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ORTA DOĞU TEKNİK ÜNİVERSİTESİ
ELEKTRİK VE ELEKTRONİK MÜHENDİSLİĞİ BÖLÜMÜ
MIDDLE EAST TECHNICAL UNIVERSITY
ELECTRICAL AND ELECTRONICS ENGINEERING DEPT.

Date:08/06/2017

Report No.: 17-03-01-507 / 2 / 2

TEST REPORT

Subject:

PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DİŞ TİC. A.Ş
products
Impulse current with stand test applied to ESE lightning catching head



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1.GENERAL:

Test Requested By :

PROTART ELEKTRİK VE BİLİŞİM TEKNOLOJİLERİ DIŞ TİC. A.Ş 19 MAYIS MAH. ŞİŞLİ PTT OFISI
YANI NO: 4/4 ŞİŞLİ / İSTANBUL TURKEY

TEL: +90 212 231 49 05 WEB: +90 212 231 48 55

Web.: www.protart.com.tr Email: export@protart.com.tr

Date of the Test: 03/05/2017

Test supervised and executed by :

ODTU Elektrik Elektronik Mühendisliği Bölümü-Güç Sistemleri Ana Bilim Dalı

Laboratory: HIZAL San. Tic. Ltd. Yüksek Gerilim Laboratuvarı OSTİM - Ankara

Environmental Conditions : 24 °C , 678 mmHg , % 60 Relative Humidity
(These values are found to be stable during the tests .)

Equipment –Device under the Test :

ESE lightning catching head

No	Sample	Class / Type / Serial No	Quantity
1	PROTART P30	3292	1

2.TEST STANDARTS:

TS- EN 62561-1 , Sec. 6.3 class H Electrical Test . 200kA current level test executed.

• **3. MEASURING SYSTEMS USED:**

- DMM Fluke 8025B Digital Multimetre , : Kalibrasyon Sertifikası UMS , E7764 , 04.13
- DMM Fluke 115 Digital Multimetre , : Kalibrasyon Sertifikası: UMS,AB-0018-K, E3381 , 05.15
- OSİLOSKOP RIGOL DS5062M , Kalibrasyon Sertifikası TSE , AB-0002-K, E0494, 05-09
- Darbe Gerilim Ölçme Sistemi HIZAL H-220 IVD-09 / Rigol Electronic DS1102E,Kalibrasyon Sertifikası UME , AB-0034-K, UME G1YG-0123, 06.14
- Darbe Yüksek Akım Şöntü : Fluke-HIZAL i-2000 Flex Rogwsky Coil/Schunt , Seri : 0094 , Kalibrasyon Sertifikası UMS, 020517, 03.17

Calibrations valid through: 5 years

IEC 60060-2- (Madde 10.3)

10.3- Interval between successive calibrations of reference measuring systemsThe interval between calibrations shall be determined according to national regulations. If there is no regulation it is recommended that the calibrations shall be repeated at least once **every five years**, provided that regular performance checks demonstrate the stability of the reference measuring system.





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4. TESTS CONDUCTED:

4.1. CURRENT IMPULSE TESTS

Stages of HVcurrent impulse generator (50kV , 200 KJ) was connected in paralel to produce current impulses . Three successive current impulses with a waveform shown in Fig. 1. was applied to the sample and visually inspected for any damage . The sample connections were also checked if any change occurred in the tightening torque before and after the test . No noticable damage and no significant change in the connections were observed. The test set – up is shown in Test Pictures.

The current waveform is analysez according to the related standart (TS-EN 62561-1 , Sec. 6.3 class H Electrical Test) and the energy / ohm in the sample conductor is calculated as follows :

- **TABLE-1:**
TS- EN - 62561-1, 6.3 md., (I_{imp}) parameters

Class	I_{imp} kA \pm %10	W/R kJ/ Ω \pm % 35
H	100	2500
N	50	625

Note – Noted parameters typically due to EN 62305-1 350 μ s time range is acceptable.

