CABLEL WIRES

HELLENIC WIRES INDUSTRY SINGLE MEMBER SOCIETE ANONYME

Your Winding **Partner**

Who we are

Cablel Wires S.A. is the sole manufacturer of enamelled wires in Greece

with an experience of more than fifty years, subsidiary of ElvalHalcor S.A., a leading Europe-based industrial group with global presence, active in the processing and trading of aluminium, copper and titanzinc products. The Company's broad product range is traded internationally under the Cablel Wires trademark. All Cablel Wires enamelled wires are manufactured and tested according to the IEC Standards. Cablel Wires enamelled wires can be produced to any recognised international standard upon request.

Technical know-how ensures that the Company's production facilities keep abreast of the ever changing technological advances within the industry. Cablel Wires continuously invests in manufacturing and testing equipment in order to maintain efficiency and keep pace with the latest production techniques.

Sales in more than 25 countries

State-of-the-art manufacturing facilities

50 years' experience

Commitment to sustainability

Applications

Automotive

Renewable Energy

Motors

Energy Distribution

Compressors

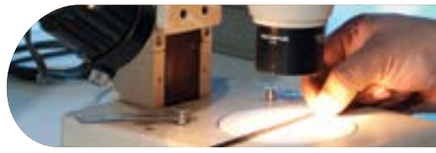
Tooling

White Goods

Industrial

Quality

The Company operates a certified Quality Management System in accordance with IATF 16949:2016 and ISO 9001:2015, while its plans include the implementation of a Total Quality Management System. Many of our products are recognized by UL and referred in E174088 file. The commitment to quality has enabled Cablel Wires to penetrate and establish a strong position in the highly competitive international marketplace. Cablel Wires enamelled wires have consolidated their reputation and are used worldwide in the most demanding electromechanical applications.
The Company's highly experienced technical and managerial personnel, through unwavering commitment to technological excellence and outstanding quality, ensures that the user of Cablel Wires makes a reliable and sustainable choice.



Sustainability

We aim to manage our business operations sustainably, maximising long-term value creation for all stakeholders. Our commitment to sustainability is reflected in our principles and corporate policies, and drives our business operations.
Focusing on product development and integration of new technologies for the benefit of the Company and society in general, on the adoption of strict standards for environmental protection and the promotion of Health and Safety in workplace, we demonstrate high level of responsibility towards our people, business partners, other stakeholders and the environment.
The strong management commitment is reflected in the Health and Safety Policy, which is implemented through Health and Safety Management System certified to international standards, OHSAS 18001:2007.
The Company implements Integrated Environmental Management Systems according to the international standard ISO 14001:2015 and ISO 50001:2018 for Energy Management System, which have been certified by independent, internationally recognized certification body.

CABLEL WIRES

Your Winding Partner

Our products

- Round enamelled copper wires
- Round enamelled aluminium wires
- Rectangular enamelled copper wires
- Copper welding wires

Round enamelled copper wires

INSULATION CLASSES

Cu-Round

The insulating materials are subdivided according to IEC Standards into insulating classes showing the corresponding maximum working temperature that must not be exceeded at any point of the winding. This table outlines the recognized insulation classifications

Insulation classifications acc. to IEC			
Class	Temperature		Type
	°C	°F	
E	120	248	ADOMIN®
B	130	266	ENOFLEX - B®
F	155	311	ENOFLEX - F®
H	180	356	ENOFLEX - 180®
H	180	356	ENOFLEX - H®
H	180	356	IDIOTHERM®
200	200	392	MEDIOTHERM® 200
220	220	428	POLITHERM®
H	180	356	ENOBOND 180®
H	180	356	IDIOBOND®
200	200	392	MEDIOBOND 200®

BARE CONDUCTOR CHARACTERISTICS

Copper Rod ETP-1 acc. to ASTM B-49

Sizes and tolerances according to IEC 60317-0-1 standards. The standard copper wire range goes from 0,07 mm up to 5,00 mm. Below are further annealed copper conductor characteristics.

