



# NIKUNI

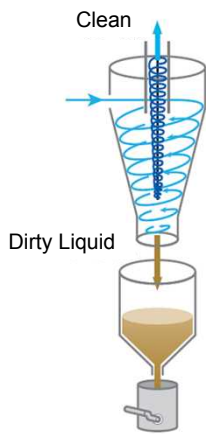
## Vortex Dynamic Filter

### Technical Handbook

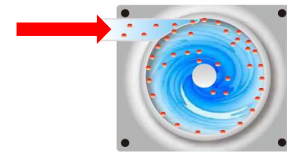


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#### Structure and Principle of the Cyclone



1. Dirty fluid is pumped into the Cyclone
2. Sludge and clean fluid are separated by strong centrifugal forces
3. Concentrated sludge is pulled down into the sludge pod by gravity via the base port
4. Clean fluid is drawn up by the vortex and is discharged from the top port



#### Highlights

- Wide range of sizes (10 - 300L/min)
- Media-free operation:  
No industrial waste & No maintenance
- Highly efficient & precise filtration (10µm 90%)
- No foaming by trapped air (with Sludge Pod)
- Simple disposal of concentrated sludge

model	process fluid
CL-10LW	10L/min.
CL-20LW	20L/min.
CL-30LW	30L/min.
CL-50LW	50L/min.
CL-70LW	70L/min.
CL-100LW	100L/min.
CL-200LW	200L/min.
CL-300LW	300L/min.

#### Advantages

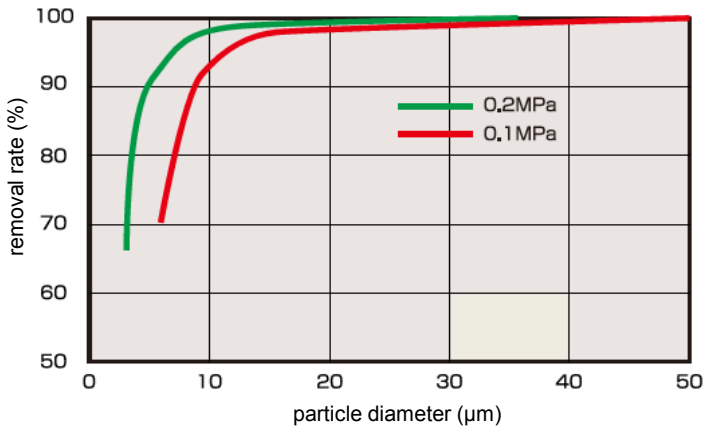
- Protect machine tools (sliding surface, coolant pump, rotary joint etc.)
- Reduce running cost (with sludge pod fitted - less fluid in circulation saving energy)
- Reduce tank cleaning frequency (with sludge pod fitted - separated waste is compacted)
- Reduce fluid replacement frequency (with sludge pod fitted - coolant lasts longer)
- Improve the performance in manufacturing (with sludge pod - reduced finishing times)

## VDF Removal Rate

### 0.2 MPa Supply Pressure

Liquid : Water (Specific gravity 1.0, Kinematic viscosity 1cst)

Sludge : Aluminum (Specific gravity 2.7)



### Removal rate of particle diameter at 0.2 MPa air supply

	3μm	5μm	10μm	15μm	25μm
Aluminum (Specific gravity 2.7)	65	88	95	98	99
FC (Specific gravity 7.21)	79	90	97	99	99

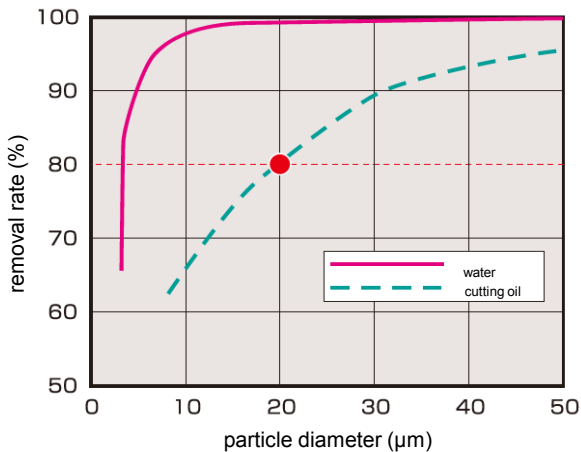
This figure shows aluminum removal rate of the VDF CL-100. For aluminum particles, the VDF can filter more than 65% of 3μm diameter particles, 95% of 10μm and 99% of 25μm with 0.2MPa air supply. Better results can be expected for materials with heavier specific gravities such as FC or SUS.

