A Publication of the
National Wildfire Coordinating Group

Sponsored by
United States
Department of Agriculture

United States
Department of the Interior

National Association of
State Foresters

Water Handling Equipment Guide

Prepared by:
NWCG Fire Equipment Working Team

PMS 447-1

October 2003

NFES No.1275

Fifth Edition

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This Interagency *Water Handling Equipment Guide* has been developed and published by the NWCG Fire Equipment Working Team (FEWT). A subcommittee was formed in 1980 and development of this *Guide* was accomplished in 1981 and 1982 with the first, second, third, and the fourth editions being published in June of 1983, 1985, 1988, and 1994 respectively. The NWCG FEWT subcommittee for the fifth edition consisted of:

Ralph Taylor – USDA Forest Service

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Tom Hutchison – USDA Forest Service

Steve Maurer – New Jersey Forest Fire Service

Mark Crow – Florida Division of Forestry

Mark Zavala – USDA Forest Service

Kate Dargan – California Department of Forestry and Fire Protection

John Craney – California Department of Forestry and Fire Protection

Dan McKenzie – USDA Forest Service

Dale Dague – USDA Forest Service (Chairperson)

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Introduction

Through a survey of Federal and State wildland fire fighting agencies, a need was expressed to identify government owned and operated interagency water handling equipment and to disseminate this information to field users. The pictures, performance, and equipment descriptions found within this *Guide* represent the various types of pumps, equipment, and other components found in the fire community and offered by manufacturers. ***It is not meant to indicate sponsorship or validation of any particular manufacturer or product.***

The primary objective of the *Guide* is to provide field users in wildland firefighting agencies with a basic information document on water handling equipment. Within the wildland fire community, every imaginable type of water handling equipment is in use. **This *Guide* does not contain all water handling equipment in use**, but does contain equipment components that are (1) commercially available or economically reproducible, (2) interagency in scope or application, and (3) currently in use. To qualify for being reproducible, there normally has to be the availability of specifications and drawings that have been tested.

The information contained in this latest edition has been completely updated to incorporate recently developed concepts in wildland fire organization, changes in equipment, and deletion of no longer used or available items. Appendixes have been expanded to provide a ready source of technical data and conversion factors required by the practitioner.

Agency-developed systems or components portrayed, but not available from a vendor or manufacturer as a unit, are included to promote standardization among agencies, resulting in reduced equipment costs and increased efficiency and safety.

Users are encouraged to submit new equipment ideas at any time. See appendix J for Mobile Equipment Input Data Sheet. Information submitted will be reviewed for inclusion in the next revision of the *Guide*. (See inside front cover for the address.)

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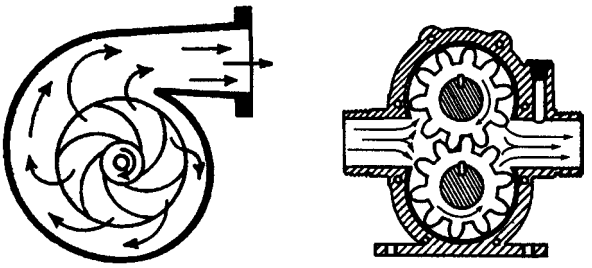
IV. APPENDIXES

I. WATER-PUMPING EQUIPMENT

For the purpose of this *Guide*, water-pumping equipment has been divided into five categories: pumps (a fire pump and power source), fire engines, water tenders, specialized, and plumbing.

A. Pumps

Pumps are either centrifugal or positive displacement; both types are used in wildland firefighting equipment. The centrifugal pumps employ outward force from a center of rotation (known as the eye) to move or discharge water. With these pumps the volume will vary with speed (rpm) and pressure. Centrifugal pumps are usually larger than positive displacement pumps and are employed for higher volumes.



Centrifugal pump Positive displacement pump

Figure 1—Pumps.

Positive displacement pumps move a quantity of water with each stroke or revolution of the piston or impeller. Volume depends primarily upon speed (rpm). To a lesser extent volume may decrease at higher pressures due to reduction in pump efficiency. The rotary gear, vane, cam-and-piston, and rotary piston are typical units. Most are self-priming. Most require relief valves to handle line surges, overloads, and flows not needed at the nozzle. Typical gear pumps have tight tolerances between the rotating parts and the pump housing.

For purposes of this *Guide*, a pump is a combination of a fire pump and a power source. Components normally include engine controls, starter, spark arrester and muffler, pump primer, pressure gauge, fittings, connections, valves, and frame.

Hand pumps are operated by hand in a push-pull action. Water is drawn from a backpack-type tank through a hose connection.

Volume pumps are designed for moving large volumes of water at low pressure to fill engines or water tenders.

Special Considerations

- **The size of the job**—The perimeter to be worked with water, the volume of fuels involved, the size and arrangement of fuel, and the distance from the fire to water source.

- **The fire characteristics**—Smoldering, creeping, running, crowning, and spotting.

- **The number and kind of exposures ahead of the fire**—Involving standing snags, down rotten logs, red slash, structures and improvements, or a stand of timber.

- **The static head, friction loss, and nozzle pressure needed**—All affect pressure requirements.

- **Other factors**—Establish flow (gal/min) and pressure (psi) requirements to meet job expectations.

- **Hearing safety sound level**—Ensures that the pump will comply with Occupational Safety and Health Administration (OSHA) standards. If the pump unit produces more than 90 decibels (dBA) at the operator's ear, a label shall be attached as required by OSHA.

- **Air pollution**—Environmental Protection Agency (EPA) Phase 1 emission standards have been in effect since production model year 1997 and are referenced in 40CFR Parts 9 and 90 of July 3, 1995. Pumps have been developed and are currently available that offer low emissions. Reference *EPA and CARB Emissions Standards To Control Nonroad Exhaust Emissions of Fire Pumps and Chain Saws, 0251 1204–SDTDC, December 2002.*

  The EPA Phase 2 will require more stringent emission standards to further reduce the hydrocarbons plus oxides of nitrogen by an additional 59 percent beyond the current Phase 1 standards. Phase 2 standards are scheduled for phasing in by 2007.

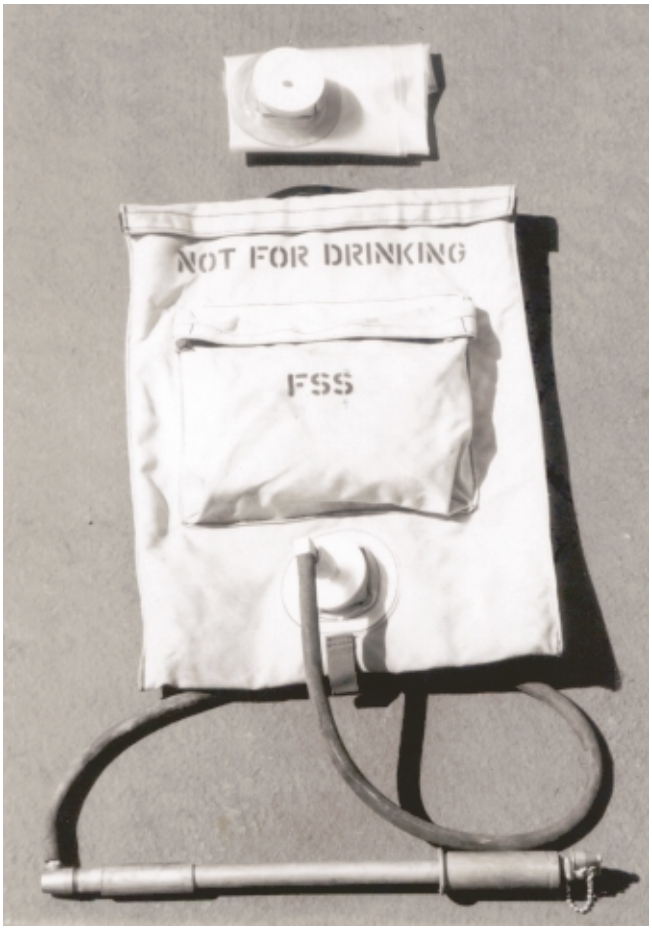
Note: Tampering with a certified engine may reduce the life span and performance of the engine and is against the law and subject to a civil penalty/fine.

Work Assignments
The typical assignments for a wildland fire pump are demanding and require rugged equipment. The following should be taken into consideration during the pump selection process:

- Flow (gal/min) requirements are highly variable; water conservation is important.
- Service is through lightweight, small-diameter hose lines, where friction loss is high.
- Hose lays are often long.
- Hose is often laid up steep slopes, with resulting high static head pressures.
- Water is normally under high static suction lifts from source to pump.
- Engine power will be reduced as altitude increases.
- Temperatures are often high.
- Hours of work are long.
- Long service life is required.
- Weight is an extremely important factor, particularly with portable pumps.
- Available water is often abrasive and corrosive.
- Pump reliability is extremely important.
- Ease of operation and maintenance.
- Performance versus initial investment and repairs.

This section covering pumps is not meant to be all inclusive. The pumps described herein are a representative sampling based on information received during the national input solicitation for the revision of this publication. They are not intended to be an endorsement of any product and may not meet some agency's standards. More information can be obtained directly from the manufacturers listed in appendix G of this publication, or from the General Services Administration Schedule 42 (539) at www.fss.gsa.gov.

1. Hand operated
In many areas of the United States, the backpack pump is a primary fireline tool. These hand-operated pumps are designed to pump water from a backpack tank, which is rigid or collapsible. They are available from various suppliers (see appendix G) and through the *GSA Wildfire Protection Equipment and Supplies Catalog*.



Trombone pump with collapsible bag.

- Pump: Hand operated, push-pull action, single- or double-acting, carried on backpack tank.
- Performance: Variable, depending on operator action (approximately 0.75 gal/min).
- Tank capacity: 4 to 5 gallons


Trombone pump with rigid tank.

