

## REFOR-tec® BS 100 / RIO

### UHPFRCC

### Ultra High Performance Fibre Reinforced Cementitious Composite

**SUPERCONCRETE, AUTOCOMPACTANT WITH VERY HIGH MECHANICAL RESISTANCES ( $R_c$  116 MPa -  $R_f$  24 MPa), FRACTURE ENERGY (15.000 N/m) AND EQUIVALENT TRACTION**

Exceeds Class **LE** provided in the General Specifications for Motorways Italy-SPEA:

**type LE** : "Expansive binder that allows to obtain concretes or mortars extremely fluid, free of bleeding, low water/cement ratio, characterized by high mechanical strength" responding to class LE of the ITALIAN HIGHWAYS SPECIFICATIONS with which it is possible to obtain concrete of **Class CE**

Is part of and exceeds the CE class of the Italian Highways specifications -SPEA:

**type CE** : "Rheoplastic concrete with volumetric stability, with  $R_{ck} \geq 50$  MPa, consistency S4-S5, the absence of bleeding and high pumpability, obtained by using a special cement as an expansive binder type LE instead of the normal cement, and mixing it with water and aggregates" responding to class CE of the ITALIAN HIGHWAYS SPECIFICATIONS



**EN 1504-3 Structural Class R4:** on the basis of the above and the pre-qualification in the field, are obtained a screed / concrete conforming to Class R4 Structural of EN 1504-3. As such it will be:

**CE approved – Certificate n. 1305 - CPD - 0808  
EN 1504-3 Class R4**



- Applications**
- Engineering of forms in reinforced concrete
  - Protection and construction of structures with reduced section: thanks to the use of **REFOR-tec® BS 100 RIO**, fibre reinforced concrete structures at high elastic modulus, fracture energy and traction resistance, can be designed with thinner sections without the need for post-tensioned bars, thanks to the obtained reduced arrow.
  - For the fabrication of light structural elements with thin sections
  - For structural repairs by casting in mould or confined spaces
  - For the structural repair of floors at low thickness
  - For seismic adaptation with absorption and transfer of shear or tensile stresses in the case of events with high dynamic stresses.
  - For the structural reinforcement by encapsulating with REFOR-tec around pillars and beams; high fire resistance: systems *Fire Structural Shield n°1* and *Fire Structural Shield n°2*.
  - For the repair of floors with the need to resist to high static and dynamic loads as well as impact resistance and shocks.

• **INDICATIVE MIX DESIGN** : REFOR-tec® BS 100/RIO :

**Kg/m<sup>3</sup>**

Comp. A	POWDER <b>BS 100/RIO MuCis®</b>	580	bulk
Comp. B	LIQUID <b>Tecnos® azur CB/ER</b>	22	IBC
Comp. C	LIQUID <b>SHRINKO-tec® nano 3</b>	5,8	IBC
Comp. D	LIQUID <b>PLASTARD® 18</b>	2,0	IBC
Comp. E	<b>FIB-energy® FS7S</b>	70,0	box
Comp. F	<b>FIB-energy® MC 200/12</b>	2,5	box
		<b>682,3</b>	

	<b>Kg/m<sup>3</sup></b>	
River aggregates :		
0÷4 mm	1000	bulk
4÷8 mm	670	bulk
H <sub>2</sub> O (w/c 0,30)	174	
total	<b>2526,3</b>	

• **ENCLOSED AIR** : 0,8%

• **DENSITY OF MIX** : 2,530 Kg/lt

• **CONSISTENCY IN TIME** :

	<b>0'</b>	<b>30'</b>	<b>60'</b>	<b>90'</b>
<b>SLUMP</b>	> 25	→	→	> 22
<b>FLOW</b>	610	→	→	> 550

• **MECHANICAL RESISTANCE** (typical – samples 4x4x16 cm)

