



INSTYTUT ENERGETYKI

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IE_n CERTIFICATE

No. DZC.521.80.2022

Issue No. 01 of 2022.09.02

(STATEMENT)

*Name and address of
the Certificate Holder:*

ERKO sp. z o.o. sp. k.
ul. Lipowa 24, 11-042 Jonkowo

Name of the product:

The Shark family of connectors dedicated to Al and Cu winding wires

Type:

AL-R1, R1, AL-R1S, R1S, AL-R2, AL-RM1, RM1, AL-RM2, RM2, AL-RD1, RD1, AL-RD2, RD2, AL-RT1, RT1, AL-RT2, RT2, AL-SRD1, AL-SRD2

Manufacturer:

ERKO sp. z o.o. sp. k.
ul. Lipowa 24, 11-042 Jonkowo, Poland

*Parameters and
application of product:*

According to appendix
Connectors for enameled round or profiled, aluminum or copper winding wires.

*The product meets
requirements of the:*

WTO No. 1/2020 of January 29, 2020, developed on the basis of the requirements of the PN-EN 61238-1: 2004 standard

*According to the
report made by:*

Instytut Energetyki

*Number of the
evaluation report:*

DZC.521.80.2022

Period of validity:

from 02nd of September 2022 until 08th of August 2025

The right to use the certificate of conformity within its validity period applies only to:

- these copies that meet the requirements specified above and have the same characteristics (parameters) as the model / product samples submitted for testing,
- certificate holder or his authorized representative.

The list of evidenced parameters is included in the appendices to the certificate of conformity.

Number of appendices: 1

based on the type 1a product certification program acc. to PN-EN ISO/IEC 17067:2014-01
(product parameters confirmed by type test)

Warsaw, 2022.09.02

DIRECTOR OF
INSTYTUT ENERGETYKI

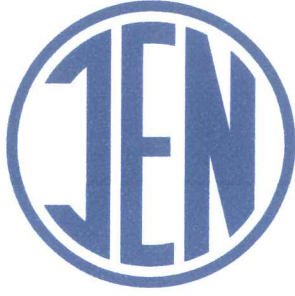
dr hab. inż. Tomasz Gałka, prof. IEn



APPENDIX TO THE CERTIFICATE OF IEn
No. DZC.521.80.2022
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LIST OF EVIDENCED PARAMETERS

Element type	Scope of application on enameled winding wires [mm ²]	
	Cu ¹⁾	Al ²⁾
AL-R1	1,77 ÷ 4,9	4,9 ÷ 9,9
R1	1,77 ÷ 4,9	-
AL-R1S	1,77 ÷ 9,9	4,3 ÷ 15,75
R1S	9,9	-
AL-R2	-	4,3 ÷ 15,75
AL-RM1	0,4 ÷ 1,4	0,785 ÷ 2,83
RM1	0,4 ÷ 1,4	-
AL-RM2	0,4 ÷ 1,4	0,785 ÷ 2,83
RM2	0,4 ÷ 1,4	-
AL-RD1	9,9 ÷ 22,4	12,5 ÷ 24
RD1	9,9 ÷ 22,4	-
AL-RD2	9,9 ÷ 22,4	12,5 ÷ 39,5
RD2	9,9 ÷ 20,8	-
AL-RT1	0,4 ÷ 1,2	0,785 ÷ 1,77
RT1	0,4 ÷ 1,2	-
AL-RT2	0,4 ÷ 1,2	0,785 ÷ 1,77
RT2	0,4 ÷ 1,2	-
AL-SRD1	9,9	12,5 ÷ 32
AL-SRD2	9,9	12,5 ÷ 32
Product class	A	
Heating current	Current density for Al wires: 6 [A/mm ²] Current density for Cu wires: 9 [A/mm ²]	
Short-circuit current: for 1 [s]	Current density for Al wires: 75 [A/mm ²] Current density for Cu wires: 150 [A/mm ²]	
Initial scatter $\delta^3)$	$\leq 0,30$	
Mean scatter $\beta^4)$	$\leq 0,30$	
Resistance factor ratio $\lambda^5)$	$\leq 2,0$	
Change in resistance factor $D^6)$	$\leq 0,15$	
Maximum temperature $\theta_{max}^7)$	$\leq \theta_{ref}$	
Permissible tensile force [N]	$\leq 40xA^8)$ for Al wires $\leq 60xA^8)$ for Cu wires	



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LIST OF EVIDENCED PARAMETERS

NOTES:

- 1) ¹⁾ Cu wires according to: PN-EN60317-26:1998, PN-EN60317-29:2002 standards.
- 2) ²⁾ Al wires according to: PN-EN60317-25:2010, PN-EN60317-69:2017 standards.
- 3) ³⁾ The average value of the resistance factors of six connectors before the first heating cycle.
- 4) ⁴⁾ The average value of the resistance factors of six connectors calculated from last 11 measurements readings. It specifies if all connectors of given type are characterized by similar changes in resistance during the heat cycles.
- 5) ⁵⁾ Resistance factor ratio of tested connector during the heat cycle test in relation to the initial resistance factor.
- 6) ⁶⁾ The value specifies the size of the resistance factor change based on last 11 measurements readings.
- 7) ⁷⁾ Temperature of the connector referenced to the temperature of the reference section.
- 8) ⁸⁾ Nominal cross-sectional area.

