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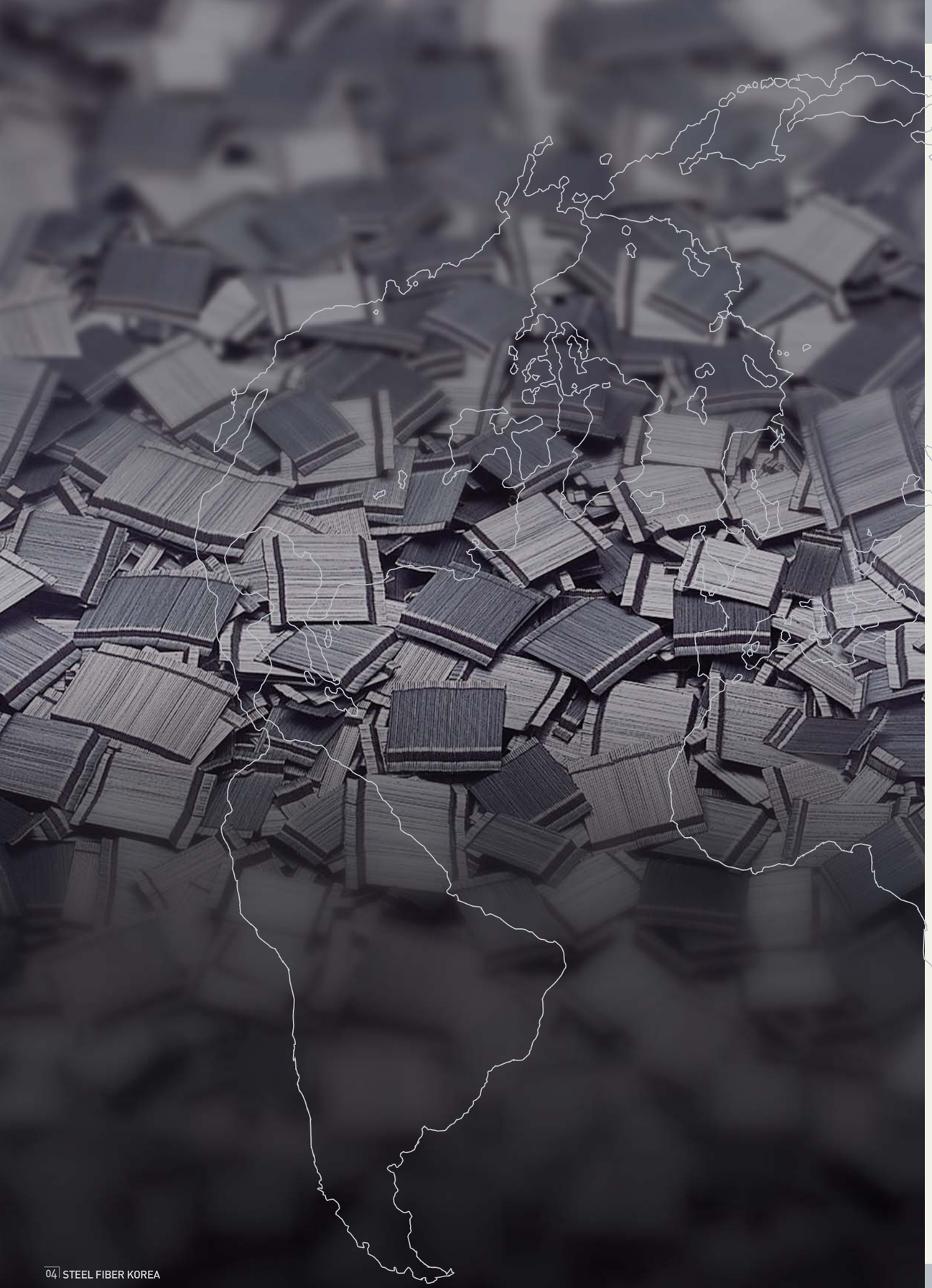
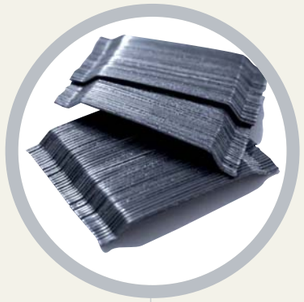


Steel Fiber Korea has long been a leader in the Korean steel fiber industry and is now looking to the world with its cutting-edge technology.

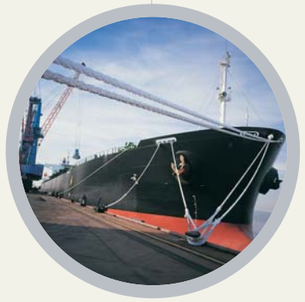
As the top player in korean domestic market, Steel Fiber Korea will continue its efforts to make the best products. With our world-class technology through continued research, we are manufacturing the best steel fiber that is widely recognized around the world.













