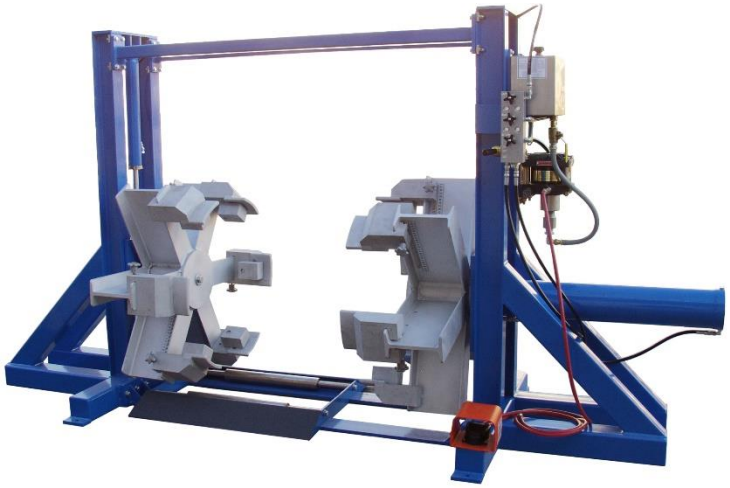
# OPERATION & SERVICE MANUAL



## Model: 14-6878-0110
## Hydraulic Beadbreaker

CE

01/2024 – Rev. 01

**For Spare Parts, Operations & Service Manuals or Service Needs**
**Scan the QR code or visit Tronair.com/aftermarket**



**Tronair, Inc.**
1 Air Cargo Pkwy East
Swanton, OH 43558

Phone: (419) 866-6301 | 800-426-6301
Web: www.tronair.com
Email: sales@tronair.com

| REVISION | DATE | TEXT AFFECTED |
| --- | --- | --- |
| OR | 01/2008 | Original Release |
| 01 | 01/2024 | Major revision |

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**PAGE**

This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., it suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.

## 1.0 PRODUCT INFORMATION

### 1.1 DESCRIPTION

The Tronair Hydraulic Beadbreaker is an easy-to-use device for breaking the tire bead on rims 12-28 in (30-71 cm) diameter for tire sizes of 28-54 in (71-137 cm) diameter. An adapter kit, K-3151, may be purchased separately to allow for tires as small as 18 in (45.7 cm) diameter.

The tire beadbreaker uses a hydraulic cylinder driven by a pneumatic pump. The hydraulic controls are located in a manifold block and the cylinder operation is controlled through a foot-pedal pneumatic valve.

### 1.2 MODEL & SERIAL NUMBER

Reference nameplate on unit

### 1.3 MANUFACTURER

***TRONAIR***, Inc.
1 Air Cargo Pkwy East
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301
Fax: (419) 867-0634
E-mail: sales@tronair.com

### 1.4 TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Construction | All steel welded frame and members |
| Capacity - Rim sizes | 12-28 in (30-71 cm) diameter |
| Maximum Working Pressure | 1725 psi at 150 input air |
| Length | 121 in (307 cm) |
| Width | 40 in (102 cm) |
| Height | 62.5 in (159) |
| Weight | 1400 lbs (635 kg) |

## 2.0 SAFETY INFORMATION

### 2.1 USAGE AND SAFETY INFORMATION

To ensure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.

**WARNING!**
Warning is used to indicate the presence of a hazard that can cause ***severe personal injury, death, and/or substantial property damage*** if the Warning Notice is ignored.

**CAUTION!**
Caution is used to indicate the presence of a hazard, which will or can cause ***minor personal injury or property damage*** is the Caution Notice is ignored.

## 3.0 TRAINING

### 3.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the unit.

### 3.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the unit in and around the intended aircraft at the intended aircraft servicing location.

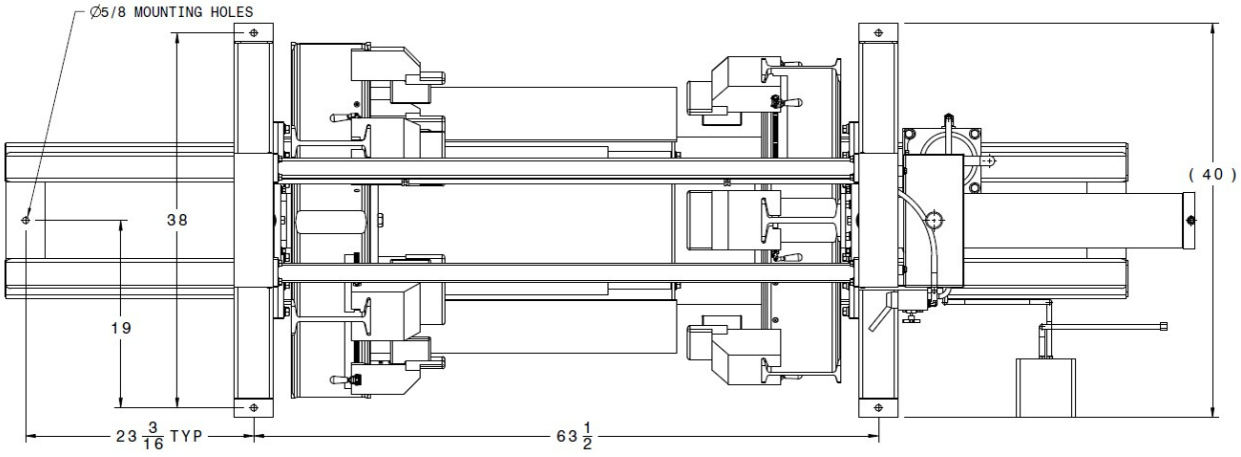
### 3.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the unit.

**NOTE: Maintenance and Trouble Shooting are to be performed by a skilled and trained technician.**

## 4.0 PREPARATION FOR USE

1. Reference sections the Parts List Illustrations in this manual.
2. The hydraulic beadbreaker is shipped fully assembled and ready to use. Remove all packaging material and discard prior to use.
3. Secure to floor or sufficient fixturing using the Ø5/8 mounting holes provided in 6 places as shown.




4. Check reservoir fluid level; fill as required. With all cylinders fully retracted, reservoir capacity is 2.5 gal (9.5 l). **Use MIL-PRF-5606 Hydraulic Fluid.**
5. Beadbreaker requires 80-150 psi (5.5-10.3 bar) shop air hook-up for operation.

## 5.0 OPERATION

**WARNINGS**

- **ALWAYS follow the wheel manufacturer's instructions and procedures relative to their respective products.**
- **DO NOT attempt to disassemble wheel until tire has been completely deflated; otherwise, serious injury to personnel or damage to equipment may result.**
- **DO NOT attempt to remove valve core until tire has been completely deflated. Valve cores will be ejected at high velocity if unscrewed before air pressure has been released.**

1. Measure the outside tire rim diameter.
2. Adjust the hydraulic beadbreaker fingers evenly from center, by positioning the inner face of the finger blocks to the rim diameter plus one (1) inch.
3. Roll the tire into position on the beadbreaker rollers, getting it as close to the fixed side (side opposite the controls) as possible.
4. Rotate the finger assembly on the fixed side; position one finger block vertically to aid in the positioning of the finger assembly height.
5. Adjust the height of the fixed side finger assembly:
    a. Lower the finger assembly by opening the control manifold valve labeled “Left” (uppermost). Slowly open the control manifold valve labeled “Return” (lower); close the “Return” valve when the inner face of the uppermost finger block is positioned about one-half inch above the wheel rim or centered around the rim. Once the finger assembly is positioned, close the “Left” valve.
    b. Raise the finger assembly by opening the “Left” valve and stepping on the foot valve until the uppermost finger block is positioned about one-half inch above the wheel rim or centered around the rim. Once the finger assembly is positioned, close the “Left” valve.
6. Adjust the height of the movable side (Control Side) finger assembly:

a. Lower the finger assembly by opening the control manifold valve labeled “Right” (Center) then slowly open the “Return” valve. Close the “Return” valve when the inner face of the uppermost finger block is positioned about one-half inch above the wheel rim or centered around the rim. Once the finger assembly is positioned, close the “Right” valve.

b. Raise the finger assembly by opening the “Right” valve and stepping on the foot valve until the uppermost finger block is positioned about one-half inch above the wheel rim or centered around the rim. Once the finger assembly is positioned, close the “Right” valve.

7. Turn the control manifold selector valve to the “In” position. The pump airflow should be adjusted using the pneumatic valve on the pump so the cylinder is operating in a pulsing fashion.
8. Step on the foot valve to bring the finger assemblies closer to the tire until there is slight contact between the tire and beadbreaker.

    **Important: Check finger block positioning in relationship to the rim edge. Damage will occur to the wheel if the fingers come in contact with the rim.**

9. If the finger assembly is not positioned correctly, re-position them before continuing.
10. With the finger assembly correctly positioned, step on the foot valve. The cylinder will extend. Allow for both sides of the tire to break free from the wheel. Tires will normally break away from the wheel one side at a time; continue the beadbreaking process until both sides of the tire are free from the wheel.
11. Turn the control manifold selector valve to the “Off” position. If the wheel has a locking ring, remove it at this time.
12. To remove the tire and wheel from the beadbreaker, retract the cylinder by turning the control manifold selector valve to the “Out” position and stepping on the foot valve until the finger assembly has cleared the wheel. Turn the selector valve to the “Off” position and remove the wheel.

## 6.0 MAINTENANCE

1. Periodically perform a visual inspection of the beadbreaker assembly. Replace suspect parts as required.
2. Inspect mounting hardware, ensuring mounting is tight and unit is secure and stable.
3. Maintain hydraulic oil level in the pump reservoir.

## 7.0 PROVISION OF SPARES

### 7.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

***TRONAIR***, Inc.
1 Air Cargo Pkwy East
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301
Fax: (419) 867-0634
E-mail: sales@tronair.com
Website: www.tronair.com

For Spare Parts, Operations & Service Manuals or Service Needs:
Scan the QR code or visit Tronair.com/aftermarket

### 7.2 RECOMMENDED SPARE PARTS LISTS

Reference the following page(s) for Replacement Parts and Kits available.

## 8.0 GUARANTEES/LIMITATION OF LIABILITY

Tronair products are warranted to be free of manufacturing or material defects for a period of one year after shipment to the original customer. This is solely limited to the repair or replacement of defective components. This warranty does not cover the following items:

a) Parts required for normal maintenance
b) Parts covered by a component manufacturers warranty
c) Replacement parts have a 90-day warranty from date of shipment

If you have a problem that may require service, contact Tronair immediately. Do not attempt to repair or disassemble a product without first contacting Tronair, any action may affect warranty coverage. When you contact Tronair be prepared to provide the following information:

a) Product Model Number
b) Product Serial Number
c) Description of the problem

If warranty coverage is approved, either replacement parts will be sent or the product will have to be returned to Tronair for repairs. If the product is to be returned, a Return Material Authorization (RMA) number will be issued for reference purposes on any shipping documents. Failure to obtain a RMA in advance of returning an item will result in a service fee. A decision on the extent of warranty coverage on returned products is reserved pending inspection at Tronair. Any shipments to Tronair must be shipped freight prepaid. Freight costs on shipments to customers will be paid by Tronair on any warranty claims only. Any unauthorized modification of the Tronair products or use of the Tronair products in violation of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied.

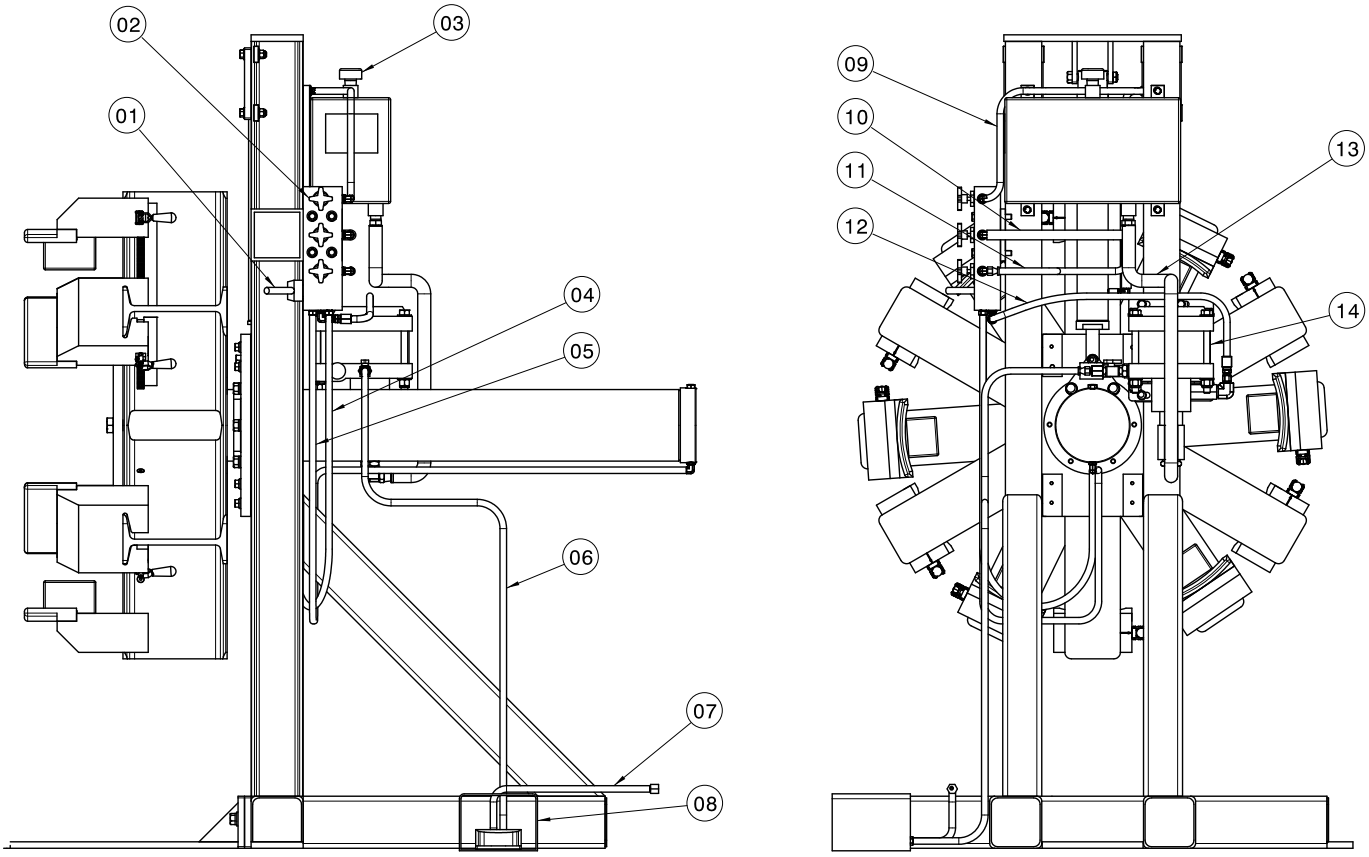
The obligations of Tronair expressly stated herein are in lieu of all other warranties or conditions expressed or implied. **Any unauthorized modification of the Tronair products or use of the Tronair products in violations of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately *void any warranty, express or implied* and Tronair *disclaims any and all liability for injury (WITHOUT LIMITATION and including DEATH), loss or damage arising from or relating to such misuse*.**

## 9.0 APPENDICES

APPENDIX I SDS – MIL-PRF-5606 Hydraulic Fluid
APPENDIX II Haskel Air Pump
APPENDIX III Declaration of Conformity

## Parts List

**When ordering replacement parts/kits, please specify model, serial number and color of your unit.**




| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | HC-1837 | VALVE, DIRECTIONAL CONTROL | 1 |
| 2 | HC-1716 | VALVE, CARTRIDGE NEEDLE | 3 |
| 3 | H-1045 | BREATHER | 1 |
| 4 | TF-1043-01*45.0 | ASSEMBLY, HOSE | 1 |
| 5 | TF-1043-01*60.0 | ASSEMBLY, HOSE | 1 |
| 6 | TF-1047-02*96.0 | HOSE, PUSH-ON | 1 |
| 7 | TF-1047-02*36.0 | HOSE, PUSH-ON | 1 |
| 8 | Z-4385 | ASSEMBLY, FOOT PEDAL (includes Items 6 & 7) | 1 |
| 9 | TF-1043-01*105 | ASSEMBLY, HOSE | 1 |
| 10 | TF-1043-01*18.0 | ASSEMBLY, HOSE | 1 |
| 11 | TF-1047-01*12.0 | HOSE, PUSH-ON | 1 |
| 12 | TF-1043-01*24.0 | ASSEMBLY, HOSE | 1 |
| 13 | TF-1047-05*25.0 | HOSE, PUSH-ON | 1 |
| 14 | PC-1083 | AIR PUMP | 1 |
| N/S | 17571-10 | LIQUID SECTION SEAL KIT | 1 |
| N/S | 16772 | AIR DRIVE SEAL KIT | 1 |
| N/S | 16771 | AIR VALVE SEAL KIT | 1 |

# Parts List

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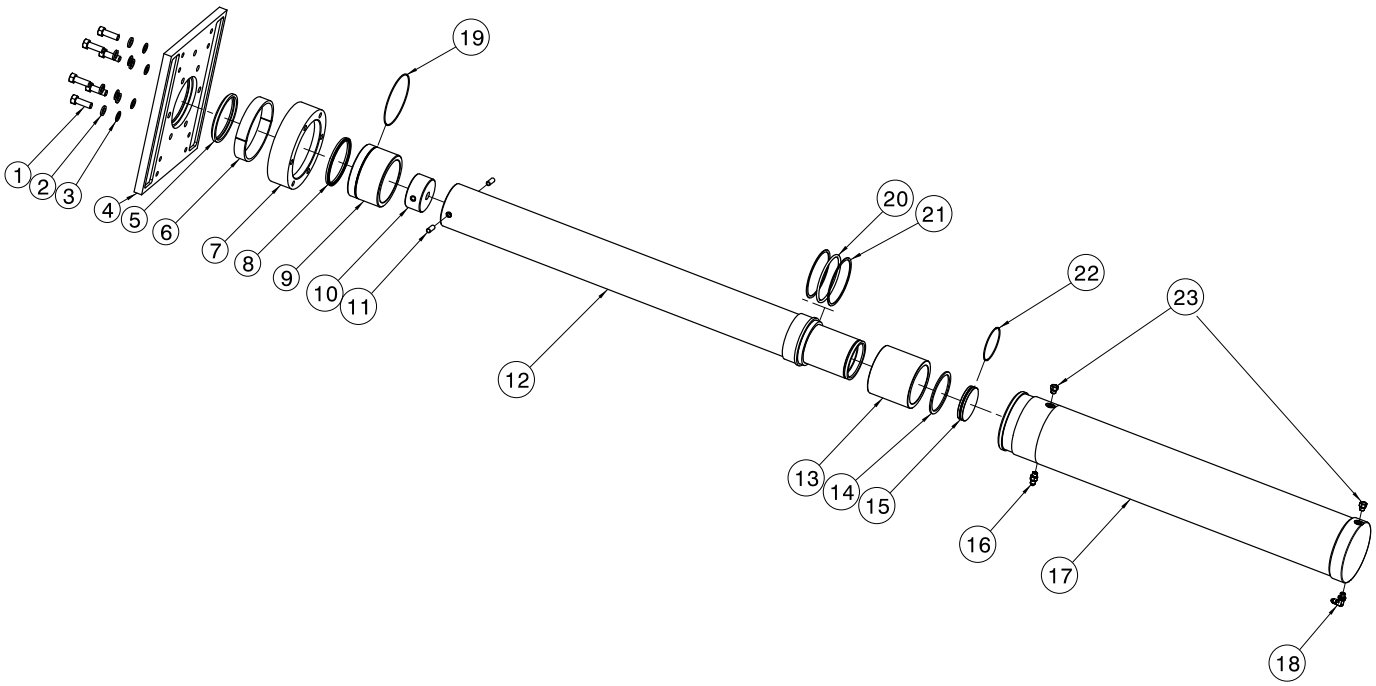


| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | G-1420-109520 | BOLT, HH GR 8, ½ - 20 X 2 LG | 6 |
| 2 | G-1251-1090R | LOCKWASHER, ½ REGULAR | 6 |
| 3 | G-1255-09 | WASHER, ½ AN | 6 |
| 4 | J-4133-01 | PLATE, CYLINDER | 1 |
| 5 | HC-1619-4000D | WIPER, RING | 1 |
| 6 | TR-1678 | RING, LOCKING | 1 |
| 7 | R-2312-01 | SUPPORT, CYLINDER | 1 |
| 8 | HC-1621-212 | SEAL, POLYPAK | 1 |
| 9 | TR-1989 | RING, GUIDE | 1 |
| 10 | R-2309 | PLUG, FRONT RAM | 1 |
| 11 | G-1300-38100 | PIN, ROLL 3/8 X 1 | 2 |
| 12 | TR-1987 | TUBE, RAM | 1 |
| 13 | TR-1988 | BUSHING, RAM | 1 |
| 14 | G-1395-57 | RING, EXTERNAL | 1 |
| 15 | R-2310 | PLUG, REAR RAM | 1 |
| 16 | N-2007-03-S-B | CONNECTOR, STR THD (-04 X –04) | 1 |
| 17 | Z-6636-01 | WELDMENT, MAIN CYLINDER | 1 |
| 18 | N-2001-03-S-B | ELBOW, STR THD (-04 X –04) | 1 |
| 19 | HC-2000-048 | O-RING SERIES 2 | 1 |
| 20 | HC-2000-346 | O-RING SERIES 2 | 1 |
| 21 | HC-2023-346 | RING, BACK-UP, ONE PIECE | 2 |
| 22 | HC-2000-041 | O-RING SERIES 2 | 1 |
| 23 | N-2053-03-S-B | PLUG, HH STR THD (-04) | 2 |

