

TECHNICAL DATA SHEET

STOPKiT® DESCRIPTION

Considered as an emergency repair, STOPKiT® is a stop leak solution for pipe. It is the most efficient repair system applicable under pressure. This unique and revolutionary concept, patented by 3X ENGINEERING (3X), allows to fix high pressure leaks by tightening. Installation can be done without shutting down the line pressure.

Different sizes of STOPKiT® are proposed to be suitable with pipe diameters from 4" to 56" (114 – 1422 mm).

STOPKiT® technology is suitable for various applications and environments. It can be used for several fluids (oil, gas, water...) according to the strap and the technical patch (special applications on demand). STOPKiT® is available for: Onshore, Offshore/Subsea.

STOPKiT® product can be used from -20°C to +150°C (-4°F to + 302°F).

Pressure up to 120 bars (1 740 psi) can be stopped for hole diameter inferior to 25 mm using patch size: 50 x 100 mm (2" x 4"). STOPKiT® can fix leaks for most hole shapes. In case of hole diameter up to 50 mm (2"), leaks can be sealed up to 50 bars (725 psi) using patch size: 100 x 100 mm (4" x 4").

STOPKiT® is a product without special specifications for the storage. STOPKiT® is lightweight and does not add any mechanical stress to the pipe, unlike metal clamps. It is sold in ready-to-use kit.

STOPKiT® can be used on elbows and even on oval diameter pipes. The pipe surface must be without sharp edges but the system can be applied on irregularity like welding wire or corrosion cankers, so it's the best system to repair damaged and leaking pipes.



To ensure the effectiveness of the STOPKiT® technology, the product must be properly installed. STOPKiT® installers have to be trained by an authorized 3X Trainer. 3X Company and its agents should be contracted for all non-standard repairs.

STOPKiT® FEATURES

USES

- Suitable on welds, elbows, ovalised pipes
- Compatible with most common fluids and gas
- Stop leak up to 120 bars (1740 psi)
- Hole diameter up to 50 mm (2")
- Pipe diameters from 4" to 56" (114 – 1422 mm)
- Temperature from -20°C to +150°C (-4°F to + 302°F)

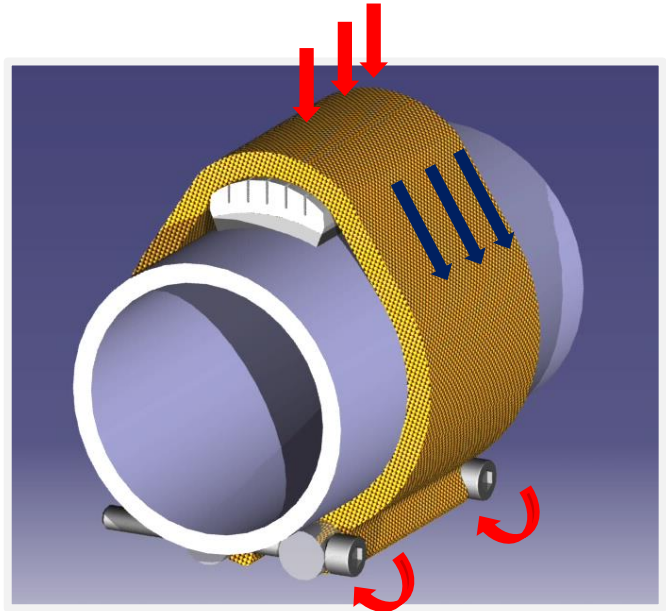
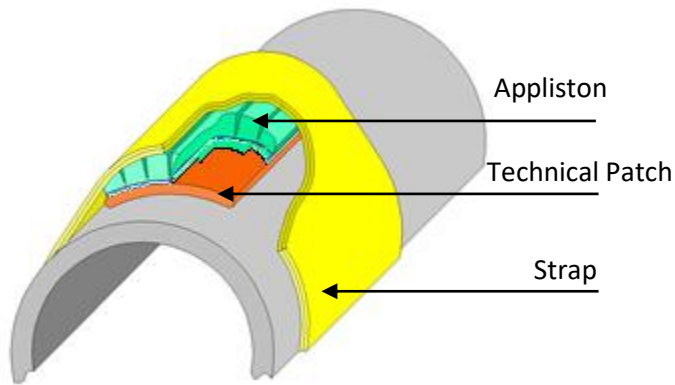
BENEFITS

- Installation in less than 5 minutes
- Light product
- No additional load on pipe
- Online sealing / No shutdown required
- Easy to store product
- Shelf-life: 5 years

STOPKIT® CONCEPT

The system operates by concentrating all the needed stress in the pipe at the defect location. The hoop stress needed to stop the leak is brought by the technical strap and the screws. The strong fibers of the strap are temperature and stress resistant.

