

Oil Diffusion Pump ULK/PFL/PBL series

ULVAC's oil diffusion pump has been used for many high vacuum equipments. We meet customer's needs with various line-up including 4 to 52 inch for oil diffusion pump and 2 to 20 inch for oil diffusion ejector pump.



ULK-14A



PBL-04



PFL-22

Features

ULK series

- ▶ 4 models are available between 4 to 14 inch. 2 kinds of oil and heater are selectable depending on required pumping speed and ultimate pressure.

PFL series

- ▶ 4 models are available between 22 to 52 inch and they are used for large size vacuum equipment such as vacuum furnace.

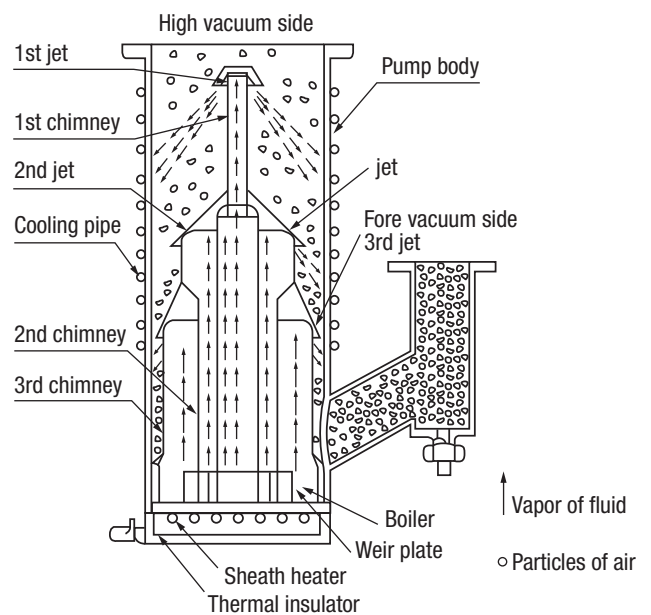
PBL series

- ▶ 6 models are available between 2 to 20 inch. This series has maximum pumping speed at 10^{-1} Pa range, where pumping speed of oil rotary pump or mechanical booster pump decreases.

Working Principle and Structure

- ▶ The oil diffusion pump consists of a pump body, boiler heater and 3-stage fractionating jet stack assembly. The working fluid (oil) is heated in the boiler, vaporized and streams out of each stage of the jet stack at high speed. Gases on the high vacuum (inlet) side of the pump are captured in the jet vapor by diffusion, and are carried from upper to the lower jet stages which compresses them in the process. These pumped gasses are then exhausted through the outlet port to the fore pump. The vapor stream from the jet stack is cooled and condensed on the inner walls of pump body, and returned to the boiler. By repetition of this process, evacuation is accomplished. The weir plate provided in the boiler permits return and recirculation of the working fluid, allowing the fractional distillation of the fluid to be a continuous process. (High vapor pressure components in the working fluid are evaporated at the outer zone of the pump housing, while low vapor pressure components are evaporated at the inner zone.)

Structure



Oil Diffusion Pump ULK series

Specifications

Model	ULK-04A		ULK-06A		ULK-10A		ULK-14A	
Pumping speed (L/sec)	550	500	1200	1100	3400	3000	5400	4900
Ultimate pressure (Pa) ^{*1}	$<2.6 \times 10^{-5}$	$<2.6 \times 10^{-6}$	$<2.6 \times 10^{-5}$	$<2.6 \times 10^{-6}$	$<2.6 \times 10^{-5}$	$<2.6 \times 10^{-6}$	$<2.6 \times 10^{-5}$	$<2.6 \times 10^{-6}$
Maximum forepressure (Pa)	40	60	40	60	35	40	30	30
Heating up time (min)	9	8.5	16.5	15	20	20	25	25
Oil ^{*4}	ULVOIL D-11	ULVOIL D-31	ULVOIL D-11	ULVOIL D-31	ULVOIL D-11	ULVOIL D-31	ULVOIL D-11	ULVOIL D-31
Oil capacity (L)	0.15		0.35		0.8		1.5	
Cooling water temperature (°C)	19°C ~ 25°C							
Water connections	Rc 1/4"		Rc 1/4"		Rc 3/8"		Rc 3/8"	
Water capacity (L/min)	1	1	1	1.5	2.5	3	2.5	3.5
Voltage	200V/1φ							
Pump power (kW)	0.55	0.73	0.9	1.2	2	2.4	2.25	2.4
Heater type	plate		plate		plate		plate	
Standard backing pump ^{*2}	VD151/VD201 PVD-180/PVD-360		VD30C/VD40C/VD60C		VD90C VS1501 PKS-016/PKS-030		VS1501/VS2401/PKS-030	
Dimensions ^{*3} (mm)	A	175	250		340		340	
	B	150	180		240		240	
	H	344	449		650		670	
Inlet	VG100		VG150		VG250		VG350	
Outlet	VG25		VG40		VG80		VG80	
Mass (kg)	7.5		13.5		47		56	
Oil level gage	without		without		Sight glass		Sight glass	
Thermal switch option	with		with		with		with	
Thermal switch operating temperature (°C)	250		250		180		180	

