

# FLUECO 55 T

HIGH PERFORMANCE, FIBRE-REINFORCED, THIXOTROPIC MORTAR WITH COMPENSATED SHRINKAGE

*Ideal for structural restoration in highly aggressive environments.*

*Thicknesses up to 50 mm, for coatings greater than 30 mm use a contrast electro-welded mesh.*



**FLUECO 55 T** is a one-component, fibre-reinforced, cementitious mortar that is made up of selected aggregates, special additives and synthetic microfibres that is mixed with water to obtain shrinkage-compensated thixotropic mixes. **FLUECO 55 T** develops high initial and final mechanical strength and is waterproof and durable even in aggressive environments. It ensures strong bonding to steel and concrete. **FLUECO 55 T** is resistant to chemical and environmental attacks and is suitable for all the classes of exposure required by UNI 11104. It contains no metal parts or chlorides.



## BENEFITS

The characteristics of **FLUECO 55 T** make it possible to carry out highly reliable and long-lasting structural repairs thus greatly reducing maintenance costs.

The specific characteristics of the product are:

- ✓ **Resistance to sulphates and chemical and environmental attack:** **FLUECO 55 T** has high compactness, low capillary porosity and high resistance to aggressive agents present in the environment such as chlorides and sulphates. It is not subject to carbonatation.
- ✓ **Waterproofing and resistant to freeze thaw cycles:** the specific formulation of **FLUECO 55 T** and the high quality of its components ensure it is completely waterproof and increase resistance to freeze thaw cycles.
- ✓ **No crazing or cracking from plastic shrinkage:** **FLUECO 55 T** develops no crazing or cracking from plastic shrinkage thanks to the use of special synthetic fibres that control plastic shrinkage.
- ✓ **High adhesion to substrates:** **FLUECO 55 T** has been specifically formulated to increase bonding between the substrate and mortar, so it can be applied even on surfaces that have simply been sandblasted, thus facilitating its application.
- ✓ **Versatility:** **FLUECO 55 T** is applied by trowel or spray in layers up to 3 cm thick. It can be pumped over long distances and sprayed directly. It resists stress after a brief curing period.
- ✓ **Constrained expansion when exposed to air:** used together with the curing additive PRESIDIO SRA it permits the development of expansive properties even when cured in the open air.



## WHERE TO USE

**FLUECO 55 T** is ideally used for the structural repair, maintenance and restoration of reinforced cement structures exposed to highly aggressive environments that cause deterioration over time. **FLUECO 55 T** is particularly suited for:

- ✓ structural repair to columns, beams, floors and screeds in reinforced cement exposed to high chemical, physical and environmental attack;
- ✓ reconstruction and thick- layer repairs to hydraulic works, viaducts, columns and canal features;
- ✓ cortical restoration of concrete and repair of rebar cover detachment caused by oxidation of rebars;
- ✓ maintenance work in mechanical industries where mineral oils, lubricants, etc. are present.

## TECHNOLOGY

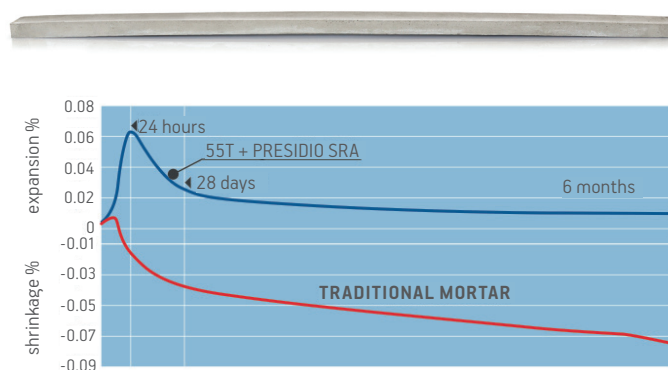
### CONTRASTED EXPANSION

The addition of PRESIDIO SRA to the mortar enhances the expansive properties even when the curing environment is not sufficiently damp, thus ensuring top performance in real jobsite conditions. The shrinkage control gives the mortar dimensional stability and avoids cracking, thus providing improved bonding of the mortar and jointless adhesion to the substrate.