COPPER CHARACTERISTICS (ANNEALED)		
DESCRIPTION	UNIT	PARTICULARS
Electric resistivity at 20°C	$\Omega mm^2/m$	0.017241
Temperature coefficient at 20°C	/°C	0.00394
Specific weight	gr/cm^3	8.89
Ultimate tensile strength	Kg/mm^2	22-30

Round enamelled copper wires

Category	**Transformers**	**Solderable**	**Solderable**	**Solderable**	**Solderable**
Type	**ADOMIN® ***	**ENOFLEX - B® ***	**ENOFLEX - F®**	**ENOFLEX - 180®**	**ENOFLEX - H®**
Standards	**IEC 60317-0-1, IEC 60317-12 NEMA MW 15-C**	**IEC 60317-0-1, IEC 60317-4 NEMA MW 2-C**	**IEC 60317-0-1, IEC 60317-20 NEMA MW 79-C**	**IEC 60317-0-1, IEC 60317-51 NEMA MW 82-C**	**IEC 60317-0-1, IEC 60317-23 NEMA MW 77-C**
Insulation Coatings	POLYVINYL ACETAL	POLYURETHANE 130	POLYURETHANE 155	POLYURETHANE 180	POLYESTERIMIDE SOLDERABLE
Dimensions Availability	0.60 - 5.00 mm 2L	0.07 - 1.40 mm L-2L	0.07 - 2.00 mm L-2L	0.07 - 2.00 mm L-2L	0.07 - 1.20 mm L-2L
Mechanical Properties	**for Ø 1.00**	**for Ø 0.25**	**for Ø 0.30**	**for Ø 0.30**	**for Ø 0.40**
Elongation	> 38%	> 25%	> 30%	> 30%	> 35%
Springiness	< 40	< 50	< 50	< 50	< 45
Adherence-Flexibility	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
Resistance to Abrasion	> 16.30N	> 6.10N	> 6.75N	> 6.75N	> 8N
Bonding Temp	-	-	-	-	-
Electrical Properties					
Breakdown Voltage	8 KV	7 KV	7 KV	7 KV	8 KV
Thermal Properties					
Temperature Index	120	130	155	180	180
Cut Through	2 min ≥ 170°C	2 min ≥ 170°C	2 min ≥ 200°C	2 min ≥ 230°C	2 min ≥ 300°C
Heat Shock	1d, 1/2h ≥ 155°C	1d, 1/2h ≥ 155°C	1d, 1/2h ≥ 175°C	1d, 1/2h ≥ 200°C	1d, 1/2h ≥ 200°C
Chemical Properties					
Solvent Test	6H	4H	4H	4H	3-4H
Solderability	-	375°C	390°C	390°C	470°C
Resistance to Refrigerants	FREON 12	-	-	-	-
Main Uses	Exceptional mechanical characteristics and very high resistance to transformer oils. Used primarily in dry or oil-immersed Transformers HT and LT	Suited to production systems with automated soldering equipment. Used in the manufacture of small motors, transformers, relays and magnet coils	Suited to production systems with automated soldering equipment. Used in the manufacture of small motors, transformers, relays and magnet coils.	Suited to production systems with automated soldering equipment. Used in the manufacture of small motors, transformers, relays and magnet coils	Typical applications: - transformers - motors - electromagnetic coils - transducers