*1 The ultimate pressure by an ionization gauge in the case of coolant temperature 20 degrees Celsius.

*2 The backing pump chooses it for the maximum throughput of the diffusion pump, but, in consideration of time of starting pressure, it is good to use a big backing pump.

*3 Please confirm other dimensions by CAD data placing in the ULVAC, Inc. website.

*4 D-11 is hydrocarbon-based general-purpose oil. D-31 is the silicon-based diffusion pump oil which heat-resistant stability is high in.

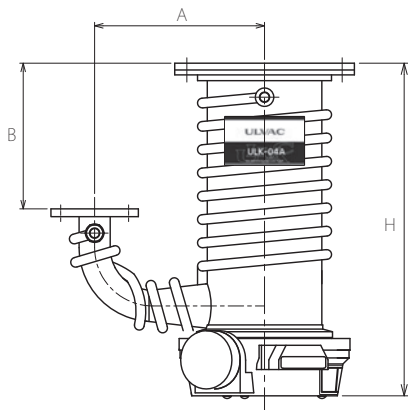
Water Cooling Baffle (ULK Option)

Model	BW-04B	BW-06B	BW-10	BW-14
conductance (L/sec)	940	2200	3130	5000
Dimensions ^{*1} (mm)	Outside dimension (D)	φ149	φ199	φ450
	Height (T)	28	28	44
	Flange height (t)	25	25	22
Water connections	Rc 1/4"		Rc 1/4"	Rc 3/8"
Water capacity (L/min)	0.7	1	2	2
Mass (kg)	1.3	1.7	7.6	11

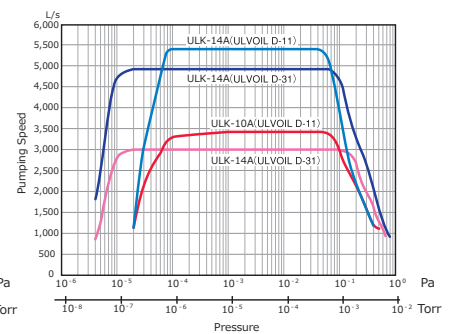
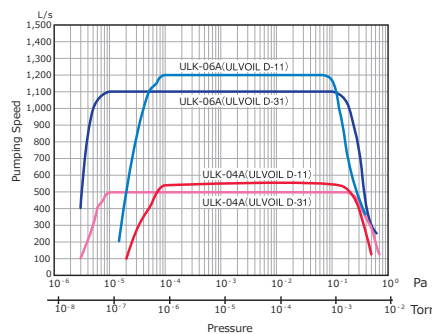
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▶ Dimensions

