



## STRUTTURA FLUIDO - FL 475

**STRUCTURAL, MONOCOMPONENT, HIGH-DURABILITY CONCRETE MIX,  
DESIGNED FOR THE RESTORATION AND REPAIR OF CONCRETE  
STRUCTURES**



**STRUTTURA FLUIDO - FL 475** is a pre-mixed, shrinkage-compensated cementitious micro-concrete. It incorporates aggregates with a maximum diameter of 8 mm and synthetic polyacrylonitrile (**PAN**). The product features a superfluid consistency, combined with excellent mechanical properties and long-lasting durability.

The carefully designed formulation ensures superior durability characteristics that exceed the minimum requirements specified by the **UNI-EN 1504-3** standard. Notably, it exhibits extremely low permeability to water, CO<sub>2</sub>, sulfates, and chlorides, making it suitable for use in the most severe environmental conditions, including exposure to freeze-thaw cycles.

Furthermore, the product's chemical composition and dense granulometric structure ensure high compressive and flexural strengths, along with elevated elastic modulus values. Volumetric stability and strong adhesion with structural bonding to a properly prepared substrate are achieved through the inclusion of expansive agents that compensate for shrinkage. This effectiveness is maintained even under air-curing conditions, thanks to the addition of the specific additive **INTEGRA SPECIAL - SRA 513**, to be introduced during the mixing phase at a rate of 0.5% by weight of **STRUTTURA FLUIDO - FL 475**.

The inclusion of synthetic polyacrylonitrile (**PAN**) fibers effectively mitigates plastic shrinkage cracking under normal conditions. This type of cracking typically occurs immediately after application due to water evaporation from the mix into an environment with low vapor saturation.



# STRUTTURA FLUIDO - FL 475

**STRUTTURA FLUIDO - FL 475** is suitable for horizontal casting or within formwork for the restoration and reinforcement of reinforced concrete structures, including prestressed concrete. Typical applications include the refurbishment of deck slabs, section enlargement of piers, columns, or beams, and the repair of flooring slabs, ceilings, and similar elements.

It can be applied by pouring or using suitable pumps, with thicknesses ranging from 50 to 100 mm. For greater thicknesses, the addition of coarse aggregate (>10 mm) is recommended to control the heat generated during hydration.

## TECHNICAL CHARACTERISTICS

**STRUTTURA FLUIDO - FL 475** achieves its full effectiveness through proven shrinkage-compensating technology, characterized by the product's ability to develop slight expansion during the initial curing phase, as evaluated according to **UNI 8148**. This controlled expansion effectively neutralizes long-term shrinkage effects.

To fully leverage this property, it is essential to ensure that the expansive phase is restrained. This requires a substrate with significant macroscopic roughness ( $\pm 5$  mm asperities) combined with distributed reinforcement placed near the surface.

This restraining reinforcement, consisting of a metal or composite mesh securely attached to the primary reinforcement or directly to the substrate using connectors, has the fundamental task of 'storing' the expansion stresses and releasing them over time, preventing the formation of cracking that could compromise the durability and structural effectiveness of the intervention.

Another essential condition for the proper development of the expansive phase is curing the mortar in a water-saturated environment for at least 48-72 hours, depending on the seasonal conditions.

If, due to site constraints, it is not possible to ensure such conditions, the use of the specific additive **INTEGRA SPECIAL - SRA 513** is required. This additive is designed to limit the loss of the mortar's natural moisture, even in the absence of wet curing.

The substrate must always be solid, clean, washed, and well-saturated to prevent any absorption of the mixing water, regardless of whether **INTEGRA SPECIAL - SRA 513** is used.

Although it inherently provides passivation for the steel reinforcement in reinforced concrete, during structural restoration using **STRUTTURA FLUIDO - FL 475**, it is crucial to fully utilize the adhesion between the reinforcement and the cementitious matrix. For this reason, it is essential that any steel exposed during scarification is thoroughly cleaned of all traces of rust and treated with the specific product **INTEGRA FERRO - FR 718**, applied as a temporary protective coating with passivating and corrosion-inhibiting properties, prior to reconstruction.

