

MECHANICAL TYPE TEST MTA 02/15.06.2011.

TEST STANDARD: IEC 61284/97; BS 3288, Part 1

TYPE OF TEST: Mechanical type test

CLIENT: EMPOWER ESTONIA

ORDER: 1/484/2/2010

PLACE OF TEST: Dalekovod Laboratorij - Zagreb

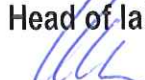
REMARKS: Satisfactory

Test Engineer



Neven Busić, M.E.E.

**Test approved by:
Head of laboratory**



M.Sc. Ivica Klasan B.Sc. Eng.

MATERIAL UNDER TEST: Double tension string, cat. no. 76.110.925

GUARANTEE: 240 kN (without tension clamp)

TEST RESULTS:
a) 260 kN, without breaking
b) 259 kN, without breaking
c) 257 kN, without breaking

MATERIAL UNDER TEST: Strain clamp, cat. no. 16.23.10D

GUARANTEE: 100 kN

TEST RESULTS:
a) 114 kN, without breaking
b) 113 kN, without breaking
c) 115 kN, without breaking

MATERIAL UNDER TEST: Single suspension string, cat. no. 75.110.946

GUARANTEE: 120 kN (without suspension clamp)

TEST RESULTS:
a) 135 kN, without breaking
b) 135 kN, without breaking
c) 136 kN, without breaking

MATERIAL UNDER TEST: Suspension clamp, cat. no. 12.22.90.5D

GUARANTEE: 120 kN

TEST RESULTS:
a) 132 kN, without breaking
b) 133 kN, without breaking
c) 135 kN, without breaking

GALVANIZING TYPE TEST

KTA 03/15.06.2011.

TEST STANDARD: BS EN ISO 1461

TEST METHOD: Magnetic method

CLIENT: EMPOWER ESTONIA

ORDER: 1/484/2/2010

PLACE OF TEST: Dalekovod Laboratorij - Zagreb

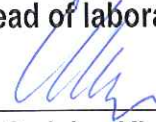
Test Engineer



Neven Busić, M.E.E.



Test approved by:
Head of laboratory



M.Sc. Ivica Klasan B.Sc. Eng.

Quality control of hot dip galvanizing, measuring of zinc coating thickness

No.	Material under test	Catalogue number	Measured coating thickness μm
1.	Hinge	68.70.21.41D	128
2.	Bolt for attachment	33.20.120.50	95
3.	Hinge	69.60.80E	125
4.	Extension link	43.26.30C	132
5.	Ball tongue	23.01.10AD	121
6.	Socket clevis	24.60.10D	127
7.	Yoke	29.35.20.90	138
8.	Clevis tongue	22.45.10D	124
9.	Strain clamp	16.23.10D	110
10.	Suspension clamp	12.22.90.5D	115
11.	Ball eye	21.25.10D	122
12.	U – bolt	35.20.75	119

CONCLUSION:

The results are completely satisfactory with the requirements of ISO 1461.

-Report end-

MECHANICAL TYPE TEST MTA 01/15.06.2011.

TEST STANDARD: IEC 61284/97; BS 3288, Part 1

TYPE OF TEST: Mechanical type test

CLIENT: EMPOWER ESTONIA

ORDER: 1/484/1/2010

PLACE OF TEST: Dalekovod Laboratorij - Zagreb

REMARKS: Satisfactory

Test Engineer



Neven Busić, M.E.E.

Test approved by:
Head of laboratory

M.Sc.Ivica Klasan B.Sc.Eng.

MATERIAL UNDER TEST:	Double tension string, cat. no. 76.330.078
GUARANTEE:	420 kN (without tension clamp)
TEST RESULTS:	a) 440 kN, without breaking b) 439 kN, without breaking c) 444 kN, without breaking
MATERIAL UNDER TEST:	Slipping of ACSR „Condor“ diam. 27.72 mm from wedge type clamp, cat. no. 10GY4025200 (x2)
GUARANTEE:	117.56 kN (95% R.T.S.)
TEST RESULTS:	a) 126.3 kN, without breaking b) 125.9 kN, without breaking c) 126.4 kN, without breaking
MATERIAL UNDER TEST:	Suspension clamp, cat. no. 12.44.90.3D
GUARANTEE:	120 kN
TEST RESULTS:	a) 134 kN, without breaking b) 133 kN, without breaking c) 135 kN, without breaking
MATERIAL UNDER TEST:	Single suspension set, cat. no. 75.330.077A
GUARANTEE:	160 kN (without suspension clamp)
TEST RESULTS:	a) 175 kN, without breaking b) 174 kN, without breaking c) 173 kN, without breaking
MATERIAL UNDER TEST:	Double suspension set, cat. no. 75.330.079A
GUARANTEE:	320 kN (without suspension clamp)
TEST RESULTS:	a) 340 kN, without breaking b) 338 kN, without breaking c) 337 kN, without breaking

