3X ENGINEERING

EMERGENCY COMPOSITE REPAIR SOLUTION FOR TANK AND PRESSURE VESSEL REINFORCEMENT

Any designs | Up to 100mm defect size | Storage and pressure | -50°C to +70°C | Oil | Gas | Water

TANKiT®

COMPOSITE PATCHING

ONSHORE | KEVLAR PATCH | EPOXY RESIN | OFFSHORE TOPSIDE | ONLINE REPAIR

Ready-to-use for emergency repair

OIL & GAS
ONSHORE / OFFSHORE

INNOVATIVE REPAIR SOLUTIONS FOR YOUR INSTALLATIONS

TANKiT® is a wet lay-up patching repair system designed to reinforce tanks and pressure vessels, restore original asset integrity and prevent further deterioration.

3X ENGINEERING
OIL & GAS
ONSHORE /OFFSHORE

This pre-engineered composite solution, made of five Kevlar® patches and bi-component epoxy resin, is a great alternative to welded metal plate and equipment replacement.

TANKiT® is ready to use and does not require calculations. It can be used in specific conditions (up to 100mm defect size and maximum temperature +70°C).

TANKiT® RANGE

ONSHORE / OFFSHORE TOPSIDE

Limited to 100mm defect size with maximum temperature +70°C

TANKiT® COMPONENTS

Steel plate & F3X8 filler + 5 Kevlar® patches (300x300mm) & bi-component resin R3X70+ + Accessories

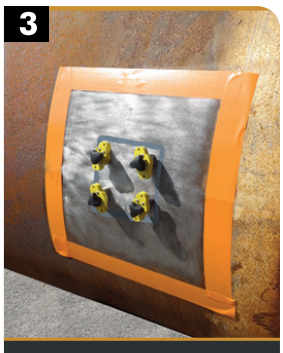
TANKiT® MAIN FEATURES & BENEFITS

- Ready to use (no calculations required)
- Online repair (no loss of production)
- Versatile product with a large range of applications (storage and GRP tanks, pressure vessels, separators, columns ...)
- 1 TANKiT = 1 repair (always 5 patches/layers)
- Cold welding system, no heating or post-curing required
- Suitable for any tank (wall, roof and bottom plate) and pressure vessel designs
- Cost-effective and easy to store
- Easy installation by trained and certified applicators
- Traceability using smart tag NFC

TANKiT® IMPLEMENTATION

1 TANKiT® packaging

2 Surface preparation Sa2½ / St3 and roughness Rz > 60 µm



3 Steel plate application (with filler & magnets)

4 Kevlar® patches with 3X resin application (5 layers)

5 TANKiT® installed & traceability tag

DOC.MKT.020 - C2 - ENG - LC - 06.2022

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TECHNICAL DATA SHEET

TANKiT® DESCRIPTION

TANKiT® is an emergency and temporary composite repair system for tanks and pressure vessels suffering from corrosion defects and / or mechanical damages. TANKiT® is a pre-engineered solution to restore original integrity without shutdown, unless active leakage. It is a composite technical alternative to welded metal plate and equipment replacement. Thoroughly tested by 3X ENGINEERING (3X), TANKiT® is a concept which provides the required strength to reinforce temporarily the damaged tank or vessel.

The original 3X concept, a wet lay-up system, is a combination of 400 g/m² Kevlar® tape and highly-reinforced ceramic epoxy resin. This specific resin composition provides excellent anti-erosion and chemical features. Even in case of through wall defect, the fluid is kept inside the vessel / tank by the composite sleeve allowing restoring line integrity. The epoxy resin allows binding and transferring loading through the whole composite system.
The bi-directional woven high-strength aramid-fiber material provides reinforcement in the hoop and axial directions.

USES

- Wall-through defects up to 100mm
- Cracks
- External / Internal corrosion
- Stop the corrosion if external defect
- Suitable for temperature up to +70°C (+158°F) for non-through-wall defect
- Suitable for temperature up to +60°C (+140°F) for through-wall defect

BENEFITS

- No engineering (ready-to-use kit)
- No heating or post-curing required
- Online repair (no shutdown unless leaking defect)
- Cold welding system
- Cost-effective installation

TANKiT® COMPONENTS

TANKiT® is a pre-engineered product sold in complete kit including steel plate (120mm x 120mm), filler, resin, 5 Kevlar® patches (300mm x 300mm) and set of accessories.

