STRUX® 90/40

Synthetic macro fiber reinforcement ASTM C1116/C1116M

Product Description

STRUX® 90/40 is a unique, high strength, high modulus, synthetic macro fibre reinforcement that is added to ready mixed and precast concrete at the batching stage. STRUX 90/40 controls drying shrinkage cracking, so it can be used as an alternative to steel mesh and steel fibre reinforcement.

Applications

- Ground bearing floor slabs
- Ground bearing external pavements
- Marine concrete applications
- Precast concrete

Note: STRUX 90/40 is not intended as a substitute for steel reinforcement in any application other than those listed. Always consult relevant national codes.

Product Advantages

- Controls drying shrinkage cracking by controlling the propagation of micro-cracking thus improving toughness and durability of concrete.
- Can be used as an alternative to steel mesh reinforcement and steel fibre reinforcement.
- Uniformly distributed throughout the concrete matrix - no risk of incorrect steel mesh reinforcement placement.
- Improves residual flexural strength, impact and fatigue resistance of concrete - Re,3 values in excess of 30% can be reliably achieved (see UK Concrete Society Technical Report 34, 3rd Edition).
- Removes a site process so saves time on construction programme.
- No steel mesh storage, fixing, movement or crane costs.
- Ready-mix concrete truck can back up and freely discharge concrete which could remove/reduce pumping costs.

Addition Rates

STRUX 90/40 addition rates are dependent on the specific application. Addition rates are also dependent on the desired hardened concrete properties and will vary between 2.3 and 7.0kg / m^3. Please see STRUX 90/40 engineering bulletin for detailed information.

Mix Design and Mixing Requirements

Concrete containing STRUX 90/40 may require the use of a superplasticiser such as ADVA ® to achieve the required workability. In addition, slight increases in fine aggregate contents may be needed. At dry batch ready-mix plants, add the STRUX 90/40 bags to the truck before the concrete constituents. STRUX 90/40 bags are water degradable and will degrade when wetted. At wet batch ready-mix plants, add the STRUX 90/40 bags to the truck before the concrete. Add the first batch of concrete constituents to the truck SEMI-DRY. This will break up the STRUX 90/40 bags and evenly disperse the fibres. Remember to make up the water content on subsequent batches. After fibre addition, the concrete must be mixed in a drum at the recommended mixing speed for a minimum of 70 revolutions to ensure adequate dispersion. Please contact GCP for further information.

Compatibility

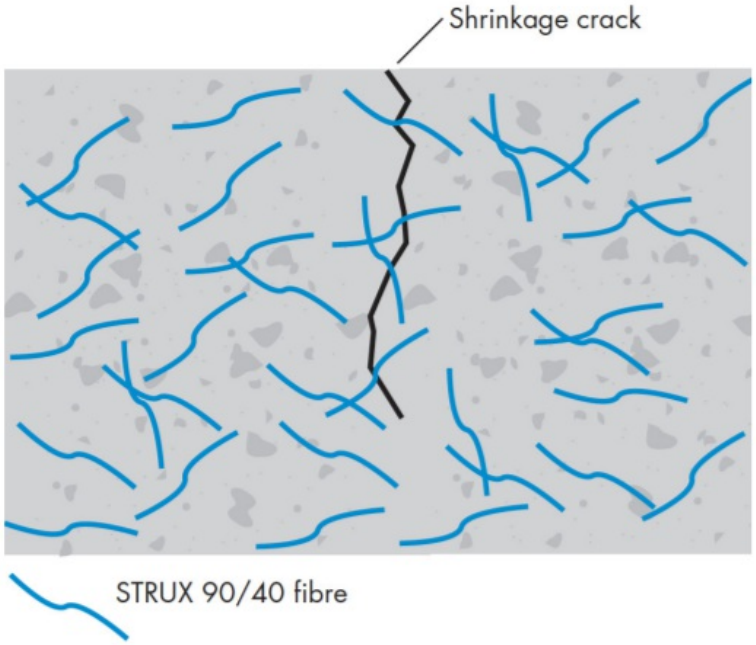
STRUX 90/40 is compatible with all GCP admixtures. The action of STRUX 90/40 in concrete is mechanical and will not affect the hydration process of the cement. Each liquid admixture should be added separately to the concrete mix.

