



Saves Your Energy

TENSION CLAMP SO141

Type Test Report



Test standard: EN50483-3, 2009



Contents

Document no

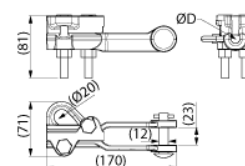
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SO141

Name: **Tension clamp**
For AAAC messenger 16-95 mm² (ø 4.8-11.3 mm)
Type: SO141
EAN: 6418677404405
Description: For suspension of LV ABC with uninsulated messenger (AMKA). The messenger is fitted, the clamp opened, directly into the groove without cutting. Clamp equipped with eye for cable hoist.
☐
SMFL for various messenger cross-sections are as follows:
☐
- 16 mm² - 4.3 kN, ☐
- 25 mm² - 6.6 kN, ☐
- 35 mm² - 9.3 kN, ☐
- 50 mm² - 13.2 kN, ☐
- 70 mm² - 18.6 kN, ☐
- 95 mm² - 25.1 kN. ☐

Package:
Unit: PCS



Technical specification

Messenger mm: 4.9-11.3
Messenger mm²: 16-95
Weight (kg): 0.46
SMFL kN: 25.1
Tightening torque Nm: 44

Use: Universal clamp for dead-ending AAAC (e.g. AMKA messenger) and other conductors.

Construction:	Component	Material
	Body	Corrosion resistant aluminium alloy
	Bolts	Hot-dip galvanised steel (M10 x 75)
	Pin	Hot-dip galvanised steel
	Bossage bolt pin	A2

Installation: The clamp is opened from the side, so it is easy to install. Tightening torque of bolts 44 Nm. The clamp includes a loop for cable hoist.

Tools required: Articulated spanner ST20.

Markings: SO141

Standard: EN 50483-3

CERTIFICATE FI 27577



Our Ref. 267771-7

Product Fitting for overhead lines
Type SO141
Trade mark ENSTO
Certificate Holder Ensto Finland Oy
 Ensio Miettisen katu 2
 FI-06150 PORVOO, FINLAND

Manufacturer Ensto Finland Oy
 Ensto Utility Networks
 Ensio Miettisen katu 2
 FI-06150 PORVOO, FINLAND

Technical information Tension clamp for 25 – 95 mm² messenger
 Tightening torque 44 Nm
 SMFL 25,1 kN

The product is certified according to the following standard(s) EN 50483-3:2009

Validity This certificate is valid until 12 July 2017 unless the standard in question has been amended or superseded with significant changes in requirements, in which case, SGS Fimko has the right to shorten the validity of the certificate based on the legislation of the European Union. This certificate includes the right to use the FI mark under the condition that changes (if any) will be checked at SGS Fimko before the product is brought onto market and that the conditions for FI certification are met.

Date of issue 12 July 2012

SGS Fimko Ltd

Signature

Sixten Lökfors
 Project Manager



This certificate has 1 appendix



This certificate is issued by the company under its General Conditions for Certification Services accessible at <http://www.sgs.fi/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

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Business ID 0978538-5

Member of the SGS Group (SGS SA)
graphic design: SGS Group, printed in Switzerland

Appendix to Certificate: 27577

Manufacturing site

Ensto Ensek AS
Paldiski mnt. 35 / 4A
EE-76606 KEILA, ESTONIA

Additional information

Tests made at manufacturer's premises, witnessed by SGS Fimko Ltd.
Manufacturer's test reports: 2407S, 2467S, 2414S and 2470S

Solar Simulator test report:
070212_SO141_prohesion_test



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LABORATORY REPORT

No.: 2407S

Revision: A

Page: 1/5

Date of Test: 1.3.2012

Test object:

Tension clamp SO141

Purpose of the test and relevant standards:

Part of type test.

Visual examination test and Dimensional and material verification test, according to EN50483-1.

Conclusion:

The clamp passed the test.



