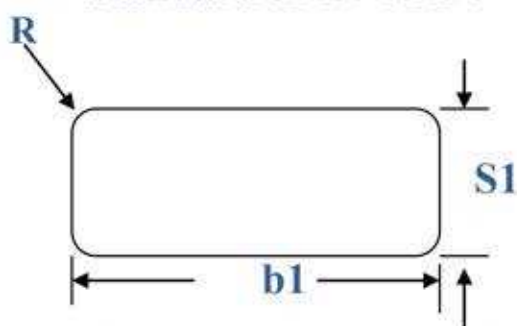


Tolerance of Dimensions and corner of rectangular wires Standard :DIN 46434



Tolerance of Dimensions of wire flat $S1, B1$

$b1, S1$	Tolerance
0.5 - 3.15	0.03
3.15 - 6.3	0.05
6.3 - 12.6	0.07
12.6 - 16	0.1

Standard: JIS C 3104 standard DIN 46434

Tolerance of radius (corner) of flat wires

$S1$	R	Tolerance
$\frac{b1}{2}$	$S \frac{1}{2}$	-
1 - 1.6	0.5 - 0.65	0.13
1.6 - 2.24	0.65 - 0.8	0.16
2.24 - 3.55	0.8 - 1	0.2
3.55 - 5.6	1	0.26

Flat wire as per standard of DIN 4643



Technical specification of copper wire

Electrical properties of copper

Conductivity at 20°C $> 58 \text{ m}/\Omega\text{mm}^2$
Specific resistance at 20°C $\leq 0.01724 \Omega\text{mm}^2/\text{m}$

Electrolyze copper Standard

ASTMB49	JIS C 3102	E-CUF20
BS6017	JIS 3104	
NF A51050		DIN1787

Mechanical characteristic of copper after annealing

	<u>Round Wire</u>	<u>Flat Wire</u>
Proof stress	$\text{RP.0.2} \leq 150 \text{ N/mm}^2$	$\leq 100 \text{ N/mm}^2$
Tensile strength	$200-270 \text{ N/mm}^2$	$200-270 \text{ N/mm}^2$
Elongation	$\leq 35\%$	$> 30\% \quad \underline{A}$

Technical specification of aluminum wire

Standard

E - AL
AL > 99.5%
DIN 1712

Electrical properties of Aluminum

Conductivity at 20°C $> 35.5 \text{ m}/\Omega\text{mm}^2$
Specific resistance at 20°C $< 0.02817 \Omega\text{mm}^2/\text{m}$

Mechanical properties of Aluminum wire

Proof stress	RP 0.2	$\text{N/mm}^2 \leq 60$
Tensile strength	RM	$60-100 \text{ N/mm}^2$
Elongation	A	$> 20\%$



Wire with KAPTON Insulation

APPLICATIONS: Transformers (Dry), Generators, Traction Electric Motors

STANDARD: IEC 317 – IEC 264

Thickness of Insulation(mm)		Normal Dimension of wire (mm)	Electrical properties	Thermal class °c	Type of insulation	Type of wire
two layers	one layer					
0.26 to 0.38	0.13-0.19	0.1-6	0.15mm(1fil lm) 4Kv – 5Kv	C(220°c)	Polyemid film with Teflon (pfe) adhesive	Round cross-Section Ø
0.26 to 0.38	0.13 to 0.19	2-88.5mm ² Thickness of wire (mm) 0.8-5.6 Width of wire (mm) 2-16	0.35mm(2fil lm) 8Kv – 10Kv	C(220°c)	Polymide film with Teflon (PFE) adhesive	Rectangular cross – Section □



Wire with KAPTON +Doglass or Fiber glass

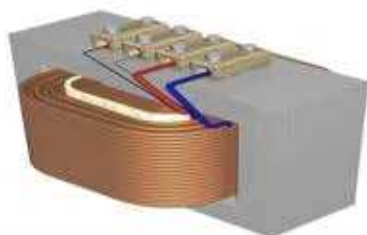
APPLICATIONS: Transformers (Dry) , Generators , Traction Electric Motors

Type if Insulation: one layer Kapton +two layers of Doglass or Fiber Glass
 Kapton + Adhasive
 Kapton + Lak + 1DGS +1Lack + 3La