## Parts List

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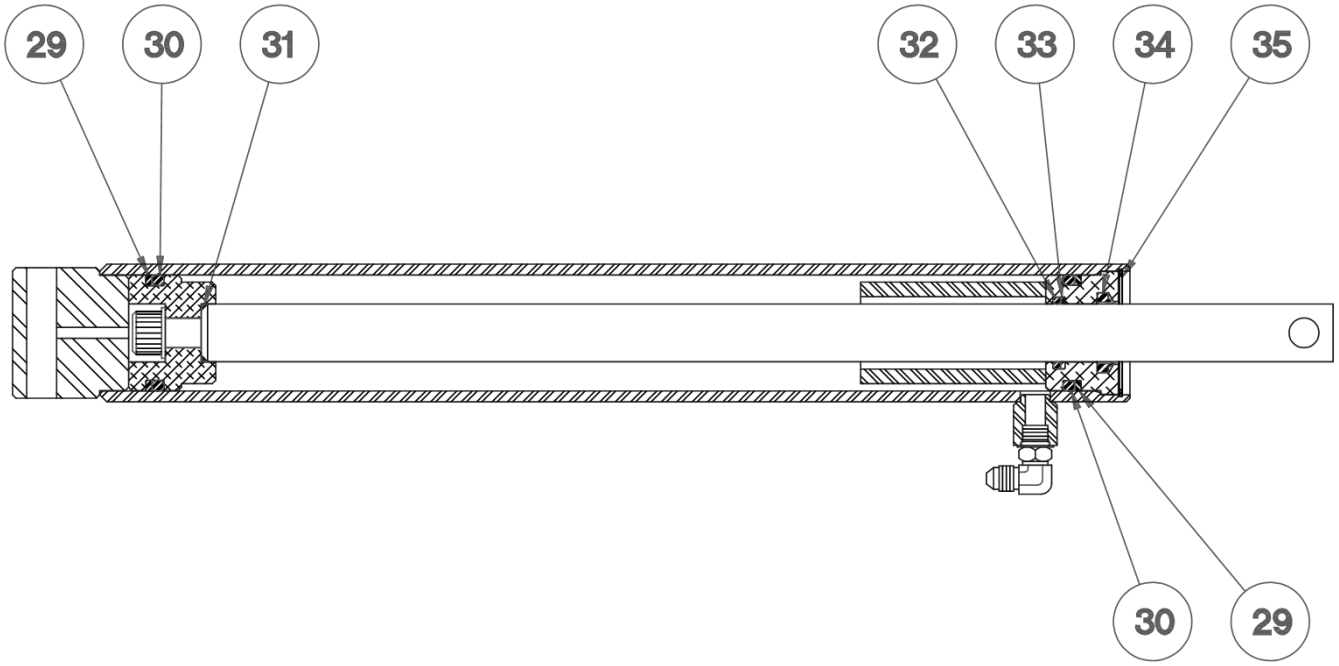
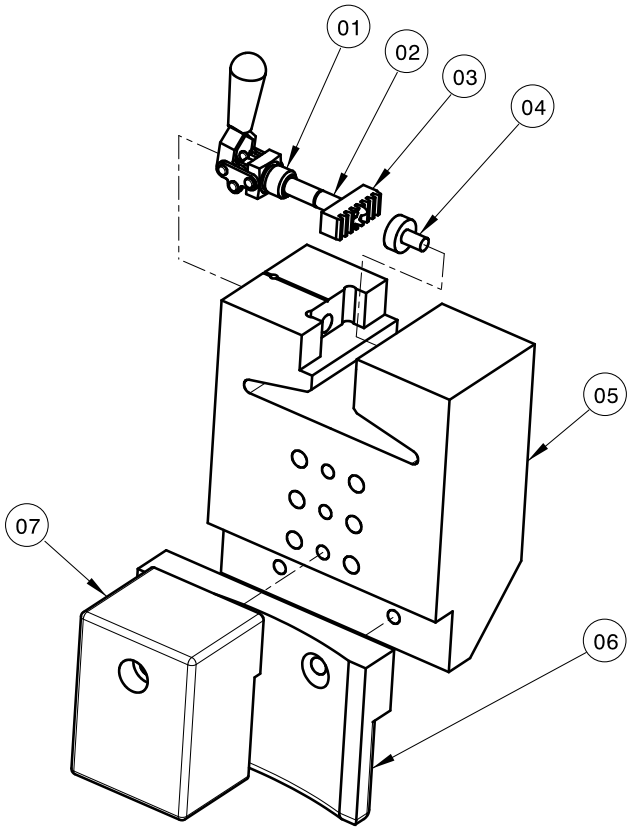



| Item | Part Number | Description | Qty |
|---|---|---|---|
| | **K-3143** | **KIT, CYLINDER SEAL REPLACEMENT**; *consists of*: | |
| 29 | HC-2020-326 | RING, BACKUP | 2 |
| 30 | HC-2000-326 | O-RING | 2 |
| 31 | HC-2000-117 | O-RING | 1 |
| 32 | HC-2000-214 | O-RING | 1 |
| 33 | HC-2020-214 | RING, BACKUP | 1 |
| 34 | HC-1655-09 | RING, WIPER | 1 |
| 35 | G-1398-212 | RING, RETAINING | 1 |
| | **K-3151** | **KIT, SMALL TIRE ADAPTER;** *consists of*: | |
| N/S | V-1001 | LABEL, “MADE IN USA” | 1 |
| N/S | V-1197-02 | LABEL, “TRONAIR” | 1 |
| N/S | Z-4524 | ASSEMBLY, SMALL TIRE ADAPTER; *CONSISTS OF:* | |
| N/S | Z-4523-01 | WELDMENT, SMALL TIRE ADAPTER | 1 |
| N/S | G-1100-109512 | BOLT, ½--20 HEX HEAD GRADE 5 | 4 |
| N/S | G-1250-1090N | FLATWASHER, ½ NARROW | 4 |
| N/S | G-1251-1090R | LOCKWASHER, ½ REGULAR | 4 |
| N/S | H-1884 | BEARING, ROLLER | 4 |
| N/S | R-1971 | ROD, ROLLER | 2 |
| N/S | TR-1702 | TUBE, ROLLER | 2 |

# Parts List

**When ordering replacement parts/kits, please specify model, serial number and color of your unit.**




| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | H-3094 | Clamp, Toggle | 1 |
| 2 | TR375-05*000.58 | Spacer | 1 |
| 3 | J-4236 | Gear, Lock | 1 |
| 4 | R-1818 | Plug, Stop | 1 |
| 5 | J-4134 | Block, Slide | 1 |
| 6 | J-2978 | Finger, Top | 1 |
| 7 | J-2977 | Block, Stop | 1 |

# APPENDIX I

## Safety Data Sheet (SDS)
## MIL-PRF-5606
## Hydraulic Fluid

# SAFETY DATA SHEET

## SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT**

**Product Name:** **MOBIL AERO HFA**
**Product Description:** Base Oil and Additives
**Product Code:** 201550401020, 490110-00, 970584
**Intended Use:** Aviation hydraulic oil

**COMPANY IDENTIFICATION**

**Supplier:** **EXXON MOBIL CORPORATION**
22777 Springwoods Village Parkway
Spring, TX. 77253 USA

| | |
|---|---|
| **24 Hour Health Emergency** | 609-737-4411 |
| **Transportation Emergency Phone** | 800-424-9300 or 703-527-3887 CHEMTREC |
| **Product Technical Information** | 800-662-4525 |
| **MSDS Internet Address** | http://www.exxon.com, http://www.mobil.com |

## SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

**CLASSIFICATION:**

Flammable liquid: Category 4.
Aspiration toxicant: Category 1.

**LABEL:**
**Pictogram:**

**Signal Word:** Danger

**Hazard Statements:**
H227: Combustible liquid. H304: May be fatal if swallowed and enters airways.

**Precautionary Statements:**
P210: Keep away from flames and hot surfaces. -- No smoking. P273: Avoid release to the environment. P280: Wear protective gloves and eye / face protection.P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish.P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up.P501: Dispose of contents and container in accordance with local regulations.

**Other hazard information:**

**HAZARD NOT OTHERWISE CLASSIFIED (HNOC):** None as defined under 29 CFR 1910.1200.

**PHYSICAL / CHEMICAL HAZARDS**

Material can accumulate static charges which may cause an ignition. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Combustible.

**HEALTH HAZARDS**

High-pressure injection under skin may cause serious damage. Excessive exposure may result in eye, skin, or respiratory irritation.

**ENVIRONMENTAL HAZARDS**

No significant hazards.

| | | | | | | |
|---|---|---|---|---|---|---|
| **NFPA Hazard ID:** | Health: | 1 | Flammability: | 2 | Reactivity: | 0 |
| **HMIS Hazard ID:** | Health: | 1* | Flammability: | 2 | Reactivity: | 0 |

**NOTE:** This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

## SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a mixture.

**Hazardous Substance(s) or Complex Substance(s) required for disclosure**

| Name | CAS# | Concentration* | GHS Hazard Codes |
|---|---|---|---|
| 2,6-DI-TERT-BUTYL-P-CRESOL | 128-37-0 | 0.1 - < 1% | H400(M factor 1), H410(M factor 1) |
| DISTILLATES (PETROLEUM), HYDROTREATED LIGHT | 64742-47-8 | 5 - < 10% | H304 |
| HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM) | 64742-53-6 | 50 - < 70% | H227, H304 |
| HYDROTREATED MIDDLE DISTILLATE (PETROLEUM) | 64742-46-7 | 20 - < 30% | H304 |
| TRIPHENYL PHOSPHATE | 115-86-6 | 0.1 - < 0.25% | H400(M factor 1), H410(M factor 1) |

* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

## SECTION 4 FIRST AID MEASURES

**INHALATION**

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

**SKIN CONTACT**

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

**EYE CONTACT**

Flush thoroughly with water. If irritation occurs, get medical assistance.

**INGESTION**

Seek immediate medical attention. Do not induce vomiting.

**NOTE TO PHYSICIAN**

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

## SECTION 5 FIRE FIGHTING MEASURES

**EXTINGUISHING MEDIA**

**Appropriate Extinguishing Media:** Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

**Inappropriate Extinguishing Media:** Straight Streams of Water

**FIRE FIGHTING**

**Fire Fighting Instructions:** Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

**Unusual Fire Hazards:** Combustible. Pressurized mists may form a flammable mixture.

**Hazardous Combustion Products:** Aldehydes, Incomplete combustion products, Oxides of carbon, Phosphorus oxides, Smoke, Fume, Sulfur oxides

**FLAMMABILITY PROPERTIES**

**Flash Point [Method]:** >82°C (180°F) [ASTM D-93]
**Flammable Limits (Approximate volume % in air):** LEL: 0.7 UEL: 7.0 [Estimated]
**Autoignition Temperature:** >225°C (437°F)

## SECTION 6 ACCIDENTAL RELEASE MEASURES

**NOTIFICATION PROCEDURES**

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable

regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

**PROTECTIVE MEASURES**

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: respiratory protection will be necessary only in special cases, e.g., formation of mists. Half-face or full-face respirator with filter(s) for dust/organic vapor or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to hydrocarbons are recommended. Gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

**SPILL MANAGEMENT**

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces. Recover by pumping or with suitable absorbent.

**Water Spill:** Stop leak if you can do it without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

**ENVIRONMENTAL PRECAUTIONS**

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

## SECTION 7 HANDLING AND STORAGE

**HANDLING**

Avoid contact with skin. Avoid prolonged breathing of mists and heated vapor. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static

accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

**Static Accumulator:** This material is a static accumulator.

**STORAGE**

The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

**EXPOSURE LIMIT VALUES**

**Exposure limits/standards (Note: Exposure limits are not additive)**

| Substance Name | Form | Limit / Standard | | | NOTE | Source |
|---|---|---|---|---|---|---|
| 2,6-DI-TERT-BUTYL-P-CRESOL | Inhalable fraction and vapor | TWA | 2 mg/m3 | | N/A | ACGIH |
| DISTILLATES (PETROLEUM), HYDROTREATED LIGHT [total hydrocarbon vapor] | Non-Aerosol | TWA | 200 mg/m3 | | Skin | ACGIH |
| HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM) | Mist. | TWA | 5 mg/m3 | | N/A | OSHA Z1 |
| HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM) | Inhalable fraction. | TWA | 5 mg/m3 | | N/A | ACGIH |
| HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM) | Mist. | TWA | 5 mg/m3 | | N/A | ACGIH |
| HYDROTREATED MIDDLE DISTILLATE (PETROLEUM) | Mist. | TWA | 5 mg/m3 | | N/A | OSHA Z1 |
| HYDROTREATED MIDDLE DISTILLATE (PETROLEUM) | Inhalable fraction. | TWA | 5 mg/m3 | | N/A | ACGIH |
| TRIPHENYL PHOSPHATE | | TWA | 3 mg/m3 | | N/A | OSHA Z1 |
| TRIPHENYL PHOSPHATE | | TWA | 3 mg/m3 | | N/A | ACGIH |

**Exposure limits/standards for materials that can be formed when handling this product:** When mists/aerosols can occur the following are recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction), 5 mg/m³ - OSHA PEL.

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

No biological limits allocated.

**ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions.

Control measures to consider:
Use explosion-proof ventilation equipment to stay below exposure limits.

**PERSONAL PROTECTION**

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

**Respiratory Protection:** If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:
No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

**Hand Protection:** Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:
If prolonged or repeated contact is likely, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

**Eye Protection:** If contact is likely, safety glasses with side shields are recommended.

**Skin and Body Protection:** Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:
If prolonged or repeated contact is likely, chemical, and oil resistant clothing is recommended.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

**ENVIRONMENTAL CONTROLS**

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

**Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.**

**GENERAL INFORMATION**

**Physical State:** Liquid
**Color:** Red

**Odor:** Characteristic
**Odor Threshold:** N/D

**IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION**

**Relative Density (at 15 °C):** 0.88
**Flammability (Solid, Gas):** N/A
**Flash Point [Method]:** >82°C (180°F) [ASTM D-93]
**Flammable Limits (Approximate volume % in air):** LEL: 0.7 UEL: 7.0 [Estimated]
**Autoignition Temperature:** >225°C (437°F)
**Boiling Point / Range:** N/D
**Decomposition Temperature:** N/D
**Vapor Density (Air = 1):** N/D
**Vapor Pressure:** [N/D at 20 °C]
**Evaporation Rate (n-butyl acetate = 1):** N/D
**pH:** N/A
**Log Pow (n-Octanol/Water Partition Coefficient):** N/D
**Solubility in Water:** Negligible
**Viscosity:** 13.8 cSt (13.8 mm2/sec) at 40 °C | 5.1 cSt (5.1 mm2/sec) at 100°C [ASTM D 445]
**Oxidizing Properties:** See Hazards Identification Section.

**OTHER INFORMATION**

**Freezing Point:** N/D
**Melting Point:** N/A
**Pour Point:** -60°C (-76°F) [ASTM D97]
**DMSO Extract (mineral oil only), IP-346:** < 3 %wt

## SECTION 10 STABILITY AND REACTIVITY

**REACTIVITY:** See sub-sections below.

**STABILITY:** Material is stable under normal conditions.

**CONDITIONS TO AVOID:** Open flames and high energy ignition sources.

**MATERIALS TO AVOID:** Strong oxidizers

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization will not occur.

## SECTION 11 TOXICOLOGICAL INFORMATION

**INFORMATION ON TOXICOLOGICAL EFFECTS**

| Hazard Class | Conclusion / Remarks |
|---|---|
| **Inhalation** | |
| Acute Toxicity: No end point data for material. | Minimally Toxic. Based on assessment of the components. |
| Irritation: No end point data for material. | Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs. |

| | |
|---|---|
| **Ingestion** | |
| Acute Toxicity: No end point data for material. | Minimally Toxic. Based on assessment of the components. |
| **Skin** | |
| Acute Toxicity: No end point data for material. | Minimally Toxic. Based on assessment of the components. |
| Skin Corrosion/Irritation: No end point data for material. | May dry the skin leading to discomfort and dermatitis. Based on assessment of the components. |
| **Eye** | |
| Serious Eye Damage/Irritation: No end point data for material. | May cause mild, short-lasting discomfort to eyes. Based on assessment of the components. |
| **Sensitization** | |
| Respiratory Sensitization: No end point data for material. | Not expected to be a respiratory sensitizer. |
| Skin Sensitization: No end point data for material. | Not expected to be a skin sensitizer. Based on assessment of the components. |
| **Aspiration:** Data available. | May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material. |
| **Germ Cell Mutagenicity:** No end point data for material. | Not expected to be a germ cell mutagen. Based on assessment of the components. |
| **Carcinogenicity:** No end point data for material. | Not expected to cause cancer. Based on assessment of the components. |
| **Reproductive Toxicity:** No end point data for material. | Not expected to be a reproductive toxicant. Based on assessment of the components. |
| **Lactation:** No end point data for material. | Not expected to cause harm to breast-fed children. |
| **Specific Target Organ Toxicity (STOT)** | |
| Single Exposure: No end point data for material. | Not expected to cause organ damage from a single exposure. |
| Repeated Exposure: No end point data for material. | Not expected to cause organ damage from prolonged or repeated exposure. Based on assessment of the components. |

**TOXICITY FOR SUBSTANCES**

| NAME | ACUTE TOXICITY |
|---|---|
| 2,6-DI-TERT-BUTYL-P-CRESOL | Oral Lethality: LD50 0.89 g/kg (Rat) |

**OTHER INFORMATION**

**For the product itself:**

Repeated and/or prolonged exposure may cause irritation to the skin, eyes, or respiratory tract. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.
**Contains:**
Base oil severely refined: Not carcinogenic in animal studies. Representative material passes IP-346, Modified Ames test, and/or other screening tests. Dermal and inhalation studies showed minimal effects; lung non-specific infiltration of immune cells, oil deposition and minimal granuloma formation. Not sensitizing in test animals.

