

# Oil for Diffusion and Ejector Pumps **ULVOIL<sup>®</sup> D-11/D-31/B-50K**

D-31 is a silicon based synthetic oil made specifically for diffusion pumps. D-31 has excellent thermal resistance in addition to low vapor pressure.

D-11 and B-50K are hydrocarbon based synthetic oil with low latent heat of evaporation. Therefore, they have higher energy efficiency compared to silicon and fluoride based oil. These oil are well suited to diffusion pumps.

## Features



- ULVOIL satisfies the 3 basic requirements of diffusion pumps.
  1. Low vapor pressure properties that determine ultimate pressure.
  2. Low latent heat of evaporation makes evaporation occur easily with low heat quantities.
  3. Excellent thermal resistance and antioxidization stability allows the oil to withstand the evaporation-condensation cycle.
 ULVOIL is a specialized oil that satisfies the above selected conditions for use in diffusion pumps.

- ULVOIL improves diffusion pump functionality. The heat capacity of a diffusion pump heater is closely related to the latent heat of evaporation of the oil being used. Excess heat capacity can result in problems such as sudden boiling. On the other hand, when the heat capacity is too small, the evaporation volume is low and the specified exhaust volume cannot be reached. We highly recommend the use of our original ULVOIL, a genuine diffusion pump oil.

ULVOIL D-11, D-31, B50K Specification Table

Applications		Diffusion pump oil		Ejector pump oil	Test method
Synthetic oil types		Hydrocarbon base	Silicon base	Hydrocarbon base	
ULVOIL model number		D-11	D-31	B-50K	
Ultimate pressure	Pa	$7 \times 10^{-5}$	$3 \times 10^{-8}$	$1.3 \times 10^{-2}$	Internal ULVAC evaluation method
Vapor pressure	20 °C	Pa	$7.3 \times 10^{-5}$	$2.1 \times 10^{-8}$	—
	40 °C	Pa	$1.7 \times 10^{-3}$	$2.1 \times 10^{-6}$	—
	100 °C	Pa	$1.5 \times 10^{-1}$	$1.1 \times 10^{-3}$	$1.3 \times 10^{-1}$
Specific heat	100 °C J/g	0.5	0.4	—	JIS K 2249
Latent heat of evaporation	J/kg	$7.1 \times 10^4$	$1.2 \times 10^5$	—	—
Average molecular weight		366	548	314	—
Density	25 °C g/kg	0.91	1.09	1.01	JIS K 2249
Kinematic viscosity	mm <sup>2</sup> /s (measurement temperature in °C)	32 (40)	170 (25)	500 (38)	JIS K 2283
Total acid number	mg KOH/g	<0.03	—	<0.05	JIS K 2501
Ignition point	°C	210	210	210	JIS K 2265
Pour point	°C	-25	-15	5	JIS K 2269
Color	25 °C	Light yellow, transparent	Colorless, transparent	Light yellow, transparent	Visual evaluation
Features		All-purpose use oil	Thermal stability	For ejector pumps	—
ULVAC pump series		PFL, F, ULK	U, ULK	PBL	—
Container	L	18 1.0	0.5	18	—