



Material Data Sheet

SMART^{UP} [STRUCTURE] Gray 2.5% FM

1. General characteristics

Material produced by combining a premix of cement, aggregates, and other minerals with liquid admixtures and metallic fibers.

Packaging:

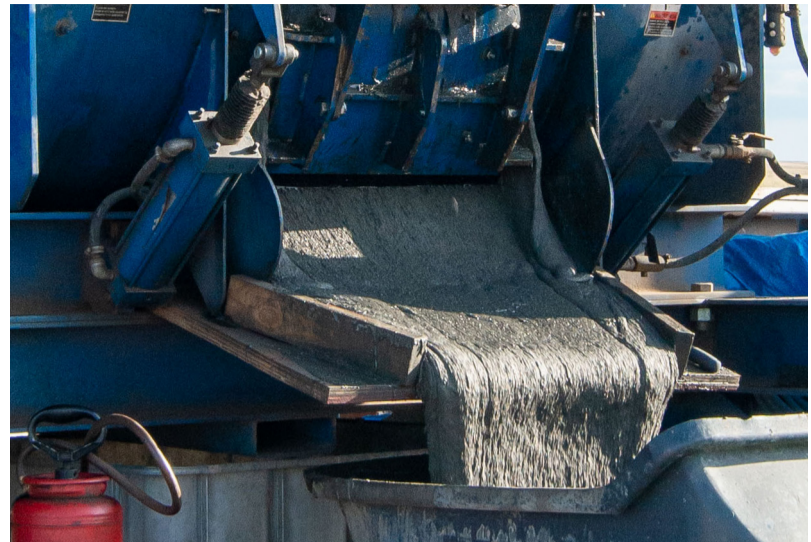
The premix is delivered in 55lb (25kg) bags or 2205lb (1000kg) big bags. The admixture is delivered in can, barrel, or bulk. Metallic fibers are delivered in 50lb (23kg) bags.

Premix	Premix of cement, sands, and other minerals
Color	Gray
Fibrous Reinforcement	Steel fibers L _f : 0.5 inch (12.7mm) d : 6.9x10 ⁻³ inch (0.175mm)
Thermal treatment	None
Efficient water-binder ratio	0.14 to 0.18
Maximum aggregate size, D _{MAX}	0.049 inch (1.25mm)

2. Composition

Component proportions indicated below yield 1 yd³ (0.76m³) of SMART^{UP} [STRUCTURE] Gray 2.5% FM (by volume) of metallic fibers.

Component	(lb/yd ³) Weight	(kg/m ³) Weight
Premix	3514.4	2085.0
Admixture 1	42.0	24.9
Admixture 2	20.2	12.0
Water	303.4	180.0
Steel fibers	332.9	197.5



3. Mixing and pouring protocol

The mixing of SMART^{UP} [STRUCTURE] Gray 2.5% FM takes approximately 15 minutes per batch. For best results, mixing is performed with a high shear mixer, either for precast elements or directly on site

The manufacturing protocol contains the following steps:

- Mixing the dry premix for 1 minute
- Progressively adding water and admixtures while mixing
- Continue mixing the concrete until it “turns fluid,” generally 4 to 6 minutes
- Introducing the metal fibers, avoiding “blocks” of fibers to form
- Continue mixing for at least 8 more minutes
- Allow concrete to sit without mixing for a few minutes before pouring to reduce air content

SMART^{UP} [STRUCTURE] Gray 2.5% FM is a self-leveling concrete that does not require vibration or other consolidation methods.

4. Fresh concrete properties

Static Flow Test Per ASTM C1347	7 to 10 inch (178 to 254 mm)
Workability	90 minutes
Density	4204 ± 211 lb/yd ³ (2494 ± 125 kg/m ³)
Air content	2 to 5%

5. Mechanical characteristics

Mechanical characteristics	Value	
Characteristic compressive strength (f_{ck}) <i>according to NF EN 12390-3, sample $\varnothing 4.3 \times 8.7$ inch - $\varnothing 11 \times 22$ cm</i>	21.8 ksi	150 MPa
Characteristic elastic limit tensile strength ($f_{ctk,el}$) <i>according to NF P 18-470, sample $2.75 \times 2.75 \times 1$ inch - $7 \times 7 \times 28$ cm</i>	1.23 ksi	8.5 MPa
Characteristic post-cracking tensile strength (f_{ctfk}) <i>according to NF P 18-470, sample $2.75 \times 2.75 \times 1$ inch - $7 \times 7 \times 28$ cm</i>	1.09 ksi	7.5 MPa
Average Young's modulus (E_{cm}) <i>according to NF EN 12390-13, sample $\varnothing 4.3 \times 8.7$ inch - $\varnothing 11 \times 22$ cm</i>	7250 ksi	50.0 GPa
Poisson's ratio	0.2	

6. Durability properties

Material property	Value
Water porosity at 90 days <i>According to NF P 18-459</i>	2 - 6%
Chloride ions diffusion coefficient at 90 days <i>According to NF P 18-462</i>	$\leq 0.1 \times 10^{-12} \text{ m}^2 \cdot \text{s}^{-1}$
Apparent gas permeability at 90 days <i>According to NF P 18-463</i>	$\leq 1.10^{-19} \text{ m}^2$
Salt-scaling <i>After 56 cycles of 24h According to XP P 18-420</i>	$< 0.10 \text{ g/m}^2$

7. Other properties

Material Property	Value
Thermal expansion coefficient <i>According to NF EN 1770, sample $1.57 \times 1.57 \times 6.3$ inch - $4 \times 4 \times 16$ cm</i>	$6.67 \mu\text{inch} \cdot \text{inch}^{-1} \cdot ^\circ\text{F}^{-1}$ $12 \mu\text{m} \cdot \text{m}^{-1} \cdot ^\circ\text{C}^{-1}$
Total shrinkage <i>According to NF P 18-427 sample $2.75 \times 2.75 \times 1$ inch - $7 \times 7 \times 28$ cm after 90 days at $68^\circ\text{F} \pm 3.6^\circ\text{F}$ ($20^\circ\text{C} \pm 2^\circ\text{C}$)</i>	$\leq 500 \mu\epsilon$ $\leq 500 \mu\text{m} \cdot \text{m}^{-1}$

8. Curing

Exposed faces of items made of **SMART^{UP} [STRUCTURE] Gray 2.5% FM** that are not formed require protection or curing to avoid damage due to evaporation as the concrete sets..

9. Facing and protection

The fineness of the granular composition of **SMART^{UP} [STRUCTURE] Gray 2.5% FM** allows high-quality surface textures to be obtained. The high fluidity and small aggregate size also allow finely detailed items to be produced.

For architectural uses, a protection product that prevents stains and dirty marks is recommended.



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The values presented in this product data sheet do not guarantee that performance is achieved for any type of work considered. The product must be used following current recommendations of the manufacturer regarding the mix design, raw materials, mixing procedure, equipment used, and method of casting such that the properties are not compromised. It is common to require additional studies at the proposed job site.