

# HVP



## HVP Series Portable Oil Purifier

In one package — a compact, economical, easy-to-use fluid purification system for removing water, particulate and gaseous contamination from hydraulic, lubrication and transformer oils.

PALL

# The Pall HVP Portable Fluid Purifier extends fluid life, reduces disposal costs, minimizes waste and increases equipment uptime.

Pall Fluid Purifiers were first introduced in 1965 responding to industry's concern regarding water contamination within hydraulic systems. Today the Pall HVP Portable Fluid Purifier is used as support equipment for the power generation,

primary metals, pulp and paper, and light industrial markets. This rugged and dependable purifier provides extensive cost savings and improved equipment operation for such applications as noted below.

## Applications served by the Pall HVP Portable Fluid Purifiers

### Power Generation

- Main turbine lube oil
- Boiler feed pump turbine reservoir
- Transformer oil
- Coal pulverizer/conveyors
- Bulk oil storage

### Primary Metals

- Roll mill automatic gauge control hydraulics
- Roll mill gear and pinion lube systems
- Roll grinder lube systems

### Light Industrial

- Bulk oil reclamation
- Blow molding
- Injection molding
- Machine tool hydraulic oils
- Automotive transfer line hydraulic oils
- Flushing test stands

### Pulp and Paper

- Wet end/dryer lube
- Press section lube and hydraulics
- Steam turbine lube and hydraulics

Contact Pall or your distributor for application/selection assistance.

Process flow rates:

HVP-902 15 gpm

HVP-2702 45 gpm



HVP 902 shown

# Why the HVP Portable Fluid Purifier is best for you

## From the leader in contamination control

Since the mid 1950s, Pall Corporation has led in the design and manufacture of fluid clarification products for hydraulic, fuel and lube systems. These products help to reduce wear, extend oil life, conserve energy, increase equipment utilization and minimize waste disposal.

Pall Industrial Hydraulics Company, a wholly owned subsidiary of Pall Corporation, designs and manufactures fluid filters and purifiers for a wide variety of fluid power applications to include power generation, pulp and paper, light industrial and primary metals.

## The HVP removes contamination

HVP Portable Fluid Purifier removes water, air, and

solid contaminants from hydraulic, lube, transformer and circuit breaker oils or other service fluids compatible with the unit's seals and having a flash point of 200°F or above.

## The HVP is easy to use

Setup of the unit is easy. You simply roll the HVP Portable Fluid Purifier to the location, plug it into a suitable electrical power supply, attach inlet and outlet hoses to fluid source, and pull the "start" switch. The purifier then circulates the oil, thus decontaminating the system. There are no adjustments to make, no controls to set, no further connections to be made, no water or shop air hookups. Also, operation of your equipment can continue while it is being decontaminated.

# What the HVP Portable Fluid Purifier can do for you

The HVP Portable Fluid Purifier removes water, air, and solid contaminants from hydraulic fluids. The immediate and long-term benefits are:

## Reduced system wear

- Less frequent component changes are required
- Smaller spare parts inventory can be maintained

## Improved system performance

- Fewer costly operational delays
- Increased system reliability

## Improved on-line performance

- Less downtime resulting from service interruptions

## Extended fluid life

- Sharply reduced oil change out due to contamination; extended oil change intervals

## Reduced fluid disposal costs and environmental risk

- Sharply reduced need to transport contaminated fluids for disposal
- Helps to minimize waste oil disposal costs



Pall Cleanliness Code:

27/24/19



14/13/12



Solid contaminants adversely affect the insulation properties of dielectric oils.

# HVP

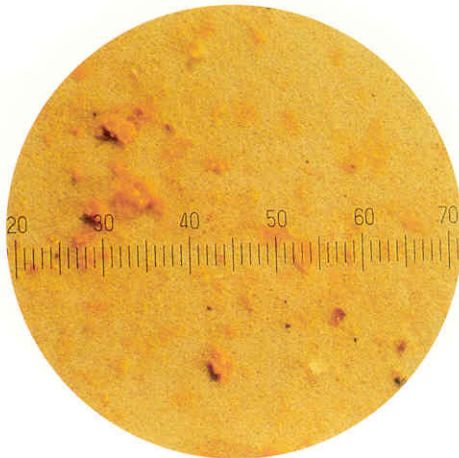
# Problems associated with fluid contamination

## Problems caused by water

The presence of both free and dissolved water in oil breaks down the oil through reduced lubricity, oxidation and acid formation. Oil that is free of water has a reduced tendency to oxidize and form organic acid, even when exposed to high temperatures. The presence of organic acid compounds leads to corrosion. Water accelerates fluid thermal degradation with production of particles or carbonaceous material. The presence of water also causes the polymerization of oil, forming larger molecules. Polymerization results in viscosity change, generation of solids harmful in terms of clogging of orifices and abrasive wear to system components.