**The following ingredients are cited on the lists below:** None.

--REGULATORY LISTS SEARCHED--

| | | |
|---|---|---|
| 1 = NTP CARC | 3 = IARC 1 | 5 = IARC 2B |
| 2 = NTP SUS | 4 = IARC 2A | 6 = OSHA CARC |

## SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

**ECOTOXICITY**

Material -- Not expected to be harmful to aquatic organisms.

**MOBILITY**

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

Less volatile component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

**PERSISTENCE AND DEGRADABILITY**

**Biodegradation:**

Components -- Expected to be inherently biodegradable

**BIOACCUMULATION POTENTIAL**

Majority of components -- Has the potential to bioaccumulate, however metabolism or physical properties may reduce the bioconcentration or limit bioavailability.

## SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**DISPOSAL RECOMMENDATIONS**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

**REGULATORY DISPOSAL INFORMATION**

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

**Empty Container Warning** Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be

completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

## SECTION 14 TRANSPORT INFORMATION

**LAND (DOT)**

**Proper Shipping Name:** COMBUSTIBLE LIQUID, N.O.S. (Distillates (Petroleum), Hydrotreated Light)
**Hazard Class & Division:** COMBUSTIBLE LIQUID
**ID Number:** NA1993
**Packing Group:** III
**ERG Number:** 128
**Label(s):** NONE
**Transport Document Name:** NA1993, COMBUSTIBLE LIQUID, N.O.S. (Distillates (Petroleum), Hydrotreated Light), COMBUSTIBLE LIQUID, PG III

Footnote: This material is not regulated under 49 CFR in a container of 119 gallon capacity or less when transported solely by land, as long as the material is not a hazardous waste, a marine pollutant, or specifically listed as a hazardous substance.

**LAND (TDG):** Not Regulated for Land Transport

**SEA (IMDG):** Not Regulated for Sea Transport according to IMDG-Code

**Marine Pollutant:** No

**AIR (IATA):** Not Regulated for Air Transport

## SECTION 15 REGULATORY INFORMATION

**OSHA HAZARD COMMUNICATION STANDARD:** This material is considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

**Listed or exempt from listing/notification on the following chemical inventories:** AICS, DSL, ENCS, IECSC, KECI, PICCS, TCSI, TSCA

**EPCRA SECTION 302:** This material contains no extremely hazardous substances.

**SARA (311/312) REPORTABLE HAZARD CATEGORIES:** Fire. Immediate Health. Delayed Health.

**SARA (313) TOXIC RELEASE INVENTORY:** This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

**The following ingredients are cited on the lists below:**

| Chemical Name | CAS Number | List Citations |
|---|---|---|
| DISTILLATES (PETROLEUM), HYDROTREATED LIGHT | 64742-47-8 | 1, 17, 18 |
| HYDROTREATED LIGHT NAPHTHENIC DISTILLATE (PETROLEUM) | 64742-53-6 | 1, 4, 13, 17, 18 |
| HYDROTREATED MIDDLE DISTILLATE (PETROLEUM) | 64742-46-7 | 1, 4, 17, 18 |

--REGULATORY LISTS SEARCHED--

| | | | |
|---|---|---|---|
| 1 = ACGIH ALL | 6 = TSCA 5a2 | 11 = CA P65 REPRO | 16 = MN RTK |
| 2 = ACGIH A1 | 7 = TSCA 5e | 12 = CA RTK | 17 = NJ RTK |
| 3 = ACGIH A2 | 8 = TSCA 6 | 13 = IL RTK | 18 = PA RTK |
| 4 = OSHA Z | 9 = TSCA 12b | 14 = LA RTK | 19 = RI RTK |
| 5 = TSCA 4 | 10 = CA P65 CARC | 15 = MI 293 | |

Code key: CARC=Carcinogen; REPRO=Reproductive

## SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

**KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):**
H227: Combustible liquid; Flammable Liquid, Cat 4
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1

**THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:**
Revision Changes:
Section 01: Company Mailing Address information was modified.
Section 05: Hazardous Combustion Products information was modified.
Section 15: List Citations Table information was modified.
Section 15: National Chemical Inventory Listing information was modified.
Section 14: Marine Pollutant information was modified.
Composition: Component Table information was modified.
Section 08: Exposure Limits Table information was modified.
Section 16: Revision Information - Implementation of GHS requirements phrase. information was deleted.

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Internal Use Only

MHC: 2A, 0, 0, 0, 1, 1 PPEC: C

DGN: 2005454XUS (552975)

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# APPENDIX II

# Haskel
# Air Pump Technical Specifications
# & Performance Data

Haskel®

an Accudyne Industries brand

# Pressure on Demand

## *Pneumatic Driven Liquid Pumps*


LP-GL 04/17

## High Pressure

Haskel pneumatic driven liquid pumps are designed to provide a safe, reliable and economical, source of hydraulic pressure.

This brochure introduces our pneumatic driven liquid pump range. Visit our website at **www.haskel.com** for more information or to locate a distributor.

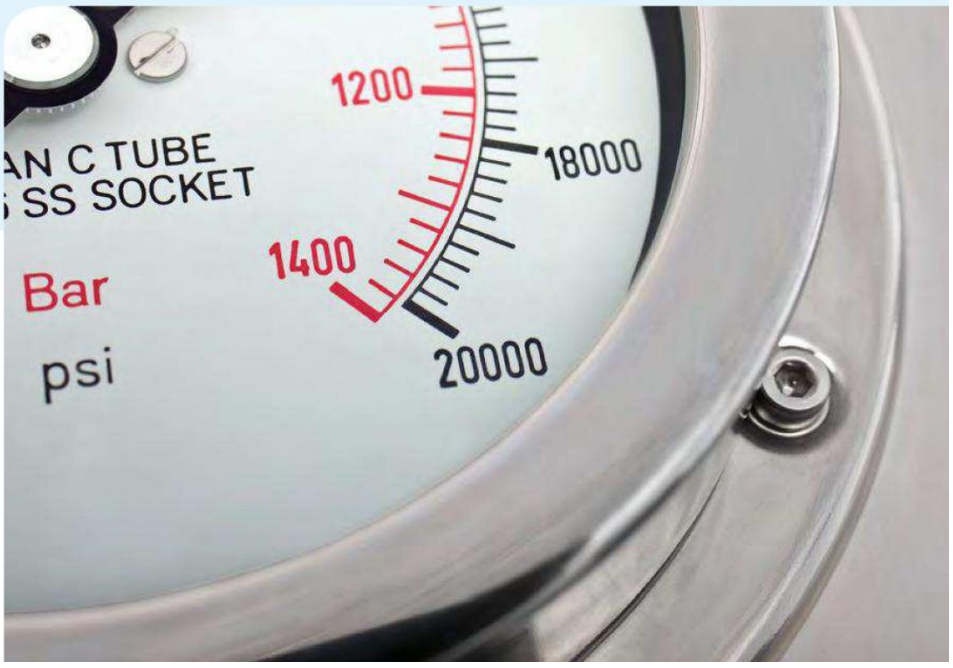
## Why Use Haskel Pneumatic Driven Pumps?

***Our pumps offer many advantages over electrically driven pumps:***

- Safe pneumatic operation – no heat, flame or spark risk
- Up to 100,000 psi (7000 bar) capability
- Infinitely variable cycling speed
- Stall feature at pre-determined pressure to hold that pressure without consuming power
- Problem-free stop/start applications
- Easily automated – many modification and control options
- Suitable for most liquids and liquefied gases
- Alternative gas drive options – sour gas, natural gas, boil off gases, nitrogen
- No need for air line lubrication – saves costs and prevents contamination
- Robust, reliable, compact and easy to maintain proven design
- Unbalanced cycling spool provides immediate response to pressure changes
- Also available in standard, or custom built power pac configurations
- Excellent worldwide service for spares and repairs
- ATEX approved
- CE certified

## Applications include:

- Pressure testing
- Work holding/power clamping
- Jacking/lifting
- Valve actuator control
- Hydraulic cylinder actuation
- Press safety overload devices
- Roller tensioning
- Metering
- Precision lubrication and spraying
- Liquefied gas transfer



## Pressure and Flow on Demand

This guide will help you to pre-select the pump ideally suited for your application. If you have specific questions, however, we urge you to provide Haskel with the operational details of your application. We will recommend a model and any corresponding accessories.

## Output Horsepower Ratings

The pumps are categorized on their horsepower ratings (see pages 6-7). These are approximate and peak at 100 psi (7 bar), assuming adequate drive, pressure and volume. Peak horsepower is at about 75% nominal ratio x drive pressure, i.e. 100:1 pump @ 100 psi air drive peaks at 100 x 100 = 10000 x 0.75 psi = 7500 psi (517 bar) hydraulic pressure.

## Double and Triple Air Head Pumps

Performance can be extended for the 1.5 hp pumps by stacking air pistons without changing the hydraulic piston. Haskel multi-head pumps consume less air than competitive single head pumps of the same area, as only one head is pressurized on the return stroke; e.g., on a 1.5 hp pump additional heads can raise performance to 2 hp.

Double air head pumps are identified by the last digit 2 in the pump model number. Thus, a nominal 50:1 ratio pump with two air heads is described as a 52. Similarly, a triple air head pump is identified with a last digit 3. Thus, a 900 ratio pump with three air heads is described as a 903.

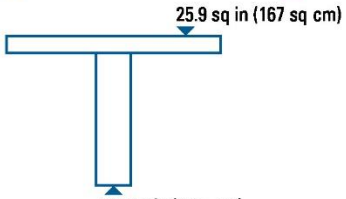
## Operation

The pumps automatically reciprocate on a differential piston principle. A large piston driven by relatively low pressure drive acts directly upon a smaller hydraulic piston.

The nominal ratio between piston sizes is indicated in the model coding and approximates to the maximum working pressure. The actual ratio is about 15% above nominal so that the pump continues to cycle when drive pressure equals nominal ratio. Initially, the pump will cycle at maximum speed acting as a transfer pump to pressurize downstream.

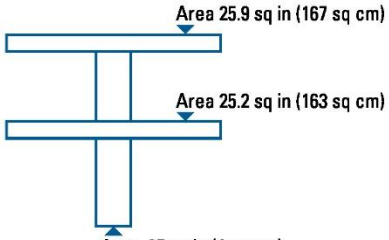
It will cycle at a slower rate as the fluid meets resistance until it stalls at maximum output pressure. When a pressure drop downstream occurs, it will recycle as necessary in an effort to maintain maximum pressure. Stall pressure is achieved when the outlet pressure rises and offers more resistance to the reciprocating differential piston assembly. The piston assembly then stalls when the forces balance, e.g. when drive pressure x drive piston area equals outlet (stall) pressure x driven hydraulic plunger area. The pump design is sensitive to very small pressure drops due to the low frictional resistance of the large diameter drive piston and hydraulic piston seals.

### Single Drive Head Pump



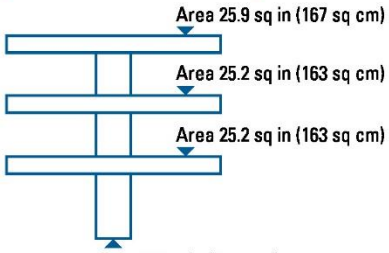

***Therefore, actual ratio*** = 40:1
Nominal Ratio = 35:1

### Double Air Head Pump




***Therefore, actual ratio*** = 79:1
Nominal Ratio = 72:1*

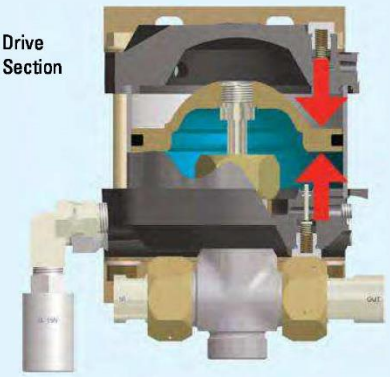
### Triple Air Head Pump



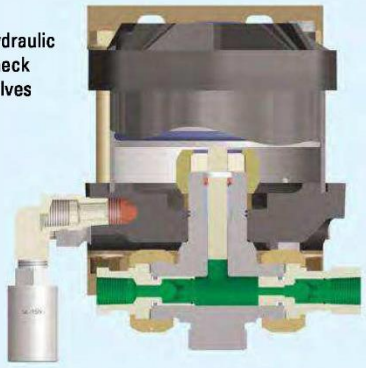

***Therefore, actual ratio*** = 118:1
Nominal Ratio = 103:1**

***Nominal Ratio***
* (2) Indicates Double Drive Piston
** (3) Indicates Triple Drive Piston

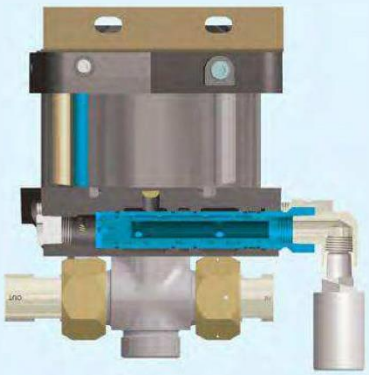
1. Drive Section



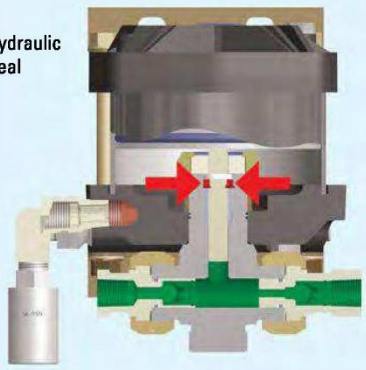
2. Hydraulic Check Valves



3. Drive Cycling Valve



4. Hydraulic Seal



## Anatomy of a Pneumatic Driven Pump

### *1. Drive Section*

The piston, complete with "O" ring seal, operates in an epoxy filled, fiberglass wound barrel, the diameter of which is constant throughout a given series of pumps. Drive media forces the piston down on the compression stroke and raises it on the suction stroke (M series have a spring return). The piston is pre-lubricated during assembly and therefore no air line lubricator is necessary.

### *2. Hydraulic Section/Check Valves*

The drive piston is linked and connected to the hydraulic plunger/piston in the hydraulic section. Outlet flow and pressure are determined by the area of the hydraulic piston head, its nominal ratio with the drive piston head, and drive pressure. On the down stroke, liquid in the hydraulic section is forced under compression through the outlet check valve. Fresh liquid is induced via the inlet check valve on the return stroke. These check valves control the flow of liquid through the hydraulic section. They are spring-loaded and have a very low cracking pressure, allowing maximum opening on the induction stroke. The pressure of hydraulic fluid on the down stroke closes the inlet check valve and acts against the spring to open the outlet check valve.

### *3. Drive Cycling Valve*

This is a pilot-operated, unbalanced, lightweight spool, which directs drive pressure, first to the top of the drive piston, and then to the underside to reciprocate the piston (cycle). It actuates via pilot valves at the top and the bottom of the stroke, which causes the unbalanced spool to shift and reciprocate the piston.

### *4. Hydraulic Seal/Check Valves*

This is one of the few wear parts. Its function is to allow the hydraulic piston to reciprocate without passing fluid into the drive section. The liquid, its pressure and its temperature determine seal specification. A distance piece can be incorporated between drive and hydraulic sections for complete contamination-free operation on most Haskel pumps.

# WETTED MATERIALS OF CONSTRUCTION AND SERVICES

| | MODEL | SERVICES (refer to pg. 17) | WETTED MATERIALS | | NON METALLICS |
|---|---|---|---|---|---|
| | | | PUMP SECTION | PLUNGERS | |
| .33 hp | M | 1 | Cad plated steel, Aluminum & SS | 416 SS | Urethane, PTFE, Buna |
| | MS | 1, 2 | All SS | 316 SS | UHMWPE, PTFE, Buna |
| | 29723 | 1, 2, 3, 5, 6 | Separation - All SS | Hard Chrome Plated 15.5PH SS + Dichronite | UHMWPE, PTFE, Ryton |
| | MDSTV | 1, 2, 3, 4, 5, 6 | Stainless Steel and Aluminum | 303 Stainless Steel | Viton, PTFE |
| .75hp | 4B-14 thru -37 | 1, 2 | Aluminum | Aluminum(Hard coated) | UHWMPE, Buna |
| | 4B-55 thru -100 | 1, 2 | 303 SS | 440 C. SS | UHWMPE, Buna |
| 1.5 hp | AW | 1 | Nickel Plated Steel & SS | 440C SS | Urethane, Buna N, PTFE |
| | ASF | 1, 2 | All SS | 440C SS | UHMWPE, Buna, PTFE, Ryton |
| | DSF | 1, 2, 3, 5, 6 | Separation - All SS | 4400C SS Hard Chrome Plated | UHMWPE, Viton, PTFE, Ryton |
| | HF | 1 | Nickel Plated Steel & SS | Stellite 15-5PH SS | UHMWPE, Buna N |
| | HSF | 1, 2 | All SS | Stellite 15-5PH SS | UHMWPE, Buna N |
| | DSHF | 1, 2, 5, 6 | Separation - All SS | Stellite 15-5PH SS | UHMWPE, Buna N |
| | ATV | 1, 2 | Aluminum, Bronze & SS | 15.5PH SS | PTFE, Viton |
| | DTV | 1, 2, 5 | Separation - Aluminum, Bronze & SS | 15.5PH SS | PTFE, Viton |
| | DSTV-1.5 | 1, 2, 3, 4, 5, 6 | Separation - All SS | 17.4PH SS | PTFE, Viton |
| | DSTV | 1, 2, 3, 4, 5 | Separation - All SS | 440C SS Hard Chrome Plated | PTFE, Viton |
| | DTN | 1, 2, 5 | Stainless Steel, Aluminum | 300 Series SS | Neopreen, PTFE |
| 2 thru 3hp | AW | 1 | Nickel Plated Steel & SS | 440C SS | Urethane, Buna N, PTFE |
| | AFD | 1 | Nickel Plated Steel & SS | 416 SS | UHMWPE, Buna, PTFE, Ryton |
| | DFD | 1, 3, 5 | Nickel Plated Steel & SS | 416 SS | UHMWPE, Viton, PTFE, Rtyon |
| | ASFD | 1, 2 | All SS | 15.5PH SS | UHMWPE, Viton, PTFE, Rtyon |
| | ASF | 1, 2 | All SS | 440C SS | UHMWPE, Viton, PTFE, Rtyon |
| | DSFD | 1, 2, 3, 5, 6 | Separation - All SS | 15.5PH SS | UHMWPE, Viton, PTFE, Rtyon |
| | DSF | 1, 2, 3, 5, 6 | Separation - All SS | 440C SS Hard chrome plated | UHMWPE, Viton, PTFE, Rtyon |
| | HF | 1 | Nickel Plated Steel & SS | Stellite 15-5PH SS* | UHMWPE, Buna N |
| | HSF | 1, 2 | All SS | Stellite 15-5PH SS* | UHMWPE, Buna N |
| | DSHF | 1, 2, 5, 6 | Separation - All SS | Stellite 15-5PH SS* | UHMWPE, Buna N |
| | DSXHF | 1, 2, 5, 6 | Separation - All SS | Stellite 15-5PH SS | UHMWPE, Buna N |
| | DSXHW | 1, 2 | Separation - All SS | Stellite 15-5PH SS | Urethane, PTFE |
| | DSTV-1.5 | 1, 2, 3, 4, 5, 6 | Separation - All SS | 17.4PH SS | PTFE, Viton |
| | DSTV | 1, 2, 3, 4, 5 | Separation - All SS | 440C SS Hard chrome plated | PTFE, Viton |
| | *Except -202 ratio is chrome plated 440 SS | | | | |
| 6 hp | GW | 1 | Nickel Plated Steel, SS & Bronze | Hard chrome plated 15.5PH SS | Urethane, Buna N, PTFE |
| | GSF | 1, 2 | All SS & Bronze | Hard chrome plated 15.5PH SS | UHMWPE, Viton, PTFE, Ryton |
| | DGSF | 1, 2, 3, 5, 6 | Separation- All SS & Bronze | Hard chrome plated 15.5PH SS | UHMWPE, Viton, PTFE, Ryton |
| | DGSTV | 1, 2, 3, 4, 5 | Separation- All SS & Bronze | Hard chrome plated 15.5PH SS | Viton, PTFE, Ryton |
| | GWD | 1 | Nickel Plated Steel & SS | 15.5PH SS Hard chrome plate optional | Urethane, Buna N, PTFE |
| | GSFD | 1, 2 | All SS & Bronze | 15.5PH SS Hard chrome plate optional | UHMWPE, Buena N, PTFE, Ryton |
| | DGFD | 1, 3, 5 | Separation- Nickel Plated Steel & SS | 15.5PH SS hard chrome plate optional | UHMWPE, Viton, PTFE, Ryton |
| | DGSFD | 1, 2, 3, 4, 5, 6 | Separation- All SS & Bronze | 15.5PH SS Hard chrome plate optional | UHMWPE, Viton, PTFE, Ryton |
| | DGSTVD | 1, 2, 3. 4, 5 | Separation- All SS & Bronze | 17.4PH SS Hard chrome plate optional | PTFE, Viton |
| 8 hp | 8SFD | 1, 2 | All SS & Bronze* | Hard chrome plated 15.5PH SS | UHMWPE, Viton, PTFE, Ryton |
| | 8DSFD | 1, 2 ,3 ,5, 6 | Separation- All SS & Bronze | 15.5PH SS Hard chrome | UHMWPE, Viton, PTFE, Ryton |
| | 8DTVD | 1, 2, 3, 4, 5, 6 | Separation- All SS & Bronze | 15.5PH SS Hard chrome | PTFE, Viton |
| | 8HSFD | 1, 2 | All SS & Bronze* | 17.4PH SS | UHMWPE, Viton, PTFE, Ryton |
| | 8DSTVD | 1, 2, 3, 5, 6 | All SS & Bronze* | 15-5 PH SS Hard chrome | Viton, PTFE |
| | 8SFD2 | 1, 2 ,6 | All SS & Bronze* | 15-5 PH SS Hard chrome | PTFE, Viton, UHMWPE |
| 10 hp | D14STD-125 | 1, 2, 3, 4, 5A | All SS & Bronze | Hard chrome plated 440C SS | PTFE, Viton |
| | D14STD-315 | 1, 2, 3, 4, 5A | All SS & Bronze | Hard chrome plated 440C SS | PTFE, Viton |
| | D14SFD-125 | 1, 2, 3, 5A, 6 | All SS & Bronze | Tungston Carbide Coated 15.5PH SS | UHMWPE, Viton, PTFE, Ryton |
| | D14SFD-315 | 1, 2, 3, 5A 6 | All SS & Bronze | Tungston Carbide Coated 15.5PH SS | UHMWPE, Viton, PTFE, Ryton |