Energy transferred due to the standart through the test object:

$I_{max.}=200.5$ kA $I_{peak-ort} = 100,25$ kA , $\Delta t = 2$ ms olduğundan , $W= (I_{rms})^2 .R . \Delta t$,
 $W = (100,25/\sqrt{2} . 10^3)^2 . 10^{-3} . 2 . 10^{-3} = 10,050$ kJ , ve $W/R = 10,050$ kJ/ $10^{-3} = 10.05$ (MJ / ohm)
calculated by experiment measurements.

This value is in accordance over three limit value spesified in the standard .

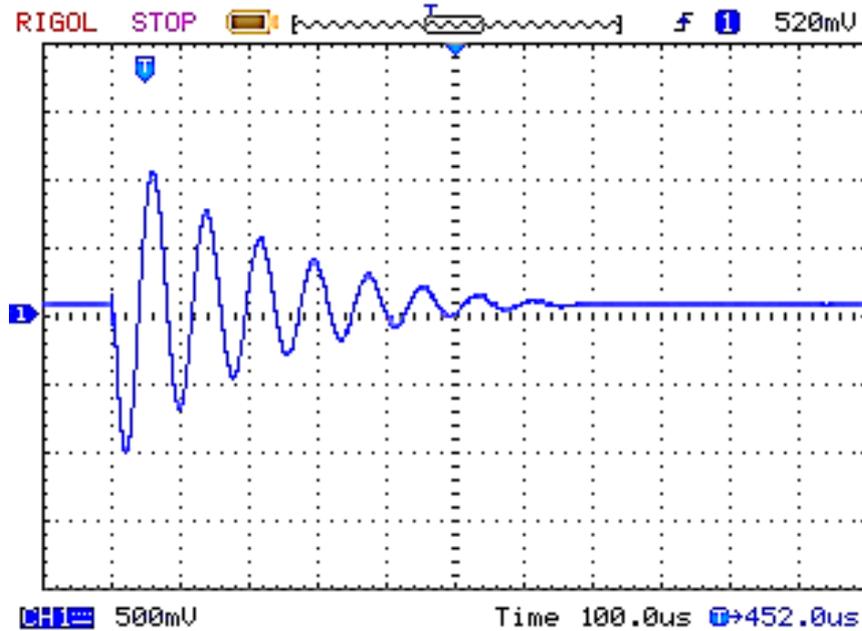


Figure .1. Impulse current oscillogram ,





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- **TEST PICS:**
High Voltage Impulse Current generator (HIZAL) (50kV, 200 kJ, 250kA) and the test system



- Impulse current recording system and the current probe



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TEST PICTURES :Test Samples

*PROTART P30



4.2-TEST Measurements:

TEST SAMPLE NO:	OSİLOGRAM	TEST MEASUREMENT	TEST RESULT
PROTART-30 (3292)		<p>Impulse Current:</p> <p>$I_{max.} = 225.03 \text{ kA}$</p> <p>$I_{peak-avg} = 112,6 \text{ kA}$</p> <p>$\Delta t = 2 \text{ ms}$</p> <p>Energy Transfer:</p> <p>$W = (I_{rms})^2 \cdot R \cdot \Delta t$</p> <p>$W = (112,6 / \sqrt{2} \cdot 10^3)^2 \cdot 10^{-3} \cdot 2 \cdot 10^{-3}$</p> <p>$= 11719 \text{ kJ}$</p> <p>$W/R = 2605 \text{ kJ}/10^{-3} = 11,719 \text{ (MJ/ohm)}$</p>	OK

5. CONCLUSION

In the context of the applied tests the samples was found to be in accordance with and above performance to the related standart specification TS- EN - 62561-1

Tests conducted by

Prof.Dr. Mirzahan HIZAL

METU Electric and Electronic Engineering Department

Power Systems Science Branch

[ODTÜ EE Müh. Böl. Ankara](http://www.odtu.edu.tr)

