Test-Report chainflex®

Test No.: **3351**

Test Intention:
In test 3351 we want to investigate the lifespan of a CFROBOT.036 in torsion application.

Client:		
Name: Frank Schorn	Team: chainflex®	Date: 12.05.2009

Order-Info:	
Customer / No.: igus® GmbH, Spicher Str.1a, 51147 Köln	
Series / No: CFROBOT	Installation type: torsion ±180°
Customer test: Yes ☐ No ☒	Development test: Yes ☒ No ☐

Technical data		**Target & Examination**	
e-chain® type:	TRC.70.110.0	Cable length [m]:	3,0
e-chain® radius [mm]:	110	Target [cycles]:	**Lifespan**
Stroke [m]:	1,0	Optical check:	☒
Acceleration **a** [m/sec²]:	0,8	Function check:	☐
Velocity **v** [°/s]:	120	Standard measuring:	☒
Ambient temperature [°C]:	approx. 25°C	AutΩMeS:	☐

Experimental setup

Checklist for the experimental preparations
☒ additional inscription/label at all wires
☒ strain reliefs at both ends of the chain
☒ correct electrical connection of all wires
☒ radius was marked at the cables and the energy chain

1. Construction:

This test is built up on the „3Ketten-Torsion “. The following picture shows the test structure:

2. Cable and hose packages:

No. 1: **1x CFROBOT.036** with the cable marking
IGUS Chainflex CFROBOT.036 1x16 E113308 сяUuS AWM 1x4 AWG Style 21387 AWM I/II A/B 90°C 1000V FT1 CE RoHS conform

3. Description of the cable construction:

Standard igus chainflex® catalogue cable.

4. Remarks:

To detect broken conductor or shielding wires we will measure the ohmic resistance of these cable elements. The cores of the samples are connected in series and one core is connected with the shielding to measure the ohmic resistances.

The following chart gives an overview regarding the test parameters:

Cable no.	Cable type	E-chain radius [mm]	Outer diameter [mm]	torsion factor [°]
1.1	CFROBOT.036	110	11,8	±180

Cable no.	Cable type	Counter reading		Effectively tested cycles	Cable okay after … cycles
		… mounting	… demounting		
1.1	CFROBOT.036	8.060.294	25.159.343	17.099.049	17.099.049

Test-order was checked by … [Martin Göllner or Christian Mittelstedt]and further employee]

