



Pump On Demand Skimmer System

POD (Pump on Demand) Skimmer System

Application

Out-of-the-box LNAPL recovery in 2-inch and larger-diameter wells. The POD Skimmer model TR-610 recovers light-end hydrocarbons with SSU values of 80 or lower (fig. 1).

POD Skimmer model TR-611 is used for 4-in and larger diameter wells and is perfect for recovering products with viscosities of 80 SSU or higher.

Advantages

- ❖ The POD Skimmer is a green energy LNAPL recovery system that can be powered by solar, CO₂, or compressed air.
- ❖ Cycles only when the pump is full, minimizing air consumption.
- ❖ No need for electrical power when operated with CO₂ or solar.
- ❖ Can be installed and operational in less than 30 minutes.
- ❖ Records the amount of product recovered from each well.

Description

For remediation sites with power limitations or where immediate response is needed, the POD Skimmer is an excellent choice. It's based on our highly successful FAP™ Plus Skimming System and incorporates many of the same proven elements.

The POD Skimmer ships partially assembled and can be fully operational using either CO₂ or solar power within minutes. This reduces the need for permits and trenching and saves money and time. When using CO₂ as a power source, the POD Skimmer takes up very little space, making it an excellent choice for locations where a smaller foot-print is needed (fig. 2).

Operation (TR-610)

POD Skimmer model TR-610 uses a 42-in auto compensating, product-only skimmer that is attached to the top of the pump. LNAPL from the skimmer feeds into the pump. As the pump chamber fills with product, the internal float shifts, opening the air valve to cycle the pump. The POD Skimmer optimizes the use of compressed gas because the pump only cycles when full.

When the skimmer is lowered into the well and free product thickness exceeds 5 inches, the product will flow into the pump through the product bypass float above the hydrophobic filter. In these conditions, the POD Skimmer is capable of recovering up to 100 or more gallons per day.

When product thickness is less than 5 inches, the product passes through an oilophilic/hydrophobic filter. The rate at which the product can pass through this element depends on the product thickness, viscosity and temperature. Gasoline at room temperature will flow through it at approximately 40 gallons per day.

(TR-611)

POD Skimmer model TR-611 operates similarly to the TR-610 but with the following differences. The unit has to be operated in 4-inch or larger wells due to the diameter of the product density float. The unit does not use a hydrophobic element and will remove product to an approximate thickness of ¼ to ½ inch. The specific gravity of the product density float can be adjusted to minimize the product thickness.



Fig. 1



Fig. 2

Features

- ❖ The POD Skimmer uses Poplet non-leak air and exhaust valves.
- ❖ The valves are assisted by a magnet to provide a positive shift in all conditions.
- ❖ The valves are self cleaning and will operate in 40-micron filtered air conditions. Dry air is not required.
- ❖ The POD Skimmer will recover only product when properly installed.
- ❖ POD Skimmer model TR-610 requires only 52 inches of well depth below the product to operate and only 39.5 inches of well depth for model TR-611.
- ❖ Each pump cycle discharges approximately 5 oz of product.
- ❖ When the skimming system is operated on bottled CO₂, the recovery rate at 60 feet of discharge head is 100 gallons of recovered product per 4.0 lb of CO₂. The current price of CO₂ varies from \$0.40 to \$0.70 per pound, therefore the cost to recover a gallon of product at this depth is \$0.02 to \$0.03.
- ❖ System includes a cycle/pulse counter to calculate the volume of product recovered from each pump.
- ❖ 42-in auto-compensating skimmer travel that removes product to a sheen (Model TR-610).
- ❖ The skimmer is furnished with convenient push-to-connect fittings.
- ❖ The product density float can be adjusted by adding or removing weights to minimize product thickness in the well (Model TR-611).
- ❖ Using CO₂ produces no objectionable noise.
- ❖ Using CO₂ will prevent the freezing of compressed gas supply lines.

