Engineering Report
EB-16242-21

Title: Tensile Breaking Strength Test
with Conductor 242-AL1/39-ST1A (LA 280 HAWK)

At the request of: EMTA KABLO SANAYI VE TİCARET A.Ş.
İstasyon Mahallesi İbişağa Caddesi No:4 34940 Tuzla – İstanbul, Turkey

Test standard: EN 50182:2001

Place of test: RIBE Test Laboratory
Werk 2
Industriestr. 5
91126 Schwabach, Germany

Internal request for test: VA 16242 File: 1.2 Contents: 5 pages

Summary:

A Tensile Breaking Strength Test was carried out with a sample of conductor 242-AL1/39-ST1A (LA 280 HAWK) received from the purchaser.

Failure load was 93,7 kN (110,3 % of the specified minimum breaking strength 84,89 kN).

Mario Dansachmüller
RIBE Engineering

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RIBE Engineering

Schwabach, 16 June 2016

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1. Test procedure

Characteristics of the conductor are given in Annex 1.

The conductor sample was prepared in line with the instructions given in EN 50182. Epoxy type end fittings were used. The length of the free conductor between end fittings was 12,19 m.

Measuring devices (calibration certificate see Annex 2):

Tensile load	Load cell 200 kN Lorenz K11, S.No. 28261

A screw-type tension device was used (constant rate of displacement per time). The rate of increase of load was such that 30 % minimum breaking strength (MBS) were reached after 1 minute 3 seconds starting from a preload of 5 % MBS. Temperature was 21,4 °C.

2. Result

The breaking strength of the conductor is determined by the load attained at which one or more wires of the conductor are fractured.

The first wire (aluminium wire of the outer layer) fractured at a load of 93,7 kN (110,3 % MBS) in the free span at a distance of 2,15 m from one of the end fittings. Maximum load obtained was 95,1 kN. The test was terminated after fracture of a total of six outer layer aluminium wires.