STOPKIT® patented concept:

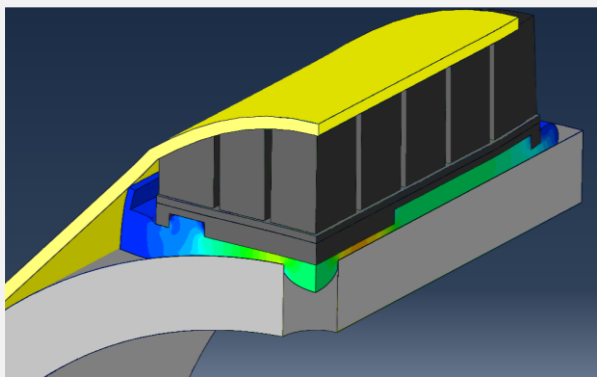


When the screws are tightened, the strap transfers the strain to the technical rubber patch in order to get the imperviousness. In fact, tightening the screws will induce a tension force in the belt, and this will perform the radial force on the leak point via the applicator. The applicator adds a tension force component to the radial force, then the distributor increases the pressure locally with the ribs and the containment grooves, as a stress concentrator, on the sealing pad.

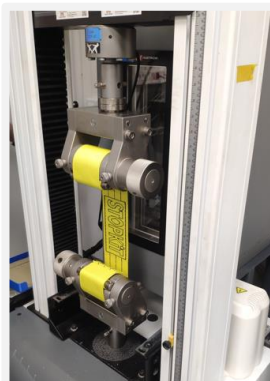
STOPKIT® study:

3X ENGINEERING has spent intensive effort to develop the latest generation of STOPKIT®.

The design has been optimized using FEA, relying on a strong knowledge of involved materials and their constitutive equations, as well as mastery of non-linear behavior. As a result, 3X is able to predict the behavior of its STOPKIT® for each new configuration.



AFTER TIGHTENING: LEAK SEALED



BELT TESTING



WITNESSED PRESSURE TEST

STOPKIT® has been thoroughly tested with active leakage to confirm that the experimental values are similar to FEA.

STOPKIT® COMPOSITION

STOPKIT® is made of:

- 1 patch 50mm x 100mm (2" x 4") for STOPKIT® 50 or 100mm x 100mm (4" x 4") for STOPKIT® 100
- Belt(s) (number of belts varies according to pipe diameter)
- Carbon Steel Bars (number of bars varies according to pipe diameter)
- Stainless Steel Bolts 17mm and Carbon Steel HSHC Screw 8 (number of bolts and screws varies according to pipe diameter)
- 1 STOPKIT® Positioner (special device for STOPKIT® implementation)



Depending on pipe diameter, the number of belts and the packaging are subject to change. Do not modify the composition of the STOPKIT® for quality purpose. Do not try to adapt a STOPKIT® on another pipe diameter than mentioned on the packaging.



PACKAGING FOR SIZE 4" UP TO 10'



PACKAGING FOR SIZE 12" UP TO 30"



PACKAGING FOR SIZE 32" UP TO 56"

STOPKIT® versions can be used in most environments: Onshore, Offshore and Subsea. Because the environment is more aggressive in subsea and offshore conditions, the composition of the belt is slightly different to make it more resistant.

TECHNICAL SPECIFICATIONS FOR STOPKIT® ONSHORE



STOPKIT® ONSHORE version is dedicated for onshore environment such as refinery or inland pipeline.

The color of the belt is yellow.

