ADDITIVE MANUFACTURING

Industrial vacuum solutions for additive manufacturing

NILFISK

A safer process from start to finish

The industrial vacuum cleaner is an important asset in additive manufacturing, particularly during process changeovers and end-of-cycle cleaning. Nilfisk has designed a dedicated range of vacuum solutions for this industry, all are third-party certified to meet the most stringent European and North American safety standards.

Key benefits

- Optimal product quality prevents cross-contamination
- Maximum operator safety eliminates exposure to hazardous dust
- Minimised explosion risk: ensures total containment of combustible powders

Why choose Nilfisk?

Technical expertise is only part of the advantage. Nilfisk works closely with customers to identify the most appropriate solution and configuration, taking into account the specific requirements, materials, and operating conditions of each additive manufacturing environment.

Understanding ST3 Dust Hazards

In additive manufacturing, many of the metal powders handled fall into the highest explosion-risk category, ST3, making advanced dust collection with inerting system essential. KST measures the maximum rate of pressure rise during a dust explosion and is used to classify the severity of combustible dust hazards. Based on the KST value, dusts are categorised as ST1, ST2, or ST3, with increasing explosion violence.

ST3 dust represents the highest explosion severity, characterized by extremely rapid pressure rise and destructive force, requiring the most stringent explosion protection and dust control measures.

Common ST3 metal powders in additive manufacturing

The most commonly used ST3 metal powders in additive manufacturing include stainless steel, titanium, and aluminum. Due to their high KST values, these fine metal powders are highly flammable and can ignite fires or explosions when exposed to heat sources, sparks, or open flames. In certain conditions, particularly when exposed to air or oxygen, there is also a risk of spontaneous combustion.

Inertizing the powder during collection using an industrial vacuum cleaner, by submerging it in a water or oil bath, practically eliminate these risks. Water or oil acts as a protective barrier, isolating the powder from oxygen and minimising the possibility of accidental ignition.

Explosion class	KST value	Explosion force
ST1	0 ≤ 200 bar m/s	Weak explosion
ST2	≤ 300 bar m/s	Strong explosion
ST3	> 300 bar m/s	Very strong explosion

The ideal solution for ST3 metal powder

Maximum safety

The inert bath, combined with two wet filter stages, and a hydrophobic star filter, ensures the highest levels of filtration and separation efficiency. Liquid levels are easy to monitor, and an automatic minimum-level shutdown provides total operational safety.

Easy to use and maintain

Unlike many systems currently available on the market, Nilfisk immersion-separator solutions are designed for simple, frequent operation. Collected metal powder forms a slurry and is safely separated from the inert liquid by a filter placed inside the separator basket.

The filtered liquid can be drained and after that the powder can be recovered.

Maintenance is fast and straightforward, an essential feature, as drying of metal powders inside the container is not permitted. The separator basket can be easily removed using its integrated lifting system, allowing safe and efficient handling.

Compact design, high capacity

The immersion separator is integrated into a robust container with a capacity of up to 12 liters of material. Despite its high capacity, the system remains compact and highly manoeuverable, thanks to its ergonomic handle and integrated wheels.

Technical specification

Description	VHC120 Z1 EXA IS	VHC200 Z1 EXA IS	VHS110 Z22 EXA IS	VHS210 L100 Z22 EXA IS
Max Pressure (bar)	6	6	NA	NA
Compressed Air consumption (NL/m)	1260	2650	NA	NA
Voltage/Frequency (V/HZ)	NA	NA	230/50	230/50
Rated power (kW)	NA	NA	1,1	1,85
Max Vacuum (KPa)	32	38	22	26
Max airflow (m³/h)	201	334,8	216	330
Sound pressure level (dB(A))	72	70	76	67
Container capacity powder (L)	4	9-12	4	9-12
Filter type, main	Star filter	Star filter	Star filter	Star filter
Filter area, main (cm²)	10.000	19.500	10.000	19.500
Inlet (mm)	50	70 (rid 50)	50	70 (rid 50)
Dimensions, W x L x H (cm)	56x57x124	91x60x159	56x57x124	86x62x182
Net weight (kg)	42	94	47	95
IP protection class	-	-	64	65

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