

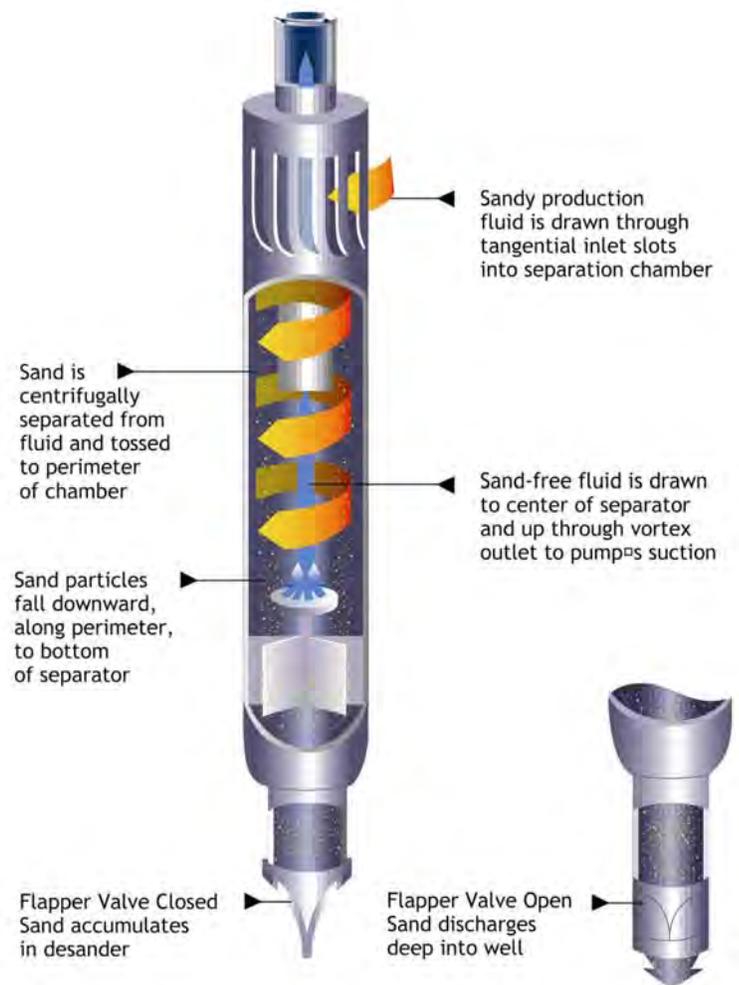
LAKOS Pump Protection Desanders

PPD

Removes sand from production fluids before they enter a downhole pump, increasing the life and efficiency of ESP and PCP pumps.

LAKOS Pump Protection Separators feature no moving parts to wear out, no screens or filter elements to clean or replace, and require no routine maintenance. Trouble-free and effective, the LAKOS Separator is easily installed onto the suction of an ESP or PCP pump.

- ◆ **Reduces pump wear, repair and replacement**
- ◆ **Extends pump life by four times or more**
- ◆ **Helps maintain optimum pump yield**
- ◆ **Saves on pump energy costs with higher operating efficiency**
- ◆ **Minimizes critical pump breakdowns**
- ◆ **Reduces the burden on other filtration and treatment processes**
- ◆ **Does not plug or restrict production**
- ◆ **Offers long life**



Flow range: Standard Models
1,661-9,057 bbl/d
(11-60 m³/hr)

Consult factory for additional
flow ranges

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General Specifications

Model	Min Well I.D.		Flow Range		Outside Diameter		Length with Riser		Conn Size EUE threads	Weight	
	in	mm	BBLD	m ³ /hr	in	mm	in	mm	in	lbs	kg
PPD-0240	6	152.4	1661-3623	11-24	4.5	114	83.25	2115	2	72	34
PPD-0300	6	152.4	3019-4529	20-30	4.5	114	83.25	2115	2	72	34
PPD-0400	6	152.4	4076-6038	27-40	4.5	114	83.25	2115	2	72	34
PPD-0600	7	177.8	6793-9057	45-60	5.56	141	101	2565	3	114	52

Head Loss: Typically, 9-14 feet (2.74-4.27 M)

Maximum Particle Size: ¼ inch (6.33 mm)