A new history of the steel fiber begins with Steel Fiber Korea.

Steel Fiber Korea is the most trusted company among customers with the best wire-making technologies and is positioned as a leading player in the global market by applying new technologies to the steel fiber manufacturing process.

History

2001
October — Established Steel Fiber Korea Co., Ltd

2002
April — Obtained Registration of Industrial Design for Steel Fiber Reinforced Concrete

2003
June — Obtained Registration of Trademark for SFK BUNDREX®
November — Obtained Registration of Trademark for Steel Fiber Korea Co., Ltd

2005
February — Obtained Registration of Patent for Manufacturing Device of Rigid and Ductile Wire for Concrete Reinforcement

2006
February — Obtained Registration of Patent for Steel Fiber Glue and its Manufacturing Method
November — Obtained Registration of Patent for Cement Material Containing Reinforced Fiber and its Composite
December — Obtained Certificate of Technology Innovation Type SME from SMBA Administrator

2008
April — Obtained Registration of Trademark for SFK Hybrid

2009
March — Entered Japanese Market
April — Held Presentation on Development of Hybrid Fiber

2010
June — Obtained CE Certification
July — Obtained ISO 9001: 2008 certification
August — Conducted Refractory Test on Prototype of Hybrid Fiber Reinforced Segment

Bundrex Steel Fiber

BUNDREX®is a superior steel fiber technology that ensures stability and cost-effectiveness

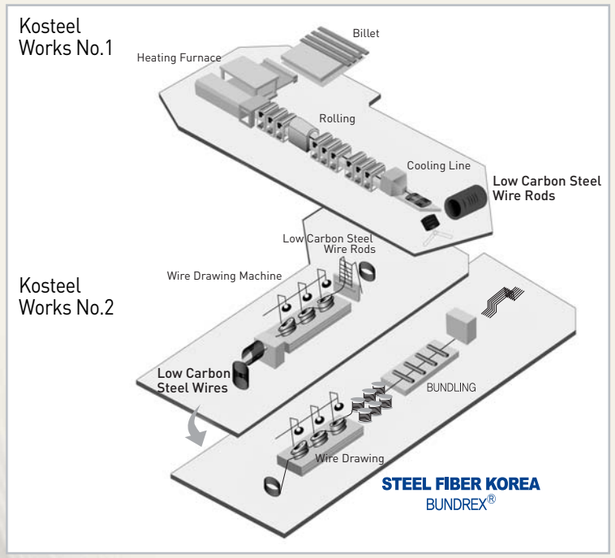
BUNDREX®steel fiber technology compensates for the weaknesses of standard concrete and has already been proven in various applications, including buildings and special structures.



Raw Material of BUNDREX® Steel Fiber

We use low carbon steel wire rods of high-quality made by Kosteel Co., Ltd, a producer of highest-quality wire material with a wide range of product lineup. In order to avoid manufacturing defective products from the beginning, we use low carbon steel wires produced through systematic processing management and strict quality inspection in accordance with ISO and KS product standards.

Raw Material Warehousing and Production Flow of Steel Fiber



Overview of BUNDREX®

- Material : ASTM 510M
- Tensile Strength : 700 ~ 1,200Mpa
- Appearance : END HOOK TYPE / BUNDLE TYPE
- BUNDLE(Glued) TYPE spread evenly without fiber ball
- End hook type acting as an anchor inside concrete; Enhanced effects of crack control with increased toughness and fatigue resistance

Advantages of BUNDREX® Steel Fiber

- Cost-effectiveness
  - Reducing the number of workers: no additional workers are needed to prevent fiber ball when mixing and placing concrete
  - Conserving working hours: fast mixing is possible without fiber ball; No pipeline or nozzle clogging when pouring shorcrete
  - Streamlining B.P. equipment: No steel fiber disperser is needed when installing B.P.
- Quality
  - Superior dispersability
  - Unlike grain-shaped particles, designed volume can be used for reinforcement 100% and the effect of steel fiber can be maximized

BUNDREX® Reinforced Concrete

Concrete reinforced with BUNDREX® technology is more than just concrete.

It is the superior-quality concrete with long durability, high cost-effectiveness, and superior safety.

