

APPLICATION

THE TASK

Glazing is used in ceramics for refining of earthenware, stoneware or porcelain products. Should the ceramic product get a smooth surface and the inherent porosity sealed, then it is glazed. That means the piece is dipped or sprayed with an aqueous low-viscosity suspension of ceramic glaze.

A very common and effective glazing method for glazing of ceramic tiles, sanitary or table ware is the usage of the spray glazing technology. The subsequent firing process of the pieces merges the ceramic body with the glaze inseparably and thus impermeable to liquids and gases.

In the spray glazing technology the aqueous glaze suspension is applied to the green or first fired ceramic body with a spray gun, using compressed air. This process can be carried out by hand or by a robot.

The spray glazing creates relatively high „overspray“ values where emissions of $> 100 \text{ mg/m}^3$ are not unusual in practice. The wet „overspray“ consists of abrasive and microscopically fine particles, which places extremely high demands on the filter media.

The exposure limits for crystalline SiO_2 must be scrupulously observed. Since 2016 in Germany the AGW values for quartz and cristobalite exposure are at $50 \text{ } \mu\text{g/m}^3$ as assessment criteria. Wet scrubbers often connected downstream to the glaze spray booth may not accomplish this requirement in any way.



Photo: Maschinen- und Stahlbau Julius Lippert GmbH & Co. KG

THE SOLUTION

Due to the initially high degree of moisture in the raw gas (dust loaded overspray mist), standard filtration systems (bag houses or cartridge dust collector) cannot be used without prior modification. However, due to the high degree of humidity, these filters become dust loaded and due to clogging the differential pressure increases. This results in unstable airflows inside the glaze booth and a short lifespan. The abrasive particles wear out quickly the conventional filter media (bag or cartridge filter) and it is difficult to accomplish the exposure limits.

MANUFACTURE OF SANITARY CERAMICS



Herding® FLEX Filter Unit

Internationale Grenzwerte für kristallines SiO ₂ (C = Cristobalit T = Tridymit)					
Land	Grenzwert		Staubfraktion	Mittelungsdauer	Bemerkungen
	Quarz	C/T			
D	0,05 *	0,05 (C) *	J.	J.	BMAS
F	0,1	0,05	A	8 h	Ministère du travail
GB	0,1	0,1	A	8 h	HSE
I	0,05	0,05	A	8 h	(ACGIH)
NL	0,075	0,075	A	8 h	SZW
DK	0,1	0,05	A	8 h	DA
CH	0,1	0,1	A	8 h	Gov. Dir.
USA	0,05	0,05	A	8 h	NIOSH
	10%Q+2	15%C+2	A	8 h	OSHA
		5%T+2	A	8 h	OSHA
S	0,1	0,05	A	8 h	NBOSH

Table: Since 2016 in Germany the AGW values for quartz and cristobalite exposure are at 50 g/m³ as assessment criteria.

The Herding® SINTER-PLATE FILTER has proven in this application to be particularly suitable. With its hydrophobic and „anti-adhesion properties“ and due to its 100 % surface filtration the filtered glaze dust cannot penetrate the filter medium, even during the cleaning jet pulse.

The Herding® filter matrix - constructed of sintered polyethylene (PE) - is a fibreless filter media. This property does not contaminate the filtered glaze and makes it ideal for product reclaim processes. The mass formula of a typical glaze is

30 % Feldspar / 16 % Quartz / 34 % Ball Clay / 20 % Kaolin

Wherein the percentage of free quartz (SiO₂) is approximately 26 %. The residual dust concentrations in the clean gas were tested by an independent emission measurement institute. Values of < 0.1 mg/m³ residual dust content result in absolute quartz values of 0.026 mg/m³ - highly below under the required 0.05 mg/m³!

ADVANTAGES OF THE Herding® SINTER-PLATE FILTER MEDIA

- » High material recovery due to high separation efficiency
- » Hydrophobic behavior of the filter medium
- » Constant operating conditions and suction volume due to surface filtration
- » Lowest maintenance costs due to the rigid filter media (no tear & wear)
- » Low space requirements due to compact and customer-specific design
- » Long service life ensures low maintenance
- » Exceptionally low emission levels
- » Herding® Filtertechnik as an engineering partner and problem solver

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