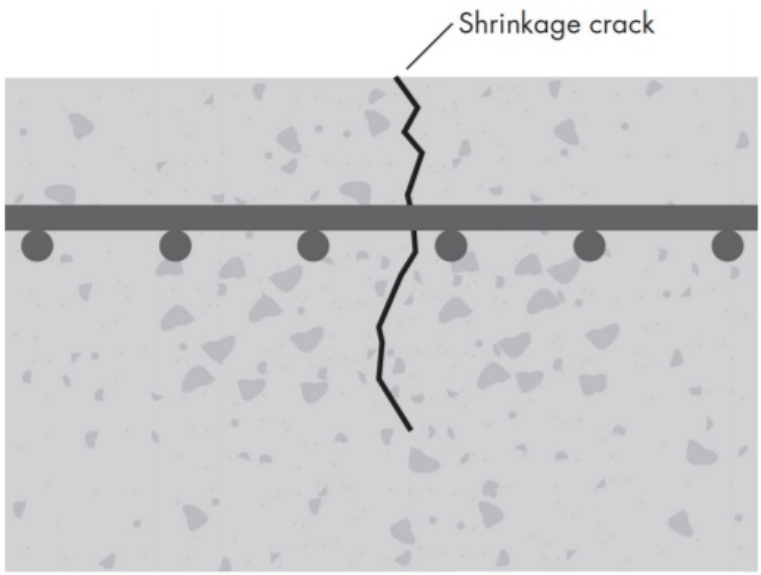
Packaging

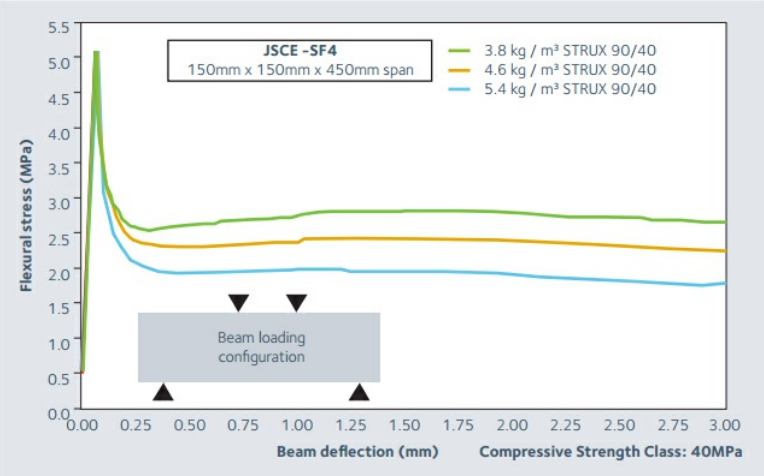
STRUX 90/40 is available in 2.3kg concrete-ready bags.

Technical Data

Specific Gravity	0.92
Absorption	None
Modulus of elasticity	9.5GPa
Tensile Strength	620MPa
Melting Point	160°C
Ignition Point	590°C
Alkali, Acid & Salt Resistance	High


Shrinkage crack
STRUX 90/40 fibre


Shrinkage crack

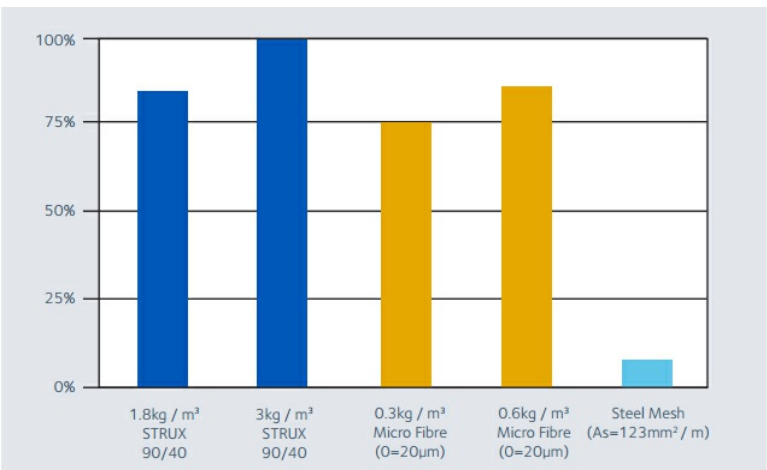


Note: These curves are based on averages of several beam tests. The toughness performance will depend on the concrete mix design used.

STRUX 90/40 DOSAGE RATE (KG/ M³)	$F_{E,3}$ (MPA)	$R_{E,3}$ (%)
3.8	1.95	38%
4.6	2.40	46%
5.4	2.75	54%

Note: These figures ($f_{e,3}$ and $R_{e,3}$) are indicative of the performance of concrete mixes containing STRUX 90/40 but they will vary depending on the hardened properties of the concrete. It is reasonable to expect higher figures when tested in other concrete mixes.

Plastic Shrinkage Crack Reduction (ASTM C1579-06)



Note: The addition of STRUX 90/40 fibres, to control plastic shrinkage cracking, does not negate the need for appropriate and efficient curing techniques.

Comparison of STRUX 90/40 and Other Types of Reinforcement (Reduces)

REINFORCEMENT TYPE	PLASTIC SHRINKAGE CRACKING	DRYING SHRINKAGE CRACKING	CORROSION RISK	FREEZE/ THAW DAMAGE
Polypropylene "Micro" fibres	+	-	+	+/-
Steel fibres	-	+	-	-
Steel mesh	-	+(1)	-	-
STRUX 90/40	+	+	+	-

Comparison of STRUX 90/40 and Other Types of Reinforcement (Provides)

REINFORCEMENT TYPE	SAFE, EASY HANDLING	QUICK, WELL CONTROLLED INSTALLATION	POSTCRACK LOAD CARRYING CAPACITY
Polypropylene "Micro" fibres	+	+	-
Steel fibres	-	+	+
Steel mesh	-	-	+(2)
STRUX 90/40	+	+	+

+ = positive effect

- = no effect

(1) Only if positioned in top third of floor slab

(2) Only if positioned in bottom third of floor slab

U.S. Patent Nos.: 6,569,525; 6,569,526; 6,758,897.