Base Load Power Hub (BLPH)

INSTRUMENT CABLES

MANUFACTURER RECORD BOOK (FINAL DOSSIER) COMPLETE

Document Number: 1725000275-QC-DB-00007

Document Class: 2

01	25/07/2025	Accepted for Construction (AFC)	Fumagalli	Cucinotta	Messa
00	23/06/2025	Issue for review (IFR)	Fumagalli	Cucinotta	Messa
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File: 1725000275-QC-DB-00007 Rev.01

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Base Load Power Hub (BLPH)

INSTRUMENT CABLES

EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) INDEX - INSTRUMENT CABLE

Document Number: 1725000275 -QC-LIS-00006

Document Class: 2

ROSETTI MARINO

1	NO COMMENTS - APPROVED - WORK MAY PROCEED
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Sign	Date
ROSETTI MARINO SpA Stefano Lisoni Quality Control Dept.	18/04/2025

02	16/04/2025	Accepted for construction (AFC)	Fumagalli	Cucinotta	Messa
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PART 1 - DESIGN DOSSIER

LIST

- document register	1724000275-MD-LIS-00001
- cable drums schedule - electrical cales	1724000275-IN-LIS00004
- ITP	1724000275-QC-ITP-00002
- Packing, Transportation Handling and Storage procedure	1724000275-QC-PRO-00008

PROJECT PROCEDURES AND SPECIFICATION

- Manufacturing and Testing procedures (FAT)	1724000275-QC-PRO-00005

- Test Report - Material Certificate - packing list - traceability row material with shipping document of all the raw material (original language)

PART 2 - CERTIFICATION DOSSIER

TEST RECORD

- FAT reports
- IRN

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PART 1 - DESIGN DOSSIER

Base Load Power Hub (BLPH)

INSTRUMENT CABLES

SUPPLIER MASTER INFORMATION REGISTER

Document Number: 1724000275 -MD-LIS-00001

Document Class: 3

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V. Barratta	11-03-202

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SMIR - REGISTRO DOCUMENTI / *SMIR - SUPPLIER MASTER INFORMATION REGISTER*

	Ordine n°/*order nr.*	**1725000275**		**Fornitore/*Supplier* :**	**FLEI SRL**	
	data / *dated:*			**Codice F./ *S. Code:***		
	Commessa / *Job:*			**Indirizzo/ *address* :**	VIA DE GASPERI, 82 20864 AGRATE BRIANZA (MB) MB	
	Descrizione / *Description*	**INSTRUMENT CABLES**		**Persona di riferim./ *contact person:***	stefania.fumagalli@flei.it	
	Macrofase / *Phase*					

Pos.	Document nr. Client (1)	Doc Client Rev. (1)	Document nr. Internal	Document nr. Internal Rev. (2)	Document nr. Supplier (3)	Doc Supplier Rev. (3)	Titolo Documento / *Document title* (4)	Disciplina / *Discipline* (5)	Blocco Classe / *Class Block (6)*	Docum. Format (7)	first issue date (8)	Third Party Approval (I/A)	Design KEY Document	Document subject to liquidated damages	Document Approval (I/A)
							CONTROL DOCUMENTS								
1	1725000275-MD-LIS-00001	00	1725000275-MD-LIS-00001	00	TBD	00	SUPPLIER MASTER INDEX REGISTER (SMIR)-INSTRUMENT CABLES	INS		A4	07/03/2025				I
							QUALITY DOCUMENTS								
2	1725000275-QC-ITP-00002	00	1725000275-QC-ITP-00002	00	TBD	00	INSPECTION AND TEST PLAN-IINSTRUMENT CABLES	QUA		A4	07/03/2025				A
							ENGINEERING DOCUMENTS								
3	1725000275-IN-DS-00003	00	1725000275-IN-DS-00003	00	TBD	00	CABLE DATA SHEETS-INSTRUMENT CABLES	INS		A4	07/03/2025		Y		I
4	1725000275-IN-LIS-00004	00	1725000275-IN-LIS-00004	00	TBD	00	CABLE DRUMS SCHEDULE-INSTRUMENT CABLES	INS		A4	07/03/2025				A
5	1725000275-QC-PRO-00005	00	1725000275-QC-PRO-00005	00	TBD	00	FAT PROCEDURE-INSTRUMENT CABLES	QUA			07/03/2025				A
6	1725000275-QC-LIS-00006	00	1725000275-QC-LIS-00006	00	TBD	00	EQUIPMENT MANUFACTURERS RECORD BOOK (FINAL DOSSIER) - INDEX-INSTRUMENT CABLES	QUA		A4	07/03/2025				A
							CERTIFICATES (ref. to notes in the RDDS)								
7	1725000275-QC-DB-00007	00	1725000275-QC-DB-00007	00	TBD	00	EQUIPMENT MANUFACTURERS RECORD BOOK – COMPLETE -INSTRUMENT CABLES	CERT		A4	27/04/2025				A
							HANDLING, SHIPPING & SITE INSTALLATION								
8	1725000275-QC-PRO-00008	00	1725000275-QC-PRO-00008	00	TBD	00	PACKING SHIPPING HANDLING AND STORAGE PROCEDURES-INSTRUMENT CABLES	EXP		A4	07/03/2025				I

Notes:

(1) Numero documento Cliente
Document number assigned by final Client
(2) Numero documento interno
Document number internal
(3) Numero documento Fornitore (assegnato dal Fornitore)
Document number assigned by Supplier
(4) Assegnare il Titolo del documento (assegnato dal Fornitore)
Fill in the document title (to be assigned by Vendor)

(5) Specific are la disciplina (compilato da Rosetti)
Process, Piping; Electrical, Expediting, Inspection, Commissioning, Quality, ecc (to be filled by Rosetti)
(6) Blocco Classe: Specifica, Disegno, Report, Data Sheet, etc. (compilato da Rosetti)
Procedure, list, drawing, data sheet, etc. (to be filled by Rosetti)
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A4, A3, A1 (Supplier)
(8) Data prevista per l'emissione del documento (compilato dal Fornitore)
Foreseen date for the first issue (Supplier)

Base Load Power Hub (BLPH)

INSTRUMENT CABLES

CABLE DRUMS SCHEDULE

Document Number: 1725000275-IN-LIS-00004

Document Class: 2

ROSETTI MARINO

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V. Barratta	02-04-2025

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ID DRUM	Cable Type	DESCRIPTION	DRUM LENGHT (M)
i120.3	SICV12-2X2.5	CU CL.2/MGT/XLPE/OS/LSZH/SWB/LSZH 2X2,5 150/250V	500
i10.4	SIMCV01-1X2X0,75	CU CL.2/XLPE/OS/LSZH/SWB/LSZH 1X2X0,75 150/250V	750
i80.3	SMICV08-1X2X0,75	CU CL.2/MGT/XLPE/OS/LSZH/SWB/LSZH 1X2X0,75 150/250V	300

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Base Load Power Hub (BLPH)

INSTRUMENT CABLES

INSPECTION AND TEST PLAN - INSTRUMENT CABLES

Document Number: 1725000275 -QC-ITP-00002

Document Class: 2

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Sign	Date
ROSETTI MARINO SpA Stefano Lissi Quality Control Dept.	27/03/2025

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Via Alcide De Gasperi 82,
20864 Agrate Brianza (MB) - Italy
Phone 039 65 32 51 mail : shipping@flei.it

ISO 9001: 2015

Customer	ROSETTI MARINO	PO No.1725000275 123A90A	ITP No.: 10/2025	Date : 25 February 2025
Project	123A90A - Base Load Power Hub Platform			
Cables Type	Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 2X2,5 - INSTRUMENT CABLE - Fire Resistant - Not I.S.			
	Cu Cl.2/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 1X2X0,75 - INSTRUMENT CABLE - Flame Retardant - Not I.S.			
	Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 1X2X0,75 - INSTRUMENT CABLE - Fire Resistant - Not I.S.			

INSPECTION TEST PLAN - Design Guidelines : IEC 60092.376

SL. No	Test Characteristics	Sampling Plan	Type of Test	Ref. Doc.	Instrument name	Report test reference	FLEI s.r.l.	ROSETTI MARINO	CROSSWIND	CA CERTIFYNG AUTHORITY
1	**Routine Test**									
1.1	High Voltage Test	10 % of the order during Inspection	Electrical	IEC 60092-350	15 kV HV Transformer	Test Report	T/H	W	W	R
1.2	Conductor Resistance	10 % of the order during Inspection	Electrical	IEC 60228	Multimeter	Test Report	T/H	W	W	R
1.3	Insulation Resistance	10 % of the order during Inspection	Electrical	IEC 60092-350	Megahometro	Test Report	T/H	W	W	R
1.4	Mutual Capacitance	10 % of the order during Inspection	Electrical	EN 50288.7	LCR meter	Test Report	T/H	W	W	R
1.5	Inductance	10 % of the order during Inspection	Electrical	EN 50288.7	LCR meter	Test Report	T/H	W	W	R
1.6	L/R ratio	10 % of the order during Inspection	Electrical	EN 50288.7	LCR meter	Test Report	T	W	W	R
2	**Sample Test**									
2.1	Conductor EXAMINATION	10 % of the order during Inspection	Non-Electrical	IEC 60092-353	Digital Caliper	Test Report	T/H	W	W	R
2.2	Thickness of Insulation	10 % of the order during Inspection	Non-Electrical	IEC 60092-353	Profile Projector	Test Report	T/H	W	W	R
2.3	Core Identification	10 % of the order during Inspection	Non-Electrical	IEC 60092-353	Visual	DATA SHEET	T/H	W	W	R
2.4	Hot Set Test on Insulation	10 % of the order during Inspection	Non-Electrical	IEC 60092-360	Hot set Oven Vernier Caliper	Test Report	T/H	W	R	R
2.5	Thickness and Diameter of outer Sheath	10 % of the order during Inspection	Non-Electrical	IEC 60092-353	Profile Projector	Test Report	T/H	W	W	R
3	**Type Test**									
3.1	Tensile strenght and elongation of insulation and sheath before ageing	One sample	Non-Electrical	IEC 60092-360	Tensile Testing Machine Vernier Caliper Dessicator	Test Report	T/H	R	R	R
3.2	Tensile strenght and elongation of insulation and sheath after ageing	One sample	Non-Electrical	IEC 60092-360	Oven Tensile machine Dessicator Vernier Caliper	Test Report	T/H	R	R	R
3.3	Fire Resistance Test	One sample	One sample	IEC 60331.21	Fire Apparatus	Test Report	T/H	R	R	R
3.4	Flame Retardant test	One sample	Non-Electrical	IEC 60332.1.2	Flame apparatus	Test Report	T/H	R	R	R
3.5	Flame Retardant test	One sample	Non-Electrical	IEC 60332.3.22	\	Compliance Declaration	Compliance Declaration	R	R	R
3.6	Corrosive and acid Gas test	One sample	Non-Electrical	IEC 60754.1 (HCl≤0,5%)	\	Compliance Declaration+Material supplier data sheet	Compliance Declaration+Material supplier data sheet	R	R	R
3.7	Smoke Emission test	One sample	Non-Electrical	IEC 61034.2 (LT≥60%)	\	Compliance Declaration+Material supplier data sheet	Compliance Declaration+Material supplier data sheet	R	R	R
3.8	Hazardous Areas	One sample	Non-Electrical	IEC 60079.14:2013 par. 9.3.2a / IEC 60079.14:2024 par. 7.4	\	Compliance Declaration	Compliance Declaration	R	R	R
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T: TEST R: REVIEW
W: WITNESS H:HOLD

Approved By :

FLEI s.r.l. Quality Control

Base Load Power Hub (BLPH)

INSTRUMENT CABLES

PACKING, SHIPPING HANDLIG AND STORAGE PROCEDURES - INSTRUMENT CABLE

Document Number: 1725000275 -QC-PRO-00008

Document Class: 3

ROSETTI MARINO

1	APPROVED - WORK MAY PROCEED
2N	REVISE AND RE-SUBMIT - DO NOT PROCEED
2Y	REVISE AND RE-SUBMIT - WORK MAY PROCEED
3	REJECTED
4	APPROVAL NOT REQUIRED

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Sign	Date
Vincent Zwaan	18/03/2025

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1.2 TRANSPORTATION AND HANDLING 4

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2.2 BENDING RADIUS 4

2.3 PULLING STRENGHT 5

2.4 CABLE UNREELING 5

3 ANNEXE1 5

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PACKING, TRANSPORTATION, HANDLING, LAYING AND STORAGE OF CABLES

The cables, whether they are armoured or unarmoured , are manufactured with some high quality materials allowing long storage handling transport and unreeling subject to the following recommendations.

1 – TRANSPORTATION HANDLING AND STORAGE OF THE DRUMS

1.1 – Storage

Cables can be stored, in usual, on site temperature limits: -15°C to +60°C. The cables drums must be appropriately wedged and stored in a vertical position (never laid on flange) on a flat, dry and solid ground and in a covered place (applicable only for export project). They must be protected to avoid any mechanical risk and exterior shocks.
The original wooden lags have to be kept until the cable unreeling to ensure a good protection of the cable. The both ends of the cable (inner and outer end) have to be watertight in order to avoid penetration of water or humidity inside the cables. Thermo retractable polyethylene caps must be installed on the both ends.

1.2 – Transportation and handling

The wooden drums must be always carried vertically. They must be fixed and properly chocked with care on the vehicle, on the wagon and on the ship, in order to avoid any exterior chocs.
The unloading and the different handling will be done carefully with lifting equipments.

- In case of handling with a crane, an axle is used in crossing the drum center, lifted from both ends by two slings. It must have a length equal, at least, to the width of the drum. It is prohibited to put the slings on the lags,
- In case of handling with a forklift truck, the drum is put vertically with care on the forks,

Never let a drum fall during all kind of unloading and do not place any weight on the drums.
When the cables drums are arriving on site, they must be properly checked. The good order of the lagging and of the ends caps of the cables (a breaking of a wooden lag could tear the outer sheath of the cable).

1.3 – Rolling direction

If a drum has to be rolled, for transportation, it must be rolled “only” in the direction indicated by an arrow pointed on the flange of the drum: “do not roll the drum in the opposite direction arrow of the drum”.

2 – LAYING OF THE CABLES

2.1 – Laying temperature

The cables can be pulled at a minimum outer temperature of: -5°C, but with a slow and regular speed (about 20 m/mm) without shock. It is always necessary, before unreeling, to store the cables for at least 24 hours in a warmed room (about +10°).