**In short, water-contaminated oil introduces many disadvantages with no benefits. It attacks the system by causing:**

- Fluid breakdown, such as additive precipitation and oil oxidation
- Reduced lubricating film thickness
- Accelerated metal surface fatigue
- Corrosion
- Jamming of components due to ice crystals formed at low temperature
- Loss of dielectric strength in insulating fluids



(Magnification 100X)

Dull orange/brown particles often seen in oil from systems where water may be present.

## Water removal

In the same way that air is said to have 100% relative humidity when it contains all the water vapor it can hold, oil is said to be saturated when it contains all the dissolved water it can hold. Any increase in water level above this point results in water droplets suspended in the oil. Thus, water can exist in oil in two forms: (1) dissolved water (up to the saturation point) and (2) free water (above the saturation point). Free water contained in oil tends to collect in low spots and low flow branches in the system, as well as plate out in close tolerance components. Such water will cause corrosion if not removed.

## Problems caused by air

All fluids contain dissolved air and other gases, and may also contain some free air. There are many ways that air can enter the low pressure side of working systems. It can enter through lines that are disconnected to remove or install components, through entrainment from poor reservoir design, through ground support equipment, through improper maintenance procedures such as failure to fill filter bowls with oil when replacing filter elements, or through a rod seal of an actuator cylinder that is leaking. Despite the most rigorous bleed procedures, air can remain trapped in the system.

Trapped air can cause many problems, damaging both fluid and system components. It can cause poor system response due to variations in system pressure. Air will also cause erosion and pump cavitation. Air can accelerate hydraulic and lube oil oxidation and cause loss of insulation properties in dielectric fluids.

## Air removal

The HVP Portable Fluid Purifier removes 100% of free (entrained) air and up to 75% of dissolved air. Air is removed when the fluid passes through the partially evacuated tower. Other gases are reduced down to trace amounts depending on recirculation time.

## Problems caused by solids

Solid particulate contamination in fluids can damage system components severely. Left to recirculate in a fluid system, 1 to 5 micron contaminants or "silting" particles act as a lapping compound—grinding away surfaces of components...generating additional contamination...causing a chain reaction of wear.