Picture 1: Tested clamp SO141



Date of Report: 21.3.2012


Tested by: Jenna Nieminen


Reviewed by: Janne Lappalainen


Witnessed by: Sami Hakonen / SGS Fimko

Ordered by: P.Pulkkinen
Distribution: OHL PD-team



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LABORATORY REPORT

No.: 2407S

Revision: A

Page: 2/5

1. Test objects

Clamp:

Type:

Batch number:

Messenger diameter:

Clamp SMFL:

Tightening torque:

No of pcs:

Tension clamp SO141

27-11

4,9 - 11,3 mm

25,1 kN

44 Nm

1

2. Testing procedure

The test was performed against the manufacturer specification sheet and standard requirement. The test included a visual examination part and a dimensional and material verification part.

Requirement:

The clamp shall fulfil the manufacturer specification data and standard requirement.

3. Test results

Visual examination:

The clamp was visually looking the same as in the specification drawing.

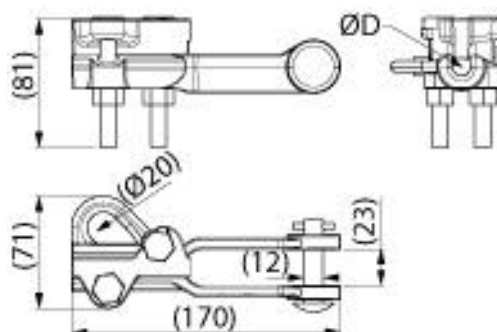
All markings required by the standard were found:

Product code: SO141

Dimensional and material verification:

All samples were within specification requirements. Clamp dimensions were within specification tolerances, see picture 2.

Distance	Requirement [mm]	Measured [mm]
Body length	170	170,40
Body width	71	68,71
Height of the bolt	81	81,54
Width of the pin	12	12,59
Height between forks	23	23,24
Diameter of eye for cable hoist	20	20,25
Messenger groove width (ØD)	11,30	11,30



Picture 2: Specification drawing

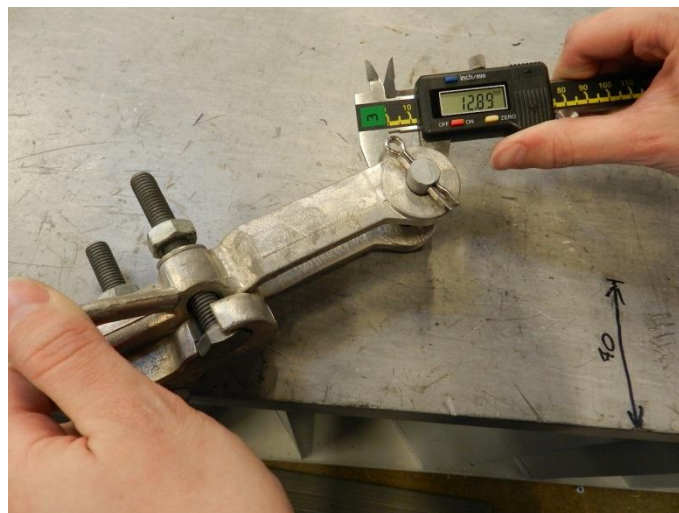
Summary:

The clamp fulfilled all test requirements.

4. Pictures



Picture 3: Markings



Picture 4: Test setup



5. Test equipment

ID	TYPE	MODEL	PURPOSE
A224	Calliper	Sylvac	Dimension measurements
A227	Calliper	Limit	Dimension measurements

6. Test Id

1364

7. Revision history

A



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LABORATORY REPORT

No.:2467S

Revision: A

Page: 1/4

Date of Test: 26.4.2012

Test object:

Tension clamp SO141.

Purpose of the test and relevant standards:

Part of type test.

Tensile test at ambient temperature according to EN 50483-3:2009, clause 8.1.1.

Conclusion:

The clamp passed the test.



Picture 1: Tested clamp SO141.