2.2 – Bending radius

During the unreeling, the bending radius shall be, at least, “twice the static bending radius (as specified in our technical data sheets)”

2.3 – **Pulling strength**

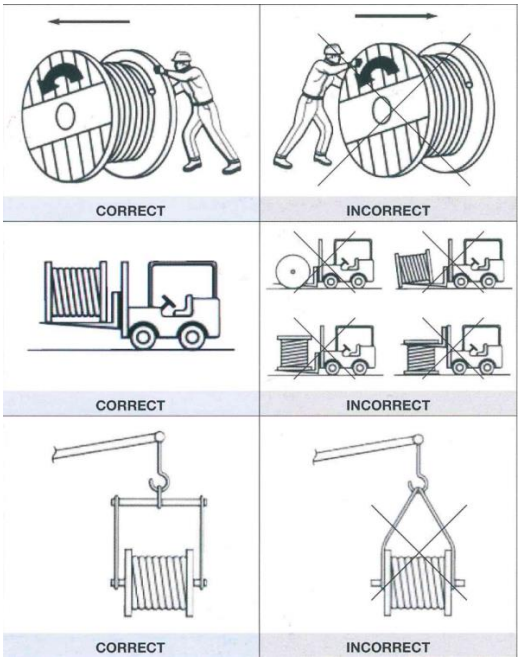
The pulling strengths exerted directly on the copper or aluminium cores of the cables should not exceed the values:

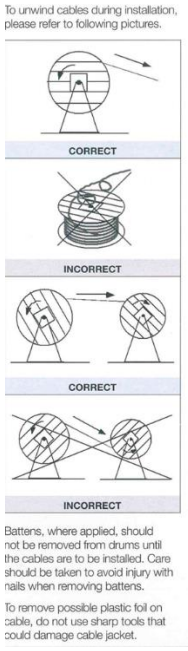
- 5 daN/mm² of cross section for copper conductors.
- 3 daN/mm² of cross section for aluminium conductors.

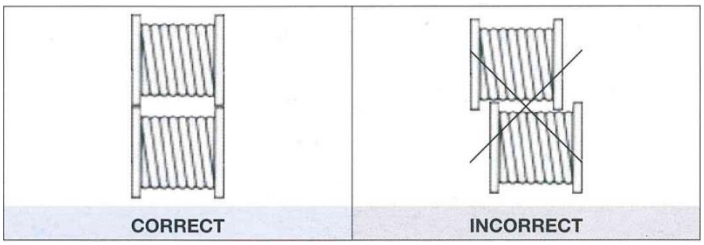
The pulling must be regular without shock and continuously checked by a dynamometer (especially in case of using a winch).

2.4 – **Cables unreeling**

The drum shall be settled on jacks by using a spindle through the central hole of the drum. The unreeling speed shall be monitored at a moment.
The cables must be unreeled "only in the opposite direction of the one indicated by an arrow" painted on the flange of the drum ("do not unreel the cable in the same direction of the arrow"). While unreeling, the cables shall not be twisted, waved or buckled.
The label, sticked on the flange, indicates the "correct unreeling method".
ANNEXE 1







Base Load Power Hub (BLPH)

INSTRUMENT CABLES

FAT PROCEDURE - INSTRUMENT CABLES

Document Number: 1725000275 -QC-PRO-00005

Document Class: 2

ROSETTI MARINO

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Sign	Date
V. Barratta	02-04-2025

01	14/03/2025	Accepted for Construction (AFC)	Fumagalli	Cucinotta	Messa
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FACTORY TEST PROCEDURES

Low Voltage Instrument Cables

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1 . Test Procedure for High Voltage test

1 SCOPE OF THE TEST

This test procedure details the test methods to verify the dielectric strength of the insulation of the finished instrumentation cables

2 NORMATIVE REFERENCES

IEC 60092-376

3 TEST EQUIPMENT

a. I05 - HV transformer 15Kv ac/100KVA Manuf. VNZ SIF MODEL 001/2011

b. Timer Chronometer Manuf. GEONAUTE SERIAL N° 13101

4 METHOD OF TESTING

4.1Method of Testing

The testing shall be carried out at ambient temperature.

Remove sufficient length of the outer jacket, armour and inner sheath from both end of the cable.

Connect the high voltage source to the conductor.

Connect amour, metallic screen to the ground.

Test voltage shall be applied between each conductor and the metallic sheath & the armour, if any.

4.2 Low Voltage cables

4.2.1 High voltage Test

Apply the 1.5 kV a.c. between each conductor and metallic screen & armour for 1 minutes.

4.2.1.1 Requirements

No breakdown of the insulation shall occur during the testing period.

(POINT 4 of the STANDARD IEC 60092-376)

4 Rated voltage

The standard rated voltage U_o/U (U_m) is as follows:

$$U_o/U\ (U_m) = 150\ V/250\ V\ (300\ V)\ a.c.$$

In the voltage designation of cables

U_o is the rated power-frequency voltage between the conductor and the earth or metallic covering for which the cable is designed;

U is the rated power-frequency voltage between conductors for which the cable is designed.

U_m is the maximum value of the highest system voltage for which the equipment may be used.

A d.c. voltage up to a maximum of 1,5 times the a.c. voltage may be used, provided that the voltage to earth does not exceed 250 V.

2. Test Procedure for Conductor Resistance

1 SCOPE OF THE TEST

This test procedure details the test methods to determine the DC resistance characteristics of the conductors and screens of the finished instrumentation cables

2 NORMATIVE REFERENCES

IEC 60092-376

3 TEST EQUIPMENT

I02 - Resistance measuring - Manufacturer FLUKE Model 8840A Serial 5256028.
Cert. Calibration N. RT05424 MTA

4 METHOD OF TESTING

Remove sufficient length of the outer jacket, armour and inner sheath from both end of the cable.
The insulation of the conductor has to be removed about 30mm from the end of the cable.
Connect the testing clamp of the resistomat to the both ends of the conductor.
Adjust suitable range for the same required value.
Adjust the cable temperature on the resistance-measuring unit for compensation at 20°C for manual measurement or connect the temperature sensor to the measuring unit for auto compensation.
Calculate the observed resistance value per kilometers by using the following formula:

$$R = \frac{R_1 \times 1000}{L} \text{ (ohm/Km)}$$

Where : R = Resistance per kilometers
R_1 = Measured Resistance
L = Length of the cable

5 REQUIREMENTS

As per relevant specifications.

Table 6 – Electrical resistance of conductors

	Class 2 Stranding		Class 5 Stranding	
Nominal cross-section	DC resistance of plain copper conductors	DC resistance of tinned copper conductors	DC resistance of plain copper conductors	DC resistance of tinned copper conductors
mm^2	Ω/km at 20°C	Ω/km at 20°C	Ω/km at 20°C	Ω/km at 20°C
0,50	40,4	41,6	41,4	42,5
0,75	26,0	26,3	27,6	28,3
1,00	19,2	19,3	20,7	21,2
1,50	12,8	12,9	14,1	14,5
2,50	7,86	8,02	8,47	8,71

3. Test Procedure for Insulation Resistance

1. TEST EQUIPMENT

1 . M E G A O H M E T R O
I03 - Manufacturer CHAUVIN ARNOUX Model CA6543 Serial 235837CMH
Cert. Calibration N. RT03807 MTA

2. METHOD OF TESTING

→ Connect the ' + ' lead of the megger to core and ' - ' lead to all other cores, metallic screen & armour.
→ Apply 500 V DC for 1 minute and measure the reading.

→ Calculate the observed insulation resistance value per kilometers by using the Following formula:

Ri = R1x L (MohmxKm)

Where Ri : Insulation resistance x kilometers
R1: Measured resistance Megaohm
L : Length of the cable kilometers

3. REQUIREMENT

→ Insulation resistance as per data sheet

Note: In the case of manual measurement, to calculate resistance at 20 deg.C, measured insulation resistance at ambient temperature shall be multiplied by the temperature correction factor of insulation material

Table 3 – Electrical requirements of insulation compounds

Designation of the insulating compound	EPR	HEPR	XLPE	HF90	S 95
Insulation resistance constant Ki (MΩ.km) (see 7.2 of IEC 60092-350:—)					
– at 20 °C, minimum,	3 670	3 670	3 670	550	1 850
– at maximum operating temperature, minimum.	3,67	3,67	3,67	0,55	1,85
Volume resistivity ρ(Ω.cm) (see 7.2 of IEC 60092-350:—)					
– at 20 °C, minimum,	$1,0 \times 10^{15}$	$1,0 \times 10^{15}$	$1,0 \times 10^{15}$	$1,5 \times 10^{14}$	$5,0 \times 10^{13}$
– at maximum operating temperature, minimum.	$1,0 \times 10^{12}$	$1,0 \times 10^{12}$	$1,0 \times 10^{12}$	$1,5 \times 10^{11}$	$5,0 \times 10^{10}$

4. Test procedure for mutual capacitance (Pairs/Triples)

1 SCOPE OF THE TEST

This test procedure details the test methods to determine the mutual capacitance characteristics of the finished instrumentation cables.

2 NORMATIVE REFERENCES

BS EN 50288.7
BS EN 50288.1
BS EN 50289.1.5 par. 4.3.2.1

3 TEST EQUIPMENT

I12 - Capacitance measuring equipment – LCR METER 1KHZ Manufact. HIOKI Model IM3523

serial number 230710207 Cert. Calibration N° RTR342597 ARO

4 METHOD OF TESTING

Remove sufficient length of the outer sheath, armour and inner sheath from both the end of the cable

The insulation of the conductors of the pairs/triples have to be removed about 30mm from the end of the cable

Connecting testing clamp at one pair/triple to one end of the cable, all others conductors and screen, if any, connected to earth .

Adjust suitable range for the same required value

Calculate the observed mutual capacitance value per kilometers by using the following

Formula:

$$C = \frac{Cmx1000}{L} \quad (\mu F/Km)$$

Where

C= mutual capacitance

Cm= measured capacitance in µF

L= Length of the cable in meters

5 REQUIREMENTS As per relevant specifications (APPROVED SPECIFICATION TO BE AVAILABLE DURING FAT)

Data Sheets approved available during FAT.

Note The value of mutual capacitance measured at ambient temperature shall be multiplied by the temperature correction factor

5. Test Procedure for Inductance (Pairs/Triples)

1 SCOPE OF THE TEST

This test procedure details the test methods to determine the inductance characteristics of the finished instrumentation cables.

2 NORMATIVE REFERENCES

BS EN 50288.7
BS EN 50288.1
BS EN 50289.1.12

3 TEST EQUIPMENT

I12 - Inductance measuring equipment – LCR METER 1KHZ Manufact. HIOKI Model IM3523

serial number 230710207 Cert. Calibration N° RTR342597 ARO

4 METHOD OF TESTING

Remove sufficient length of the outer sheath, armour and inner sheath from both the end of the cable.

The insulation of the conductors of the pairs/triples has to be removed about 30mm from both ends of the conductor.

Connecting testing clamp at one pair/triple to one end of the cable, on the other end the conductor are placed in short circuit .

Adjust suitable range for the same required value

Calculate the observed inductance value per kilometers by using the following Formula

$$L = \frac{Lm \times 1000}{Le} \quad (\text{Mh/Km})$$

Where L = Inductance

Lm= measured inductance in Mh

Le= Length of the cable in meters

5 REQUIREMENTS (APPROVED SPECIFICATION TO BE AVAILABLE DURING FAT)
Data Sheets approved available during FAT.

(POINT 7.6 of the standard IEC 60092-350)

7.6 Inductance to resistance ratio (control and instrumentation cables only)

The inductance-to-resistance ratio (L/R ratio) shall be calculated from measurements of inductance (L) made at 1 kHz on a total of at least two pairs, triples or quads that have been selected at random from the inner and outer layers and the d.c. resistance measured at 20 °C. The values obtained shall be recorded in the cable type-test report.

6. Determination Value of L/R Ratio Adjacent Cores

1 SCOPE OF THE TEST

This test procedure details the test methods to determine the value of the inductance to resistance ratio of adiacent cores (pais/triple) of the finished instrumentation cables.

2 NORMATIVE REFERENCES

IEC 60092-350

3 TEST EQUIPMENT

I12 - Inductance and resistance measuring equipment – LCR METER 1KHZ Manufact. HIOKI Model IM3523 serial number 230710207 Cert. Calibration N° RTR342597 ARO

4 METHOD OF TESTING

As per inductance and conductor resistance (Loop) of the pairs/triple

* Calculate the observed L/R ratio value

Formula $L/R = \frac{Lm \times 1000}{R1X2}$ (µH/ohm)

5 REQUIREMENTS (APPROVED SPECIFICATION TO BE AVAILABLE DURING FAT)

Data Sheets approved available during FAT. (POINT 7.6 of the standard IEC 60092-350)

7.6 Inductance to resistance ratio (control and instrumentation cables only)

The inductance-to-resistance ratio (L/R ratio) shall be calculated from measurements of inductance (L) made at 1 kHz on a total of at least two pairs, triples or quads that have been selected at random from the inner and outer layers and the d.c. resistance measured at 20 °C. The values obtained shall be recorded in the cable type-test report.

7. Test Procedure for Conductor examination

1. SCOPE OF THE TEST

This test procedure details the test methods to determine the diameter and number of copper wire in the conductors

2. NORMATIVE REFERENCE

IEC 60228

3 TEST EQUIPMENT

Vernier Caliper-> (digital 0÷150) Man. MARCALL Model 16ER Serial number 7101056465
Cert. Calibration N° II11
Calibrated with primary sample I13: Mitutoyo Type 611506-0,2/0,5 mm Serial number 960307
Cert. Calibration N°35069 LAT187

4 METHOD OF TESTING

Take a sample have length of 30 cm approximately.
The average of two measurements taken at right angles shall be taken as the diameter.
Average of three measurements at different places shall be considered as the diameter.
Measurement must be taken up to two decimal places to avoid any over usage of material
Count the number of wires / strands in the conductor

5 REQUIREMENTS

As per IEC 60092-350 (SEE POINT 4.2.3)

4.2.3 Class and form

The conductors considered in this standard are intended only for fixed installations and shall comply with class 2 or class 5 of IEC 60228. The minimum nominal conductor size depends on the voltage rating of the cable and shall be in accordance with Table 1.

Stranded copper class 2 conductors are recommended for general fixed-installation systems.

To aid installation, a conductor of class 5 may be used. Cables using class 5 conductors should not be regarded as suitable for repeated flexing in service.