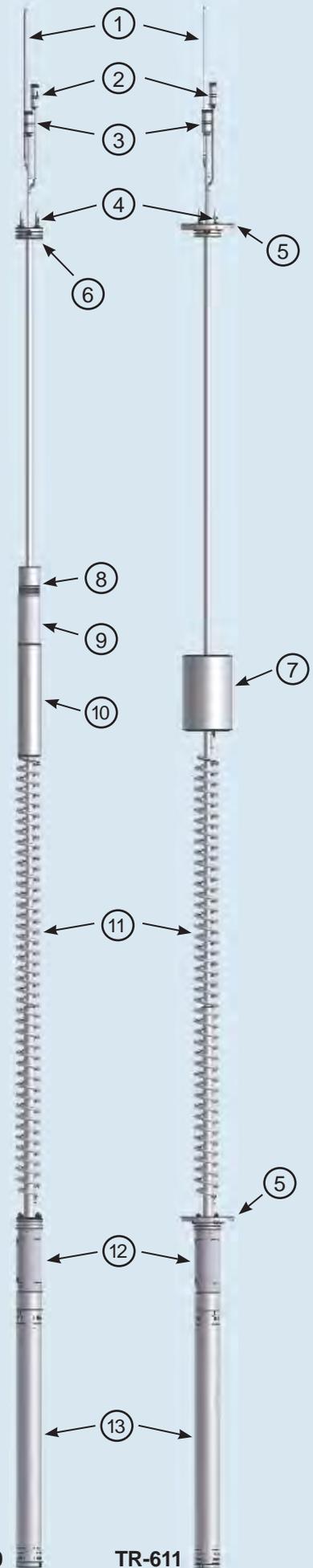
- ① Pump exhaust, 3/16 in clear Nylon
- ② Gas supply, reducing union 5/32 in O.D. x 1/4 in O.D.
- ③ Product discharge reducing union 1/4 in O.D. x 3/8 in I.D.
- ④ Eye bolts to suspend skimmer in well.
- ⑤ Well centralizer 3½ in O.D.
- ⑥ Well centralizer 1½ in O.D.

- ⑦ Product density float 3½ in O.D.
- ⑧ Product bypass float 1½ in O.D.
- ⑨ Hydrophobic filter element 1½ in O.D.
- ⑩ Density float 1½ in O.D.

- ⑪ Coiled product tubing

- ⑫ Spacer

- ⑬ POD Pump 1½ in O.D.



TR-610

TR-611

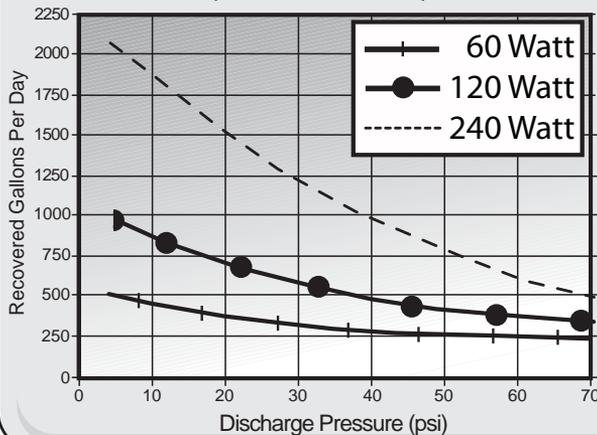
Note: For operating pressures of greater than 80 psi, contact DGS!

Ordering Information

Pump/Skimmer Construction

Pump:	
304 and 303 stainless steel:	Pump head body, bottom, and center tube
Ebonite:	Pump float
Viton®:	Check valve balls and O-rings
Brass and nickel-plated brass:	Fittings
N-40 nickel-plated rare-earth	Magnets
Nickel-plated brass with Viton seals	Valves
Skimmer:	
304 and 316 stainless steel:	Tube and centralizers
UHMW;	Density float
Ebonite:	Product by-pass float
Nylon®:	Product discharge, air, and exhaust lines
Urethane:	Shimmer hose
Brass and nickel-plated brass:	Air and discharge fittings

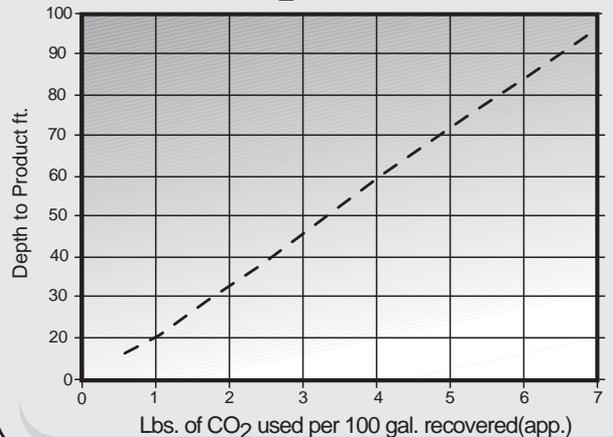
POD Skimmer Performance*
(Solar Powered)**



* Requires multiple POD pumps.

** Based on optimum positioning of solar panels.

POD Skimmer Performance*
(CO₂ Powered)*



* Supply system must be leak-free.

