

# MasterEmaco S 1160 TIX

**Thixotropic and structural mortar for the restoration and levelling of reinforced concrete with thicknesses from 5 to 50 mm. High efficiency and durability thanks to the PWS (self-curing) and Steel Protection ( $d_k = 0$ ) technology.**

## DEFINITION

MasterEmaco S 1160 TIX is a cement-based, thixotropic and structural mortar for reconstruction or smoothing with thicknesses ranging from 5 to 50 mm even in overhead applications (ZERO GRAVITY).

The innovative PWS technology creates a slow release "inner water tank" for improved hardening, drastically reducing the tendency to crack and allowing for application even on particularly absorbent substrates.

Thanks to its new formula, MasterEmaco S 1160 TIX provides a protective barrier for reinforcements, thus ensuring high durability of the restoration work even if there is no passivation agent (as long as the reinforcement has a coating thickness for MasterEmaco S 1160 TIX equal to at least 10 mm).

## MAIN FIELDS OF APPLICATION

MasterEmaco S 1160 TIX has been designed to guarantee the maximum efficiency and durability in all types of restoration interventions typical of building, such as millimetric stringers and large repairs with a trowel or with spray-on applications for variable thicknesses from 5 up to 50 mm.

Typical interventions include:

- extended repairs of reinforced concrete structures also with an exposed side;
- reinforcements of reinforced concrete structures also with an exposed side;
- any civil, industrial or commercial building concrete structure with defects or detachments.

MasterEmaco S 1160 TIX can be applied:

- with a trowel up to 50 mm on vertical and overhead surfaces as a restoration mortar thanks to its Zero Gravity feature, which minimises waste and ensures maximum performance.



**Zero Gravity:** we facilitate your work even for overhead applications by reducing waste to a minimum



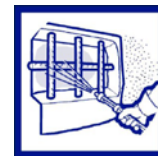
**Self Curing:** we prevent cracking, even for applications in hot and ventilated environments thanks to the special PWS (Polymer Water Storage).



**Steel Protection:** our mortars turn lilac (test with phenolphthalein) protecting metal reinforcements against corrosion.



**R4 class (EN 1504-3):** we guarantee high performance and durability in accordance with the regulations in force relating to structural mortar.



1305 BASF Construction Chemicals Italia spa Via Vicinale delle Corti, 21 Treviso 16 IT0082/01	
<b>EN 1504-3</b> Malta CC per ripristini di strutture in calcestruzzo a base di cemento idraulico. EN 1504-3 metodi 3.1/3.2/3.3/4.4/7.1/7.2	
Resistenza a compressione:	Classe R4
Contenuto di cloruri:	< 0,05%
Adesione al supporto:	> 2,0 MPa
Ritiro:	> 2,0 MPa (adesione dopo la prova)
Resistenza alla carbonatazione:	Specifica superata
Modulo elastico:	> 28 GPa
Compatibilità termica:	
Gelo-disgelo	> 2,0 MPa (adesione dopo i cicli)
Temporali	> 2,0 MPa (adesione dopo i cicli)
Cicli a secco	> 2,0 MPa (adesione dopo i cicli)
Assorbimento capillare:	$\leq 0,5 \text{ Kg/m}^2 \cdot \text{h}^{0,5}$
Reazione al fuoco:	Classe A1
Sostanze pericolose:	Conforme 5.4

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## CHARACTERISTICS

The particular features of MasterEmaco S 1160 TIX universal mortar are:

- **Innovation:** PWS technology provides significant benefits, such as:
  - Application even on particularly absorbent substrates;
  - a drastic reduction of the tendency to cracking thanks to a reserve water that guarantees a kind of internal curing;
  - better hydration for mortar;
- **excellent adhesion:** it also adheres on simply sanded concrete and reduces waste to a minimum especially for overhead applications (ZERO GRAVITY);
- **excellent aesthetic finish:** maximum granulometry 1.2 mm;
- **resistance to long-term cracking:** this basic requirement for the durability of the restoration work is assessed with the O-ring test. MasterEmaco S 1160 TIX does not show any cracks even during long curing processes;
- **resistance to aggressive environmental agents:** it is waterproof, resistant to sulphates and chlorides and is not subject to degradation by the cyclical action of freezing and thawing, thereby ensuring greater protection from corrosion for the reinforcements;
- **high durability:** Thanks to its special formula, MasterEmaco S 1160 TIX guarantees effective protection for reinforcements by preventing corrosion due to carbonation and/or in the presence of chlorides.