Stranded circular non-compacted or compacted conductors are permitted for all cross-sections. Sector-shaped conductors are permitted for cross-sections of 10 mm^2 and above.

Table 1 – Minimum size of conductors

U	**Nominal cross-sectional area (Minimum)** mm^2
250 V	0,5
1 000 V	1,0
3 kV	10
6 kV	10
10 kV	16
15 kV	25
20 kV	35
30 kV	50

8. Test Procedure for Measurement of Thickness of Insulation and Sheaths

1 SCOPE OF THE TEST

This test procedure details the test methods to determine the insulation and the sheath thickness.

2. NORMATIVE REFERENCE

IEC 60811-201

3. TEST EQUIPMENT

3. Profile Projector –>II56 Optical Englander (20x) manuf. JVC Alpa TK-C700 E N° 1553454
Digital micrometers 0÷25 DIGITRIX N°399968-399978
Cert. Calibration N° II56
Calibrated with primary sample:I22 Mitutoyo Type Nominal accuracy : 7.983 mm
Cert. Calibration N°RTD26895

Vernier Caliper-> (digital 0÷150) Man. MARCALL Model 16ER Serial number 7101056465
Cert. Calibration N° II11
Calibrated with primary sample:I13 Mitutoyo Type 611506-0,2/0,5 mm Serial number 960307
Cert. Calibration N°35069 LAT187

4 METHOD OF TESTING

Prepare each test piece of insulation and sheaths in the form of a thin slice along a place perpendicular to the axis of the conductor or cable.
Place the test piece under the measuring equipment with the plane of the cut, perpendicular to the optical axis.
Make six measurements at 60° to each other.
If the inner profile of the sample is irregular or uneven take six readings radically at a position where the thickness is thinnest.
Take the reading in millimeter to two decimal places if the thickness is greater than 0.50 mm and to three decimal places if the thickness is less than 0.50 mm.
For the sheath direct over the insulation cores the number of readings shall be the same number of cores but limited to six measurements points.

5 REQUIREMENTS

As per IEC 60092-350(SEE POINT 4.3.3)

4.3.3 Insulation thickness

The thickness of insulation is specified for each size and type of cable in the applicable product standard.

For single core or multi-core cables, the thickness at any point may be less than the specified value, provided the difference does not exceed 0,1mm + 10 % of the specified value.

For single-unit or multi-unit cables, the thickness at any point may be less than the specified value, provided the difference does not exceed 0,1mm + 20 % of the specified value.

The thickness of any separator, screen or inorganic tape(s) applied over the conductor or over the insulation shall not be included in the thickness of insulation.

9. Test Procedure for Armour Wire / Tape Measurement

1. SCOPE OF THE TEST

This test procedure details the test methods to determine the diameter of galvanized steel wire for armour and thickness of aluminum/polyester tape.

2. NORMATIVE REFERENCE

BS EN 608111-1-1
BS EN 50288.7
BS EN 50288.1

3 TEST EQUIPMENT

Y Micrometer digital 0÷25 Man. Mytutoyo Model 293.265 Serial 6099146 ID 120
Cert. Calibration N° II08
Calibrated with primary sample I13: Mitutoyo Type 611506-0,2/0,5 mm Serial number 960307
Cert. Calibration N°35069 LAT187

4 METHOD OF TESTING

Take a sample have length of 30 cm approximately.
The average of two measurements taken at right angles shall be taken as the diameter of wire / width & thickness of tape.
Average of three measurements at different places shall be considered as the diameter of wire / width & thickness of tape.
Measurement must be taken up to two decimal places to avoid any over usage of material

5 REQUIREMENTS

As per relevant specifications (APPROVED SPECIFICATION TO BE AVAILABLE DURING FAT)
Data Sheets approved available during FAT.

10 – Title: Test Procedure of diameter under armour and overall

1. TEST EQUIPMENT

1. Vernier caliper

2. METHOD OF TESTING

→ Take a sample have length of 30 cm approximately.
→ The average of two measurements taken at right angles shall be taken as the diameter
→ Average of three measurements at different places shall be considered as the diameter
→ Measurement must be taken up to two decimal places to avoid any overusage of material

3. REQUIREMENT

→ As per relevant specification and data sheet.
Data Sheets approved available during FAT.(SEE BELOW POINTS of THE STANDARD IEC 60092-350

4.9 Outer sheath

4.9.1 Material

The sheath shall be selected from one of those listed in IEC 60092-360. The sheathing compound selected shall be compatible with the cable components with which it is in contact and compatible with the operating temperature of the cable.

4.9.2 Application

The outer sheath shall be extruded in one or more closely adherent layers. The outer sheath shall form a compact and homogeneous body and shall be so applied that it fits closely onto the underlying components.

It shall be possible to remove the outer sheath without damaging the underlying insulation and/or screen(s).

4.9.3 Thickness of outer sheath

The thickness of sheath for each size and type of cable shall be as specified in the applicable product standard.

Unless specified in the applicable product standard, the thickness at any point may be less than the specified value if any, providing the difference does not exceed 0,1 mm + 15 % of the specified value for sheaths applied on a smooth cylindrical surface, or 0,2 mm + 20 % of the specified value for sheaths applied on an irregular cylindrical surface.

11. Test Procedure for Hot Set Test

1. SCOPE OF THE TEST

This test procedure details the test methods to determine the max elongation under load and max permanent elongation after cooling of XLPE insulation.

2. NORMATIVE REFERENCE

IEC 60811-507

IEC 60092-360

IEC 60092-350

3 TEST EQUIPMENT

a. Heating Oven. 30°C ÷300°C Manuf. GALLI Model 2100 Serial N°2123
b. Calibrated weights Manuf. CIBE Serial N° B5608÷B5612 – Cert. Calibration N°041/10÷045/10
c. Sample holding fixture
d. Vernier Calliper (digital 0÷150) Man. Mytutoyo Model 500-181U Serial 206522 ID 123 Cert. Calibration N° RT07640 –e. Timer Chronometer Manuf. GEONAUTE SERIAL N° 13101
Cert. Calibration N° RT07564 MTA –
f. Temperature thermometer 0÷300°c – manuf. KAYE model Pt 50.4 Serial N°910908
Certificate Calibration LAT123 20-ST-2283

4 METHOD OF TESTING

Prepare dumbbell test pieces from XLPE insulation with thickness 0.8 to 2.00 mm.
Mark 20 mm gauge length in the center of the dumbbell. (L_1)
Suspend the sample in the oven with a weight of 20 N/cm2 at 200^0C for 15 minutes.
After the test duration of 15 minutes measure the length between the marks. (L_2)
Calculate the elongation, in percentage, under load as follows

$$\frac{L_2 - L_1}{L_1} \times 100$$

Remove the load from the test piece and keep in oven at same temperature for 5 minutes.
After 5 minutes, remove the sample from oven and allow to cool to room temperature.
After the sample attained to room temperature measure the lengths between the marks. (L3)
Calculate the elongation, in percentage, without load as follows

$$\frac{L_3 - L_1}{L_1} \times 100$$

5 REQUIREMENTS

The elongation under load shall not be more than 175%
The elongation without load shall not be more than 15%

12. Test Procedure for Flame Retardant & Fire Resistant

1 SCOPE OF TEST

This test procedure details the test methods to check if cable will pass test for Flame retardant & or Fire Resistant

2. NORMATIVE REFERENCE

IEC 60332.1.2 **-** IEC 60332.3.22 Flame retardant
IEC 60331.21 Fire Resistant

3. TEST EQUIPMENT

According to IEC 60332.1.2 for Flame Retardant

TEST EQUIPMENT

- A suitable three-sided metallic screen, with open front and closed top and bottom. The base shall be non-metallic
- A clamp suitable to fix the test sample of cables
- One gas burner

TEST SAMPLE

The test sample shall be a piece of the finished cable of cable 600 + - 25 mm long

FLAME CONDITION

When propane is used, the burner being regulated to give a flame approximately 175 mm Long with an inner blue cone approximately 55 mm long

TEST PROCEDURE

The sample shall be clamped at each end to position it vertically in the middle of a three-sided metallic screen and shall be adjusted so that the bottom of sample is approximately 50 mm from the base of the metallic screen.
The axis of the burner shall be at an angle of 45° to the axis of the sample.
The flame is applied for a continuos period of T seconds derived from Table 1:

Table 1 – Time for flame application

Overall diameter of test piece [a] mm	Time for flame application [b] s
$D \leq 25$	60 ± 2
$25 < D \leq 50$	120 ± 2
$50 < D \leq 75$	240 ± 2
$D > 75$	480 ± 2

[a] Where non-circular cables (for example, flat-form constructions) are to be tested, the circumference shall be measured and used to calculate an equivalent diameter, as if the cable were circular.

[b] For flat cables having a ratio of major to minor axis greater than 17:1, the flame application time remains under consideration.

TEST EVALUATION CRITERIA

After the burning has ceased, the surface of sample shall be wiped clean and the charred of affected portion shall not have reached 50 mm of the lower edge of the top clamp.

According to IEC 60331.21 For Fire Resistant

TEST EQUIPMENT

- A suitable chamber, of minimum volume 10 m³
- A source of heat comprising a horizontally mounted ribbon burner
- A sample supporting systems
- A test wall equipped with thermocouples for verification of the source of heat
- A continuity checking arrangement
- Fuses

TEST SAMPLE

A cable sample at least 4.5m long shall be available from the cable length for test. Each individual test specimen to be tested shall be a piece of cable, taken from the cable sample,
not less than 1200 mm long shall have approximately 100 mm of sheath or outer coverings removed at each end.
At each end of the cable, each conductor shall be suitably prepared for electrical connections, and the exposed conductors shall be spread apart to avoid contact with each other.

TEST CONDITIONS

- Flow rate (at reference conditions of 1 bar and 20°C)
- Propane: (5,0 ± 0,25) litres/minute
- Air: (80 ± 5) litres/minute
- Test temperature: 750 °C
- Voltage applied between the cores: 250 (300) V a.c.

TEST PROCEDURE

The test specimen shall be held horizontally by means of suitable supports at each end and securely clamped to prevent movement.
The middle portion of the test specimen shall be supported by two metal rings placed approximately 300 mm; these, as well as any other metal parts of the supporting systems, shall be earthed.
At the transformer end of the test sample, ground the neutral conductor and any protective conductors. Any metal screens, drain wire or metallic layer shall be interconnected and grounded. Where a metallic sheath, armour or screen acts as a neutral or protective conductor, it shall be connected as for a neutral or protective conductor.
Each phase conductor is connected to a separate phase of the transformer output by a 2A fuse.
For multicores ≥4, multipairs, and multitriads cables, the conductors have to be divided in groups and each group has to be connected to a separate phase of the transformer output with a 2 A fuse or circuit-breaker with equivalent characteristics in each phase.

Ignite the burner and adjust the propane and air flow rates to those obtained during the verification procedure (see IEC 60331-11).
Switch on the electricity supply and adjust the voltage to the rated voltage of the cable (subject to a minimum voltage of 100 V a.c.), i.e. the test voltage between conductors shall equal the rated voltage between conductors and the test voltage from conductors to earth shall equal the rated voltage from conductor to earth. In the case of single-core cables the voltage shall be applied between the conductor and the earthed supporting apparatus and earthed metallic covering, if present.
The test shall continue for the flame application for 3 hours, if not otherwise specified. After that the flame shall be extinguished but the cable sample shall remain energized for a further 15 min. The total test duration shall be the flame application time together with the 15 min cooling period.

TEST EVALUATION CRITERIA

The criteria for determining the point of failure shall be as follows:

. the voltage is not maintained during the test duration, as indicated by fuse failure
. a conductor rupture during the test duration, as indicated by the lamp extinguishing

FLEI s.r.l. IMQ CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2015 IQNET RECOGNIZED CERTIFICATION

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 424 / 2025

TEST REPORT: Testing document No.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev	10
Tipo di cavo e sezione Cable type and section	Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 2X2,5 - INSTRUMENT CABLE - Fire Resistant - Not I.S.	Job card	A57/2025
Norma di riferimento Ref. Standard/customer spec.	IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22		
Length mt.	510		
Drum No.	08-7897		

CARATTERISTICHE TECNICHE CONSTRUCTION CHARACTERISTICS							Richiesto Required	Riscontrato Tested
Conduttore Conductor	STRANDED plain/bare soft annealed copper wires	Classe Class	2	IEC 60228		Diametro Nominale Nominal Diameter	2,0 mm	2,0 mm
Isolamento Insulation	Mica/Glass Tape (MGT) plus XLPE	Colore Colour	Black NUMBERED (from 1 to 2)			Spessore Nominale Nominal Thickness	0,6 mm	0,8 mm
Schermatura totale Collective screen	polyester tape helically wound Thickness 0,025 mm (overlap > 25%) plus Aluminium /polyester tape Thickness 0,023 mm helically wound (overlap > 25%) plus polyester tape helically wound Thickness 0,025 mm	Drenaggio Drain wire	STRANDED TINNED COPPER size 0,5 sqmm(7X0,30 mm), in continuous contact with the shield			% copertura % coverage	100	> 100
Guaina interna Inner Sheath	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360 - Black	Spessore Medio Average Thickness	1,1 mm	Diametro Diameter	tolerance ± 10%	mm	10,3	10,5
Armatura Armouring	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)				Nominal Wire Diameter	mm	0,3	0,3
Guaina esterna *Overall sheath*	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360, moisture/abrasion/UV Resistant			Colore Colour	Orange	Spessore Medio Average Thickness	1,3 mm	1,3 mm
Diametro esterno Overall Diameter				Diametro Diameter	tolerance ± 10%	mm	14,1	14,6
Marcatura Marking/Printing	FLEI - 2X2,5 SQMM - MGT/XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - 2025 - CE PROGRESSIVE METER LENGTH PRINTING							

CARATTERISTICHE ELETTRICHE ELECTRICAL CHARACTERISTICS			Richiesto Required	Riscontrato Tested	PROVE DI TENSIONE VOLTAGE TEST Test eseguito in C.A. a 50 Hz Test performed in A.C. at 50 Hz	KV x min.	Risultato Result
Resistenza conduttore Conductor resistance	Ω/km a 20°C	≤	7,86	< 7,20	Tra conduttori Between conductors	1,5x5	OK
Resistenza isolamento a 500V Insulation resistance at 500V	MΩ x km@20°C	≥	1000	> 6600	Tra conduttori / Schermo Between Cores / Shield	1,5x5	OK
					Spark Test Isolamento IEC 62230 Insulation Spark Test	6 KV	OK
					Spark test guaina IEC 62230 Sheath Spark Test	10 KV	OK
					TEST DI CONTINUITA' CONTINUITY TEST		OK

INSTRUMENT LIST				
	x	**CODE I 23 and/or I02**	**TYPE : MULTIMETER**	**CODE I 05**
	x	**CODE I 03**	**TYPE : MEGAOHMETER**	**TYPE : HIGH VOLTAGE TEST BENCH**
	x	**CODE I 12**	**TYPE : LCR METER**	
	x	**CODE II 11**	**TYPE : DIGITAL CALIPER**	
	x	**CODE II 56 and/or II14**	**TYPE : PROFILE READER**	

Data: 14/03/2025
Date:

Il collaudatore:Giovanni Cucinotta
Quality Control

FLEI s.r.l. Quality Control

Il Collaudatore del Cliente:
Customer Quality Control:

Foglio: Page: 1 / 4

FLEI s.r.l.