## Removal rate comparison between water and oil

### 0.2 MPa supply pressure

Water (Specific gravity 1.0, Kinematic viscosity 1cst)

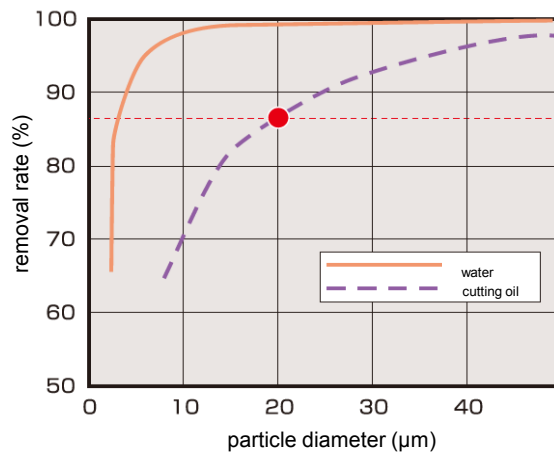
Cutting oil (Specific gravity 0.86, Kinematic viscosity 5cst)



### 0.3 MPa supply pressure

Water (Specific gravity 1.0, Kinematic viscosity 1cst)

Cutting oil (Specific gravity 0.86, Kinematic viscosity 5cst)



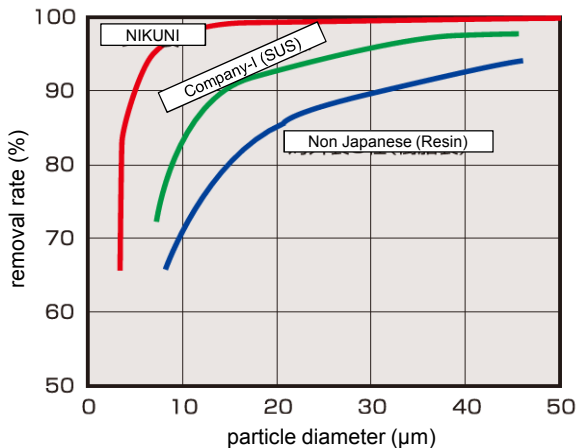
The figures above show the removal rate comparison of water (Specific gravity 1.0, Kinematic viscosity 1cst) and cutting oil (Specific gravity 0.86, Kinematic viscosity 5cst). The VDF removal rate decreases for heavy viscosity liquids such as cutting oil, but still can remove more than 80% of 20μm diameter particles.

## Removal rate comparison with other companies

### 0.2 MPa supply pressure

Liquid : Water (Specific gravity 1.0, Kinematic viscosity 1cst)

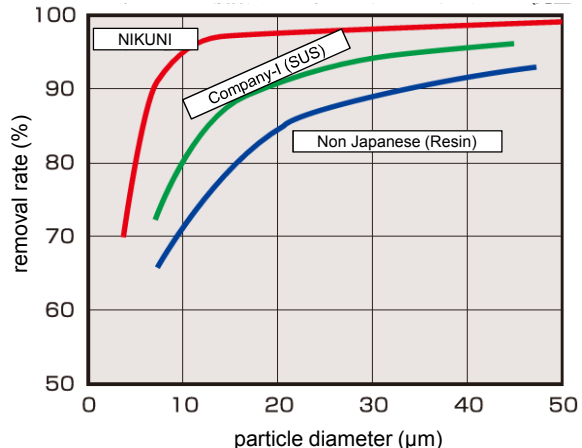
Sludge : Aluminum (Specific gravity 2.7)



### 0.1 MPa supply pressure

Liquid : Water (Specific gravity 1.0, Kinematic viscosity 1cst)