MATERIAL UNDER TEST: Single suspension set, cat. no. 75.330.078A

GUARANTEE: 160 kN (without suspension clamp)

TEST RESULTS:
a) 175 kN, without breaking
b) 175 kN, without breaking
c) 176 kN, without breaking

MATERIAL UNDER TEST: Suspension clamp, cat. no. 12.31.90.2D

GUARANTEE: 120 kN

TEST RESULTS:
a) 134 kN, without breaking
b) 133 kN, without breaking
c) 135 kN, without breaking

MATERIAL UNDER TEST: Single tension string, cat. no. 76.110.924

GUARANTEE: 160 kN (without tension clamp)

TEST RESULTS:
a) 172 kN, without breaking
b) 171 kN, without breaking
c) 173 kN, without breaking

MATERIAL UNDER TEST: Strain clamp, cat. no. 16.23.10D

GUARANTEE: 100 kN

TEST RESULTS:
a) 114 kN, without breaking
b) 113 kN, without breaking
c) 115 kN, without breaking

MATERIAL UNDER TEST: Single suspension string, cat. no. 75.110.945

GUARANTEE: 120 kN (without suspension clamp)

TEST RESULTS:
a) 135 kN, without breaking
b) 135 kN, without breaking
c) 136 kN, without breaking

MATERIAL UNDER TEST: Suspension clamp, cat. no. 12.22.90.5D

GUARANTEE: 120 kN

TEST RESULTS:
a) 132 kN, without breaking
b) 133 kN, without breaking
c) 135 kN, without breaking

MATERIAL UNDER TEST: Tension set, cat. no. 76.283.1 EW

GUARANTEE: 120 kN (without tension clamp)

TEST RESULTS:
a) 132 kN, without breaking
b) 131 kN, without breaking
c) 133 kN, without breaking

MATERIAL UNDER TEST: Strain clamp, cat. no. 16.19.10

GUARANTEE: 100 kN

TEST RESULTS:
a) 114 kN, without breaking
b) 113 kN, without breaking
c) 115 kN, without breaking

MATERIAL UNDER TEST: Suspension set, cat. no. 75.241.3 EW

GUARANTEE: 85 kN (without suspension clamp)

TEST RESULTS:
a) 97 kN, without breaking
b) 96 kN, without breaking
c) 97 kN, without breaking

MATERIAL UNDER TEST: Suspension clamp, cat. no. 11.17.90D

GUARANTEE: 85 kN

TEST RESULTS:
a) 96 kN, without breaking
b) 96 kN, without breaking
c) 97 kN, without breaking

MATERIAL UNDER TEST:	Tension set, cat. no. 76.282.1 EW
GUARANTEE:	120 kN (without tension clamp)
TEST RESULTS:	a) 132 kN, without breaking b) 131 kN, without breaking c) 133 kN, without breaking
MATERIAL UNDER TEST:	Slipping of Fe 70 mm ² from dead end clamp cat. no. 72.123.115 (x2)
GUARANTEE:	79.61 kN (95% R.T.S.)
TEST RESULTS:	a) 86.2 kN, breaking of conductor b) 86.4 kN, breaking of conductor c) 85.8 kN, breaking of conductor
MATERIAL UNDER TEST:	Suspension set, cat. no. 75.240.3 EW
GUARANTEE:	80 kN (without suspension clamp)
TEST RESULTS:	a) 92 kN, without breaking b) 93 kN, without breaking c) 94 kN, without breaking
MATERIAL UNDER TEST:	Suspension clamp, cat. no. 11.12.10D
GUARANTEE:	80 kN
TEST RESULTS:	a) 90 kN, without breaking b) 91 kN, without breaking c) 92 kN, without breaking
MATERIAL UNDER TEST:	Slipping of ACSR „Condor“ diam. 27.72 mm from spacer damper, cat.no.38.84.40
GUARANTEE:	2.5 kN
TEST RESULTS:	a) 2.6 kN, without slipping b) 2.7 kN, without slipping c) 2.8 kN, without slipping

MATERIAL UNDER TEST:	Slipping of ACSR diam. 22.40 mm from rigide spacer, cat.no.38.52.30.30F
GUARANTEE:	2.5 kN
TEST RESULTS:	a) 2.6 kN, without slipping b) 2.6 kN, without slipping c) 2.7 kN, without slipping
MATERIAL UNDER TEST:	Slipping of ACSR „Condor“ diam. 27.72 mm from vibration damper, cat.no.66.35.90.5
GUARANTEE:	2.5 kN
TEST RESULTS:	a) 2.6 kN, without slipping b) 2.7 kN, without slipping c) 2.6 kN, without slipping
MATERIAL UNDER TEST:	Slipping of ACSR diam. 15.1 mm from vibration damper, cat.no.66.35.90
GUARANTEE:	2.5 kN
TEST RESULTS:	a) 2.9 kN, without slipping b) 2.7 kN, without slipping c) 2.8 kN, without slipping
MATERIAL UNDER TEST:	Slipping of GSW diam. 11.00 mm from vibration damper, cat.no.66.05.90
GUARANTEE:	2.5 kN
TEST RESULTS:	a) 2.8 kN, without slipping b) 2.7 kN, without slipping c) 2.8 kN, without slipping

GALVANIZING TYPE TEST **KTA 04/15.06.2011.**

TEST STANDARD: BS EN ISO 1461

TEST METHOD: Magnetic method

CLIENT: EMPOWER ESTONIA

ORDER: 1/484/1/2010

PLACE OF TEST: Dalekovod Laboratorij - Zagreb

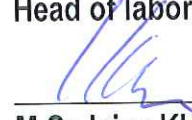
Test Engineer



Neven Busić, M.E.E.