Date of Report: 3.5.2012


Tested by: Kari Malinen


Reviewed by: Janne Lappalainen


Witnessed by: Sami Hakonen / SGS Fimko

Ordered by: P. Pulkkinen
Distribution: OHL PD-team



1. Test objects

Tension clamp:

Type:	SO141
Messenger size:	25-95 mm ²
Tightening torque:	44 Nm
No of pcs:	2
Batch:	27-11

Conductors:

Type:	AMKA 3x16+25 mm ²
Used cross section:	25 mm ²
Manufacturer/country:	Prysmian / Finland
Breaking load for messenger:	7,4 kN
Conductor material:	Aluminium
Standard:	HD 626-5D

Type:	AMKA 3x120+95 mm ²
Used cross section:	95 mm ²
Manufacturer/country:	Prysmian / Finland
Breaking load for messenger:	27,9 kN
Conductor material:	Aluminium
Standard:	HD 626-5D



2. Testing procedure

The clamps were installed to the messengers according to manufacturer instructions. The tightening torque of the clamp nuts was 21 Nm. The clamps were tested with messenger size, 25 mm² and 95 mm². The test assembly was installed into a horizontal test machine.

First the load was increased to 80% of MBL of the messenger, next it was decreased to 20% of MBL of the messenger and the messenger was marked where it exits the clamp. Then the load was increased to 90% of MBL of the messenger and kept at this value for 60 seconds and the load was removed.

Requirement:

The clamp shall not slip by more than 10 mm respect to the mark on the neutral messenger. No damage shall occur, which would affect the correct function of the tension clamp.

3. Test results

Messenger [mm ²]	MBL of Messenger [kN]	80% of MBL [kN]	20% of MBL [kN]	90% of MBL for 60 s [kN]	Remarks	Result
25	7,4	5,9	1,5	6,7	-	o.k.
95	27,9	22,3	5,6	25,1	slip 5,4 mm	o.k.

Table 1: Test data and results.

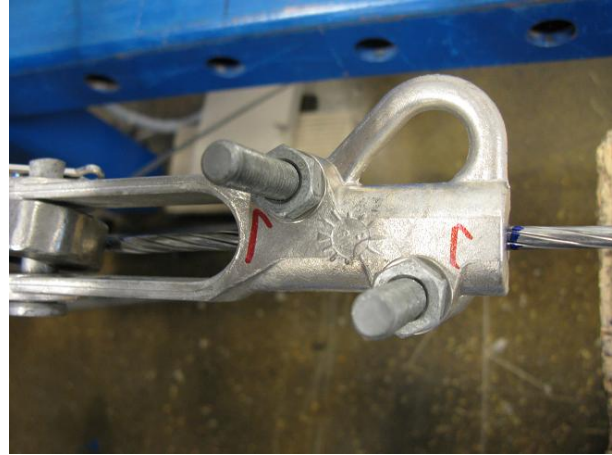
Summary:

All samples fulfilled the test requirements.

4. Pictures



Picture 2: Test assembly.



Picture 3: Clamp under test.

5. Test equipment

<u>ID</u>	<u>TYPE</u>	<u>MODEL</u>	<u>PURPOSE</u>
L110	Tensile test machine	50 kN	Tensile tests
L56	Torque wrench	BDS – 80 E	Torque adjustment
A222	Calliper	Sylvac	Dimension measurements

6. Test Id

1377

7. Revision history

A



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LABORATORY REPORT

No.: 2414S

Revision: A

Page: 1/4

Date of Test: 1.3.2012

Test object:

Tension clamp SO141

Purpose of the test and relevant standards:

Part of type test.

Clamp bolt tightening test for tension clamp according to EN 50483-3 clause 8.2.1.

Conclusion:

The clamp passed the test.



