To
Tal COHEN
Technical Director of Regulatory,
Certification and Reliability
ESSENCE Group

Torino, 16/02/2022

Non-toxicity declaration for the product S100 – Smoke Generator

The Smoke Generator Toxicity Assessment compiled by the laboratory MICRO-B Srl (Asola – MN) and dated 21 February 2018, analyzed the smoke released by the product S25.

S25 and S100 are the same product. S25 was the name used until 2020, now all the references have to be addressed with the name S100. No changes in the chemical compound have been made.

The chemical analysis has been performed following Directive (EU) 2017/184, taking TLV-STEL (Threshold Limit Values – Short-Term Exposure Limit) reference data of various chemical compounds released within the smoke.

In particular, the analyzed chemicals that present different grades of toxicity (under GHS provisions) are:
CO, SO_2, NO_2, HCl, NH_3, IPA (pyrene), dichloromethane, 1,1,1-trichloroethane, ethylbenzene, 1,2-dichlorobenzene, COVs.

However, as requested by the standard EN 50131-13 [Alarm systems. Intrusion and hold-up systems Pyrotechnic Obscuration Security Devices], OECD toxicity tests are required to qualify the final product, but the chemical analysis can give an indication of the non-toxic characteristics of the smoke.

EN 50131-13 considers the following categories of toxicity:

- Acute Inhalation toxicity
- Acute dermal irritation/Corrosion
- Acute eye irritation/Corrosion
- Acute oral toxicity

In the following table, the toxicity hazards are reported together with the values found from the chemical analysis, compared with the standards limits.

The concentration values were detected after an exposure of 15 minutes in a room of 60 m^3.

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Chemical	Hazards as considered by EN 50131-13	Conc. [mg/m^3] as per analysis	TLV-STEL limit according to (EU) Directive 2017/164 [mg/m^3]	TLV-STEL limit according to ACGIH [mg/m^3]
Carbon monoxide (CO)	Acute toxicity, Category 3, inhalation	28	117	-
Sulfur dioxide (SO_2)	Acute toxicity, Category 3, inhalation Skin corrosion, Category 1B Serious eye damage, Category 1	< 0.1	2.7	-
Nitrogen dioxide (NO_2)	Acute toxicity, Category 1, inhalation Skin corrosion, Category 1B Serious eye damage, Category 1	< 0.1	1.91	9.4
Hydrogen sulfide (H_2S)	Acute toxicity, Category 2, inhalation	0.2	14	7
Hydrogen chloride (HCl)	Acute toxicity, Category 3, inhalation Skin corrosion, Category 1A Serious eye damage, Category 1	< 0.1	15	2.9
Ammonia (NH_3)	Acute toxicity, Category 3, inhalation Skin corrosion, Category 1B Serious eye damage, Category 1	0.3	36	24
IPA (pyrene)	-	< 0.01		10
Dichloromethane	Skin irritation, Category 2 Eye irritation, Category 2	< 1.5	706	-
1,1,1-trichloroethane	Acute toxicity, Category 4, inhalation Skin irritation, Category 2 Eye irritation, Category 2	< 1.5	1110	2457
Ethylbenzene	Acute toxicity, Category 4, inhalation	< 1.5	884	543
1,2-dichlorobenzene	Acute toxicity, Category 4, oral Acute toxicity, Category 4, inhalation Skin irritation, Category 2 Eye irritation, Category 2	< 1.5	306	301
Total COVs	-	< 1.5	-	-

As it is possible to see from the table, the concentration values DO NOT EXCEED the limits defined by the mentioned standards.

Therefore, it is possible to foresee that no harm to the health has to be expected in case of short exposure to the smoke released by the S100.

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