▶ ULK



▶ Pumping Speed Curve



Oil Diffusion Pump PFL series

Specifications

Model	PFL-22	PFL-36	PFL-52
Pumping speed (L/sec)	10000	34000	70000
Ultimate pressure (Pa) ^{*1}		3.0×10^{-4}	
Maximum forepressure (Pa)	16	6.7	16
Heating up time (min)	40	60	60
Oil		ULVOIL D-11	
Oil capacity (L)	5	13	27
Cooling water temperature (°C)		19°C~25°C	
Water connections	Rc 1/2"×2	Rc 1/2"×2	Rc 1/2"×4, Rc 3/8"×2
Water capacity (L/min)	12	38	50
Voltage		200V/3φ	
Pump power (kW)	8	Start-up 22 Normal 11	Start-up 45 Normal 30
Heater type	coiled element	coiled element	coiled element
Standard backing pump ^{*2}	PMB-040C+PKS-070 (PMB1200D+PKS-030)	PMB-040C+PKS-070 (PMB1200D+PKS-070) (PMB2400D+PKS-070)	PMB-060C+PKS-070×2pc. (PMB2400D+PKS-070)
Dimensions ^{*3} (mm)	A	480	725
	B	630	1022
	H	1330	1732
Inlet	VG550	VG900	52inch equivalent to VG of jis standard
Outlet	VG150	VG250	VG350
Mass (kg)	290	650	1400
Oil level gage	Sight glass	Sight glass	Sight glass
Thermal switch option	with	with	with
Thermal switch operating temperature (°C)	180	110	110

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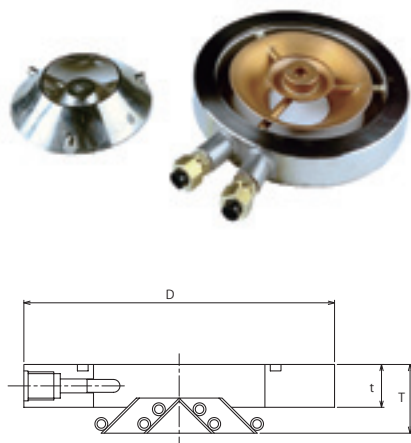
*3 Please confirm other dimensions by CAD data placing in the ULVAC,Inc.website.

Water Cooling Baffle (PFL Option)

Model	BW-22	BW-36	BW-52
conductance (L/sec)	14000	54000	75000
Dimensions ^{*1} (mm)	Outside diameter (D)	φ680	φ1065
	Height (T)	101	113
	Flange height (t)	26	28
Water connections	Rc 3/8"	Rc 3/8"	Rc 1/2"
Water capacity (L/min)	3	5	5
Mass (kg)	28	66	200

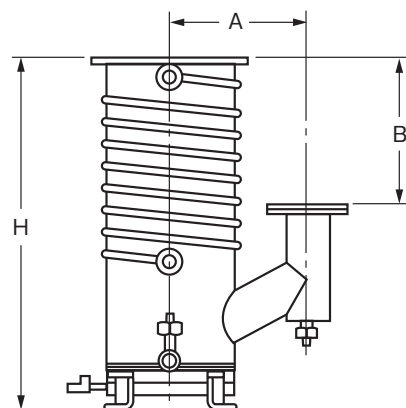
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Water Cooling Baffle

