



CPE SYSTEMS INC



# SEN 20

## TECHNICAL SPECIFICATIONS



Hyginox SEN is our line of internally sealed, close-coupled centrifugal pumps. These pumps are perfect for sanitary processors, providing increased seal lifetime and decreased maintenance, while still offering the same performance and ease-of-use benefits you would expect from a centrifugal pump. It is designed specifically for the dairy, beverage, and food-processing industries, and is assembled according to NEMA standards.

## DESIGN

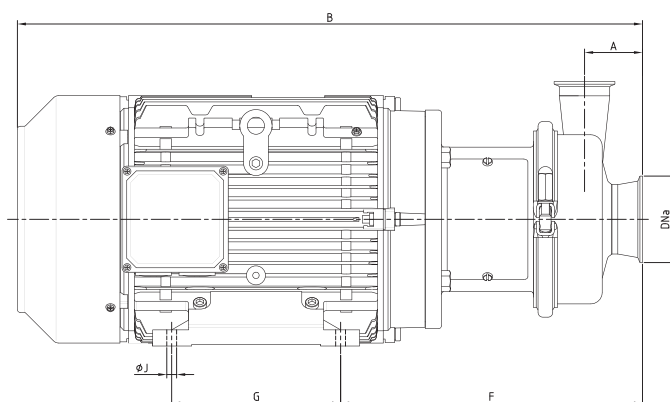
Hyginox SEN pumps use a single internal mechanical seal built to the EN 12756 standard. The seal has a silicon carbide rotary face, a carbon stationary face, and EPDM gaskets, and a full silicon carbide seal is available as a special order. Viton and PTFE gaskets are also available. Product-contact parts are AISI 316L stainless steel.

## FEATURES

- **Mechanical seal:** C/SiC or SiC/SiC
- **Gaskets:** EPDM, PTFE, or Viton
- **Motors:** Stainless steel or TEFC
- **Motor efficiency:** NEMA Premium Efficiency

## HORSEPOWER

| Horsepower | Max. Flow Rate | Shut Off Head |
|------------|----------------|---------------|
| 3 HP       | 125 GPM        | 80 ft         |
| 5 HP       | 150 GPM        | 98 ft         |
| 7.5 HP     | 160 GPM        | 120 ft        |
| 10 HP      | 185 GPM        | 145 ft        |
| 15 HP      | 190 GPM        | 160 ft        |



## TECHNICAL SPECIFICATIONS

### Materials

|                                  |                           |
|----------------------------------|---------------------------|
| Parts in Contact With Product:   | Stainless steel AISI 316L |
| Other Steel Parts:               | Stainless steel AISI 304L |
| Gaskets in Contact With Product: | EPDM (standard)           |
|                                  | Viton/FPM (special order) |
|                                  | PTFE (special order)      |

### Mechanical Seal

|                          |                                 |
|--------------------------|---------------------------------|
| Rotary Seal:             | Silicon carbide                 |
| Stationary Seal:         | Carbon (standard)               |
|                          | Silicon Carbide (special order) |
| External Surface Finish: | Bright Polish                   |
| Internal Surface Finish: | Ra < 0.8 µm                     |
| Connection Type:         | Tri-Clamp                       |
| Connection Size:         | 2" x 1.5"                       |

### Motor

|                   |                           |
|-------------------|---------------------------|
| Type:             | S.S Premium Efficiency    |
|                   | TEFC Motor                |
| Motor Frame Size: | 143TC - 213TC NEMA C-Face |
| Speeds:           | 3600 RPM                  |

### Operating Limits

|                            |                              |
|----------------------------|------------------------------|
| Nominal Pressure:          | 10 bar (145 PSI)             |
| Temperature Range:         | 14°F (-10°C) - 248°F (120°C) |
|                            | 284 °F (SIP, max. 30 min.)   |
| Maximum Flow:              | 190 US GPM (43.2 m³/h)       |
| Maximum Differential Head: | 160 ft (49 m)                |
| Maximum Speed:             | 3600 RPM (60 Hz)             |



The SEN-20 is available as a pump and motor or as a portable pump assembly. The portable pump assembly includes a VFD, cart, cord, and plug. The portable assembly comes fully programmed and has more voltage options than the pump and motor.