Characteristics of BUNDREX®-Reinforced Concrete

STEEL FIBER REINFORCED CONCRETE

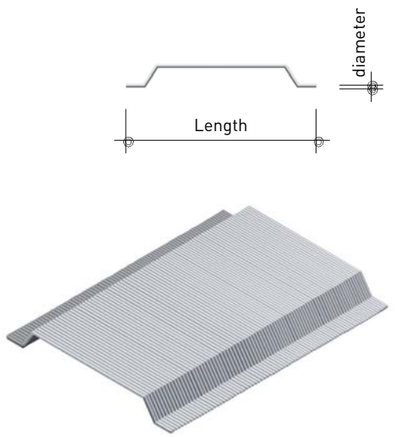
- Increased fatigue resistance, flexural toughness, shear force, flexibility, impact resistance, and fracture resistance of concrete
- Increased resistance to drying shrinkage
- High in abrasion durability, resistance to erosion, corrosion resistance
- Enhanced physical properties of concrete leading to decrease in thickness of concrete section
- Reinforced cohesion of concrete with even dispersion of steel fiber
- Three-dimensional reinforcement effects inside concrete
- Effective prevention of structural member corrosion by blocking negative ionization

Expected Effects of Reinforced Concrete

Physical Properties of Concrete	BUNDREX® Effects
Modulus of Rupture	3 times increase
Shear Strength	2 times increase
Torsional strength	2 times increase
Fatigue Resistance	1.8 times increase
Abrasion and Corrosion	1.4 times increase
Shock absorption	15 times increase

Bundrex Steel Fiber

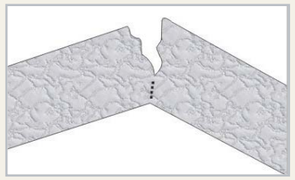
BUNDREX® leads standards of steel fiber through unlimited passion for quality.





Change in Physical Properties of Concrete when reinforced with BUNDREX®

When reinforced with BUNDREX®, brittleness, one of the weaknesses of concrete, leads to enhanced ductility and toughness .



Brittleness



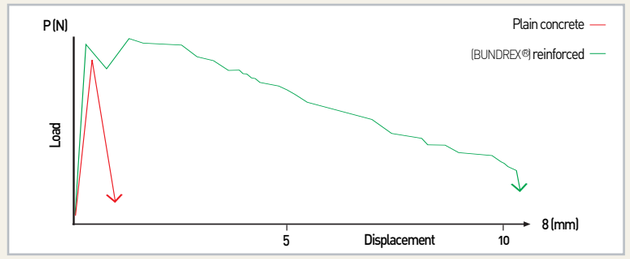
Ductility

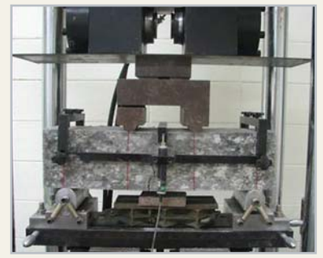
Performance effects of BUNDREX®- Reinforced Concrete by Type

Characteristics	Tunnel	Dam	Road Pavemen	Bridge Deck	Inclined	Factory Flooring	Building	Secondary product
Crack Resistance	○	○	○	○	○	○	○	○
Impact Resistance	▲	○	○	○	●	●	▲	●
Abrasion Resistance	▲	○	○	○	■	●	▲	▲
Freeze/Thaw resistance	○	○	○	○	○	○	○	○
Fatigue Resistance	■	■	●	○	■	○	■	●
Refractoriness	●	■	■	▲	■	●	●	●
Shear Resistance	○	■	●	○	○	●	●	●
Weight, Thickness Decrease	○	▲	●	●	●	▲	○	○
Cost-effectiveness	●	■	●	▲	●	○	●	●

○ Very Good ▲ Average
● Good ■ N/A

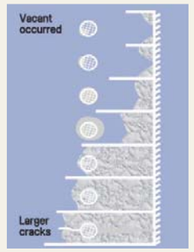
Graph of equivalent flexural strength of SFRC containing BUNDREX®



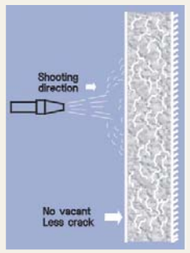


Characteristics of BUNDREX®- Reinforced Shot Concrete

Wire Mesh Reinforcement	BUNDREX® Reinforcement
• Difficult to install wire mesh in case of back break from excavation; decreased reinforcement effects • Decreased adhesion, layer splitting, hollowing-out due to vibration on wire mesh when placing shotcrete • High frequency of cracking in shotcrete and decreased reinforcement effects in case of cracking • Shotcrete reinforcement needed right after excavation due to risk of cave-in disasters; decreased reinforcement effects due to delay of reinforcement • Low constructability and complex work process • Increased construction costs due to longer working hours	• Increased reinforcement effects with wall of even thickness on a rugged surface • Increased tensile strength, bending strength, shear strength of concrete; no hollowing-out; reduction of wall thickness (20%) • High resistance to cracking; increase in toughness (residual strength) after cracking • Shotcrete construction possible right after excavation; drop in risk of cave-in disasters; rise in reinforcement effects and safety of permanent structures • Streamlined work process; rise in quality and safety • Reduced working hours and construction costs