DENOMINATION	STON50			STON100		
USE	ONSHORE ENVIRONMENT – EMERGENCY REPAIR					
PIPE DIAMETER	From 4" to 56" (114 – 1422 mm)					
MIN. TEMPERATURE	-20°C (-4°F)					
MAX. TEMPERATURE	+150°C (+302°F)					
PATCH SIZE	50 x 100mm (2" x 4")			100 x 100mm (4" x 4")		
MAXIMUM DEFECT SIZE	Ø ≤ 25mm (1")			Ø ≤ 50mm (2")		
MAXIMUM PRESSURE*	Pipe diameter	-20°C <T ≤ +80°C -4°F <T ≤ +176°F	+80°C <T < +150°C +176°F <T ≤ +302°F	Pipe diameter	-20°C <T ≤ +80°C -4°F <T ≤ +176°F	+80°C <T < +150°C +176°F <T ≤ +302°F
	Ø ≤ 6"	120 Bars (1 740 psi)	40 bars (580 psi)	Ø ≤ 6"	50 bars (725 psi)	15 bars (215 psi)
	6" < Ø ≤ 12"	90 bars (1 305 psi)	30 bars (435 psi)	6" < Ø ≤ 12"	32 bars (465 psi)	10 bars (145 psi)
	12" < Ø ≤ 24"	60 bars (870 psi)	20 bars (290 psi)	12" < Ø ≤ 24"	25 bars (360 psi)	8 bars (115 psi)
	24" < Ø ≤ 56"	45 bars (650 psi)	15 bars (215 psi)	24" < Ø ≤ 56"	20 bars (290 psi)	6 bars (85 psi)

*Values given for information as each leaking configuration is specific.

TECHNICAL SPECIFICATIONS FOR STOPKIT® OFFSHORE



STOPKIT® OFFSHORE version is dedicated for offshore environment such as platform or subsea conditions.

The color of the offshore belt is red. The belt has been designed specifically for harsh environments. The belt of this STOPKIT® is not only lighter and more flexible but is also very resistant underwater. It will definitely improve the long-term product efficiency.

DENOMINATION	STOF50			STOF100		
USE	OFFSHORE AND SUBSEA ENVIRONMENTS – EMERGENCY REPAIR					
PIPE DIAMETER	From 4" to 56" (114 – 1422 mm)					
MIN. TEMPERATURE	-20°C (-4°F)					
MAX. TEMPERATURE	+150°C (+302°F)					
PATCH SIZE	50 x 100mm (2" x 4")			100x100mm (4" x 4")		
MAXIMUM DEFECT SIZE	Ø ≤ 25mm (1")			Ø ≤ 50mm (2")		
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*Values given for information as each leaking configuration is specific.

MATERIAL SPECIFICATIONS

Part	Material
Belt	PES / aramid
Nut	ISO 4035 04 CLASS – Zinc plated
Screw	CS 42CD4 + Zinc-Nickel
O-ring spacer	Nitrile
E bar	CS 42CD4 + Zinc-Nickel
S bar	CS 42CD4 + Zinc-Nickel
Applicator	PA 66
Patch	HNBR
Anti friction sleeve	LDPE

CORROSION RESISTANT



Metallic material parts are corrosion resistant.

Two elastomeric O-ring spacers are mounted grooves at the extremity of the two bars to avoid the contact between stainless steel bars and the surface of the steel pipe.

A specific grease is used to lubricate the threads to ensure an easy bolting to the necessary torque.

TEMPERATURE EFFECT

STOPKIT® delivers optimal performance for temperature inferior to +80°C (+176°F).

It is possible to seal leakage up to +150°C (+302°F) with degraded pressure performance. Indeed, the temperature may affect the components because of patch softening or belt and reduce product lifetime from months to few weeks.