(*) Upon request

Round enamelled copper wires

Category	**High-Temperature**	**High-Temperature**	**High-Temperature**	**Solderable & Bondable**	**Bondable**
Type	**IDIOTHERM® ***	**MEDIOTHERM® 200**	**POLITHERM®**	**ENOBOND 180®**	**IDIOBOND®**
Standards	**IEC 60317-0-1, IEC 60317-8 NEMA MW 30-C**	**IEC 60317-0-1, IEC 60317-13 NEMA MW 73-C, MW 35-C**	**IEC 60317-0-1, IEC 60317-7/26 NEMA MW 71-C**	**IEC 60317-0-1, IEC 60317-35**	**IEC 60317-0-1, IEC 60317-37**
Insulation Coatings	THEIC MODIFIED POLYESTERIMIDE	MODIFIED POLYESTER (IMIDE) WITH POLYAMIDE-IMIDE OVERCOAT	POLYIMIDE OR POLYAMIDE-IMIDE	POLYURETHANE 180 WITH A BONDING LAYER	THEIC POLYESTERIMIDE WITH A BONDING LAYER
Dimensions Availability	0.07 - 1.00 mm L 0.18 - 5.00 mm 2L	0.07 - 6.00 mm L 0.10 - 6.00 mm 2L	0.07 - 1.00 mm L 0.18 - 5.00 mm 2L	0.20 - 0.80 mm L-2L	0.20 - 1.20 mm L-2L
Mechanical Properties	**for Ø 1.00**	**for Ø 1.00**	**for Ø 1.00**	**for Ø 0.30**	**for Ø 0.30**
Elongation	> 38%	> 38%	> 38%	> 30%	> 30%
Springiness	< 40	< 40	< 40	< 55	< 55
Adherence-Flexibility	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
Resistance to Abrasion	> 14.90N	> 15.30N	> 10.80N	> 6.75N	> 7.50N
Bonding Temp	-	-	-	190°C	190°C
Electrical Properties					
Breakdown Voltage	10 KV	10 KV	10 KV	7 KV	8 KV
Thermal Properties					
Temperature Index	180	200, 210	220	180	180
Cut Through	2 min ≥ 300°C	2 min ≥ 360°C	2 min ≥ 400°C	2 min ≥ 230°C	2 min ≥ 300°C
Heat Shock	1d, 1/2h ≥ 200°C	1d, 1/2h ≥ 220°C	1d, 1/2h ≥ 240°C	1d, 1/2h ≥ 200°C	1d, 1/2h ≥ 200°C
Chemical Properties					
Solvent Test	5H	5H	5H	4H	4H
Solderability	-	-	-	390°C	-
Resistance to Refrigerants	FREON 12	HFC 134 - 404 - 407 FREON 12 - 22	HFC 134 - 404 - 407 FREON 12 - 22	-	-
Main Uses	Motor/generator windings of temperature index 180. Dry or oil immersed transformers. Good resistance to FREON 12	Motor/generator winding operating at very high temperature. Dry or oil-immersed transformers. Hermetic compressor motors and nuclear applications. Very high resistance to FREON 12-22, HFC 134-404-407 and transformer oil.	For applications requiring exceptional mechanical and thermal properties. Electric motor windings of class 220, nuclear and space applications. High resistance to FREON 12-22 and HFC 134-404-407	For self-supporting windings, avoids varnish impregnations. Suitable for TV deflection coils, small motors, magnetic relays.	For self-supporting windings. Avoids varnish impregnations. Suitable when high operating temperature is required.

(*) Upon request

Round enamelled copper wires

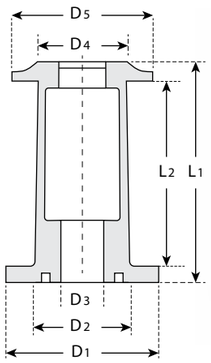
Category	**Bondable**
Type	**MEDIOBOND 200®**
Standards	**IEC 60317-0-1, IEC 60317-38 NEMA MW 102-C**
Insulation Coatings	MODIFIED POLYESTER (IMIDE) OVERCOATED WITH POLYAMIDE-IMIDE WITH A BONDING LAYER
Dimensions Availability	0.20 - 1.20 mm L-2L
Mechanical Properties	**for Ø 0.40**
Elongation	> 32%
Springiness	< 50
Adherence-Flexibility	EXCELLENT
Resistance to Abrasion	> 8.50N
Bonding Temp	190°C
Electrical Properties	
Breakdown Voltage	8 KV
Thermal Properties	
Temperature Index	200, 210
Cut Through	2 min ≥ 360°C
Heat Shock	1d, 1/2h ≥ 220°C
Chemical Properties	
Solvent Test	5H
Solderability	-
Resistance to Refrigerants	-
Main Uses	For self-supporting windings. Avoids varnish impregnations. Suitable when special thermal resistance is required.

