

Colour Contrast Penetrant Testing System

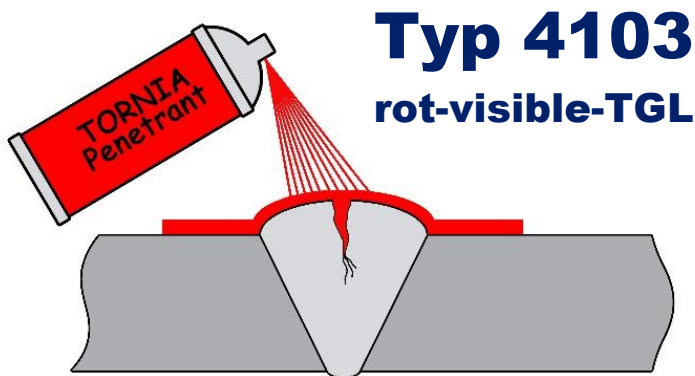
Complies with the requirements of EN ISO 3452:2014

TORNIA TRES-CHECK PREMIUM

- Typ 4103 Penetrant-rot-visible-TGL
- Typ 436 Reiniger
- Typ 437 Entwickler

Medium sensitivity, reliable crack testing

Temperature range -10°C - +50°C



- Surface crack testing
- Leak testing

Subject to technical changes
Tornesch April 2021



Penetrant Testing

TORNIA TRES-CHECK PREMIUM

Application

Surface crack testing can only be performed effectively applying penetrant testing, where the material defects have connection to the surface and are free of oil or scale which would hinder the penetrant to penetrate. Therefore, to gain safe test results all kinds of contamination must be removed carefully.

This test system is also suitable for leak testing.

Penetrant testing enables easy detection of surface cracks regardless of the type and the direction of the defect, the material or the construction geometry.

Typical defect indications

- Cold cracks
- Hot cracks
- Grinding cracks
- Pores of different sizes
- Pore holes
- Stress crack corrosion
- Spongy texture
- Wrinkles
- Overlaps

Application area

- Aircraft construction
- Automotive
- Railway industry
- Tank construction
- Engineering
- Boiler and heat exchanger construction
- Foundry
- Shipbuilding
- Welding technology
- Electrical engineering
- Metal processing
- Military

