TEST DATA SHEET

CHRYSO®LUMINTECH

Luminesent particles for aesthetic concretes.

LUMINANCE ASSESSMENT ACCORDING TO DIN 67510-1 + NF X 08-050-1

The purpose of the test is to measure the light intensity (in mcd/m2) emitted at the inserts' surface after 5 min of exposure to a 1000 lux lamp type D65 (similar to sunlight irradiation spectrum).

The light emission (luminance) values emitted by the samples after the exposure time are given hereafter:

	Luminance (mcd/m²)	1 mn	5 mn	10mn	30 mn	60 mn	90 mn	120 mn	150 mn	Codification NFX08-050 1
Toptint Glow+	CHRYSO®Lumin P+ Jade	9900	1093	522	191	88	54	36	25	D
	CHRYSO®Lumin P+ Agate	1400	309	171	61	33	19	5	5	C
Toptint Glow	CHRYSO®Lumin P Ton Pierre	1749	251	141	44	21	13	9	6	C
	CHRYSO®Lumin P Blanc	828	140	88	34	13	12	5	5	B
	CHRYSO®Lumin P Gris Clair	400	101	66	26	10	10	9	5	B
	CHRYSO®Lumin P Gris Moyen	287	76	48	16	8	5	3	3	A

VISIBILITY DURATION ACCORDING TO NF X 08-050-1

For all the samples the emission intensity is lasting over 10h00 above the visibility threshold value of 0.3 mcd/m².

UV EXPOSURE INDUCED PARTICLES AGEING ACCORDING TO NF EN ISO 11507

The UV ageing test has been carried out using a CHRYSO®Lumin P Blanc / Toptint Glow White.

No ageing effect has been evidenced through the efficiency test (light emission efficiency evaluation before and after the UV ageing test). Considering the chemical variations across all references, these results can be extended to all particles and inserts.

ECO-TOXICITY ON OCDE 202 ENVIRONMENT (DAPHNIA) OCDE 201 (ALGAE) OCDE 236 (FISHES)

The tests are conducted on CHRYSO®Lumin P Blanc / Toptint Glow White and CHRYSO®Lumin P Ton Pierre / Toptint stone.

	OCDE 201 CEt50- 72h	OCDE 202 CE50- 48h	OCDE 236 CE50- 96h
CHRYSO®Lumin P Blanc / Toptint Glow White	> 100 mg/L	> 100 mg/L	> 100 mg/L
CHRYSO®Lumin P Ton Pierre / Toptint stone	> 100 mg/L	> 100 mg/L	> 100 mg/L

The values measured in each case (fresh water algae growth inhibition, daphnia mobility and fresh water fishes at embryonic state development) are over the thresholds regarding "acute toxicity" classification criteria.

These results translate into particles classification as "harmless" regarding eco-toxicity potential.

LEACHING TEST ACC. TO NF EN 1744-3

The test is conducted on the fraction 4-8 mm. The results obtained for the first water contact (according to the standard requirement) are the following:

	pH	Conductivity at 25°C (µS/cm)
CHRYSO®Lumin P Blanc / Toptint Glow White	8,2	102
CHRYSO®Lumin P Ton Pierre / Toptint Glow Stone	11,1	405
CHRYSO®Lumin P Gris Clair / Toptint Glow Light Grey	8,6	162
CHRYSO®Lumin P Gris Moyen / Toptint Glow Medium Grey	8,7	136

An additional processing step (a second water bath) has been documented further the standard requirement.

All the particles did no more influence the pH (7) while the conductivity remains low (55 µS/cm maximum) whatever the sample reference, proving the absence of continuous leaching phenomena.

DENSITY AND WATER ABSORPTION ACC. TO NF EN 1097-6*

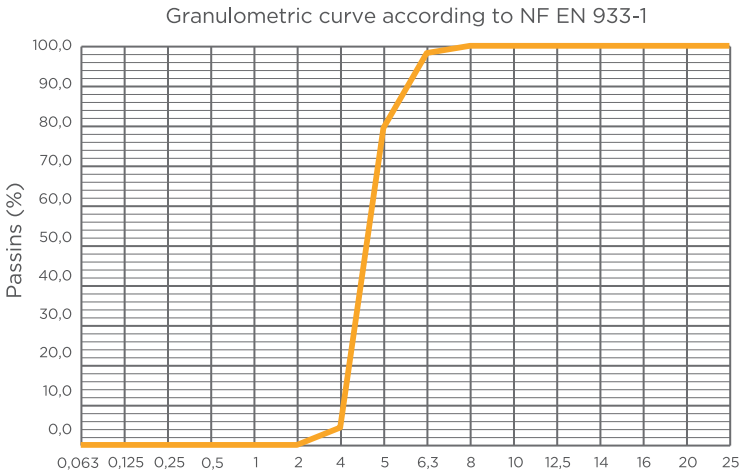
The tests are conducted on the 4-8 mm fraction using CHRYSO®Lumin P Blanc / Toptint Glow White.