- Construction and material:

  Pump: brass, or other noncorrosive materials.

  Tank: galvanized stainless steel, nylon duck with replaceable liner, or polyethylene.

  Hose: rubber, Federal Specification A-A-59567

  Quick-connect fittings: stainless steel, or other noncorrosive materials.

  Straps: nylon, padded carrying straps.
- Written materials: Specifications are available from various suppliers (appendix G) and:

  USDA Forest Service
  Technology and Development Center
  444 East Bonita Avenue
  San Dimas, CA 91773
  Phone: 909–599–1267

2. Mini lightweight portable

These pumps weigh less than 30 pounds and are designed for one person to carry. They are ideal where small, lightweight equipment is desired. They are designed for light-duty initial attack in remote locations by helicopter or smokejumper operations or any other situation where weight and/or space limitations are a consideration.

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Honda**		
Model	**Mini-Striker**	Model	**GXH50**		
Type	**Single-stage centrifugal**	Horsepower	**2.5**	RPM	**7,000**
Priming	**Manual**	Ignition type	**Magneto**		
Inlet size	**1½ inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**15¾**	Width (in)	**10¾**	Fuel pump available	**No**
Length (in)	**15¾**	Dry weight (lb)	**20**		

Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Value

PSI	**0**	**25**	**50**	**75**	**85**
GAL/MIN	**56**	**51**	**32**	**8**	**0**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**No**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

Pump		Engine			
Make	**Mercedes Textiles Ltd.**	Make	**Honda**		
Model	**Wick 80-4H**	Model	**GX31**		
Type	**Single stage, centrifugal**	Horsepower	**1.5**	RPM	**7,000**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size	**1½ inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**11**	Width (in)	**11**	Fuel pump available	**Yes**
Length (in)	**14**	Dry weight (lb)	**17.8**		

Manufacturer

Hydro-Wick Industries Ltd.
287 St. Jean Ouest, East Angus, Quebec, Canada J0B1R0

Pump Performance Values

PSI	**0**	**20**	**30**	**42**	**53**	**60**	**73**
GAL/MIN	**55**	**44**	**38**	**26**	**13**	**7**	**0**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**No**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

WATER PUMPING EQUIPMENT
Pumps—Mini lightweight portable

Pump		Engine			
Make	**Mercedes Textiles Ltd.**	Make	**Honda**		
Model	**Wick 100-4H**	Model	**GXH50**		
Type	**Centrifugal**	Horsepower	**2.5**	RPM	**7,000**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size	**1½ inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**16**	Width (in)	**11**	Fuel pump available	**No**
Length (in)	**14**	Dry weight (lb)	**20.2**		

Manufacturer

Hydro-Wick Industries Ltd.
287 St. Jean Ouest, East Angus, Quebec, Canada J0B1R0

Pump Performance Values

PSI	**0**	**35**	**55**	**77**	**85**	**95 100**
GAL/MIN	**69**	**46**	**33**	**17**	**10**	**4 0**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**No**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

3. Lightweight portable

These pumps weigh from 30 to 60 pounds and are designed to be carried by one to two persons. They are designed for light-duty initial attack or any other situation where weight and/or space limitations are a consideration. Engine, starter, pump, controls, fittings, and other accessories are included as a complete assembly. The fuel tank and fuel hose with primer are sometimes carried separately from the engine and pump.

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Briggs & Stratton**		
Model	**BE-S**	Model	**133437**		
Type	**Positive displacement**	Horsepower	**6**	RPM	**3,600**
Priming	**Self-priming**	Ignition type	**Electronic**		
Inlet size	**1 inch NPSH**	Cylinders	**1**		
Outlet size	**1 inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**14**	Width (in)	**15**	Fuel pump available	**No**
Length (in)	**17½**	Dry weight (lb)	**45**		

Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S1A6

Pump Performance Values

PSI	**50**	**100**	**150**	**200**
GAL/MIN	**11**	**10**	**9**	**8**

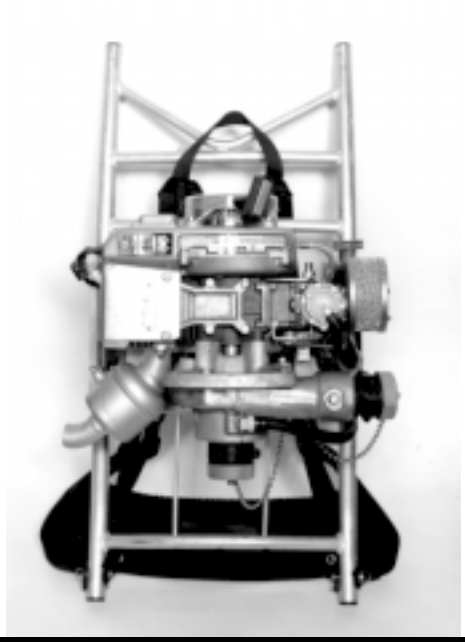
Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Integral**
Cooling method	**Air cooled**	Relief valve	**Optional**
Starting system	**Electric w/backup recoil**	Backpack & straps	**No**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

WATER PUMPING EQUIPMENT
Pumps—Lightweight portable

Pump		Engine			
Make	**Hale Products**	Make	**US Motor Power**		
Model	**20FP-C8P Fyr-Pak**	Model	**Power Bee**		
Type	**Centrifugal**	Horsepower	**8**	RPM	**7,000**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size	**1½ inch NST**	Cylinders	**1**		
Outlet size	**1½ inch NST**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**13**	Width (in)	**16½**	Fuel pump available	**Yes**
Length (in)	**32**	Dry weight (lb)	**34**		



Manufacturer

Hale Products
700 Spring Mill Avenue, Conshohocken, PA 19428

Pump Performance Values

PSI	**40**	**140**	**205**
GAL/MIN	**70**	**40**	**10**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable Handles	**N/A**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**Yes**
2- or 4-stroke cycle	**2 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**N/A**		

Pump		Engine			
Make	**Hale Products**	Make	**US Motor Power**		
Model	**20 FP-C8FR Fyr-Port**	Model	**Power Bee**		
Type	**Centrifugal**	Horsepower	**8**	RPM	**7,000**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size	**1½ inch NST**	Cylinders	**1**		
Outlet size	**1½ inch NST**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**19½**	Width (in)	**16**	Fuel pump	**Yes**
Length (in)	**17½**	Dry weight (lb)	**50**[1]		

Manufacturer

Hale Products
700 Spring Mill Avenue, Conshohocken, PA 19428

Pump Performance Values

PSI	**10**	**100**	**175**
GAL/MIN	**70**	**45**	**10**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

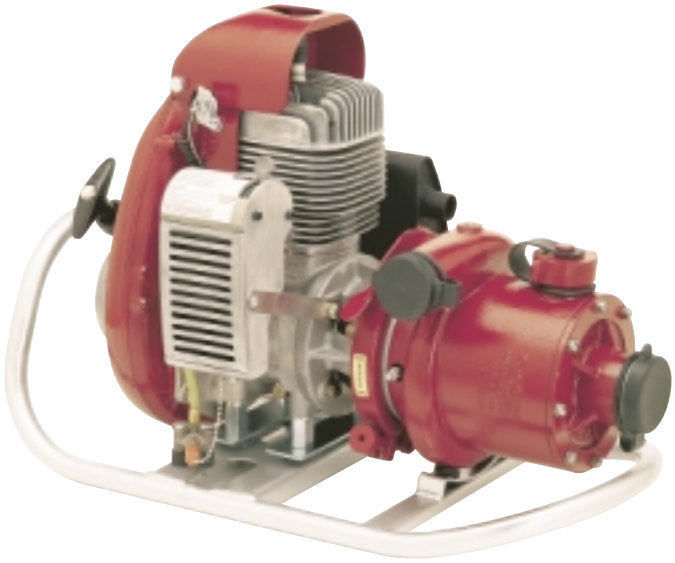
USDA qualification code	**N/A**	Integral or removable base	**Integral**
Cooling Method	**Air cooled**	Integral or removable handles	**Removable**
Starting System	**Recoil**	Relief valve	**No**
2- or 4-stroke cycle	**2 stroke**	Backpack & straps	**No**
Pressure gauge	**No**	Special accessories or tools	**None**

Remarks

[1] Wraparound frame shown. Skid mounted option (20FP-C8SK) also available at 35 pounds.

WATER PUMPING EQUIPMENT
Pumps —Lightweight portable

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Rotax**		
Model	**Mark 3**	Model	**185 cc**		
Type	**4-stage, centrifugal**	Horsepower	**10**	RPM	**5,000**
Priming	**Manual**	Ignition type	**Magneto**		
Inlet size	**2 inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**16¼**	Width (in)	**12**	Fuel pump available	**No**
Length (in)	**23**	Dry weight (lb)	**55**		



Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

PSI	**50**	**75**	**100**	**150**	**200**	**250**	**300**	**350**	**380**
GAL/MIN	**89**	**83**	**78**	**65**	**52**	**38**	**25**	**9**	**0**

Hearing safety sound level **Warning label required**

Description

USDA qualification code	**2-C-60-200/35**	Integral or removable handles	**No**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil w/ backup Manual**	Backpack & straps	**Optional**
2-or 4-stroke cycle	**2 stroke**	Special accessories or tools	**Spark plug wrench, grease gun included**
Pressure gauge	**Optional**		
Integral or removable base	**No**		

Remarks
Forest Service—USDA qualified: July 25, 2001
Meets Forest Service—USDA Specification 5100-274

Pump		Engine			
Make	**Mercedes Textiles Ltd.**	Make	**Solo**		
Model	**Wick-375**	Model	**210**		
Type	**Centrifugal**	Horsepower	**10**	RPM	**5,700**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size	**2 inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**14½**	Width (in)	**14¼**	Fuel pump available	**Yes**
Length (in)	**22¾**	Dry weight (lb)	**53.5**		

Manufacturer

Hydro-Wick Industries Ltd.
287 St. Jean Ouest, East Angus, Quebec, Canada J0B1R0

Pump Performance Values

PSI	**0**	**110**	**180**	**260**	**360**
GAL/MIN	**90**	**77**	**56**	**29**	**0**

Hearing safety sound level **Warning label required**

Description

USDA qualification code	**N/A**	Handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil w/ backup manual**	Backpack & straps	**Optional**
2- or 4-stroke cycle	**2 stroke**	Special accessories or tools	**Quick-connect fuel line**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

4. Heavy portable
These pumps are heavier than 60 pounds; mounting and carrying frames may be included, depending on the purpose. Engine, electric or rope starter, fuel tank, pump, controls, fittings, and other accessories are included as a complete assembly.