STANDARD: DIN 46436 – DIN 40406 – GEN 754101 – TUN 901168

Test Standard :DIN 46416 Electrical Properties : >5KV Thermal class:C

Thickness of Insulation (mm)	Nominal Dimension of wire (mm)	Electrical properties	Thermal class °c	Type of insulation	Type of wire
0.26 to 0.45	0.1-6	> 5- KV	C(220°c)	PFE Polymide film with Teflon (pfe) adhesive+ 2 layers of daglass fiberglass	Round cross-Section 
0.26 to 0.45	2-88.5mm ² Thickness of wire (mm) 0.8-5,6 Width of wire (mm) 2-16	0.35mm(2film) 8Kv – 10Kv	C(220°c)	PFE Polymide film with Teflon (PFE) adhesive	Rectangular cross – Section 



Wire with Doglass-Glass Fiber Insulation

This Insulation is used in two ways:

Tape Glass-Twisted Glass Fiber-Type Glass

APPLICATIONS: These wires are used for the formation of windings for Electric Machines, Apparatus and Instruments, Traction Motors, Dry Transformers...etc.

STANDARD: DIN 46434 – JIS.C – 3206, C – 3207, C – 3104, IEC 2513

Thickness of Insulation (mm)	Nominal Dimension of wire (mm)	Electrical properties	Thermal Properties class °c	Type of insulation	Type of wire
0.1 - 0.4	Ød 0.9 - 5.2		C(220°c)		Round cross-Section Ø
0.22 - 0.3 (0.22) 0.28 - 0.32 (0.22)	Thickness of Side " a " 1-5 along the side " b " 2-12.5		C(220°c)	Glass Fiber Insulation Treated with Silicone Varnish for Adhesion and Impregnation	Rectangular cross-Section Ø
0.1 - 0.4	Thickness - 4 "a " 2.8 - 10 "b "	0.4 - 1.5 KV	C(220°c)	Heat -Resistance Enamel Insulation Subsequently Wound Fibers and Impregnated with heat - Resistance Varnish	Rectangular cross-Section Ø
0.1 - 0.4	Ød 0.8 - 6		C(220°c)	Glass Fiber Insulation Treated with heat-resistance Enamel and Impregnated with heat resistance varnish	Round cross-Section Ø
0.1 - 0.4	Ød 0.8 - 6		C(220°c)	Fiber Glass ,Mechanical Enamel	Round cross-Section بصورت گرد Ø



Wire with Insulation of MICA – POLYESTER + MICA

APPLICATIONS: These wires are used for the formation of windings for Electric Machines, Apparatus and Instruments, Traction Motors, Dry Transformers...etc.

STANDARD: IEC 851 – IEC 264 - JIS C3204 One Silk Layer- JIS C3284 One Cotton Layer- JIS C3206 covered with different type

Overlap %	Insulation class size (mm)	Electrical Properties	Thermal class °C	Type of insulation	Type of wire
33 - 50	one and two layers 0.19 – 0.85	Dielectric Ric Strenght V/μm	≥ F	Mica – Mica + Polyester	Round and Flat Ø 2 – 6 mm  5 – 60 mm



Wire with NOMEX Insulation

Applications: Transformers (Dry), Generators, Traction Electric Motors

STANDARD: BS 4653 – IEC 31727

	Heat Shock	Thickness of Insulation (mm) Insulation class size (mm)	Overlap %	Dimension of wire (mm) Rec. wires Cross - section (mm)	Electric al properti es (1 coat)	Ther mal class °C	Type of insulation	Type of wire
33	240°C	0.1-0.4	30 50 66	5 - 90mm ² Thickness (mm) 0.8 – 5.6 Width (mm) 2 – 16t 1.2 – 6 (mm)	Dielectri c Strenght V/μm 40	C	Aramid – paper aromatic polyemid	Rectangular cross – Section  Round Cross section 



Wire with Paper Insulation

APPLICATIONS : Electric Machine, Apparatus, Transformers, Chock, Oil Transformer

STANDARD: DIN 46434 – 46435 IEC 317 -27 BS 4653

Thickness of Insulation(mm)	Nominal Dimension of Wire (mm)	3P Electrical properties	Thermal class °C	Type of insulation	Type of wire
Based on number of layer is variable.	0.4 – 6	Based on number of layer is variable	F	PAPER	Round cross - section Ø
<u>30 (mm²) - to</u> <u>Min</u> <u>Max</u> 0.14 0.45					
<u>30 (mm²) - over</u> <u>Min</u> <u>Max</u> 0.45 0.5	2 – 120 (mm ²)	Baese d on number of layer is variable	F	PAPER	Rectangular cross - Section ⏏

