Renderoc FR10

FOSROC constructive solutions

High Performance Aramid Fiber containing Kevlar® brand fiber for Concrete Structures Reinforcement

Description

Renderoc FR10 is a high strength and high elastic modulus fiber sheet containing Kevlar® brand fiber. It is used to improve seismic performance and for strengthening construction structure, such as improve existing column's and beam's shear strength and deformation properties.

Advantages

- High tensile strength and elastic modulus
- Good dimensional stability
- High impact resistance
- High chemical resistance
- Very low electric conductivity
- Non-rusting/corrosion
- Easy to handle & use
- Suitable in even small/narrow place
- Good thermal expansion
- High shear stress and cut resistance

Physical Properties

Breaking Strength (tf/m)

AK-40	AK-60	AK-90	AK-120
40	60	90	120

Fiber quantity (g/m^2)

280	415	623	830

Thickness (mm)

0.193	0.286	0.430	0.572

Design value (Tensile strength : kgf/mm^2)

210

Design value (Elastic modulus : tf/mm^2)

12.0

Design value (Max strain : %) = 1.8

(Design value means guarantee! value)

Kevlar® is a DuPont registered trademark

Applications

Renderoc FR10 can be used for strengthening columns and beams of railway bridges and road bridges, inside wall of railroad tunnels, repair of concrete support of electric pole, piers of highway bridges, connecting beams of highway bridges and other strengthening concrete structures. Renderoc FR10 has been widely used and proved for concrete structure reinforcement in Japan and Korea.

Renderoc FR10 is high performance fiber made with Kevlar® brand fiber for its high strength and high elastic modulus. Its low density properties, specific strength and modulus are extremely high compared with the conventional materials, such as steel and concrete.

Comparison with Conventional Materials

	Steel	Carbon	Renderoc FR10
Handling	Difficult	Easy	Easy
Strength	OK but Weight	OK	OK
Rust	Bad	OK	OK
Impact	Bad	OK	OK
Conductivity	Good	Excel.	Excel.
Process	Difficult Risky	No Good	Good
Facility req.	Heavy	Hand Tool	Hand Tool
Skill required	Difficult	Easy	Easy
Ambient noise on site	Less	Partially less	No

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Site space occupancy	Big	Small	Small
Thermal Expansion with concrete (durability)	Good	Delamination	Good
Total cost	Good	> than Renderoc FR10	Cheaper

Chemical Resistance

Renderoc FR10 is chemically stable reinforcement material under variety of exposure conditions.

Chemical	Cone/Temp (%/°C)	Time (hrs)	Effect on BS
ACIDS			
Acetic acid	99 (21)	24	None
Acetic acid	40 (21)	1000	Slight
Acetic acid	40 (99)	100	Appreciable
Formic acid	90 (21)	100	None
HCl	37 (21)	24	None
Nitric acid	10 (21)	100	Appreciable
Phosphoric	10 (21)	100	None
Sulfuric acid	10 (21)	100	None
BASES			
Ammonium	28 (21)	1000	None
Potassium	50 (21)	24	None
Sodium	40 (21)	100	None
Sodium	10 (100)	10	Appreciable
NaCl	10 (99)	100	None
Oils & fuel	(21)	>24	None
Organic			
Solvents	100 (21)	>24	None

Application Procedures

Concrete surfaces to be applied by **Renderoc FR10** should be clean, free of any dust, oil, paint and other foreign materiais. Removing impurities from the concrete surface may be done by using a sander or other means. The clean surface is then applied with surface (fine) grinding.

Coarse surface is not recommended and will lead to the formation of air trapped during priming. Coarse surface should be repaired by using **Expocrete** prior to priming

Major damaged concrete surfaces should be repaired by using Fosroc Renderoc system.

Apply the clean surface with recommended epoxy priming **Nitobond EP10P**. The use of epoxy primer is very critical and should have very good bonding strength between **Renderoc FR10** and the concrete. Detail of technical data of **Nitobond EP 10P** is available in separate data sheet.

The next step will be wrapping **Renderoc FR10** sheet around the repaired surface, then apply one more coating of epoxy resin for impregnation.

The last step is finishing the repaired surface with repair mortar and or finish coating, such as epoxy painting or other finishing materials. Contact **Fosroc** office for detail recommended finishing materials. The finishing coats should be applied within 6 hours.

Limitations

Since **Renderoc FR10** has limitation to ultra violet resistance, finishing material used should have ultra viotet protection and the repaired surface should not be exposed to sunlight more than 6 hours.

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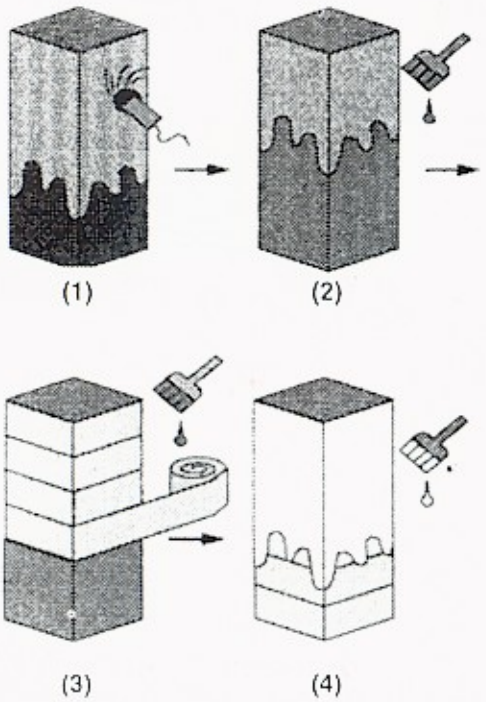
Application Diagram



1. Surface preparation (fine grinding)
2. Epoxy primer coating
3. **Renderoc FR10** wrapping and epoxy impregnation
4 Surface finishing

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