Picture 1: Tested clamp SSO141



Date of Report: 8.2.2011


Tested by: Jenna Nieminen


Reviewed by: Janne Lappalainen


Witnessed by: Sami Hakonen / SGS Fimko

Ordered by: P.Pulkkinen
Distribution: OHL PD-team



1. Test objects

Clamp:

Type:	Tension clamp SO141
Batch number:	27-11
Conductor range:	25 – 95 mm ²
Conductor diameter:	4.9 – 11.3 mm
Tightening torque:	44 Nm
No of pcs:	2

Conductors:

Type:	AMKA 3x16+25 mm ²
Used cross section:	25 mm ²
Manufacturer/country:	REKA / Finland
Insulation thickness:	1,6 mm
Core diameter:	7,6 mm
Conductor material:	Aluminium
Refer to standard:	4D HD626:S1

Type:	AMKA 3x120+95 mm ²
Used cross-sections:	95 mm ²
Manufacturer/Country:	REKA / Finland
Insulation thickness:	1,7 mm
Core diameter:	12,7 mm
Conductor material:	Aluminium
Refer to standard:	4D HD626:S1



2. Testing procedure

Two clamps were tested. The clamp was installed on to the messenger. The tightening torque was increased to 1,1 x the specified installation torque. After that bolts were opened and increased again 10 times. After these 10 times bolts were increased to tightening torque of the bolt. The clamp was checked for any damages.

Requirement

No damage shall occur during tightening which could affect the correct function of the clamp or it's nuts.

3. Test results

Sample [mm ²]	Spec. Installation Torque [Nm]	Spec. X 1,1 [Nm]	10 x inst./rem. Result	Tight. Torque of bolt [Nm]	Result
25	44	48,4	10	55	ok
95	44	48,4	10	55	ok

Table 1: Test data

Summary:

All samples fulfilled standard requirements.



4. Pictures



Picture 2: Test setup

5. Test equipment

ID	TYPE	MODEL	PURPOSE
L56	Torque wrench	BDS – 80 E	Torque adjustment

6. Test Id

1645

7. Revision history

A

Venus Greenhouse Test

Customer:

Ensto Finland Oy
Janne Lappalainen
P.O. Box 51
FI-06101 Porvoo

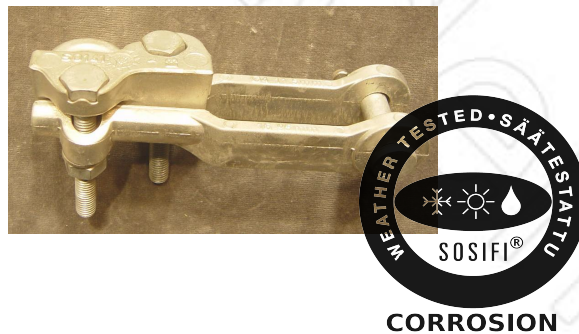
Research Contract:

EnstoFinlandLappalainen__ta151211HS.pdf
Ensto Test Id: 1368, 31st of August, 2011

Target:

Test item	Code	Q'ty	Manufacturer
Tension clamp	SO141	2	

Picture of the tested sample has been taken before the test.



Testing time:

The start of the test: 7th of February, 2012
The end of the test: 20th of March, 2012

The Purpose of the Test:

To test the withstand of the samples to prohesion mist spray.

Test method:

The strain of the test is made according to the standard EN 50483-6, 8.4.2.2 Gas atmosphere (Method 2). The test is a prohesion test. The test cycle consists of 0.05 % NaCl and 0.35 % (NH₄)₂SO₄ salt mist at the ambient temperature of 24 ± 3°C for one hour and one hour long drying time at the ambient temperature of 35°C. This test cycle is repeated for 500 times.

Validation of test method:

The test method was defined according to the requirements of the customer.

The test is used for comparative test of materials. The test conditions have some correlation with the real life conditions because the salt concentration is not very high. However, at the end of the drying period the concentration of the salt solution is very high.