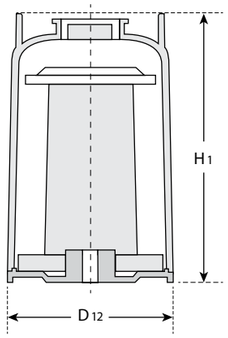
Standard diameters & tolerances

ACCORDING TO IEC 60317 - 0 -1					
NOMINAL CONDUCTOR DIAMETER	CONDUCTOR TOLERANCE ±	MINIMUM DIAMETER INCREASE		MAXIMUM OVERALL DIAMETER	
		Grade 1 (L)	Grade 2 (2L)	Grade 1 (L)	Grade 2 (2L)
mm	mm	mm	mm	mm	mm
0.071	0.003	0.007	0.012	0.084	0.091
0.080	0.003	0.007	0.014	0.094	0.101
0.090	0.003	0.008	0.015	0.105	0.113
0.100	0.003	0.008	0.016	0.117	0.125
0.112	0.003	0.009	0.017	0.130	0.139
0.125	0.003	0.010	0.019	0.144	0.154
0.140	0.003	0.011	0.021	0.160	0.171
0.160	0.003	0.012	0.023	0.182	0.194
0.180	0.003	0.013	0.025	0.204	0.217
0.200	0.003	0.014	0.027	0.226	0.239
0.224	0.003	0.015	0.029	0.252	0.266
0.250	0.004	0.017	0.032	0.281	0.297
0.280	0.004	0.018	0.033	0.312	0.329
0.315	0.004	0.019	0.035	0.349	0.367
0.355	0.004	0.020	0.038	0.392	0.411
0.400	0.005	0.021	0.040	0.439	0.459
0.450	0.005	0.022	0.042	0.491	0.513
0.500	0.005	0.024	0.045	0.544	0.566
0.560	0.006	0.025	0.047	0.606	0.630
0.630	0.006	0.027	0.050	0.679	0.704
0.710	0.007	0.028	0.053	0.762	0.789
0.750	0.008	0.030	0.056	0.805	0.834
0.800	0.008	0.030	0.056	0.855	0.884
0.850	0.009	0.032	0.060	0.909	0.939
0.900	0.009	0.032	0.060	0.959	0.989
0.950	0.010	0.034	0.063	1.012	1.044
1.000	0.010	0.034	0.063	1.062	1.094
1.060	0.011	0.034	0.065	1.124	1.157
1.120	0.011	0.034	0.065	1.184	1.217
1.180	0.012	0.035	0.067	1.246	1.279
1.250	0.013	0.035	0.067	1.316	1.349
1.320	0.013	0.036	0.069	1.388	1.422
1.400	0.014	0.036	0.069	1.468	1.502
1.500	0.015	0.038	0.071	1.570	1.606
1.600	0.016	0.038	0.071	1.670	1.706
1.700	0.017	0.039	0.073	1.772	1.809
1.800	0.018	0.039	0.073	1.872	1.909
1.900	0.019	0.040	0.075	1.974	2.012
2.000	0.020	0.040	0.075	2.074	2.112
2.120	0.021	0.041	0.077	2.196	2.235
2.240	0.022	0.041	0.077	2.316	2.355
2.360	0.024	0.042	0.079	2.438	2.478
2.500	0.025	0.042	0.079	2.578	2.618
2.650	0.027	0.043	0.081	2.730	2.772
2.800	0.028	0.043	0.081	2.880	2.922
3.000	0.030	0.045	0.084	3.083	3.126
3.150	0.032	0.045	0.084	3.233	3.276
3.350	0.034	0.046	0.086	3.435	3.479
3.550	0.036	0.046	0.086	3.635	3.679
3.750	0.038	0.047	0.089	3.838	3.883
4.000	0.040	0.047	0.089	4.088	4.133
4.250	0.043	0.049	0.092	4.341	4.387
4.500	0.045	0.049	0.092	4.591	4.637
4.750	0.048	0.050	0.094	4.843	4.891
5.000	0.050	0.050	0.094	5.093	5.141