Wire Mesh Reinforcement

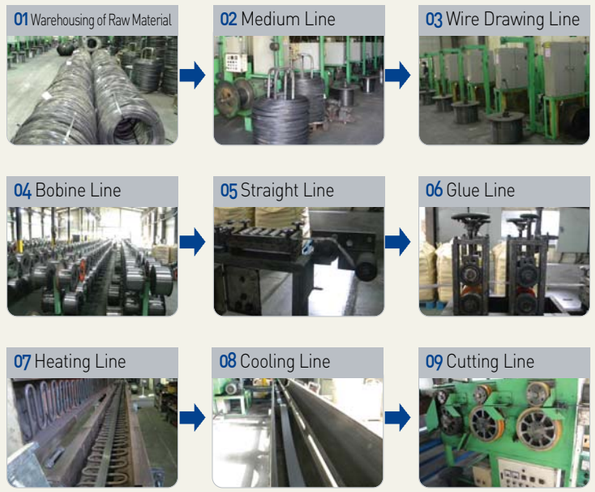


BUNDREX® Reinforcement

Bundrex Steel Fiber



Production Process of BUNDREX® Steel Fiber





CE



ISO 9001:2008

BUNDREX® Steel Fiber Table ←Unit: mm, %→

Specification	Diameter	Length (L)	Aspect Ratio (L/D)
SFK0530	0.5	30	60
SFK0535	0.5	35	70
SFK0630	0.6	30	50
SFK0635	0.6	35	58
SFK0750	0.7	50	71.4
SFK0950	0.9	50	55.6

* As per customer's request, diameter and size are adjustable

Flow Chart of BUNDREX® Steel Fiber Input

• Draw Construction Plan

- Set up construction schedule — Pre-planning: delivery, process, safety management

- Install supply system, allocate, schedule raw material input in line with construction plan
- Supply system

Install supply system



- Deliver BUNDREX to the field and inspect loaded material

Deliver BUNDREX to the field



- Put BUNDREX into B/P in the field through steel fiber supply system
- Measure and put in BUNDREX according to designed volume

Input and mixing of BUNDREX to B/P



- Placing of Steel Fiber-Reinforced Concrete

Placing of Concrete



Packing Method 1000kg(1Ton), 500kg, 20kg(Test)



Supply System

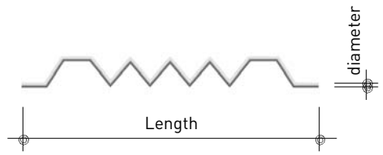

Packing of 1 Ton Bag


Placing of Concrete

Slab-on-Ground

Many buildings and structures stand firm based on the slab-on-ground

Steel fiber-reinforced slab-on-ground has already been used for large warehouses, factories, superstores, and so forth. Reducing construction costs, it ensures safety, easy constructability, and even high toughness.





BUNDREX® - reinforced slab-on-ground is more cost-effective and structurally stable

Characteristics of BUNDREX® - reinforced slab-on-ground

- Superior resistance to cracking
- Increased toughness (residual strength)
- Increased bending strength
- Increased ductility (durability) of concrete



Expected Effects of BUNDREX® - reinforced slab-on-ground

Packing

Performance
- Decreased cracking
- Increased joint spacing
- Increased load carrying capacity of concrete pavement
- Extended pavement lifespan

Application
Expressway, road, parking lot, bridge deck, new pavement, repair and reinforcement work

Cast-in-place concrete

Performance
- Reinforcement of bending stress and tensile force

Application
Machine foundation, structural panels, shell structure, silos, intake tubes, deck slab

Dams and hydraulic structures

Performance
- Impact resistance
- Resistance of toughness, tension, deformation
- Fracture resistance

Application
Spill+way of dam, water pressure tunnel, reservoir around river or reinforced erosion control dam

Tunnel lining

Performance
- Improved bending strength and crack resistance
- Improved crack restraint
- Improved durability
- Improved safety

Application
Tunnel lining

Comparison of Properties Between Ordinary Slab and BUNDREX® - Reinforced Slab-On-Ground

Index	Ordinary Slab	Steel Fiber-Reinforced Slab-On-Ground
Constructability	Decline in constructability	Improvement in constructability
Initial dry shrinkage crack control	Dry shrinkage cracking of upper base	Decrease in dry shrinkage crack of upper base
Initial cracking strength and strongest internal force	Average	Superior
	Unreinforced Concrete Slab ← Reinforced Concrete Slab ← Steel Fiber-Reinforced Slab on Ground	
Failure aspects	Brittle Behavior	Ductile Behavior

SFK Hybrid Fiber

Steel Fiber Korea leads the sector of refractory explosive spalling-resistant fiber in Korea with its cutting-edge technology

Our SFK Hybrid Fiber is specially manufactured to improve explosive spalling resistance and refractory performance of high-strength concrete.