# Performance and Specification Overview

| Max Air | Air Head | Power | Pump Model Code | Ratio Dash no. | Actual Area Ratio | Maximum Rated Output Pressure | | | | Displacement/Cycle | | Maximum Flow | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Continuous | | Intermittent | | | | | |
| | | | | | | psi | bar | psi | bar | cu in | ml | cu in/min | l/min |
| 125 psi/8.6 bar | Single | 0.33 hp | M, MDSTV | -5 | 5.6 | 625 | 43 | 625 | 43 | 0.83 | 13.6 | 506 | 8.30 |
| | | | M, MS | -7 | 7.8 | 900 | 62 | 900 | 62 | 0.60 | 9.8 | 366 | 6.00 |
| | | | | -12 | 14 | 1500 | 103 | 1500 | 103 | 0.36 | 5.9 | 234 | 3.83 |
| | | | M, MS, 29723 | -21 | 25 | 2600 | 179 | 2600 | 179 | 0.20 | 3.3 | 130 | 2.13 |
| | | | | -36 | 41 | 4500 | 310 | 4500 | 310 | 0.12 | 2.0 | 78 | 1.28 |
| | | | | -71 | 82 | 8800 | 607 | 8800 | 607 | 0.06 | 1.0 | 39 | 0.64 |
| | | | | -110 | 126 | 13500 | 931 | 13500 | 931 | 0.039 | 0.60 | 25 | 0.42 |
| | | | M, MS | -188 | 217 | 15000 | 1034 | 15000 | 1034 | 0.023 | 0.40 | 18 | 0.29 |
| | | | 29723 | -188 | 217 | 10000 | 1034 | 10000 | 1034 | 0.023 | 0.40 | 18 | 0.29 |
| | | | MS | -220 | 220 | 20000 | 1380 | 25000 | 1723 | 0.021 | 0.34 | 14 | 0.22 |
| 100 psi/7 bar | Single | 0.75 hp | 4B | -14 | 16 | 1500 | 103 | 1500 | 103 | 0.9 | 14.7 | 428 | 7.01 |
| | | | | -30 | 34 | 3200 | 221 | 3200 | 221 | 0.43 | 7.0 | 204 | 3.35 |
| | | | | -37 | 42 | 3800 | 262 | 3800 | 262 | 0.35 | 5.7 | 166 | 2.72 |
| | | | | -55 | 63 | 6000 | 414 | 6000 | 414 | 0.22 | 3.6 | 105 | 1.71 |
| | | | | -100 | 114 | 10600 | 731 | 10600 | 731 | 0.13 | 2.0 | 62 | 1.01 |
| 150 psi/10.5 bar | Single | 1.5 hp | DSTV | -1.5 | 1.6 | 240 | 17 | 300 | 21 | 31.90 | 513 | 5104 | 83.6 |
| | | | ATV, DTN, DTV | -4 | 4.6 | 690 | 48 | 1200 | 83 | 20.00 | 328 | 3200 | 52.4 |
| | | | AW, ASF, DSF, DSTV | -B10 | 11.5 | 1600 | 110 | 1600 | 110 | 4.05 | 66.4 | 1215 | 19.9 |
| | | | | -B15 | 17 | 2400 | 165 | 2400 | 165 | 2.70 | 44.3 | 810 | 13.3 |
| | | | | -25 | 29 | 4000 | 276 | 4000 | 276 | 1.62 | 26.6 | 486 | 8.0 |
| | | | | -35 | 40 | 5700 | 393 | 5700 | 393 | 1.16 | 19.0 | 348 | 5.7 |
| | | | | -60 | 69 | 9800 | 676 | 9800 | 676 | 0.67 | 11.0 | 201 | 3.3 |
| | | | | -100 | 115 | 15000 | 1034 | 16500 | 1138 | 0.41 | 6.7 | 123 | 2.0 |
| | | | | -150 | 173 | 15000 | 1034 | 20000 | 1379 | 0.27 | 4.5 | 81 | 1.3 |
| | | | HF, HSF, DSHF | -151 | 173 | 25000 | 1724 | 25000 | 1724 | 0.27 | 4.5 | 81 | 1.3 |
| | | | | -225 | 260 | 30000 | 2069 | 37000 | 2552 | 0.18 | 3.0 | 41 | 0.7 |
| | | | | -300 | 345 | 30000 | 2069 | 50000 | 3448 | 0.14 | 2.3 | 32 | 0.5 |
| | | | HF | -450 | 533 | 45000 | 3103 | 45000 | 3103 | 0.0 | 1.5 | 20 | 0.3 |
| | Double | 2 hp | ATV | -8 | 9.2 | 850 | 59 | 1200 | 83 | 20 | 328 | 3200 | 52.4 |
| | | | AW, ASF, DSF, DSTV | -B22 | 23 | 3200 | 221 | 3200 | 221 | 4.05 | 66.4 | 1215 | 19.9 |
| | | | | -B32 | 34 | 4800 | 331 | 4800 | 331 | 2.70 | 44.3 | 810 | 13.3 |
| | | | | -52 | 57 | 5000 | 345 | 8000 | 552 | 1.62 | 26.6 | 488 | 8.0 |
| | | | | -72 | 80 | 11000 | 759 | 11000 | 759 | 1.16 | 19.0 | 348 | 5.7 |
| | | | | -122 | 138 | 15000 | 1034 | 19000 | 1310 | 0.67 | 11.0 | 201 | 3.3 |
| | | | HF, HSF, DSHF | -202 | 230 | 30000 | 2069 | 33000 | 2276 | 0.41 | 6.7 | 92 | 1.5 |
| | | | | -302 | 346 | 30000 | 2069 | 50000 | 3448 | 0.27 | 4.5 | 61 | 1.0 |
| | | | DSXHF | -452 | 520 | 30000 | 2069 | 70000 | 4828 | 0.18 | 3.0 | 41 | 0.7 |
| | | | | -602 | 690 | 30000 | 2069 | 75000 | 5172 | 0.14 | 2.3 | 32 | 0.5 |
| 100 psi/7 bar | Triple | 2 hp | DXHF, DSXHF | -683 | 780 | 30000 | 2069 | 70000 | 4828 | 0.18 | 3.0 | 25 | 0.41 |
| | | | | -903 | 1038 | 30000 | 2069 | 75000 | 5172 | 0.14 | 2.3 | 20 | 0.33 |
| | | | DSXHW | -1373 | 1575 | 30000 | 2069 | 100000 | 6897 | 0.086 | 1.4 | 12 | 0.197 |
| 150 psi/10.5 bar | Single | 2.2 | AFD-DFD-ASFD-DSFD | -B60 | 69 | 6500 | 448 | 6500 | 448 | 1.34 | 2.2 | 369 | 6.0 |
| | | 3 hp | ASFD | -10 | 11.5 | 1600 | 110 | 1600 | 110 | 8.10 | 133 | 1823 | 29.9 |
| | | | | -15 | 17 | 2400 | 165 | 2400 | 165 | 5.40 | 89 | 1215 | 19.9 |
| | | | | -25 | 29 | 4000 | 276 | 4000 | 276 | 3.24 | 53.6 | 729 | 11.9 |
| | | | | -35 | 40 | 5700 | 393 | 5700 | 393 | 2.32 | 38.0 | 522 | 8.6 |
| | | | | -60 | 69 | 9800 | 676 | 9800 | 676 | 1.34 | 22.0 | 302 | 4.9 |
| | | | | -100 | 115 | 15000 | 1034 | 16500 | 1138 | 0.82 | 13.4 | 185 | 3.0 |
| | | | | -150 | 173 | 15000 | 1034 | 20000 | 1379 | 0.54 | 9.0 | 122 | 2.0 |
| | | | | -202 | 230 | 30000 | 2069 | 33000 | 2276 | 0.82 | 13.4 | 144 | 2.4 |
| 125 psi/8.6 bar | Single | 6 hp | GWD, GSFD, DGSFD, DGSTVD | -12 | 14.8 | 1850 | 128 | 4000 | 276 | 15.9 | 260 | 5009 | 82.1 |
| | | | GW, GSF, DGSF, DGSTV | -35 | 40.3 | 4375 | 302 | 4375 | 302 | 6.0 | 98 | 1890 | 31.0 |
| | | | | -60 | 69 | 7500 | 517 | 7500 | 517 | 3.5 | 57 | 1103 | 18.1 |
| | | | | -100 | 115 | 8000 | 552 | 10000 | 690 | 2.1 | 34 | 662 | 10.8 |
| | | 8 hp | 8SFD, 8DSFD, 8DSTVD | -25 | 27.5 | 3575 | 246 | 4000 | 276 | 14.0 | 229 | 2660 | 43.5 |
| | | | 8SFD | -40 | 43.5 | 6000 | 414 | 6000 | 414 | 8.90 | 145 | 1691 | 28.0 |
| | | | | -65 | 73 | 10000 | 690 | 10000 | 690 | 5.40 | 88 | 1026 | 17.0 |
| | | | 8DSFD | -100 | 112 | 10000 | 690 | 10000 | 690 | 3.52 | 58 | 669 | 11.0 |
| | | | 8HSFD | -225 | 253 | 25000 | 1724 | 25000 | 1724 | 1.56 | 26 | 296 | 5.0 |
| | | | 8SFD2 (Double Air Drive Piston Models) | -55 | 55 | 5500 | 379 | 7200 | 497 | 14.14 | 232 | 1900 | 31.1 |
| | | | | -88 | 88 | 8800 | 607 | 10000 | 690 | 8.84 | 145 | 1182 | 19.36 |
| | | | | -224 | 225 | 25000 | 1724 | 25000 | 1724 | 3.53 | 58 | 476 | 7.6 |
| | | 10 hp | D14STD, D14SFD | -125 | 138 | 16000 | 1103 | 16000 | 1103 | 8.80 | 144.2 | 704 | 11.5 |
| | | | | -315 | 347 | 36000 | 2483 | 36000 | 2483 | 3.50 | 57.4 | 280 | 4.6 |

| Typical Performance using 100 psi (7 bar) Air drive | | | | | | | |
|---|---|---|---|---|---|---|---|
| Outlet Pressure | | Outlet Flow | | Outlet Pressure | | Outlet Flow | |
| psi | bar | cu in/min | l/min | psi | bar | cu in/min | l/min |
| 225 | 15.5 | 500 | 8.20 | 415 | 29 | 249 | 4.09 |
| 300 | 21 | 350 | 5.70 | 600 | 41 | 160 | 2.6 |
| 700 | 48 | 200 | 3.28 | 1125 | 78 | 100 | 1.64 |
| 1500 | 103 | 90 | 1.48 | 2000 | 138 | 48.9 | 0.8 |
| 1700 | 117 | 70 | 1.15 | 3100 | 214 | 39.6 | 0.65 |
| 2450 | 169 | tbd | tbd | 4500 | 310 | tbd | tbd |
| 3000 | 207 | 40 | 0.64 | 6000 | 414 | 19 | 0.31 |
| 7500 | 517 | 20 | 0.33 | 10000 | 690 | 8.5 | 0.14 |
| 5000 | 345 | 18 | 0.30 | 10000 | 690 | 14 | 0.23 |
| 5000 | 345 | 18 | 0.30 | 10000 | 690 | 14 | 0.23 |
| 7500 | 517 | 15 | 0.24 | 15000 | 1034 | 12 | 0.2 |
| 700 | 48 | 400 | 6.55 | 1450 | 100 | 61 | 1.00 |
| 1500 | 103 | 200 | 3.28 | 3000 | 207 | 62 | 1.00 |
| 1750 | 121 | 170 | 2.78 | 3500 | 241 | 82 | 1.33 |
| 2000 | 138 | 110 | 1.80 | 5000 | 345 | 66 | 1.08 |
| 5000 | 345 | 57 | 0.93 | 10000 | 690 | 26 | 0.43 |
| 50 | 3 | 5000 | 81.9 | 150 | 10 | 1000 | 16.4 |
| 100 | 7 | 1953 | 32 | 400 | 28 | 750 | 12.3 |
| 400 | 28 | 1000 | 16.4 | 990 | 68 | 500 | 8.19 |
| 750 | 52 | 598 | 9.8 | 1600 | 110 | 200 | 3.28 |
| 1000 | 69 | 403 | 6.6 | 2500 | 172 | 195 | 3.2 |
| 2000 | 138 | 350 | 4.1 | 3600 | 248 | 98 | 1.6 |
| 3000 | 207 | 152 | 2.5 | 6200 | 427 | 50 | 0.82 |
| 4000 | 276 | 100 | 1.64 | 10000 | 690 | 24.4 | 0.4 |
| 7000 | 483 | 59.7 | 0.98 | 15000 | 1034 | 29.9 | 0.49 |
| 7000 | 483 | 59.7 | 0.98 | 15000 | 1034 | 29.9 | 0.49 |
| 7500 | 517 | 39.6 | 0.65 | 24000 | 1655 | 9.8 | 0.16 |
| 15000 | 1034 | 29.9 | 0.49 | 27000 | 1862 | 20.1 | 0.33 |
| 36000 | 2483 | 14.6 | 0.24 | 45000 | 3103 | 9.2 | 0.15 |
| 200 | 14 | 1953 | 32 | 800 | 28 | 750 | 12.3 |
| 400 | 28 | 799 | 13.1 | 2100 | 145 | 200 | 3.28 |
| 700 | 48 | 500 | 8.2 | 3000 | 207 | 152 | 2.50 |
| 1900 | 131 | 299 | 4.9 | 5000 | 345 | 98 | 1.60 |
| 2000 | 138 | 226 | 3.7 | 7500 | 517 | 50 | 0.82 |
| 4000 | 276 | 122 | 2.0 | 12000 | 828 | 40.2 | 0.66 |
| 7000 | 483 | 91.5 | 1.5 | 20000 | 1379 | 20.1 | 0.33 |
| 10000 | 690 | 45.2 | 0.7 | 30000 | 2069 | 15.2 | 0.25 |
| 10000 | 690 | 34.8 | 0.6 | 40000 | 2759 | 15.2 | 0.25 |
| 15000 | 1034 | 24.4 | 0.4 | 50000 | 3448 | 12.2 | 0.2 |
| 15000 | 1034 | 19.5 | 0.32 | 60000 | 4138 | 4.9 | 0.08 |
| 15000 | 1034 | 15.9 | 0.26 | 70000 | 4828 | 5.5 | 0.09 |
| 16000 | 1103 | 9.2 | 0.15 | 90000 | 6207 | 3.1 | 0.05 |
| 1000 | 69 | 348 | 5.7 | 5500 | 379 | 152 | 2.5 |
| 500 | 34 | 1520 | 24.9 | 1000 | 69 | 380 | 6.22 |
| 750 | 52 | 1030 | 16.9 | 1500 | 103 | 260 | 4.26 |
| 1000 | 69 | 662 | 10.9 | 2500 | 172 | 162 | 2.66 |
| 1500 | 1034 | 465 | 7.6 | 3500 | 248 | 100 | 1.64 |
| 3000 | 138 | 248 | 4.1 | 6000 | 414 | 56 | 0.92 |
| 5000 | 345 | 151 | 2.5 | 10000 | 690 | 41 | 0.67 |
| 7500 | 517 | 103 | 2.0 | 15000 | 1034 | 27 | 0.44 |
| 10000 | 690 | 63 | 1.0 | 20000 | 1379 | 47 | 0.77 |
| 200 | 14 | 5004 | 82 | 1200 | 83 | 1454 | 24 |
| 1000 | 69 | 1770 | 29 | 3500 | 241 | 600 | 9.8 |
| 2000 | 138 | 976 | 16 | 5500 | 379 | 397 | 6.5 |
| 2000 | 138 | 573 | 9.4 | 10000 | 690 | 195 | 3.2 |
| 1000 | 69 | 2400 | 39.3 | 2500 | 172 | 280 | 4.6 |
| 2000 | 138 | 1420 | 23.2 | 4000 | 276 | 200 | 3.27 |
| 3000 | 207 | 880 | 14.4 | 6000 | 414 | 310 | 5.08 |
| 5000 | 345 | 555 | 9.1 | 10000 | 690 | 163 | 2.67 |
| 10000 | 690 | 270 | 4.4 | 20000 | 1379 | 144 | 2.36 |
| 2500 | 172 | 1230 | 20.1 | 4000 | 276 | 675 | 11 |
| 4000 | 276 | 850 | 13.9 | 5000 | 345 | 800 | 13.1 |
| 10000 | 690 | 315 | 5.2 | 18500 | 1276 | 140 | 2.3 |
| 8000 | 552 | 488 | 8.0 | 12000 | 828 | 195 | 3.2 |
| 15000 | 1034 | 238 | 3.9 | 30000 | 2069 | 79.3 | 1.3 |

## Pump Selection Information

All Haskel pumps are identified by letters coding the type of pump, followed by a number indicating the practical working ratio of the drive area to the hydraulic plunger area. These letters are explained in the chart below.