SELECTION TABLE FOR POD PUMPS/SKIMMERS

Part Number	Model	Assembled Length (pump / skimmer) (in)	Assembled Weight (lb)	Well Centralizer Diameter (in)
TR-610	POD Skimming System, (Includes pump, skimmer, spanners and cycle counter)	97	8	1 $\frac{1}{8}$
TR-611	POD High Viscosity Skimming System, (Includes pump, skimmer, spanners and cycle counter)	97	8	3 $\frac{1}{2}$

For manuals, parts lists and more, visit www.durhamgeo.com

Accessories

Tank-Full Shut-Off (TR-75713) - Installed on the recovery tank or drum to prevent overflowing of the product storage vessel. The main air is supplied to the inlet side of the overflow device and the outlet air supply to the POD Skimmer. The overflow device is triggered by increased fluid levels in the recovery tank and mechanically shuts-off the air supply to the POD Skimmer. The standard overflow device can be used with multiple pumps and installs into a standard 2-in female pipe thread. The unit does not consume compressed gas.



TR-75713

TR-75713	Tank-Full Shut-Off	4 lb
Dimensions	6 x 6 x 21 in	
Enclosure	PVC and aluminum	
Operating Pressure	0 - 100 psi	

Electro-Pneumatic Overflow Protection Device (TR-758) - Uses an intrinsically safe float sensor to shut off the air supply to the POD Skimmer. Includes a programmable 24-hour timer to allow on/off time settings in 15 minute increments. Features a NEMA 4 rated enclosure with Solid State GEM Pak® circuitry and an 8-ft power cord.
Note: Must be located in non-hazardous environment.



TR-758

Electro-Pneumatic Overflow Protection Device	10 lb
Dimensions	6 x 6 x 4 in
Air capacity	23 scfm@100 psi
Voltage (ac)	110 V

Hoses and Tubing (TR-7341 / 735) - For the POD Skimmer. Available in various sizes and sold per foot.

PN	Size	Composite	Use
TR-7341	3/8 in O.D.	Nylon®	Downwell fluid discharge
TR-735	1/4 in O.D.	Polyethylene	Downwell supply to pump

SolarNAPL (TR-51600) - A solar-powered air compressor which can be configured to run the POD Skimmer. It uses the sun's renewable energy as the only power source necessary to operate recovery pumps and is an excellent option for remote locations.



TR-51600

TR-51600	SolarNAPL	210 lb
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Suspension Cable Kits (918701) - Come with fittings and 50 ft of cable for typical installations. Longer cable lengths are available (918702) and sold per ft. Cable clamps (918537) also available.

Air Compressor (TR-901) - Electric, non-explosion-proof indoor-use air compressor. Can be used with multiple POD Skimmers.

Air Compressor	hp	Tank size	cfm @ 90 psi	Voltage (ac)	Weight
TR-901	2.0	13 gal.	5.5	120 V (60 Hz)	150 lb

CO₂ Cylinders - Purchasing your own CO₂ cylinder eliminates the cost of renting from suppliers. All CO₂ cylinders ship empty.

CO ₂ Cylinder	Wt. of CO ₂ stored (lb)	Weight (empty) (lb)
TR-617	5	8
TR-616	10	15
TR-615	20	24



POD Drum Connector (TR-618) - Is threaded onto the 3/4-in FNPT bung on a 55 gallon product recovery drum. Includes a 3/8 in O.D. push-to-connect swivel elbow that connects to the product discharge tube of the POD Skimmer.



TR-618

TR-618	POD Drum Connector	5 lb
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High Pressure CO₂ Regulator (TR-612) - Comes with 1/4 in O.D. push-to-connect fittings.

TR-612	CO ₂ Regulator	2 lb
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Well Seals

DGSI well seals provide an easy means of connecting fluid and air lines to simplify installations. Strain relief seals isolate the individual DGSI tubing sizes used on the POD Skimmer pumps and are vacuum rated.

The well seals are attached to the casing, sealing them to the diameter of the well casing with a Fernco™-type flexible coupling. Additional threaded openings through the seals are provided for fluid level monitoring.

Eyehook included for attaching pump support cable.



2-inch well seal, TR-620



4-inch well seal, TR-621

Well Seals Construction

Fernco-type seal:	Neoprene rubber, stainless steel hose clamps
Eyelet for pump construction:	Type 304 stainless steel
Compression seals for hoses and tubing:	Nylon® and neoprene rubber
Pipe plugs:	Nylon®
Hardware misc.:	18-8 stainless steel
Top seal plate:	Gray PVC

How to spec your well seal: Select part numbers from the following groups as needed.



TR-620

2 in Well Seal Assembly*

TR-620



TR-621

4 in Well Seal Assembly*

TR-621

* If exhausting the POD Skimmer outside the well it will be necessary to install 1/4-inch tubing (TR-735) from the top of the skimmer through the well seal and to purchase additional tube adapters (300878 and 603549).

Note: To view detailed information on well seals, visit

www.DGSI.info/wellseals