Background of SFK Hybrid Fiber Development

SFK Hybrid fiber, an explosive spalling reducer, was developed to prevent explosive spalling of concrete resulting from large tunnels, underground space, high-rise buildings, and super high-strength concrete. SFK Hybrid fiber ensures durability performance, including structural performance and refractory performance.

- Verification test by the Korea Institute of Construction Technology (engineering) & (construction)

Overview of SFK Hybrid Fiber

It was designed to generate superior refractory effects by mixing more than two types of fiber for optimum effects.

Product Description of SFK Hybrid Fiber(Ⅰ)

- Color : White
- Specification : 5~10mm hybrid type
- Material : polypropylene
- Packing : 0.9kg/bag
- Design Mixing Proportion : according to each mixing design



Mixing of SFK Hybrid Fiber(Ⅱ)

- TYPE1: P.P+P.P(P.P fiber+P.P fiber)
- TYPE2: P.P+STEEL FIBER(P.P fiber+steel fiber)

	Strength of Concrete	Hybrid Type
SFK Hybrid Fiber Ⅰ	≤ 60Mpa	Polypropylene + Polypropylene
SFK Hybrid Fiber Ⅱ	≥ 80Mpa	Polypropylene + Steel Fiber

Effects of SFK Hybrid Fiber

01 Resistance to explosive spalling of high-strength concrete (improved refractory performance)
02 Crack prevention (crack control) plastic shrinkage cracking
03 Increased durability
04 Increased toughness
05 Increased residual strength after fire exposure
06 Improved seismic resistance and fatigue resistance
07 Assured constructability

Fire Tests



Control



SFK Hybrid

Fire-resistance test by the Korea Institute of Construction Technology in 2009

Satisfactory fire-resistance performance (test records issued)







Fire Tests



Test result 1 (60Mpa)

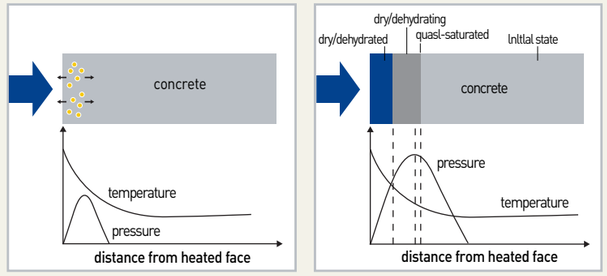


Test result 2 (80Mpa)

SFK Hybrid Fiber



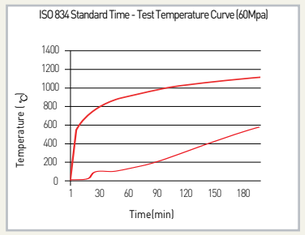
Thermal Stress and Pore Pressure

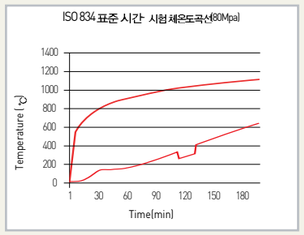


Korea's standard of unloading fire-resistance performance (KSF 2257-6.7)

- Refractory performance management of high-strength pillar and beam with over 50 MPa of standard compressive strength of design
- Based on time-temperature graph prescribed in KSF 2257-1
- Suitable to standard with average temperature of main reinforcement of 538℃, maximum of 649℃ or lower

Time-Temperature Standard Curve of SFK Hybrid Fiber in fire exposure





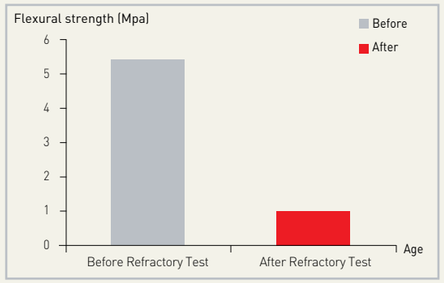
Refractory Performance Management standard of High-strength Concrete Columns and Beams (Ministry of Land, Transport, and Maritime affairs, Notification No. 2008-334)
The Standards and rules on refractory structure, evacuation, and fire protection prescribed in the Article 2 of Enforcement Decree on Construction and in the Article 3, set out standards and methods to verify refractory performance of columns and beams made of concrete with over 50 MPa of standard compressive strength of design

