Test-Report chainflex®

Test No.: 3486

Test Intention:
In test 3486 we want to investigate the lifespan of our CFROBOT8.045 in a torsion application with ± 180°.

Client:		
Name: Rainer Rössel	Team: chainflex®	Date: 15.09.2009

Order-Info:	
Customer / No.: igus® GmbH, Spicher Str.1a, 51147 Köln	
Series / No: CFROBOT8	Installation type: Torsion, ±180°
Customer test: Yes ☐ No ☒	Development test: Yes ☒ No ☐

Technical data		Target & Examination	
e-chain® type:	TRC.100	Target [cycles]:	Lifespan
e-chain® radius [mm]:	-/-	Optical check:	☒
Angle [°/m]:	± 180	Fluke DTX-ELT:	☒
Cable length [m]:	4,0	Standard measuring:	☐
Ambient temperature [°C]:	approx. 25°C	AutΩMeS:	☐

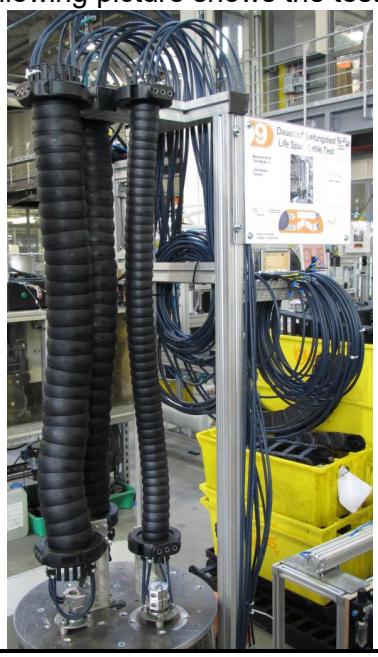
Experimental setup

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 „3-Ketten Torsion“. The following picture shows the test structure:



2. Cable and hose packages:

No. 1: **1x CFROBOT8.045** with the cable marking
igus chainflex CFROBOT8.045 (4x2xAWG26)C CE E L/CF CAT5e conform RoHS conform
www.igus.de

3. Description of the cable construction:

Standard igus chainflex® catalogue cable

4. Remarks:

The CFROBOT8.045 was ready made with CAT5e connectors, we will check the electrical parameters regularly with the Fluke DTX-ELT Analyzer.

The following chart gives an overview regarding the test parameters:

Cable no.	Cable type	External diameter [mm]	Torsion	Bending factor catalogue
1.X	CFROBOT8.045	8,3	± 180°	10,0

Cable no.	Cable type	Counter reading		Effectively tested cycles	Cable okay after … cycles
		… mounting	… demounting		
1.1	CFROBOT8.045	9.954.353	31.964.575	22.010.222	22.010.222

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

Date:	Martin Göllner	Name:		Name:	15.09.2009

Result

Start Report 15.09.2009:

At the 15.09.2009 we started the test 3486 at a counter reading of 9.954.353 cycles, we will measure the cable parameters regularly with the Fluke DTX-ELT.

Interim Report 09.02.2012:

At the 09.02.2012 we demounted the cable no. 1.1 after 22.010.222 cycles, because we want to finalize the test.

The following protocol shows the result of the Fluke measurement after 22.010.222 cycles.

LINKWARE CABLE TEST MANAGEMENT SOFTWARE

Cable ID: 3486

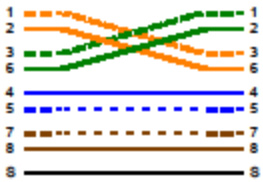
Test Summary: PASS

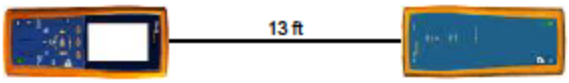
Date / Time: 02/09/2012 01:35:38pm
Headroom: 34.6 dB (NEXT 12-36)
Test Limit: 100BASE-TX
Cable Type: Cat 5e FTP

Operator: CF
Software Version: 2.1200
Limits Version: 1.2800
NVP: 69.0%

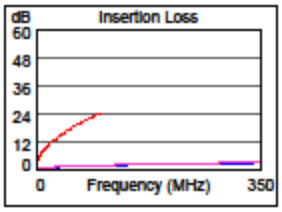
Model: DTX-ELT
Main S/N: 9751011
Remote S/N: 9751012
Main Adapter: DTX-CHA002
Remote Adapter: DTX-CHA002

Wire Map (Ethernet Two-Pair Crossed)
PASS

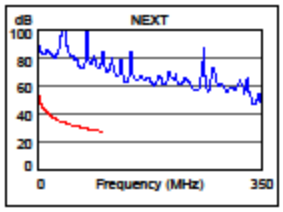


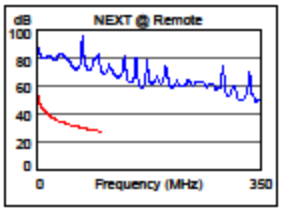


Length (ft), Limit 328	[Pair 36]	13
Prop. Delay (ns)	[Pair 12]	20
Delay Skew (ns)	[Pair 12]	1
Resistance (ohms)	[Pair 12]	1.3
Impedance (ohms)	[Pair 12]	N/A
Insertion Loss Margin (dB)	[Pair 36]	22.5
Frequency (MHz)	[Pair 36]	100.0
Limit (dB)	[Pair 36]	24.0