	CHRYSO®Lumin P Blanc / Toptint Glow White
Density (t/m3)	1.52
Water absorption coefficient – WA24 (%)	1.3

*but the modified drying temperature, 40°C in a ventilated dry oven).

PARTICLE SIZE DISTRIBUTION ACC. TO NF EN 933-1

The specific fractions are obtained through a crushing and sieving process. The graph below shows the characteristics of the specific fraction 4-8 mm measured on the CHRYSO®Lumin P Blanc / Toptint Glow White.



FREEZE RESISTANCE TEST ACC. TO EN 1367-1

The trial is conducted on the fraction 4-8 mm using CHRYSO®Lumin P Blanc / Toptint Glow White. The particles are soaked in water at atmospheric pressure and then subjected to 10 freeze-thaw cycles before fragmentation evaluation on a 2 mm sieve. For comparison purpose, a natural aggregate is qualified as freeze-thaw resistant if the weight loss is less than 1%.

	CHRYSO®Lumin P Blanc / Toptint Glow White
Weight loss freeze-thaw cycles – F (%)	0.3

The luminescent particles are qualified as freeze-thaw resistant, category F1 - the best ranking category.

ABRASIVENESS AND GRINDABILITY ACC. TO NF P 18-579

The test is conducted on the fraction 4-6.3 mm using CHRYSO®Lumin P Blanc / Toptint Glow White.

	CHRYSO®Lumin P Blanc / Toptint Glow White
Sample weight (g)	219.2
Abrasiveness – ABR (g/t)	86.7
Grindability – BR (%)	3.7

These values show a low abrasiveness and good resistance to grinding.

TEST LOS ANGELES ACC. TO EN 1097-2 : RESISTANCE TO FRAGMENTATION INDUCED BY SHOCKS

The test is conducted on the fraction 4-8 mm using CHRYSO®Lumin P Blanc / Toptint Glow White.

	CHRYSO®Lumin P Blanc / Toptint Glow White
Remaining weight (g) on the 1.6 mm sieve	4878.4
Los Angeles Coefficient – LA	2

This value documents a high resistance to fragmentation by shock.

TEST MICRODEVAL EN 1097-1 : RESISTANCE TO WEAR BY MUTUAL FRICTION

The test is conducted on the fraction 4-8 mm using CHRYSO®Lumin P Blanc / Toptint Glow White.

	CHRYSO®Lumin P Blanc / Toptint Glow White
Remaining weight at the sieve de 1.6 mm (g)	499
Coefficient Micro Deval – MDE	0

This value evidences a high particle resistance to wearing by mutual friction.

FLATNESS COEFFICIENT ACC. TO NF EN 933-3

The test is conducted on the fraction 4-8 mm using CHRYSO®Lumin P Blanc / Toptint Glow White. The global flatness coefficient is 11%. This value shows a low flatness coefficient.

SCALING RESISTANCE TEST ON CONCRETE PAVERS ACC. TO NF EN 1338

The trials are conducted on vibro-pressed paver samples treated with 2-4 particles CHRYSO®Lumin P Ton Pierre / Toptint Glow Stone (dosage: 200 g/m^2).

After 28 freeze-thaw cycles, the weight loss measured in kg /m^2 for each condition is way lower (better) than the regulated value (1 kg/m^2):
- 0.18 kg/m^2 for the reference tests in presence of de-icing salts
- 0.20 kg/m^2 for the tests without de-icing salts

No significant scaling happened when considering specifically the particles.

THERMAL EXPANSION INDUCED RAVELLING TEST ON CONCRETE PAVERS ACC. TO INTERNAL CHRYSO PROTOCOL

The elements submitted to the testing protocol are vibro-pressed pavers treated with CHRYSO®Lumin P Ton Pierre / Toptint Glow Stone (fraction 2-4mm, dosage: 200g/m^2), by comparison with the same pavers without the particles.

The cycles (12h00 -20°C / 12h00 20°C / 12h00 60°C) exposure duration was 58 days. The weight loss happened to be minimal (0.66kg/m^2) for the treated pavers and as good as the reference.