Test approved by:
Head of laboratory



M.Sc. Ivica Klasan B.Sc. Eng.

Quality control of hot dip galvanizing, measuring of zinc coating thickness

No.	Material under test	Cataloge number	Measured coating thickness μm
1.	Hinge	68.70.21.51D	125
2.	Bolt M20	33.20.120.50	97
3.	Hinge	69.60.80B	127
4.	Extension link	43.26.30E	135
5.	Extension link	43.26.374C	138
6.	Ball clevis	22.59.20D	121
7.	Arcing horn	41.16.49.3	113
8.	Socket clevis	24.79.10D	123
9.	Yoke	29.82.10E	139
10.	Arcing horn – racket	41.32.76	112
11.	Hinge	69.90.100.9D	125
12.	Yoke	43.29.452.6D	138
13.	Hinge	69.90.80.70	132
14.	Clevis tongue	43.22.09.9D	127
15.	Yoke	43.29.13D	133
16.	Extension link	28.111.70E	138
17.	Suspension clamp	12.44.90.3D	118
18.	U – bolt	35.30.101B	122
19.	Shackle	27.10.10D	130
20.	Ball tongue	23.59.20D	124
21.	Arcing horn	41.16.17B	113
22.	Socket clevis	24.87.80D	126
23.	Yoke	43.29.38.7F	133
24.	Arcing ring	43.41.317.2A	116
25.	Extension link	43.26.24.6F	125
26.	Clevis tongue 90°	22.45.20D	123
27.	Yoke	29.50.20.5	136
28.	Suspension clamp	12.31.90.2D	119
29.	Clevis tongue	22.45.10D	122
30.	Yoke	43.29.33.8B	139

No.	Material under test	Catalogue number	Measured coating thickness μm
31.	Ball tongue	23.01.50D	120
32.	Strain clamp	16.23.10D	122
33.	U – bolt	35.20.75D	118
34.	Ball eye	21.25.10D	123
35.	Socket clevis	24.60.10D	128
36.	Yoke	43.29.33.80	135
37.	Suspension clamp	12.22.90.5D	119
38.	Strain clamp	16.19.10	117
39.	Eye tongue	21.33.40D	120
40.	Shackle	27.08.10D	123
41.	Suspension clamp	11.17.90D	116
42.	Ground connector	73.11.04	115
43.	Suspension clamp	11.12.10D	117
44.	Shackle	27.52.10D	121

CONCLUSION:

The results are completely satisfactory with the requirements of ISO 1461.

-Report end-

MECHANICAL TYPE TEST MTA 02/25.08.2011.

TEST STANDARD: IEC 61284/97

TYPE OF TEST: Mechanical type test

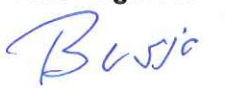
CLIENT: EMPOWER - TALLINN, ESTONIA

ORDER: TL 330 kV, /1/484/1,2/2010

PLACE OF TEST: Dalekovod Laboratorij - Zagreb

REMARKS: Satisfactory

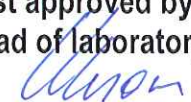
Test Engineer


Neven Busić, M.E.E.



DALEKOVOD
LABORATORY

Test approved by:
Head of laboratory


mr.sc.Ivica Klasan B.Sc.Eng.

MATERIAL UNDER TEST: Slipping of ACSR conductor „Condor“ Ø 27,72 mm cross section 402,80/52,30 mm², from wedge type clamp cat.no.401005A/402/52 and midspan joint cat.no.55.57.13

GUARANTEE: 117,56 kN (95 % U.T.S)

TEST RESULTS: a) 124,2 kN, without slipping of conductor
b) 124,4 kN, without slipping of conductor
c) 124,3 kN, without slipping of conductor

MATERIAL UNDER TEST: Slipping of ACSR conductor 243-AL1/39-ST1A Ø 21,80 mm cross section 243,1/39,5mm², from Strain clamp cat.no. 16.23.10 and midspan joint cat.no.55.55.09

GUARANTEE: 80,86 kN (95 % U.T.S)

TEST RESULTS: a) 82,1 kN, without slipping of conductor
b) 82,5 kN, without slipping of conductor
c) 82,3 kN, without slipping of conductor