### *Pump Model Letter Coding*

| | |
|---|---|
| **M** | .875" stroke .33 hp miniature pump series |
| **S** | Stainless steel hydraulic piston and body |
| **29723** | .33 hp Chemical Pump |
| **D (Prefix)** | Pump incorporates a Distance Piece |
| **D (Suffix)** | Double Acting pump |
| **4B** | 1" stroke .75 hp pump series (bottom inlet only) |
| **A** | 2" stroke 1.5 + 2 hp pump series |
| **H** | 2" stroke 1.5 + 2 hp High Pressure pump series |
| **XH** | 2" stroke 1.5 + 2 hp Extreme High Pressure pump series |
| **G** | 4.5" stroke 6 hp pump series |
| **B** | 4.5" stroke 8 hp pump or booster series |
| **14** | 4" stroke 10 hp pump series |
| **W** | Polyurethane U-cup dynamic seal |
| **F** | UHMWPE (Ultra-high Molecular Weight Polyethylene Dynamic Seal |
| **T** | Reinforced Teflon® dynamic seal |
| **V** | Viton® o-ring static seal |

## Guidelines for 24/7 Continuous Duty Applications for Maximizing Seal Life Performance

| Pump Series | Maximum Cycles per Minute |
|---|---|
| 0.3 hp | 90 cpm |
| 0.75 hp | 80 cpm |
| 1.5, 2.0 and 2.2 hp (Single and Double Drive Piston) | 60 cpm |
| 2.0 hp (Triple Drive Piston) | 60 cpm |
| 3.0 hp | 60 cpm |
| 6.0 hp | 40 cpm |
| 8.0 hp | 40 cpm |
| 10.0 hp | 40 cpm |

# .33 hp (.25 kW) M Series Pump Models


| Model | Nominal Ratio | Maximum Working Pressure<br>Consult chart on page 6 for more information regarding continuous/intermittent pressures. | Displacement per Cycle |
|---|---|---|---|
| **M, MDSTV** | **-5** | **625 psi (43 bar)** | **.83 cu in (13.6 ml)** |
| M, MS | -7 | 900 psi (62 bar) | .6 cu in (9.8 ml) |
| | -12 | 1500 psi (103 bar) | .36 cu in (5.9 ml) |
| M, MS, 29723* | -21 | 2600 psi (179 bar) | .2 cu in (3.3 ml) |
| | -36 | 4500 psi (310 bar) | .12 cu in (2.0 ml) |
| | -71 | 8800 psi (607 bar) | .06 cu in (1.0 ml) |
| | -110 | 13500 psi (931 bar) | .039 cu in (0.6 ml) |
| | -188 | 15000 psi (1034 bar) | .023 cu in (.4 ml) |
| MS | -220 | 25000 psi (1723 bar) | .021 cu in (.34 ml) |

*Note: 29723 series rated to 10,000 psi (690 bar) maximum (ratios -110 and -188)

## *Key Features*

- Choice of 6 models, 9 ratios, 27 possible combinations
- Flows to 2 gpm (7.5 l/min)
- Choice of wetted materials
- Single air head
- Drive pressure 25 to 125 psi (1.8 to 9 bar)
- Pressures to 25,000 psi (1724 bar)
- All Hydraulic fluids, water (plain or DI), solvents, mild chemicals, liquefied gases

*For service codes, see page 17.*
*For weights and dimensions, see page 18.*

## *Optional Modifications*

| Number | Description |
|---|---|
| **-HP** | Hand pump attachment (with handle). Provides manual operation of pump for precision pressure control or use without air power |
| 26220-2 | Hand pump attachment kit. |
| 29002 | Viton air drive. |
| 51331 | EPR seals for liquid section for 29723-XX ratio pumps. |
| 51788 | Piped exhaust – standard. Provides connection ports for drive and pilot exhausts. Enables under tank top mounting and/or natural gas drive. |
| 51794 | Piped exhaust – sour gas. With hand pump (HP). |
| 51794-2 | Piped exhaust – sour gas. Without hand pump (HP). |
| 53175 | Level II cleaning. |
| 53304 | High pressure outlet port. Fits ¼" O.D. high pressure threaded and coned tube. |
| 53935 | Low temperature drive. Enables operation down to 5°F. Some sacrifice of seal life at normal temperature. M or MS series. |
| 57905 | No return spring. Provides improved fill on suction stroke pumping liquefied gases by utilizing the inlet pressure. Only available on M and MS series. |
| 59888 | Cycle timer installed. |
| 80103 | Noise reduction kit fitted. |
| 82367 | SS trim for 1⁄3 hp drive |

## .75 hp (.56 kW) Pump Models


| Model | Nominal Ratio | Maximum Working Pressure<br>Consult chart on page 6 for more information regarding continuous/intermittent pressures. | Displacement per Cycle |
|---|---|---|---|
| 4B | -14 | 1500 psi (103 bar) | .9 cu in (14.8 ml) |
| | -30 | 3200 psi (221 bar) | .43 cu in (7.1 ml) |
| | -37 | 3800 psi (262 bar) | .35 cu in (5.7 ml) |
| | -55 | 6000 psi (414 bar) | .22 cu in (3.6 mil) |
| | -100 | 10600 psi (731 bar) | .13 cu in (2.1 ml) |

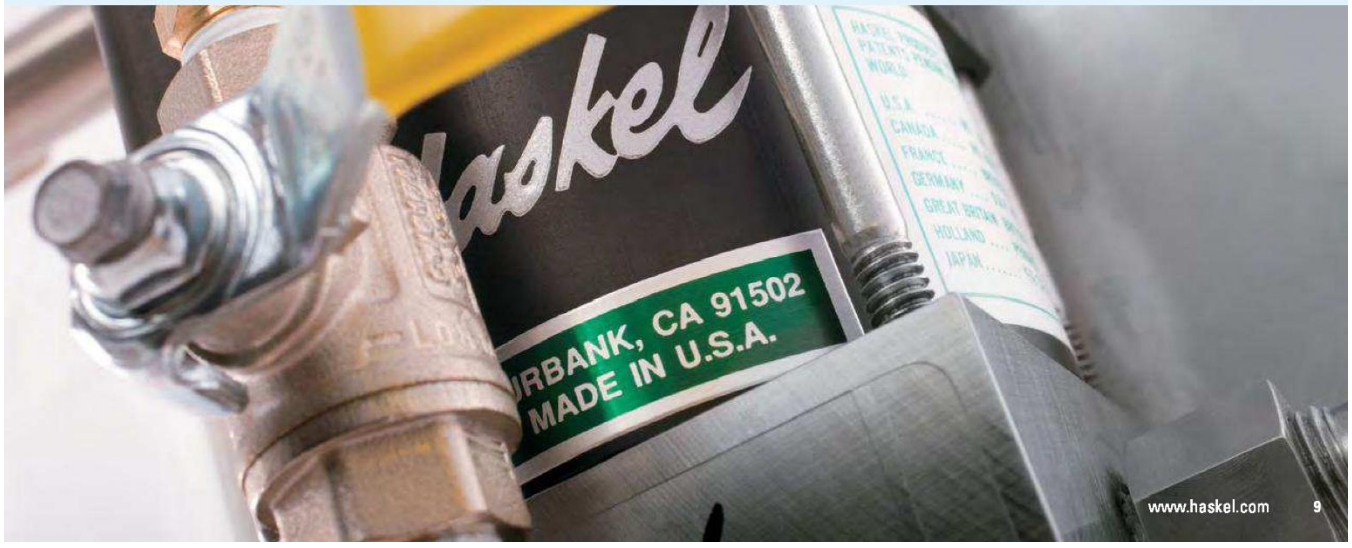
*For service codes, see page 17.*
*For weights and dimensions, see page 18.*

### *Key Features*

- One model available in 5 ratios
- Output pressures to 10,000 psi (690 bar)
- Flows to 1.5 gpm (5.7 l/min)
- Choice of wetted materials
- Single air head
- Drive pressure 3 psi to 100 psi (.2 to 7 bar)

### *Optional Modifications*

| Number | Description |
|---|---|
| 57639 | Low drive air pressure. Allows user to regulate drive air to as low as 3 psi (.2 bar). |
| 59354 | Noise reduction kit fitted. |
| 81575 | Changes the "F" seal to a "W" seal. Recommend for use with water. |
| 82104 | Viton air drive. |



# 1.5 hp (1.12 kW) Pump Models


## Key Features

- Choice of 10 models, 13 ratios, 50 possible combinations
- Output pressures to 50,000 psi (3448 bar)
- Flows to 22 gpm (83.0 l/min)
- Choice of wetted materials
- Single air head
- Drive pressure 3 to 150 ps (.2 to 10 bar)

## Optional Modifications

| Number | Description |
|---|---|
| 16821 | Low air pressure control feature. For operating at air pressures as low as 3 to 4 psi (.2 to .3 bar). Includes 28881 modification. 45 psi minimum pilot air required. |
| 16831 | Low temperature modification. For special sealing in air drive for operating temperatures from as low as -20°F up to normal +120°F. |
| 16834 | Exhaust adapter. With back pressure balance piston. |
| 27964 | Interconnecting inlet-outlet tubing. ½" female for 4:1 ratio series pumps (ATV-4 or DTV-4). |
| 28000 | Threaded vent (or purge) ports on standard distance piece. Except 1.5:1 ratio. |
| 28881 | Air pilot modification. 1/8" NPT. Allows remote start/stop of pump. |
| 29376 | Three-way cycling spool. For 1.5 hp and 2 hp single acting pumps, for use with CO2 |
| 29702 | Single stroke modification. |
| 51050 | Extreme service cycling modification. Not recommended for long stall periods. |
| 51056 | Exhaust/pilot vent combination. |
| 51331 | EPR (Ethylene propylene) static seals in wetted section. Applies to distance piece pumps only. |
| 51345 | Sour gas drive provision to N.A.C.E. specifications. 1.5 hp to 2.2 hp distance piece pumps only, single air head and double air head. |
| 52788 | Viton seals air drive. |
| 53925 | Severe Arctic low temperature service. -25, -35, -60, -100, -150, -151, -225, -300, -450 ratios. |
| 54885 | Rotate pump body 90° from standard. |
| 54935 | SS trim for 5/3 air drive. |
| 55516 | Polyurethane ("W") seal. For F or TV series pumps, except high output models. |
| 59353 | Noise reduction kit fitted. Not available on AFD, DFD, ASFD or DSFD. |
| 82460 | HNBR seals in air drive section. |

| Model | Nominal Ratio | Maximum Working Pressure<br>Consult chart on page 6 for more information regarding continuous/intermittent pressures. | Displacement per Cycle |
|---|---|---|---|
| **DSTV(1)** | -1.5 | 160 psi (11 bar) | **31.9 cu in (513.0 ml)** |
| ATV, DTV(1)(2) DTN(1) | -4 | 1200 psi (83 bar) | 20.0 cu in (328.0 ml) |
| AW, ASF, DSF, DSTV | -B10 | 1600 psi (110 bar) | 4 cu in (66.4 ml) |
| | -B15 | 2400 psi (165 bar) | 2.7 cu in (44.3 ml) |
| | -25 | 4000 psi (276 bar) | 1.6 cu in (26.6 ml) |
| | -35 | 5700 psi (393 bar) | 1.2 cu in (19 ml) |
| | -60 | 9800 psi (676 bar) | .7 cu in (11 ml) |
| ATV | -8 | 850 psi (59 bar) | 20 cu in (328.0 ml) |
| AW, ASF, DSF, DSTV | -100 | 16500 psi (1138 bar) | .4 cu in (6.7 ml) |
| | -150 | 20000 psi (1375 bar) | .28 cu in (4.5 ml) |
| HF, HSF, DSHF | -151 | 25000 psi (1724 bar) | .28 cu in (4.5 ml) |
| | -225 | 37000 psi (2551 bar) | .18 cu in (3.0 ml) |
| | -300 | 50000 psi (3448 bar) | .14 cu in (2.3 ml) |
| HF | -450 | 45000 psi (3403 bar) | .09 cu in (1.5 ml) |

(1) These series are "Lift" pumps and maximum outlet pressure is (air drive x pump ratio) + inlet pressure

(2) DTV has poppet checks

*For service codes, see page 17.*
*For weights and dimensions, see page 20.*

## 1.5 hp (1.12 kW) High Output Flow Pumps

Available in a choice of 4 models, these high output, low ratio pumps are capable of pressures to 1200 psi (82 bar) and flow rates of up to 22 gpm (83 l/min). These are "lift" pumps whereby the outlet pressure equals the air drive x the pump ratio plus the inlet pressure.

Model DSTV-1.5 has a maximum air drive of 150 psi (10 bar) and is capable of pressures up to 160 psi (11 bar). The model ATV, DTN-4 and DTV-4 work on a maximum air drive of 150 psi (10 bar) and have a maximum intermittent pressure rating of 1200 psi (83 bar). A noise reduction modification is available for applications where noise level is an issue.

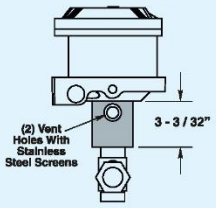
## Distance Piece (Separation)

Pumps with prefix "D" in the model number have aluminum distance piece between the air drive and pump section (except DSTV-1.5).

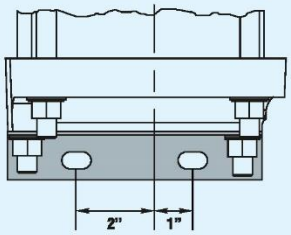
## Mounting Brackets

All series mounting brackets have 7/16" holes (slots) for 3/8" bolts. Upper mounting brackets are not furnished as standard on single air head non-distance piece units.

### Dimensional Data




### Mounting Brackets




## 2 & 2.2 hp (1.49 & 1.64 kW) Pump Models


### Key Features

- Choice of 16 models, 13 ratios, 46 possible combinations
- Output pressures to 100000 psi (7000 bar)
- Flows to 5 gpm (15 l/min)
- Choice of wetted materials
- Double and triple air heads
- Drive pressure 3 to 100 psi (.2 to 7 bar)

When using high pressure ratio pumps the reliability of the XH models (-452 through -1373) will be improved with an air driven supercharge pump, not only to simplify priming but to reduce fatigue stresses. The higher the supercharge, the better the results. Also install a relief valve to protect the lower pressure pump from potential back pressure. Supercharging of the -1373 model is recommended. This approach will ensure a reasonable life for the seals and other wear components.

| | Model | Nominal Ratio | Maximum Working Pressure (Consult chart on page 6 for more information regarding continuous/intermittent pressures.) | Displacement per Cycle |
|---|---|---|---|---|
| 2 hp | AW, ASF, DSF, DSTV | -B22 | 3200 psi (221 bar) | 4 cu in (66.4 ml) |
| | | -B32 | 4800 psi (331 bar) | 2.7 cu in (44.3 ml) |
| | | -52 | 8000 psi (552 bar) | 1.6 cu in (26.6 ml) |
| | | -72 | 11000 psi (758 bar) | 1.2 cu in (19 ml) |
| | | -122 | 19000 psi (1310 bar) | .7 cu in (11 ml) |
| | HF, HSF, DSHF | -202 | 33000 psi (2275 bar) | .4 cu in (6.7 ml) |
| | | -302 | 50000 psi (3448 bar) | .28 cu in (4.5 ml) |
| | DSXHF | -452 | 70000 psi (4827 bar) | .18 cu in (3.0 ml) |
| | | -602 | 75000 psi (5171 bar) | .14 cu in (2.3 ml) |
| | DSXHF | -683 | 70000 psi (4827 bar) | .18 cu in (3.0 ml) |
| | | -903 | 75000 psi (5171 bar) | .14 cu in (2.3 ml) |
| | DSXHW | -1373 | 100000 psi (6895 bar) | .09 cu in (1.4 ml) |
| 2.2 hp | AFD, DSFD, DFD, ASFD | -B60 | 6500 psi (448 bar) | 1.3 cu in (22 ml) |

*For service codes, see page 17.*
*For weights and dimensions, see page 20.*

## 3 hp (2.24 kW) Pump Models


### Key Features

- One model available in 8 ratios
- Output pressures to 33000 psi (2275 bar)
- Flow rates to 8 gpm (30 l/min)
- Single air head
- Drive pressure 3 to 150 psi (.2 to 10 bar)

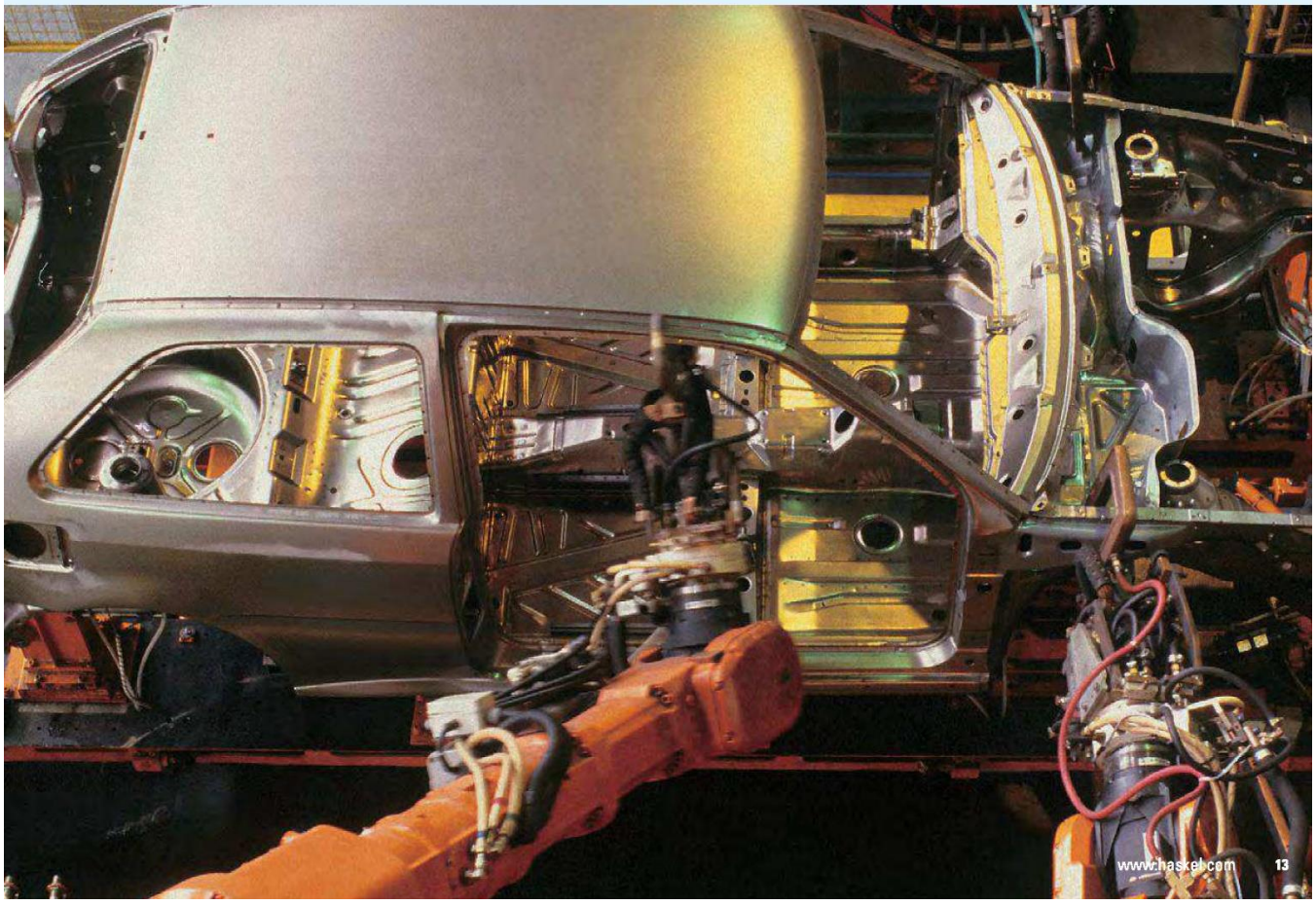
*For service codes, see page 17.*
*For weights and dimensions, see page 20.*

| Model | Nominal Ratio | Maximum Working Pressure (Consult chart on page 6 for more information regarding continuous/intermittent pressures.) | Displacement per Cycle |
|---|---|---|---|
| ASFD | 10 | 1600 psi (110 bar) | 8.1 cu in (132.8 ml) |
| | 15 | 2400 psi (165 bar) | 5.4 cu in (88.6 ml) |
| | 25 | 4000 psi (276 bar) | 3.3 cu in (53.2 ml) |
| | 35 | 5700 psi (393 bar) | 2.3 cu in (38 ml) |
| | 60 | 9800 psi (676 bar) | 1.3 cu in (22 ml) |
| | 100 | 16500 psi (1138 bar) | .8 cu in (13.4 ml) |
| | 150 | 20000 psi (1379 bar) | .6 cu in (9 ml) |
| | 202 | 33000 psi (2275 bar) | .8 cu in (13.4 ml) |

