

# VACUUM DISTILLATION UNIT (VDU)

PRODUCT  
BULLETIN



## HIGH VACUUM DISTILLATION FOR THE RECOVERY OR REFINING OF INDUSTRIAL ROLLING OILS

In the production of rolled aluminum sheet or foil, it is inevitable that the roll oil will become contaminated by heavy hydrocarbon oils and greases. These contaminants result from hydraulic system leaks, bearings and gearbox oils.

At some point, a level of contamination is reached where the quality of the rolled product is adversely affected. These effects can be in the form of staining, dimensional instability and uneven heat distribution.

The contaminated oil then has to be replaced by fresh oil with additives. An added concern is the disposal of the spent oil in an environmentally safe manner.



*Belt Driven Bottoms Pump designed for high vacuum pump suction operation.*



*Model VDU-30 Vacuum Distillation Unit*

## EQUIPMENT FEATURES

### Standard

- Heavy gauge reinforced steel construction.
- Heavy gauge distillation chamber with sight glass and level control sensors.
- Centrifugal feed pump with T.E.F.C. motor.
- Patented condenser with economizer preheater.
- Insulated, low watt-density electric heaters with unique turbulent flow design to eliminate carbonizing oil.
- Distillate receiver tank constructed of hot rolled steel with external level sight glass and level control sensors.
- Distillate cooling loop with heat exchanger and spray headers to promote further vaporized oil condensation.
- Vent cooler for removal of remaining oil vapors.
- Low vacuum pump with exhaust condensor.
- High vacuum booster pump to achieve up to 5mm Hg. vacuum.
- Centrifugal distillate discharge pump.
- Piping is all threaded black iron (bronze-free) pipe with welded seal to maintain high vacuum operation.
- 480V/3/60Hz control panel with PLC controller and touch-screen operator interface.

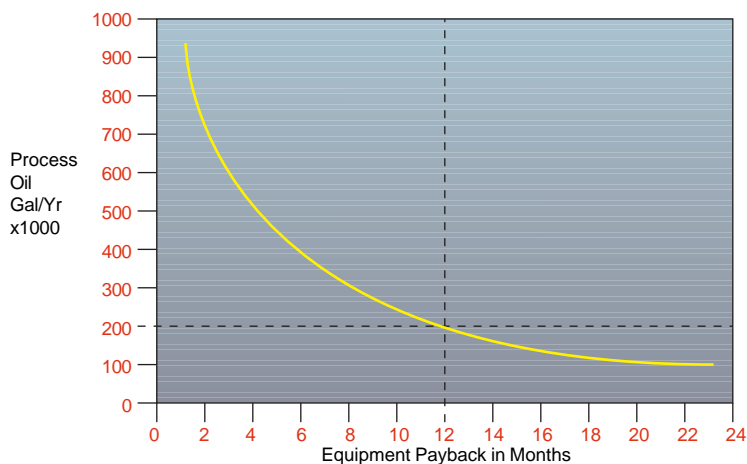
### Optional Features

- Water stripper with feed pump.
- Thermal insulation of the distillation chamber.
- Other voltages available.

## COST SAVINGS ANALYSIS

Cost of new oil with additives:	\$2.75/gal.
Operating cost of distillation unit:	(\$0.15/gal.)
Net value of recovered oil & additives:	\$2.60/gal.
Value of used oil if burned as fuel:	(\$1.10/gal.)
Net Savings:	\$1.50/gal.

**FIGURE 1  
PAYBACK VS OIL PROCESSED**



# FILTERTECH

Main Office/Factory  
Fairgrounds Drive, Manlius, NY 13104-0527  
TEL (315) 682-8815; FAX (315) 682-8825  
E-mail: [info@filtertech.com](mailto:info@filtertech.com)  
Web site: <http://www.filtertech.com>

West Region Office  
51 W. Elliot Rd., Suite 104, Tempe, AZ 85284  
TEL (480) 775-1111; FAX (480) 775-0604

## MODE OF OPERATION

A typical Filtertech installation would consist of the Model VDU Vacuum Distillation Unit and the optional oil-water decant tank. The contaminated oil would first be pumped from a waste storage tank through the oil-water decant tank which would strip trace amounts of water from the oil. By removing the water from the oil, “bumping” in the distillation chamber is eliminated.

Prior to introduction into the distillation chamber, the oil is preheated which causes the oil to immediately flash when exposed to the high vacuum environment in the distillation chamber. While the roll oil and additives vaporize and are carried out of the distillation chamber, the heavy hydrocarbon oil contaminants “bottoms” drop to the base of the distillation chamber where they accumulate before disposal.

To extract any remaining roll oil or additives from the heavy hydrocarbon oils, the bottoms are recirculated again through the heating elements and again flashed into the distillation chamber. When enough heavy hydrocarbon oil contaminants have accumulated in the distillation chamber, the “bottoms” are automatically discharged into a waste tank for disposal or recovery for fuel blending.