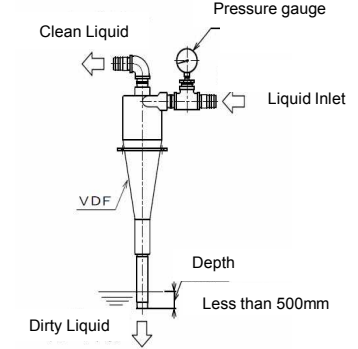
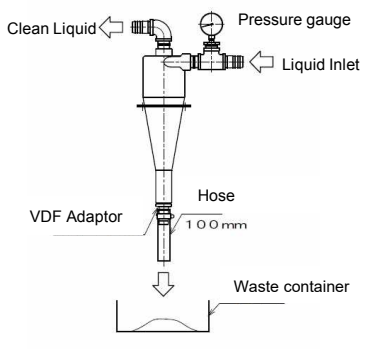
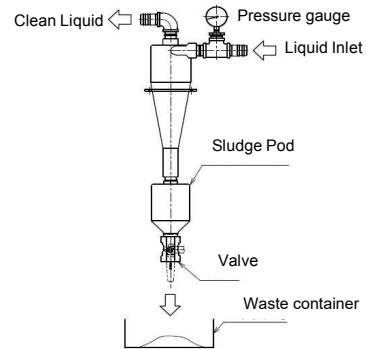
Sludge : Aluminum (Specific gravity 2.7)



※ Lower pressure contributes to energy saving.

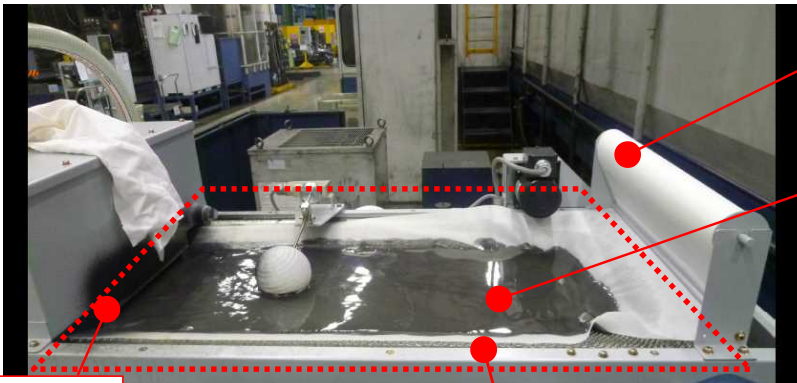
## VDF Underflow Treatment (discharge via the base port)

**Recommended**

	<p>Waste discharge direct into waste fluid tank, sub-surface exit</p> 	<p>Waste discharge direct to atmosphere via base port adaptor nozzle</p> 	<p>Waste discharge to atmosphere via sludge pod</p> 
<p>Features</p>	<p>Prevents air being sucked in and causing bubbles in the waste fluid tank.</p>	<p>Where the waste discharge is to atmosphere above the fluid surface, an Nikuni VDF base port adaptor nozzle should be fitted.</p>	<p>A Nikuni sludge pod fitted to the base port will concentrate the separated material, thereby reducing the volume of fluid discharged and, importantly, also reducing the volume of fluid in circulation, saving energy.</p>
<p>Notes</p>	<p>In some circumstances where the levels of the clean fluid and dirty fluid differ, fluid could be siphoned between the tanks. In such a case discuss with your VDF supplier.</p>	<p>If when discharging to atmosphere a base port adaptor is not fitted, it is possible in some circumstances that air may be drawn in generating bubbles in the waste fluid tank</p>	<p>Manual or automated valve release is required from time to time to avoid clogging of the sludge pod and to discharge accumulated separated waste material into a container</p>

## Typical equipment that a Nikuni VDF can improve

### Paper Filter



Cost of filter media

Particle filter can block

Waste tanks can overflow where filters block

Larger space required

### Magnetic Separator



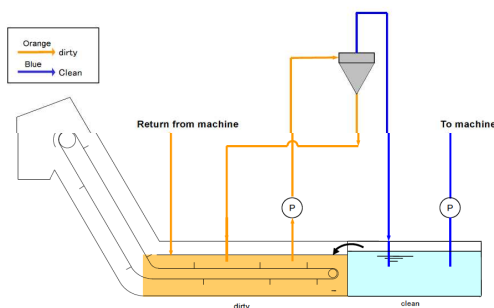
Can only collect magnetic material whereas a VDF can collect many different particles