## INSTRUCTIONS FOR USE

|                                                  |                                                                                                                                                                     |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Classification according to <b>UNI-EN 1504-3</b> | Class <b>R4</b> , type <b>CC</b>                                                                                                                                    |
| Color                                            | Cement gray                                                                                                                                                         |
| Granulometry                                     | $\leq 8.0$ mm (EN 12192-1)                                                                                                                                          |
| Application                                      | With suitable plastering pump or concrete pumps                                                                                                                     |
| Mixing water                                     | 12.0 - 14.0 % (180 – 210 liters per 1500 kg big bag) (3.0-3.5 liters per 25 kg bag.)                                                                                |
| Average consumption                              | 20.5 kg/m <sup>2</sup> per each cm of applied thickness                                                                                                             |
| Minimum thickness per layer                      | 50 mm                                                                                                                                                               |
| Maximum thickness per layer                      | 100 mm                                                                                                                                                              |
| Application temperature                          | + 5 °C / + 35 °C                                                                                                                                                    |
| Pot life of the mixture                          | 60 min at 20°C                                                                                                                                                      |
| Packaging                                        | In 1500 kg big bag – 25 kg polyethylene lining paper bags on 1,500 kg pallet                                                                                        |
| Storage                                          | 1500 kg big bag. - 6 months in original, intact packaging, protected from moisture<br>25 kg bags - 12 months in original, intact packaging, protected from moisture |

## PERFORMANCE CHARACTERISTICS

| Properties                                                                                                                   | Testing                         | Product performance                            | Minimum requirement according to EN 1504-3 for Class R4 |
|------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------------------------------------|---------------------------------------------------------|
| Density of the hardened product                                                                                              | EN 12190                        | 2.40 kg/l                                      | Not required                                            |
| Chloride ion content                                                                                                         | EN 1015-17                      | < 0,05 %                                       | ≤ 0,05 %                                                |
| Bleeding                                                                                                                     | UNI 8998                        | Absent                                         | Not required                                            |
| Expansion controlling in air                                                                                                 | UNI 8148<br>(Modified Method B) | 1 g > 0.04%                                    | Not required                                            |
| Expansion controlling in air                                                                                                 | Bending/boarding test           | Bending                                        | Not required                                            |
| Elastic Modulus                                                                                                              | EN 12390-13                     | 27 (± 2) GPa                                   | ≥ 20 GPa                                                |
| Adhesion to concrete at 28 days                                                                                              | EN 1542                         | > 2.0 MPa                                      | ≥2.0 MPa                                                |
| Thermal compatibility - Freeze-thaw cycles with de-icing salts - after 50 cycles (measured as adhesion according to EN 1542) | EN 13687-1                      | > 2.0 MPa                                      | ≥2.0 MPa                                                |
| Thermal compatibility - Thermal cycling (thermal shock) - after 30 cycles (measured as adhesion according to EN 1542)        | EN 13687-2                      | > 2.0 MPa                                      | ≥2.0 MPa                                                |
| Thermal compatibility - Dry thermal cycling - after 30 cycles (measured as adhesion according to EN 1542)                    | EN 13687-4                      | > 2.0 MPa                                      | ≥2.0 MPa                                                |
| Capillary absorption                                                                                                         | EN 13057                        | <0.08 kg/m <sup>2</sup> ·h <sup>0.5</sup>      | ≤ 0.5 kg/m <sup>2</sup> ·h <sup>0.5</sup>               |
| Water pressure resistance                                                                                                    | EN 12390-8                      | < 5 mm                                         | Not required                                            |
| Compressive strength at 1, 7, and 28 days                                                                                    | EN 12390-3                      | > 25/55/70 MPa                                 | ≥ 45 MPa                                                |
| Flexural strength at 1, 7, and 28 days                                                                                       | EN 12390-5                      | 5.0/7.0/8.0 MPa                                | Not required                                            |
| Exposure class                                                                                                               | EN 206                          | X0-XC1-XC2-XC3-XC4-XD1-XD2-XD3-XS1-XS2-XS3-XA1 | Not required                                            |
| Resistance to accelerated carbonation                                                                                        | EN 13295                        | Test passed                                    | Carbonation depth lower than reference concrete         |
| Pull-out resistance of steel bars                                                                                            | RILEM CEB – FIP RC 6-78         | > 25 MPa                                       | Not required                                            |
| Crack resistance                                                                                                             | 0-Ring test                     | No cracks at 180 days                          | Not required                                            |
| Reaction to fire                                                                                                             | EN 1504-3                       | Class A1                                       | Not required                                            |

