



Kazakhstan

**Hot Oil
&
Pumping Services**

Hot Oil Unit



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1. SCOPE OF SERVICE

Hot Oil Units offer a safe, environmentally friendly, and inexpensive method of keeping wax and other materials from clogging oil wells and pipelines. With the high cost of chemicals, the often unsafe handling of them, and the growing concern of dangerous chemicals in the environment, Hot Oil Units can offer a safe and effective alternative.



Hot Oil Units have been operating on the North America Continent for some 50 years with an estimated 1,000 units in service today. From their early beginnings, Hot Oil Units and services have evolved to be a routine effective operation that is safe; to personnel, the well and surface equipment.

The Hot Oil Unit is usually operated by a 2 or 3 Man Crew depending on the expected length of operation. Our operators have experience in high pressure/high temperature pumping, down hole completions, various types and pressure ratings of surface equipment, and a good understanding of how, and where, wax build-up occurs. Our personnel are trained in First Aid & CPR, H2S Safety Training, Safe Handling of Fluids, Heavy Equipment Operation & Driving, and Fire Fighting.

Wax build-up can be from surface to 1,200 meters depending on bottom hole (formation) temperature. When an Oil and Gas Operator decides that they require a Hot Oil Treatment, a thorough campaign is usually required on both wells and pipelines. After the initial campaign a routine program can be scheduled for a problem well, and pipelines. For example some wells may need to have the wax removed every 2-4 weeks, where others need it every 6 months. In most cases, a properly designed well maintenance program can eliminate use of other well intervention services for long periods of time.

Scrubbed or cleaned crude oil is the most common medium used, however diesel, solvents, chemical solutions, and sometimes water is used. The fluid used can be heated and controlled consistently at any temperature, most often in the 180°F to 225°F (80°C to 110°C) range.

The Hot Oil unit is designed to take on fluid from many sources. The unit is equipped with both a centrifugal pump and a gear pump to self load from a variety of sources and from different points on the unit.



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The ability of the unit to circulate back to its own tanks, allows the unit to supply an air free purging of all hoses, treating lines, and manifolds to provide a safe, non-combustible, mixture to flammable fluids prior to high pressure pumping. Venting of the tanks to a safe area is provided by vent lines and hoses at the back of the unit. The hoses can be moved according to wind direction, or can be connected to a ventilation vessel to be flared off under a controlled system.

The Hot Oil unit can also lessen the chance of spillage as the gear pump is plumbed to suck back all hoses and treating line connections. This decreases the amount of fluid left in the hoses & lines to control spillage during rig out after treatment is completed.

The Weatherford Hot Oil Unit itself consists of the following major components:

- 5 million BTU (1,464 kW)** direct diesel fired heater
- 600 Hp, 10,000 PSI** Triplex (SPM)
- 8 m³** – Supply/Storage Tank
- 0.6 m³** - Chemical/Methanol Storage Tank
- 4 X 3 X 13** circulation pump (Mission Magnum)
- 3"** Load/Unload Pump. (Roper)

Auxiliary Equipment consists of the following components:

- 2" 1502 high pressure treating iron (total of 45 meters)
- Temperature gauges mounted at different stages of the heating process
- A digital flow meter with read out on the operator's panel
- Treating line pressure gauge to 10,000 psi (70,000 kPa)
- Pressure chart recorder, with multi time chart settings (available on request)

Safety Devices mounted on the unit include the following:

- 2" 1502 adjustable safety relief (up to 10,000 psi or 70,000 kPa)
- High temperature heater shutdown,
- Fire Extinguishers
- Engine Kill (engine intake shutdown valve)
- Back-Up Alarm
- High Pressure Line Warning Signs
- Cable Whip-Checks for Treating Line





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USES OF HOT OIL UNITS

- The main function is the clean out of well bores. By heating and pumping hot oil (or other hot fluids) down the annulus (casing) and returning up the tubing & down the flow line this reduces and eliminates wax (paraffin) build up. In some cases it is also needed to pump down the tubing to the formation to clean the wax build up.
- Pumping hot fluids through coil tubing to clean out hydrated or waxed off production tubing or by pumping down annulus through a circulating valve.
- Hot Fluid is often pumped through tubulars to clean them prior to a work-over.
- Clean out wax or other material in pipelines.
- Heating water, oil, or frac fluids for well stimulation or fracturization.
- Heating mix water for cementing treatments
- Hot water is circulated to thaw ice or gelled material in cold climates.
- Hot oil is used to pump through pipelines to cleanout for better operations or to cleanout surface facilities prior to a turn around inspection.
- Refineries often use Hot Oil Units to clean out lines, circulate tanks and re-boilers, and to treat de-ethylene & distillation towers.
- Hot Oil Units are used around rigs to clean out tanks.
- Hydro-blasting and jetting for cleaning coolers and compressors.
- Pre-heating treatment fluids for well stimulation services such as fracturing operations.