## CONSUMPTION AND PACKAGING

The coverage is about 17.5 kg/m<sup>2</sup> with a coat that is 1 cm thick.

MasterEmaco S 1160 TIX is available in 25 kg bags.

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## PERFORMANCE

*The performance described below is obtained with a consistency of 160-170 mm, in accordance with UNI EN 13395/1.*

Requirements	Acceptance limits	Performance
Applicable thicknesses Minimum Maximum	-	5 mm 50 mm
Granulometry	-	Max 1.2 mm
Workability time (at 20°C)	-	60 minutes
Expansive characteristics, UNI 8147	-	1 g > 0.04 %
Adhesion to concrete, UNI EN 1542 on MC 0.40 substrate (with w/c ratio = 0.40) according to UNI EN 1766	$\geq 2$ MPa	$\geq 2$ MPa
Resistance to freezing-thawing cycles with deicing salts measured as adhesion UNI EN 1542 after cycles UNI EN 13687/1 on MC 0.40 substrate	$\geq 2$ MPa	$\geq 2$ MPa
Resistance to thunder shower cycles measured as adhesion UNI EN 1542 after cycles UNI EN 13687/2 on MC 0.40 substrate	$\geq 2$ MPa	$\geq 2$ MPa
Resistance to thermal cycles without deicing salts measured as adhesion UNI EN 1542 after cycles UNI EN 13687/4 on MC 0.40 substrate.	$\geq 2$ MPa	$\geq 2$ MPa
Resistance to accelerated carbonation, UNI EN 13295	Carbonation depth $\leq$ that of reference concrete MC 0.45 (with w/c ratio = 0.45) according to UNI EN 1766	Specification obsolete
Water impermeability measured as capillary absorption coefficient, UNI EN 13057	$\leq 0.5 \text{ kg}\cdot\text{m}^{-2}\cdot\text{h}^{-0.5}$	$< 0.15 \text{ kg}\cdot\text{m}^{-2}\cdot\text{h}^{-0.5}$
Impermeability to water measured as resistance to water penetration under direct pressure, UNI EN 12390/8	-	Average penetration depth < 5 mm
Elastic modulus, UNI EN 13412	at 28 dd $\geq 20.000$ MPa	28.000 MPa
Compression strength, UNI EN 12190	at 28 dd $\geq 45$ MPa	1 d > 15 MPa 7 dd > 45 MPa 28 dd > 60 MPa
Tensile strength in bending, UNI EN 196/1	-	1 d > 4 MPa 7 dd > 6 MPa 28 dd > 8 MPa
Pull-out resistance of steel bars, RILEM-CEB-FIP RC6-78	-	> 25 MPa
Crack test (O Ring test)	-	No crack after 180 days
Test to determine the tendency to cracking in the plastic phase, ASTM C1579	-	No cracks
Test to determine the thixotropy characteristics - brick test	-	Test passed successfully

## APPLICATION SHEET

### STORAGE

Store in a dry and protected place at a temperature between 5 and +35°C.

### PREPARING THE SUBSTRATE

All the necessary precautions must be taken to avoid damaging the structures. The thickness to be removed must be determined by the design engineer on the basis of preliminary surveys aimed at identifying the preservation conditions of the structure.

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Inconsistent or contaminated concrete must be removed by means of mechanical chiselling using light demolition equipment powered by compressed air, adopting all the necessary precautions in order to avoid damaging the structures.

The surface of the support concrete must appear macroscopically rough (+/- 5 mm) for the purpose of obtaining the utmost adhesion between the substrate and the repair material. The edges of the intervention area must be at right angles or feature a dovetail arrangement, avoiding V-shaped finishes. Define the area of intervention with a clean cut at least 5 mm deep. Any loose or contaminated concrete must be removed with a suitable technique.