## PORTABLE ASSEMBLY COMPONENTS:

- SEN-20 Pump Head
- TEFC or SS Washdown Motor
- Lenze SMVector AC VFD (NEMA 4X)
- Stainless Steel Pump Cart
- Electrical Cord and Plug of Choice

## PUMP AND MOTOR COMPONENTS:

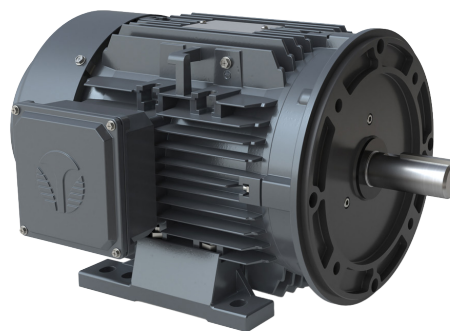
- SEN-20 Pump Head
- TEFC or SS Washdown Motor

## Motors



## STAINLESS STEEL WASHDOWN MOTOR:

- Totally Enclosed Fan Cooled (TEFC)
- Construction Material: Stainless Steel
- NEMA Premium Efficiency
- IP69 Rated
- Factory Certified Class 1 Division 2 Groups A, B, C, D



## TEFC MOTOR:

- Totally Enclosed Fan Cooled (TEFC)
- Construction Material: Enhanced Performance Cast Aluminum
- NEMA Premium Efficiency
- IP55 Enclosure Protection
- Class 1 Division 2 Groups A, B, C, D

## Portable Assembly Options

| Horsepower | Available Motors                             | Cart                  | Available Voltages                                                                            |
|------------|----------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------------|
| 3 HP       | Stainless Steel Washdown Motor<br>TEFC Motor | Medium Duty Cart      | 230 volt single phase<br>230 volt three phase<br>460 volt three phase<br>575 volt three phase |
| 5 HP       | Stainless Steel Washdown Motor<br>TEFC Motor | Medium Duty Cart      | 230 volt three phase<br>460 volt three phase<br>575 volt three phase                          |
| 7.5 HP     | Stainless Steel Washdown Motor<br>TEFC Motor | Heavy Duty Cart       | 230 volt three phase<br>460 volt three phase<br>575 volt three phase                          |
| 10 HP      | Stainless Steel Washdown Motor<br>TEFC Motor | Heavy Duty Cart       | 230 volt three phase<br>460 volt three phase<br>575 volt three phase                          |
| 15 HP      | Stainless Steel Washdown Motor<br>TEFC Motor | Super Heavy Duty Cart | 230 volt three phase<br>460 volt three phase<br>575 volt three phase                          |



## LENZE Variable Frequency Drive



The Lenze i550 protec is our new inverter series in the ½ HP to 20 HP range. They are available in 115, 230, 460, and 575 volt - 60 Hz with 1 phase and 3 phase input. The slim and sleek casing is also extremely durable, featuring both impact resistance and IP66 washdown protection. A micro USB interface is provided for more efficient programming. This user-friendly VFD is programmable and has scalable functionality. This trustworthy and powerful VFD can be implemented into your operations with ease. The i550 can be controlled by the keypad, an optional potentiometer, or a remote control (the remote control is available at additional cost). Our portable pump assemblies feature this VFD to achieve optimal efficiency.

### FEATURES

- IP66 (NEMA 4X) approved; it is both dust and water resistant.
- Equipped with a Micro USB interface for programming and diagnostics.
- Full onboard PID programming for interfacing with flow meters, level controls, pressure sensors, and can/bottle fillers.
- The i550 Protec has a sensorless vector control for synchronous motors.
- Equipped with multiple digital and analog inputs for remote control and safety interlocks.
- Compatible with our wireless remote controls, pressure switches, and run dry protection.
- Equipped with a potentiometer (optional).