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 425 / 2025

TEST REPORT: Testing document No.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev	20

Tipo di cavo e sezione Cable type and section	Cu Cl.2/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 1X2X0,75 - INSTRUMENT CABLE - Flame Retardant - Not I.S.
Job card	A57/2025
Norma di riferimento Ref. Standard/customer spec.	IEC 60332.1.2 - IEC 60332.3.22

Length mt.	775									
Drum No.	07-231									

CARATTERISTICHE TECNICHE CONSTRUCTION CHARACTERISTICS							Richiesto Required	Riscontrato Tested
Conduttore Conductor	STRANDED plain/bare soft annealed copper wires	Classe Class	2	IEC 60228		Diametro Nominale Nominal Diameter	1,1 mm	1,1 mm
Isolamento Insulation	XLPE	Colore Colour	White - Black			Spessore Nominale Nominal Thickness	0,5 mm	0,5 mm
Schermatura totale Collective screen	polyester tape helically wound Thickness 0,025 mm (overlap > 25%) plus Aluminium /polyester tape Thickness 0,023 mm helically wound (overlap > 25%) plus polyester tape helically wound Thickness 0,025 mm	Drenaggio Drain wire	STRANDED TINNED COPPER size 0,5 sqmm(7X0,30 mm), in continuous contact with the shield			% copertura % coverage	100	> 100
Guaina interna Inner Sheath	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360 - Black	Spessore Medio Average Thickness	1,0 mm	Diametro Diameter	tolerance ± 10%	mm	6,5	6,7
Armatura Armouring	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)				Nominal Wire Diameter	mm	0,2	0,2
Guaina esterna *Overall sheath*	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360, moisture/abrasion/UV Resistant			Colore Colour	Grey	Spessore Medio Average Thickness	1,1 mm	1,2 mm
Diametro esterno Overall Diameter				Diametro Diameter	tolerance ± 10%	mm	9,5	10,5
Marcatura Marking/Printing	FLEI - 1X2X0,75 SQMM - XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60332.1.2 - IEC 60332.3.22 - 2025 - CE PROGRESSIVE METER LENGTH PRINTING							

CARATTERISTICHE ELETTRICHE ELECTRICAL CHARACTERISTICS			Richiesto Required	Riscontrato Tested
Resistenza conduttore Conductor resistance	Ω/km a 20°C	≤	26	< 23,7
Capacità Capacitance	nF/Km	≤	150	68,8
Induttanza Inductance	mH/Km	≤	0,9	0,66
L/R	µH/ohm	≤	25	14,15
Resistenza isolamento a 500V Insulation resistance at 500V	MΩ x km@20°C	≥	1000	> 26000

PROVE DI TENSIONE VOLTAGE TEST			
Test eseguito in C.A. a 50 Hz Test performed in A.C. at 50 Hz	KV x min.	Risultato Result
Tra conduttori Between conductors	1,5x5	OK
Tra conduttori / Schermo Between Cores / Shield	1,5x5	OK
Spark Test Isolamento IEC 62230 Insulation Spark Test	5 KV	OK
Spark test guaina IEC 62230 Sheath Spark Test	9 KV	OK
TEST DI CONTINUITA' CONTINUITY TEST		OK

INSTRUMENT LIST				
	x	CODE I 23 and/or I02	TYPE : MULTIMETER	CODE I 05
	x	CODE I 03	TYPE : MEGAOHMETER	TYPE : HIGH VOLTAGE TEST BENCH
	x	CODE I 12	TYPE : LCR METER	
	x	CODE II 11	TYPE : DIGITAL CALIPER	
	x	CODE II 56 and/or II14	TYPE : PROFILE READER	

Data: 14/03/2025
Date:

Il collaudatore:Giovanni Cucinotta
Quality Control

FLEI s.r.l. Quality Control

Il Collaudatore del Cliente:
Customer Quality Control:

Foglio: Page: 2 / 4

FLEI s.r.l. — IMQ CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2015 — IQNET RECOGNIZED CERTIFICATION

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 426 / 2025

TEST REPORT: Testing document No.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev	30
Tipo di cavo e sezione Cable type and section	Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 1X2X0,75 - INSTRUMENT CABLE - Fire Resistant - Not I.S.	Job card	A57/2025
Norma di riferimento Ref. Standard/customer spec.	IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22		
Length mt.	309		
Drum No.	06-2693		

CARATTERISTICHE TECNICHE CONSTRUCTION CHARACTERISTICS							Richiesto Required	Riscontrato Tested
Conduttore Conductor	STRANDED plain/bare soft annealed copper wires	Classe Class	2	IEC 60228		Diametro Nominale Nominal Diameter	1,1 mm	1,1 mm
Isolamento Insulation	Mica/Glass Tape (MGT) plus XLPE	Colore Colour	White - Black			Spessore Nominale Nominal Thickness	0,5 mm	0,8 mm
Schermatura totale Collective screen	polyester tape helically wound Thickness 0,025 mm (overlap > 25%) plus Aluminium /polyester tape Thickness 0,023 mm helically wound (overlap > 25%) plus polyester tape helically wound Thickness 0,025 mm	Drenaggio Drain wire	STRANDED TINNED COPPER size 0,5 sqmm(7X0,30 mm), in continuous contact with the shield			% copertura % coverage	100	> 100
Guaina interna Inner Sheath	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360 - Black	Spessore Medio Average Thickness	1,1 mm	Diametro Diameter	tolerance ± 10%	mm	8,5	8,5
Armatura Armouring	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)				Nominal Wire Diameter	mm	0,2	0,2
Guaina esterna *Overall sheath*	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360, moisture/abrasion/UV Resistant			Colore Colour	Orange	Spessore Medio Average Thickness	1,2 mm	1,3 mm
Diametro esterno Overall Diameter				Diametro Diameter	tolerance ± 10%	mm	11,7	12,5
Marcatura Marking/Printing	FLEI - 1X2X0,75 SQMM - MGT/XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - 2025 - CE PROGRESSIVE METER LENGTH PRINTING							

CARATTERISTICHE ELETTRICHE ELECTRICAL CHARACTERISTICS			Richiesto Required	Riscontrato Tested
Resistenza conduttore Conductor resistance	Ω/km a 20°C	≤	26	< 23,7
Capacità Capacitance	nF/Km	≤	150	64,22
Induttanza Inductance	mH/Km	≤	0,9	0,62
L/R	µH/ohm	≤	25	13,34
Resistenza isolamento a 500V Insulation resistance at 500V	MΩ x km@20°C	≥	1000	> 5000

PROVE DI TENSIONE VOLTAGE TEST			
Test eseguito in C.A. a 50 Hz Test performed in A.C. at 50 Hz	KV x min.	Risultato Result
Tra conduttori Between conductors	1,5x5	OK
Tra conduttori / Schermo Between Cores / Shield	1,5x5	OK
Spark Test Isolamento IEC 62230 Insulation Spark Test	5 KV	OK
Spark test guaina IEC 62230 Sheath Spark Test	9 KV	OK
TEST DI CONTINUITA' CONTINUITY TEST		OK

INSTRUMENT LIST				
	x	CODE I 23 and/or I02	TYPE : MULTIMETER	CODE I 05
	x	CODE I 03	TYPE : MEGAOHMETER	TYPE : HIGH VOLTAGE TEST BENCH
	x	CODE I 12	TYPE : LCR METER	
	x	CODE II 11	TYPE : DIGITAL CALIPER	
	x	CODE II 56 and/or II14	TYPE : PROFILE READER	

Data: 14/03/2025
Date:

Il collaudatore:Giovanni Cucinotta
Quality Control

FLEI s.r.l. Quality Control

Il Collaudatore del Cliente:
Customer Quality Control:

Foglio: Page: 3 / 4

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 427 / 2025

TEST REPORT: Testing document Nr.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev Tested	From 10 to 30

Norma di riferimento *Ref. Standard/customer spec:*	IEC 60502.1 / IEC 60092.360

MATERIAL CERTIFICATE

MECHANICAL TEST

INSULATION XLPE	REQUIRED	**TESTED**
TENSILE STRENGHT	>12,5 N/mm²	15,3 N/mm²
ELONGATION AT BREAK	> 200 %	412%
AFTER AGEING (135° C x 168 hours)		
TENSILE STRENGHT	+/- 25 %	14,35 N/mm² (-6,2%)
ELONGATION AT BREAK	+/- 25 %	-7% (383,2%)
HOT SET TEST (200°C x 15 min.)	175%	75%
OVERALL SHEATH LSZH type SHF1	REQUIRED	**TESTED**
TENSILE STRENGHT	>9 N/mm²	12,8 N/mm²
ELONGATION AT BREAK	> 120 %	165%
AFTER AGEING (110° C x 168 hours)		
TENSILE STRENGHT	+/- 30 %	11,7% (-8%)
ELONGATION AT BREAK	+/- 30 %	156,8% (-5%)

TYPE TESTS	**TESTED**
FIRE RESISTANT TEST (IEC 60331.21)	OK : PASS
FLAME RETARDANT TEST (IEC 60332.1.2)	OK : PASS
FLAME RETARDANT TEST (IEC 60332.3 .22)	COMPLIANCE DECLARATION
ACID GAS GENERATION (IEC 60754.1/2)	COMPLIANCE DECLARATION
SMOKE DENSITY/LIGHT TRANSMITTANCE (IEC 61034.2 LT ≥ 60%)	COMPLIANCE DECLARATION
UV RESISTANCE TEST UL 2556 ex UL 1581 section 1200	COMPLIANCE DECLARATION
HAZARDOUS AREAS IEC 60079.14:2013 par. 9.3.2a / IEC 60079.14:2024 par. 7.4	COMPLIANCE DECLARATION

INSTRUMENT LIST	CODE I 04	TYPE : TENSOR CHECK PROFILE (DINAMOMETER)	
Data: 14/03/2025 Date:	Il collaudatore:Giovanni Cucinotta Quality Control	Il Collaudatore del Cliente: Customer Quality Control:	Foglio: Page: 4

FLEI srl
Via A. De Gasperi n. 82
20864 AGRATE B.ZA (MB) ITALY P. IVA IT09912870152

PACKING LIST n. 62

ORDINE n. 1725000275 123A90A 07/02/2025
ORDER PROJECT 123A90A BASE LOAD POWER HUB PLATFORM

Cliente
Customer ROSETTI MARINO SPA
VIA TRIESTE N. 230
48122 RAVENNA RA

N.of drum 3
Gross w. 405
Net weight 322
Volume 0,85

Consegna FRANCO ns. FABBRICA
Delivery

destinazione finale/final destination:
ROSETTI MARINO SPA YARD PIOMBONI VIA DEL MARCHESATO N. 37
48122 MARINA DI RAVENNA (RA)

ITEM TARIF : 8544 4995 0

COLLI PACKAGE		PESO WEIGHT kg		DIMENSIONE DIMENSION cm			VOLUME	CONTENUTO				
numero number	imballo packing	lordo gross	netto net	lunghezza leng.	larghezza width	altezza height	mt. cubi cubic mt.	Pos. item	quantità(km) quantity(km)	decrizione description		bob.nr. drum nr.
1	DRUM	182	147	86	56	86	0,41	10	0,510	CU CL2/MGT/XLPE/OS/LSZH/SWB/LSZH 2X2,5 150/250V ORANGE	1EQP151	08-7897
2	DRUM	140	114	76	48	76	0,27	20	0,775	CU CL2/XLPE/OS/LSZH/SWB/LSZH 1X2X0,75 150/250V GREY	1EQP151	07-231
3	DRUM	83	61	66	40	66	0,17	30	0,309	CU CL2/MGT/XLPE/OS/LSZH/SWB/LSZH 1X2X0,75 150/250V ORANGE	1EQP151	06-2693

COPPER CONDUCTOR

CAMBIAGO TRAFILERIE S.R.L.
Via Giovanni Pascoli 6, 20060 Basiano (MI) - Italy
Email: amministrazione@cambiagotrafilerie.it Pec: cambiagotrafilerie@legalmail.it

27/01/2025

DOCUMENTO DI TRASPORTO N. 64

Beni Viaggianti a Mezzo - Delivery or transport by
Vettore
Causale trasporto - Reason for Transport
Vendita

Spett.le - Messers
FLEI SRL

VIA DE GASPERI 82
20864 AGRATE BRIANZA (MB)

DESTINAZIONE MERCE - DESTINATION OF GOODS
FLEI SRL

VIA DE GASPERI 82
20864 AGRATE BRIANZA (MB)

Codice - Product Code	Descrizione Description	U.M.	Netti Net	Lordi Gross	N. Colli Pack
	-Ord. 250006 Vs Rif: 005 DEL 08/01/25				
7R037	TREFOLO RAME ROSSO SEZ. 0,75 MMQ BOBINA	KG	192	270	
BF630	BOBINA FERRO ø 630 MM	NR	1		
	-Ord. 250006 Vs Rif: 005 DEL 08/01/25				
7R043	CORDA RAME ROSSO SEZ. 1 MMQ	KG	708	853	
BF630	BOBINA FERRO ø 630 MM	NR	2		
	-Ord. 250018 Vs Rif: 14 DEL 13/01/25				
S030	FILO RAME STAGNATO DIAMETRO 0,30 MM	KG	392	422	
BPD250	BOBINA PLASTICA DIN D.250 MM	NR	15		
BANCALE80X120L	BANCALE DI LEGNO 80X120	NR	1		
BANCALE63X63L	BANCALE LEGNO PER BFD630	NR	1		
BANCALE80X80L	BANCALE DI LEGNO 80X80	NR	1		

FLEI s.r.l. Quality Control

FLEI ACCETTATO CON RISERVA

27 01 25

Aspetto Esteriore dei Beni Packing	N. Colli Package No	Peso KG Weight KG	Porto Delivery
A Vista	03	1545	Franco

Vettori - Forwarder	Data/Ora Ritiro-Departure Date and Time	Firma - Signatures
GELMI & ROMELLI AUTOTRASPORTI		

Beni Viaggianti a Mezzo - Delivery or transport by	Data/Ora Ritiro-Departure Date and Time	Firma Conducente - Driver's Signature
Vettore		

Annotazioni e Variazioni - Notes

Firma Destinatario - Consignee's Signature

IMBALLI IN PRESTITO D'USO Vi preghiamo di prendere nota che verranno fatturati se danneggiati e/o non resi entro 120 giorni

AFFINAZIONE E TRAFILERIA DI ARLUNO S.R.L.