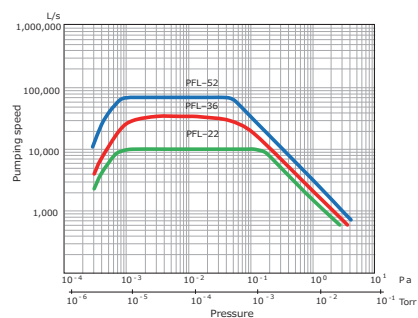


Dimensions

▶ PFL



Pumping Speed Curve



Oil Diffusion ejector Pump PBL series

Specifications

Model	PBL-02	PBL-04	PBL-06	PBL-10	PBL-14	PBL-20
Pumping speed (L/sec)	80	200	500	1800	4000	7000
Ultimate pressure (Pa) ^{*1}	2.7×10 ⁻²					
Maximum forepressure (Pa)	40					
Heating up time (min)	20	30	30	40	50	60
Oil	ULVOIL B-6					
Oil capacity (L)	0.1	0.6	7.5	18	36	90
Cooling water temperature (°C)	19°C ~ 25°C					
Water connections	Rc 1/8"×1	Rc 1/4"×1	Rc 3/8"×2	Rc 1/2"×2	Rc 1/2"×3	Rc 1/2"×3, Rc 3/8"×1
Water capacity (L/min)	1.5	5	8	12	18	25
Voltage	200V/1φ			200V/3φ		
Pump power (kW)	0.44	1.8	4 2KW×2pc.	8 4KW×2pc.	11 5.5KW×2pc.	18 6KW×3pc.
Heater type	cartridge	coiled element	sheathed	sheathed	sheathed	sheathed
Standard backing pump ^{*2}	VD201/VD30C PVD-360	PKS-016 VS1501	PKS-030 VS2401	PKS-070 (PMB600D+PKS-030) (PMB600D+VS1501)	PMB1200D+PKS-030 PMB1200D+VS1501	PMB-040C+PKS-070 (PMB2400D+PKS-070)
Dimensions ^{*3} (mm)	A	100	150	200	300	510
	B	70	112	152	346	422
	H	463	524	973	1321	1687
Inlet	VG50	VG100	VG150	VG250	VG350	VG500
Outlet	3/4B hose fittings	VG40	VG50	VG80	VG100	VG200
Mass (kg)	6	17	86	198	313	495
Oil level gage	without	without	dip stick	dip stick	dip stick	dip stick
Thermal switch option	without	without	without	without	without	without
Thermal switch operating temperature (°C)	-	-	-	-	-	-

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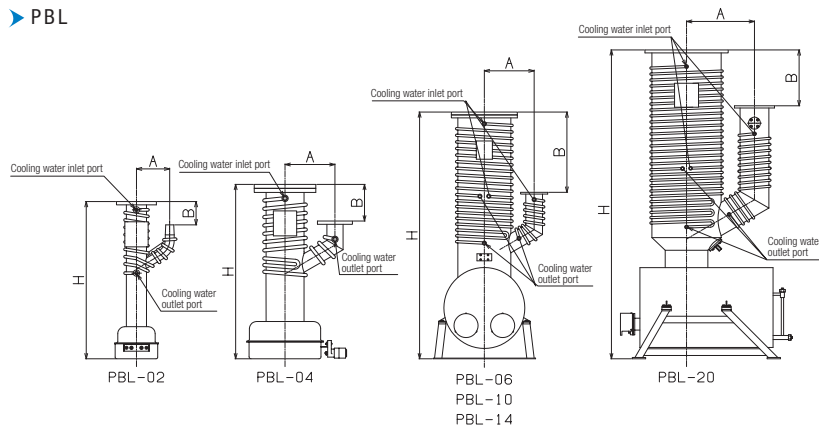
Water Cooling Baffle (PBL Option)

Model	BW-02	BW-04B	BW-06B	BW-10	BW-14	BW-20	
conductance (L/sec)	100	940	2200	3130	5000	13000	
Dimensions ^{*1} (mm)	Outside dimension (D)	φ120	φ149	φ199	φ350	φ625	
	Height (T)	16	28	28	44	50	152
	Flange height (t)	16	25	25	22	22	24
Water connections	Rc 1/8"	Rc 1/4"	Rc 1/4"	Rc 1/4"	Rc 3/8"	Rc 3/8"	
Water capacity (L/min)	1.5	0.7	1	2	2	3	
Mass (kg)	1	1.3	1.7	7.6	11	22	

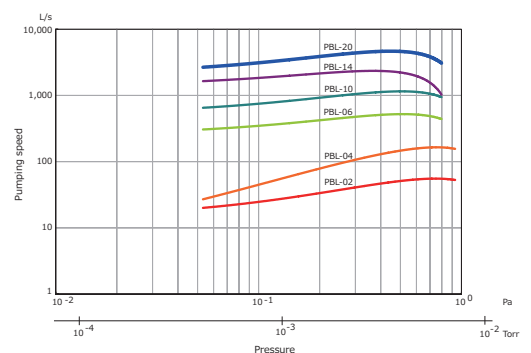
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Dimensions

PBL



Pumping Speed Curve



ULVAC, Inc. Components Division

www.ulvac.co.jp/en

Overseas Sales in Japan TEL +81-467-89-2261

USA : ULVAC Technologies, Inc. TEL +1-978-686-7550
 GERMANY : ULVAC GmbH TEL +49-89-960909-0
 CHINA : ULVAC (SHANGHAI) Trading Co.,Ltd. TEL +86-21-6127-6618
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