Material: 316L stainless steel; post-weld heat treated; Viton flapper valve

Exterior Finish: Glassblast

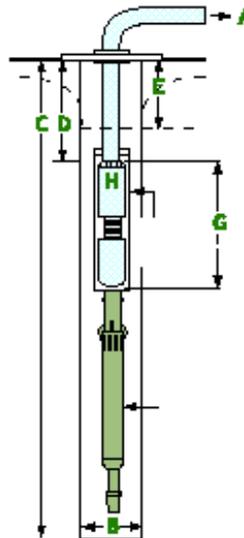
Each model in the Pump Protection series is engineered for a specific flow range and with concern for certain restrictions. To assure maximum performance, carefully identify the proper model. Selecting a larger or smaller model than recommended may affect performance. Use this information to select a model according to your pump's actual flow rate. If two or more models are applicable, choose the unit with the lowest maximum flow rate. Note also the minimum well I.D. for the model chosen. If your well I.D. is too small, either select another model that accommodates your flow rate and well I.D., or consult the factory for special assistance.

Installation Schematics

Required data for proper model selection:

- Maximum and minimum flow rate of pump
- Minimum inside diameter (I.D.) of well
- Depth of well
- Depth of pump setting
- Pumping water level
- Maximum diameter of pump/motor
- Overall length of pump and motor
- Pump's riser size (N.P.T.)

Separators require a minimum submergence of 30 feet (9.2 M) below the drawdown water level. Minimum clearance below separator's purge discharge is 30 feet (9.2 M).



Where Does the Sand Go?

Certainly the most common procedure for (and objection to) disposing of separated sand is to discharge that sand deep into the well. It has always been, and always will be, a better alternative to grinding up a pump and destroying its efficiency. And, though the accumulation of sand in a well could eventually require evacuation (though it seldom does), that cost is far less than the certainty of expensive pump repair or replacement and excessive energy cost through reduced efficiency.

But the sand most likely will never fill up the well. Extensive research conducted by Ohio University, under the direction of the National Water Well Association, unmasked the mystery of what a pump protection and separator can really do to solve the problem of a sandy well. Essentially, the study revealed that a pump protection separator actually helps create a state of "equilibrium," virtually eliminating the entry of additional sand into a well. Technically it is described as such:

- Sand is carried into a well by the velocity and efficiency of the incoming water.
- The sand separator removes and discharges that sand back into the well until the well fills up to a certain level.
- At that level, the flow pattern of the incoming water through the ground formations and into the well is sufficiently distorted to reduce its actual incoming velocity and efficiency.
- At such a reduced efficiency, the water is then no longer capable of carrying sand into the well.
- The sand separator maintains that equilibrium by preventing the pump from evacuating sand, which would otherwise encourage conditions in the well to draw in more sand.

Conclusion: The separated sand from a LAKOS Pump Protection Separator most often will NOT fill up the well, and may actually stop additional sand from even entering the well.

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Oil and Gas Desanding Systems

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Not Connected with the DeLaval Separator Company

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LAKOS products are manufactured and sold under one or more of the following U.S. Patents: 3,289,608; 3,512,651; 3,658,837; 3,701,425; 3,947,364; 3,963,073; 4,027,481; 4,120,795; 4,148,735; 4,305,825; 4,555,333; 5,320,747; 5,338,341; 5,368,735; 5,425,876; 5,571,416; 5,578,203; 5,622,545; 5,653,874; 5,894,995; 6,090,276; 6,143,175; 6,167,960; Des. 327, 693; and corresponding foreign patents. Other U.S. and foreign patents pending.

LIMITED WARRANTY

All products manufactured and marketed by this corporation are warranted to be free of defects in material or workmanship for a period of at least one year from date of delivery. Extended warranty coverage applies as follows:

All LAKOS Desanders: Five year warranty

All other components: 12 months from date of installation; if installed 6 months or more after ship date, warranty shall be a maximum of 18 months from ship date. If a fault develops, notify us, giving a complete description of the alleged malfunction. Include the model number(s), date of delivery and operating conditions of subject product(s). We will subsequently review this information and, at our option, supply you with either servicing data or shipping instruction and returned materials authorization. Upon prepaid receipt of subject product(s) at the instructed destination, we will then either repair or replace such product(s), at our option, and if determined to be a warranted defect, we will perform such necessary product repairs or replace product(s) at our expense.

This limited warranty does not cover any products, damages or injuries resulting from misuse, neglect, normal expected wear, chemically-caused corrosion, improper installation or operation contrary to factory recommendation. Nor does it cover equipment that has been modified, tampered with or altered without authorization.

No other extended liabilities are stated or implied and this warranty in no event covers incidental or consequential damages, injuries or costs resulting from any such defective product(s).



Ask about our downhole and borehole video inspection camera systems, a division of the LAKOS/LAVAL companies.

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