*For service codes, see page 17.*
*For weights and dimensions, see page 21.*

## *Optional Modifications (for 2 hp, 2.2 hp and 3 hp pump models)*

| Number | Description |
|---|---|
| 16821 | Assures reliable drive operation with pressures low as 3 psi as long as 20 psi or more is provided to the separate 1/8" NPT port. |
| 16831 | Low temperature modification. For special sealing in air drive for operating temperatures from as low as -20°F up to normal +120°F. |
| 16834 | Exhaust adapter. With back pressure balance piston. |
| 29376 | Three-way cycling spool. For 1.5 hp and 2 hp single acting pumps. |
| 51050 | Extreme service cycling modification. Not recommended for long stall periods. |
| 51056 | Exhaust/pilot vent combination. |
| 51331 | EPR (Ethylene propylene) static seals in wetted section. Applies to distance piece pumps only. |
| 51345 | Sour gas drive provision to N.A.C.E. specifications. 1.5 hp to 2.2 hp distance piece pumps only, single air head and double air head. |
| 52788 | Viton seals. Air drive only – 1.5 hp to 2.2 hp pumps only. |
| 53925-4 | Severe Arctic low temperature service. -10, -15, -22, -32 |
| 54885 | Rotate pump body 90° from standard. Except 3 hp pump. |
| 54935 | SS trim for 5/3 air drive. |
| 55516 | Polyurethane ("W") seal. For F or TV series pumps, except high output models. |
| 59353 | Noise reduction kit fitted. Not available on AFD, DFD, ASFD or DSFD. |
| 55465 | Ceramic Plunger -80 Ratio. |
| 55516 | Polyurethane "W" seal in "F" series pumps-except high output models. |
| 59353 | Noise reduction kit fitted. Not available on AFD, DFD, ASFD or DSFD. |
| 59888 | Cycle timer installed. |
| 82460 | HNBR Seals in air drive section. |



## 6 hp (4.47 kW) Pump Models


### *Key Features*

- Choice of 10 models, 4 ratios, 20 possible combinations
- Output pressures to 10,000 psi (690 bar)
- Flow rates to 21 gpm (80 l/min)
- Choice of wetted materials
- Single air head – double acting
- Drive pressure 3 to 125 psi (.2 to 9 bar)
- All hydraulic fluids, water (plain or DI), solvents

| Model | Nominal Ratio | Maximum Working Pressure<br>Consult chart on page 6 for more information regarding continuous/intermittent pressures. | Displacement per Cycle |
|---|---|---|---|
| GWD, GSFD, DGSFD[1], DGSTVD[1] | -12 | 4000 psi (276 bar) | 15.9 cu in (260 ml) |
| GW, GSF, DGSF, DGSTV | -35 | 4375 psi (302 bar) | 6.0 cu in (98 ml) |
| | -60 | 7500 psi (517 bar) | 3.5 cu in (57 ml) |
| | -100 | 10000 psi (690 bar) | 2.1 cu in (34.5 ml) |

(1) Double Acting "Lift" Pumps

*For service codes, see page 17.*
*For weights and dimensions, see page 22.*

Incorporating 10 models, this heavy duty range of double acting pumps provide pressures up to 10,000 psi (690 bar) and flow rates up to 4 gpm (15 l/min).

Designed to operate with air drive pressures between 40 and 125 psi (2.8 and 9 bar). For drive pressures 3 to 40 psi (.2 to 2.8 bar), order 51875-1 mod.

## 8 hp (5.97 kW) Pump Models

### *Key Features*

- Choice of 9 models, 8 ratios, 9 possible combinations
- Pressures to 30,000 psi (2068 bar)
- Flow rates to 11.5 gpm (44 l/min)
- All hydraulic fluids, water (plain or DI), solvents, liquefied gases
- Choice of wetted materials
- Single air head – double acting
- Drive pressure 3 to 125 psi (.2 to 9 bar)

| Model | Nominal Ratio | Maximum Working Pressure<br>Consult chart on page 6 for more information regarding continuous/intermittent pressures. | Displacement per Cycle |
|---|---|---|---|
| 8SFD, 8DSFD, 8DSTVD 8FD | -25[1] | 4000 psi (276 bar) | 14 cu in (229 ml) |
| 8SFD | -40 | 6000 psi (408 bar) | 9 cu in (145.3 ml) |
| | -65 | 10000 psi (690 bar) | 5.4 cu in (88.2 ml) |
| 8DSFD | -100[1] | 10000 psi (690 bar) | 3.5 cu in (57.5 ml) |
| 8SFD2 [1] | -55 | 7200 psi (496 bar) | 14 cu in (229 ml) |
| | -88 | 10000 psi (786 bar) | 8.83 cu in (144 ml) |
| | -224 | 29000 psi (1724 bar) | 3.5 cu in (57 ml) |
| 8HSFD | -225[1] | 25000 psi (1724 bar) | 1.6 cu in (25.5 ml) |

(1) Double Acting "Lift" Pumps

*For service codes, see page 17.*
*For weights and dimensions, see page 21.*

# 10 hp (7.46 kW) Pump Models

| Model | Nominal Ratio | Maximum Working Pressure<br>Consult chart on page 6 for more information regarding continuous/intermittent pressures. | Displacement per Cycle |
|---|---|---|---|
| D14STD | 125(1) | 16000 psi (1103 bar) | 8.8 cu in (144.2 ml) |
| | 315(1) | 36000 psi (2482 bar) | 3.5 cu in (57.4 ml) |
| D14SFD | 125(1) | 16000 psi (1103 bar) | 8.8 cu in (144.2 ml) |
| | 315(1) | 36000 psi (2482 bar) | 3.5 cu in (57.4 ml) |

**(1)** Double Acting "Lift" Pumps

*For service codes, see page 17.*
*For weights and dimensions, see page 21.*

## *Key Features*

- Choice of 4 models, 4 ratios, 4 possible combinations
- Pressures to 36000 psi (2500 bar)
- Flow rates to 3 gpm (11 l/min)
- Drive pressure 3 to 125 psi (.2 to 9 bar)
- All hydraulic fluids, water (plain or DI), solvents, liquefied gases
- Choice of wetted materials

## *Optional Modifications (for 6 hp, 8 hp and 10 hp pump)*

| Number | Description |
|---|---|
| 29125 | External pilot modification – for 6 hp thru 10 hp pumps. |
| 87410 | Low air pressure control – for 6 hp thru 10 hp pumps. |
| 54030 | Sour gas air drive provision to NACE spec. 6 hp distance piece pumps only. |
| 54936 | Exhaust/pilot vent combiner. |
| 57002 | Viton seals – air drive only – 6 hp |
| 57944 | Viton seals – air drive only – 8 hp |
| 59888 | Cycle timer installed. |

Incorporating two basic models, this heavy duty range of double acting pumps provide pressures up to 36000 psi (2482 bar) and output flow rate up to 3 gpm (11 l/min).

Operating from a maximum air drive pressure of 125 psi (9 bar), these pumps are designed for medium to high pressure service with minimum maintenance.

These large, slow speed pumps approach a seal life as high as 5 times that of many smaller pumps and this advantage becomes ever greater in heavy duty service involving water, or other liquids with negligible lubricity.

## Power System Specialists

World safety standards and quality demands are rising. Component manufacturers are required to provide test certification and product quality assurance which can only be determined using the types of systems which Haskel can provide. Typically, we have built systems for production and field testing the proof, leak, and burst aspects of hoses, cylinders, and valves.

These systems can be portable, mobile, or static test rigs. We also offer a range of standard pressure packs used for power jacking, clamping, and other applications where reliable power is needed.

## Quality and After-Sale Service

Haskel meets the requirements of international quality assurance ISO 9001. Build quality is matched by an innovative design and problem solving ability which stems from years of years of experience. Our representatives around the world are carefully chosen and trained to help you arrive at a correct product choice, and to offer a maintenance and parts service that is second to none.

## Selecting Your Accessories

Haskel can either provide accessories separately or supply them fitted to form a complete package suited to your application. Additionally, Haskel can fit customer nominated accessories. Our accessories catalog is available and our technical support team is always ready to advise you on the most suitable choice of accessories for your application.

- Air pilot switches
- Air pilot valves
- Regulating relief valves
- Directional control and release valves
- Hydraulic accumulators, gas receivers and storage cylinders
- High pressure valves, fittings and tubing
- Plenum chambers
- Port adapters
- Gauge snubbers
- Filters
- Stainless steel check valves
- Intensifiers with integral checks for cycling
- Capillary type gauge snubbers

***Please ask for your copy of our latest accessories brochure.***

## Liquids Compatible with Haskel Pumps

To assist in easier pump selection, we have classified various popular liquids in groups and assigned to each group a service code. These service code numbers are featured in the chart to the right and are designated for each pump series. Seals and other wetted materials can be supplied to suit your preferred liquid. For advice, please contact our technical services personnel at 818-843-4000.

## Services

### *Service Codes*

*1* Petroleum-based oils, kerosene, ethylene glycol, water with 5% soluble oil.

*2* Plain water, diesel fuel.

*3* Most phosphate ester-based fire-resistant hydraulic fluids, e.g. Pydraul, Lindol, Cellulube, Fyrquel, and Houghtosafe 1120 and petroleum-based solvents compatible with UHMWPE (Ultra-high Molecular Weight Polyethylene) dynamic seals and Viton static seals.

*4* Petroleum-based solvents, e.g. aromatic hydrocarbons (benzene, toluene, xylene, hylene, etc.); chlorinated solvents (trichlorethylene, carbon tetrachloride, chlorobenzine, etc.); mercaptans, Dowtherm A, fluoronated solvents (fluorobenzene, fluorochlorethylene, etc.); Dowtherm E, plus all of Group 3 and some mildly corrosive acids compatible with wetted materials. See note 5A for service with methyl-ethyl-ketone, methyl acetone, diacetone, alcohol and freon 22.

*5* Skydrol and Aerosafe hydraulic fluid; acetone and some alcohols (ethyl, methyl, and isopropyl).
*5A.* Also suitable for these fluids if Viton static seals are replaced with EPR; specify modification number 51331 (no extra charge); e.g., 51331-MDTV-5. Most phosphate ester-based fluids solidify at approximately 30000 psi.

*6* Deionized water; demineralized water.

***Note: Dynamic seal life with non-lubricating fluids will understandably be less than with lubricating types.***

## Operating Temperatures

### *Drive Section*

-4° (25°F) to +65°C (150°F) (low temperature seals are available for Arctic operation).

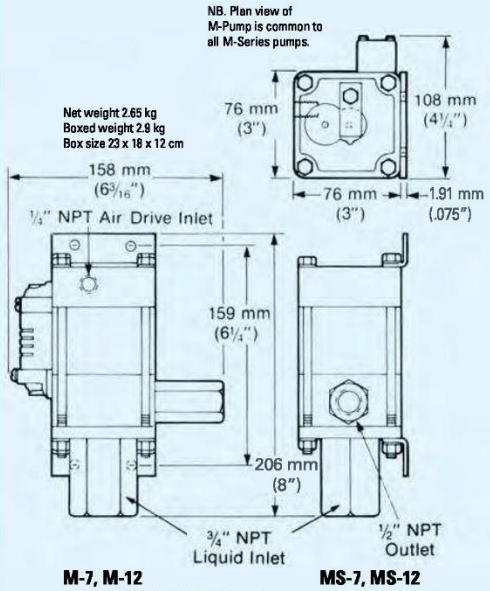
### *Liquid Section*

For reasonable seal life, high temperature should be limited to 54° C (130° F), for F and W seal models, 135° C (275° F) for T and TV models (with distance piece).

| hp | Model | Services 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| .33 | M | • | | | | | |
| | MS | • | • | | | | • |
| | MDSTV | • | • | • | • | • | • |
| | 29723 | • | • | • | | • | • |
| .75 | 4B -14 to -37 | • | • | | | | • |
| | 4B -55 to -100 | • | • | | | | • |
| 1.5<br>2<br>2.2 | AW | • | | | | | |
| | ASF | • | • | | | | • |
| | DSF | • | • | • | | • | • |
| | HF | • | • | | | | |
| | HSF | • | • | | | | • |
| | DSHF | • | • | | | • | • |
| | DSTV | • | • | • | • | • | • |
| | ATV | • | • | • | | | • |
| | DTV | • | • | | | • | • |
| | DSTV-1.5 | • | • | • | • | • | • |
| | AFD | • | | • | | | |
| | DFD | • | | • | | • | |
| | ASFD | • | • | | | | • |
| | DSFD | • | • | • | | • | • |
| | DSXHF | • | • | | | • | • |
| | DSXHW | • | • | | | | • |
| 3 | **ASFD** | • | • | | | | • |
| 6 | GW | • | | | | | • |
| | GSF | • | • | | | | • |
| | DGSF | • | • | • | | • | • |
| | DGSTV | • | • | • | • | • | • |
| | GWD | • | | | | | |
| | GSFD | • | • | • | | • | • |
| | DGFD | • | | • | | • | |
| | DGSFD | • | • | • | • | • | • |
| | DGSTVD | • | • | • | • | • | • |
| 8 | 8FD | • | | | | | • |
| | 8SFD | • | • | • | • | • | • |
| | 8SFD2 | • | • | • | • | • | • |
| | 8DSFD | • | • | • | | • | • |
| | 8DSTVD | • | • | • | | • | • |
| | 8HSFD | • | • | • | • | • | • |
| 10 | D14STD-125 | • | • | • | • | • | • |
| | D14STD-315 | • | • | • | • | • | • |
| | D14SFD-125 | • | • | • | | • | • |
| | D14SFD-315 | • | • | • | | • | • |

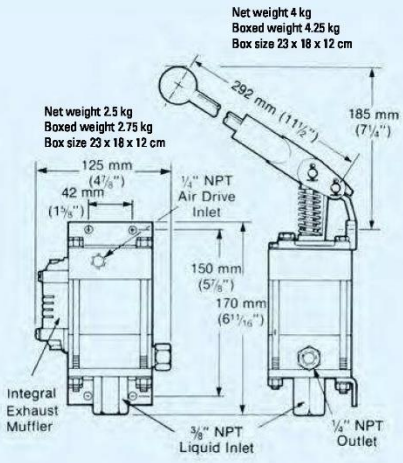
# Weights and Dimensions

## .33 hp (.25 kW) M Series Pump Models



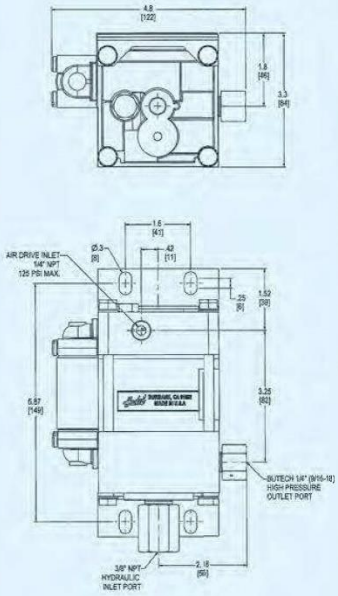

**M-7, M-12 approx. weight 9 lbs (4 kg)**

**MS-7, MS-12 approx. weight 9 lbs (4 kg)**

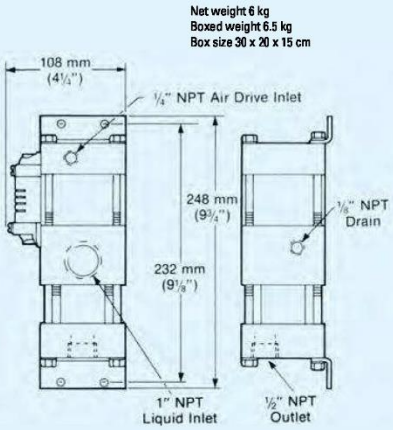



**MS-21, MS-36, MS-71, MS-110, MS-188, approx. weight 6 lbs (2.7 kg)**

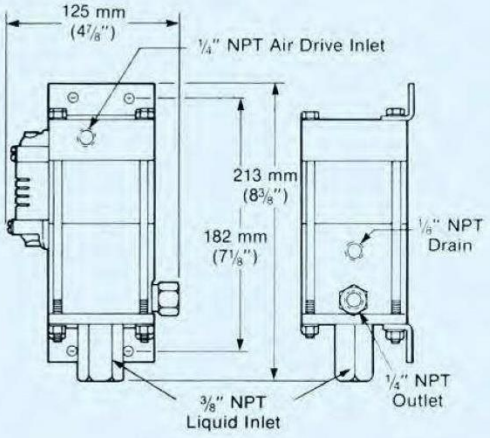
**M-21, M-36, M-71, M-110, M-188 approx. weight 6 lbs (2.7 kg)**



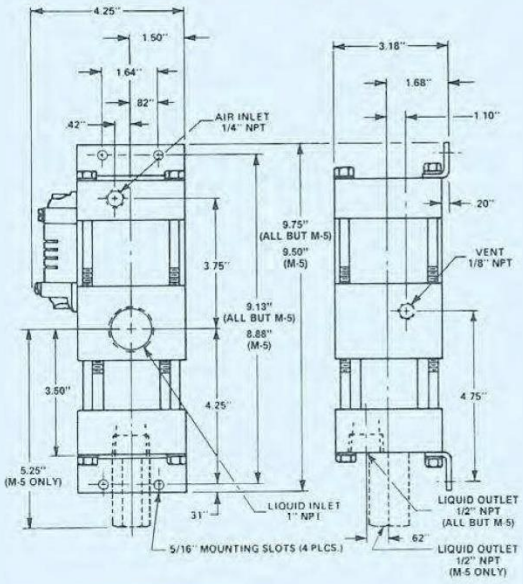
**MS-220 approx. weight 6 lbs (2.7 kg)**