### ARCHING TEST

It is possible to assess the product's ability to guarantee the correct contrasted expansion in the open-air by preparing a sample of approx. 100x5x2. The arching of the sample after just 24 hours demonstrates the actual expansion behaviour of the mortar.

The diagram illustrates how **FLUECO 55 T** with the addition of PRESIDIO SRA can ensure expansion and hence offset shrinkage after just 24 hours, unlike traditional mortars. The product's internal curing improves its overall performance in hot climates.



## APPLICATION INSTRUCTIONS

### SUBSTRATE CLEANING

- ▶ **remove all flaking parts** from the concrete in the area to be repaired, including grout slurry, either by mechanical chipping or pressure washing and taking care not to damage the structures.
- ▶ **remove spots, efflorescence or soaked-in stains** of grease oils, paints, lime, dust, dirt etc.;
- ▶ **remove any earlier repairs** if irreparably damaged or deteriorated;

### SUBSTRATE PREPARATION

- ▶ **roughen the surface** mechanically by bush hammering, chiselling or pressure washing (this last avoids damage to the substrate and is recommended for large areas) to reach the sound, compact concrete and enhance bonding between the mortar and substrate. The surface should be roughened with unevenness to a depth of at least 5 mm while the edges around the area to be repaired must be scarified to a depth of at least 10 mm with a sharp edge finish. Roughening of the surface layer is needed both to promote bonding of the mortar to the substrate and to allow the expansive properties to develop correctly.
- ▶ **wet the surface with water under pressure to saturation.** This procedure avoids the substrate absorbing water from the mix as this could lead to cracking and reduce the bonding strength of the mortar. This operation also allows the removal of any fragments remaining from the roughening of the concrete substrate. Excess water must evaporate completely before restoration is carried out.

### REBAR PROTECTION

- ▶ **sandblast the reinforcement bars** and remove all loose particles such as rust flakes or fragments of material that could lead to corrosion or impair bonding. Scarification of the substrate by hydroblasting also effectively cleans the bars, making sandblasting unnecessary.
- ▶ **protect the reinforcement bars** by re-alkalising them with the corrosion-inhibiting agent DRACOSTEEL.

### ADDITIONAL REINFORCEMENT

For lifts over 2 cm thick we recommend using an **electro-welded mesh** with spacers (at least 1 cm from the substrate) and the application of a rebar cover of at least 1.5 - 2 cm.

## MORTAR PREPARATION

The mixing of the mortar **FLUECO 55 T** is carried out using an on-site concrete mixer. Pour the mixing water into the cement mixer according to the proportions indicated: 15-17% of water for every 25 kg bag of **FLUECO 55 T**.

Add the product slowly in a continuous flow, mixing for at least 4 to 5 minutes until the mix is smooth and lump free. Make sure that all the product has been properly mixed and that there is no powder residue on the sides and bottom of the concrete mixer. To prepare small quantities of product you can use a mixing drill with paddle at low speed. **PRESIDIO SRA**, added to the mix at a dosage of 1 % on the weight of the mortar (0.25 kg per bag) acts as internal curing, and enhances the **expansive properties in the air**. **PRESIDIO SRA** affects the curing of the mortar, so the dosage should be adjusted on the basis of the ambient temperature. In warm climates **PRESIDIO SRA** permits good workability; when ambient temperatures range between 5 and 10° C we recommend reducing the dosage to avoid excessive slowing down of the setting time.

## APPLICATION

**FLUECO 55 T** can be laid using either a trowel or by spraying. The product must be applied to clean, roughened and water-saturated surfaces as described in the previous paragraph.