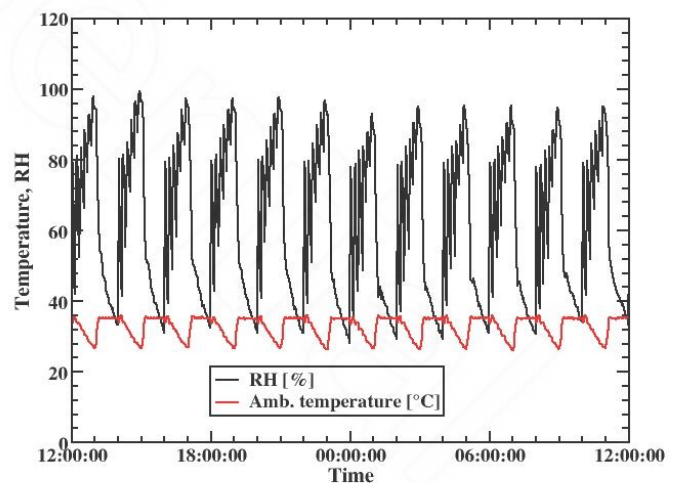
Actions done:

The samples were attached to a test casing after which the samples were placed into a prohesion mist chamber. The prohesion liquid solution was made to a purified water by using pro analysi sodium chloride and pro analysi ammonium sulphate. The amount of total impurities in the used salts was max. 0.5 % (in the standard 0.3 %). The pH of the solution was measured with a pH-meter to be 5.5. On a separate test a collecting receptacle with a collecting surface of 80 cm² collected 1.9 ml of prohesion solution per hour averaged over a period of 16 hours.

The samples were attached with plastic cable ties to the sample stand. The angle of the sample stand was 60° from horizontal. The sample stand was situated into a test chamber and the test lasted for 1000 hours.

The samples were photographed before the test, after every second test week and after the test. After the test the samples were washed in running tap water for five minutes. The temperature of the tap water was 30°C. After that the samples were rinsed in purified water and then dried with an air blast.

The ambient temperature and relative humidity in the test chamber during a cycle of 24 hours is presented in the figure.





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Test Report

Confidential

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ref.no.: 070212_SO141_prohesion_test_Solar_TR.pdf

SO141, Sample A: (Top row: Before test, after two test weeks, **Middle row:** after four test weeks, after test, **Bottom row:** after washing)





Solar Simulator

Solar Simulator Finland Ltd.

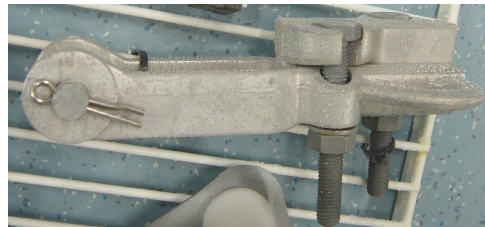
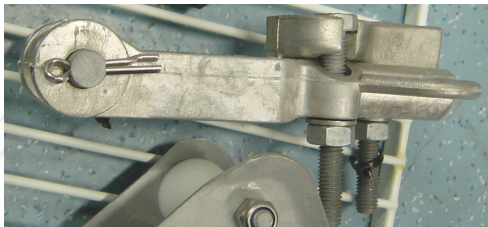
Test Report

Confidential

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ref.no.: 070212_SO141_prohesion_test_Solar_TR.pdf

SO141, Sample B: (Top row: Before test, after two test weeks, **Middle row:** after four test weeks, after test, **Bottom row:** after washing)



Used measuring equipment:

Prohesion chamber, No. 22

Temperature: No. 22 / Ch22_T1, calibrated 14th February, 2012, calibration is valid

Humidity: No. 22 / Ch22_RH, calibrated 14th February, 2012, calibration is valid

pH: No. 41, Fastech FT11, calibrated 24th February, 2012, calibration is valid

Analysis:

-

Recommendations:

-

Conclusions:

The strain for the samples was 1000 h of prohesion mist.