### TECHNICAL SPECIFICATIONS



|                         |                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------|
| Horsepower:             | 3 - 15 HP                                                                                  |
| 1Ø/3Ø Input:            | 1Ø 230 VAC, 50/60 Hz<br>3Ø 230/460/575 VAC, 50/60 Hz                                       |
| 3Ø Output:              | 208-230/460/575 VAC                                                                        |
| Ambient Temperature:    | -22°F - 131°F (-30°C - 55°C)                                                               |
| Standard IO:            | 5x digital input, 1x digital output, 2x analog input,<br>1x analog output, 1x relay output |
| Communication Networks: | CANopen, Modbus RTU, Modbus TCP, IO-Link,<br>EtherCAT, EtherNet/IP, PROFINET               |
| Approvals:              | CE, UL, CSA, EAC, ROHS                                                                     |



## Medium Duty Cart



Custom designed for the craft food and beverage industry, this is our mid-size pump cart, built for pumps 3 to 5 HP. This cart is aerodynamic, tilt draining, maneuverable, and has a small footprint. All parts are hand welded in Canada for quality assurance and durability.

|           |                                                                              |
|-----------|------------------------------------------------------------------------------|
| Frame:    | 16 ga stainless steel round tube with foot                                   |
| Handle:   | 16 ga stainless steel round tube                                             |
| Platform: | 11 ga stainless steel AISI 304<br>Pre-drilled to fit 184 and 213 NEMA frames |
| Axle:     | ½" stainless steel rod axle                                                  |
| Wheels:   | 8" Duraflex rubber wheels                                                    |

## Heavy Duty Cart

Custom designed for the craft food and beverage industry, this is our Heavy Duty pump cart, built for pumps 7.5 to 10 HP. This cart is constructed of stainless steel and has foam filled tires. It is designed to be sturdy and reliable. All parts are hand welded in Canada for quality assurance and durability.

|           |                                                                |
|-----------|----------------------------------------------------------------|
| Frame:    | 16 ga stainless steel square tube with foot                    |
| Handle:   | 16 ga stainless steel square tube                              |
| Platform: | 14 ga stainless steel AISI 304<br>Fits 213TC frames and larger |
| Axle:     | 1/2 ga stainless steel rod axle                                |
| Wheels:   | 8" Duraflex rubber wheels                                      |



## Super Heavy Duty Cart



This 4-wheeled stainless steel pump cart is Canadian-made and designed for large-scale sanitary processors, including food and beverage manufacturing plants. This cart is designed for pumps between 10 and 20 HP. The wheels are set closer together, the base is larger, and the handle has been reimagined to allow for easy maneuverability of large pumps. The polished stainless steel pad is sized to fit 213TC and larger NEMA frame motors up to 15 HP and for larger pumps with gear motors.

|           |                                                                                                           |
|-----------|-----------------------------------------------------------------------------------------------------------|
| Frame:    | 1½" 16 ga stainless steel tube frame                                                                      |
| Handle:   | 16 ga stainless steel round tube                                                                          |
| Platform: | Polished stainless steel<br>Fits 213TC frames and larger, up to 15 HP (and larger pumps with gear motors) |
| Axle:     | ½" stainless steel rod axle                                                                               |
| Wheels:   | 8" foam filled tires, non-rusting                                                                         |