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Since a Hot Oil Unit has a high pressure pump and tank, it can also be used as a straight pressure unit (Kill Unit):

- Pressure test lubricators, BOP's, and/or pump lines as a third party independent.
- Pressure test down hole tubulars and completions.
- Pressure up on SSSV's to equalize prior to opening.
- To kill wells for securement or abandonment.
- Perform hydro-tests on pipe spools, new pipeline installation or surface production facilities.
- Hold back pressure on annulus (casing) during well hydraulic fracturization.
- Pumping waste fluids such as chemicals and injection water to injection wells



As these units are equipped with a crude storage tank and a 3" load/unload gear pump, they can also perform the same function as a tank truck. However, weight restrictions to the chassis or road regulations may not allow the transport of full capacity volumes.

The above are just some of the uses of a Hot Oil Unit. The service is very desirable in many areas and has few negative effects.



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2. EQUIPMENT SPECIFICATION

2.1 HOT OIL UNIT (Truck Mounted)

Component	Description
Cab and Chassis:	T-800 Kenworth 2004 (GOST Certified)
Engine:	Caterpillar 6 cylinder Turbo Diesel C-12 430 HP @ 1800 rpm 1550 ft/lbs. torque
Transmission:	Eaton Road Ranger 10 speed
Engine Emergency Shut Down(ESD)	Roda-Deco Pneumatic remote operation
Power Divider:	Spicer 784, 450 HP rated
Low Pressure Pumps:	
- Centrifugal:	Mission Magnum 3 X 4 X 13.
- Roper:	Roper model #3622HBF2423 624 liters/minute (165 US Gallons/minute) @ full flow
High Pressure:	SPM TWS600S Triplex pump, 3 ½" or 4 ½ "Plungers, 600 Hp, Maximum CWP 707 Atm (10,394 psi)
Heater:	5 M BTU ThermoGen Heater (rated output) Series/Parallel flow, Electronic Ignition
Fire Suppression:	
- 150 lb ANSUL:	Wheeled unit w/Purple K suppressant, Nitrogen propelled
- 15 lb CO2	Flag Fire 15 Lb (6.8 kg)
High Pressure Treating:	2" 1502 API 10,000 psi working pressure, 45 meters of pup joints, 8 @ Swivel Chiksan® (2 way swivel), 1 @ Check valve, 2 @ 2X1 Low torque valve 1 @ Thread to Thread Crossover 1 @ Wing to Wing Crossover 2 @ "T" Connection
Hoses:	
- Loading Suction Hose /	14 meters of 3" Tank truck hose 3" Fig 206 WECO connections
- Low Pressure Discharge Hose	14 meters of 2" Tank truck hose 2" Fig 206 WECO connections
-Tank Vent Hose	14 meters of 2" Tank truck hose 2" aluminium. Camlocks connections

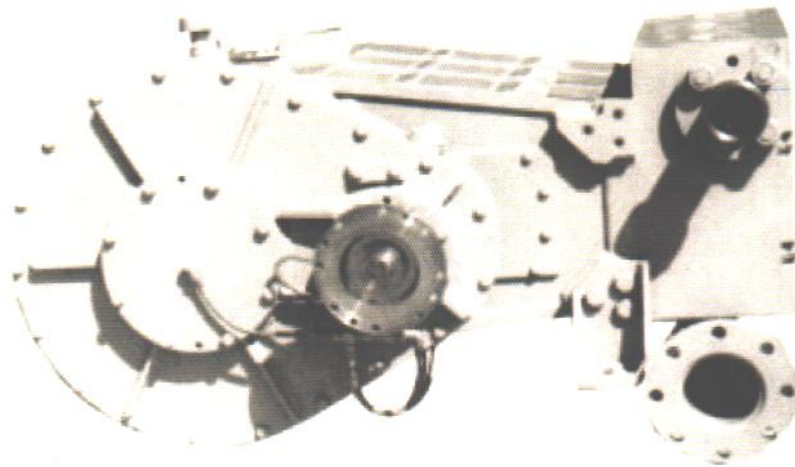


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2.2 HIGH PRESSURE PUMP SPECIFICATION