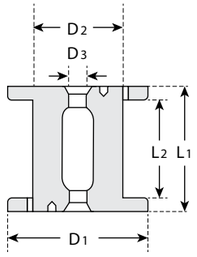
Packaging spools for CU rounds

CONICAL SPOOLS ACCORDING TO IEC 264 - 3										
Type of spool	Average content of wound wire (kg)	Dimensions (mm)								
		D_1	D_2	D_3	D_4	D_5	L_1	L_2	D_{12}	H_1
250/400	45	250	160	100	140	236	400	335	315	500
315/500	90	315	200	100	180	300	500	425	400	630
400/630	180	400	250	100	224	375	630	530	500	800
500/800	380	500	315	100	280	475	800	670	580	1000





CYLINDRICAL SPOOLS ACCORDING TO IEC 264 - 2							
Type of spool	Wire range (mm)	Average Content (kg)	Dimensions (mm)				
			Flange (D_1)	Barrel (D_2)	Bore (D_3)	Width (L_1)	Traverse (L_2)
160	0.07-0.15	6.5	160	100	22	160	128
200	0.16-0.56	11	200	125	22	200	160
250	0.63-1.90	20	250	160	22	200	160
355	2.00-5.00	40	355	224	36	200	160
500	2.00-5.00	100	500	315	36	250	180



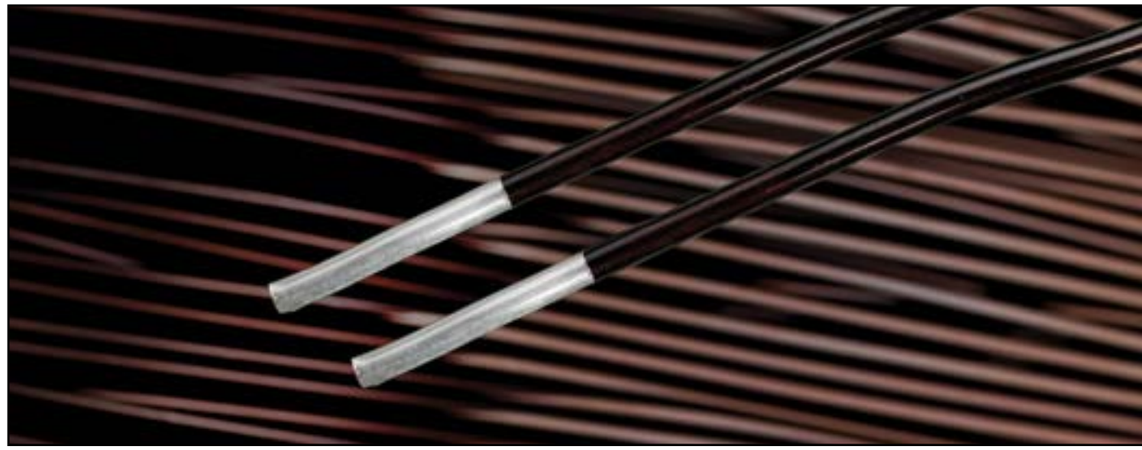
Round enamelled aluminium wires

BARE CONDUCTOR CHARACTERISTICS

Primary Aluminium Wire Rod EC GRADE

Sizes and tolerances according to IEC 60317-0-3 standards. The standard aluminium wire range goes from 1,00 mm up to 5,00 mm.