TANKiT®

EMERGENCY COMPOSITE REPAIR SOLUTION FOR TANK AND PRESSURE VESSEL REINFORCEMENT
Service temperature from -50°C (-58°F) to +70°C (+158°F)
Application temperature from +10°C (+50°F) to +70°C (+158°F)

FIBER SPECIFICATIONS	
Fiber nature	Aramid Kevlar® 49
Fiber directions towards tank axis	Hoop/axial (0° / 90°)
Fiber type	Woven type
Tensile strength	2 900 MPa (420.5 ksi)
Tensile Modulus	110 GPa (15 950 ksi)
Weight per square meter	400 g/m2

RESIN SPECIFICATIONS	
Chemical Name	R3X70+
Chemical Family	Epoxy (bi-component)
Color	Black or Grey
Mixing ratio by weight	(Part A : Part B) = 6.8 : 1
Pack size	1.28 kg/set
Solids	100%
VOCs	none
Storage	Between +15°C (+59°F) and +32°C (+90°F) if long-term storage
Shelf life	2 years in unopened containers

TANKiT® SPECIFICATIONS

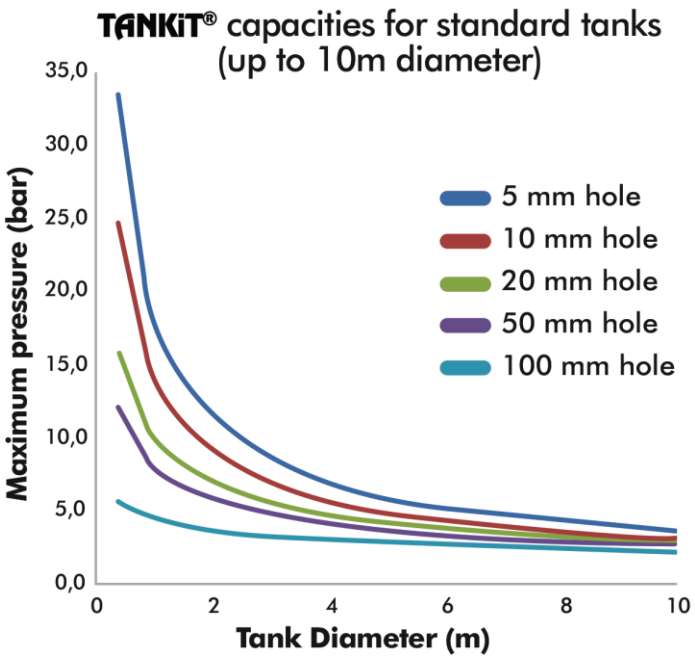
COMPOSITE SPECIFICATIONS							
TECHNICAL SPECIFICATION	**Percentage of fiber in volume**	Up to 30%					
	Nominal ply thickness	1 mm* (0.041inch) *: depends on ambient temperature and viscosity					
	Total layers	5 layers					
	Density	1.52 g/cm^3(94.9 lb/cu.ft.)					
	Application temperature	From +10°C (+50°F) to +70°C (+158°F)					
	Service temperature	From -50°C (-58°F) to +70°C (+158°F) for non-through-wall defect From -50°C (-58°F) to +60°C (+140°F) for through-wall defect					
	Glass transition temperature (ASTM D7426)	+90°C (+194°F)					
	Curing time for R3X70+: - **given values could be shorten by using ATEX approved heating belts** - **values just given as information**		+10°C (+50°F)	+16°C (+60°F)	+25°C (+77°F)	+28°C (+82°F)	+32°C (+90°F)
		Light load	4 days	36 hrs	30 hrs	24 hrs	22 hrs
		Full load	7 days	72 hrs	60 hrs	48 hrs	44 hrs
MECHANICAL PROPERTIES*	**Tensile Strength in Hoop direction long-term (ASTM D1598)**	188 MPa (27 260 psi)					
	Tensile Strength in Axial direction long-term (ASTM D1598)	50 MPa (7 250 psi)					
	Tensile Modulus in Hoop direction (ISO 527 or ASTM D3039)	29.6 GPa (4 290 ksi)					
	Tensile Modulus in Axial direction (ISO 527or ASTM D3039)	9 GPa (1 300 ksi)					
	Poisson's ratio (ISO 527 or ASTM D3039)	0.23					
	Shear modulus (ASTM D5379)	3 GPa (435 ksi)					
	Impact resistance (ASTM G14)	11.2 J/m^2					
	Resin Shore D hardness (ISO 868 or ASTM D2583)	83 Shore D, Resin hardness requirement: >76 shore D					
	Lap Shear Strength (BS EN 1465 or ASTM D3165)	18.3 MPa (2 650 psi)					
	Cathodic disbondment (ASTM G95)	Passed					
CHEMICAL PROPERTIES	**Resistance to pH**	From 3 to 12					
	Chemical resistance	Excellent (check chemical resistance chart for more information)					