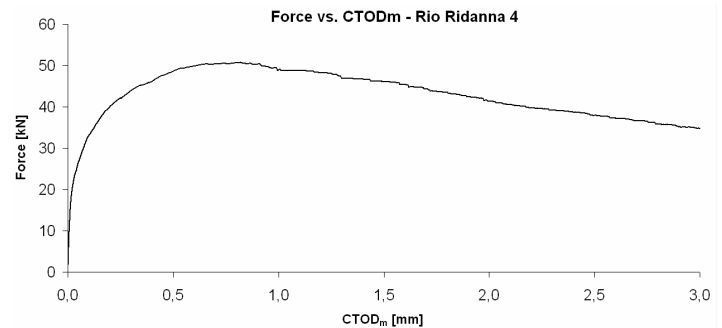
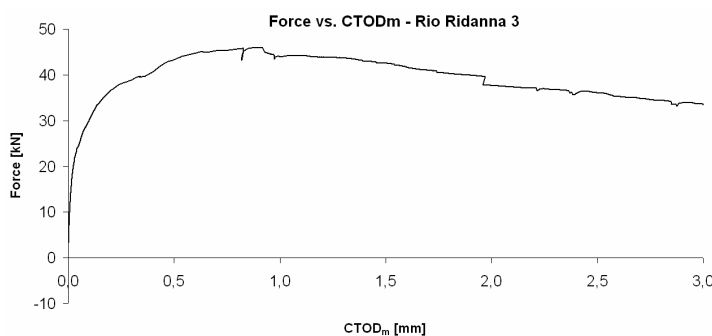
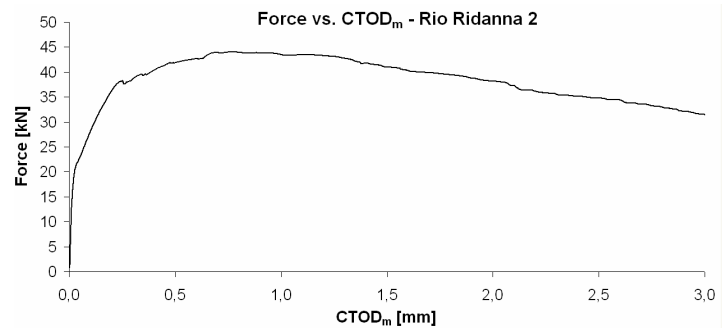
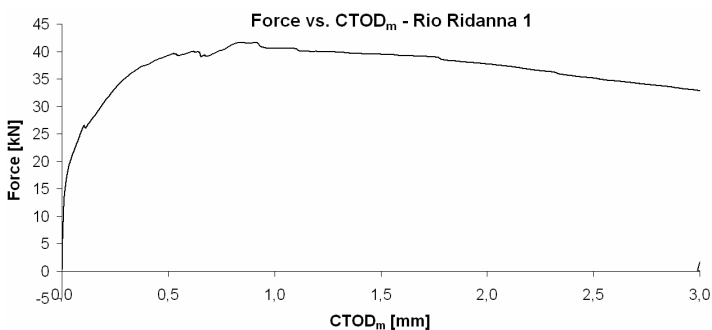
	<b>FLEXION</b>	<b>COMPRESSION</b>
24 h	12	31
48 h	13	55
7 d.	19	88
28 d.	24	116

• **ELASTICITY MODULUS** : 38 GPa

### EQUIVALENT FLEXURAL STRENGTH AND FRACTURE ENERGY according to UNI EN 11039 prisms 15x15x60 cm with a cut in the middle section with a depth of 45 mm

Sample n°	$f_{ff}$ MPa	$f_{eq(0-0,6)}$ MPa	$f_{eq(0,6-3)}$ MPa	$D_0$	$D_1$	CTOD <sub>max</sub> mm	Date test	Fracture energy N/m
1	4,71	8,99	<b>10,04</b>	1,91	1,12	0,842	13/03/09	<b>12.332</b>
2	5,54	10,01	<b>10,44</b>	1,81	1,04	0,756	13/03/09	<b>11.731</b>
3	5,57	10,51	<b>11,03</b>	1,89	1,05	0,882	17/03/09	<b>12.936</b>
4	5,67	11,29	<b>11,47</b>	1,99	1,02	0,818	17/03/09	<b>15.736</b>

In the calculations, we assume an opening in the apex of the opening CTOD<sub>0</sub> = 0,025 mm



#### Remarks INFORMATION ACCORDING TO 2003/53/CE:

**Storage:** 12 months in original packaging, unopened, stored protected and dry, +5°C and +35°C.

Do not use the content of opened bags if you notice lumps. Avoid the freezing of the liquid component.

**Safety indications** Read carefully the indications on the packaging, or request the relative Material Safety Datasheet of this material.

The above information is based on our best experiences and lab results and on results of the application of the product in various fields. Tecnochem Italiana is not responsible for negative performances due to not proper use of the product or for defects due to elements not connected with the quality of the product included wrong storage. Technical characteristic in this technical data sheet are up-to-dated periodically. Revision date of this technical data sheet is indicated below.

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