ALUMINIUM CHARACTERISTICS		
DESCRIPTION	UNIT	PARTICULARS
Nominal Electric resistivity at 20°C	$\Omega mm^2/m$	0.027894
Specific weight	gr/cm^3	2.7
Tensile strength	Mpa	80-95



Round enamelled aluminium wires

Type	MEDIOTHERM - 200®
Standards	**IEC 60317-0-3 IEC 60317-25 NEMA MW 73-A, MW 35-A**
Insulation Coatings	MODIFIED POLYESTER (IMIDE) WITH POLYAMIDE-IMIDE OVERCOAT
Dimensions Availability	1.00 - 5.00 mm L-2L *
Mechanical Properties	**for Ø 3.00**
Elongation	> 24%
Adherence-Flexibility	EXCELLENT
Electrical Properties	
Breakdown Voltage	GR 1 >3.0 kV GR2 >5.0 kV
Thermal Properties	
Temperature Index	200, 210
Heat Shock	220°C
Chemical Properties	
Solvent Test	5H
Resistance to Transformer Oil	VERY GOOD
Main Uses	Oil submerged or dry transformers, welding transformers, hermetic motors

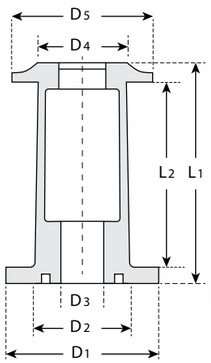
(*) For Dimensions below < 1.00 mm upon request

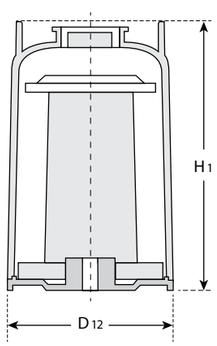
Standard diameters & tolerances

ACCORDING TO IEC 60317 - 0 -3					
NOMINAL CONDUCTOR DIAMETER	CONDUCTOR TOLERANCE ±	MINIMUM DIAMETER INCREASE		MAXIMUM OVERALL DIAMETER	
mm	mm	Grade 1 (L) mm	Grade 2 (2L) mm	Grade 1 (L) mm	Grade 2 (2L) mm
1.000	0.010	0.034	0.063	1.062	1.094
1.060	0.011	0.034	0.065	1.124	1.157
1.120	0.011	0.034	0.065	1.184	1.217
1.180	0.012	0.035	0.067	1.246	1.279
1.250	0.013	0.035	0.067	1.316	1.349
1.320	0.013	0.036	0.069	1.388	1.422
1.400	0.014	0.036	0.069	1.468	1.502
1.500	0.015	0.038	0.071	1.570	1.606
1.600	0.016	0.038	0.071	1.670	1.706
1.700	0.017	0.039	0.073	1.772	1.809
1.800	0.018	0.039	0.073	1.872	1.909
1.900	0.019	0.040	0.075	1.974	2.012
2.000	0.020	0.040	0.075	2.074	2.112
2.120	0.021	0.041	0.077	2.196	2.235
2.240	0.022	0.041	0.077	2.316	2.355
2.360	0.024	0.042	0.079	2.438	2.478
2.500	0.025	0.042	0.079	2.578	2.618
2.650	0.027	0.043	0.081	2.730	2.772
2.800	0.028	0.043	0.081	2.880	2.922
3.000	0.030	0.045	0.084	3.083	3.126
3.150	0.032	0.045	0.084	3.233	3.276
3.350	0.034	0.046	0.086	3.435	3.479
3.550	0.036	0.046	0.086	3.635	3.679
3.750	0.038	0.047	0.089	3.838	3.883
4.000	0.040	0.047	0.089	4.088	4.133
4.250	0.043	0.049	0.092	4.341	4.387
4.500	0.045	0.049	0.092	4.591	4.637
4.750	0.048	0.050	0.094	4.843	4.891
5.000	0.050	0.050	0.094	5.093	5.141