SPM Model TWS 600S PLUNGER PUMP

Rated Max Brake Horsepower600 BHP (447 kW)
 Maximum Rod Load.....100,000# (43,360 kg)
 Stroke Length.....6" (152.4 mm)
 Gear Ratio.....4.6:1



Performance data

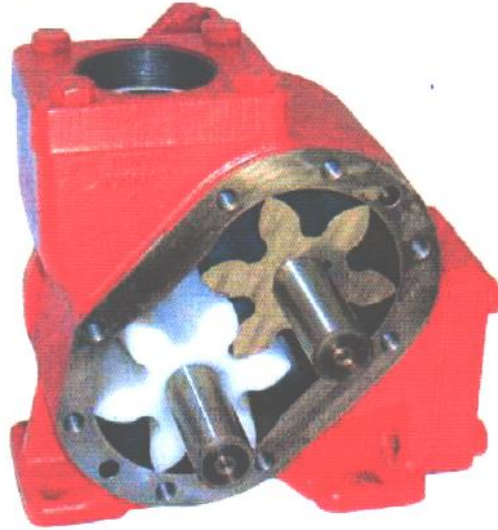
PLUNGER DIAMETER	OUTPUT PER REV	DISPLACEMENT AT PUMP STROKES PER MINUTE / PINION RPM									
		50/230		120/552		200/920		300/1380		450/2070	
inch (mm)	gal/rev (liter/rev)	gpm (L/Min)	psi (bar)	gpm (L/Min)	psi (bar)	gpm (L/Min)	psi (bar)	gpm (L/Min)	psi (bar)	gpm (L/Min)	psi (bar)
3 ½ (88.9)	0.75 (2.8)	37 (142)	10,394 (716)	90 (341)	10,288 (709)	150 (568)	6,173 (425)	225 (851)	4,115 (284)	337 (1277)	2,744 (189)
4 ½ (114.3)	1.24 (4.7)	52 (235)	6,288 (443)	149 (563)	6,224 (439)	248 (938)	3,734 (263)	372 (1407)	2,489 (175)	558 (2111)	1660 (117)
INPUT POWER: BHP(kW)		253 (188)		600 (448)		600 (448)		600 (448)		600 (448)	



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2.3 LOAD/UNLOAD PUMP SPECIFICATION

ROPER PUMP – 3600 Series

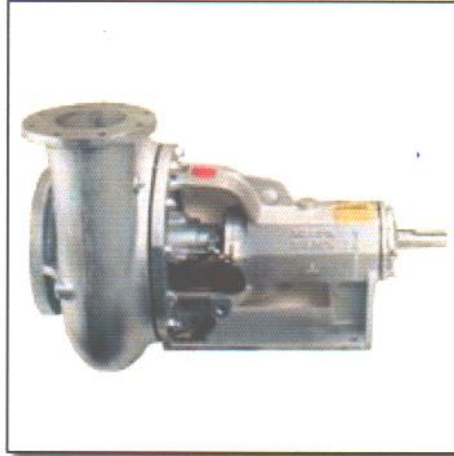


PUMP MODEL	THEORETICAL CAPACITY	MAX SPEED	MAX FLOW AT MAX SPEED (0 PSI DISCHARGE PRESSURE)	MAX PRESSURE	PORT CONNECTION
3622/3722	0.22 Gal/Rev (0.83 L/Rev)	750 RPM	165 Gal/Min (624 L/Min)	128 PSI (8.7 Atm)	3"