# Capacity Curves

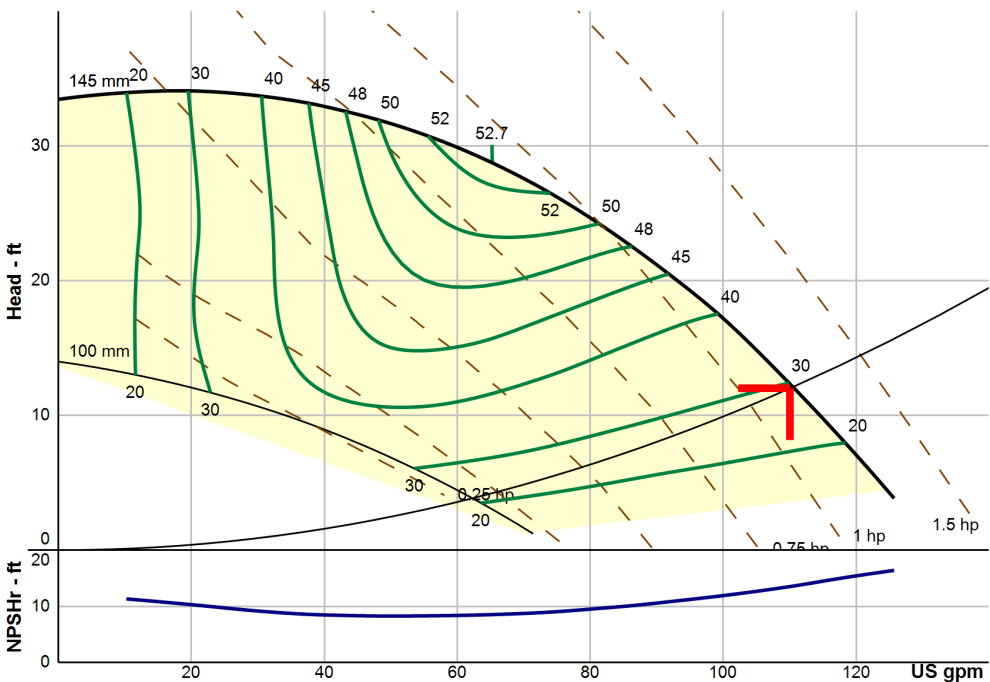
MODEL: SEN-20

Frequency: 60 Hz

RPM: 1800

Size: 2" x 1.5" x 4"

| --- Duty Point ---   |                      |
|----------------------|----------------------|
| Flow:                | 110 US gpm           |
| Head:                | 12.1 ft              |
| Eff:                 | 29.3%                |
| Power:               | 1.15 hp              |
| NPSHr:               | 13.6 ft              |
| Speed:               | 1750 rpm             |
| --- Design Curve --- |                      |
| Shutoff Head:        | 33.5 ft              |
| Shutoff dP:          | 14.5 psi             |
| Min Flow:            | --- US gpm           |
| BEP:                 | 52.7% @ 65.3 US gpm  |
| NOL Power:           | 1.22 hp @ 126 US gpm |
| --- Max Curve ---    |                      |
| Max Power:           | 1.22 hp @ 126 US gpm |



## Performance Evaluation:

| Flow<br>US gpm | Speed<br>rpm | Head<br>ft | Efficiency<br>% | Power<br>hp | NPSHr<br>ft |
|----------------|--------------|------------|-----------------|-------------|-------------|
| 132            | 1750         | ---        | ---             | ---         | ---         |
| 110            | 1750         | 12.3       | 30              | 1.15        | 13.5        |
| 88             | 1750         | 21.9       | 47              | 1.03        | 10.3        |
| 66             | 1750         | 28.6       | 53              | 0.903       | 8.56        |
| 44             | 1750         | 32.5       | 48              | 0.746       | 8.35        |



# Capacity Curves

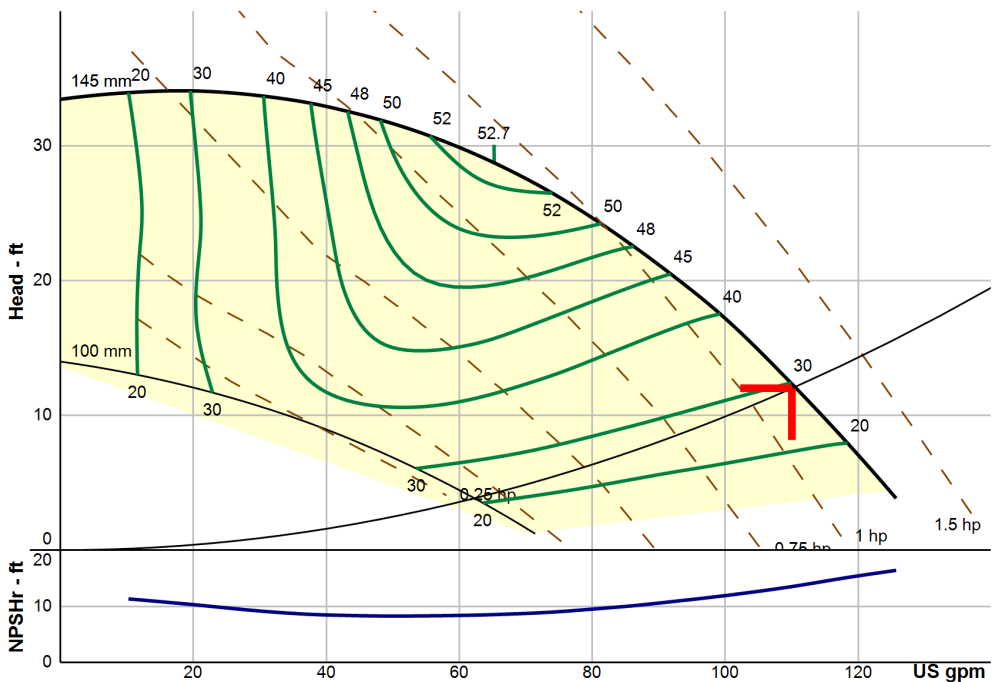
MODEL: SEN-20

Frequency: 60 Hz

RPM: 3600

Size: 2" x 1.5" x 4"