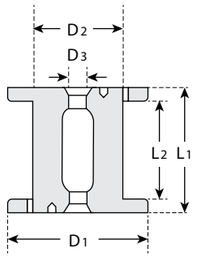
Packaging spools for AL rounds

CONICAL SPOOLS ACCORDING TO IEC 264 - 3										
Type of reel	Average content of wound wire (kg)	Dimensions (mm)								
		D_1	D_2	D_3	D_4	D_5	L_1	L_2	D_{12}	H_1
250/400	15	250	160	100	140	236	400	335	315	500
315/500	30	315	200	100	180	300	500	425	400	630
400/630	60	400	250	100	224	375	630	530	500	800
500/800	125	500	315	100	280	475	800	670	580	1000





CYLINDRICAL SPOOLS ACCORDING TO IEC 264 - 2							
Type of spool	Wire range (mm)	Average content of wound wire(kg)	Dimensions (mm)				
			Flange (D_1)	Barrel (D_2)	Bore (D_3)	Width (L_1)	Traverse (L_2)
250	1.00 -1.90	7	250	160	22	200	160
355	2.00-5.00	13	355	224	36	200	160
500	2.00-5.00	33	500	315	36	250	180

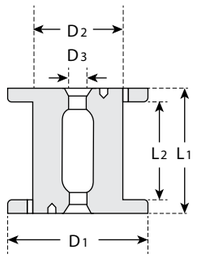


Rectangular enamelled copper wires

Type	MEDIOTHERM - 200®
Standards	**IEC 60317-0-2, IEC 60317-29**
Insulation Coatings	MODIFIED POLYESTER (IMIDE) WITH POLYAMIDE-IMIDE OVERCOAT
Dimensions Availability	Width: 3.15-20.00 mm Thickness: 1.00-4.50 mm
Mechanical Properties	
Elongation	> 32%
Adherence-Flexibility	EXCELLENT
Electrical Properties	
Breakdown Voltage	GR1 >1.5 kV GR2 >2.5kV
Thermal Properties	
Temperature Index	200
Heat Shock	220°C
Chemical Properties	
Solvent Test	4H
Resistance to Transformer Oil & Refrigerants	EXCELLENT
Main Uses	Oil submerged or dry transformers, welding transformers, hermetic motors

Packaging spools for CU rectangular

CYLINDRICAL SPOOLS ACCORDING TO IEC 264 - 2							
Type of spool	range of wire cross sectional areas (mm)	Average Content (kg)	Dimensions (mm)				
			Flange (D_1)	Barrel (D_2)	Bore (D_3)	Width (L_1)	Traverse (L_2)
355	3.00 - 80.00	50	355	224	36	200	160
500	3.00 - 80.00	110	500	315	36	250	180
630	3.00 - 80.00	250	630	315	125 (or 42)	230	180



Copper welding wires

CHARACTERISTICS

Cu ETP1

Dimensions Availability : 1,24 mm / 1,38mm / 1,50mm

COPPER CHARACTERISTICS (ANNEALED)		
Description	Unit	Particulars
Electric resistivity at 20°C	$\Omega mm^2/m$	≤ 0.01739
Electric conductivity at 20°C	$m/\Omega mm^2$	≥ 57.5
Elongation at fracture	%	22-28
Tensile Strength	N/mm^2	245-285
Diameter varation	mm	+0 -0,04

Packaging for copper welding wire

	Dimensions (mm)	Average Wire Content (Kg)
Cardboard	1100 x 1100 x 1180	1500
Cardboard on pallets	1100 x 1100 x 1350	

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DESIGNED BY web activities

CABLEL WIRES

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