Via Montenero 39, 20004 Arluno (MI)
CF / P.IVA / REA 01831360159 – Cap. versato € 1.000.000
Telefono 02/9017557
email info@traf-arluno.it – pec affinazioneetrafileriadiarluno@pec.it – sito web www.traf-arluno.it

TIPO DOCUMENTO
DOC.DI TRASPORTO

NUMERO 0001670 | DATA 28/11/2024 | PAGINA 1

Spettabile
FLEI srl
VIA DE GASPERI, 82

20864 AGRATE BRIANZA MB
DESTINAZIONE MERCE
IDEM

CODICE CLIENTE C000777 | PARTITA IVA 09912870152 | CODICE FISCALE 09912870152

ASPETTO DEI BENI	CAUSALE DEL TRASPORTO	TRASPORTO A CURA DEL	PORTO
BOBINE	VENDITA	Vettore	PORTO ASSEGNATO

RIF. VS/ORD. IN CORSO

ARTICOLO	DESCRIZIONE	Q.TA'/NR.	PESO LORDO KG.	PESO BANCALI KG.	PESO BOBINE KG.	PESO NETTO KG.
RIG.BOB	FILO RAME ROSSO mm. 0,53		3.970,00	30,00	683,00	3.257,00
AI630/P	BOBINA 630	6				
AIBANC/P	BANCALE SEMPLICE	6				
RIG.BOB	FILO RAME ROSSO mm. 0,67		4.327,00	35,00	715,00	3.577,00
AI630/P	BOBINA 630	7				
AIBANC/P	BANCALE SEMPLICE	7				
RIG.BOB	FILO RAME ROSSO mm. 0,85		324,00	5,00	111,00	208,00
AI630/P	BOBINA 630	1				
AIBANC/P	BANCALE SEMPLICE	1				
RIG.BOB	FILO RAME ROSSO mm. 1,05		3.710,00	35,00	724,00	2.951,00
AI630/P	BOBINA 630	7				
AIBANC/P	BANCALE SEMPLICE	7				
	Riepilogo Imballi:					
	21,000 x AI630/P					
	21,000 x AIBANC/P					
	TOTALI :		12.331,000	2.338,000		9.993,000

FLEI s.r.l. Quality Control

FLEI s.r.l. ACCETTATO CON RISERVA

28 11 24

VETTORE
GELMI & ROMELLI AUTOTRASP.di Taddei Marco snc
VIA GENERALE GIUSEPPE TREBOLDI, 71
25048 EDOLO BS

PARTITA IVA VETTORE
00558870986

ISCRIZIONE ALBO TRASPORTATORI
BS1300985B

DATA E ORA RITIRO
28/11/2024 11:00

FIRMA VETTORE

FIRMA MITTENTE

FIRMA CONDUCENTE

FIRMA DESTINATARIO

NOTE

INSULATION MATERIAL

padanaplast®
EXCELLENCE IN COMPOUNDING

Finproject S.p.A. Società soggetta all'attività di direzione e coordinamento di Eni S.p.A.
Società con socio unico.
Sede legale, via San Gabriele, 96 - 62010 Morrovalle (Macerata) - ITALIA
C.F. - P.IVA 01744770437 - Capitale Sociale 18.500.000,00 € i.v.
BU Compounding - Stabilimento produttivo di Roccabianca
Strada Paganina, 3 - 43010 Roccabianca (Parma) - ITALIA - Tel. +39 0521 5291 / Fax +39 0521 870427
info@padanaplast.com - www.padanaplast.com

Tel d'emergenza: +1-813-248-0585

DOCUMENTO DI TRASPORTO (D.P.R. 472/96 del 14/08/96) N. 1921 / DDT DEL 18-09-2024 Pag. 1

Consegnare a:	Spettabile:
FLEI S.R.L. VIA A.DE GASPERI,82 - AGRATE BRIANZA (MB) 20041 - AGRATE BRIANZA (MB) ITALIA	FLEI S.R.L. VIA A.DE GASPERI,82 20041 - AGRATE BRIANZA (MB) ITALIA

Informazioni aggiuntive Intestatario

Causale del trasporto	INCOTERM
Vendita	Trasp. pagato fino a ICC2020 AGRATE BRIANZA

Aspetto beni	Peso netto (kg)	Peso lordo (kg)	Colli	Shipping type
Visible	4100	4329,155	9	PARTIAL LOAD

U.M.	Quantità	Articolo	Vs. articolo	Nostro riferimento	Vostro riferimento	Scheda trasporto
KG	**100**	CATALYST MASTERBATCH CT/1 IN SACCHI DA 20 KG SU PALETTA DA 1000 KG CATALYST CT/1 *RC S20 P1000		1897/ORD del 05-09-2024	208 del 04-09-2024	2037/TO del 12-09-2024

Data consegna 18-09-2024

Lotti: RC2201490014253 - 100.000 KG

U.M.	Quantità	Articolo	Vs. articolo	Nostro riferimento	Vostro riferimento	Scheda trasporto
KG	**4.000**	POLIDAN EC/110 IN OCTABIN DA 500 KG SU PALETTA POLIDAN EC/110 *RC C500CNB8 SH P		1897/ORD del 05-09-2024	208 del 04-09-2024	2037/TO del 12-09-2024

Data consegna 18-09-2024

Lotti: RI2202486014199 - 4000.000 KG

FLEI s.r.l. Quality Control

FLEI s.r.l.
ACCETTATO CON RISERVA
DATA FIRMA
18 09 24

Proprietario merce,Committente,Caricatore Finproject spa Documento valido ai sensi DM 30.6.09 n. 554 (G.U. N. 153 del 4.7.09) e scheda di trasporto.

Vettore 1 DSV SPA	Data inizio trasporto 18-09-2024 Ora 10:35	Firma conducente
Container ID Seal number	Iscr. Albo Trasp. P.IVA 00891230153	
	Targa GH944A... Autista	Firma destinatario

Istruzioni per lo speditore Orari di scarico:
Lun 08.00 - 12.30 13.30 - 16.30
Mar 08.00 - 12.30 13.30 - 16.30
Mer 08.00 - 12.30 13.30 - 16.30
Gio 08.00 - 12.30 13.30 - 16.30
Ven 08.00 - 12.30 13.30 - 16.30

Compilato da / firma
jlenia.battagliola

INNER SHEATH

VIBIPLAST SRL
VIA MODIGLIANI, 12
20022 CASTANO PRIMO (MILANO) ITALIA

Tel. +39-0331/88 03 54 Fax +39-0331/88 15 93
Cap. Soc. € 312.000,00 I.V.
R.E.A. N. 1103104 MI
REG. IMPR. MILANO - C. F. - P. IVA 06496850154
e-mail vibiplast@vibiplast.it sito http://www.vibiplast.it

SEDE LEGALE
SPETT.LE / MESSRS. COD. CL000720

FLEI SRL

VIA DE GASPERI, 82
20864 AGRATE BRIANZA (MB)
ITALIA

SPEDIZIONE MERCI

FLEI SRL

VIA A. DE GASPERI, 82
20864 AGRATE BRIANZA (MB)
ITALIA

DOCUMENTO
D.D.T.

Numero	Data	Pag.
1.748	15/11/2024	1 / 1

CAUSALE DEL TRASPORTO	RESA	IMBALLO	Nr. COLLI	PESO Kg.
C/Vendita	FRANCO DESTINO	SACCONI	9	8.160,00

Codice	Descrizione	U.M.	Quantità
	Ordine Cl. num. 1599/2024/OR del 30/10/2024		
	Vs. num. 283 del 30/10/2024 Rif. Sig. Beretta		
HL312UVANTITOPOTB-NERO	HFFR TIPO: HL 312 / UV / ART / TB Nero - LOTTO 319	Kg	3.000,00
VB33ARTIC-N	PVC TIPO: VB-33 / ARTIC Naturale - LOTTO 0227824	Kg	460,00
VB33ARTIC-G7001	PVC TIPO: VB-33 / ARTIC Grigio 7001 - LOTTO 0229624	Kg	1.482,00
VB49ARTICUVANTITOPO-B5C	PVC TIPO: VB-49 / ARTIC / UV / ART Blu 5015 - LOTTO 0227924	Kg	966,00
VB49ARTICUVANTITOPO-G7C	PVC TIPO: VB-49 / ARTIC / UV / ART Grigio 7001 - LOTTO 0229724	Kg	2.090,00
	N.9 SACCONI A RENDERE		
	N.9 BANCALI		

FLEI s.r.l. Quality Control

Informativa ETICHETTATURA AMBIENTALE DEGLI IMBALLAGGI: https://www.vibiplast.it/msdscertificates

NOTE

TRASPORTO A CURA	INIZIO TRASPORTO	FIRMA CONDUCENTE	FIRMA DESTINATARIO
☐ MITTENTE ☐ DESTINATARIO ☒ VETTORE	DATA _____ ORA: _____		FLEI s.r.l. ACCETTATO CON RISERVA DATA 18-11-24 FIRMA

VETTORI (DITTA - DOMICILIO O RESIDENZA)	RITIRO	FIRMA VETTORE
AUTOTRASPORTI VIOLA DOMENICO VIA MORONI, 45 20022 CASTANO PRIMO (MI) **Tel. :** 0331/880685 **P. Iva :** 02026240156 **N° Iscr. Albo:**	DATA 15/11/24 ORA: 15.20	

BIANCHINI INGENIERO
MACCAFERRI

ARMDUR

Documento di Trasporto

(Art. 1, comma 3 DPR 14/08/96 n. 472)

8000379963

Data: 09.12.2024

Cliente: 101266
FLEI S.R.L.
VIA A. DE GASPERI 82
I-20864 AGRATE BRIANZA MB
Monza - Brianza - Italia
NIF: IT09912870152

Indirizzo di consegna: 101266
FLEI S.R.L.
VIA A. DE GASPERI 82
20864 AGRATE BRIANZA

Informazioni di Spedizione

Stabilimento:	VALLS
Tipo Trasp.:	Vendite Nazionali
Incoterms 2020:	C.P.T. - AGRATE BRIANZA
Peso Totale:	2.199,456 KG
Peso Netto:	2.016,000 KG
N° Colli:	2
Doc. SAP:	4904606234

Vettore/Spedizioniere: 214868
BOSATRANS, S.A.
ESA65251902
Nr. Trasporto: 94700

Pos.	Materiale/Definizione	Quantità	UM	Quantità UF		N° Colli:	Peso Kg
	enviar copia albaran y certificado de calidad por email						
	Ordine: 3181427290 del 04.12.2024 **Vs. Riferimento 325 del 04.12.2024**						
000010	345824 FILO ZN. RICOTTO 0,30 MM SPL DIN200	2.016,000	KG	2.016,000	KG	2	2.016,000

Quality Control

FLEI s.r.l. Quality Control

Inizio trasporto (Data e Ora) 09.12.2024 - __:__:__

FLEI s.r.l. ACCETTATO CON RISERVA

Firma del vettore:	**Firma del destinatario:** DATA 13-12-24 FIRMA

Osservazioni del destinatario

BIANCHINI INGENIERO MACCAFERRI

ARMOUR

Documento di Trasporto

(Art. 1, comma 3 DPR 14/08/96 n. 472)

8000381966

Data: 27.01.2025

Cliente: 101266
FLEI S.R.L.
VIA A. DE GASPERI 82
I-20864 AGRATE BRIANZA MB
Monza - Brianza - Italia
NIF: IT09912870152

Indirizzo di consegna: 101266
FLEI S.R.L.
VIA A. DE GASPERI 82
20864 AGRATE BRIANZA

Informazioni di Spedizione

Stabilimento:	VALLS
Caus. Trasp.:	Vendite Nazionali
oterms 2020:	C.P.T. - AGRATE BRIANZA
Peso Totale:	2.107,728 KG
Peso Netto:	2.016,000 KG
N° Colli:	2
Doc. SAP:	4904643463

Vettore/Spedizioniere: 214868
BOSATRANS, S.A.
ESA65251902
Nr. Trasporto: 95070

Pos.	Materiale/Definizione	Quantità	UM	Quantità UF		N° Colli:	Peso Kg
	enviar copia albaran y certificado de calidad por email						
	Ordine: 3181427543 del 20.01.2025 **Vs. Riferimento 24 del 20.01.2025**						
000010	345823 FILO ZN. RICOTTO 0,20 MM SPL DIN200	1.008,000	KG	1.008,000	KG		1.008,000
)20	347055 FILO ZN. RICOTTO 0,40 MM SPL DIN200	1.008,000	KG	1.008,000	KG		1.008,000

FLEI s.r.l. Quality Control

Inizio trasporto (Data e Ora) 27.01.2025 - __:__:__

Firma del vettore:

Firma del destinatario:

FLEI s.r.l. ACCETTATO CON RISERVA

Osservazioni del destinatario

DATA 29-01-25 FIRMA

OUTER SHEATH

VIBIPLAST SRL
VIA MODIGLIANI, 12
20022 CASTANO PRIMO (MILANO) ITALIA

Tel. +39-0331/88 03 54 Fax +39-0331/88 15 93
Cap. Soc. € 312.000,00 I.V.
R.E.A. N. 1103104 MI
REG. IMPR. MILANO - C. F. - P. IVA 06496850154
e-mail vibiplast@vibiplast.it sito http://www.vibiplast.it

SEDE LEGALE
SPETT.LE / MESSRS. COD. CL000720

FLEI SRL

VIA DE GASPERI, 82
20864 AGRATE BRIANZA (MB)
ITALIA

SPEDIZIONE MERCI

FLEI SRL

VIA A. DE GASPERI, 82
20864 AGRATE BRIANZA (MB)
ITALIA

DOCUMENTO
D.D.T.