CHEMICAL RESISTANCE

CHEMICAL	STOPKIT PATCH	CHEMICAL	STOPKIT PATCH
Acetic Acid	C	Hydrogen, Gas	A
Acetone	U	Iso-Butane	A
Acetylene Gas	A	Jet Fuel JP3	A
Aerozene 50 (50%Hydrazine, 50% UDMH)	U	Jet Fuel JP4	A
Alcohol (Methanol)	B	Jet Fuel JP5	A
Aluminum Hydroxide Solution	A	Jet Fuel JP6	A
Amines, primary (such as Methyl, Ethyl, Propyl)	U	JP3 (Fuel)	A
Ammonia (gas)	A	JP4 (Fuel)	A
Ammonia (liquid)	B	JP5 (Fuel)	A
Argon Gas	A	JP6 (Fuel)	A
Aromatic Fuels (up to 50% Aromatic)	A	JPX (Fuel)	A
Aromatic Hydrocarbons (100% Aromatic)	U	Kerosene	A
Asphalt, Emulsion	B	Machinery Oil (mineral)	A
ASTM Test Fuel A	A	Methane	A
ASTM Test Fuel B	A	Methanol	B
ASTM Test Fuel C	B	Mineral Oil	A/B
ASTM-Oil IRM 902	A	Muriatic Acid (HCl), diluted	B
ASTM-Oil IRM 903	A	Natural Gas	A
ASTM-Oil No.1	A	Neon Gas	A
ATM-Brake Fluid (Glycol based)	U	Nitrogen Gas	A
Automatic-Transmission Fluid	A	Octane	B
Automotive Gasoline	A	Olefin, crude	A
Battery Acid (Sulfuric Acid diluted)	U	Oleic Acid	A
Benzine (Gasoline)	A	Paraffin	A
Benzine 80/Benzene 20	B	Paraffin Oil	A
Benzol (Benzene)	U	Petroleum	A
Brake Fluids (based on mineraloil)	A	Petroleum Ether	A
Butane	A	Phenol	U
Chloric Acid	U	Phosphoric Acid 45%	B
Citric Acid	A	Potassium Hydroxide (Solution 50%)	B
Copper Sulfate (Blue Vitriol) Solution	A	Potassium Hypochlorite (Javelle water)	B
Crude Oil	B	Propane	A
Cyclohexane	A	Propanol	B
Diesel Fuel	A	2-Propanone (Acetone)	U
Diesel Oil	A	Sea Water	A
Domestic Fuel Oils	A	Silicone grease	A
Ethane	A	Silicone Oil	A
Ethylene Glycol	A	Silver Nitrate	B
Freon 11	A	Sodium Bicarbonate Solution	A
Freon 112	B	Sodium Chloride (Common Salt)	A
Gas Oil	A	Sodium Hydroxide, Caustic Soda	B
Gasoline/Alcohol Mix	B	Sulfur Dioxide (SO2)	U
Gasoline, 130 Octane	A	Sulfur Hexafluoride (SF6)	B
Gasoline, aromatic	A	Sulfuric Acid, diluted	B
Gasoline, Ethyl and Regular	A	Toluene (Toluol)	U
Gasoline, Refined	A	Transformer Oil	B
Gasoline, Sour	A	Waste Gas (cont. Carbon Dioxide)	A
Gasoline, with Mercaptan	A	Waste Gas (cont. Carbon Monoxide)	A
Generator Gas	A	Waste Gas (cont. Hydrogen Chloride)	B
Glycerol	A	Waste Gas (cont. Hydrogen Fluoride)	A
HEF-3	B	Waste Gas (cont. Sulfur Dioxide)	B
Helium Gas	A	Waste Gas (cont. Sulfuric Acid)	U
Heptane	A	Water to +150 °C / +302 °F	B
Hydrochloric Acid (Muriatic Acid) 37%	U		

A Very good suitability and resistance. Elastomer shows little or no effect from exposure. Little effect on performance and physical properties.

B Good suitability. Some effects from exposure with some loss of physical properties. Some chemical swelling



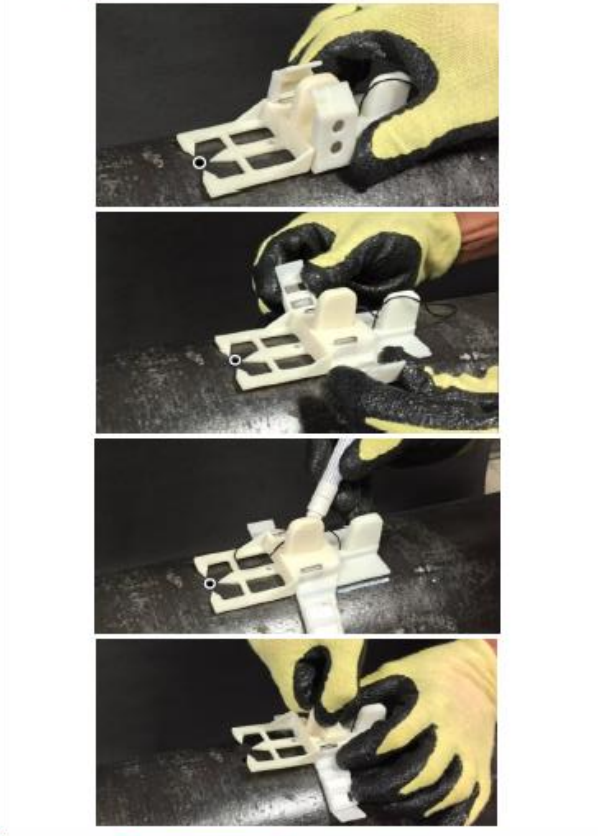

C Limited suitability. Significant swell and loss of physical properties after exposure. Additional tests should be done.