The roll oil and additive vapors in the distillation chamber are carried over into the condenser where they precipitate and drain into the distillate receiver tank for further cooling.

When the distillate receiver tank is full, the tank is automatically pumped down and into a clean oil holding tank provided by the operating facility.

A secondary condenser “vent cooler” is used to condense any remaining vapors thus preventing contamination of the vacuum pump seal oil.

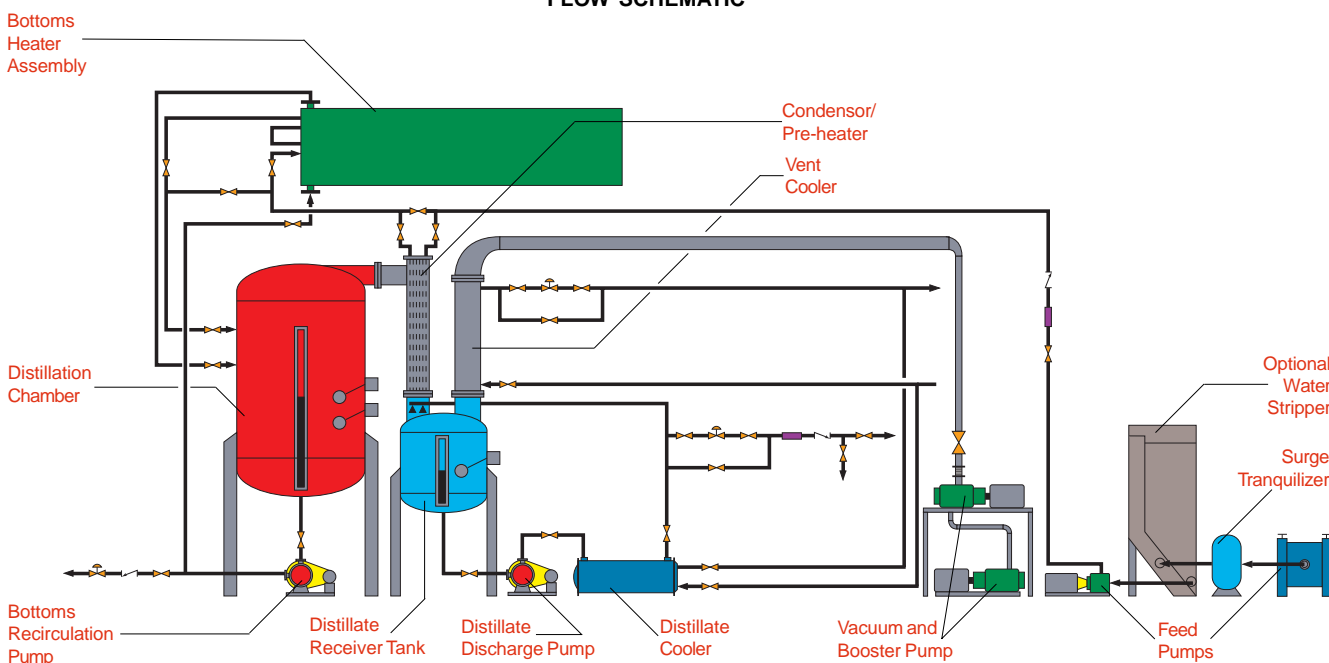
The operation of the VDU is fully automatic and utilizes a PLC controller and operator interface. The VDU can also be provided with the necessary storage tanks for contaminated oil, clean oil and waste bottoms as a complete turnkey system.

High quality rolling oil can be reclaimed at approximately 5% of the cost of new base oil. Operation and maintenance costs are minimal as the unit is completely automatic, requiring only periodic operator checking.

Due to the low operating cost to process contaminated roll oil, many facilities pretreat the neat (virgin) roll oil to further purify the oil before use.

A typical amortization schedule of the entire capital investment, including site preparation, installation and operating costs based on a usage of 200,000 gallons per year, results in a payback of less than 12 months (see figure 1).

**FIGURE 2  
VACUUM DISTILLATION UNIT  
FLOW SCHEMATIC**



## SPECIFICATIONS

Model†	Dimensions			Cooling Water GPM @ 75 F	Electrical Requirements	Est. Wt. lbs.
	Length	Width	Height			
VDU-30	12'-1" (368 cm)	7'-0" (214 cm)	13'-2" (402 cm)	35 (133 lpm)	480V/3Ø/60Hz-100A	12,200 (5545 kg)
VDU-100	17'-0" (518 cm)	7'-0" (214 cm)	13'-11" (424 cm)	50 (190 lpm)	480V/3Ø/60Hz-150A	16,000 (7273 kg)

† Other sizes are available on a custom basis.

Specifications subject to change without notice.

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