**M-5 approx. weight 9 lbs (4 kg)**

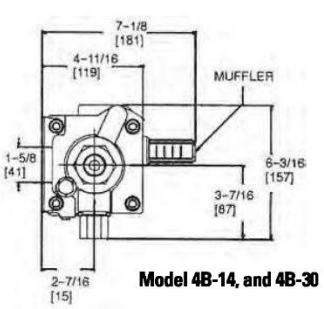



**29723-21, 29723-36, 29723-71, 29723-110**
**approx. weight 6.5 lbs (3 kg)**

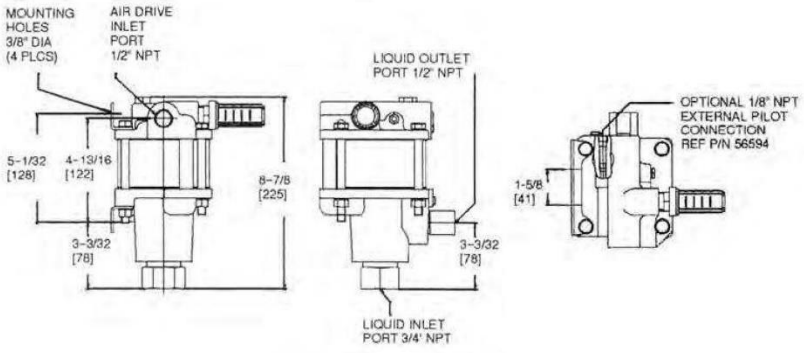


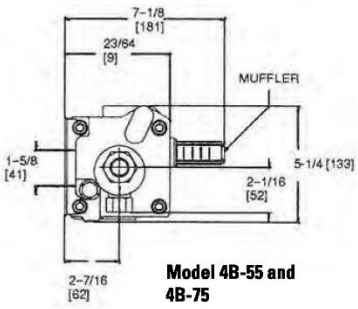

**MDSTV-5 , MDTV**
**Approx weight 15 1/2 lbs (7 kg)**

## .75 hp (.56 kW) Pump Models

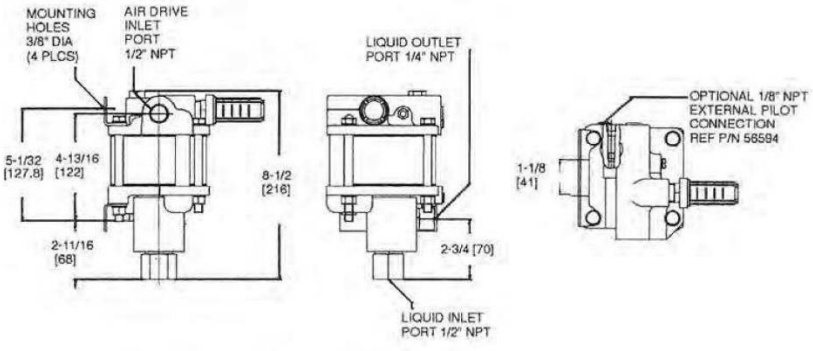



**Model 4B-14, and 4B-30**

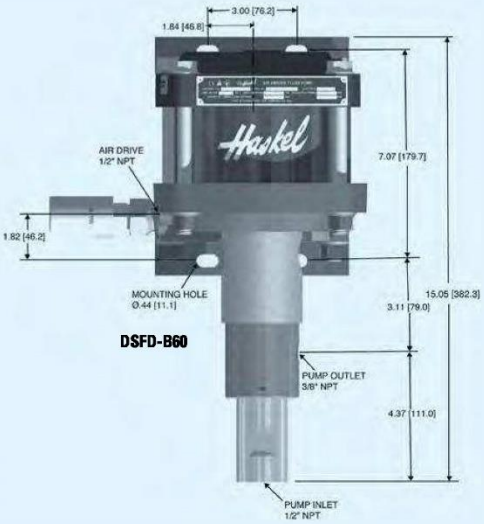


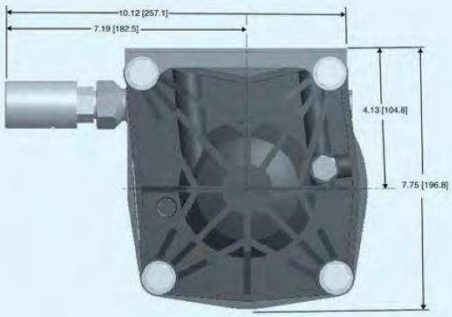

**Model 4B-55 and 4B-75**



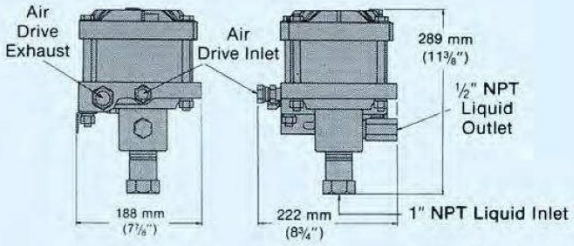
## 1.5 hp, 2 & 2.2 hp (1.12, 1.49 & 1.64 kW) Pump Models




**DSFD-B60**

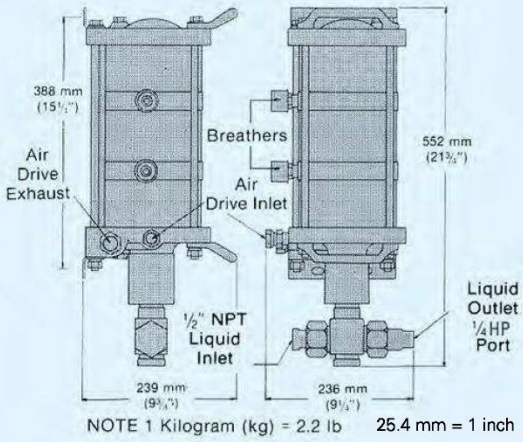



Net weight 10 kg
Boxed weight 11 kg
Box size 37 x 37 x 38 cm




**1.5 and 2 hp low ratio pumps;**
**-B10 and -B15 ratios**

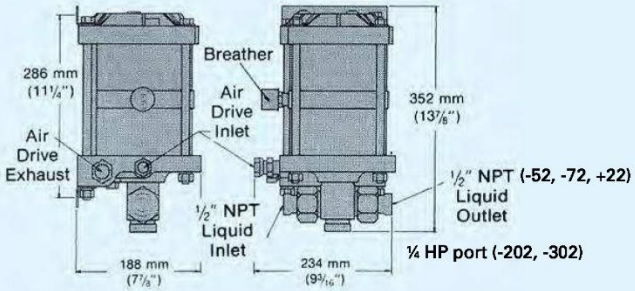
Net weight 18 kg
Boxed weight 20 kg
Box size 68 x 42 x 50 cm



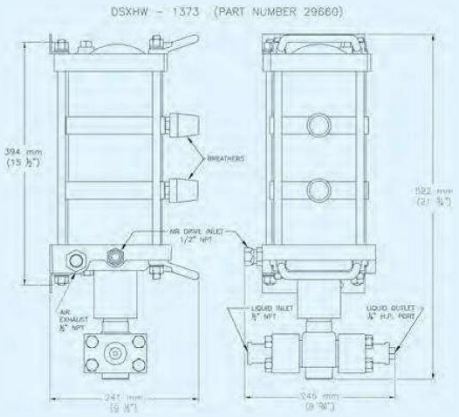

NOTE 1 Kilogram (kg) = 2.2 lb 25.4 mm = 1 inch

**2 hp high ratio pumps;**
**-683 and -903 ratios**

Net weight 14 kg
Boxed weight 15 kg
Box size 52 x 40 x 40 cm

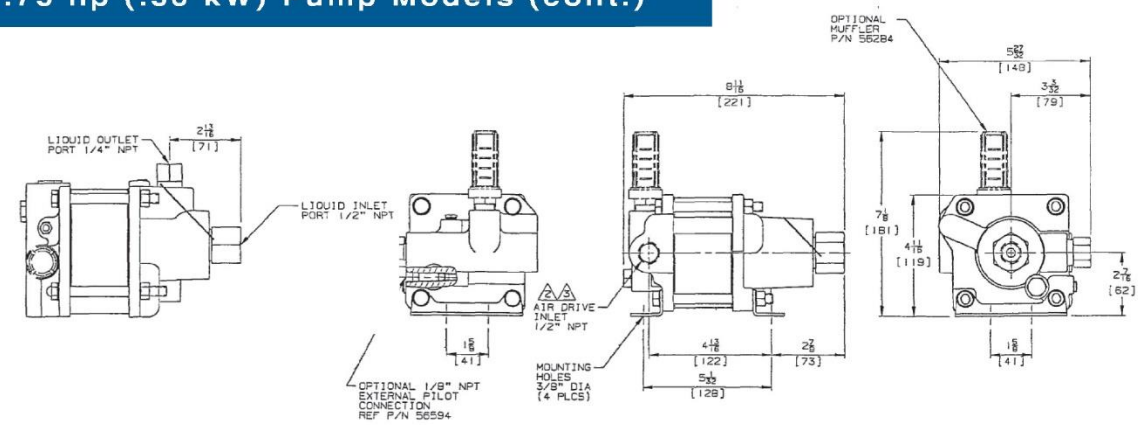



**1.5 and 2 hp medium ratio pumps;**
**-52, -72, -122, -202 and -302 ratios**

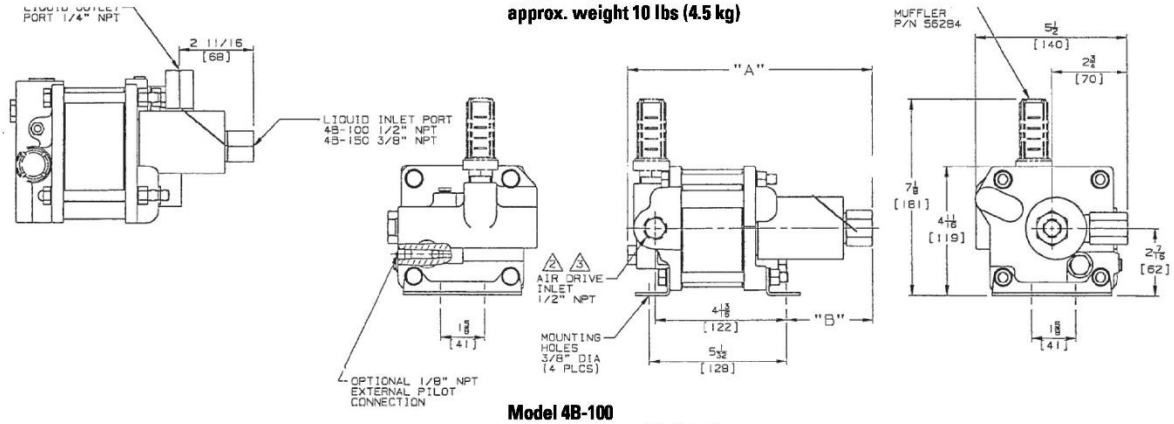



**2 hp (1.49 & 1.64 kW) Pump Models;**
**-1373 ratio**

## .75 hp (.56 kW) Pump Models (cont.)

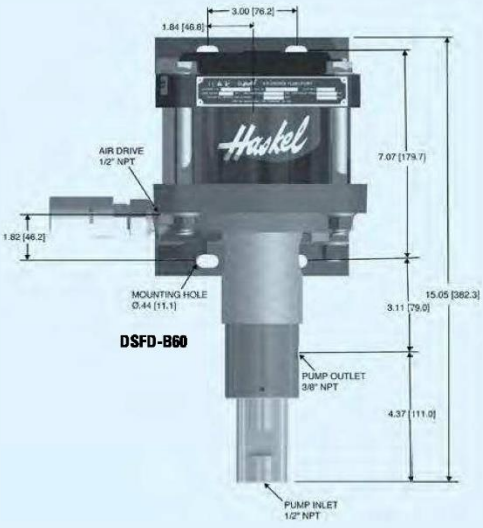



**Model 4B-37**
**approx. weight 10 lbs (4.5 kg)**

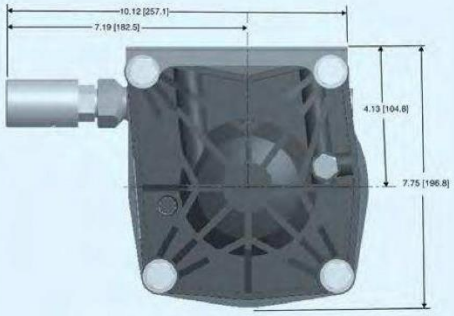



**Model 4B-100**
**approx. weight 11 lbs (5 kg)**

## 1.5 hp, 2&2.2 hp (1.12, 1.49 & 1.64 kW)Pump Models

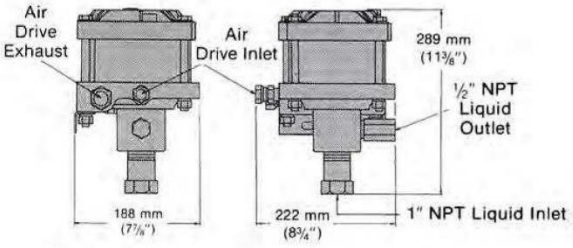



**DSFD-B60**



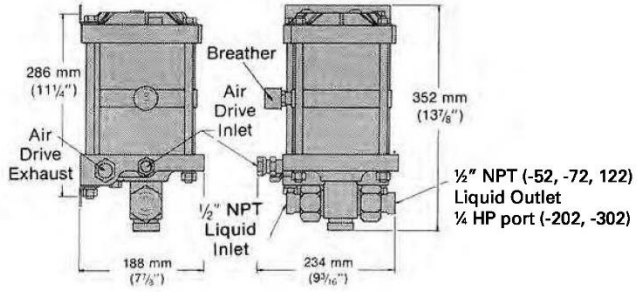
# 1.5 hp, 2&2.2 hp (1.12, 1.49 & 1.64 kW)Pump Models (cont.)

Net weight 10 kg
Boxed weight 11 kg
Box size 37 x 37 x 38 cm



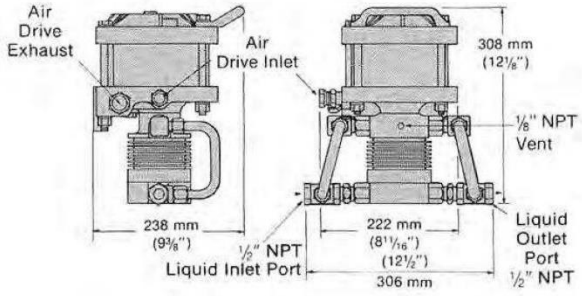

**1.5 and 2 hp low ratio pumps; -B10 and -B15 ratios**

Net weight 14 kg
Boxed weight 15 kg
Box size 52 x 40 x 40 cm




**1.5 and 2 hp medium ratio pumps; -52, -72, -122, -202 and -302 ratios**

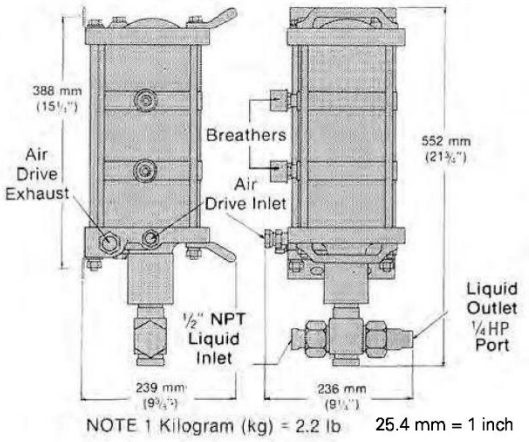
Net weight 10 kg
Boxed weight 11 kg
Box size 45 x 37 x 44 cm




**ATV-4 pumps; double acting, high output**

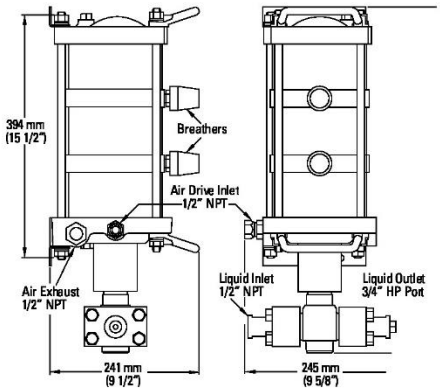
Note: For model DTV-4, add distance piece dimension from page 11.
Interconnecting inlet and outlet port tubing shown.

Net weight 18 kg
Boxed weight 20 kg
Box size 68 x 42 x 50 cm



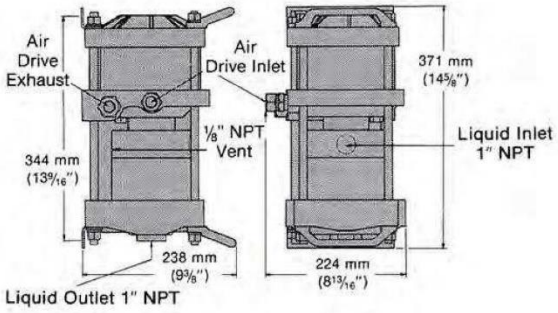

NOTE 1 Kilogram (kg) = 2.2 lb 25.4 mm = 1 inch

**2 hp high ratio pumps; -683 and -903 ratios**

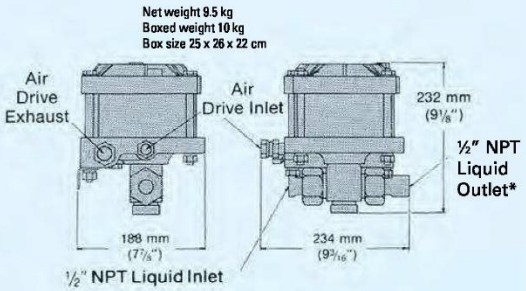



**2 hp (1.49 & 1.64 kW) pump models; -1373 ratio**

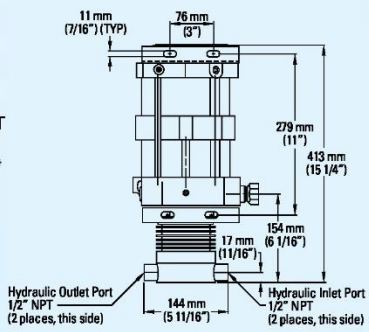
Net weight 18 kg
Boxed weight 19 kg
Box size 45 x 37 x 44 cm

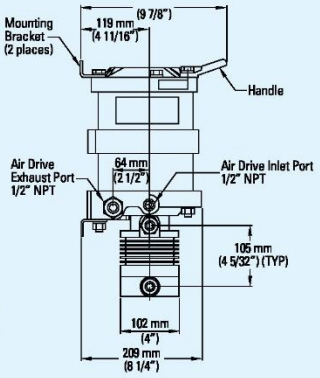



**DSTV-1.5 pump; single acting, high output**

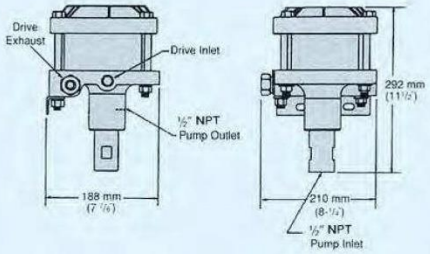



**1.5 and 2 hp medium and high ratios; -25 through -150, -151*, -225*, -300* and -450* ratios**
***¼" Super Pressure Outlet Port**



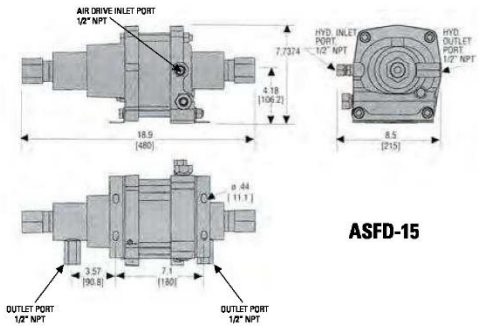




**ATV-8 pumps**

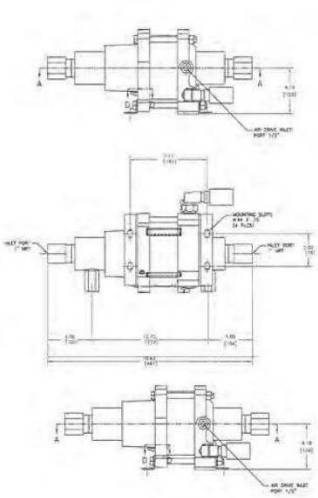



**AFD or ASFD, -B60, -B100 pumps; double acting, high output**

## 3 hp (2.24 kW) Pump Models

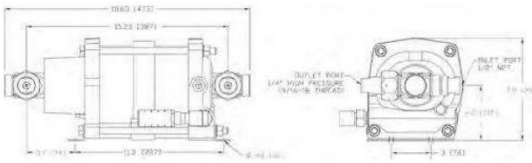



**ASFD-15**




| MODEL | OUTLET PORT | INLET PORT |
|---|---|---|
| ASFD-25 | 1/2" NPT | 1/2" NPT |
| ASFD-35 | | |
| ASFD-60 | | |
| ASFD-100 | 3/8" MEDIUM PRESSURE 9/16-18 THREAD | |
| ASFD-150 | | |

**ASFD-10**

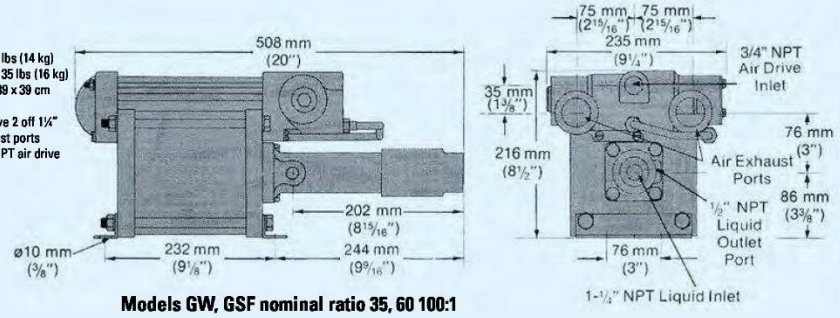


**ASFD-202**

# 6 hp (4.47 kW) Pump Models

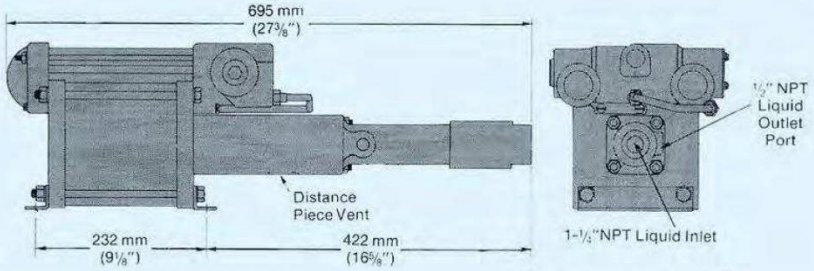
Net weight 31 lbs (14 kg)
Boxed weight 35 lbs (16 kg)
Box size 52 x 39 x 39 cm

All models have 2 off 1¼" NPT air exhaust ports and 1 off ¾" NPT air drive inlet ports.