Use of SFK Hybrid Fiber

01 Open a bag and put it on a B/P conveyer belt or in a mixer
02 Concrete mixing: insert according to the optimum mix proportion
03 Mixing time: same as mixing time for plain concrete

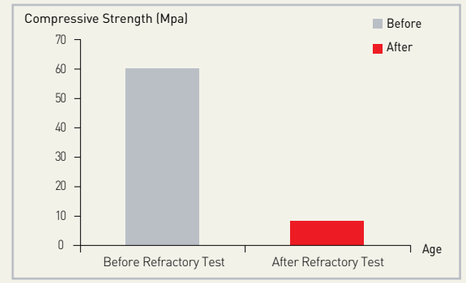
Flexural strength of SFK Hybrid Fiber-reinforced concrete before and after refractory test

Refractory Test	1	2	3	Average
Before	5.2	5.6	5.4	5.4
After	0.81	0.78	0.72	0.77



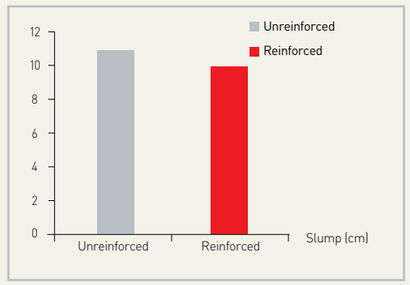
Compressive strength of SFK Hybrid Fiber-reinforced concrete before and after refractory test

Compressive Strength (Mpa)	1	2	3	Average
Before	62.4	60.3	59.1	60.6
After	8.6	8.3	8.9	8.6

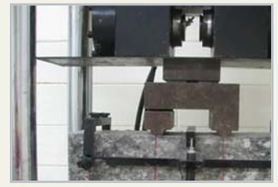


Slump by reinforcement with SFK Hybrid Fiber

With or without SFK Hybrid Fiber	1	2	Average
SFK Hybrid Fiber Unreinforced	10.5	11.5	11.0
SFK Hybrid Fiber Reinforced	9.5	10.5	10.0




Compressive Strength Test


Flexural Strength/Toughness Test


Tensile Strength Test

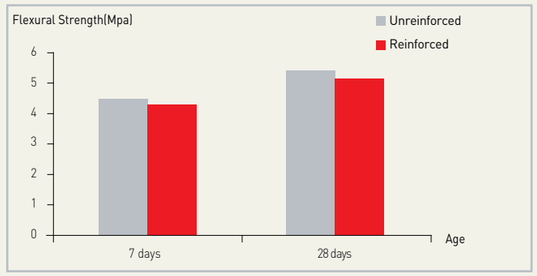
SFK Hybrid Fiber

Steel Fiber Korea’ s cutting-edge technology is hand in hand with customers’ satisfaction



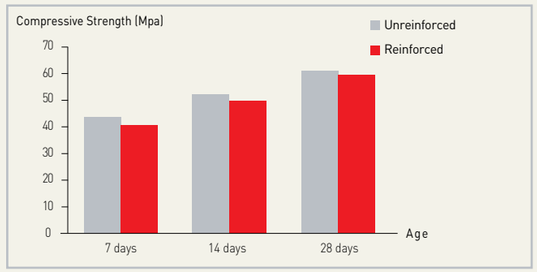
Flexural Strength by SFK Hybrid Fiber Reinforcement

With or without SFK Hybrid Fiber	Age	1	2	3	Average
SFK Hybrid Fiber Unreinforced	7 days	4.8	4.3	4.4	4.5
	28 days	5.2	5.6	5.4	5.4
SFK Hybrid Fiber Reinforced	7 days	4.5	4.1	4.3	4.3
	28 days	5.2	5.5	5.2	5.2



Compressive Strength by SFK Hybrid Fiber Reinforcement

With or without SFK Hybrid Fiber	Age	1	2	3	Average
SFK Hybrid Fiber Unreinforced	7 days	43.8	41.6	43.9	43.1
	14 days	52.4	50.3	52.7	51.8
	28 days	62.4	60.3	59.1	60.6
SFK Hybrid Fiber Reinforced	7 days	41.5	40.8	39.2	40.5
	14 days	51.2	48.4	50.7	50.1
	28 days	60.1	60.8	58.2	59.7



