

# STRUX<sup>®</sup> 90/40

Advanced synthetic macro fibre reinforcement that controls shrinkage cracking in concrete

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## Product Description

STRUX<sup>®</sup>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 -  $R_{e,3}$  values in excess of 30% can be reliably achieved (see UK Concrete Society Technical Report 34, 3<sup>rd</sup> 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<sup>3</sup>. 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

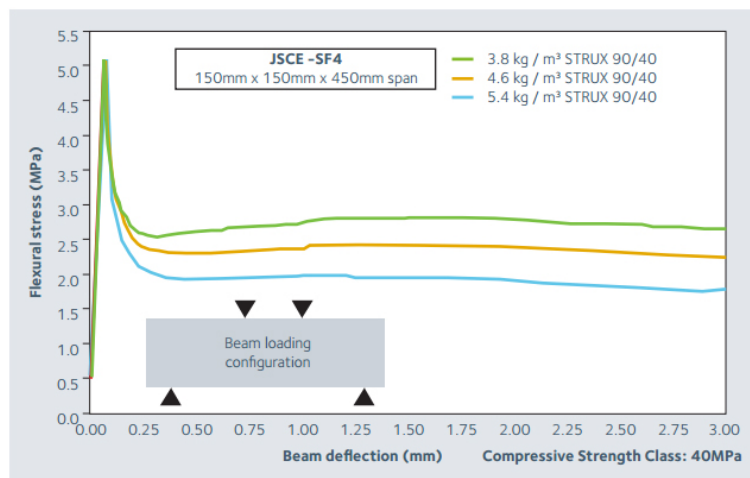
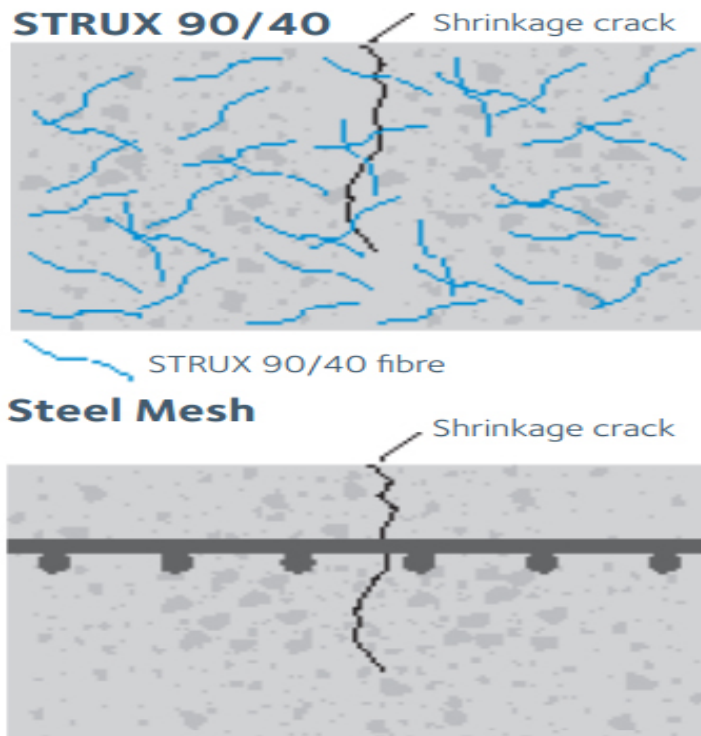
STRUX 90/40 is compatible with all GCP admixtures. The action of STRUX 90/40 in concrete is mechanical and will not affect the hydration process of the cement. Each liquid admixture should be added separately to the concrete mix.

## 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

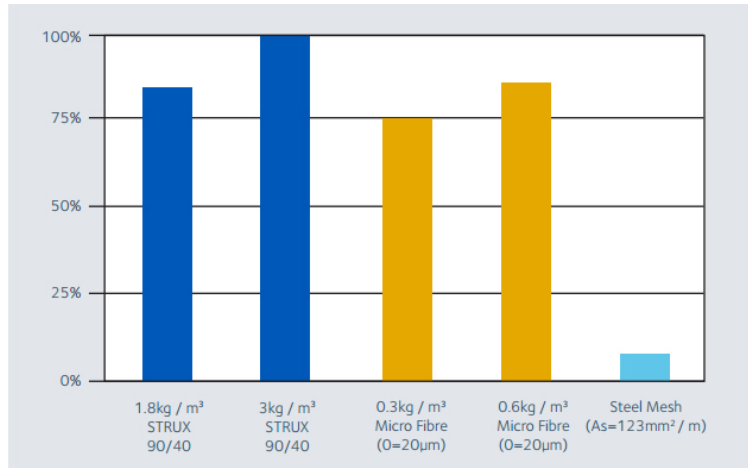


Note: These curves are based on averages of several beam tests. The toughness performance will depend on the concrete mix design used.

STRUX 90/40 DOSAGE RATE (KG/ M <sup>3</sup> )	$f_{E,3}$ (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.

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GCP Applied Technologies Inc., 2325 Lakeview Parkway, Alpharetta, GA 30009, USA

GCP (Hong Kong) Ltd., 6 On Chuen Street, On Lok Tsuen Ind Area, Fanling, Hong Kong

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Last Updated: 2025-05-15

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