## VDF use for machining center

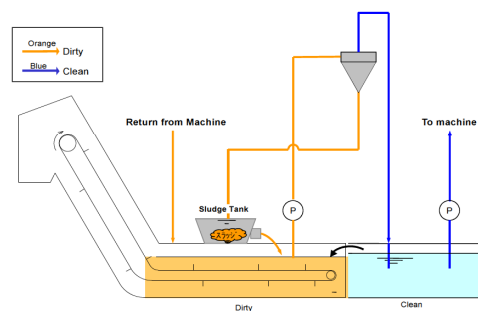
### Advantages

1. Rotary joint damage prevention (filtering accuracy 20 $\mu$ m)
2. Coolant pump damage prevention, especially for high pressure pumps
3. Cost reduction (no need to buy filtration media)
4. Whole machine protection with high precision filtration
5. Reduction of tank cleaning frequency with less sludge at the bottom of the coolant tank.

#### VDF Use example for machining center-1



#### VDF Use example for machining center-2

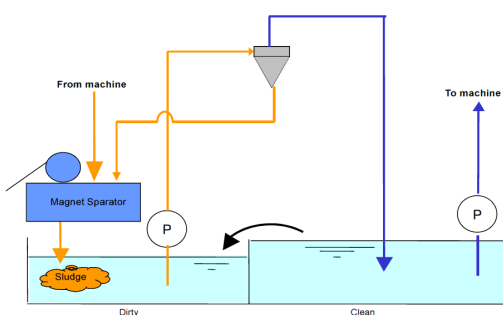


## VDF use for cylindrical grinding machine

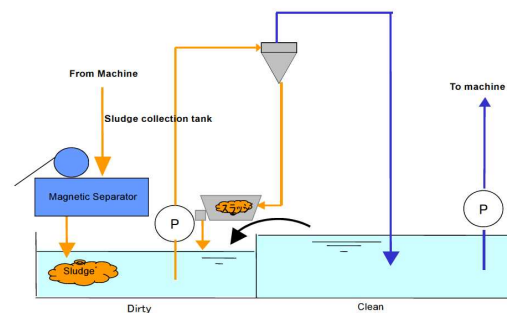
### Advantages

1. Solves clogging up of the grinding wheel
2. Prevents coolant pump damage, especially for high pressure pumps
3. Cost reduction (no need to buy filtration media)
4. Process improvements, reduced downtime and whole machine protection with high precision filtration
5. Reduction of tank cleaning frequency with less sludge at the bottom of the coolant tank.

#### VDF Use example for grinding machine-1



#### VDF Use example for grinding machine-2



## VDF Dimensions

### VDF



Withstands pressures: up to 1.0MPa, Heat resistance: up to 50°C

model	A	V-W	X	Y	Z	weight	pump
CL-10LW	160mm	-	Rc3/8	Rc3/8	Rc1/4	0.8kg	15FED
CL-20LW	214mm	-	Rc1/2	Rc1/2	Rc3/8	1.1kg	20FED
CL-30LW	250mm	55mm	Rc1/2	Rc3/4	Rc3/8	2.0kg	25CPFD
CL-50LW	313mm	99mm	Rc1/2	Rc1	Rc1	3.5kg	25CPFD
CL-70LW	313mm	99mm	Rc3/4	Rc1	Rc1	3.5kg	40CPFD
CL-100LW	430mm	120mm	Rc1/2	Rc1	Rc1	6.0kg	40CPFD
CL-200LW	596mm	170mm	Rc1·1/2	Rc1·1/2	Rc1·1/2	11.0kg	50CPFD
CL-300LW	716mm	200mm	Rc1·1/2	Rc1·1/2	Rc1·1/2	16.0kg	50CPFD

Material:SUS13

### VDF Resin



Withstands pressures: up to 0.5MPa, Heat resistance: up to 40°C

model	A	J	K	X	Y	Z	weight
CL-30MR	249mm	27mm	89mm	Rc1/2	Rc3/4	Rc3/8	2kg
CL-65MR	322mm	34mm	110mm	Rc3/4	Rc1	Rc1	3.5kg
CL-100MR	442mm	34mm	144mm	Rc1/2	Rc1	Rc1	6kg