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Briggs & Stratton**		
Model	**BB-4**	Model	**I/C**		
Type	**4-stage, Centrifugal**	Horsepower	**18**	RPM	**4,000**
Priming	**Exhaust**	Ignition type	**Electronic**		
Inlet size	**2 inch NPSH**	Cylinders	**2**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**19**	Width (in)	**19**	Fuel pump available	**Yes**
Length (in)	**34**	Dry weight (lb)	**143**		

Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

PSI	50	100	150	200	250	300	350	400
GAL/MIN	**105**	**98**	**85**	**78**	**66**	**53**	**40**	**14**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA Qualification Code	**C-175-15/60**[1]	Integral or removable handles	**Integral**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**Dual-circuit alternator, pump seal**
Pressure gauge	**Optional**		
Integral or removable base	**Integral**		

Remarks
Forest Service—USDA qualified: August 8, 1994 Meets Forest Service—USDA specification 5100-273
[1] Alternate coding: C-175-25/40, C-175-20/50

Pump		Engine			
Make	**Berkeley Pumps**	Make	**Robin**		
Model	**B1½XQBS-18**	Model	**EH63**		
Type	**Centrifugal**	Horsepower	**18**	RPM	**3,600**
Priming	**None**	Ignition type	**Electronic**		
Inlet size	**2 inch NPT**	Cylinders	**2**		
Outlet size	**1½ inch**	Fuel used	**Gasoline**		
Height (in)	**26**	Width (in)	**17**	Fuel pump available	**Yes**
Length (in)	**24¼**	Dry weight (lb)	**250**		

Manufacturer

Sta-Rite Industries
1215 South Adams Street, Grand Island, NE 68801

Pump Performance Values

PSI	**180**	**200**	**250**	**280**
GAL/MIN	**90**	**69**	**43**	**31**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**No**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

WATER PUMPING EQUIPMENT
Pumps —Heavy portable

Pump		Engine			
Make	**Hale Products**	Make	**Briggs & Stratton Vanguard**		
Model	**HP100**	Model	**3504000 Series**		
Type	**Centrifugal**	Horsepower	**18**	RPM	**3,600**
Priming	**Exhaust Venturi**	Ignition type	**Electronic**		
Inlet Size (in)	**2 inch NPT**	Fuel	**Gasoline**		
Outlet Size (in)	**2 inch NPT**	Fuel pump	**Yes**		
Height (in)	**22⅞**	Width (in)	**19⅝**	Cylinders	**2**
Length (in)	**35½**	Dry weight (lb)	**185**		

Manufacturer

Hale Products
700 Spring Mill Avenue, Conshohocken, PA 19428

Pump Performance Values

PSI	**50**	**150**	**200**	**275**
GAL/MIN	**155**	**100**	**65**	**15**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Integral**
Cooling method	**Air cooled**	Relief valve	**Yes**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special accessories or tools	**None**
Pressure gauge	**Yes**		
Integral or removable base	**Integral**		

Pump		Engine			
Make	**Hale Products**	Make	**Briggs & Stratton Vanguard**		
Model	**HP400**	Model	**3504000 Series**		
Type	**Centrifugal**	Horsepower	**18**	RPM	**3,600**
Priming	**Exhaust**	Ignition type	**Electronic**		
Inlet size	**3 inch NPT**	Cylinders	**2**		
Outlet size	**4-inch Victaulic**	Fuel used	**Gasoline**		
Height (in)	**22⅝**	Width (in)	**19⅝**	Fuel pump available	**Yes**
Length (in)	**25⅜**	Dry weight (lb)	**184**		

Manufacturer

Hale Products
700 Spring Mill Avenue, Conshohocken, PA 19428

Pump Performance Values

PSI	**25**	**50**	**75**	**100**
GAL/MIN	**500**	**320**	**210**	**95**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Integral**
Cooling Method	**Air cooled**	Relief Valve	**Yes**
Starting System	**Electric w/backup recoil**	Backpack & Straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special accessories or tools	**None**
Pressure gauge	**Yes**		
Integral or removable base	**Integral**		

WATER PUMPING EQUIPMENT
Pumps —Heavy portable

Pump		Engine			
Make	**MalloryCo**	Make	**Honda**		
Model	**M88**	Model	**GX270K1QAE2**		
Type	**Positive displacement**	Horsepower	**9**	RPM	**3,600**
Priming	**Self-priming**	Ignition type	**Electronic**		
Inlet size	**1½ inch NPT**	Cylinders	**1**		
Outlet size	**1½ inch NPT**	Fuel used	**Gasoline**		
Height (in)	**22**	Width (in)	**18**	Fuel pump available	**No**
Length (in)	**27**	Dry weight (lb)	**135**		

Manufacturer

MalloryCo
1040 Industrial Way, Longview, WA 98632

Pump Performance Values

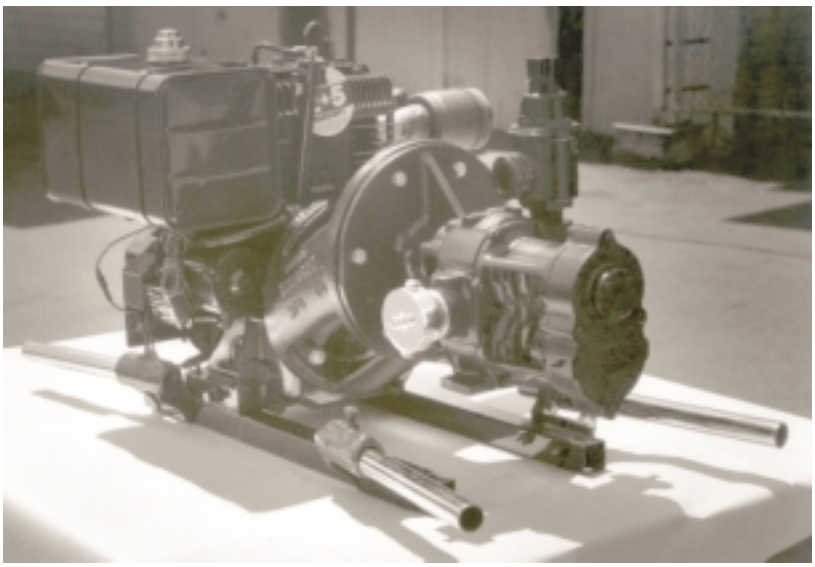
PSI	**50**	**100**	**150**
GAL/MIN	**50**	**40**	**25**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Optional**
Cooling method	**Air cooled**	Relief valve	**Optional**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**Spark plug wrench**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

Pump		Engine			
Make	**Edwards Manufacturing Inc.**	Make	**Briggs & Stratton**		
Model	**TSD-25**	Model	**256427**		
Type	**Positive displacement**	Horsepower	**11**	RPM	**3,000**
Priming	**Self-priming**	Ignition type	**Magneto**		
Inlet size	**1½ inch NPT**	Cylinders	**1**		
Outlet size	**1½ inch NPT**	Fuel used	**Gasoline**		
Height (in)	**18**	Width (in)	**18**	Fuel pump available	**No**
Length (in)	**30**	Dry weight (lb)	**122**		



Manufacturer

Edwards Manufacturing Inc.
2441 SE Stubb Street, Milwaukie, OR 97222

Pump Performance Values

PSI	**100**	**150**	**200**	**250**
GAL/MIN	**40**	**38**	**36**	**34**

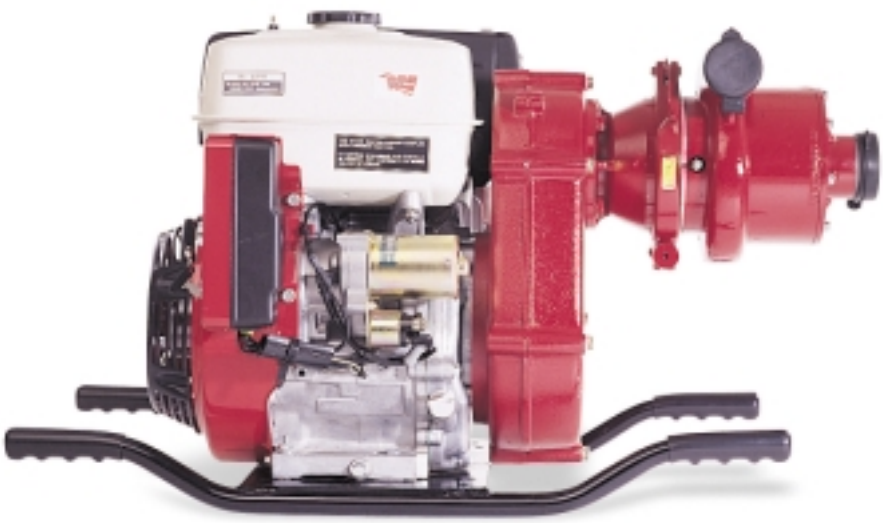
Hearing Safety sound Level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**Yes**
Starting system	**Manual**	Backpack & straps	**N/A**
2- or 4- stroke cycle	**4 stroke**	Special tools or accessories	**Packing adjusting wrench**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

WATER PUMPING EQUIPMENT
Pumps —Heavy portable

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Honda**		
Model	**Ultra-Striker**	Model	**GX390K1**		
Type	**3-stage, centrifugal**	Horsepower	**13**	RPM	**3,600**
Priming	**Exhaust**	Ignition type	**Magneto**		
Inlet size	**2 inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**19**	Width (in)	**17**	Fuel pump available	**No**
Length (in)	**29**	Dry weight (lb)	**126**		



Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

PSI	**5**	**120**	**150**	**190**	**225**	**265**	**315**	**335**
GAL/MIN	**102.3**	**84.2**	**71.9**	**60.3**	**46.3**	**32.7**	**6.7**	**0**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA Qualification Code	**N/A**	Integral or removable handles	**Integral**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**Yes**		
Integral or removable base	**Removable**		

5. Floatable
These pumps float and can be carried by one person. A complete assembly includes an engine, fuel tank, rope starter, pump, controls, fittings, floating collar, strainer, and other accessories.