Numero	Data	Pag.
1.070	26/06/2024	1 / 1

CAUSALE DEL TRASPORTO	RESA	IMBALLO	Nr. COLLI	PESO Kg.
C/Vendita	FRANCO DESTINO	SACCONI	4	4.072,00

Codice	Descrizione	U.M.	Quantità
	Ordine Cl. num. 967/2024/OR del 18/06/2024		
	Vs. num. 168 del 18/06/2024 Rif. Sig. Beretta		
HL312UVTB-A2003	HFFR TIPO: HL 312 / UV / TB Arancio 2003 - LOTTO 170-171	Kg	2.000,00
HL312UVTB-G7001	HFFR TIPO: HL 312 / UV / TB Grigio 7001 - LOTTO 170	Kg	2.000,00
	N.4 SACCONI A RENDERE		
	N.4 BANCALI		
	Chiusura per vacanze estive dal 08/08/2024 al 26/08/2024 compresi		
	Closed for Summer Holiday from 08/08/2024 to 26/08/2024 including		
	PER QUESTA FORNITURA VERRA' APPLICATO PAG + 30 GG		

FLEI s.r.l. Quality Control

Informativa ETICHETTATURA AMBIENTALE DEGLI IMBALLAGGI: https://www.vibiplast.it/msdscertificates

NOTE

TRASPORTO A CURA	INIZIO TRASPORTO	FIRMA CONDUCENTE	FIRMA DESTINATARIO
☐ MITTENTE ☐ DESTINATARIO ☒ VETTORE	DATA _____ ORA: _____		FLEI s.r.l. ACCETTATO CON RISERVA DATA 26/06/2024 FIRMA

VETTORI (DITTA - DOMICILIO O RESIDENZA)	RITIRO	FIRMA VETTORE
AUTOTRASPORTI VIOLA DOMENICO VIA MORONI, 45 20022 CASTANO PRIMO (MI) **Tel. :** 0331/880685 **P. Iva :** 02026240156 **N° Iscr. Albo:**	DATA 26/6/24 ORA: 9.15	

OUTER SHEATH

VIBIPLAST SRL
VIA MODIGLIANI, 12
20022 CASTANO PRIMO (MILANO) ITALIA

Tel. +39-0331/88 03 54 Fax +39-0331/88 15 93
Cap. Soc. € 312.000,00 I.V.
R.E.A. N. 1103104 MI
REG. IMPR. MILANO - C. F. - P. IVA 06496850154
e-mail vibiplast@vibiplast.it sito http://www.vibiplast.it

SEDE LEGALE
SPETT.LE / MESSRS. COD. CL000720

FLEI SRL

VIA DE GASPERI, 82
20864 AGRATE BRIANZA (MB)
ITALIA

SPEDIZIONE MERCI

FLEI SRL

VIA A. DE GASPERI, 82
20864 AGRATE BRIANZA (MB)
ITALIA

DOCUMENTO
D.D.T.

Numero	Data	Pag.
313	24/02/2025	1 / 1

CAUSALE DEL TRASPORTO	RESA	IMBALLO	Nr. COLLI	PESO Kg.
C/Vendita	FRANCO DESTINO	SACCONI	1	918,00

Codice	Descrizione	U.M.	Quantità
	Ordine Cl. num. 160/2025/OR del 30/01/2025 Vs. num. 41 del 30/01/2025 Rif. Sig. Beretta		
HL108UVULTB-A2003	HFFR TIPO: HL 108 / UV / UL / TB Arancio 2003 - LOTTO 052 INTRASTAT : 39013000 N.1 SACCONE A RENDERE N.1 BANCALE	Kg	900,00

FLEI s.r.l. Quality Control

Informativa ETICHETTATURA AMBIENTALE DEGLI IMBALLAGGI: https://www.vibiplast.it/msdscertificates

NOTE

FLEI s.r.l. ACCETTATO CON RISERVA

TRASPORTO A CURA	INIZIO TRASPORTO	FIRMA CONDUCENTE	FIRMA DESTINATARIO
☐ MITTENTE ☐ DESTINATARIO ☒ VETTORE	DATA _____ ORA: _____		DATA 25/02/2025 FIRMA

VETTORI (DITTA - DOMICILIO O RESIDENZA)	RITIRO	FIRMA VETTORE
AUTOTRASPORTI VIOLA DOMENICO VIA MORONI, 45 20022 CASTANO PRIMO (MI) **Tel. :** 0331/880685 **P. Iva :** 02026240156 **N° Iscr. Albo:**	**DATA** 24/2/25 **ORA:** 16.45	

COPPER CONDUCTOR

CAMBIAGO
TRAFILERIE

BOLLETTINO DI COLLAUDO
TEST REPORT

Ordine / Cliente: **ARCO CAVI GROUP S.R.L.**

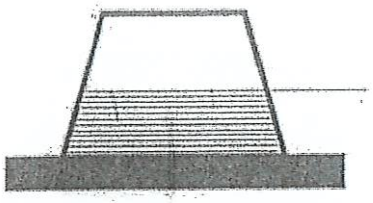
Prodotto: **TREFOLO DI RAME ROSSO 7 X 0,37**
D.D.T.: **64** Del: **27/01/2025**
Norma Applicata: **EN60228 REV. 2005**
Materiale: **CU ETP – UNI 1977 REV. 2000**
Quantità: **1 BOBINA DIN 630**
ORD.: 5 DEL 08/01/25

PARAMETRO	MIN	MAX
TREFOLO RAME ROSSO 7 X 0,37	RILEVATO	RILEVATO
SEZIONE MMQ	0.7523	0.7523
RESISTENZA ELETTRICA	23.07	23.07
PESO LINEARE KG / KM	6.6952	6.6952
ALLUNGAMENTO	22%	23%

FUEN S.r.l.
Quality Control

Responsabile Qualità:
GIANLUIGI BRUSAMOLINO

COPPER CONDUCTOR



- Fili - Trefoli - Corde - Piattine e barre di rame
- Catodi e pani rame
- Rottami e semilavorati metallI non ferrosi

AFFINAZIONE E TRAFILERIA DI ARLUNO S.R.L.

CAP. VERS. € 260.000,00 - C.C.I.A.A. MILANO REA 887717 - COD. FISC.-PART. IVA 01831360159
REGISTRO IMPRESE MILANO 88851/161555/3933/5

20010 ARLUNO (Milano) - Via Montenero, 39 - Tel. 02 9017557-8 - Fax 02 9017558
E-mail: info@traf-arluno.it - http: www.traf-arluno.it

Spett. le Flei

Arluno,

Quality statement (EN 10204 2.2)

DDT 1670

Semi-finished copper goods furnished to your company comply with UNI EN 1977:2013 - ASTM B 49 17 and EN 13602:2013 regulation.

Resistivity:	0,01759
Conductivity:	101 %

CHEMICAL COMPOSITION

Cu	99,974	Pb	0,0013
Se	0,0008	Sn	0,0009
Te	0,0008	Ni	0,0008
Bi	0,0001	Fe	0,0035
Co	0,0001	Si	0,001
Mn	0	Zn	0,0001
Sb	0,0005	Ag	0,011
As	0,0011	S	0,004

FLEI s.r.l. Quality Control

Elongation:	23-24 %
Tensile strenght:	≥ Kg. 22/mm²

Best regards,

Affinazione e Trafileria di Arluno

INSULATION MATERIAL

ORIGINAL

padanaplast®
EXCELLENCE IN COMPOUNDING

Finproject S.p.A. Società soggetta all'attività di direzione e coordinamento di Eni S.p.A.
Società con socio unico.
Sede legale, via San Gabriele, 96 - 62010 Morrovalle (Macerata) - ITALIA
C.F. - P.IVA 01744770437 - Capitale Sociale 18.500.000,00 € i.v.
BU Compounding - Stabilimento produttivo di Roccabianca
Strada Paganina, 3 - 43010 Roccabianca (Parma) - ITALIA - Tel. +39 0521 5291 / Fax +39 0521 870427
info@padanaplast.com - www.padanaplast.com

CERTIFICATE OF ANALYSIS

Insp. certificate "3.1" EN 10204

Customer

FLEI S.R.L.
VIA A.DE GASPERI , 82
20041 AGRATE BRIANZA MB
ITALIA

Customer Destination

FLEI S.R.L.
VIA A.DE GASPERI , 82
20041 AGRATE BRIANZA MB
ITALIA

Transport	2037 / TO	**Batch number**	RI2202486014199
Delivery note	1921 / DDT	**Order**	1897 / ORD
Shipping date	16-09-2024	**Customer ref.**	208

POLIDAN EC/110 IN OCTABIN DA 500 KG SU PALETTA

Batch number RI2202486014199 **/ Quantity** **4.000,000 KG**

Characteristics	Units	Value	Specification	Method
MFI 190°C/2,16kg *	g/10min	0,8	0,4 - 0,8	MA01
Specific gravity *	g/cm3	0,918	0,900 - 0,940	ASTM D792
Tensile Strenght *	N/mm2	23,4	>= 12,5	EN 60811
Elongation at break *	%	500	>= 250	EN 60811
H.S.T.200°C 20 N/cm2 all% *	%	60	<= 100	EN 60811
H.S.T. 200°C res%	%	0	-10 - 10	EN 60811
Production date	-	26-08-2024		

* MFI 190°C/2,16kg - (a) Test made on granules during production, without catalyst
* Specific gravity - (b) Test made on pressed plate, without catalyst
* Tensile Strenght - (c) Test made on extruded cable (97% graft + 3% catalyst CT1) crosslinked in water 2 hours 95°C.
* Elongation at break - (c) Test made on extruded cable (97% graft + 3% catalyst CT1) crosslinked in water 2 hours 95°C.
* H.S.T.200°C 20 N/cm2 all% - (c) Test made on extruded cable (97% graft + 3% catalyst CT1) crosslinked in water 2 hours 95°C.

Apparent defects or non compliance with Padanaplast technical specifications, shall be communicated to Padanaplast within 8 days from receipt of the goods (ref. General conditions of sale)

FLEI S.r.l. Quality Control

Supplier :

Finproject S.p.A. - BU Compounding - Stabilimento di Roccabianca
Società soggetta all'attività di direzione e coordinamento di Eni S.p.A.
Società con socio unico.
Strada Paganina 3, 43010 Roccabianca (Parma) - Italia
C.F. - P.IVA 01744770437 - Capitale Sociale 18.500.000,00 € i.v.

Approved by

Stefania Bolgarani
#Finproject S.p.A. - BU Compounding - Stabilimento di Roccabianca
Quality Control Laboratory Manager
Strada Paganina, 3
43010 Roccabianca (PR) Italy

Issued at ROCCABIANCA on 18-09-2024 13:09:27

INNER SHEATH

VIBIPLAST S.R.L.

CERTIFICATO DI ANALISI
INSPECTION CERTIFICATE (EN 10204-3.1)

DATA COMPILAZIONE : / *COMPILATION DATE :* 15/11/24

CLIENTE : / *CUSTOMER :*
FLEI S.r.l.
VIA ALCIDE DE GASPERI, 82
20864 AGRATE BRIANZA (MB)

MATERIALE TIPO : / *MATERIAL TYPE :* *HL 312 / UV / ART / TB*

COLORE : / *COLOUR :* ***NERO***

LOTTO N° : / *LOT No. :* ***3192024***

I VALORI RILEVATI DALLE NOSTRE PROVE DI CONTROLLO QUALITA' SONO I SEGUENTI :
THE VALUES MEASURED BY OUR QUALITY CONTROL TESTS ARE AS FOLLOWS :

PROVA TIPO *TEST*	METODO *METHOD*	UNITA' *UNIT*	PRESCRITTO / TOLLERANZA *VALUE / TOLERANCE*	RILEVATO *RESULT*	CONFORME A *IN ACCORDANCE WITH*
PESO SPECIFICO --- DENSITY	*CEI EN 60811-606*	*g/cm³*	*1.51 ± 0.03*	*1.53*	*Specifiche Vibiplast --- Vibiplast Specifications*

VIBIPLAST S.R.L.
CONTROLLO QUALITA' / *QUALITY CONTROL*

Vibiplast Laboratorio
Via Modigliani, 12 e 19
20022 - Castano Primo (MI) Italy
Tel. +39 0331 880354
E-mail : vibiplast@vibiplast.it

Mod. RQ-CQ-16/1 (15/02/21)

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Pensa all'ambiente prima di stampare questo documento.
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ARMOUR

BIANCHINI INGENIERO
MACCAFERRI

A. Bianchini Ingeniero S.A.
Gran Vial, 8 - Pol. Ind. C.I.V
08170 - MONTORNÉS DE VALLÈS
(BARCELONA) - ESPAÑA

DECLARACION DE CONFORMIDAD
DECLARATION OF COMPLIANCE

Tipo 2.1 s/EN 10204
Type 2.1 acc. EN 10204

AENOR ER Empresa Registrada ER-0185/1995 — IQNet

Cert. N°: 26629

Sold-to party	FLEI S.R.L.	Order	/ 3181427543 --- 24
Ship-to	FLEI S.R.L. VIA A. DE GASPERI 82 / 20864 AGRATE BRIANZA / IT	GI Doc. Date	8000381966 27/01/2025
Material	345823-WIRES ZND D0.20 SPL D200	Dlv.qty	1008-KG

Nombre de Producto/*Product Name*: **ALAMBRE / *WIRE* ZN**
Tipo de Producto/*Product Type*: **Clase D – RECOCIDO/ *Class D - ANNEALED***

Se declara que los productos entregados en este pedido son conformes con las siguientes características:
It is declared that the products delivered in this order are in conformity with the following characteristics:

Caracteristica / *Characteristic*	**Valores / *Values***	**Norma / *Standard***
Diámetro del alambre *Steel wire diameter*	0,20±0,015 mm	EN 10218-2
Resistencia a la tracción del alambre *Wire tensile strength*	330-450 MPa	EN 10218-1
Alargamiento *Elongation*	≥ 15 %	EN 10218-1
Protección a la corrosión del alambre *Wire corrosión protection*	Galvanizado/Galvanized	EN 10244-2
Masa de recubrimiento alambre *Wire mass coating*	≥ 15 g/m² (Clase / *Class D*)	EN 10244-2

Composición química según normas: EN 16120-1, -2
Chemical composition according to standards: EN 16120-1, -2