Performance of BUNDREX® Steel Fiber Delivery

Listings of Steel Fiber Delivery /Domestic

Client	Title of work	Constructor	Construction Type
Korea Highway Corporation	Expressway work section 4 (Daejeon-Dangjin)	GS Engineering & Construction	Tunnel shotcrete
Korea Rail Network Authority	Jungang Line work section 3 (Deokso-Wonju)	Samsung C&T Corp.	Tunnel shotcrete
Korea Water Resources Corporation	Sihwa Tidal Power Plant	Daewoo Engineering & Construction Co., Ltd	Tunnel shotcrete
Korea Western Power Co., Ltd	Cheongsong Pumped Storage Power station (Cheongsong dam)	Samsung C&T Corp.	Lining of Hydraulic pressure
Korea High Speed Rail Construction Authority	KTX Work section 13-3 SK	Engineering & Construction	Tunnel shotcrete
Iksan Regional Construction Management Office	National Bypass in Jeongup	NamKwang Engineering & Construction	Tunnel shotcrete
Seoul Metropolitan City	Seoul Subway Line 7 Extension Work section 702	Hyundai Engineering & Construction	Tunnel shotcrete

* BUNDREX® steel fiber was adopted by more than 113 sites.

Listings of Steel Fiber Delivery /Overseas

Location(Country)	Title of work	Constructor	Construction Type
Japan	Yokohama Circle North Line	Obayashi	RC Segment
Japan	Kawajiri Tunnel Shield Works	Obayashi	RC Segment
Japan	NO.25th Mido-Suji Shield Works	Taisei	RC Segment
Japan	Yamato River Shield Works	Kajima	RC Segment