Pump		Engine			
Make	**W. S. Darley & Co.**	Make	**Briggs & Stratton**		
Model	**Dolphin HEF12BS**	Model	**I/C**		
Type	**Centrifugal**	Horsepower	**12**	RPM	**3,600**
Priming	**Self-priming**	Ignition type	**Magneto**		
Inlet size	**6-inch smooth bore**	Cylinders	**1**		
Outlet size	**2½ inch NST**	Fuel used	**Gasoline**		
Height (in)	**20**	Width (in)	**30**	Fuel pump available	**No**
Length (in)	**32½**	Dry weight (lb)	**120**		

Manufacturer

W.S. Darley & Co.
200 East Walnut Street, Chippewa Falls, WI 54729

Pump Performance Values

PSI	**20**	**45**	**50**	**65**
GAL/MIN	**405**	**250**	**200**	**100**

Hearing safety sound level **102 dBA at full throttle (Warning label required)**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Integral**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**N/A**		

Pump		Engine			
Make	**Waterous Company**	Make	**U. S. Motor Power**		
Model	**Floto-Pump**	Model	**Power Bee 82029**		
Type	**Centrifugal**	Horsepower	**8**	RPM	**6,250**
Priming	**Self-priming**	Ignition type	**Magneto**		
Inlet size	**N/A**	Cylinders	**1**		
Outlet size	**1½ inch NH**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**16**	Width (in)	**20**	Fuel pump available	**No**
Length (in)	**28**	Dry weight (lb)	**42**		

Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075–2456

Pump Performance Values[1]

PSI	**35**	**75**	**105**	**130**	**150**	**170**
GAL/MIN	**60**	**50**	**40**	**30**	**20**	**10**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**N/A**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**2 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**N/A**		

Remarks

[1] Values are for high-pressure model.

Pump		Engine			
Make	**Hale Products**	Make	**US Motor Power**		
Model	**20FB-C8 Fyr Flote**	Model	**Power Bee**		
Type	**Centrifugal**	Horsepower	**8**	RPM	**7,000**
Priming	**Self-priming**	Ignition type	**Electronic**		
Inlet size	**2 inch nonthreaded**	Cylinders	**1**		
Outlet size	**1½ inch NST**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**16**	Width (in)	**20**	Fuel pump available	**Yes**
Length (in)	**28¼**	Dry weight (lb)	**49**		

Manufacturer

Hale Products
700 Spring Mill Avenue, Conshohocken, PA 19428

Pump Performance Values

PSI	**0**	**90**	**170**
GAL/MIN	**140**	**50**	**10**

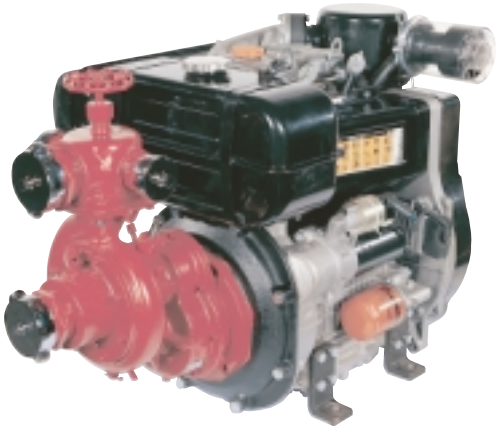
Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**No**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**No**
2- or 4-stroke cycle	**2 stroke**	Special tools or accessories	**None**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

6. Mountable
These pumps are normally mounted on wildland fire equipment and vary in weight between 140 and 360 pounds. Engine, electric or rope starter, fuel tank, pump, controls, and other accessories are included as a complete assembly.

Pump		Engine			
Make	**W. S. Darley & Co.**	Make	**Lombardini**		
Model	**1½ AGE 21LD**	Model	**PLD-560-2**		
Type	**Centrifugal**	Horsepower	**26**	RPM	**2,600**
Priming	**Manual**	Ignition type	**Compression**		
Inlet size	**2 inch NPT**	Cylinders	**2**		
Outlet size	**2 ea. 1½ inch NPT**	Fuel used	**Diesel**		
Height (in)	**22¾**	Width (in)	**24½**	Fuel pump available	**Yes**
Length (in)	**35½**	Dry weight (lb)	**187**		



Manufacturer

W. S. Darley & Co.
200 East Walnut Street, Chippewa Falls, WI 54729

Pump Performance Values

PSI	**120**	**195**	**235**
GAL/MIN	**180**	**120**	**60**

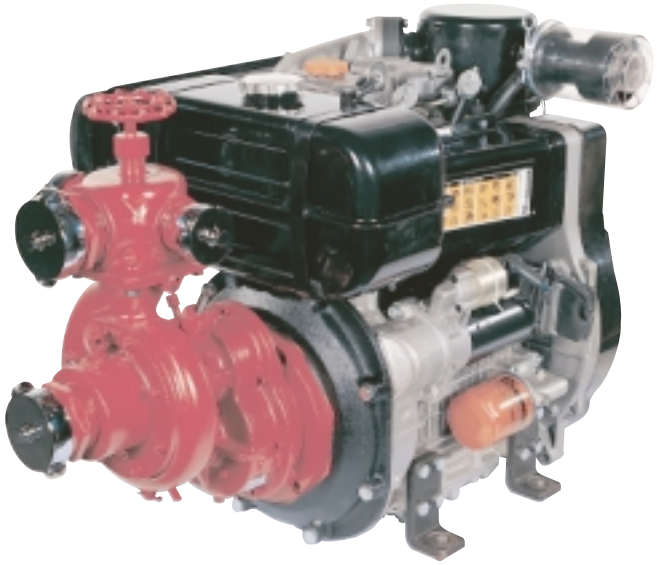
Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable base	**Integral**
Cooling method	**Air cooled**	Integral or removable handles	**N/A**
Starting system	**Electric**	Relief valve	**No**
2- or 4-stroke cycle	**4 stroke**	Backpack & straps	**N/A**
Pressure gauge	**Optional**	Special tools or accessories	**No**

Remarks
The Darley 1½ AGE is also available with a diesel 26 HP Briggs & Stratton water-cooled engine or a gasoline 18 HP Briggs & Stratton Air cooled engine. Weight and performance will vary with each combination.

Pump		Engine			
Make	**W. S. Darley & Co.**	Make	**Lombardini**		
Model	**2½ AGE 26LD**	Model	**N/A**		
Type	**Centrifugal**	Horsepower	**26**	RPM	**2,600**
Priming	**Manual**	Ignition type	**Compression**		
Inlet size	**2½ inch NPT**	Cylinders	**2**		
Outlet size	**2 ea.1½ inch and, 1 ea. 2½ inch NPT**	Fuel used	**Diesel**		
		Width (in)	**24**	Fuel pump available	**Yes**
Height (in)	**24**	Dry weight (lb)	**330**		
Length (in)	**34**				



Manufacturer

W. S. Darley & Co.
200 East Walnut Street, Chippewa Falls, WI 54729

Pump Performance Values

PSI	**80**	**125**	**180**	**190**
GAL/MIN	**300**	**200**	**100**	**50**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable base	**Integral**
Cooling method	**Air cooled**	Integral or removable handles	**N/A**
Starting system	**Electric**	Relief valve	**No**
2- or 4-stroke cycle	**4 stroke**	Backpack & straps	**N/A**
Pressure gauge	**Optional**	Special tools or accessories	**No**

Remarks
The Darley 2½ AGE is also available with a gasoline 31 HP Briggs & Stratton Vanguard water-cooled engine or a gasoline 24 HP Onan air-cooled engine. Weight and performance will vary with each combination.