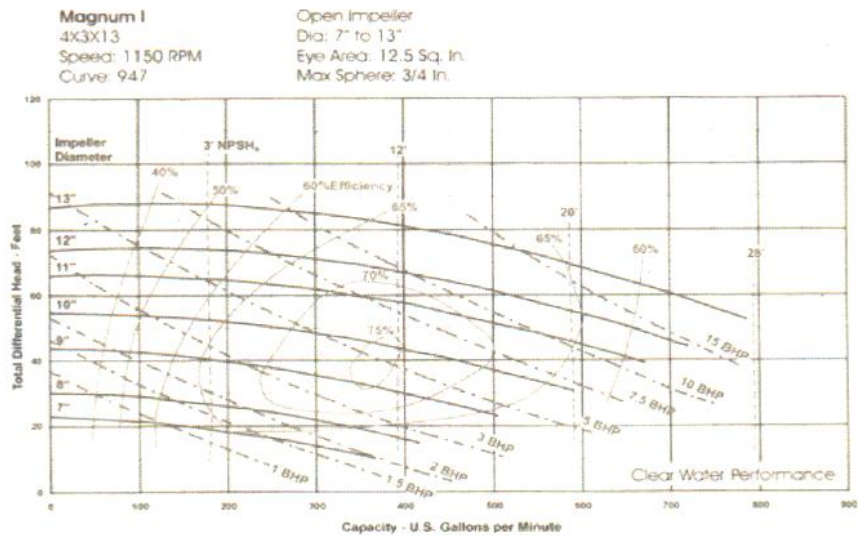
Characteristics:

- Right angle port design
- Bi-directional rotation, self priming
- Standard operation up to 212 deg. F (100°C)

2.4 CENTRIFUGAL PUMP SPECIFICATION MISSION MAGNUM 4x3x13



The Mission Magnum 1 Centrifugal Pump has been engineered for the toughest jobs in drilling, production, well servicing, and in industrial applications. The revolutionary design of the Magnum 1 Centrifugal Pump provides Supreme-duty performance in all types of fluid pumping operations. Although it offers greater capacity and higher heads, the Magnum 1 Centrifugal Pump remains the competitive pump of choice for aggressive applications.



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Truck Chassis

Kenworth T-800
Caterpillar 430 Hp (320 Kilo Watt)
Fuller transmission 10 Speed
4 X 6 wheel drive

Heater

5 Million BTU Heat Exchanger (1,465 Kilo Watt)
(Rating is maximum heater output at 85% heating efficiency)
Series & Parallel heating coil capabilities
(Series output of 300 liters/minute, Parallel output of 450 liters/minute)
Heating water at a rate of $\Delta 30^{\circ}\text{C}$ in approximately 90 minutes for a 60m^3 tank.

Pressure Pump

SPM TWS600S Pump
3-1/2" Plungers (other plunger sizes upon request only)
600 Fluid Hp (450 Fluid Kilo Watt)
CWP 10,394 psi (707.0 Atm)

Treating Line (API 1502)

- 14 @ Pup Joints (3 meters each)
- 2 @ Pup Joints (1.5 meters each)
- (Total of 45 meters of treating line)
- 7 @ 2 Way Swivels
- 1 @ Thread to Thread Crossover
- 1 @ Wing to Wing Crossover
- 2 @ "T" Connection
- 1 @ Check Valve
- 2 @ 2X1 Plug Valve

Instrumentation

- Marten Decker pressure gauge 0 to 10,000 psi (0 to 70,000 kPa)
- Nu-Flo flow meter rate & totalizer (Bbls, Gallon, liter, m³)
- Suction & discharge temperature gauges
- 15,000 psi Chart Recorder with up to 12 hour timer (upon request)

Loading Pump

- Roper 3622 Series Pump
- Output - 165 GPM (624 LPM)
- Designed to load and unload unit as well as to suck back fluid in hoses and treating line to lesson spillage.

Circulation Pump

- Mission Magnum (4" X 3" X 13")
- 400 GPM (1500 LPM) at 55% efficiency

Fluid Storage

- 2 @ Fluid tanks 4m³ for fluid storage
- 1 @ Fluid tank 0.6m³ for holding none corrosive chemicals or methanol (unit is capable of self loading & unloading of treating fluids)
- 1 @ Diesel tank 2.2m³ for holding heater fuel
- 2 @ Diesel tank 341 Liter for hold fuel for the truck engine

Fire Suppression & Safety Equipment

- 1 @ 15 Lb Fire Extinguisher CO₂ (for heater exchanger only)
- 1 @ 150Lb Wheeled Fire Extinguisher (ABC Category Fires)
- 1 @ Engine Rig Saver (engine air intake shut down)
- 1 @ Over Temperature Shut Down to fuel system on heater
- 1 @ 0-15,000 psi Pressure Relief Valve on pressure pump manifold
- 1 @ Backup Alarm
- 2 @ Warning Signs for high pressure pumping
- 1 @ Complete set of cable whip-checks for treating line.