## METHOD OF USE

### PREPARATION OF THE SUBSTRATE

Remove deteriorated concrete using hydrodemolition or careful mechanical chiseling, until reaching a sound and compact layer. In conditions of particularly severe environmental exposure, it may be necessary to remove layers of concrete that are still structurally sound but have been carbonated or contaminated with chlorides and are no longer able to protect the reinforcement from corrosion.

Clean the exposed reinforcements of any traces of rust using sandblasting or a wire brush, ensuring there is sufficient space between the bars and the substrate to allow for the subsequent application of mortar/micro-concrete/composite material

Perform a thorough pressure washing of the surfaces to ensure they are completely free of dust and loose particles.

Treat the exposed reinforcement bars by applying the specific corrosion-inhibiting passivating product **INTEGRA FERRO - FR 718** in two coats with a brush.

Install any additional reinforcements, securely connected to the primary reinforcement or directly to the substrate using mechanical connectors or chemical anchors from the **INTEGRA FIXA** line. If required due to application thickness, install any restraining reinforcement for expansion.

Position any formwork, ensuring it is made non-absorbent using water or an appropriate release agent treatment. Verify that the formwork is perfectly sealed and allows adequate space for the subsequent application of **STRUTTURA FLUIDO - FL 475** micro-concrete.

Before applying the product, perform a final pressure washing of the surfaces to ensure they are well saturated with water, removing any standing water with compressed air jets.

### MIXING

Introduce the minimum required amount of mixing water, equal to 3.0-3.5 liters for each 25 kg bag (or 180-210 liters for each 1,500 kg big-bag), into the mixer, truck mixer, or the mixing chamber of the plastering pump. Add any necessary aggregates, and lastly, the powdered product. Continue mixing for several minutes until a homogeneous, lump-free, and sufficiently workable mixture is obtained. If needed, add the remaining water, taking care not to exceed the maximum dosage of 3.5 liters for each 25 kg bag (or 210 liters for each 1,500 kg big-bag).

For smaller quantities, which must never be less than full bags, preparation can be done using a low-speed paddle mixer.

Always avoid manual mixing.

If it is not possible to ensure proper wet curing of the product for at least 24 hours after application, add **INTEGRA SPECIAL - SRA 513**, a liquid additive that promotes curing and expansion in air for **STRUTTURA FLUIDO - FL 475**, to the mixing water at a dosage of 0.5% of the mortar weight.

When applying the product under conditions near the permitted temperature limits, pay particular attention to the temperature of the mixing water, which must not be excessively hot in summer or excessively cold in winter.

### APPLICATION AND SMOOTHING

Proceed with filling the formwork continuously, preferably from a single side, to facilitate cavity filling and prevent the formation of voids until reaching the predetermined level.

When planning the work phases, consider that at a temperature of 20 °C, the product remains workable for approximately 60 minutes. This time decreases in hot weather and increases in cold weather.

The optional addition of aggregate (**INTEGRA SPECIAL GH0610** or **GH1020**), recommended for large-volume pours starting from a thickness of 100 mm, does not alter the workability times.

For use in environmental conditions close to the permitted limits, apply the product during time periods with ascending temperatures in winter and descending temperatures in summer.

During application, the product can be settled and leveled using a straightedge to ensure homogeneous distribution, particularly on large surfaces and in the presence of complex reinforcements.

To facilitate the filling of thin or complex spaces, it is possible to slide the mortar using rods, strips, chains, or light external vibration.