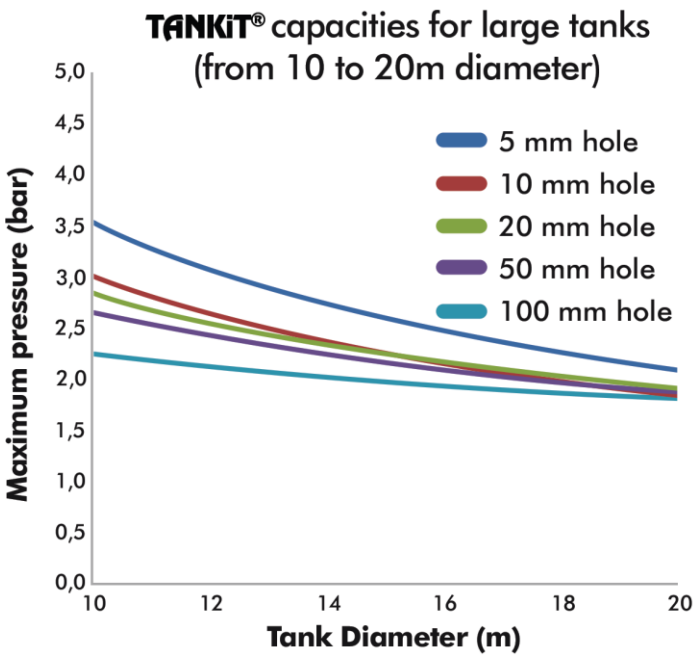
** values are given for indication and may vary depending on the environment*

TANKiT® CAPABILITIES

Because the number of layers is constant (5 layers), the performance of the TANKiT® is linked not only to the pressure, diameter and thickness but also to the pit dimensions and the steel grade. TANKiT® was thoroughly tested with a maximum hole diameter of 100 mm.

Please refer to the following table to determine if the TANKiT® is suitable with your application.





Please note that this solution may not be in accordance with API 653, ASME B31G, ISO 24.817 and ASME PCC-2 codes and standards. Please refer to our product REINFORCEKiT® PATCH if you are interested in standard compliant solutions.