For overlays of more than 30 mm, apply several coats. In case of a large surface and thickness above 50 mm, it is possible to reinforce it by applying an electro-welded mesh that does not adhere to the scarified surface and is fixed by means of spacers. The finishing time for **FLUECO 55 T** is roughly half an hour during the summer months and about 1 hour in the cold season.

To impede micro-cracking due to plastic shrinkage we recommend smoothing the mortar with a wet sponge floater once it has started setting (approx. 20 min at 20° C).

## CURING

**PRESIDIO SRA**, added to the mix at a dosage of 1 % on the weight of the mortar acts as internal curing, reduces moisture loss, thus reducing shrinkage and cracking and enhancing curing. The addition of **PRESIDIO SRA** to **FLUECO 55 T** allows the development of its expansive properties in the air and reduces shrinkage by 20 - 50% compared to when the product is used without this additive. To ensure a proper curing of the product even in dry climates, or where surfaces are exposed to excessively windy or sunny conditions, we recommend the use of the curing membrane **PROBETON CURING N**.



### PRECAUTIONS IN HOT CLIMATES

- ▶ Store **FLUECO 55 T** away from direct sunlight;
- ▶ carry out the work in the early hours of the morning, and stop work when the sun is strongest. It is better to resume working in the late afternoon, as long as the structure has been wet continuously for at least 6 hours before work starts;
- ▶ to achieve optimum performance from **FLUECO 55 T** you should ensure proper curing by applying **PROBETON CURING N** by spray or by brush.



### PRECAUTIONS IN COLD CLIMATES

- ▶ Store **FLUECO 55 T** in a heated environment where possible;
- ▶ do not use the product at temperatures below 0° C;
- ▶ start work in the later hours of the morning;
- ▶ make sure that the substrate is not frozen.
- ▶ **Substrate saturation with water.** Carry out all the procedures to prepare the substrate then saturate the concrete or masonry with water continuously for at least 6 hours before laying **FLUECO 55 T**. Any excess water on the surface must be removed with compressed air or cloths. Apply **PROBETON CURING N** by spray or by brush.

## PACKAGING AND STORAGE

**FLUECO 55 T** is packed in 25 kg bags and if kept in its original packaging and properly stored under cover in a dry place, the product maintains its characteristics for a year.



## PRODUCT CHARACTERISTICS

APPEARANCE	Powder
COLOUR	Grey
MAXIMUM AGGREGATE SIZE	2.5 mm
APPARENT BULK DENSITY	approx. 1.2 kg/l
CHLORIDE ION CONTENT - UNI EN 1015-17	0.012%
PACKAGING	25 kg bags

## APPLICATION DATA

MIX COLOUR	Grey
MIXING WATER	15-17% of water for every 25 kg bag
BULK DENSITY OF MIX - UNI EN 12190	2280 kg/m <sup>3</sup>
PH OF MIX	> 12
MIX CONSISTENCY - UNI EN 13395-1	170 mm (thixotropic) Flow table 70% UNI 7044
TEMPERATURE OF USE	+5 - 35°C
POT LIFE OF MIX	approx. 50 minutes (+20° C - 50% R.H.)
COMPLETE HARDENING	approx. 28 days at +20°C
WAITING TIME BETWEEN COATS	at least approx. 30 minutes (20°C - 50% R.H.)
THICKNESS OF APPLICATION	3 cm (2 cm overhead)
CONSUMPTION	19 kg/m <sup>2</sup> per cm of thickness

## REFERENCE STANDARDS

**FLUECO 55 T** meets the requirements defined by EN 1504-9 "Products and systems for the protection and repair of concrete structures Definitions, requirements, quality control and evaluation of conformity" general principles for the use of products and systems".

**FLUECO 55 T** complies with the minimum requirements claimed by EN 1504-3 "Structural and non structural repair" for structural mortars of class R4.