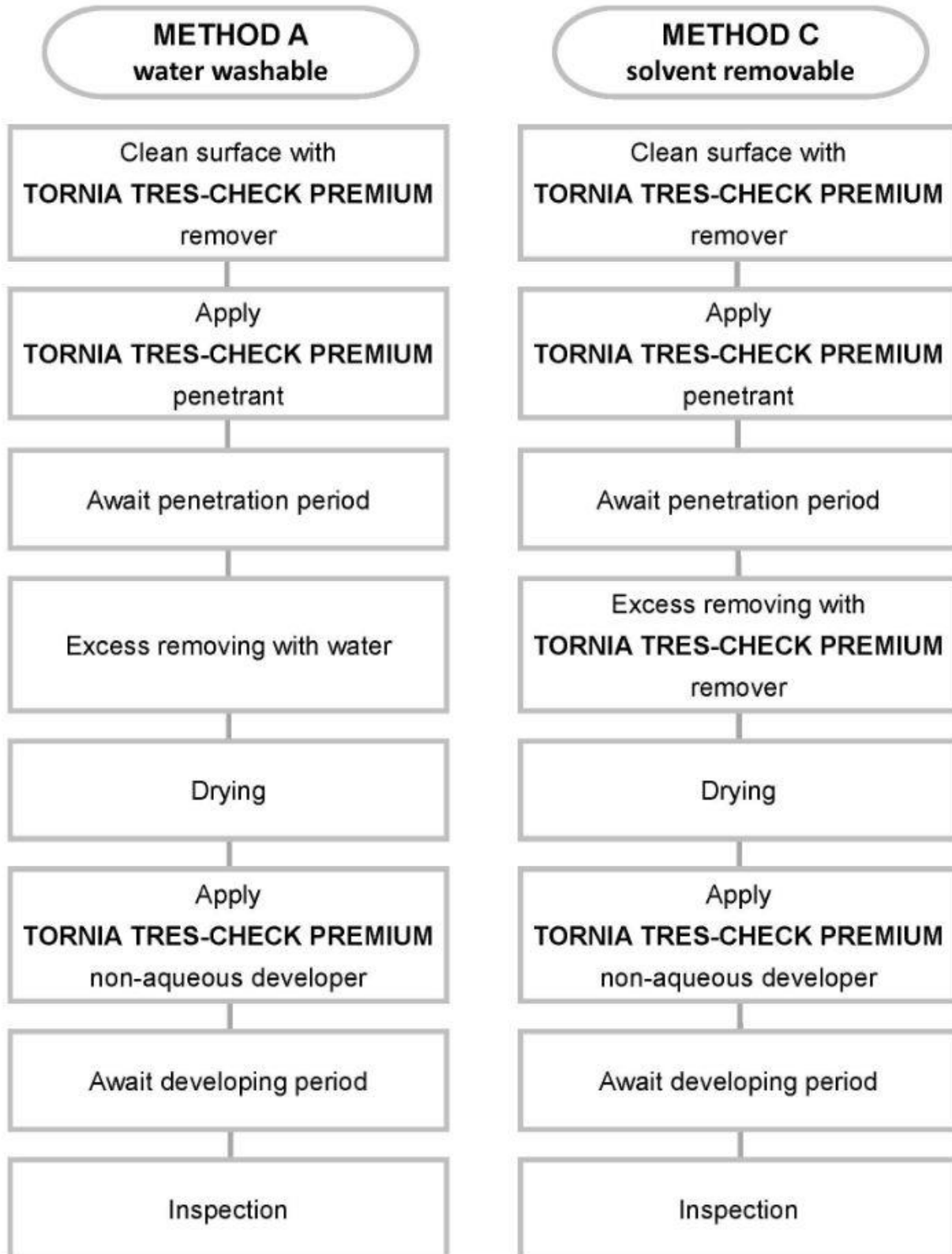
Application for

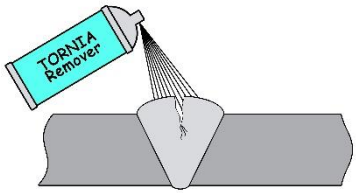
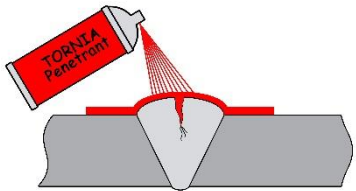
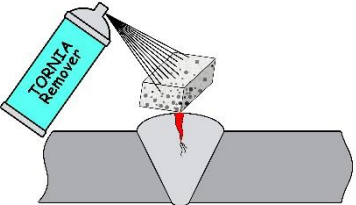
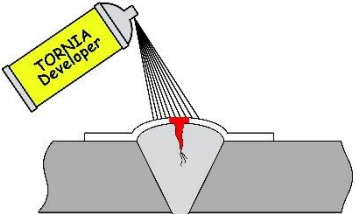
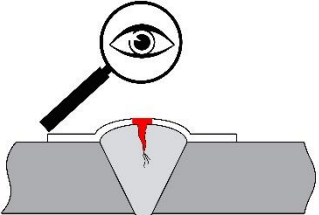
- Alloyed and unalloyed steels
- Claddings
- Weldings
- Steel and grey cast
- Malleable cast
- Steatit
- Plastics ⁽¹⁾
- Carbide
- Sinter metals
- Copper
- brass
- Ceramics ⁽¹⁾

⁽¹⁾ Test for suitability before use

Method A&C

Water and solvent washable



	<p>Precleaning</p> <p>Remove oil, grease and other contaminants from the surface of the area to be inspected.</p> <p>Application: remover Typ 436 Reiniger and clean lint-free cloth</p> <p>The surface must be fully dried before application of the penetrant.</p>
	<p>Penetration</p> <p>Apply the penetrant Typ 4103 Penetrant-rot-visible-TGL evenly onto the cleaned and dry test area (spray, brush, pour, immerse).</p> <p>Shake well the aerosol before use.</p> <p>Application temperature: -10 - +50°C (14 - 122°F)</p> <p>Penetration time: 5 - 30 minutes</p>
	<p>Excess penetrant removal</p> <p>Remove excess penetrant from test area carefully with water or with cloth sprayed with remover Typ 436 Reiniger. Afterwards dry test area.</p> <p>Do not spray remover Typ 436 Reiniger directly onto the surface. This would affect the test sensitivity.</p> <p>Control of excess penetrant removal: Illuminance (visible light) >350 lx.</p>
	<p>Developing</p> <p>Shake well aerosol before use.</p> <p>Spray developer Typ 437 Entwickler from a distance of 20-30 cm onto the test area to produce a very thin and even layer.</p> <p>The developer Typ 437 Entwickler absorbs the penetrant which remains in the defects and thereby intensifies the indication.</p> <p>Developing time: min. 10 minutes, max. 30 minutes</p>
	<p>Inspection</p> <p>First Inspektion directly after application of the developer. Further inspections acc. to the standard/specification.</p> <p>Final inspection after expiration of developing time.</p> <p>Illuminance (visible light) min. 500 lx.</p>

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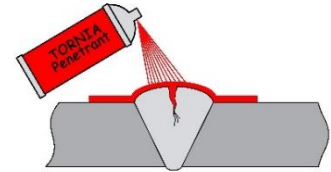
Typ 4103 Penetrant-rot-visible-TGL

Type II

Method A & C

Sensitivity at -10°C - +50°C

→ sensitivity class 2



TORNIA TRES-CHECK PREMIUM Typ 4103 Penetrant-rot-visible-TGL

is a water or liquid solvent washable, almost odourless red colour contrast penetrant.