C %	Mn %	Si %	P %	S %		
≤ 0,1	0,30 - 0,60	≤ 0,30	≤ 0,035	≤ 0,035		

A. BIANCHINI INGENIERO S.A. · Alambres y sus Derivados · Gaviones Metálicos para Defensas Fluviales · Gran Vial, 8 (C.I.V) · MONTORNÉS DEL VALLÉS (BARCELONA)

FLEI s.r.l. Quality Control

Fdo. / *Sig.* Fortunato Nuño
Dpto. Calidad / *Quality Dept.*

ARMOUR

BIANCHINI INGENIERO
MACCAFERRI
A. Bianchini Ingeniero S.A.
Gran Vial, 8 - Pol. Ind. C.I.V
08170 - MONTORNÉS DE VALLÈS
(BARCELONA) - ESPAÑA

DECLARACION DE CONFORMIDAD
DECLARATION OF COMPLIANCE

Tipo 2.1 s/EN 10204
Type 2.1 acc. EN 10204

AENOR ER Empresa Registrada ER-0185/1995 — IQNet

Cert. N°: 26242

Sold-to party	FLEI S.R.L.	Order	/ 3181427290 --- 325
Ship-to	FLEI S.R.L. VIA A. DE GASPERI 82 / 20864 AGRATE BRIANZA / IT	GI Doc. Date	8000379963 09/12/2024
Material	345824-WIRES ZND D0.30 SPL D200	Dlv.qty	2016-KG

Nombre de Producto/*Product Name*: **ALAMBRE / *WIRE* ZN**
Tipo de Producto/*Product Type*: **Clase D – RECOCIDO/ *Class D - ANNEALED***

Se declara que los productos entregados en este pedido son conformes con las siguientes características:
It is declared that the products delivered in this order are in conformity with the following characteristics:

Caracteristica / *Characteristic*	**Valores / *Values***	**Norma / *Standard***
Diámetro del alambre *Steel wire diameter*	0,30±0,015 mm	EN 10218-2
Resistencia a la tracción del alambre *Wire tensile strength*	330-450 MPa	EN 10218-1
Alargamiento *Elongation*	≥ 15 %	EN 10218-1
Protección a la corrosión del alambre *Wire corrosión protection*	Galvanizado/Galvanized	EN 10244-2
Masa de recubrimiento alambre *Wire mass coating*	≥ 15 g/m² (Clase / *Class D*)	EN 10244-2

Composición química según normas: EN 16120-1, -2
Chemical composition according to standards: EN 16120-1, -2

C %	Mn %	Si %	P %	S %		
≤ 0,1	0,30 - 0,60	≤ 0,30	≤ 0,035	≤ 0,035		

FLEI s.r.l. Quality Control

A. BIANCHINI INGENIERO S.A. Alambres y sus derivados Gaviones Metálicos para Defensas Rígidas Gran Vial, 8 (C.I.V) MONTORNÉS DEL VALLÉS (BARCELONA)

Fdo. / *Sig.* Fortunato Nuño
Dpto. Calidad / *Quality Dept.*

OUTER SHEATH

VIBIPLAST S.R.L.

CERTIFICATO DI ANALISI

INSPECTION CERTIFICATE (EN 10204-3.1)

DATA COMPILAZIONE : 19/06/24
COMPILATION DATE :

CLIENTE :
CUSTOMER :
FLEI S.r.l.
VIA ALCIDE DE GASPERI, 82
20864 AGRATE BRIANZA (MB)

MATERIALE TIPO : *HL 312 / UV / TB*
MATERIAL TYPE :

COLORE : *GRIGIO 7001*
COLOUR :

LOTTO N° : *1702024*
LOT No. :

I VALORI RILEVATI DALLE NOSTRE PROVE DI CONTROLLO QUALITA' SONO I SEGUENTI :
THE VALUES MEASURED BY OUR QUALITY CONTROL TESTS ARE AS FOLLOWS :

PROVA TIPO *TEST*	METODO *METHOD*	UNITA' *UNIT*	PRESCRITTO / TOLLERANZA *VALUE / TOLERANCE*	RILEVATO *RESULT*	CONFORME A *IN ACCORDANCE WITH*
PESO SPECIFICO --- DENSITY	*CEI EN 60811-606*	*g/cm³*	*1.51 ± 0.03*	*1.52*	*Specifiche Vibiplast --- Vibiplast Specifications*

VIBIPLAST S.R.L.
CONTROLLO QUALITA' / *QUALITY CONTROL*

Vibiplast Laboratorio
Via Modigliani, 12 e 19
20022 - Castano Primo (MI) Italy
Tel. +39 0331 880354
E-mail : vibiplast@vibiplast.it

FLEI s.r.l. Quality Control

Mod. RQ-CQ-16/1 (15/02/21)

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OUTER SHEATH

VIBPLAST S.R.L.

CERTIFICATO DI ANALISI
INSPECTION CERTIFICATE (EN 10204-3.1)

DATA COMPILAZIONE : / *COMPILATION DATE :* 21/02/25

CLIENTE : / *CUSTOMER :*
FLEI S.r.l.
VIA ALCIDE DE GASPERI, 82
20864 AGRATE BRIANZA (MB)

MATERIALE TIPO : / *MATERIAL TYPE :* *HL 108 / UV – UL / TB*

COLORE : / *COLOUR :* ***ARANCIO 2003***

LOTTO N° : / *LOT No. :* ***0522025***

I VALORI RILEVATI DALLE NOSTRE PROVE DI CONTROLLO QUALITA' SONO I SEGUENTI :
THE VALUES MEASURED BY OUR QUALITY CONTROL TESTS ARE AS FOLLOWS :

PROVA TIPO / *TEST*	METODO / *METHOD*	UNITA' / *UNIT*	PRESCRITTO / TOLLERANZA — *VALUE / TOLERANCE*	RILEVATO / *RESULT*	CONFORME A / *IN ACCORDANCE WITH*
PESO SPECIFICO --- DENSITY	*CEI EN 60811-606*	*g/cm³*	*1.53 ± 0.03*	*1.54*	*Specifiche Vibiplast --- Vibiplast Specifications*

FLEI s.r.l. Quality Control

VIBIPLAST S.R.L.
CONTROLLO QUALITA' / *QUALITY CONTROL*

Vibiplast Laboratorio
Via Modigliani, 12 e 19
20022 - Castano Primo (MI) Italy
Tel. +39 0331 880354
E-mail : vibiplast@vibiplast.it

Mod. RQ-CQ-16/1 (15/02/21)

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ISO 9001:2015

List of Testing Equipment

Testing Equipment				
Description	Manufacturer/brand name	Model / Reference	Kind of tests performed / Validity	code
Dielectric Equipment ac 0 - 15KV 100KVA	VNZ Imp. SIF	001/2011	Voltage Test Validity 23/10/2026	I 05
Megahometro	Chauvin Arnoux	C.A 6543 N° 235837 CMH	Insulation Resistance Validity 25/07/2025	I 03
Multimeter	Burster	RESISTOMAT 2316 / 536171	Conductor resistance up to 35 sqmm Validity 27/10/2027	I 23
Michroohmmeter	Cropico	D05 N° 056329	Conductor Resistance more than 35 sqmm Validity 23/10/2026	I 18
Centesimal Digital Sliding Gauge	Marcall	16ER -710105646J 0-150mm	Diameter Measurement Validity 17/04/2025	II 11
Optical Englander with Micrometer Digital Gauge	Jvc - Alpa	N.399978-N.399968	Thickness Measurement Validity 10/04/2025	II 56
LCR Meter	HIOKI	LCR METER IM3523	Mutual Capacitance – L/R Ratio Validity 03/03/2027	I 12
Digital Thermometer	Vemer	VE 305 K -50°C +1000°C N° 903788	Temperature Measurement Validity 10/02/2026	II 64
Testing Machines	Gibitre	Tensor check profile – TCC2018070	Tensile Strenght / Elongation at Break Validity 03/03/2028	I 04
Digital Tester	Vemer	VE 125 N° 803592	Continuity Test Conductors and Screen	N.A.
Oven Natural Air Flow	Galli	2100 20°C – 300°C N° 21023	Material Ageing Hot Set test – Heat Shock Test	N.A.
Apparatus For Fire Resistance Test IEC 60331	Galbusera Attrezzature Tecniche Spec.	Art. N. 06.18.F1 N° 002567/12	Apparatus For Fire Alone at a Flame Temperature at least of 750°C	N.A.
Issued by : Quality Department	FLEI s.r.l. Quality Control			

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

DECLARATION OF CONFORMITY
DICHIARAZIONE DI CONFORMITA'
DÉCLARATION DE CONFORMITÉ

CLIENTE:
CUSTOMER :
KUNDE:
ACHETEUR:

ROSETTI MARINO

ORDINE:
PURCHASE ORDER :
AUFTRAG:
COMMANDE:

1725000275 123A90A

DESCRIZIONE CAVO:
CABLE DESCRIPTION :
BESCHREIBURG KABLE.
DESCRIPTION CABLE:

SEE PACKING LIST

TIPO E QUANTITA':
TYPE AND QUANTITY :
MENGE:
TYPE ET QUANTITE':

SEE PACKING LIST

Con il presente si attesta che sono state eseguite le prove di collaudo del materiale fornito a fronte dell'ordine di acquisto da Voi conferitoci. Visto l'esito delle prove suddette, si certifica che il materiale in oggetto è conforme alle seguenti prescrizioni:
We declare we tested the material we are supplying to you with reference to the purchase order You granted us. On the basis of the results of the tests, we are certifying that the material in object comply with the following regulations:
Wir erklären hiermit, dass die Prüfungen in Übereinstimmung mit den bestellten Waren durchgeführt wurden. Wir bescheinigen daher, dass die oben genannten Waren mit den folgenden Normen übereinstimmen:
Nous déclarons par la présente que des tests ont été effectués sur l'équipement fourni dans le cadre de votre bon de commande. Sur la base des résultats de ces essais, nous certifions que le matériel en question répond aux exigences suivantes :

X	**VOSTRE SPECIFICHE** YOUR SPECIFICATIONS IHRE ANGABE VOTRE SPECIFICATIONS	SPECIFICATIONS INCLUDED IN THE ORDER
X	**NORME** STANDARDS NORME STANDARDS	IEC 60092.376 - IEC 60331.21 – IEC 60332.1.2 – IEC 60332.3.22 IEC 60754.1/2 – IEC 61034.2 – IEC 60079.14 par.9.3.2a
X	**ALLEGATI** ATTACHEMENTS ANLAGE ANNEXES	TEST REPORT No.: 424÷427/2025

DATE 14/03/2025

Quality Control : Giovanni Cucinotta

FLEI s.r.l. Quality Control

PART 2 - CERTIFICATION DOSSIER

- TEST RECORD - FAT REPORT
- IRN

FLEI s.r.l. — IMQ CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2015 — IQNET RECOGNIZED CERTIFICATION

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 424 / 2025

TEST REPORT: Testing document No.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev	10
Tipo di cavo e sezione Cable type and section	Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 2X2,5 - INSTRUMENT CABLE - Fire Resistant - Not I.S.	Job card	A57/2025
Norma di riferimento Ref. Standard/customer spec.	IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22		
Length mt.	510		
Drum No.	08-7897		

CARATTERISTICHE TECNICHE CONSTRUCTION CHARACTERISTICS							Richiesto Required	Riscontrato Tested
Conduttore Conductor	STRANDED plain/bare soft annealed copper wires	Classe Class	2	IEC 60228		Diametro Nominale Nominal Diameter	2,0 mm	2,0 mm
Isolamento Insulation	Mica/Glass Tape (MGT) plus XLPE	Colore Colour	Black NUMBERED (from 1 to 2)			Spessore Nominale Nominal Thickness	0,6 mm	0,8 mm
Schermatura totale Collective screen	polyester tape helically wound Thickness 0,025 mm (overlap > 25%) plus Aluminium /polyester tape Thickness 0,023 mm helically wound (overlap > 25%) plus polyester tape helically wound Thickness 0,025 mm	Drenaggio Drain wire	STRANDED TINNED COPPER size 0,5 sqmm(7X0,30 mm), in continuous contact with the shield			% copertura % coverage	100	> 100
Guaina interna Inner Sheath	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360 - Black	Spessore Medio Average Thickness	1,1 mm	Diametro Diameter	tolerance ± 10%	mm	10,3	10,5
Armatura Armouring	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)				Nominal Wire Diameter	mm	0,3	0,3
Guaina esterna *Overall sheath*	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360, moisture/abrasion/UV Resistant			Colore Colour	Orange	Spessore Medio Average Thickness	1,3 mm	1,3 mm
Diametro esterno Overall Diameter				Diametro Diameter	tolerance ± 10%	mm	14,1	14,6
Marcatura Marking/Printing	FLEI - 2X2,5 SQMM - MGT/XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - 2025 - CE PROGRESSIVE METER LENGTH PRINTING							

CARATTERISTICHE ELETTRICHE ELECTRICAL CHARACTERISTICS			Richiesto Required	Riscontrato Tested	PROVE DI TENSIONE VOLTAGE TEST Test eseguito in C.A. a 50 Hz Test performed in A.C. at 50 Hz	KV x min.	Risultato Result
Resistenza conduttore Conductor resistance	Ω/km a 20°C	≤	7,86	< 7,20	Tra conduttori Between conductors	1,5x5	OK
Resistenza isolamento a 500V Insulation resistance at 500V	MΩ x km@20°C	≥	1000	> 6600	Tra conduttori / Schermo Between Cores / Shield	1,5x5	OK
					Spark Test Isolamento IEC 62230 Insulation Spark Test	6 KV	OK
					Spark test guaina IEC 62230 Sheath Spark Test	10 KV	OK
					TEST DI CONTINUITA' CONTINUITY TEST		OK

INSTRUMENT LIST				
	x	**CODE I 23 and/or I02**	**TYPE : MULTIMETER**	**CODE I 05**
	x	**CODE I 03**	**TYPE : MEGAOHMETER**	**TYPE : HIGH VOLTAGE TEST BENCH**
	x	**CODE I 12**	**TYPE : LCR METER**	
	x	**CODE II 11**	**TYPE : DIGITAL CALIPER**	
	x	**CODE II 56 and/or II14**	**TYPE : PROFILE READER**	

Data: 14/03/2025
Date:

Il collaudatore:Giovanni Cucinotta
Quality Control

FLEI s.r.l. Quality Control

Il Collaudatore del Cliente:
Customer Quality Control:

