

## M MIXING

The Synthetic Fibers are added to concrete before or during the Mixing operation.

## P PUMPING:

Fibre Tuff can be pumped through rubber Hoses without difficulty.

## H HANDLING AND STORAGE:

Fibre Tuff is packed as per requirement and Supplied on durable, PP woven laminated bags. Bag Must be stored in Cool places. For sample packet please coordinate with our representative.

## E EASY FINISH FIBRE:

Surface Finish is major problem for many fibre reinforcements. Fibre Tuff uniquely design and material composition ensures that it remains embedded below the concrete surface, very little protrudes out of the surface

## C COMPATIBILITY

Fibre Tuff is compatible with all concrete admixtures and performance enhancing chemicals.

## S SAFETY

No special care is required while using fibre Tuff. Full material data safety sheet is available if asked for.

### COMPLETED PROJECTS



Finished Floor with FibreTuff



Concrete slab is mixed with Fibretuff



FibreTuff Replacing Steel



Blast Wall



Shot Crete with Fiber Tuff

### FIBER TUFF AGAINST CRACK



Steel mesh



Bajaj Fibre Tuff



Up to 3,18,000 Fiber Tuff are evenly distributed in every cubic metre of concrete.

MUSCLE TO YOUR CONCRETE

### INTRODUCING FIBRETUFF

Fiber Tuff, Macro synthetic polypropylene fiber are heavy duty synthetic fiber specially engineered for use as a secondary reinforcement, providing excellent resistance to the post cracking capacity of concrete and are replacing steel fiber in a range of applications, including ground supported slab (both internal and external) sprayed concrete (shotcrete) and precast concrete units.

The properties of fiber are covered by BS EN 14889, fiber of concrete part 2, Polymer Fibres- Definition, specification and conformity.

### CHARACTERISTICS OF FIBRETUFF

FibreTuff features a unique continuous embossed surface, enabling the fibre to achieve maximum bond with the cement matrix for optimum performance.

Macro Structural Synthetic Fibres are highly resistant to acidic and alkaline environments, thus, they do not require concrete cover as protection against corrosion.



### Technical Specifications (Confirm to EN 14889-2, ASTM C1116-II)

Characteristics	Base resin	Length	Tensile Strength	Surface Texture	No. Fibres per kg	Specific Gravity	Youngs Modulus	Melting Point	Ignition Point
Material Property	Modified Olefin	36mm	550 - 650 MPa	Continuously Embossed	36,200	0.90 - 0.93	10 - 12 Gpa	160°C - 179°C	Greater than 450°C
		50mm			29,000				
		54mm			26,500				



### Factory Address:

D-5/1, M.I.D.C Hingna Industrial Estate, Nagpur - 440028

### Office Address:

D-5/1, M.I.D.C Hingna Industrial Estate, Nagpur - 440028

Tel. No. 07104 - 281000

E-mail : info@brllp.in

Website : www.brllp.in





## Benefits

- Significantly improves shrinkage and temperature crack control
- Safer and lighter to handle than steel
- Reduces carbon footprint
- Reduces plastic settlement crack
- Reduces permeability
- Reduces bleeding
- Unlike steel, doesn't stain concrete with rust marks
- Potential for increase in joint spacing
- Increases flexural strength
- Increases impact resistant
- Increases residual strength
- Increases fatigue resistance
- Increases tensile strength
- Increases energy absorption
- Increases ductility
- Increases toughness
- Increases post crack load capacity

## APPLICATIONS

### Tunnelling & Mining

- Portal Stabilisation
- Ventilation Shaft
- Shotcrete FRS
- Segment Lining
- Invert Slab
- Roadways

### Residential

- Concrete Pavements
- Swimming pools
- Parking Lots
- Basement car park
- Driveways
- Concrete Footpaths
- Concrete Roadways
- Slab on Grade

### Commercial & Industrial Flooring

- Hardstands
- Engineered Slabs
- Flooring
- Composite Slab
- Driveways
- Tilt-Up Walls
- Slab on Grade

### Marine Structures

- Foreshore Protection
- Marinas Wharfs & Jetties
- Retention Basins
- Retaining Walls
- Offshore Platforms
- Bridges & Piers
- Artificial Reefs
- Culverts
- Canals

### Precast Concrete

- Precast Blocks
- Precast Paving Slabs
- Precast Boundary walls
- Precast units
- Precast concrete stairs
- Precast Tunnel Lining

**Dosage :** Recommended dosage of FibreTuff varies from 2 Kg/m<sup>3</sup> - 9 Kg/m<sup>3</sup>.

We suggest you to Contact your Bajaj Reinforcement representative Before using so that we can discuss together. Designs are available, if asked for.