Sensitivity class 2 (Type II, Method A&C).

Sulfur and halogen content: complies with the requirements of EN ISO 3452:2014.

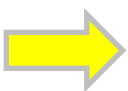
Also complies with the requirements of EN ISO 3452:2014, ASTM E-165 und ASTM D-516.

	Typ 4103 Penetrant-rot-visible-TGL (loose items)	Typ 4103 Penetrant-rot-visible-TGL (aerosol)
Colour	Red	Red
State of aggregation	Liquid	Aerosol
Odour	Characteristic	Characteristic
Sensitivity level	2	2
Flash point (EN ISO 2719)	43°C (110°F)	Not determined
Viscosity (20°C)	10.28 mm ² /s	Not determined
Density (20°C, DIN 51757)	0.9440 g/cm ³	Not applicable
Water tolerance at 15°C (method A)	> 5%	Not determined
Shelf life	5 years	2 years
Sensitivity of indications: 50 µm	100 %	100 %
30 µm	100 %	100 %

Corrosion		Elemental analysis	
Aluminium	none	Sulfur	0,004 Gew. %
Magnesium	none	Chloride	0,001 Gew. %
Carbon steel	none	Fluoride	0,010 Gew. %

Specifications	Delivery form	Art. no.
EN ISO 3452:2014	Aerosol 500 ml	GT01-410301
ASTM D-516	Container 1 L	GT01-410302
ASTM E-165	Container 10 L	GT01-410303
ASTM E-1417	Container 200 L	GT01-410304
ASTM E-1418		
AMS-2644		
ASME B&PV Code Section V		
MIL-I-25135E		
PMUC		
RCC-M		

Health / safety / shipping		
	Typ 4103 Penetrant Loose items	Typ 4103 Penetrant Aerosol
Contains no known Carcinogens	✓	✓
Avoid inhalation and/or repeated skin contact	✓	✓
Wearing of protective gloves and safety glasses is recommended	✓	✓
Never expose to temperatures above 43°C (110°F)	✓	✓
Storage class TRGS 510	12	2B
Do not store near oxidants	✓	✓
ADR/RID	No dangerous good	UN 1950 (Pressure gas packs)
VOC Directive 2004/42/EG	5.38 %	56.94 %
Disposal according to official regulations	✓	✓



For further information, see Safety Data Sheet of penetrant.

TORNIA TRES-CHECK PREMIUM

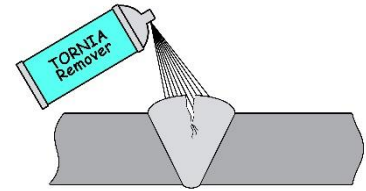
Typ 436 Reiniger (remover)

Method C

(Excess penetrant remover solvent)

Class 2

Temperature range: -10°C up to +50° C



TORNIA TRES-CHECK PREMIUM Typ 436 Reiniger

is a halogen-free, solvent-based (alcohol-based) remover.

Typ 436 Reiniger is used for removing penetrant and cleaning of surfaces to be tested in metal processing, welding, aircraft, railway and automobile industry, inspection of pipelines, refineries, chemical and nuclear power stations.

Typ 436 Reiniger complies with the requirements of penetrant testing acc. to EN ISO 3452 and ASTM E-165.

Since the remover evaporates without residue, it is suitable for titanium and high-nickel alloys.

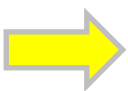
Typ 436 Reiniger is fast-drying, and therefore ideal for precleaning (removal of oil, grease and other contaminants), excess penetrant removal and postcleaning.