| --- Duty Point ---   |                      |
|----------------------|----------------------|
| Flow:                | 110 US gpm           |
| Head:                | 12.1 ft              |
| Eff:                 | 29.3%                |
| Power:               | 1.15 hp              |
| NPSHr:               | 13.6 ft              |
| Speed:               | 1750 rpm             |
| --- Design Curve --- |                      |
| Shutoff Head:        | 33.5 ft              |
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| --- Max Curve ---    |                      |
| Max Power:           | 1.22 hp @ 126 US gpm |



## Performance Evaluation:

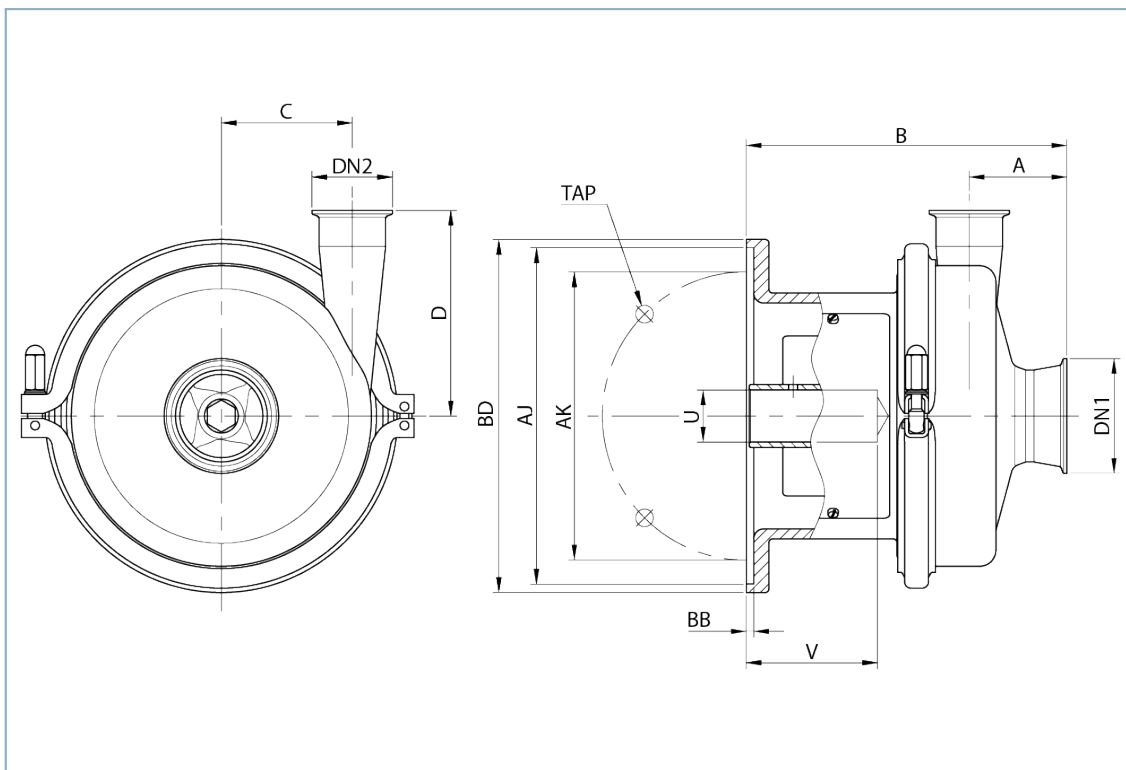
| Flow   | Speed | Head | Efficiency | Power | NPSHr |
|--------|-------|------|------------|-------|-------|
| US gpm | rpm   | ft   | %          | hp    | ft    |
| 132    | 1750  | ---  | ---        | ---   | ---   |
| 110    | 1750  | 12.3 | 30         | 1.15  | 13.5  |
| 88     | 1750  | 21.9 | 47         | 1.03  | 10.3  |
| 66     | 1750  | 28.6 | 53         | 0.903 | 8.56  |
| 44     | 1750  | 32.5 | 48         | 0.746 | 8.35  |