U The elastomer is unsuitable for application in this media.



INSTALLATION PROCEDURE

Scan this QR code to watch STOPKIT® installation video

<p>0 – WEAR APPROPRIATE PPE</p> <ul style="list-style-type: none"> •Perform risk assessment prior job – spill and spatter hazards •Select and wear suitable PPE according to HSE regulations on site and operational hazards (chemical, temperature, pressure, access, handling) 	
<p>1 – STOPKIT POSITIONER PRESENTATION</p> <ul style="list-style-type: none"> •Magnetic positioner 1st (1) •Magnetic positioner 2nd (2) •Removable centring (3) 	
<p>2 – SETTING UP ON THE PIPE</p> <ul style="list-style-type: none"> •Clean the pipe •Avoid any burrs or sharp edges around the hole •Centre the pin hole aligned on the 3 arrowheads <ul style="list-style-type: none"> •Stitch down the two ears •Check the centering <ul style="list-style-type: none"> •Draw a line on each side of the frame located at the back of the positioner <ul style="list-style-type: none"> •Remove the centring and lay it on the pipe under the positioner <p>Materials:</p> <ul style="list-style-type: none"> - PPE - File - Rags and acetone - White marker 	
<p>3 – SETTING UP OF THE STOPKIT ON THE PIPE</p> <ul style="list-style-type: none"> •Insert the screws in the entrance bar first. <p>Attention! The screw heads and the washers must be in contact with the flat spots of the entrance bar</p> <ul style="list-style-type: none"> •Note the presence of the anti-loss washers. •Tight the screws into the threaded bar. <p>Materials:</p> <ul style="list-style-type: none"> - PPE 	

4 – POSITIONING OF THE STOPKiT

- Beyond 10 inch the STOPKiT is composed of several belts
- Centre the rubber patch on the smallest belt
- Position the STOPKiT next to the leak and tight softly to let a free sliding capacity
- Slide the STOPKiT over the leak and insert the ergots of the patch into the notches of the positioner

Materials:

- PPE
- Tightening tool (key ratchet Allen 8)



5 – SETTING UP OF THE SECOND POSITIONER

- Rubber patch must be perfectly centred on the leak
- Set up the second positioner next to the rubber patch and slide it up to touch, insert the ergots of the patch into the notches of the positioner.
- Stitch down the two ears
- Draw a line on each side of the frame.

Materials:

- PPE
- White marker



6 – LEAK SEALING

- Tight alternatively the right screw and the left screw (10 times) to keep the two bars parallel
- Repeat until torque reaches 40 Nm for both screws
- After 30 minutes, check the 40 Nm tightening
- Screw and block the nuts and the lock nuts

Materials:

- PPE
- Torque ratchet (Allen 8) calibrated
- 2 plate spanners N° 16



7 – POSITIONERS REMOVAL

- Fold up the ears of the two positioners
- Remove the positioners by dragging the tail

Material:

- PPE



STOPKiT® must be installed only by trained and certified applicators
Contact us for training certificate. By e-mail at 3x@3xeng.com or by phone +377 92 05 79 81

APPLICATION NOTES

REQUIRED TOOLS

The following tools are required for STOPKIT® installation:

- Marker
- File
- Rags and acetone
- Tightening tool (key ratchet Allen 8)
- Torque ratchet (Allen 8) calibrated
- Plate spanners N°16

INSTRUCTION

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

USE

STOPKIT® is made for single use only. Do not use if packing is already open or STOPKIT® already used.

SHELF-LIFE

5 years after manufacturing date mentioned on packaging (dd/mm/yy).

SAFETY

Each applicator should read and understand the Installation Procedure before to use 3X products. Before intervention, Hazards and measures must be assessed accurately to ensure the safety of installation and applicators (pipe temperature, fluid or gas exposure, environment contamination...). Make sure the applicators wear appropriate PPE before leak sealing in accordance with risk assessment (chemical protective apparel, face shield, chemical or heat resistant gloves).

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 product 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.