	Typ 436 Reiniger Loose items	Typ 436 Reiniger aerosol
Colour	Colourless	Colourless
State of aggregation	Liquid	Aerosol
Odour	Alcohol	Alcohol
Flash point (EN ISO 2719)	10°C (50°F)	Not determined
pH level	Neutral	Neutral
Vapour pressure (20°C)	Approx. 58 hPa	Not determined
Density (20°C, DIN 51757)	0.7890 g/cm ³	0.784 – 0.786 g/cm ³
Water solubility	Completely soluble	Completely soluble
Shelf life	5 years	4 years

Corrosion		Elemental analysis	
Aluminium	none	Sulfur	0.003 wt %
Magnesium	none	Chloride	< 0.001 wt %
Carbon steel	none	Fluoride	0.002 wt %

Specifications	Delivery form		Art. no.
EN ISO 3452:2014	Aerosol	500 ml	GT01-436001
ASTM D-516	Container	1 L	GT01-436002
ASTM E-165	Container	10 L	GT01-436003
	Container	200 L	GT01-436004

Health / safety / shipping			
	Typ 436 Reiniger Loose items	Typ 436 Reiniger Aerosol	
Contains no known Carcinogens	✓	✓	
Avoid inhalation and/or repeated skin contact	✓	✓	
Wearing of protective gloves and safety glasses is recommended	✓	✓	
Never expose to temperatures above 50°C (122°F)	✓	✓	
Storage class TRGS 510	3	2B	
Do not store near oxidants	✓	✓	
ADR/RID	UN 1170 (Ethanol)	UN 1950 (Pressure gas packs)	
VOC Directive 2004/42/EG	100 % (784 g/l)	100 % (784 g/l)	
Disposal according to official regulations	✓	✓	

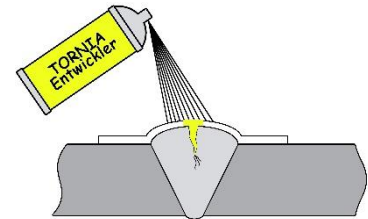


For further information, see Safety Data Sheet of remover.

TORNIA TRES-CHECK PREMIUM

Typ 437 Entwickler (developer)

Form e and d
(non-aqueous solvent-based wet developer)



TORNIA TRES-CHECK PREMIUM Typ 437 Entwickler

is a very fine-grained, non-aqueous, solvent-based wet developer for penetrant testing (type I), contrast colour penetrant testing (type II) and fluorescent contrast colour penetrant testing (type III).

Typ 437 Entwickler enables good detectability of indications. Therefore, the developer is ideally suitable for inspections which require detectability of finest indications.

Typ 437 Entwickler is sprayed onto the surface to be tested. The developer dries quickly and produces a thin uniform layer on the test area.

After inspection the dried developer can be removed from the test area with **Typ 436 Reinigers**.

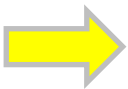
Typ 437 Entwickler complies with the requirements of penetrant testing acc. to EN ISO 3452 und ASTM E-165.

	Typ 437 Entwickler Loose Ware	Typ 437 Entwickler Aerosol
Colour	Whitish	White
State of aggregation	Liquid	Aerosol
Odour	Alcohol	Alcohol
Flash point (EN ISO 2719)	12 – 13 °C (ca. 55°F)	Not determined
Vapour pressure (20°C)	approx. 58 hPa	3,100 hPa
Density (20°C, DIN 51757)	approx. 0.790 g/cm ³	0.66 g/cm ³
Water solubility	Completely soluble	Partly soluble
Solvent content	--	20 - 25 %
Solid content	--	9.44 %
Evaporation residues / solids content	< 5 mg	< 5 mg
Shelf life	5 years	4 years

Corrosion		Elemental analysis	
Aluminium	none	Sulfur	0.017 wt %
Magnesium	none	Chloride	0.004 wt %
Carbon steel	none	Fluoride	0.010 wt %

Specifications	Delivery form		Art. no.
EN ISO 3452:2014	Aerosol	500 ml	GT01-437001
ASTM D-516	Container	1 L	GT01-437002
ASTM E-165	Container	10 L	GT01-437003
	Container	200 L	GT01-437004

Health / safety / shipping		
	Typ 437 Entwickler Lose Ware	Typ 437 Entwickler Spray
Contains no known Carcinogens	✓	✓
Avoid inhalation and/or repeated skin contact	✓	✓
Wearing of protective gloves and safety glasses is recommended	✓	✓
Never expose to temperatures above 50°C (122°F)	✓	✓
Storage class TRGS 510	3	2B
Do not store near oxidants	✓	✓
ADR/RID	UN 1170 (Ethanol)	UN 1950 (Pressure gas packs)
VOC-Richtlinie 2004/42/EG	--	90.63% (598.158 g/l)
Disposal according to official regulations	✓	✓



For further information, see Safety Data Sheet of developer.

Further products of the new generation

TORNIA



www.helling-group.com

Subjekt to technical changes
Tornesch April 2021