## Viscosity and Specific Gravity Table

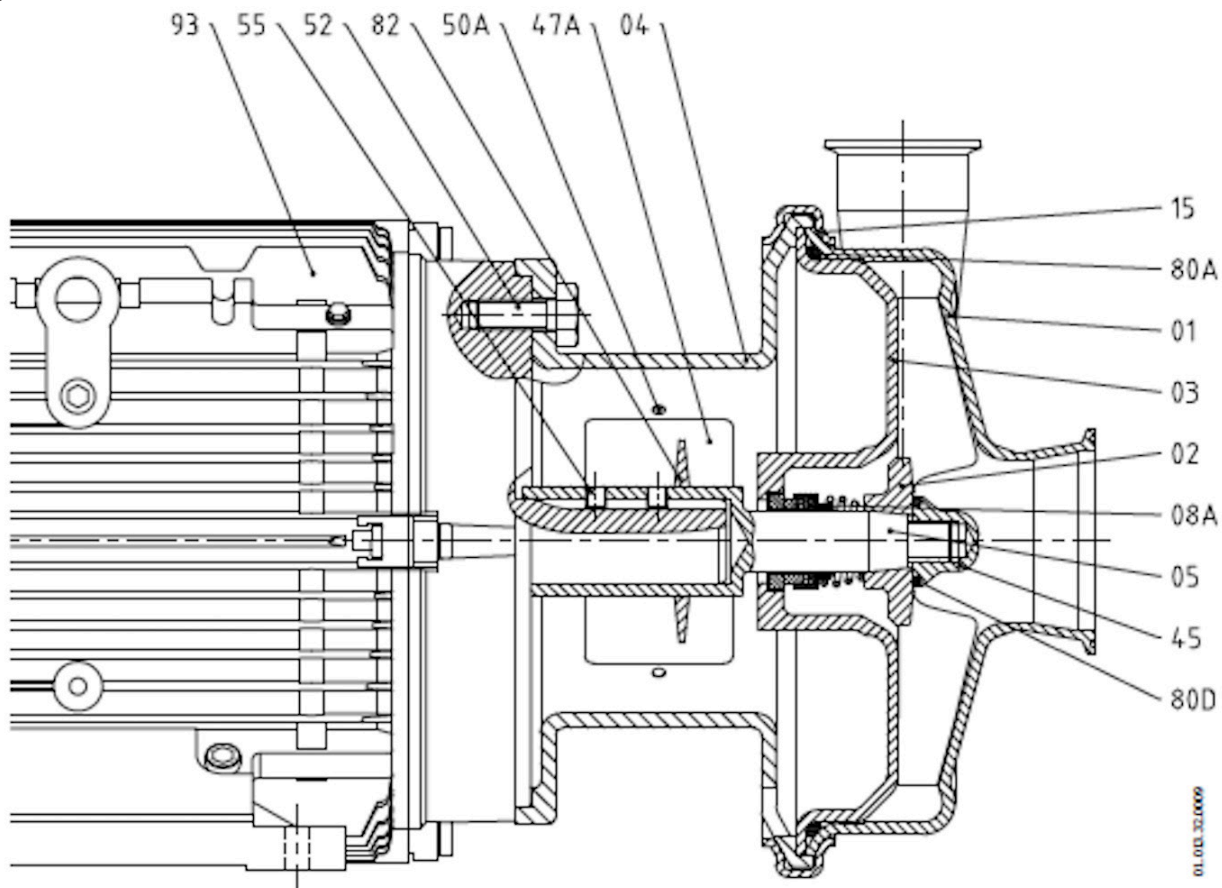
| Product               | Specific Gravity | Viscosity                                              |
|-----------------------|------------------|--------------------------------------------------------|
| Acetic Acid           |                  |                                                        |
| 5%                    | 1.01             |                                                        |
| 10%                   | 1.01             | 31.7 SSU @ 59°F                                        |
| 50%                   | 1.06             | 33.0 SSU @ 59°F                                        |
| 80%                   | 1.08             | 35.0 SSU @ 59°F                                        |
| Animal Fat            | 0.9              | 130 SSU @ 115°F<br>50 SSU @ 200°F                      |
| Barbecue Sauce        | 1.05             | 11,500 SSU @ 40-75°F                                   |
| Beer                  | 1.02             | 32 SSU @ 68°F                                          |
| Blood - Animal        | 0.93-0.98        | 15,000 SSU @ 55°F                                      |
| Butter                | 0.93-0.98        | 15,000 SSU @ 55°F<br>440 SSU @ 90°F<br>220 SSU @ 115°F |
| Coconut Oil           | 0.92             | 125 SSU @ 106°F                                        |
| Corn Oil              | 0.92             | 135 SSU @ 130°F<br>54 SSU @ 212°F                      |
| Corn Starch Solutions |                  |                                                        |
| 22 Baume              | 1.18             | 150 SSU @ 70°F<br>130 SSU @ 100°F                      |
| 24 Baume              | 1.2              | 600 SSU @ 70°F<br>440 SSU @ 100°F                      |
| 25 Baume              | 1.21             | 1400 SSU @ 70°F<br>800 SSU @ 100°F                     |
| Cottage Cheese        | 1.02             | 4,300 SSU                                              |
| Cream (sweet)         | 1                | 73 SSU                                                 |
|                       | 0.99             | 140 SSU                                                |
|                       | 0.99             | 215 SSU                                                |
| Egg Yolk              | 1.12             | 21,500 @ 35°F                                          |
| Gelatin               | 1.01             | 1,380-2,580 SSU @ 160°F                                |
| Glucose               | 1.35 - 1.44      | 35M-100M SSU @ 100°F<br>4M-11M @ 150°F                 |
| Honey                 | 1.3              | 1250-1425 SSU @ 100°F                                  |
| Ice Cream Mix         | 1.15             | 1050 SSU @ 46°F                                        |
| Lard                  | 0.96             | 287 SSU @ 100°F                                        |
| Linseed Oil           | 0.92 - 0.94      | 143 SSU @ 100°F<br>93 SSU @ 130°F                      |
| Malt Syrup            | 1.41             | 85,400 SSU @ 77°F                                      |
| Maple Syrup           | 1.37             | 2,000 SSU @ 68°F                                       |