### CURING

After setting and until hardening is complete, protect the application by covering the surface with a damp cloth or polyethylene sheet, or by regularly spraying a fine mist of water. For applications within formwork, it is recommended not to expose the cast to the environment until it has cooled down completely.

The use of **INTEGRA SPECIAL - SRA 513**, designed to ensure expansion in air, must still include protection of the **STRUTTURA FLUIDO - FL 475** micro-concrete from ventilation and direct sunlight for at least 24 hours.

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## FINISHING

Upon completion of the restoration cycle, it is possible to apply the most suitable protective treatment for the specific environmental exposure, selected from those available in the **PROTECTION** line.

## COMPLIANCE

**STRUTTURA FLUIDO – FL 475** fully meets the performance requirements set by the European standard **EN 1504-3** for structural mortars of class **R4**, type **CC** (EN 1504-1) with the accreditation system 2+ (AVCP), certified 0925-CPR-ch n°3/2020.

Additional features and performance enhancements make **STRUTTURA FLUIDO – FL 475** compliant with the specifications outlined in major public and private tenders for the restoration and maintenance of infrastructure. Consult our Technical Department for verification of additional compliance.

## WARNINGS

Do not apply at temperatures below +5 °C or above +35 °C.  
Do not apply on substrates at risk of freezing within the following 24 hours.  
Do not remix the mixture if the product is in the process of hardening, as this may result in the loss of its characteristics.  
Do not apply on gypsum, inconsistent or crumbling substrates.  
Do not apply on surfaces that are not roughened and in the absence of contrasting reinforcement.  
Do not apply in case of strong wind or excessive direct sunlight.  
Do not apply on large surfaces without providing construction joints.  
Do not use in thicknesses other than those indicated.

## SAFETY INSTRUCTIONS

### PRODUCT FOR PROFESSIONAL USE

During handling and application, wear protective clothing and gloves, safety goggles, and dust masks. In case of skin contact, wash with soap and water. In case of eye contact, rinse immediately with water and seek medical attention if irritation persists. For safety information and for the use and storage of the product, the user must refer to the latest Safety Data Sheet.

## SPECIFICATION VOICE

**STRUTTURA FLUIDO - FL 475** - cementitious micro-concrete with compensated shrinkage, reinforced with synthetic fibers, super-fluid, and highly durable, designed for the restoration and repair of concrete structures.

It is suitable for horizontal pours or use within formwork for the restoration and reinforcement of reinforced concrete structures, including pre-stressed concrete. Typical applications include the refurbishment of bridge deck slabs, increasing the cross-section of piers, columns, or beams, and the repair of flooring slabs, ceilings, and similar structures.

**STRUTTURA FLUIDO – FL 475** fully meets the performance requirements set by the European standard EN 1504-3 for structural mortars of class R4, type CC (EN 1504-1) with the accreditation system 2+ (VVCP), certified 0925-CPR-ch n°3/2020.

It can be applied by pouring or using appropriate pumps, in the presence of adequate reinforcement against expansion and on macroscopically roughened supports in pours with a thickness between 50 and 100 mm. For greater thicknesses, it is recommended to integrate with coarse aggregate > 10mm to contain the heat of hydration.

For air expansion characteristics, the product should be used with the addition of **INTEGRA SPECIAL – SRA 513** at a dosage of 0.5% of the dry product.

For further information on specifications, cost analysis, construction details, and maintenance plans, please contact the Technical Office of Fibre Net SpA.

The information provided in this data sheet and any technical advice provided verbally or in writing, regarding the methods of use and performance of our products, corresponds to the current state of scientific and practical knowledge. They do not imply any responsibility or guarantee on our part for the final outcome of the work using our products. It is the responsibility of the Customer to determine whether Fibre Net products are suitable for their intended use and purposes and to ensure compliance with workplace conditions and disposal procedures in accordance with applicable laws and regulations. Fibre Net may modify technical characteristics, descriptions, and illustrations of the product described in this data sheet at any time. The Customer is responsible for ensuring that this data sheet is not outdated or replaced by subsequent editions and/or new products. For further information, the Customer is advised to contact our Technical Service in advance. This edition cancels and replaces any previous editions.