Run time (min.)	Initial	120	180
Water content (PPM)	21,000	3,570	322

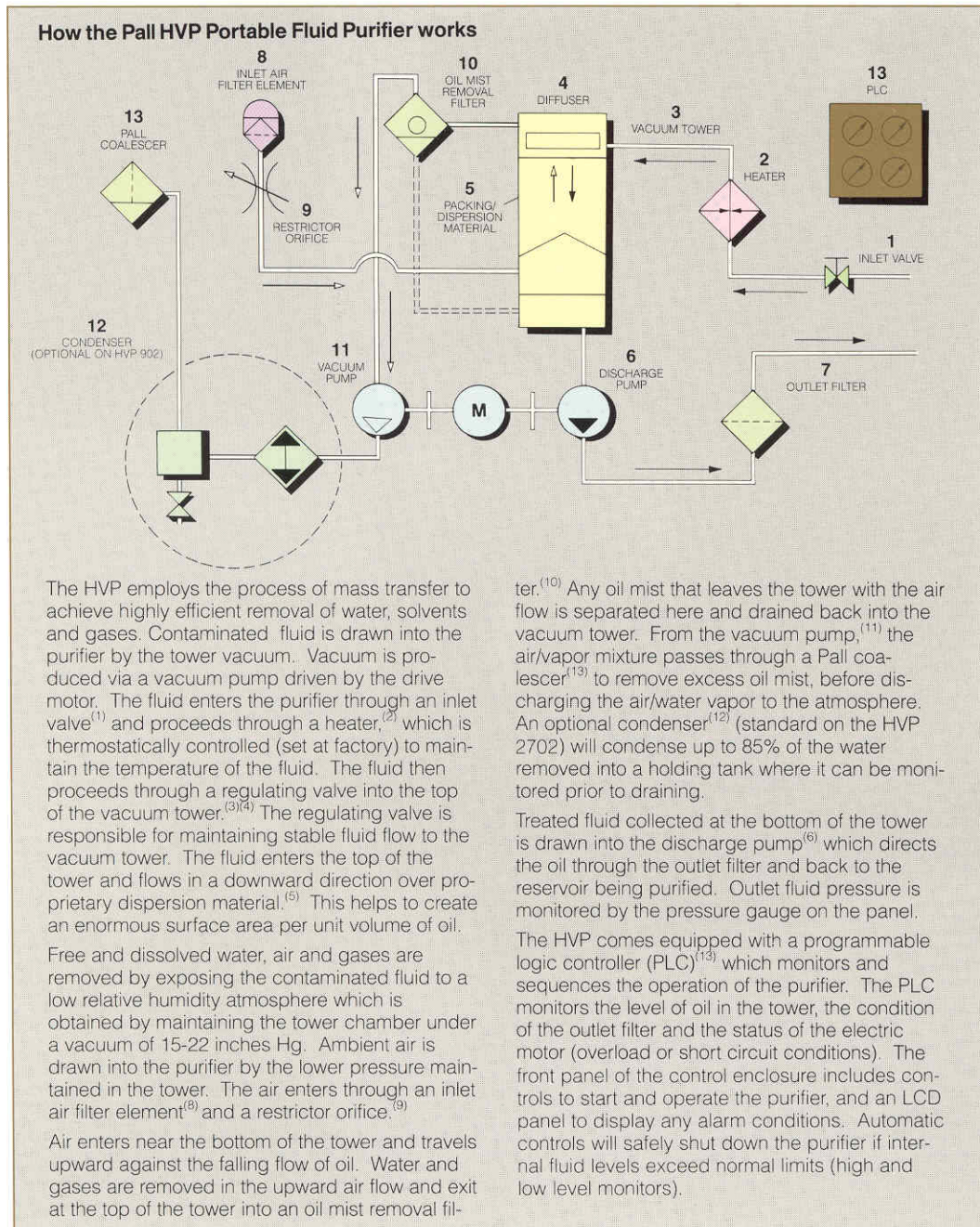
Typical water removal performance (50 gal. Mobil DTE 13 hydraulic fluid)

## Solids removal

To remove suspended particulate matter, Pall's HVP Fluid Purification System pumps the fluid through an Ultipor® III filter. This efficient  $\beta_x \geq 200$  filter element removes particulate that causes abrasive wear in bearings, pumps and valves. It also removes silt that can build up in the clearance between the valve spool and sleeve and cause stiction and instability in electrohydraulic servo valves. In insulating oils, this level of filtration prevents dielectric breakdown caused by bridging of charged particles. Fluid additives such as viscosity improvers and rust inhibitors, which are in solution, are not removed by this process.

## Reduce wear and prevent system problems

Wear causes numerous problems in hydraulic systems. Erosion and failure of *nozzles, flappers, slide valves, etc.* result from wear. Wear brings on poor response and high internal leakage in valves which produce instability and loss of control in servo systems. Pump breakdown is often caused by the wear particles that are recycled in the system and increase exponentially until failure occurs. Additional results of wear are failures in bearings, plugging of control orifices and abrasion of seals. Fluid breakdown (with subsequent acceleration of oxidation rates) occurs as wear-causing contaminants adversely affect the oil.



Typical bearing erosion caused by silting particles not removed in time.

# Features and benefits:

## Unique operating principle

The Pall HVP Purifier design can remove 100% free water and as much as 80% of dissolved water, 100% of free and entrained air and up to 75% of dissolved air. This is achieved without the need for excessive heat or high vacuum.

## Unattended operation

Automatic controls will safely shut down the system if fluid level is outside normal limits.

## Service information

An LCD panel displays all alarm conditions, including possible cause and service requirements, where applicable.



## High efficiency particulate filter

Solid particulate removal is achieved using an Ultipor<sup>®</sup> III filter rated at  $\beta_{0.5} \geq 200$ . This provides clean fluid to the system while exhibiting long filter service life.

## Overall dimensions

HVP 902: 79"H x 54"L x 31"W  
HVP 2702: 79"H x 63"L x 42.5"W

## Easily portable

The HVP Purifier is compact and mounted on casters providing high mobility. A pneumatic wheel option with tow bar is available for movement over gravel or similar terrain.



## Designed for simple operation

Just plug into an electrical outlet, open inlet and outlet valves, and start motor. **NO** adjustments are necessary. **NO** water or air line connections are required.