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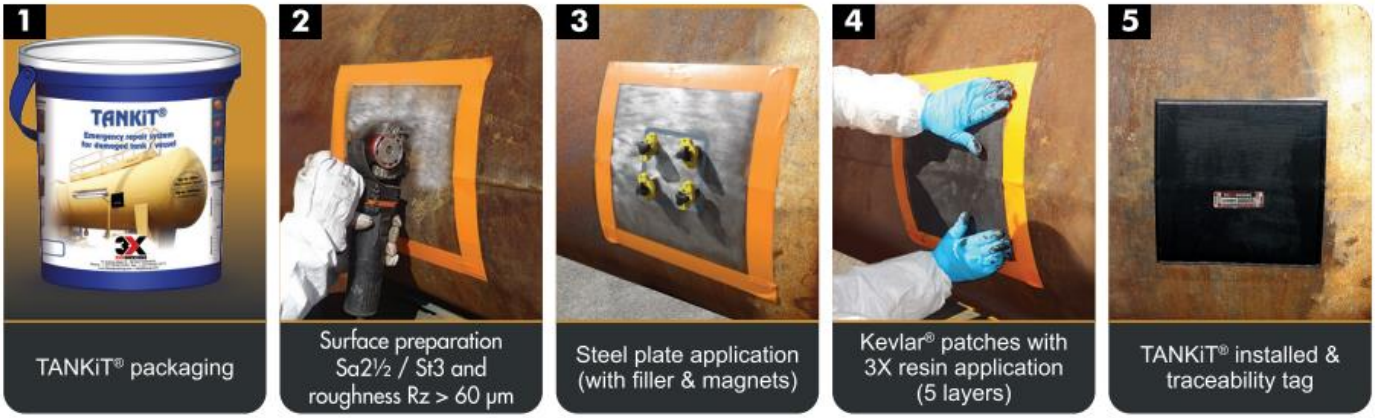
Application temperature from +10°C (+50°F) to +70°C (+158°F)

OIL & GAS
ONSHORE / OFFSHORE

TANKiT® IMPLEMENTATION STEPS

Application instructions are provided to technicians during 3X training course. Please contact 3X to get your staff trained and certified.



1. SURFACE PREPARATION Proper surface preparation is critical to the long-term performance of the composite. All rust, mill scale, corrosion products and foreign matter must be removed from the surface by a combination of solvent washing and Bristle blasting or abrasive blasting. After surface preparation, roughness should achieve a minimum of 60µm and match with SA 2 ½ or ST3 standards. Then the surface must be cleaned and rinsed using an adequate solvent which evaporates leaving no film residue, such as acetone. If through-wall defect, a metallic plate must be cut at the right dimensions and surface prepared both sides.

2. FILLER APPLICATION Check atmospheric conditions before job start ($T_{Dew\ point}$ +3°C<$T_{Support}$; 85%RH). F3X8 specific filler must be used to fill pits and reshape the surface. In case of through-wall defect, the plate and the surrounding area of leakage must be fully covered with a thick layer of F3X8 filler. Strong magnets are then used to compress firmly the steel plate over the leakage. After filler curing, the magnets are removed.

3. PATCH APPLICATION Apply a uniform layer of R3X70+ resin on the whole surface. The 5 Kevlar® patches are then impregnated and positioned over the defect. A cover metallic plate is then positioned over the TANKiT® thanks to magnet to compress and hold it in position during the whole curing.

4. FINALIZATION Apply a protective coating as per company standards and local environment (UV, swamp, etc).

APPLICATION NOTES

INSTRUCTION TANKiT® must be used only by trained and certified applicators. Contact us for training certificate.

SAFETY Each applicator should read and understand the Material Safety Data Sheets (MSDS) and the installation procedure before using 3X products.

WARRANTY DISCLAIMER Every reasonable effort is made to ensure the technical information and recommendations of this data sheet are true and accurate to the best of our knowledge at the date of issuance. However, improvements being continuously implemented to 3X products, this information is subject to change without notice. Please contact your 3X distributor for the last updated products specifications. This 3X technical datasheet warrants the quality of this product when used according to directions. User shall determine suitability of the product for use and assumes all risk.

3X ENGINEERING

INNOVATIVE REPAIR SOLUTIONS FOR YOUR INSTALLATIONS

TANKiT®

SUITABLE FOR VARIOUS TANK AND PRESSURE VESSEL DESIGNS

➲ ENVIRONMENT

ONSHORE – OFFSHORE

➲ TANK DIAMETER

UP TO 20’’

➲ DEFECT SIZE

UP TO 100mm

➲ SERVICE TEMPERATURE

FROM -50°C TO +70°C (-58°F TO +158°F)

➲ FLUID

OIL – GAS – WATER

OIL & GAS
ONSHORE /OFFSHORE

TANK TO BE REPAIRED – GENERAL VIEW

WORK AREA WITH LEAK BEFORE PATCHING

TANKiT PATCHING COMPLETED

TANKiT ON PRESSURE VESSEL COMPLETED