WATER PUMPING EQUIPMENT
Pumps—Mountable

Pump		Engine			
Make	**Robwen**	Make	**Briggs & Stratton**		
Model	**180**	Model	**Vanguard**		
Type	**Centrifugal**	Horsepower	**18**	RPM	**7,200**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size	**2 inch NPT**	Cylinders	**2**		
Outlet size	**1½ inch NPT**	Fuel used	**Gasoline**		
Height (in)	**21**	Width (in)	**24**	Fuel pump available	**No**
Length (in)	**25**	Dry weight (lb)	**224**		

Manufacturer

Robwen Inc.
1989 Blake Avenue, Los Angeles, CA 90039

Pump Performance Values

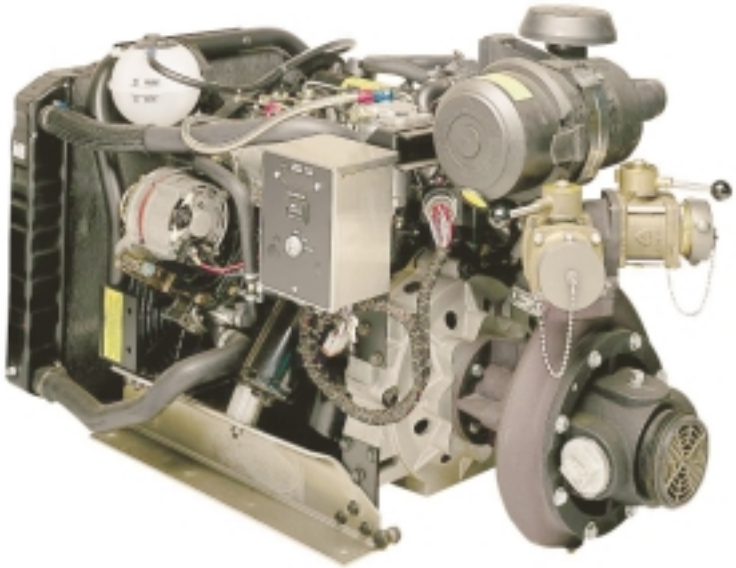
PSI	**100**	**130**	**190**	**235**	**250**	**250**
GAL/MIN	**110**	**100**	**70**	**50**	**20**	**10**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**N/A**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Electric w/backup recoil**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

Pump		Engine			
Make	**Waterous**	Make	**Volkswagen**		
Model	**E200-A**	Model	**ADG**		
Type	**Centrifugal**	Horsepower	**57**	RPM	**4,000**
Priming	**Electric or manual (optional)**	Ignition type	**Compression**		
Inlet size	**4 inch NH**	Cylinders	**4**		
Outlet size	**2 ea. 2½ inch**[1]	Fuel used	**Diesel**		
Height (in)	**28**	Width (in)	**25**	Fuel pump available	**Yes**
Length (in)	**47**	Dry weight (lb)	**570**		



Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075–2456

Pump Performance Values

PSI	**60**	**200**	**210**
GAL/MIN	**650**	**250**	**0**

Hearing safety sound level **95 to 97 dBA (Warning label required)**

Description

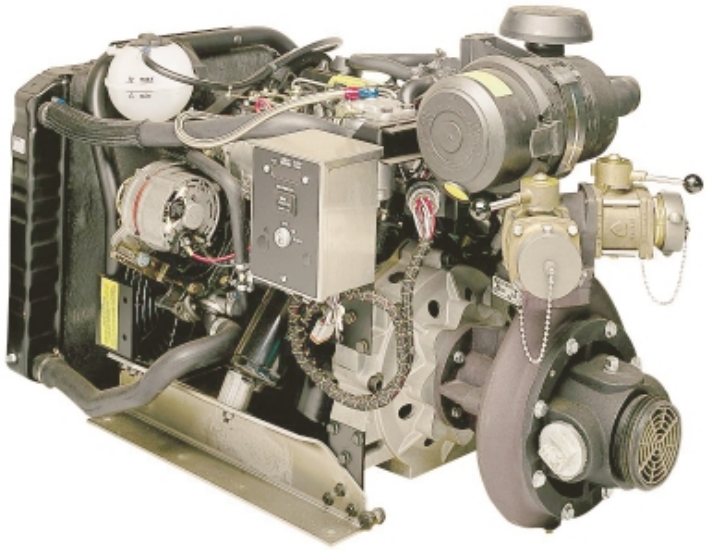
USDA Qualification Code	**N/A**	Integral or removable base	**Removable**
Cooling method	**Water cooled**	Integral or removable handles	**N/A**
Starting system	**Electric**	Relief valve	**Optional**
2- or 4-stroke cycle	**4 stroke**	Backpack & straps	**N/A**
Pressure gauge	**No**	Special tools or accessories	**No**

Remarks

[1] Five discharge combinations are available. See Waterous Company for details.

WATER PUMPING EQUIPMENT
Pumps—Mountable

Pump		Engine			
Make	**Waterous**	Make	**Volkswagen**		
Model	**E200-B**	Model	**ADF**		
Type	**Centrifugal**	Horsepower	**67**	RPM	**4,000**
Priming	**Electric or manual (optional)**	Ignition type	**Electronic**		
Inlet size	**4 inch NH**	Cylinders	**4**		
Outlet size	**2 ea. 2½ inch**[1]	Fuel used	**Gasoline**		
Height (in)	**30½**	Width (in)	**31½**	Fuel pump available	**Yes**
Length (in)	**47**	Dry weight (lb)	**570**		



Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075–2456

Pump Performance Values

PSI	**88**	**160**	**210**
GAL/MIN	**600**	**400**	**200**

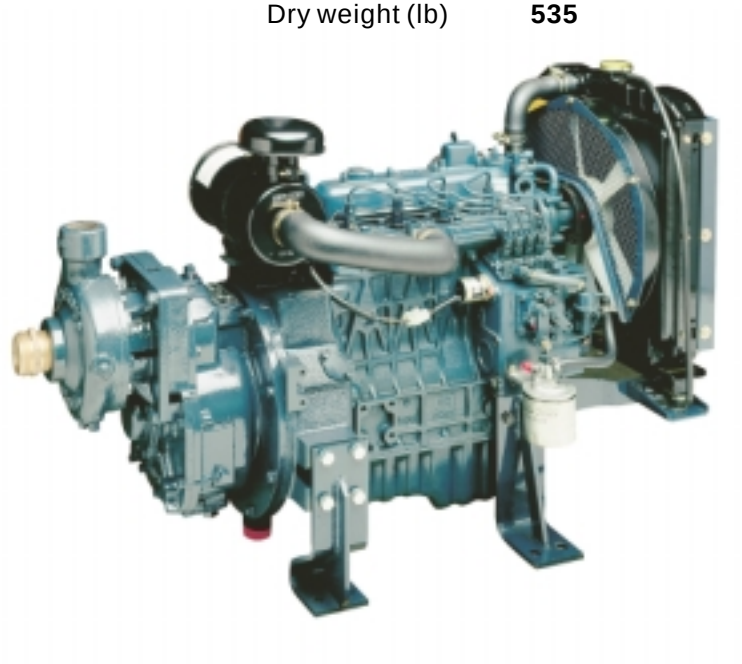
Hearing safety sound level **95 to 97 dBA (Warning label required)**

Description

USDA Qualification Code	**N/A**	Integral or removable base	**Removable**
Cooling method	**Water cooled**	Integral or removable handles	**N/A**
Starting system	**Electric**	Relief valve	**Optional**
2- or 4-stroke cycle	**4 stroke**	Backpack & straps	**N/A**
Pressure gauge	**No**	Special tools or accessories	**None**

Remarks
[1] Five discharge combinations are available. See Waterous Company for details.

Pump		Engine			
Make	**Waterous**	Make	**Kubota**		
Model	**E301-A**	Model	**V1305E-2**		
Type	**Centrifugal**	Horsepower	**30**	RPM	**3,000**
Priming	**Manual**	Ignition type	**Compression**		
Inlet size	**2 inch NPT**	Fuel used	**Diesel**		
Outlet size	**1½ inch NPT**	Fuel pump available	**Yes**		
Height (in)	**42½**	Width (in)	**23**	Cylinders	**2**
Length (in)	**42**	Dry weight (lb)	**535**		



Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075–2456

Pump Performance Values

PSI	**100**	**230**	**330**
GAL/MIN	**170**	**100**	**50**

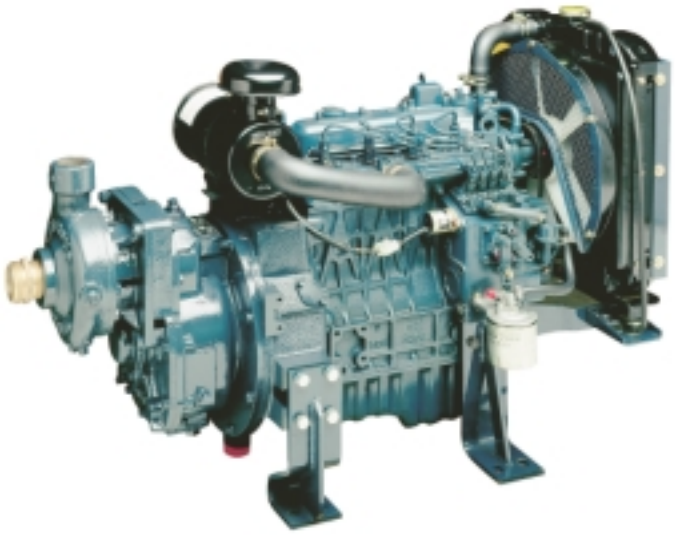
Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**N/A**
Cooling method	**Water cooled**	Relief valve	**Yes**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**No**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

WATER PUMPING EQUIPMENT
Pumps—Mountable

Pump		Engine			
Make	**Waterous**	Make	**Kubota**		
Model	**E302-A**	Model	**V1305E-2**		
Type	**Centrifugal**	Horsepower	**30**	RPM	**3,000**
Priming	**Self-priming**	Ignition type	**Compression**		
Inlet size	**3 inch NPT**	Cylinders	**2**		
Outlet size	**2 inch NPT**	Fuel used	**Diesel**		
Height (in)	**42½**	Width (in)	**23**	Fuel pump available	**Yes**
Length (in)	**43**	Dry weight (lb)	**553**		



Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075–2456

Pump Performance Values

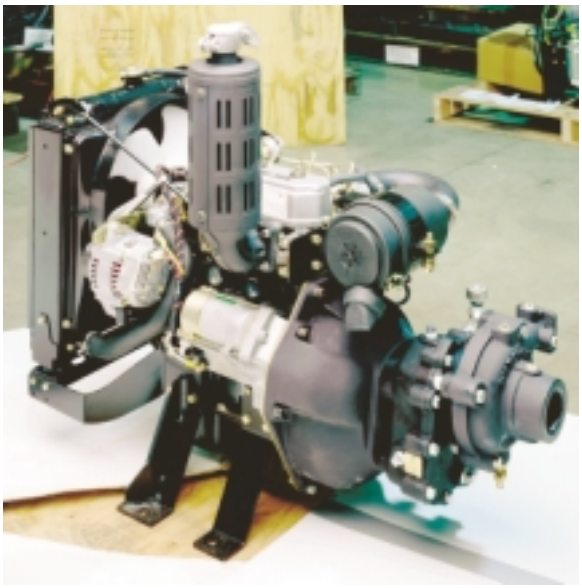
PSI	**180**	**205**	**210**
GAL/MIN	**200**	**150**	**50**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA Qualification Code	**N/A**	Integral or removable handles	**N/A**
Cooling method	**Water cooled**	Relief valve	**Yes**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**No**
Pressure gauge	**No**		
Integral or removable base	**Removable**		

