ (133)</td>
<td>6½ (165)</td>
<td>108 (49)</td>
</tr>
<tr>
<td>3198 MFI</td>
<td>1½ x 3-10</td>
<td>A50</td>
<td>1½</td>
<td>3</td>
<td>19½ (495)</td>
<td>4 (102)</td>
<td>3½ (95)</td>
<td>8½ (210)</td>
<td>8½ (216)</td>
<td>230 (104)</td>
</tr>
<tr>
<td></td>
<td>3 x 4-10</td>
<td>A70</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>11 (279)</td>
<td>280 (127)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 x 4-13</td>
<td>A40</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>10 (254)</td>
<td>12½ (318)</td>
<td>343 (156)</td>
</tr>
</tbody>
</table>

**Baseplate Mounting Options**

Goulds offers a complete range of mounting systems to meet plant reliability requirements, and to make alignment and maintenance easier.

- **CAMBER TOP CAST IRON**
  Rigid and corrosion resistant, it is preferred by many plants.

- **CHEMBASE PLUS™**
  Polymer concrete construction provides exceptional rigidity and corrosion resistance. ANSI 1991 dimensional.

- **FABRICATED STEEL**
  Economical baseplate that meets ANSI/ASME B73.1 M current edition dimensional requirements.

- **ENHANCED FEATURE FABRICATED STEEL**
  Upgraded ANSI baseplate designed to maximize pump operation life and ease installation by meeting API-minded chemical pump users toughest requirements.
**PRO Services®**

**Extending Equipment Life...**

**Product Repair** (all types and brands of rotating equipment)
- Service Center Repair
- Field Service
- Parts Supply

**Reliability Improvement**
- Inventory Management
- Replacement/Exchange
- Turnkey Repair/Installation
- Training

**Optimization of Assets**
- Predictive Analysis/Condition Monitoring
- Root Cause Failure Analysis
- Pump & System Assessments
- Upgrades – Mechanical & Hydraulic
- Maintenance Management/Contract Maintenance

- Technical Expertise
- Factory Trained Service Personnel
- Quality
- Fast Turnaround
- Emergency Service — 24 hours/day, 7 days/week
- ISO and Safety Certified

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**PUMP SMART**

PumpSmart® is the latest advancement in pump control and protection to reduce energy consumption, increase uptime and decrease maintenance cost. It allows the pump to be right-sized to the application by dialing in the speed and torque which increases flow economy, reduces heat and vibration, and improves overall system reliability.

- **Simplified Pump Control** — PumpSmart was designed specifically to optimize pumping applications and can be used to control a single pump or coordinate between multiple pumps without the need for an external controller.
- **Pump Protection** — PumpSmart guarantees to protect the pump from upset conditions with patented sensorless pump protection algorithms.
- **Smart Flow** — PumpSmart features a sensorless flow function for centrifugal pumps that can calculate the flow of the pump within ± 5% of the pump rated flow.
- **Drive for the DCS** — While most VFDs can only provide basic information, PumpSmart offers unparalleled insight to the pump operation which allows for smoother process control and efficiency.
- **Pump Experts** — PumpSmart is a variable speed drive with pump-specific algorithms imbedded into the drive. With over 150 years of pump knowledge, let the pump experts take responsibility of your pump system.

Visit our Web site at www.gouldspumps.com