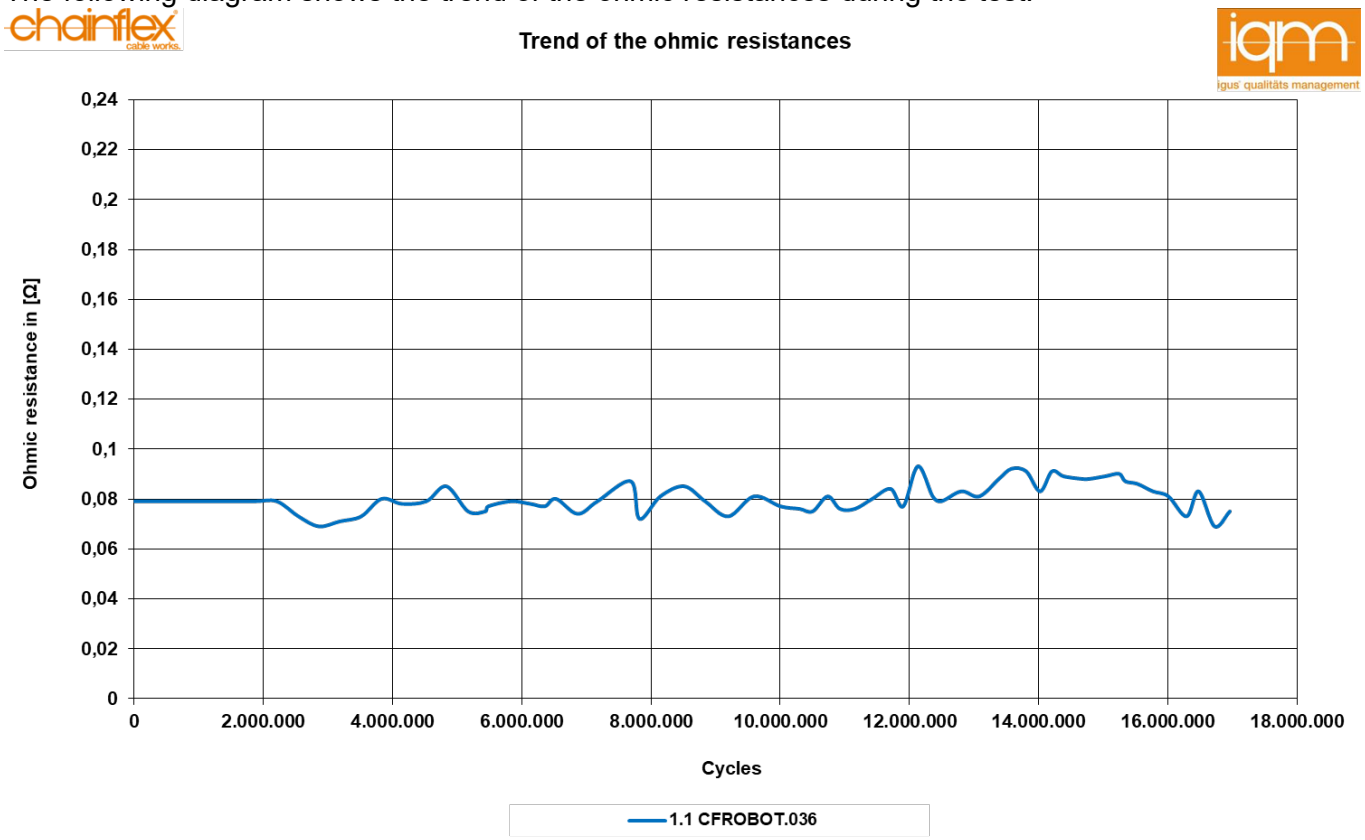
Date:	25.02.2009	Name:		Name:	Frank Schorn

Result

Start report 12.05.2009:
At the 12.05.2009 we started the test 3351 at counter reading 8.060.294, we will measure the ohmic resistance regularly.

Interim report 10.05.2012
At the 10.05.2012 we demounted cable no. 1.1 after 17.099.049 cycles to finalize the test

The following diagram shows the trend of the ohmic resistances during the test:



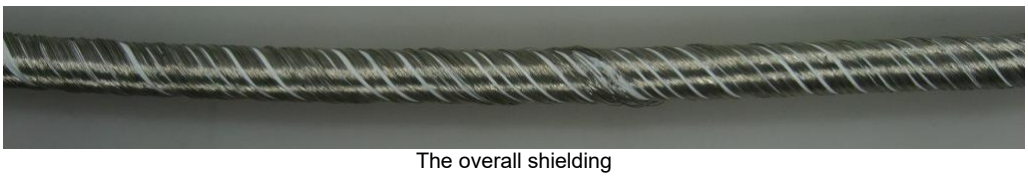
Cable no.	Cable type	Counter reading		Effectively tested cycles	Cable okay after … cycles
		… mounting	… demounting		
1.1	CFROBOT.036	8.060.294	25.159.343	17.099.049	17.099.049

Evaluation

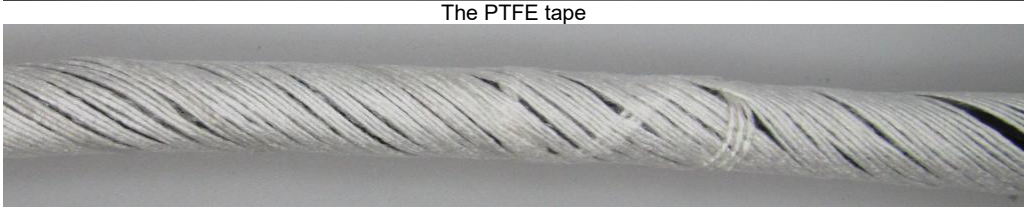
Dissection report:
The following pictures show the dissected elements of the cables