## Key Applications Areas



Tunnel



Warehouses



Marine Structures



Precast Structure



Concrete Roads



Shotcrete Sprays



Precast Tunnel Lining



Runways & Flooring

## Fibre Tuff against Steel fibre

Property	Synthetic Macro Fibre	Steel Fibre
Workability	Slightly Reduced	Reduced
Plastic Shrinkage Cracking	Slightly Reduced	Unaffected
Post Crack Ductility	Greatly Increased	Increase
Early age Thermal Cracking	Reduced	Reduced
Long Term Shrinkage Cracking	Reduced	Reduced
Durability in Chloride Exposure	Greatly Increased	Increase
Long term creep behavior	Increased	Slightly Increase
Compressive strength	Unaffected	Unaffected
Residual Flexural strength	Increase	Increase
Impact Strength	Increase	Greatly Increase
Flexural Toughness	Increase	Increase
Abrasion Resistance	Slightly Increase	Increase
Freeze Thaw Resistance	Increase	Slightly Increase
Flexural Energy absorption	Greatly Increase	Greatly Increase
Concrete Permeability	Decrease	Decrease
Energy Absorption	Greatly Increase	Increase
Safety	Unaffected	"Hazard from Handling and Protuding Fibre"

An Economical Solution to your Structure

## OUR OTHER PRODUCTS

### MicroSyntheticFibre



*Bsecure Doors*  
FROM "BAJAJ", NAGPUR





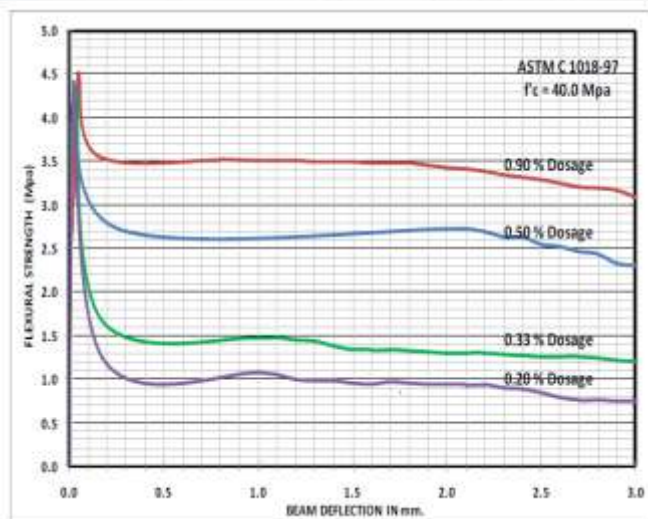
### PRODUCT DESCRIPTION :

Fibre Tuff from Bajaj Reinforcements LLP orequivalent conforms to classification BS EN 14889-2, under class II: Macro fibre >0.30mm in diameter with tensile strength between 550 to 650 MPa, length 36 to 60mm with continually embossed surface anchorage mechanism to encourage bond.

### Benefits :

- ✓ Increases post crack load capacity.
- ✓ Redistribute load, 3D Reinforcement
- ✓ Increase ductility/Toughness.
- ✓ Eliminate set up of Steel Mesh.
- ✓ Speed up precast production.
- ✓ Improve abrasion and precast production.
- ✓ Comprehensive design and Technical support.

### Effect of Fibre Tuff on Residual Strength



Note: These curve are based on average of several beam test. The toughness performance will be based on concrete mix design used.

Fibre Tuff Dosage	Fe3 (MPa)	Re3 %
%(Kg/ m3)		
0.2% (1.82)	0.74	16.8
0.33% (3.00)	1.2	27.9
0.50% (4.95)	2.38	53.8
0.90% (8.20)	3.09	70.1



### Reference Documents :

- ✓ ASTM C1609 M-12: (Flexural performance using Centre point Load)
- ✓ ASTM C1018 (Test Method for flexural toughness and first crack strength)
- ✓ TR34: (Concrete Industrial Ground Floor)
- ✓ IRC:SP:46-2013: (Guideline for design and construction of Fibre Reinforced Concrete Pavements)
- ✓ Tensile strength as per EN 10002-1

### Dosage :

Fibre Tuff has regular dosage of 2.5 to 9 Kg per cubic Meter of Concrete. Dosage rate is decided as per Structural requirements. We suggest you to Contact your Bajaj Reinforcement representative Before using so that we can discuss together. Designs are available, if asked for.

### Easy Finish Fibre :

Surface Finish is major problem for many fibre reinforcements. Fibre Tuff uniquely design and material composition ensure it remain embedded below the concrete surface.

### Mixing :

The Synthetic Fibers are added to concrete before or during the Mixing operation.

Conformity: Confirms to EN 14889 – 2, ASTM C1116 - II





### Benefits :

- ✓ Redistribute load and increases ductility and toughness.
- ✓ Improve Shrinkage and Temperature crack
- ✓ Reduces pavement thickness
- ✓ Improves the flexural behaviour of concrete
- ✓ Comprehensive design and technical support
- ✓ Optimal resistance against Impact and Dynamic Loads
- ✓ Considerable increase in joint spacing
- ✓ Provides excellent edge and impact protection due to the three dimensional dispersion of fibres throughout the concrete mix.
- ✓ High impact strength for air craft runways and tarmacs.