Pump		Engine			
Make	**Waterous**	Make	**Briggs & Stratton**		
Model	**E501-A**	Model	**DM 950D**		
Type	**Centrifugal**	Horsepower	**26.5**	RPM	**3,600**
Priming	**Manual**	Ignition type	**Compression**		
Inlet size	**2 inch NPT**	Cylinders	**3**		
Outlet size	**1½ inch NPT**	Fuel used	**Diesel**		
Height (in)	**24½**	Width (in)	**19½**	Fuel pump available	**Yes**
Length (in)	**34**	Dry weight (lb)	**265**		



Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075–2456

Pump Performance Values

PSI	**40**	**300**	**420**
GAL/MIN	**120**	**80**	**40**

Hearing safety sound level **Data not provided by pump manufacturer**

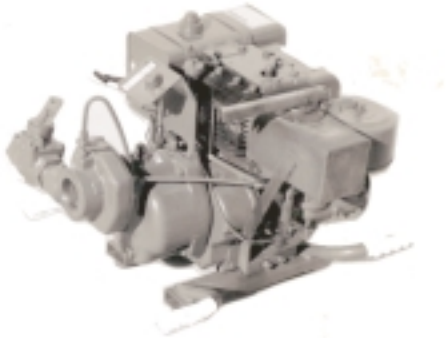
Description

USDA qualification code	**N/A**	Integral or removable base	**Removable**
Cooling method	**Water cooled**	Integral or removable handles	**N/A**
Starting system	**Electric**	Relief valve	**Yes**
2- or 4-stroke cycle	**4 stroke**	Backpack & straps	**N/A**
Pressure gauge	**Yes**	Special tools or accessories	**No**

Remarks
The Waterous E500 series pump is also available with a gasoline 31 HP Briggs & Stratton water-cooled engine.

7. Pumps in use but no longer available; parts still available
These pumps are widespread in use but are no longer being produced by the manufacturer. Replacement parts are still readily available.

Pump		Engine			
Make	**Hale Products**	Make	**Briggs & Stratton**		
Model	**20-FD-B25**	Model	**25217**		
Type	**Centrifugal**	Horsepower	**11**	RPM	**3,600**
Priming	**Exhaust**	Ignition type	**Magneto**		
Inlet size	**2 inch NH**	Cylinders	**1**		
Outlet size	**1½ inch NH**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**18¼**	Width (in)	**22**	Fuel pump available	**No**
Length (in)	**24**	Weight (lb)	**132**		



Manufacturer

Hale Fire Pump Co.
700 Spring Mill Avenue, Conshohocken, PA 19428

Pump Performance Values

1½ in	PSI	**50**	**75**	**100**	**125**	**150**	**166**	**175**	**200**	**225**	**250**	**275**
suction	GAL/MIN	**60.5**	**60**	**58**	**53**	**47**	**43**	**40.5**	**34**	**26.5**	**19.5**	**10.5**
2½ in	PSI	**50**	**75**	**100**	**125**	**150**	**170**	**175**	**200**	**225**	**250**	
suction	GAL/MIN	**77**	**75**	**69**	**61**	**54**	**48**	**46**	**38**	**31**	**22**	

Hearing safety sound level **104 dBA (Warning label required)**

Description

USDA qualification code	**C-175-15-50[1]**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4- stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

Remarks
Forest Service—USDA qualified: December 7, 1979
Meets Forest Service—USDA Specification 5100-273b
[1]Alternate coding: C-175-20/35, C-175-25/20

Pump		Engine			
Make	**Homelite Consumer Products, Inc.**	Make	**Homelite**		
Model	**FP 150**	Model	**FP 150**		
Type	**Centrifugal**	Horsepower	**6.8**	RPM	**7,500**
Priming	**Manual**	Ignition type	**Magneto**		
Inlet size (in)	**1½ inch NH**	Cylinders	**1**		
Outlet size (in)	**1½ inch NH**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**15**	Width (in)	**19**	Fuel pump available	**No**
Length (in)	**16**	Weight (lb)	**29**		

Manufacturer

Homelite Textron
14401 Carowinds Boulevard, Charlotte, NC 28217

Pump Performance Values

PSI	**50**	**75**	**100**	**125**	**150**	**175**	**190**
GAL/MIN	**51**	**46**	**40.5**	**34.5**	**26.5**	**16**	**0**

Hearing safety sound level **107 dBA (Warning label required)**

Description

USDA qualification code	**C-30-150/25**[1]	Integral or removable handles	**Integral**
Cooling Method	**Air cooled**	Relief valve	**No**
Starting System	**Manual**	Backpack & Straps	**Optional**
2- or 4- stroke cycle	**2 stroke**	Special tools or accessories	**Foot valve, combination spark plug wrench/screw driver**
Pressure gauge	**Optional**		
Integral or removable base	**Integral**		

Remarks
Forest Service—USDA qualified: July 15, 1980
Meets Forest Service—USDA Specification 5100-274b
[1]Alternate coding: C-30-175/15

Pump		Engine			
Make	**Waterous Company**	Make	**Lister Petter**		
Model	**P100-A**	Model	**LPA2**		
Type	**Centrifugal**	Horsepower	**14.1**	RPM	**3,600**
Priming	**Manual**	Ignition type	**Compression**		
Inlet size	**2½ inch NPT**	Cylinders	**2**		
Outlet size	**1½ inch NPT**	Fuel used	**Diesel**		
Height (in)	**31**	Width (in)	**24**	Fuel pump available	**Yes**
Length (in)	**24**	Dry weight (lb)	**275**		

Manufacturer

Waterous Company
125 Hardman Avenue South, South St. Paul, MN 55075

Pump Performance Values

PSI	**35**	**125**	**135**
GAL/MIN	**200**	**100**	**50**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**N/A**
Cooling method	**Air cooled**	Relief valve	**Yes**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**NH thread adapters**
Pressure gauge	**No**		
Integral or removable base	**N/A**		

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Wisconsin**		
Model	**WA-7**	Model	**BKND**		
Type	**Positive displacement**	Horsepower	**6.8**	RPM	**3,600**
Priming	**None**	Ignition type	**Magneto**		
Inlet size	**1 inch NPT**	Cylinders	**1**		
Outlet size	**1 inch NPT**	Fuel used	**Gasoline**		
Height (in)	**20**	Width (in)	**18**	Fuel pump available	**No**
Length (in)	**27**	Weight (lb)	**98**		

Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

PSI	**50**	**100**	**150**	**200**	**250**
GAL/MIN	**26**	**25**	**24**	**21**	**17**

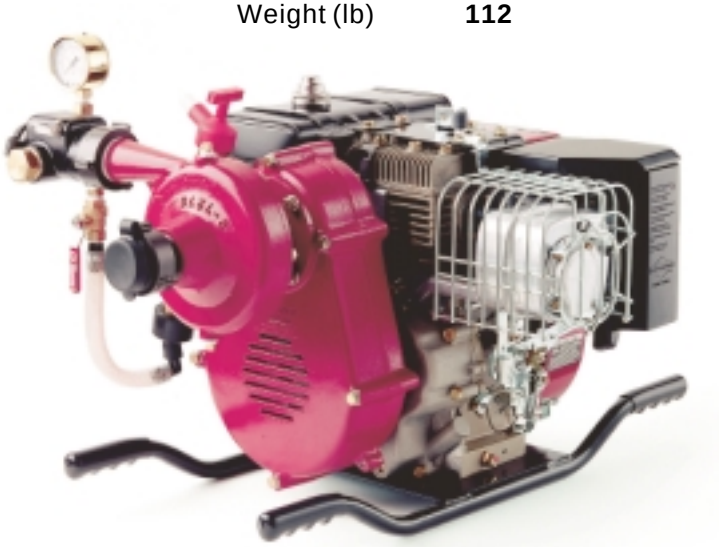
Hearing safety sound level **100 dBA (Warning label required)**

Description

USDA Qualification Code	**P-130-15/20**[1]	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**Yes**
Starting system	**Rope or electric**	Backpack & straps	**N/A**
2- or 4- stroke cycle	**4 stroke**	Special tools or accessories	**Packing gland & wrench**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

Remarks
Forest Service—USDA qualified: March 18,1960
Meets Forest Service—USDA Specification 5100-273b
[1]Alternate coding: P-130-20/20 P-130-25/15

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Briggs & Stratton**		
Model	**B1-11**	Model	**Industrial Plus**		
Type	**Centrifugal**	Horsepower	**11**	RPM	**3,600**
Priming	**Manual**	Ignition type	**Electronic**		
Inlet size (in)	**1½ inch NPSH**	Cylinders	**1**		
Outlet size (in)	**1½ inch NPSH**	Fuel used	**Gasoline**		
Height (in)	**20**	Width (in)	**21½**	Fuel pump available	**No**
Length (in)	**28**	Weight (lb)	**112**		



Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

PSI	**0**	**40**	**135**	**180**	**260**
GAL/MIN	**64**	**59**	**46**	**25**	**0**

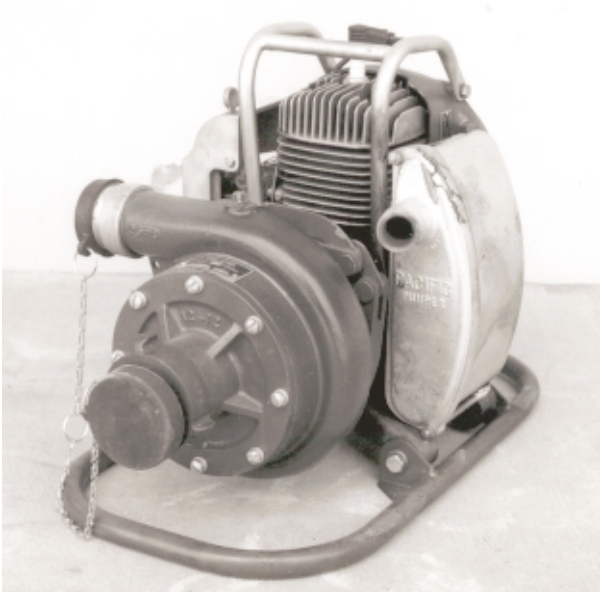
Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**C-130-15/40**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Electric**	Backpack & straps	**N/A**
2- or 4-stroke cycle	**4 stroke**	Special tools or accessories	**None**
Pressure gauge	**Yes**		
Integral or removable base	**Removable**		

Remarks
Forest Service—USDA qualified: August 8, 1994
Meets Forest Service—USDA Specification 5100-273

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Rotax**		
Model	**Mark 26**	Model	**95 cc**		
Type	**Centrifugal**	Horsepower	**5**	RPM	**5,000**
Priming	**Manual**	Ignition type	**Magneto**		
Inlet size	**2 inch NPSH**	Cylinders	**1**		
Outlet size	**1½ inch NPSH**	Fuel used	**Gasoline-oil mixture**		
Height (in)	**14**	Width (in)	**11**	Fuel pump available	**Yes**
Length (in)	**19**	Weight (lb)	**38**		



Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

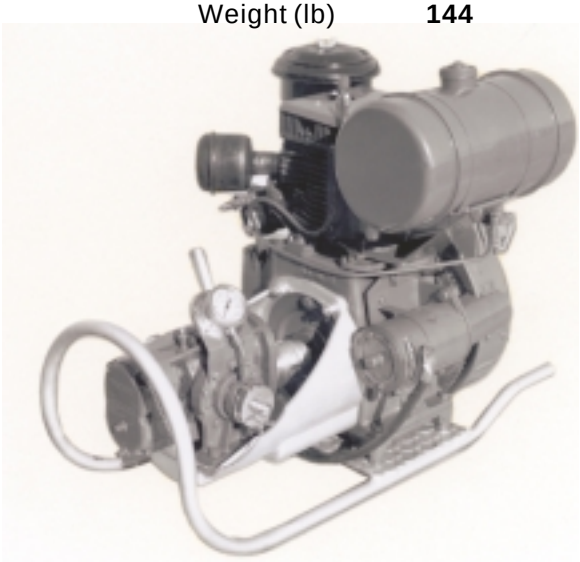
PSI	**0**	**50**	**100**	**150**	**160**
GAL/MIN	**84**	**72**	**50**	**18**	**0**

Hearing safety sound level **Data not provided by pump manufacturer**

Description

USDA qualification code	**N/A**	Integral or removable handles	**Removable**
Cooling method	**Air cooled**	Relief valve	**No**
Starting system	**Recoil**	Backpack & straps	**Yes**
2- or 4- stroke cycle	**2 stroke**	Special tools or accessories	**Spark plug wrench, grease gun**
Pressure gauge	**None**		
Integral or removable base	**Removable**		

Pump		Engine			
Make	**Wildfire Equipment Inc.**	Make	**Wisconsin**		
Model	**WX-10**	Model	**AENLD**		
Type	**Positive displacement**	Horsepower	**8.3**	RPM	**3,400**
Priming	**None**	Ignition type	**Magneto**		
Inlet size	**1½ inch**	Cylinders	**1**		
Outlet size	**1½ inch**	Fuel used	**Gasoline**		
Height (in)	**23½**	Width (in)	**20½**	Fuel pump available	**No**
Length (in)	**29½**	Weight (lb)	**144**		



Manufacturer

Wildfire Equipment Inc.
1100 Norman, Suite 200, Lachine, Quebec, Canada H8S 1A6

Pump Performance Values

PSI	**50**	**100**	**150**	**200**
GAL/MIN	**45**	**43**	**32**	**24**

Hearing safety sound level **98.5 dBA (Warning label required)**

Description

USDA Qualification Code	**P-175-15/30[1]**	Integral or removable handles	**Removable**
Cooling Method	**Air cooled**	Relief valve	**Yes**
Starting System	**Recoil or electric**	Backpack & straps	**N/A**
2- or 4- stroke cycle	**4 stroke**	Special tools or accessories	**Packing gland and wrench**
Pressure gauge	**Optional**		
Integral or removable base	**Removable**		

Remarks
Forest Service—USDA qualified: March 18,1960
Meets Forest Service—USDA Specification 5100-273b
[1]Alternate coding: P-175-20/20

8. Engine driven

These pumps are normally driven by the vehicle's engine. They are coupled to the engine by a power take-off unit (pto), hydraulic drive, V-belts, or chain drives. They are generally used where large volumes or high pressures are needed. These were previously identified as power take-off pumps.

B. Fire Engines

Using the Fire Equipment Working Team (FEWT) and the National Fire Protection Association (NFPA), the National Wildfire Coordinating Group (NWCG) categorizes information on fire engines into logical groups and provides common options often requested by fire managers. The Incident Command System (ICS) uses this engine type system based on the equipment capability. The table below shows NWCG minimum performance requirements for structure and wildland engine resource types. Additional information for required crew training and equipment recommendations can be found at the internet site for the National Wildfire Coordinating Group –http://www.nwcg.gov/.

Table 1—NWCG engine types—minimum requirements.

Components	Structure Engines		Wildland Engines				
	1	2	3	4	5	6	7
Pump Rating							
minimum flow (gal/min)	1,000+	250+	150	50	50	30	10
at rated pressure (psi)	150	150	250	100	100	100	100
Tank Capacity Range (gal)	400+	400+	500+	750+	400-750	150-400	50-200
Hose (feet)							
2½ inch	1,200	1,000	~	~	~	~	~
1½ inch	400	500	500	300	300	300	~
1 inch	~	~	500	300	300	300	200
Ladders (feet)	48	48	~	~	~	~	~
Master Stream (gal/min)	500	~	~	~	~	~	~
Personnel (minimum)	4	3	2	2	2	2	2

This section lists many of the different initial attack engines used in the United States and describes the wide variety of vehicle sizes, pump, and tank size configurations. The data displayed in this section is intended to assist individuals interested in outfitting an initial attack wildland engine. Many of the following engines could possibly be reclassified from one NWCG ICS type to another by changing the basic equipment compliment, personnel staffing, or level of training.

Sheet No.	NWCG ICS Type	Tank Capacity (gallons)	Pump Rating (gal/min @ 150 psi)	Pump Drive	Equipment Designator	Agency
1	2	500	1,250	PTO	Model 18	California Department of Forestry
2	3	500	300	PTO	Model 1	California Department of Forestry
3	3	500	300	PTO	Model 5	California Department of Forestry
4	3	650	500	Auxiliary engine	Model 9	California Department of Forestry
5	3	1,200	500	Auxiliary engine	Model 11	California Department of Forestry
6	3	500	500	Hydraulic	Model 14	California Department of Forestry
7	3	500	500	Hydraulic	Model 15	California Department of Forestry
8	3	650	500	Hydraulic	Model 17	California Department of Forestry
9	3	650	500	Hydrostatic	Urban interface unit	Texas Forest Service
10	3	600	225	PTO	Model 70 and 71	USDA Forest Service (R-3)
11	3	600	225	PTO	Model 46	USDA Forest Service (R-3)
12	3	500	400	PTO	Model 62	USDA Forest Service (R-5)
13	3	600	350	PTO	Model 75	USDA Forest Service (R-6)
14	3	1,000	350	PTO	Model 80	USDA Forest Service (R-6)
15	3	500	500	PTO	BLM 665 Model 14	USDI Bureau of Land Mgmt
16	3	525-750	100	PTO	BLM 665 engine	USDI Bureau of Land Mgmt
17	3	500	500	PTO	FWS Model 15	USDI Fish and Wildlife Service
18	4	1,000	85	Auxiliary engine	2½ ton 6 by 6	Connecticut DEP Forestry
19	4	800	80	Auxiliary engine	FEPP Brush patrol	Florida Division of Forestry
20	4	800	85	Auxiliary engine	4800 Large 4 by 4	Michigan DNR
21	4	900	85	Auxiliary engine	2½ ton 6 by 6	Michigan DNR
22	4	1,400	85	Auxiliary engine	5 ton 6 by 6	Michigan DNR
23	4	750	85	Flywheel	Engine 44	New Mexico State Forestry
24	4	700	85	Auxiliary engine	Model 52	USDA Forest Service (R-1)
25	4	2,400	140	Auxiliary engine	BLM 668 UEX engine	USDI Bureau of Land Mgmt
26	4	500-865	140	Auxiliary engine	BLM 667 engine	USDI Bureau of Land Mgmt
27	4	850	N/A	Auxiliary engine	850 gallon pumper	Wisconsin DNR
28	5	500	100	Auxiliary engine	Wildland engine	Florida Division of Forestry
29	6	250	100	Auxiliary engine	Brush patrol	Alabama Forestry Commission
30	6	300	110	Auxiliary engine	Grass patrol 4 by 4	East Bay Regional Parks
31	6	300	80	Auxiliary engine	Wildland brush patrol	Florida Division of Forestry
32	6	175	85	Auxiliary engine	M-1008	Michigan DNR
33	6	250	85	Auxiliary engine	Hummer	Michigan DNR
34	6	300	N/A	Auxiliary engine	Wheeled ATV	New Jersey Forest Fire Service
35	6	250	60	Auxiliary engine	Initial attack brush truck	New Jersey Forest Fire Service
36	6	200-300	85	Auxiliary engine	Model 52	USDA Forest Service (R-1)
37	6	200	85	Auxiliary engine	Model 41	USDA Forest Service (R-5)

