

# *Ethanol Production Pumps*





## The Most Trusted in the Industry

Flowserve has been successfully providing equipment for the corn processing and ethanol production industry for more than 35 years. Its reputation is built upon superior pump design, unequalled materials expertise and field-proven performance.

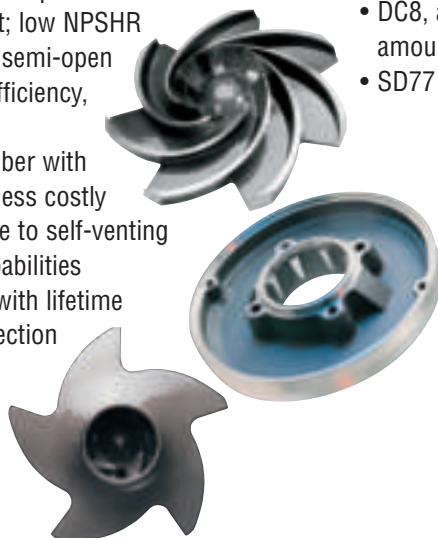
### Ethanol Pumping Expertise

- Mash
- Evaporation
- Beer bottoms
- Final ethanol
- Acid wash
- Gasoline
- Boiler feed
- Fermentation/beer
- Process condensate
- Product
- CIP
- Cooling water
- Sump
- Milling/steeping

### Superior Product Design

With ideal design features for abrasive and corrosive services, Flowserve ANSI and ISO process pumps are the global workhorses of ethanol production.

- Mark 3 ANSI reverse vane impeller transfers erosion/corrosion from casing to less expensive rear cover; repeatable “as new” performance after wear and impeller adjustment; low NPSHR
- CPX ISO precision cast semi-open impeller delivers high efficiency, low NPSHR
- Tapered bore seal chamber with flow modifiers permits less costly sealing arrangement due to self-venting and solids-handling capabilities
- Heavy-duty power end with lifetime warranty gives full protection during hose down
- Reinforced baseplate options



### Materials Expertise

Many ethanol production pump users standardize on ASTM A995, grade CD4MCuN. Invented by Flowserve, this duplex stainless steel has a hardness approximately three times that of austenitic stainless steels. It also has greater pitting and crevice corrosion resistance compared with other duplex stainless steels or 316SS.

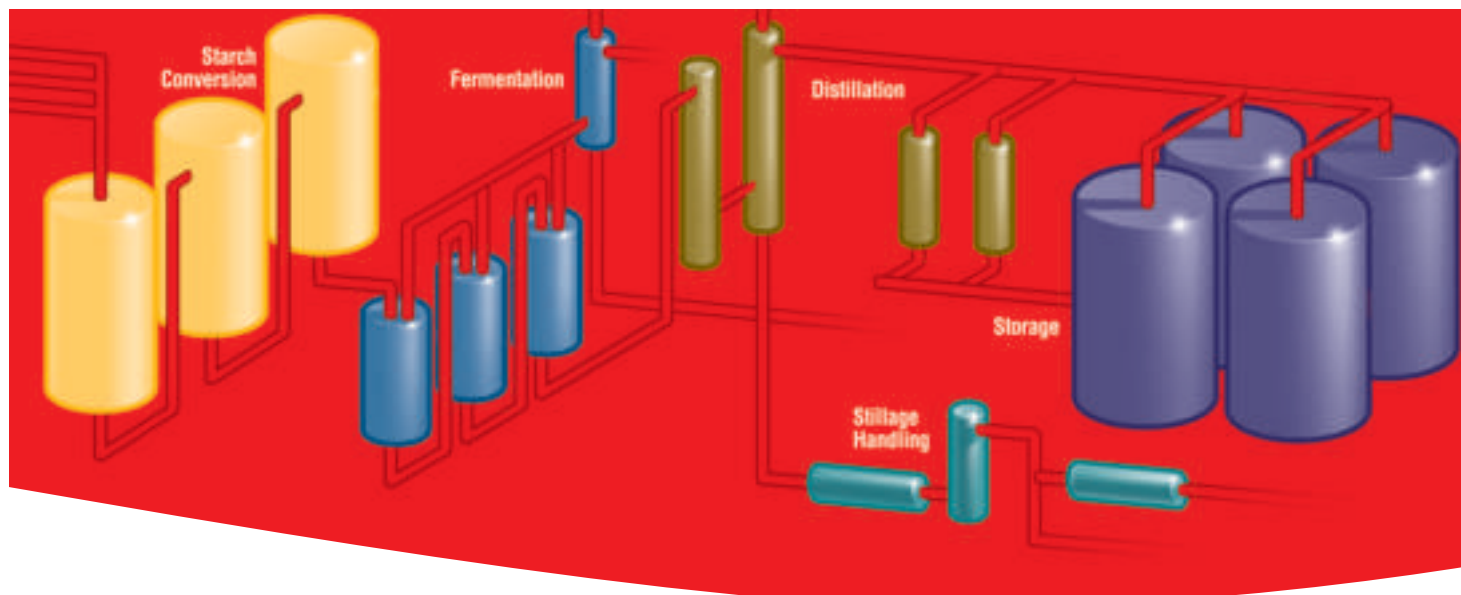
Other materials include:

- ASTM A995, grade CD4MCuN with hard coating
- CR29 hard chrome cast iron (>500 Brinell)
- ASTM A744, grade CN7M (Alloy 20)
- ASTM A744, grade CF8M (316SS)
- ASTM A395, grade 60-40-18 (DCI)
- Fluoropolymer

In addition to standard shaft materials, Flowserve offers two highly corrosion and abrasion resistant proprietary alloys. These include:

These include:

- DC8, a cobalt-based alloy with appreciable amounts of chromium and molybdenum
- SD77 high silicon iron



## Industry Leading Ethanol Production Pumps

- Starch Conversion
- Fermentation
- Distillation
- Storage
- Stillage Handling

### Standard Process Pumps

Mark 3 (ANSI B73.1), CPX (ISO 2858/5199)

- ● ● ● ● – Standard
- ● ○ ○ ○ – Recessed impeller
- ● ● ● ● – Self-priming
- ● ● ● ● – Dynamically sealed

### Fluoropolymer Lined Pumps

- ● ○ ○ ○ – PolyChem™ S-Series (ANSI B73.1 and ISO 2858)

### Heavy-duty (Stock) Pumps

- ● ● ● ● – FRBH
- ● ● ● ● – Mark 3, Group 3 and 4

### Sealless Pumps

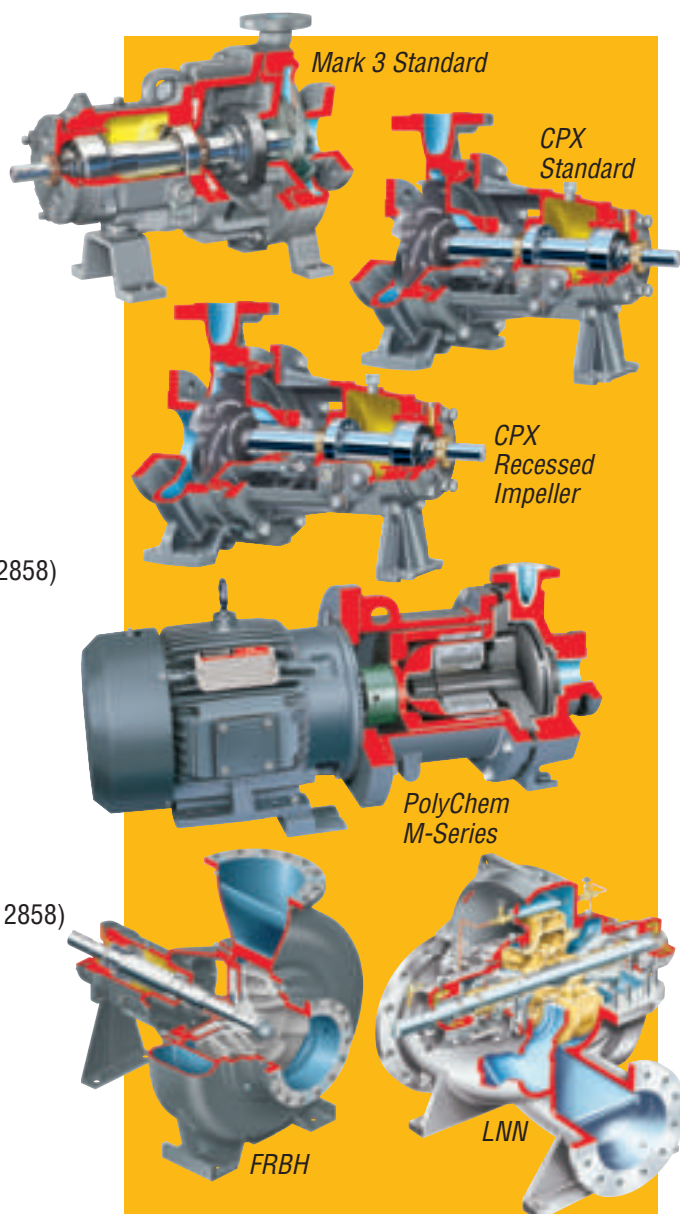
- ● ○ ○ ○ – Magnetic drive-metallic
  - Guardian® (ANSI B73.1)
  - CPXS (ISO 2858/5199)
- ● ○ ○ ○ – Magnetic drive-fluoropolymer lined
  - PolyChem M-Series (ANSI B73.1 and ISO 2858)

### Cooling Water and Sump Pumps

- ○ ○ ○ ○ – VTP vertical turbine
- ○ ○ ○ ○ – LR and LNN axially split, single stage
- ● ● ● ● – Standard and cantilever sump pumps
- ○ ○ ○ ○ – MDX vertical submersible, formed SS

### Boiler Feed Pumps

- ○ ○ ○ ○ – Radially split, multistage ring section





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