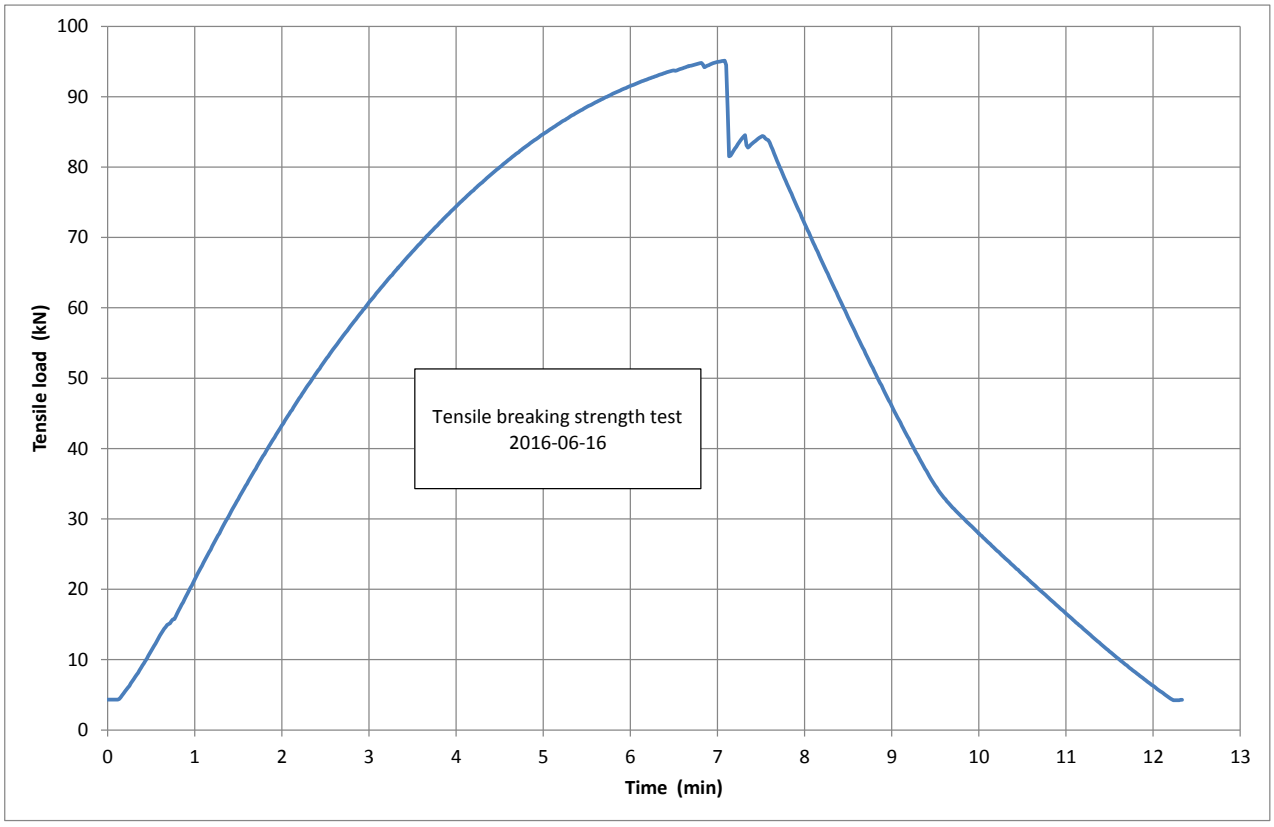

Fig. 1: Diagram load vs. time

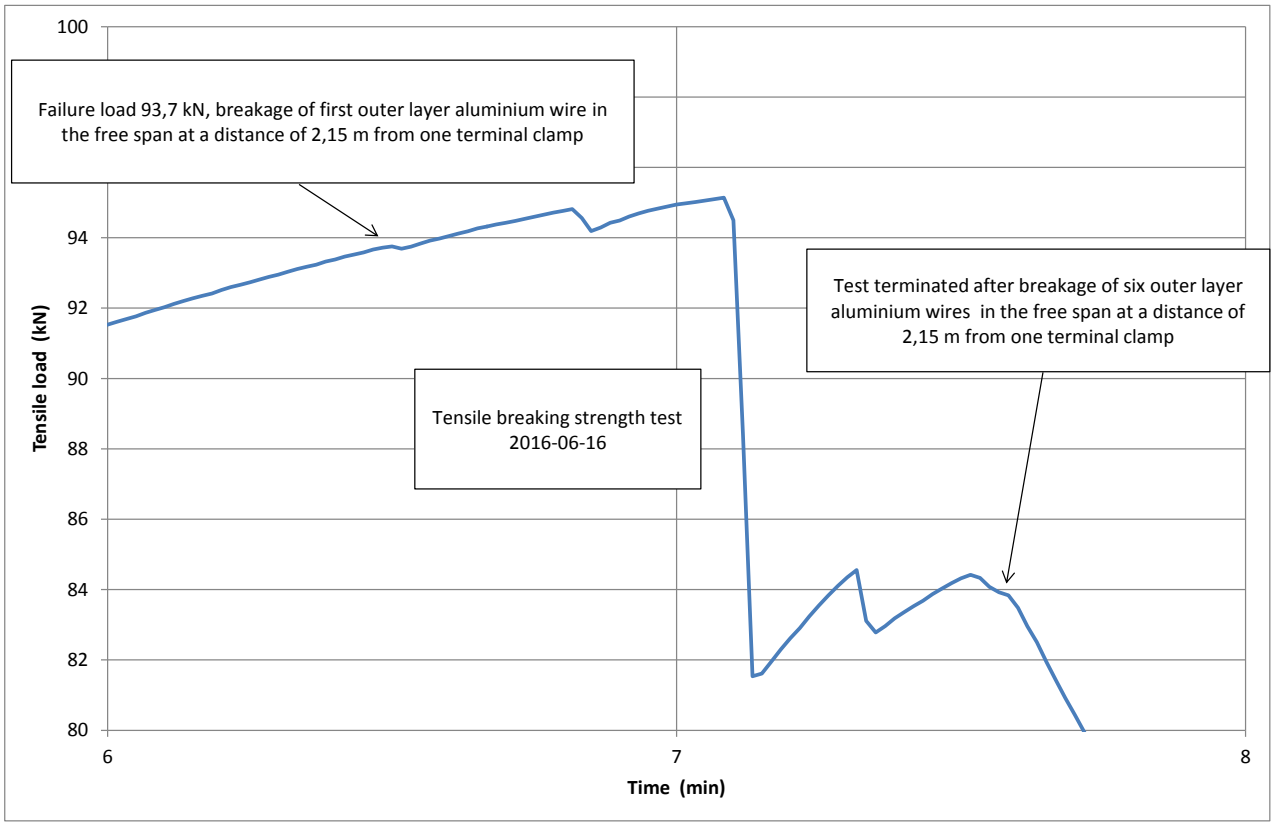

Fig. 2: Diagram load vs. time

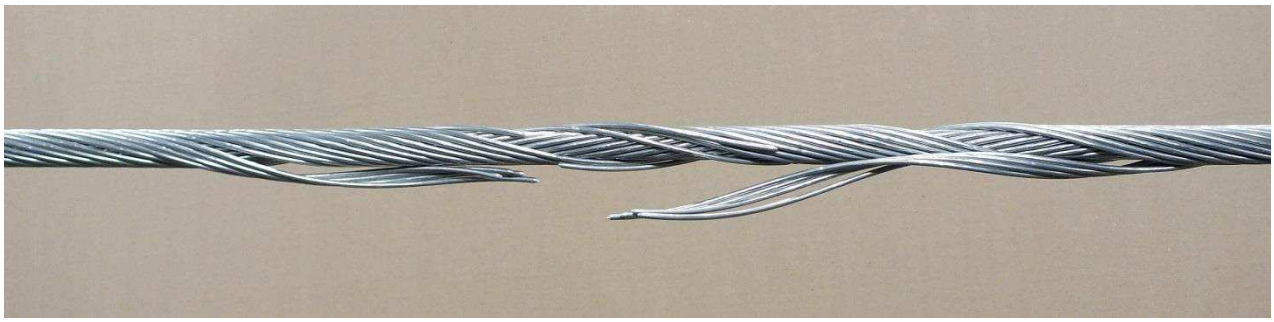

Fig. 3: Breakage of six outer layer aluminium wires in the free conductor span

Annex 1: Conductor data

EMTA
CONDUCTOR & CABLE

CODE NAME			**242-AL1/39-ST1A**					
OLD CODE			**LA 280 HAWK**					
STANDARD			**BS EN 50182_2001**					
Aluminium Conductor Steel Reinforced	Size/nominal sectional area		mm²	240				
	Aluminum strand		Number	26		Diameter	3,44	mm
	Steel strand(for ACSR only)			7			2,68	
	Calculated area		Alum.	241,6	mm²	Total	281,1	mm²
			Steel	39,5				
	Minumum breaking strength		kN	84,89				
	Outside diameter		mm	21,80				
	Standard weight		Alum.	667,4	kg/km	Total	976,2	kg/km
			Steel	308,8	kg/km			
	Calculated resistance 20°C		D.C.	0,1195			Ohm/km	
	Modulus of elasticity		Final	77.000			N/mm²	
	Coefficient of linear expansion		Per °C	18.9 * 10⁻⁶				
	Lay ratio and Direction of lay		Outer	Second			Third	
		Alum.	10 - 14	Right	10 - 16	Left		
		Steel	16 - 26	Right				
	Length of each reel		m (+/- %2)	1.750				
	Reel type		mm*mm*mm	1500 * 700 * 750 (890)				
	Net weight per drum (without grease)		kg	1.708				
	Gross weight per drum		kg	1.928				
	Grease weight Acc. To BS EN 50182_2001*		kg/km (+/-%20)					
	Grease type							
ALUMINUM WIRE	Diameter		mm	3,44				
	Ultimate tensile strength		N/mm²	165				
	Conductivity at 20°C		% IACS	61				
STEEL CORE WIRE	Diameter		mm	2,68				
	Ultimate tensile strength		N/mm²	1.350				
	Stress at 1% extension		N/mm²	1.140				
	Elongation in 250 mm		%	3,0				
	Galvanizing weight of coating		g/m²	230				
	Torsion		turns	16				

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Annex 2: Calibration certificate load cell

Zentrum für Konstruktionswerkstoffe
Staatliche Materialprüfungsanstalt Darmstadt
Fachgebiet und Institut für Werkstoffkunde
Prof. Dr.-Ing. Matthias Oechsner