|                 |             |                                                         |
|-----------------|-------------|---------------------------------------------------------|
| Margarine       | 0.93        | 13,900 SSU @ 84°F                                       |
| Milk            | 1.02 - 1.05 | 31.5 SSU @ 68°F                                         |
| Molasses        |             |                                                         |
| A. First        | 1.4 - 1.46  | 1,300 - 23,500 SSU @ 100°F<br>700 - 8,160 SSU @ 130°F   |
| B. Second       | 1.43 - 1.48 | 6,536 - 61,180 SSU @ 100°F<br>3058 - 15,294 SSU @ 130°F |
| C. Blackstrap   | 1.46 - 1.49 | 12,190 - 23,500 SSU @ 100°F                             |
| Mustard         | 1           | 17,000 SSU @ 85°F                                       |
| Olive Oil       | 0.91 - 0.92 | 200 SSU @ 100°F                                         |
| Peanut Butter   | 1.2         | 77,400 SSU @ 110-140°F                                  |
| Sesame Seed Oil | 0.92        | 184 SSU @ 100°F<br>110 SSU @ 130°F                      |
| Soy Bean Oil    | 0.91        | 500 SSU @ 44°F                                          |
| Tomato Paste    | 1.14        | 60M-80M SSU<br>21M SSU Approx.                          |
| Water           | 1           | 31 SSU @ 68°F                                           |