**Models GW, GSF nominal ratio 35, 60 100:1**

Net weight 41 lbs (18.5 kg)
Boxed weight 48 (22 kg)
Box size 66 x 41 x 49 cm

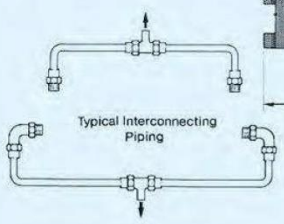


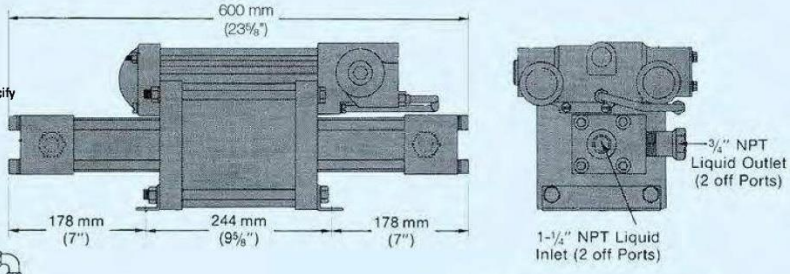

**Models DGSF, DGSTV nominal ratio 35, 60 100:1**

End dimensions as GW/GSF

Net weight 57 lbs (26 kg)
Boxed weight 61 (27 kg)
Box size 66 x 41 x 49 cm

If interconnecting piping for the two inlets and two outlets is required, specify modification 29077 with your order.



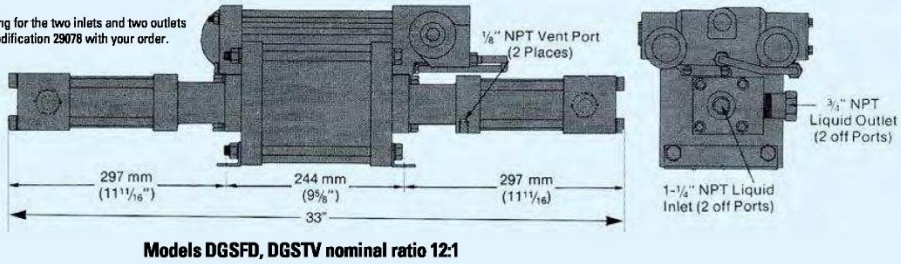




**Models GWD, GSFD nominal ratio 12:1**

End dimensions as GW/GSF

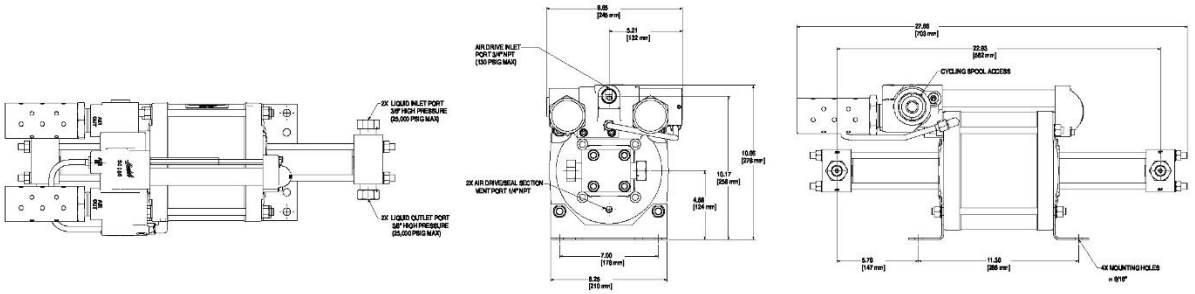
Net weight 66 lbs (30 kg)
Boxed weight 75 lbs (34 kg)
Box size 91 x 51 x 39 cm

If interconnecting piping for the two inlets and two outlets is required, specify modification 29078 with your order.

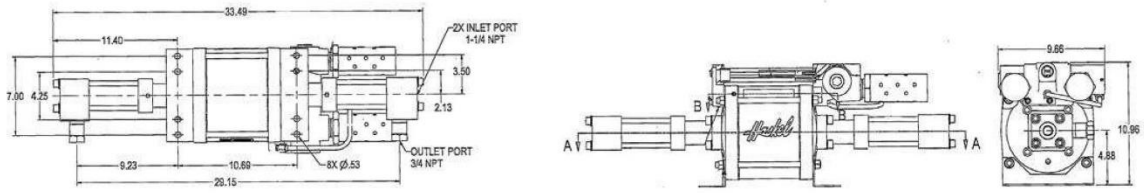



**Models DGSFD, DGSTV nominal ratio 12:1**

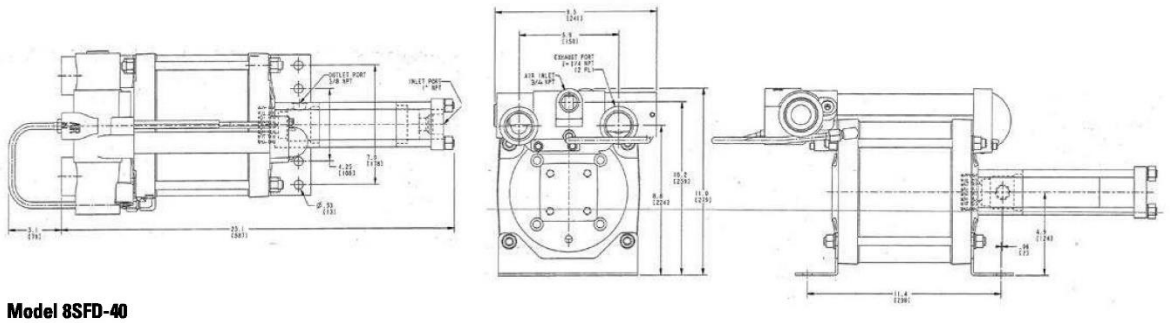
# 8 hp (5.97 kW) Pump Models



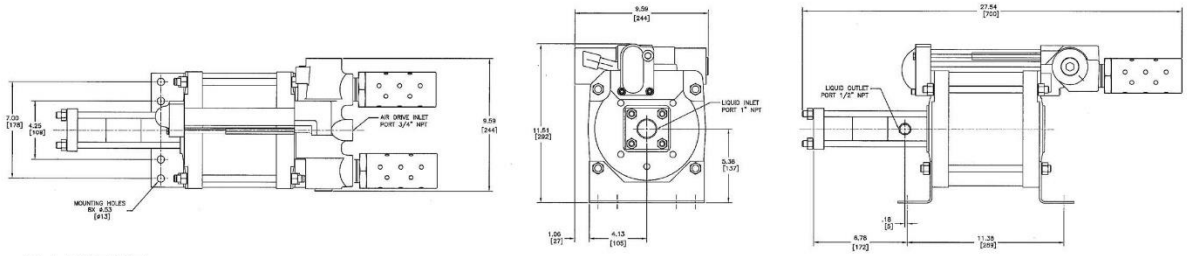
**Model 8HSFD-25**
**Inlet, Outlet ports 3/8" HP**




**Models 8DSFD-25 & 8DSTVD-25**

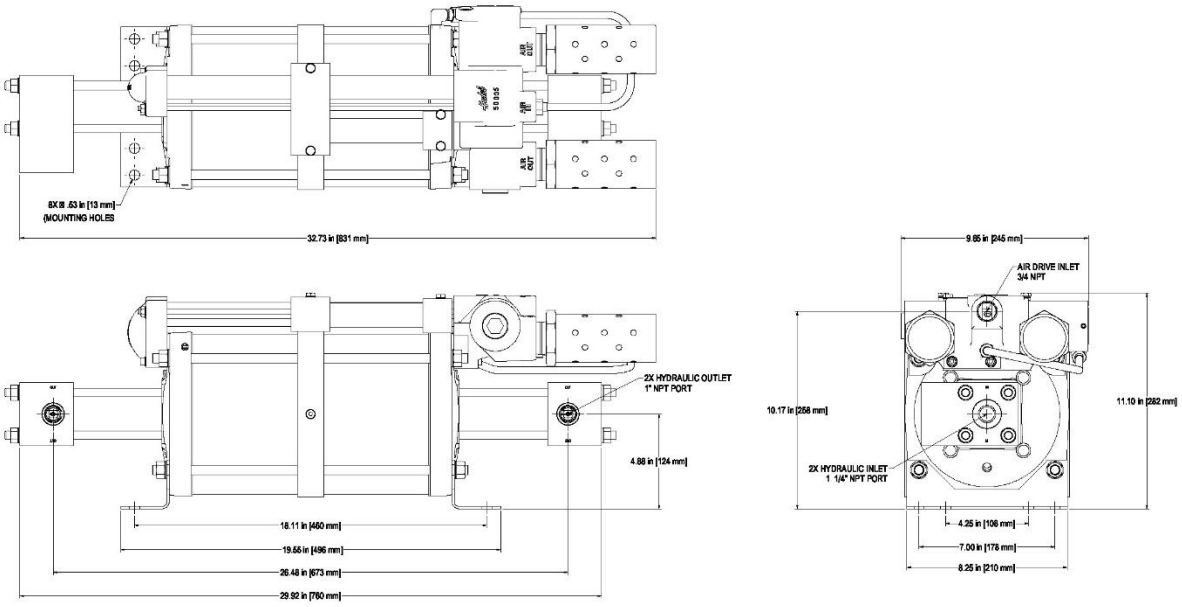


**Model 8SFD-40**

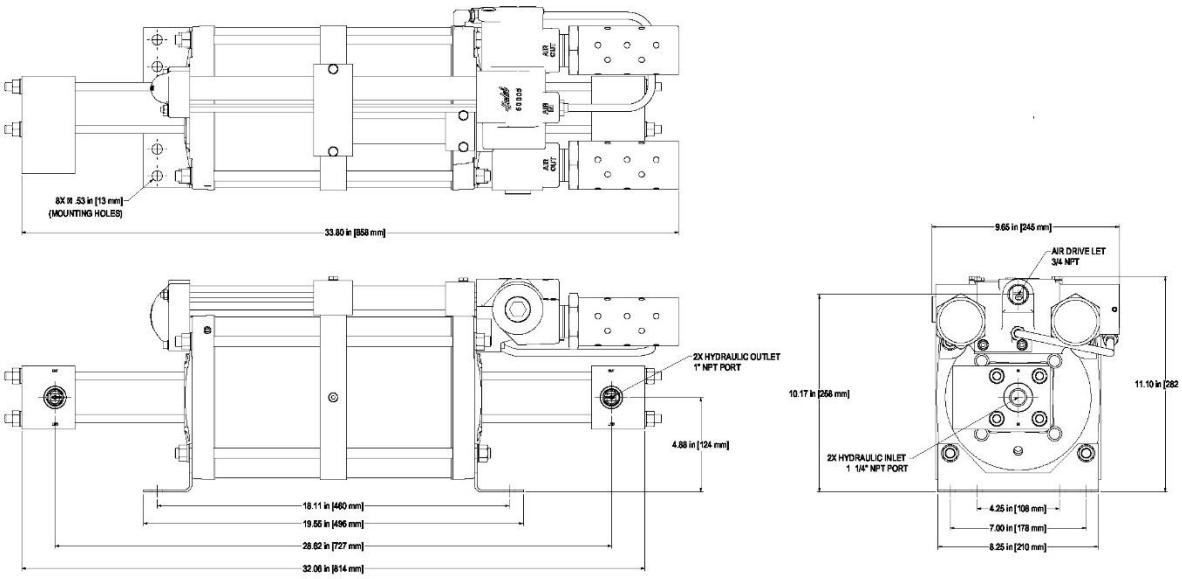


**Model 8SFD-65**

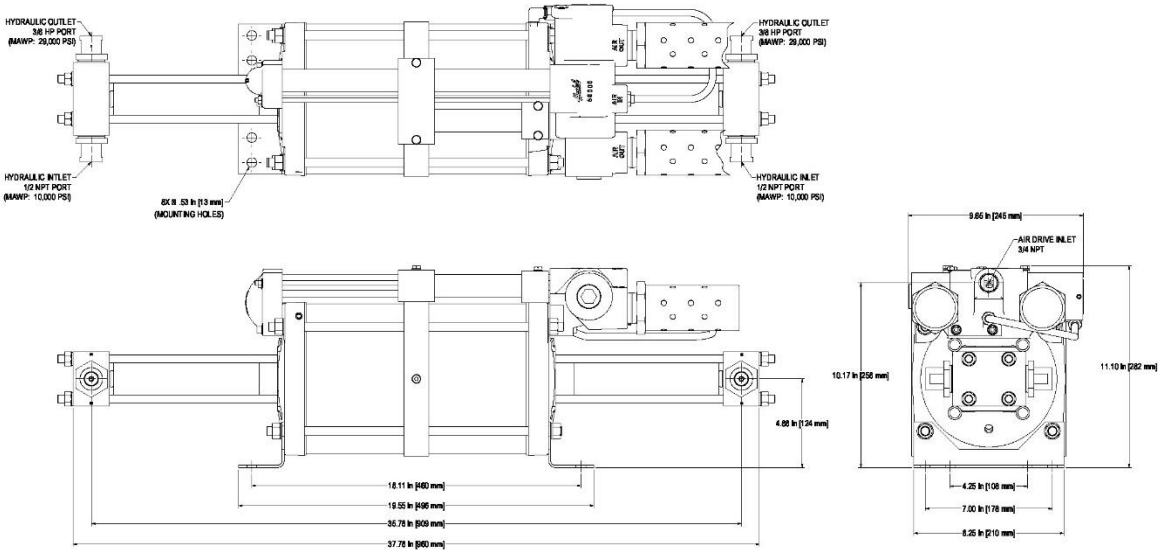
## 8 hp (5.97 kW) Pump Models (cont.)




**Model 8SFD2-55**

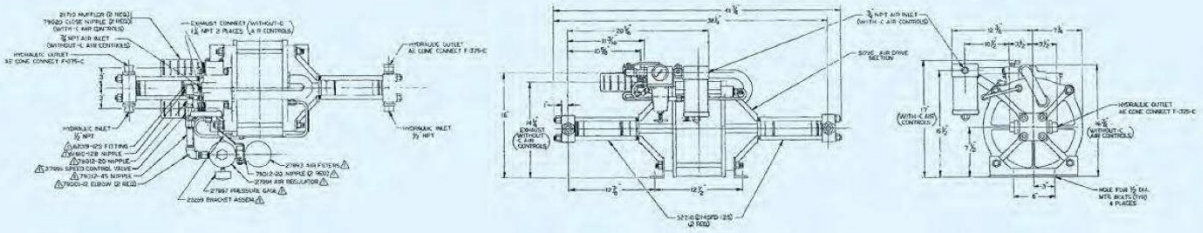



**Model 8SFD2-88**

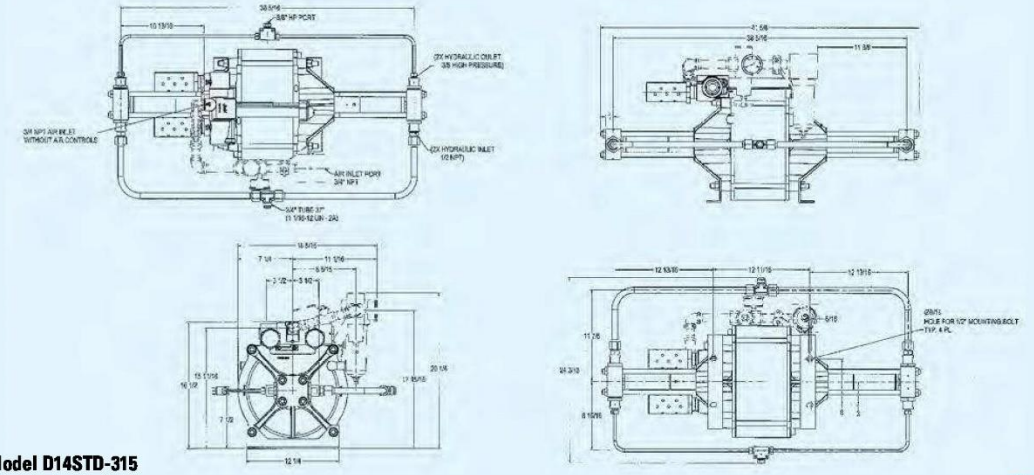



**Model 8SFD2-224**

## 10 hp (7.46 kW) Pump Models



**Model D14STD-125**



**Model D14STD-315**

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# APPENDIX III

# Declaration of Conformity

# DECLARATION of CONFORMITY

**The design, development and manufacture is in accordance with European Community guidelines**

Hydraulic Beadbreaker
14-6878-0110

Relevant provisions complied with by the machinery:
2006/42/EC

Relevant standards complied with by the machinery:
EN ISO 12100-1

Identification of person empowered to sign on behalf of the Manufacturer:

Patrick Finch

Quality Assurance Representative

**Tronair, Inc.**
1 Air Cargo Pkwy East
Swanton, OH 43558

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Email: sales@tronair.com