WATER PUMPING EQUIPMENT
Fire Engines—Engine matrix

Sheet No.	NWCG ICS Type	Tank Capacity (gallons)	Pump Rating (gal/min @ 150 psi)	Pump Drive	Equipment Designator	Agency
38	6	300	85	Auxiliary engine	Model 33U	USDA Forest Service (R-6)
39	6	300	90	PTO	Model 45	USDA Forest Service (R-6)
40	6	200	72	Auxiliary engine	E 3-1	USDA Forest Service (R-9)
41	6	280	50	Auxiliary engine	GSA FT 60HD/IA	USDA Forest Service (R-9)
42	6	300	85	Auxiliary engine	Superior NF, Type 6	USDA Forest Service (R-9)
43	6	250	100	Auxiliary engine	Type VI slip on	USDA Forest Service (R-9)
44	6	300	100	Auxiliary engine	BLM 662 engine	USDI Bureau of Land Mgmt
45	6	250	90	Auxiliary engine	Brush patrol	Virginia Dept. of Forestry
46	7	150	65	Auxiliary engine	IA wildland engines	North Carolina DFR
47	7	100	11	Auxiliary engine	BE-S slip-on unit	USDA Forest Service (R-9)
48	7	125	36	Belt driven	B-2	USDA Forest Service (R-9)
49	7	75-125	30	Auxiliary engine	Type VII slip on	USDA Forest Service (R-9)
50	7	150	20	Auxiliary engine	Wisconsin IA	Wisconsin DNR
51	N/A	50-75	85	Auxiliary engine	Model 20	USDA Forest Service (R-5)

Agency: CDF

Equipment Designator: Model 18

ICS Type: 2

Summary: Tank Capacity—gallons 500
Pump Rating—gal/min @ psi 1,000 @ 150
Pump Drive—Midship
Mobile Attack Capability?—Yes
Number Crew Personnel—6
Foam System Available?— Yes Gallons—20
All-Wheel Drive? —No

General Description: The Model 18 engines are designed for both wildland and structure firefighting. The engine has excellent off-highway and mobile-attack performance. More equipment storage and pumping capacities were added while maintaining a minimum increase in overall size, compared to the Model 17. The engine has a 1,250 gal/min two-stage pump, and a midship 150 gal/min auxiliary single-stage pump. The tank capacity is 500 gallons. The engine is also equipped with class A foam. There is seating for six firefighters, all inside the cab.

Pump: Manufacturer: Darley Model: LDM
Type: Centrifugal
Performance: gal/min (max) at free flow; 1,250 gal/min @ max psi = 1,000 @ 150
Primer Type: Electric

Tank: Material: Polypropylene
Construction: Baffles? Yes
If steel, is the tank corrosion treated? N/A

Controls and Gauges: Hand Throttle? Yes Pressure Gauge? Yes Automatic shutdown? No

Valves: Tank-to-Pump? Yes Pump-to-Tank? Yes

Overboard Discharge:	Quantity	5	4	1
	Size	2½ inch	1½ inch	1 inch reel line
Suction:	Quantity	2	1	
	Size	6 inch	2½ inch	

Priming Valve Handle: Manual
Suction Valve Handle: Manual
Tank-to-Plumbing Shut-0ff? Yes
Gravity Tank Drain/Dump? Yes
Type— ¼ turn valve
Manufacturer: Spartan
Manufacturer Model Year: 1997
Engine Fuel Type: Diesel
Vehicle Operating Weight: 34,000
Brake Type: Air

Discharge Valve Handle: Manual
Adjustable Pressure Relief? Yes
Pump and Plumbing Drain? Yes
Rock Trap/Plumbing Strainer? Yes
Type— Inlet screen
Cab/Axle Distance: 117 inch
GVW Rating: 38,500
Horsepower Rating: 300
Transmission Type: MTB 643 Allison

Written Materials:
Specifications and drawings are available from: California Department of Forestry
Davis Equipment Facility
5800 Chiles Road
Davis, CA 95616

WATER PUMPING EQUIPMENT
Engine Data Sheet No. 2

Agency: CDF
Equipment Designator: Model 1
ICS Type: 3
Summary: Tank Capacity (gallons)— 500
Pump Rating—300 gal/min @ 150 psi
Pump Drive—PTO
Mobile Attack Capability?—Yes
Number Crew Personnel—6
Foam System Available?—See description
Gallons—
All-Wheel Drive? —No

General Description: This Model 1 is classified as a heavy fire engine and can carry six firefighters. It is a two-wheel drive engine with excellent climbing capabilities. The power to the rear wheels is delivered through an automatic Allison 600 Series transmission. The power is directed through a split-shaft transmission or power divider to either the driving wheels or the main pump. The main pump can only be used for stationary pumping.

The auxiliary pump is driven by its own engine and is used for mobile attack. The four-person crew compartment is at the rear and features two fire blankets rolled up in canisters. The engine carries two live reels, along with 1-, 1½-, and 2½-inch water outlets. The principle pump control panel is outside with a second set of controls for the auxiliary pump located in the cab. Compartments for fire tools, self-contained breathing apparatus, suction hose for both pumps, hose fittings, nozzles, and other miscellaneous equipment, including a hose roller, form the body around the engine. This engine may have a foam system added at a later date with varying gallonage.

Pump: Manufacturer—Waterous Model—CPK-2
Type—Centrifugal
Performance: gal/min (max) at free flow—300
gal/min @ max psi = 500 @ 250
Primer Type—Electric

Tank: Material— Steel
Construction: Baffles?— Yes
If steel, is the tank corrosion treated?—Yes

Controls and Gauges: Hand Throttle?— Yes Pressure Gauge?— Yes Automatic shutdown?— No
Valves: Tank-to-Pump?— Pump-to-Tank?—Yes

Overboard Discharge:	Quantity	2	4	2
	Size	2½ inch	1½ inch	1-inch reel line
Suction:	Quantity	2		
	Size	3 inch		

Priming Valve Handle: Manual
Suction Valve Handle: Manual
Tank-to-Plumbing Shut-0ff? Yes
Gravity Tank Drain/Dump? Yes
Type— Pipe plug
Manufacturer: IHC International
Manufacturer Model Year: 1988
Engine Fuel Type: Diesel
Vehicle Operating Weight: 21,000
Brake Type: Air

Discharge Valve Handle: Manual
Adjustable Pressure Relief? No
Pump and Plumbing Drain? Yes
Rock Trap/Plumbing Strainer? Yes
Type— Inlet screen
Cab/Axle Distance: 84 inch
GVW Rating: 26,300
Horsepower Rating: 180 - 210
Transmission Type: Allison 5 speed

Written Materials: Specifications and drawings are available from: California Department of Forestry
Davis Mobile Equipment Facility
5800 Chiles Road
Davis, CA 95616

Agency: CDF
Equipment Designator: Model 5
ICS Type: 3
Summary: Tank Capacity (gallons)— 500
Pump Rating—300 gal/min @ 150 psi
Pump Drive—PTO
Mobile Attack Capability?— Yes
Number Crew Personnel—6
Foam System Available?—See description
Gallons—
All-Wheel Drive? —Yes

General Description: This Model 5 is classified as a heavy fire engine and can carry six firefighters. It is a four-wheel drive engine with excellent climbing capabilities. The power to the rear wheels is delivered through an automatic Allison 600 Series transmission. The power is directed through a split-shaft transmission or power divider to either the driving wheels or the main pump. This function is handled through a transfer case with the power for the pump taken through a pto. The main pump can be used only for stationary pumping.

The auxiliary pump is driven by its own engine and is used for mobile attack. The four-person crew compartment is at the rear and features two fire blankets rolled up in canisters. The engine carries two live reels, along with 1-, 1½-, and 2½-inch water outlets. The principle pump control panel is outside with a second set of controls for the auxiliary pump located in the cab. Compartments for fire tools, self-contained breathing apparatus, suction hose for both pumps, hose fittings, nozzles, and other miscellaneous equipment, including a hose roller, form the body around the engine. This engine may have a foam system added at a later date with varying gallonage.

Pump: Manufacturer—Waterous Model—CPK-2
Type—Centrifugal
Performance: gal/min (max) at free flow—300
gal/min @ max psi = 500 @ 250
Primer Type— Electric

Tank: Material— steel
Construction: Baffles?— Yes
If steel, is the tank corrosion treated?— Yes

Controls and Gauges: Hand Throttle?— Yes Pressure Gauge?— Yes Automatic shutdown?— No
Valves: Tank-to-Pump?— Pump-to-Tank?—Yes

Overboard Discharge:	Quantity	2	4	2
	Size	2½ inch	1½ inch	1-inch reel line
Suction:	Quantity	2		
	Size	3 inch		

Priming Valve Handle: Manual
Suction Valve Handle: Manual
Tank-to-Plumbing Shut-0ff? Yes
Gravity Tank Drain/Dump? Yes
Type— Pipe plug
Manufacturer: IHC International
Manufacturer Model Year: 1988/1989
Engine Fuel Type: Diesel
Vehicle Operating Weight: 21,000-22,000
Brake Type: Air

Discharge Valve Handle: Manual
Adjustable Pressure Relief? No
Pump and Plumbing Drain? Yes
Rock Trap/Plumbing Strainer? Yes
Type— Inlet screen
Cab/Axle Distance: 84 inch
GVW Rating: 27,800
Horsepower Rating: 180 - 210
Transmission Type: Allison 5 speed

Written Materials: Specifications and drawings are available from: California Department of Forestry
Davis Mobile Equipment Facility
5800 Chiles Road
Davis, CA 95616