Foglio: Page: 1 / 4

FLEI s.r.l. — IMQ CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2015 — IQNET RECOGNIZED CERTIFICATION

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 425 / 2025

TEST REPORT: Testing document No.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev	20
Tipo di cavo e sezione Cable type and section	Cu Cl.2/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 1X2X0,75 - INSTRUMENT CABLE - Flame Retardant - Not I.S.	Job card	A57/2025
Norma di riferimento Ref. Standard/customer spec.	IEC 60332.1.2 - IEC 60332.3.22		
Length mt.	775		
Drum No.	07-231		

CARATTERISTICHE TECNICHE CONSTRUCTION CHARACTERISTICS							Richiesto Required	Riscontrato Tested
Conduttore Conductor	STRANDED plain/bare soft annealed copper wires	Classe Class	2	IEC 60228		Diametro Nominale Nominal Diameter	1,1 mm	1,1 mm
Isolamento Insulation	XLPE	Colore Colour	White - Black			Spessore Nominale Nominal Thickness	0,5 mm	0,5 mm
Schermatura totale Collective screen	polyester tape helically wound Thickness 0,025 mm (overlap > 25%) plus Aluminium /polyester tape Thickness 0,023 mm helically wound (overlap > 25%) plus polyester tape helically wound Thickness 0,025 mm	Drenaggio Drain wire	STRANDED TINNED COPPER size 0,5 sqmm(7X0,30 mm), in continuous contact with the shield			% copertura % coverage	100	> 100
Guaina interna Inner Sheath	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360 - Black	Spessore Medio Average Thickness	1,0 mm	Diametro Diameter	tolerance ± 10%	mm	6,5	6,7
Armatura Armouring	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)				Nominal Wire Diameter	mm	0,2	0,2
Guaina esterna *Overall sheath*	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360, moisture/abrasion/UV Resistant			Colore Colour	Grey	Spessore Medio Average Thickness	1,1 mm	1,2 mm
Diametro esterno Overall Diameter				Diametro Diameter	tolerance ± 10%	mm	9,5	10,5
Marcatura Marking/Printing	FLEI - 1X2X0,75 SQMM - XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60332.1.2 - IEC 60332.3.22 - 2025 - CE PROGRESSIVE METER LENGTH PRINTING							

CARATTERISTICHE ELETTRICHE ELECTRICAL CHARACTERISTICS			Richiesto Required	Riscontrato Tested
Resistenza conduttore Conductor resistance	Ω/km a 20°C	≤	26	< 23,7
Capacità Capacitance	nF/Km	≤	150	68,8
Induttanza Inductance	mH/Km	≤	0,9	0,66
L/R	µH/ohm	≤	25	14,15
Resistenza isolamento a 500V Insulation resistance at 500V	MΩ x km@20°C	≥	1000	> 26000

PROVE DI TENSIONE VOLTAGE TEST			
Test eseguito in C.A. a 50 Hz Test performed in A.C. at 50 Hz	KV x min.	Risultato Result
Tra conduttori Between conductors	1,5x5	OK
Tra conduttori / Schermo Between Cores / Shield	1,5x5	OK
Spark Test Isolamento IEC 62230 Insulation Spark Test	5 KV	OK
Spark test guaina IEC 62230 Sheath Spark Test	9 KV	OK
TEST DI CONTINUITA' CONTINUITY TEST		OK

INSTRUMENT LIST				
	x	CODE I 23 and/or I02	TYPE : MULTIMETER	CODE I 05
	x	CODE I 03	TYPE : MEGAOHMETER	TYPE : HIGH VOLTAGE TEST BENCH
	x	CODE I 12	TYPE : LCR METER	
	x	CODE II 11	TYPE : DIGITAL CALIPER	
	x	CODE II 56 and/or II14	TYPE : PROFILE READER	

Data: 14/03/2025
Date:

Il collaudatore:Giovanni Cucinotta
Quality Control

FLEI s.r.l. Quality Control

Il Collaudatore del Cliente:
Customer Quality Control:

Foglio: Page: 2 / 4

FLEI s.r.l. — IMQ CERTIFIED QUALITY MANAGEMENT SYSTEM ISO 9001:2015 — IQNET RECOGNIZED CERTIFICATION

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 426 / 2025

TEST REPORT: Testing document No.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev	30
Tipo di cavo e sezione Cable type and section	Cu Cl.2/MGT/XLPE/OS/LSZH/SWB/LSZH 150/250 V (300 V) 1X2X0,75 - INSTRUMENT CABLE - Fire Resistant - Not I.S.	Job card	A57/2025
Norma di riferimento Ref. Standard/customer spec.	IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22		
Length mt.	309		
Drum No.	06-2693		

CARATTERISTICHE TECNICHE CONSTRUCTION CHARACTERISTICS							Richiesto Required	Riscontrato Tested
Conduttore Conductor	STRANDED plain/bare soft annealed copper wires	Classe Class	2	IEC 60228		Diametro Nominale Nominal Diameter	1,1 mm	1,1 mm
Isolamento Insulation	Mica/Glass Tape (MGT) plus XLPE	Colore Colour	White - Black			Spessore Nominale Nominal Thickness	0,5 mm	0,8 mm
Schermatura totale Collective screen	polyester tape helically wound Thickness 0,025 mm (overlap > 25%) plus Aluminium /polyester tape Thickness 0,023 mm helically wound (overlap > 25%) plus polyester tape helically wound Thickness 0,025 mm	Drenaggio Drain wire	STRANDED TINNED COPPER size 0,5 sqmm(7X0,30 mm), in continuous contact with the shield			% copertura % coverage	100	> 100
Guaina interna Inner Sheath	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360 - Black	Spessore Medio Average Thickness	1,1 mm	Diametro Diameter	tolerance ± 10%	mm	8,5	8,5
Armatura Armouring	Galvanized Steel Wire Braid Armour (coverage ≥ 90%)				Nominal Wire Diameter	mm	0,2	0,2
Guaina esterna *Overall sheath*	Extruded LSZH Thermoplastic Compound (O.I. ≥ 30%), type SHF1 to IEC 60092.360, moisture/abrasion/UV Resistant			Colore Colour	Orange	Spessore Medio Average Thickness	1,2 mm	1,3 mm
Diametro esterno Overall Diameter				Diametro Diameter	tolerance ± 10%	mm	11,7	12,5
Marcatura Marking/Printing	FLEI - 1X2X0,75 SQMM - MGT/XLPE/OS/LSZH/SWB/LSZH - 150/250 V - IEC 60331.21 - IEC 60332.1.2 - IEC 60332.3.22 - 2025 - CE PROGRESSIVE METER LENGTH PRINTING							

CARATTERISTICHE ELETTRICHE ELECTRICAL CHARACTERISTICS			Richiesto Required	Riscontrato Tested
Resistenza conduttore Conductor resistance	Ω/km a 20°C	≤	26	< 23,7
Capacità Capacitance	nF/Km	≤	150	64,22
Induttanza Inductance	mH/Km	≤	0,9	0,62
L/R	µH/ohm	≤	25	13,34
Resistenza isolamento a 500V Insulation resistance at 500V	MΩ x km@20°C	≥	1000	> 5000

PROVE DI TENSIONE VOLTAGE TEST			
Test eseguito in C.A. a 50 Hz Test performed in A.C. at 50 Hz	KV x min.	Risultato Result
Tra conduttori Between conductors	1,5x5	OK
Tra conduttori / Schermo Between Cores / Shield	1,5x5	OK
Spark Test Isolamento IEC 62230 Insulation Spark Test	5 KV	OK
Spark test guaina IEC 62230 Sheath Spark Test	9 KV	OK
TEST DI CONTINUITA' CONTINUITY TEST		OK

INSTRUMENT LIST				
	x	CODE I 23 and/or I02	TYPE : MULTIMETER	CODE I 05
	x	CODE I 03	TYPE : MEGAOHMETER	TYPE : HIGH VOLTAGE TEST BENCH
	x	CODE I 12	TYPE : LCR METER	
	x	CODE II 11	TYPE : DIGITAL CALIPER	
	x	CODE II 56 and/or II14	TYPE : PROFILE READER	

Data: 14/03/2025
Date:

Il collaudatore:Giovanni Cucinotta
Quality Control

FLEI s.r.l. Quality Control

Il Collaudatore del Cliente:
Customer Quality Control:

Foglio: Page: 3 / 4

Via A. De Gasperi 82 Agrate Brianza – (MB) Italy

ATTESTATO DI COLLAUDO N° 427 / 2025

TEST REPORT: Testing document Nr.

Cliente Customer	ROSETTI MARINO	ORDINE N° Order No.	1725000275 123A90A
		Item/Rev Tested	From 10 to 30

Norma di riferimento *Ref. Standard/customer spec:*	IEC 60502.1 / IEC 60092.360

MATERIAL CERTIFICATE

MECHANICAL TEST

INSULATION XLPE	REQUIRED	**TESTED**
TENSILE STRENGHT	>12,5 N/mm²	15,3 N/mm²
ELONGATION AT BREAK	> 200 %	412%
AFTER AGEING (135° C x 168 hours)		
TENSILE STRENGHT	+/- 25 %	14,35 N/mm² (-6,2%)
ELONGATION AT BREAK	+/- 25 %	-7% (383,2%)
HOT SET TEST (200°C x 15 min.)	175%	75%
OVERALL SHEATH LSZH type SHF1	REQUIRED	**TESTED**
TENSILE STRENGHT	>9 N/mm²	12,8 N/mm²
ELONGATION AT BREAK	> 120 %	165%
AFTER AGEING (110° C x 168 hours)		
TENSILE STRENGHT	+/- 30 %	11,7% (-8%)
ELONGATION AT BREAK	+/- 30 %	156,8% (-5%)

TYPE TESTS	**TESTED**
FIRE RESISTANT TEST (IEC 60331.21)	OK : PASS
FLAME RETARDANT TEST (IEC 60332.1.2)	OK : PASS
FLAME RETARDANT TEST (IEC 60332.22)	COMPLIANCE DECLARATION
ACID GAS GENERATION (IEC 60754.1/2)	COMPLIANCE DECLARATION
SMOKE DENSITY/LIGHT TRANSMITTANCE (IEC 61034.2 LT ≥ 60%)	COMPLIANCE DECLARATION
UV RESISTANCE TEST UL 2556 ex UL 1581 section 1200	COMPLIANCE DECLARATION
HAZARDOUS AREAS IEC 60079.14:2013 par. 9.3.2a / IEC 60079.14:2024 par. 7.4	COMPLIANCE DECLARATION

INSTRUMENT LIST	CODE I 04	TYPE : TENSOR CHECK PROFILE (DINAMOMETER)	
Data: 14/03/2025 Date:	Il collaudatore:Giovanni Cucinotta Quality Control	Il Collaudatore del Cliente: Customer Quality Control:	Foglio: Page: 4

ROSETTI MARINO	RELEASE NOTE	Nr. RN-0275-FLE-02	Sheet 1 of 1
		Date 25/06/2025	Rev. 00

PROGETTO *Project*	CLIENTE *Client*	COMMESSA *Job*
HOLLANDSE KUST NOORD WIND PARK	CROSSWIND	*123A90*

FORNITORE *Vendor*	NUMERO D' ORDINE *Purchase Order No.*
FLEI	*1725000275*

Release Note	☐ FOR PAYMENT	☒ FOR SHIPMENT

RELEASE NOTE FOR PAYMENT

PO Art.	9. INVOICING & PAYMENT TERMS AND CONDITIONS

RELEASE NOTE FOR SHIPMENT

POS. Item	Q.TA' Quantity	DESCRIZIONE Description	Nr. TAG TAG No.	TIPO DI ISPEZIONE / Kind of Inspection	ESITO / Result
10	500	INSTRUMENT CABLE ml	SMICV12-2X2,5	NA	positive
20	750	INSTRUMENT CABLE ml	SMICV01-1X2X0,75	NA	positive
30	300	INSTRUMENT CABLE ml	SMICV08-1X2X0,75	NA	positive

Warehouse open Monday to Friday From 08.00 to12.00 and from 13.00 to 17.00.
Contact Mr Rota +39 3451608099

DOCUMENTI APPLICABILI / *APPLICABLE DOCUMENTS*

POSIZIONE *Items*	TIPO DI DOCUMENTO *Type of Document*	NUMERO DI DOCUMENTO *Document Number*	Rev.	COD. DI APPROV. *Approv. Code*

PUNCH LIST: ☐ SI / *YES* VEDI PUNCH LIST ALLEGATA N° / *REFER TO ATTACHED PUNCH LIST N°*
☒ NO/ *NO*

CONTROLLO VALIDITA' FIDEJUSSIONE ***/ PERFORMANCE or WARRANTY BOND expiration date check***
Estensione Fidejussione Richiesta *(Performance or Warranty Bond Extension of Validity required)*
☐ SI / *YES* ☒ NO/ *NO*
Acceptance Method: *Performance or Warranty Bond valid if actually delivery date it's not greater than two weeks from contractual delivery date.*

RELEASE NOTE

RISULTATO / *RESULT*	FORNITURA / *SUPPLY*	DISTRIBUZIONE A: / *DISTRIBUTION TO:*	
☒ POSITIVO / *POSITIVE*	☒ COMPLETA / *COMPLETE*	☒ Project Manager	☒ Administration
☐ NEGATIVO / *NEGATIVE*	☐ PARZIALE / *PARTIAL*	☒ Project Quality Manager	☒ Project Eng-/Procurement Coord
☐ PUNTI PENDENTI / *PUNCH-LIST*	☐ ULTIMA / *FINAL*	☐ Warehouse	☐ Supplier

NOTE / *NOTES*

Note:
Attached SCAN_20250313_091457007

L' INCARICATO */Person in charge* ROSETTI MARINO *Supply Management dept.*		IL RAPPR. DEL CLIENTE / *Client Representative*	IL FORNITORE */Vendor*	CONSTRUCTION MANAGER *Only requested for Punch List to be closed at Yard*
Nome Cognome *Name Surname*	**Firma** *Signature*			
Vincent Zwaan		N.A.	N.A.	N.A.

QUESTO DOCUMENTO NON SOLLEVA IL FORNITORE DALLA RESPONSABILITA' DI EVENTUALI DIFETTI E/O MALFUNZIONAMENTI RILEVATI DURANTE L'USO / *The present RELEASE NOTE does not relieve the Supplier of the responsibility of any possible defects and/or malfunctioning arising during the utilisation.*