HVP 902 shown with option condenser



# The HVP Portable Fluid Purifier significantly reduces problems caused by particulates, water and air.

The HVP Portable Fluid Purifier is a complete and automatic unit. It typically provides the following levels of contamination control:

Contaminant	Filtration Performance to:
Particulate	Pall Cleanliness Code 13/12/10*
Free and dissolved water	100% free, 80% dissolved water removed
Free and dissolved air	100% free, 75% dissolved air removed

\*When utilizing Pall, KZ Ultipor III  $\beta_1 \geq 200$ .

## The HVP has key advantages over other units

**Versus desiccant units**—the HVP removes air; has unlimited water removal capability (no water absorbing material to replace); does not generate particles; does not change fluid chemistry.

**Versus centrifuge units**—the HVP costs less to purchase and operate; removes air, dissolved water; is portable; offers ease of maintenance.

**Versus coalescer units**—the HVP removes free and dissolved air; removes dissolved water; works where water is tightly bound as in a stable emulsion.

**Versus blotter presses**—the HVP has unlimited capacity to remove water; requires no downtime or costs for cleaning cartridges or replacing blotters; removes free and dissolved air and solvents.

**Versus vacuum separators**—the HVP does not require excess heating of oil, thus avoiding the danger of coking; has low power consumption; provides ease of maintenance.

### The HVP is versatile

The HVP Portable Purifier can be used to decontaminate any fluid having a flash point equal to or greater than 200°F with a maximum viscosity of 1300 SSU.

## Does not alter fluid... just removes water and contaminants

Since the HVP Portable Fluid Purifier does not use desiccants, high vacuum or high heat, it will not alter the physical or chemical properties of the treated fluid. Any other equipment using these processes could cause the following problems:

Purification Process	Potential Problem
Desiccant	Strips out fluid additives, generates hard particle contamination and requires monitoring to ensure that proper desiccant level is maintained.
High Vacuum	Strips the fluid of light ends, changing its viscosity.
High Heat	Causes fluid oxidation, coking or charring.

# HVP Portable Fluid Purifier specifications

	HVP-902	HVP-2702
Fluid Circulation Rate:	15 gpm/57 lpm	45 gpm/170 lpm
Plumbing Requirements:	Inlet 1 1/2" NPT Outlet 1 1/4" SAE st. thd.	Inlet 2" NPT Outlet 1 1/2" SAE st thd.
Dimensions:	L-54" W-31" H-79" (1.4m) (0.8m) (2.0m)	L-63" W-42.5" H-79" (1.6m) (1.08m) (2.0m)
Approx. Dry Weight:	1400 lbs.	2000 lbs
Motor(s):	3hp	7.5hp and 1hp
Heater Capacity:	18 kW (maximum)	30kW (maximum)
Chamber Vacuum:		15-22 in. (380-560 mm Hg)
Maximum Viscosity:		1300 SUS (260 cSt)
Filtration:		Pall 8314 Series Ultipor®III Medium with $\beta_x \geq 200$
Inlet Pressure:		15 inches Hg to 15 psig (380 mm Hg to 1 bar.)
Maximum Outlet Pressure:		75 psig (5 bar)
Water removal rate:		The removal rate of free water will vary depending on the fluid properties (viscosity, basestock, additive content) and application parameters (temperature, system volume, water content). In general, higher removal rates will be achieved with higher concentrations of water and higher temperatures. Depending on these conditions, free water removal rates of up to 18 gallons per day for the HVP902 (up to 40 gallons per day for the HVP2702) can be expected.

## Ordering information

MODEL NO. HVP-902  
HVP-2702

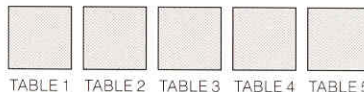


TABLE 1

CODE	SUPPLY POWER V/PH/Hz
220*	220/3/60
480	480/3/60
575	575/3/60
380	380/3/50

\*Not available for HVP-2702

TABLE 2

CODE	REMOVAL RATING MICRON SIZE AT WHICH $\beta_x = 200$
KZ	1
KP	3
KN	6

TABLE 3

CODE	SEAL
H	Buna N
Z	Fluorocarbon

TABLE 4

CODE	WHEEL CONFIGURATION
W	Caster wheels (standard)
P	Pneumatic wheels
F	Floor mount

TABLE 5

CODE	CONDENSER
C	Condenser
N*	No Condenser

\*Condenser is standard on the HVP 2702



**Pall Corporation**  
25 Harbor Park Drive  
Port Washington, New York 11050  
(516) 484-3600 • 1 (888)-333-7255  
Fax: (516) 484-3825  
<http://www.pall.com/contaminationcontrol>

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