## TECHNICAL SPECIFICATIONS



**FLUECO 55 T**, produced by **DRACO Italiana SpA**, is a shrinkage-compensating, thixotropic mortar that provides resistance to sulphates and chemical attack from the environment used for structural repair work and restoration of concrete buildings. It can be applied by trowel or by spraying. All instructions and precautions followed must comply with the recommendations given by the manufacturer: **DRACO Italiana SpA**.

## FINAL PERFORMANCE 16 % MIXING WATER (20° C - 65% RH)

CHARACTERISTICS	TEST METHOD	REQUIREMENTS IN ACCORDANCE WITH PERFORMANCE EN-1504-3 FOR CLASS R4 MORTARS	PRODUCT PERFORMANCE
COMPRESSIVE STRENGTH	EN 12190	≥45 MPa (after 28 days)	> 20 MPa at 1 day > 50 MPa at 7 days > 60 MPa at 28 days
FLEXURAL STRENGTH	EN 196/1	None	> 4 MPa at 1 day > 6 MPa at 7 day > 8 MPa a 28 days
COMPRESSIVE MODULUS OF ELASTICITY	EN 13412	≥20 GPa (after 28 days)	28 ± 2 GPa
BOND STRENGTH ON CONCRETE (PULL OFF) (substrate of type MC 0.40 w/c ratio = 0.40) according to EN 1766 - sp. 10 mm	EN 1542	≥2 MPa (after 28 days)	> 2 MPa
RESTRAINED EXPANSION IN AIR	UNI 8147 method mod.	None	> 0,04% at 1 day (*)
WARP TEST		None	Convex behaviour after 24 h
CRACK RESISTANCE	"O Ring Test"	None	No cracking after 180 days
HYGROMETRIC EXPANSION (UNRESTRAINED) ON EXPOSURE TO AIR	Line bar	Convex arching at 24 hrs	Meets specifications (*)
RESISTANCE TO ACCELERATED CARBONATATION	EN 13295	Depth of carbonatation ≤ reference concrete type (MC 0.45 water/cement ratio = 0.45) according to UNI 1766	Meets specifications
IMPERMEABILITY TO WATER penetration depth	EN 12390/8	None	< 5 mm
CAPILLARY ABSORPTION	EN 13057	≤0.5 kg/m <sup>2</sup> ·h <sup>0.5</sup>	< 0.15 kg/m <sup>2</sup> ·h <sup>0.5</sup>
THERMAL COMPATIBILITY measured as bond strength according to EN 1542 on concrete type MC 0.4 UNI EN 1766: - Freeze-thaw cycles with de-icing salts - Storm cycles - Dry thermal cycles	EN 13687/1	≥2 MPa (after 50 cycles)	> 2 MPa
PULL-OUT STRENGTH OF STEEL REBAR	RILEM-CEB-FIP RC6-78	None	> 25 MPa
REACTION TO FIRE	EN 13501 - 1	Euroclass A1	A1

\*Specification satisfied with the addition of PRESIDIO SRA to **FLUECO 55 T**

**NOTE:** The indicated performances are obtained with a consistency 170-180 mm according to UNI EN 13395-1.

### Legal notice - SLCMP version dated 01.03.2017

In the technical specifications herein, Draco Italiana s.p.a. used the indicators therein specified, with the relevant standards.

Please check if this Sheet and the figures therein contained apply to the product batch you are interested in or if they have been overridden by any later release. If in doubt, check whether this Sheet matches the one applicable at the time of finalising the sales agreement, at [www.draco-edilizia.it](http://www.draco-edilizia.it), and/or contact our Engineering Department.

No advice provided by our staff, either verbally or in writing at your request, about the potential applications of the Products shall be binding under the sales agreement or shall be considered an integral part of the agreement. Such advice is based on our experience and on the best available practical and/or scientific knowledge; as such, it shall not be binding or conditional on the buyer or user. Please try our products first to find out whether they are fit for your intended use or application; in any case, you shall be solely responsible for your choice.