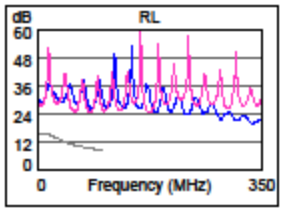
	Worst Case Margin		Worst Case Value	
PASS	MAIN	SR	MAIN	SR
Worst Pair	12-36	12-36	12-36	12-36
NEXT (dB)	35.1	34.6	42.4	42.3
Freq. (MHz)	1.6	1.9	69.8	82.3
Limit (dB)	57.2	56.1	29.7	28.5

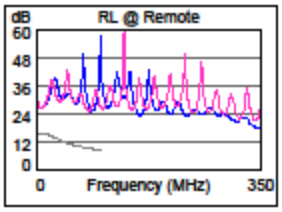




N/A	MAIN	SR	MAIN	SR
Worst Pair	36	12	36	12
RL (dB)	12.0	11.0	15.5	16.3
Freq. (MHz)	5.8	6.6	81.8	86.0
Limit (dB)	15.0	15.0	8.9	8.7

Compliant Network Standards:
10BASE-T 100BASE-TX





LinkWare Version 6.0

Project: CF
Site: IGUS

FLUKE networks

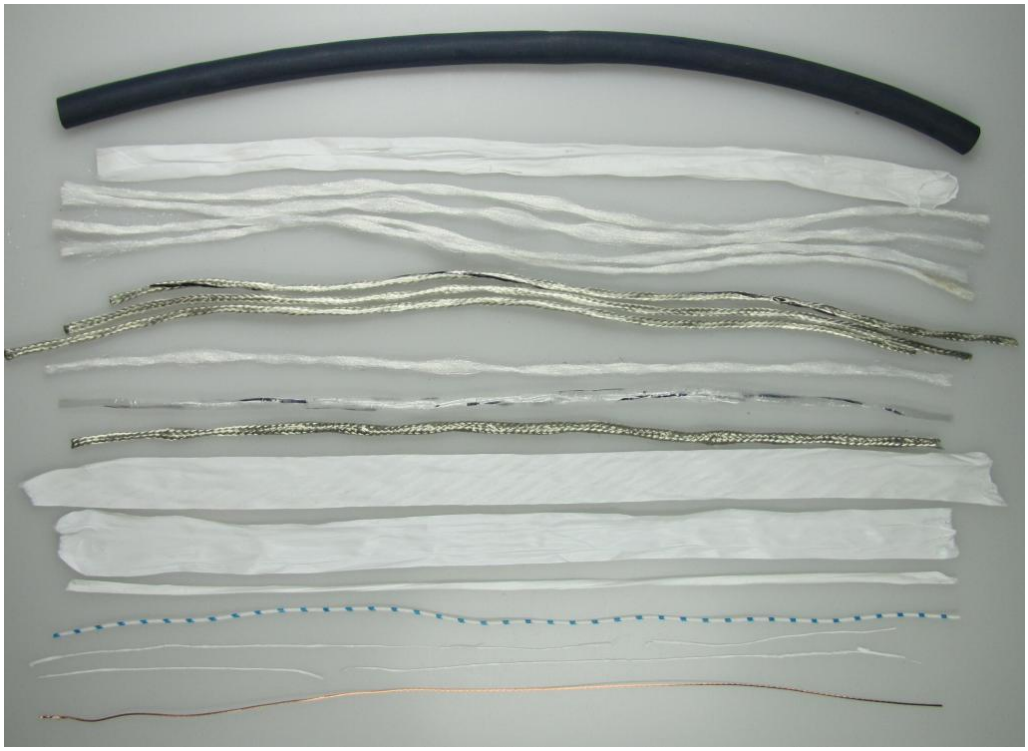
UNTITLED.flw

Evaluation

Dissection Report 02.03.2012:

The following pictures show the dissected pieces of the cable

The condition of the cable no.1.1 (CFROBOT8.045) after 22.010.222 cycles



Overview of the dissected pieces of the cable no.1, CFROBOT8.045.

DS: 22.010.222	Upper fixed point	Middle of the tested cable	Lower fixed point
Outer jacket	O.K.	O.K.	O.K.
Fillers	O.K.	O.K.	O.K.
Centre element	O.K.	O.K.	O.K.
Condition shielding	Single broken wires	damaged	O.K.
PTFE tapes	O.K.	O.K.	O.K.
Condition core insulation	O.K.	O.K.	O.K.
Condition conductor	O.K.	O.K.	O.K.

Name:	R. Thoß	Date:	02.03.2012