TECHNISCHE UNIVERSITÄT DARMSTADT

akkreditiert durch die / *accredited by the*

Deutsche Akkreditierungsstelle GmbH

als Kalibrierlaboratorium im / *as calibration laboratory in the*

DAkkS Deutsche Akkreditierungsstelle D-K-11048-01-00

Deutschen Kalibrierdienst DKD

Kalibrierschein *Calibration certificate*	**W 160272.3** **1. Ausfertigung**
Kalibrierzeichen *Calibration mark*	L 1938 D-K-11048-01-00 2016-02

Gegenstand *Object*	**liegende 200 kN Zugprüfmaschine**
Hersteller *Manufacturer*	**Lorenz**
Typ *Type*	**K11**
Fabrikat/Serien-Nr. *Serial number*	**28261**
Auftraggeber *Customer*	**RIBE, Richard Bergner Elektroarmaturen GmbH & Co. KG** **Bahnhofstraße 8 - 16** **91126 Schwabach**
Auftrags-, Vertragsnummer	**310513 vom 20.1.14 / W 620**
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	**7**
Datum der Kalibrierung *Date of calibration*	**15.02.2016**

Dieser Kalibrierschein dokumentiert die Rückführung auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).
Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.
Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
This calibration certificate documents the traceability to national standards, which realize the units of measurement according to the International System of Units (SI).
The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.
The user is obliged to have the object recalibrated at appropriate intervals.

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung sowohl der Deutschen Akkreditierungsstelle als auch des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift haben keine Gültigkeit.
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Stempel *Seal*	Datum *Date*	Stellv. Leiter des Kalibrierlaboratoriums *Deputy head of the calibration laboratory*	Bearbeiter *Person in charge*
	16.02.2016	Dipl.-Ing. (FH) A. Hecht	Dipl.-Ing. V. Marzian

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