The condition of the cable no.1.1 (CFROBOT.036) after 17.099.049 cycles

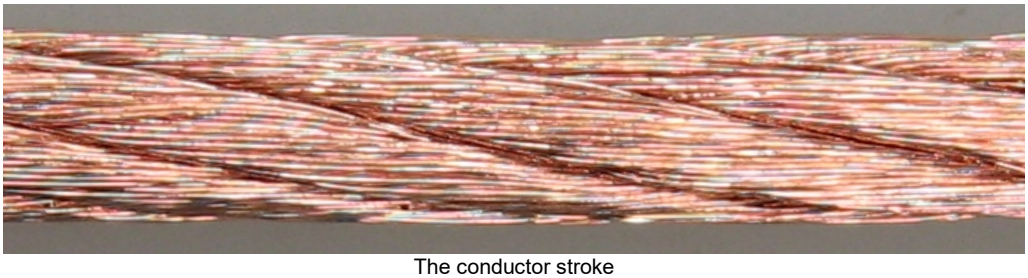
Cable no.1.1 CFROBOT.036 (fixed point)


The overall shielding


The PTFE tape


Close up of the rayon threats


The conductor insulation


The conductor stroke

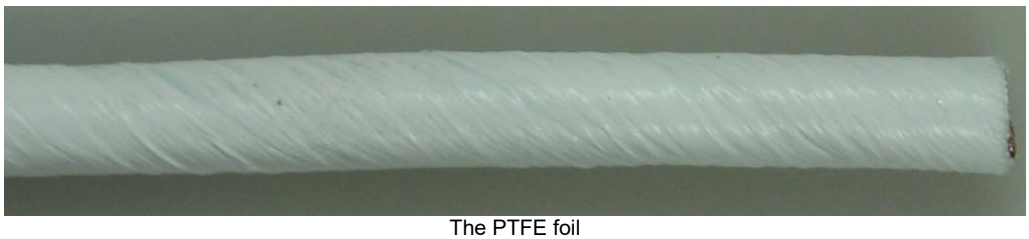

The copper conductor

Overview of the dissected pieces of the cable no.1.2, point of the fixed point after 17.099.049 cycles.

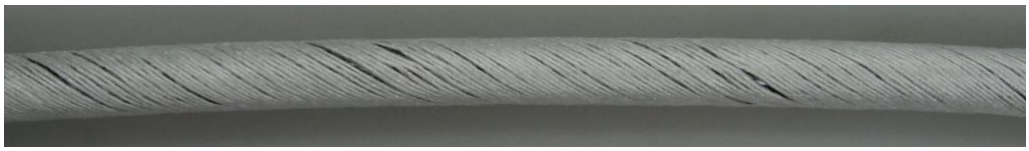
Cycles	17.099.049
Condition outer jacket	O.K.
Rayon thread:	O.K.
Condition overall shielding	O.K.
PTFE foil:	O.K.
Inner rayon thread:	O.K.
Condition core insulation	O.K.
Condition conductor	O.K.

Cable no.1.1 CFROBOT.036 (middle point)

The overall shielding

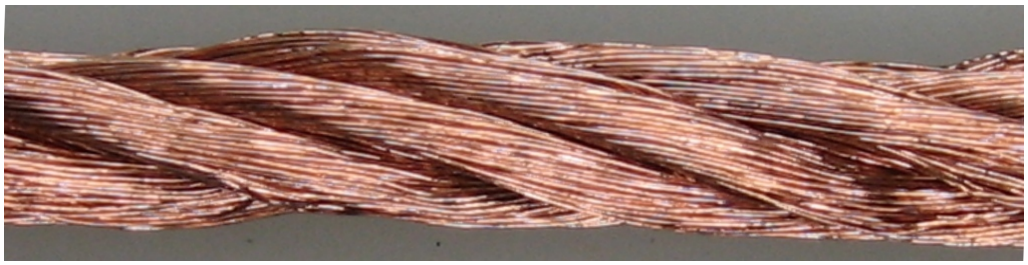


The PTFE foil



The inner rayon thread.

The conductor insulation.



The conductor stroke

The copper conductor.

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Overview of the dissected pieces of the cable no.1.2, point of the middle point after 17.099.049 cycles.

Cycles	17.099.049
Condition outer jacket	O.K.
Rayon thread:	O.K.
Condition overall shielding	O.K.
PTFE foil:	O.K.
Inner rayon thread:	O.K.
Condition core insulation	O.K.
Condition conductor	O.K.

Name:	Ch. Mittelstedt	Date:	10.05.2012