Material:PA6

### VDF PVC



model	A	B	V-W	X	Y	Z	weight
CL-10PVC-F/P	160mm	94mm	-	Rc3/8	Rc3/8	Rc1/4	1.0kg
CL-20PVC-F/P	214mm	119mm	-	Rc1/2	Rc1/2	Rc3/8	1.8kg
CL-30PVC-F/P	250mm	133mm	55/95mm	Rc1/2	Rc3/4	Rc3/8	2.5kg
CL-50PVC-F/P	313mm	154mm	95mm	Rc1/2	Rc1	Rc1	4.5kg
CL-70PVC-F/P	313mm	154mm	99mm	Rc3/4	Rc1	Rc1	4.5kg
CL-100PVC-F/P	430mm	198mm	120mm	Rc1/2	Rc1	Rc1	9.0kg

Material:PVC for main body, F=FKM / P=Perfluoro for O-ring

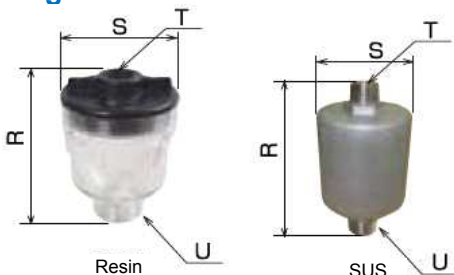
### VDF Adaptor



model	A	B	S	X	VDF
AD-30LW	45mm	d. 17mm	22mm	Rc3/8	CL-20LW, CL-30LW
AD-50LW	80mm	d. 27mm	38mm	Rc1	CL-50LW
AD-100LW	80mm	d. 27mm	38mm	Rc1	CL-70LW, CL-100LW
AD-200LW	102mm	d. 40mm	54mm	Rc1·1/2	CL-200LW
AD-300LW	102mm	d. 40mm	54mm	Rc1·1/2	CL-300LW

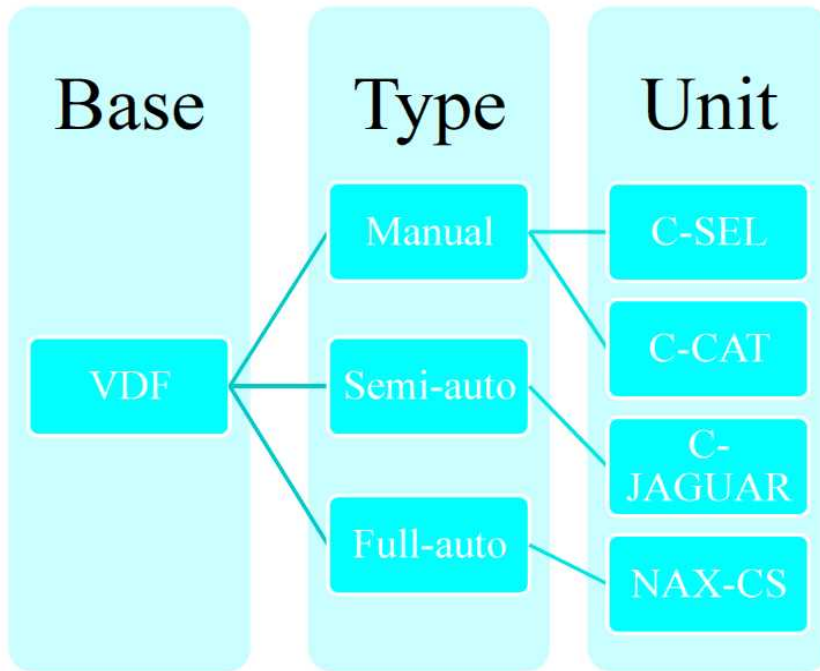
Material:SCS13

### Sludge Pod



model	R	S	T	U	capacity	weight
SPD-100LW	210mm	112mm	Rc1	Rc1·1/4	1L	2kg
SPD-300LW	278mm	160mm	Rc1·1/2	Rc1·1/2	3L	3kg
SPD-100P	163mm	130mm	Rc1	Rc1·1/4	0.8L	0.6kg

Material:PET for case, PA6 for CAP, FKM for O-ring



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