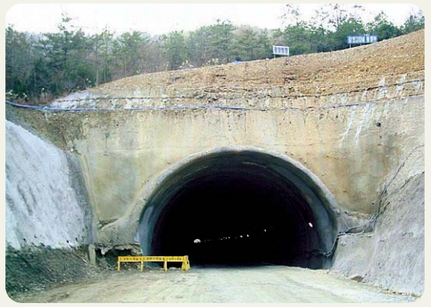
Steel Fiber Korea_Major Sites



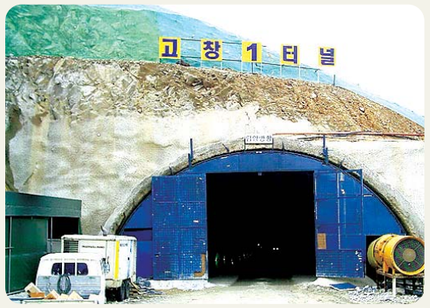
Seocheon Tunnel



Yeongam Tunnel No.1



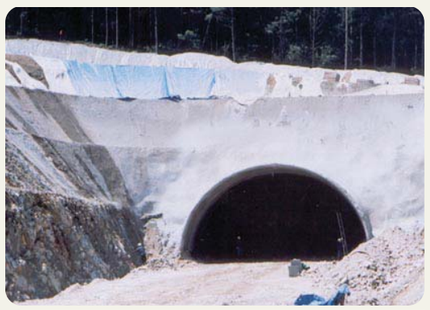
Kangjin Tunnel



Gochang Tunnel No.1



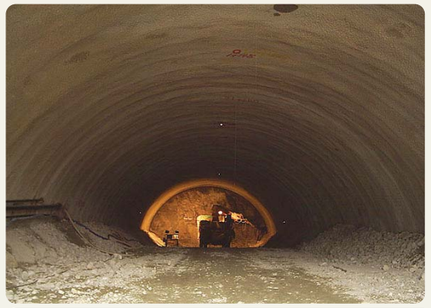
Gochang Tunnel



Chimgok Tunnel



Osan Tunnel



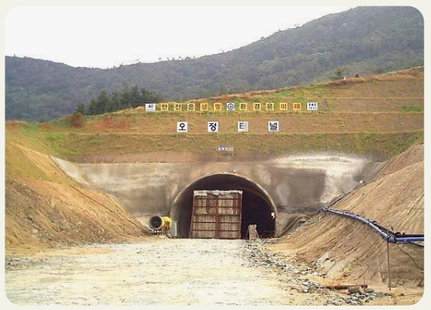
Yulchi Tunnel



Jeongok Tunnel No.2



Nokmun Tunnel



Ojeong Tunnel



Yongdu Tunnel

Steel Fiber Korea_ Major Sites



Gochang Tunnel



Munsusan Tunnel



Farm Road Pavement



Jungbu Inland Expressway



Munpyung Tunnel



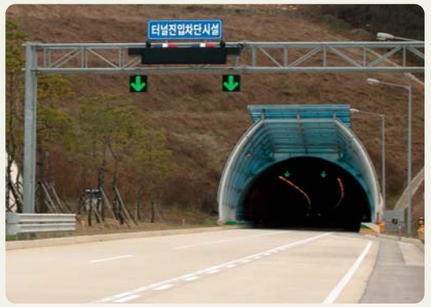
Jangsung Tunnel



Parking Lot Slab Construction



Distribution Center
Flooring Construction



Munju Tunnel



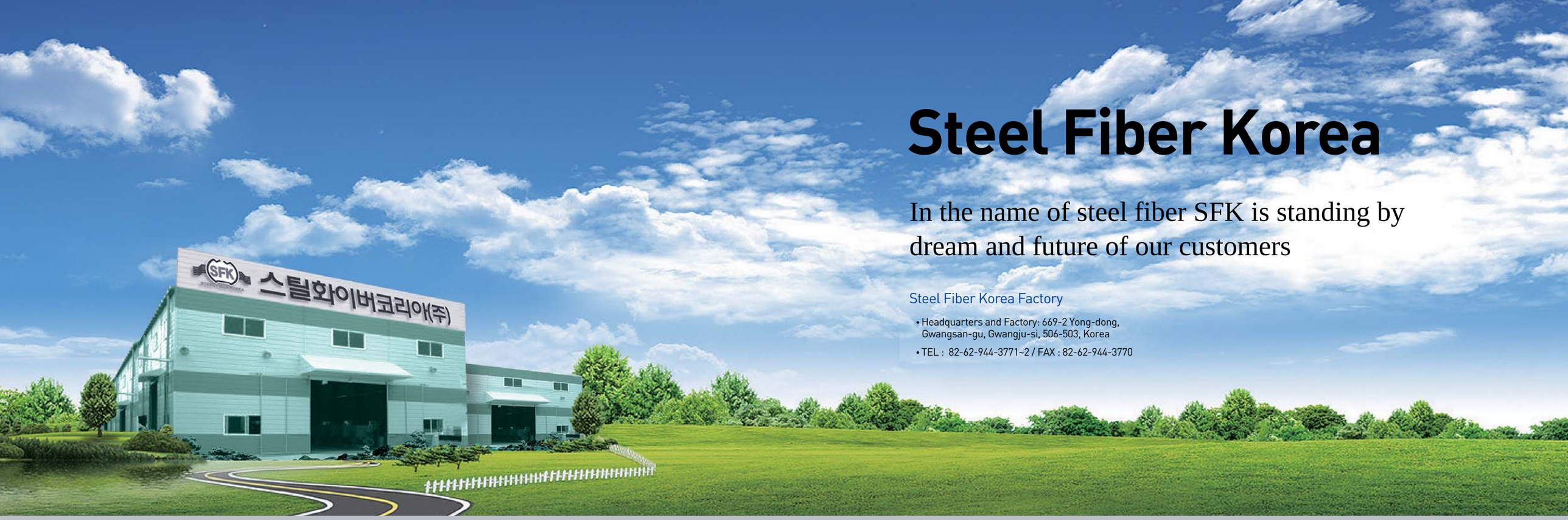
Nabi Tunnel



Tunnel Segment



Segment



Steel Fiber Korea

In the name of steel fiber SFK is standing by dream and future of our customers

Steel Fiber Korea Factory

- Headquarters and Factory: 669-2 Yong-dong, Gwangsan-gu, Gwangju-si, 506-503, Korea
- TEL : 82-62-944-3771~2 / FAX : 82-62-944-3770

Affiliated Company



Kosteel Works No. 1 - Pohang Factory No.1

- Address : 286, Ho-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-380, Korea
- TEL : 82-54-278-0300
- FAX : 82-54-278-0307
- Production Capacity : 350,000 ton
- Major Products: wire and rebar
- KS items: deformed bar KSD3504, low carbon steel wire rods KSD3554



Kosteel Works No. 2 - Pohang Factory No.2

- Address : 594, Ho-dong, Nam-gu, Pohang-si, Gyeongsangbuk-do, 790-380, Korea
- TEL : 82-54-278-0314
- FAX : 82-54-278-0317
- Production Capacity : 100,000 ton
- Major products: low carbon steel wire, wire nail, annealed wire, flat tie, flat coil
- KS items: low carbon steel wire KSD3552, round wire nail KSD3553



Kosteel Works No. 3 - Umsung Factory No.3

- Address : 2-6, Soseok-ri, Daeso-myeon, Eumseong-gun, Chungcheongbuk-do, Korea
- TEL : 82-43-882-7893
- FAX : 82-43-882-7898
- Production Capacity : 350,000 ton
- Production Capacity: 1,800,000 ㎡/year
- Major products: super deck



Stepping Stone for Global Expansion KOSTEEL VINA, Vietnam Subsidiary

- Trach Industrial Zone, Dong Nai Province, Vietnam
- TEL : +84-61-848-840
- FAX : +84-61-848-874