There was some degradation in the samples. However, the tesnsion clamp **SO141** passed the visual test.

Remarks:

Samples were photographed at an interval of two test weeks. The photographs were sent by email to the customer.

Actions, operations and reporting are in accordance with IEC/ISO 17025 'General requirements for the competence of testing laboratories'.

This test report is for R&D purposes and internal use only. Test reports and other documents for marketing use are also available.

Signatures:



Timo Oksa
Littoinen, 20th of March, 2012





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LABORATORY REPORT

No.:2470 S

Revision: A

Page: 1/3

Date of Test: 26.4.2012

Test object:

Tension clamp SO141.

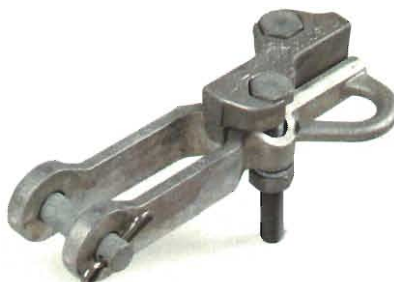
Purpose of the test and relevant standards:

Part of type test.

Tensile test at ambient temperature according to EN 50483-3:2009, clause 8.1.1., after gas atmosphere test (Method 2) done at Solar Simulator Finland according to EN 50483-1:2009 clause 8.4.2.2., test report: 070212_SO141_prohesion_test_Solar_TR.pdf.

Conclusion:

The clamp passed the test.



Picture 1: Tested clamp SO141.



Date of Report: 3.5.2012

Tested by: Kari Malinen

Reviewed by: Janne Lappalainen

Witnessed by: Sami Hakonen / SGS Fimko

Ordered by: P. Pulkkinen
Distribution: OHL PD-team



1. Test objects

Tension clamp:

Type:	SO141
Messenger size:	25-95 mm ²
Tightening torque:	44 Nm
No of pcs:	2
Batch:	27-11

Conductors:

Type:	AMKA 3x16+25 mm ²
Used cross section:	16 mm ²
Manufacturer/country:	Prysmian / Finland
Breaking load for messenger:	7,4 kN
Conductor material:	Aluminium
Standard:	HD 626-5D

Type:	AMKA 3x120+95 mm ²
Used cross section:	120 mm ²
Manufacturer/country:	Prysmian / Finland
Breaking load for messenger:	27,9 kN
Conductor material:	Aluminium
Standard:	HD 626-5D

2. Testing procedure

Tensile test

The clamps were installed to the messengers according to manufacturer instructions. The tightening torque of the clamp nuts was 21 Nm. The clamps were tested with messenger size, 25 mm² and 95 mm². The test assembly was installed into a horizontal test machine.

First the load was increased to 80% of MBL of the messenger, next it was decreased to 20% of MBL of the messenger and the messenger was marked where it exits the clamp. Then the load was increased to 90% of MBL of the messenger and kept at this value for 60 seconds and the load was removed.

Requirement:

Tensile test

The clamp shall not slip by more than 10 mm respect to the mark on the neutral messenger. No damage shall occur, which would affect the correct function of the tension clamp.

3. Test results

Messenger [mm ²]	MBL of Messenger [kN]	80% of MBL [kN]	20% of MBL [kN]	90% of MBL for 60 s [kN]	Remarks	Result
25	7,4	5,9	1,5	6,7	no	o.k.
95	27,9	22,3	5,6	25,1	no	o.k.

Table 1: Test data and results.

Summary:

All samples fulfilled the test requirements.

4. Pictures



Picture 2: Test assembly.



Picture 3: Clamp under test.

5. Test equipment

<u>ID</u>	<u>TYPE</u>	<u>MODEL</u>	<u>PURPOSE</u>
L110	Tensile test machine	50 kN	Tensile tests
L56	Torque wrench	BDS – 80 E	Torque adjustment
A222	Calliper	Sylvac	Dimension measurements

6. Test Id

1391

7. Revision history

A