### Reference Documents :

- ✓ ASTM C108 ( Standard test method for first crack load of FRC)
- ✓ ASTM C1609 (Standard Test Method for flexural performance of FRC)
- ✓ TR 66 (External In-Situ Concrete Paving)
- ✓ IRC:SP:76:2008 (Tentative Guideline for Conventional thin and ultra-thin white topping)

### Dosage :

Fibre Tuff has regular dosage of 2.5 to 9 Kg per cubic Meter of Concrete. Dosage rate is decided as per Structural requirements. We suggest you to Contact your Bajaj Reinforcement representative Before using so that we can discuss it together

### Cost Comparison against TMT bar :

Particular	Wire Mesh	Fibre Tuff
Material Cost	Yes	Yes
Cost For Concrete Pump	Yes	Yes
Cost to Tie Bars	Yes	Nil
Cost of Handling	Yes	Nil

### Cost Comparison against Steel Fibre :

FIBRE	COST PER Kg (Approx)	Typical Dosage	Rate per Cubic meter of Concrete	Percentage Saving
Bajaj Fibre Tuff	350	3	1050	<b>47% Saving per cubic meter of concrete</b>
Steel Fibre	80	25	2000	

### PRODUCT DESCRIPTION :

Fibre Tuff is a macro synthetic fibre designed specifically for the reinforcement of concrete and other cementitious mixes. Fibre Tuff have an engineered contoured profile, which serves to effectively anchor the fibre into the concrete thus resisting matrix pull out and enhancing the concrete's performance even after it has developed stress cracks.

### Benefits :

- ✓ Redistribute load Increase ductility/toughness
- ✓ Eliminates corrosion long term durability
- ✓ Reduces Permeability thus increases concrete life
- ✓ Improves shrinkage and temperature crack control
- ✓ Safer and lighter to handle than steel
- ✓ 85% reduction in carbon footprint compare to steel
- ✓ Strong bonding with Concrete.
- ✓ Increases post crack load capacity
- ✓ Speed up construction by eliminating steel mesh set up. Reduces wear on concrete pumps and hoses.



### Reference Document :

- ✓ ASTM C1550 ( Standard test method for Flexural Toughness of FRC using Centrally loaded Round Panel Test)
- ✓ EFNARC/ EN 14488-5 ( Square panel test)
- ✓ ASTM C1018 (Test Method for flexural toughness and first crack strength)
- ✓ Tensile strength as per EN 10002-1

### Dosage :

Fibre Tuff has regular dosage of 5 to 9 Kg per cubic Meter of Concrete. Dosage rate is decided as per Structural toughness. We suggest you to Contact your Bajaj Reinforcement representative before using so that we can discuss together the applications.

### Pumping :

Fibre Tuff can be pumped through 50mm rubber Hoses without difficulty, hose life increases against steel Fibre, thus saving time and money.

### Mixing :

The Synthetic Fibers are added to concrete before or during the Mixing operation.

### Handling / Packaging & Storage

Fibre Tuff is packed in mulchable paper bag or as per the requirement. It Must be stored in Cool places. For sample packet Please Coordinate with our representative.

### Technical Specification :

Characteristics	Fibre Tuff
Base Material	Modified Olefins
Specific Gravity	0.90 - 0.93
Diameter (mm)	0.8 to 0.9
Length(mm)	36/50/54
Aspect Ratio	≥64
Tensile Strength(MPa)	550-650 MPa
Young Modulus	10-12 Gpa
Melt Point	160°C - 179°C
Anchorage	Continuous Embossing
Alkali Resistance	Excellent



## Bajaj Fiber Tuff

## Steel Fibres

1	Specialy processed to increase bonding strength with concrete thus maximum performance is delivered	Varous type of identation is done in order to increse bonding which can adversely effect pumping and hose life
2	"Easier to pump. Also, pump and hoses loss are very less. No wear & tear to batching plant / site mixer with the use of macro synthetic fibres. Bounce back losses are very low."	Restrained flow, loss to pump and hoses. 10 Kgs or 50,000 nos. of steel needles moving at high speed while mixing of concrete will cause a lot of wear and tear to the batching plant and transit mixer. Bounce back losses are very high.
3	Safer to handle as they pose very little risk of human injury during handling and the as-sprayed surface presents a diminished risk of laceration.	Human Injuries as well as movement of material causes damage and requires more labour.
4	The low mass of fibres used per cubic metre for most levels of post-crack performance offers the contractor an advantage in terms of reduced environmental and transport costs that can make a substantial difference to the overall attractiveness of shotcrete in remote areas.	Higher mass of fibres used per cubic metre. Dead weight is much higher, increases the risk of spalling.
5	Carbon emissions per cubic metre is less. Instead, it reduces carbon footprint.	Higher carbon emissions is observed.
6	Lower overall cost for FRS mix.	Overall cost for FRS mix is much higher.
7	Fibre Tuff are corrosion free and have no durability concerns.	"Corrosion of Steel Fibres presents serious durability problems."
8	Fibre Count per unit volume 8 – 10 times higher than steel fibres. Approx. 50,000 pieces per Kg.	Much lower fibre count per unit volume than macro synthetic fibres. Approx. 5000 pieces per Kg.
9	Can be added to the mix at any stage during batching. No balling issues are observed.	Steel fibres tend to ball and glued steel fibres come together resulting in loss of fibres.