| Pump Model | Motor      | DN1  | DN2  | A    | B     | C    | D    | U    | V    | AJ   | AK   | BB   | BD    | TAP  | kg |
|------------|------------|------|------|------|-------|------|------|------|------|------|------|------|-------|------|----|
| SEN-15     | 56C        | 1 ½" | 1 ½" | 1,69 | 6,69  | 2,17 | 3,62 | 0,62 | 2,17 | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 6  |
|            | 143/145TC  | 1 ½" | 1 ½" | 1,69 | 6,69  | 2,17 | 3,62 | 0,87 | 2,2  | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 6  |
| SEN-20     | 56C        | 2"   | 1 ½" | 2,09 | 7,13  | 2,91 | 5,16 | 0,62 | 2,17 | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 8  |
|            | 143/145TC  | 2"   | 1 ½" | 2,09 | 7,13  | 2,91 | 5,16 | 0,87 | 2,2  | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 8  |
|            | 182/184TC  | 2"   | 1 ½" | 2,09 | 8,44  | 2,91 | 5,16 | 1,13 | 2,95 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 10 |
|            | 213/215TC  | 2"   | 1 ½" | 2,09 | 8,44  | 2,91 | 5,16 | 1,38 | 3,46 | 4,5  | 7,25 | 0,24 | 9,06  | 0,55 | 10 |
| SEN-26     | 56C        | 3"   | 2"   | 2,4  | 7,68  | 2,83 | 5,71 | 0,62 | 2,17 | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 8  |
|            | 143/145TC  | 3"   | 2"   | 2,4  | 7,68  | 2,83 | 5,71 | 0,87 | 2,2  | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 8  |
|            | 182/184TC  | 3"   | 2"   | 2,4  | 9,02  | 2,83 | 5,71 | 1,13 | 2,95 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 10 |
|            | 213/215TC  | 3"   | 2"   | 2,4  | 9,02  | 2,83 | 5,71 | 1,38 | 3,46 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 10 |
| SEN-28     | 143/145TC  | 1 ½" | 1 ½" | 2,36 | 7,09  | 4,17 | 5,39 | 0,87 | 2,2  | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 13 |
|            | 182/184TC  | 1 ½" | 1 ½" | 2,36 | 8,42  | 4,17 | 5,39 | 1,13 | 2,95 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 14 |
|            | 213/215TC  | 1 ½" | 1 ½" | 2,36 | 8,42  | 4,17 | 5,39 | 1,38 | 3,46 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 14 |
|            | 254/256TC  | 1 ½" | 1 ½" | 2,36 | 9,19  | 4,17 | 5,39 | 1,63 | 4,09 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 17 |
| SEN-35     | 143/145TC  | 3"   | 2"   | 3,03 | 7,93  | 4,09 | 6,42 | 0,87 | 2,2  | 4,5  | 5,87 | 0,16 | 6,61  | 0,43 | 14 |
|            | 182/184TC  | 3"   | 2"   | 3,03 | 9,25  | 4,09 | 6,42 | 1,13 | 2,95 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 15 |
|            | 213/215TC  | 3"   | 2"   | 3,03 | 9,25  | 4,09 | 6,42 | 1,13 | 3,46 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 15 |
|            | 254/256TC  | 3"   | 2"   | 3,03 | 9,31  | 4,09 | 6,42 | 1,63 | 4,09 | 8,5  | 7,25 | 0,24 | 9,84  | 0,55 | 18 |
| SEN-36     | 284/286TSC | 3"   | 2"   | 3,03 | 10,04 | 4,09 | 6,42 | 1,63 | 4,09 | 10,5 | 9    | 0,24 | 11,02 | 0,55 | 17 |
|            | 182/184TC  | 4"   | 3"   | 2,32 | 8,54  | 3,86 | 7,24 | 1,13 | 2,95 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 17 |
|            | 213/215TC  | 4"   | 3"   | 2,32 | 8,54  | 3,86 | 7,24 | 1,13 | 3,46 | 8,5  | 7,25 | 0,24 | 9,06  | 0,55 | 18 |
|            | 254/256TC  | 4"   | 3"   | 2,32 | 9,31  | 3,86 | 7,24 | 1,63 | 4,09 | 8,5  | 7,25 | 0,24 | 9,84  | 0,55 | 21 |
|            | 284/286TSC | 4"   | 3"   | 2,32 | 9,31  | 3,86 | 7,24 | 1,63 | 4,09 | 10,5 | 9    | 0,24 | 11,02 | 0,55 | 20 |

Parts List



| Part # | Part Name          |
|--------|--------------------|
| 01.    | Pump Housing       |
| 02.    | Impeller           |
| 03.    | Pump Cover         |
| 04.    | Lantern            |
| 05.    | Shaft              |
| 08A.   | Mechanical Seal    |
| 09.    | Seal Cover         |
| 15.    | Clamp Body         |
| 47A.   | Lantern Protection |
| 50A.   | Protector Screw    |
| 52.    | Hexagonal Screw    |
| 55.    | Threaded Stud      |

| Part # | Part Name   |
|--------|-------------|
| 80A.   | O-Ring      |
| 80D.   | O-Ring      |
| 82.    | Splash Ring |
| 93.    | Motor       |