## CLEANING REINFORCED BARS

Incoherent or contaminated concrete around the reinforced bars must be removed. All rust on uncovered reinforced bars must be cleaned by means of mechanical brushing or sanding. Subsequently, the Design Engineer/Site Manager, at his/her discretion, decides whether to apply the protective layer for MasterEmaco P 5000 AP rods before reconstructing the section with MasterEmaco S 1160 TIX mortar. Indeed, this treatment is not strictly necessary when using the MasterEmaco S 1160 TIX, since, thanks to the new formula, it guarantees protection of the rods (Steel Protection:  $d_k = 0$ ), provided that the minimum thickness of the rod is at least 10 mm.

## PLACING ADDITIONAL STRUCTURAL REINFORCEMENTS

When it is necessary, for structural reasons, to add new reinforcements, you must guarantee at least a 2 cm cover. For work featuring a thickness of 3-5 cm, it is necessary to place an electro-welded mesh (5x5 cm) and with a 5 mm diameter. Since this mesh will have to have a cover of at least 2 cm and be detached from the substrate by at least 1 cm (through the use of suitable spacers), the working thickness in the presence of electro-welded net cannot be less than 4 cm. To ensure a correct anchorage of the contrast mesh, use reinforcement steel sections inserted in holes with a diameter at least twice that of the bar and sealed with MasterFlow 960. The density and the diameter

of said nailing will be established on a case-by-case basis by the Site Manager.

## CLEANING AND SATURATION OF CONCRETE

Cleaning and saturation of the substrate concrete must be carried out with pressurised water (80 ÷ 100 atm and using hot water in winter). This operation is crucial in order to prevent the concrete substrate to steal water from the mixture. Inaccurate saturation leads to the loss of adherence and to the cracking of the added material. The use of pressurised water also guarantees effective cleaning of the surfaces in order to remove dust and small inconsistent parts that may be present after the milling of the concrete. The cleaning and saturation of the surfaces are crucial operations for obtaining high adherence values between the substrate and the added material.

## APPLICATION TEMPERATURE

MasterEmaco N 1160 TIX can be applied when the ambient temperature is between +5°C and +35°C. When the temperature is between 5 ÷ 10°C mechanical resistances develop more slowly. We therefore recommend storing the bags in a heated environment and applying the mortar in the mid-hours of the morning.

## PREPARING THE MIXTURE

It can be mixed in a concrete mixer with a power drill or in the mixer of the spraying machine until a plastic, smooth mixture which is free of lumps is obtained. Mixing by hand is instead not recommended. It is always necessary to mix the entire content of each bag. Each 25 kg bag of MasterEmaco S 1160 TIX must be mixed with 4.00 ÷ 4.75 litres of water.

## APPLICATION

In trowel applications to achieve the desired thickness (up to 5 cm), first create a rough coat and then a browncoat. In the case of extended surfaces, MasterEmaco S 1160 TIX can be applied in a single coat for thicknesses from 5 to 50 mm by using spraying machines either with an auger or a piston (not featuring a continuous cycle). During phases when the spray is interrupted (also according to the outside temperature), it is necessary to thoroughly

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clean the pipes and the pump itself with pressurised water and a soft rubber ball designed to clean pipes.

## FLOATING

Proper floating is essential to effectively counter the formation of micro-cracks resulting from plastic shrinkage. Floating must be applied with a sponge float after sufficient time has elapsed following the application, depending on the weather.

The time interval between the application and the float finish depends on the first hardening phase of the mortar, which is determined by placing your hand on the surface and your fingers do not sink but leave a light mark on the mortar.

## HARDENING

The innovative PWS technology guarantees a slow-release "inner water tank" for improved hardening. However, to obtain the highest performance on site that MasterEmaco S 1160 TIX can offer, ensure proper curing, which can be easily and effectively carried out by using BASF's curing products.

## PROTECTION

To lengthen the useful life of the structure, enhancing durability even in areas which require no maintenance, it is always recommended to apply a protective system of the MasterProtect line on the entire structure. This acts as a barrier to the entrance of aggressive environmental agents, also improving the aesthetic appearance of the structure.

Since 16/12/1992 BASF Construction Chemicals Italia Spa has been operating under a Certified Quality System in compliance with UNI EN ISO 9001. Furthermore, the Environmental Management System is certified according to UNI EN ISO 14001 and the Safety Management System is certified according to OHSAS 18001. Environmental sustainability: Green Building Council Partner since 2009.

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This edition supersedes all previous ones.

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