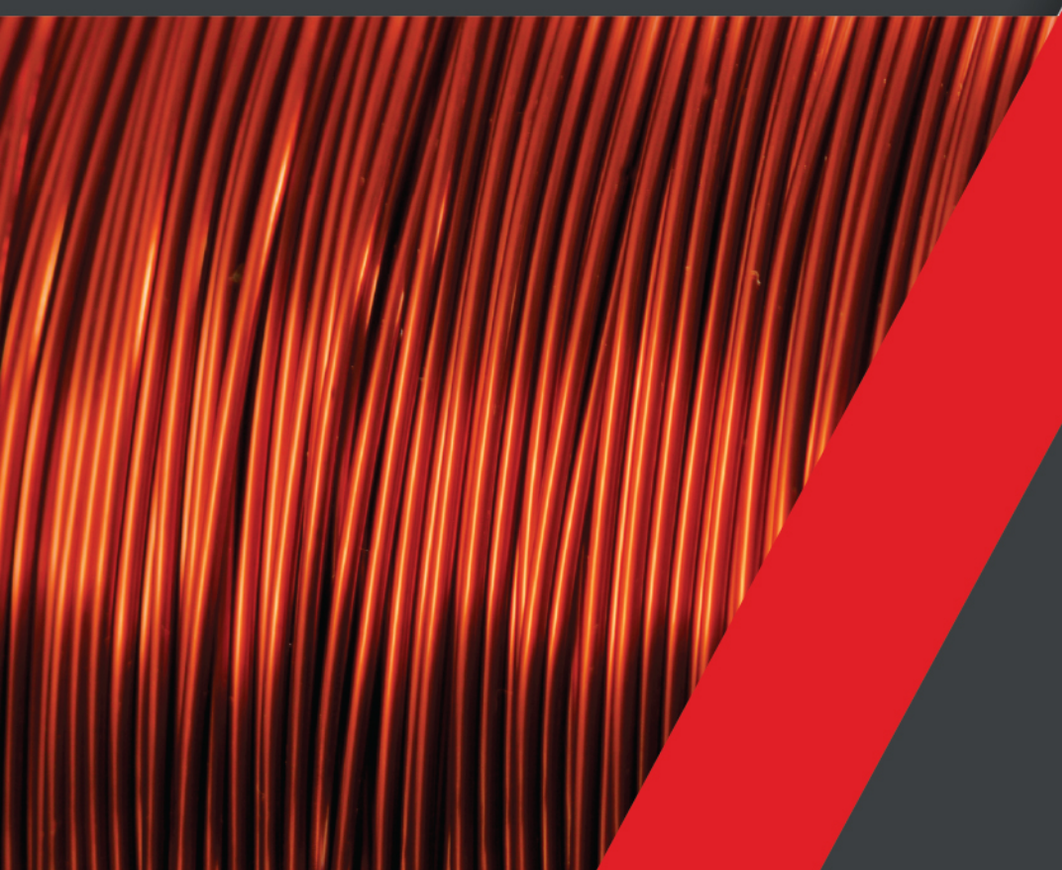
GIZA CABLE INDUSTRIES
الجيـزة لصنـــاعة الكـــابلات

ENAMELED WIRES

TECHNICAL CATALOGUE



COPPER & ALUMINUM ROUND ENMELLED WIRE

INNOVATING
FOR A SAFER WOLRD

www.gc-3.com

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Introduction

Copper & Aluminum Round Enmelled Wire

Our History

1993: Giza Telephone Cables GTC was established.

Telephone cable production started with a capacity of 1.2mil. pair/km

1994: Telephone cables production capacity increased to 1.5mil. pair/km

1997: Enameled wires division inaugurated with a capacity of 2500MT/year.

1998: Building wires division inaugurated with a capacity of 5000MT/year.

2001: Building wires division capacity expanded to 25,000MT/year for copper

and aluminum to 30,000MT/year.

2004: Enameled wires division increased its capacity to 5,000MT/year

and expanded the Telephone cables division's output to reach 2.4mil. pair/km

2007: The company name changed from GTC to Giza Cable Industries GC3.

2010: The power cables division was inaugurated with a production capacity of 20,000MT/year.

2011: The contracting services for LV, MV, HV & EHV, and Telecom networks were launched.

2013: Medium voltage cables up to 36kV production started.

2016: The production of underground power cables up to 132kV has started.

2020: The Enameled wire division has expanded to 7,500MT/year and aluminum

was added

to the range of products.

2022: The new LED lighting factory was inaugurated.

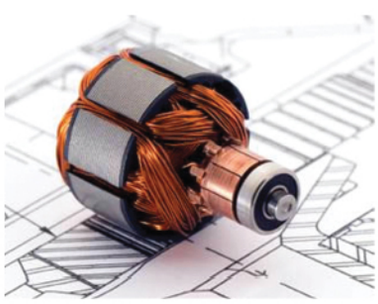
What is Copper & Aluminum Round Enmelled wire:

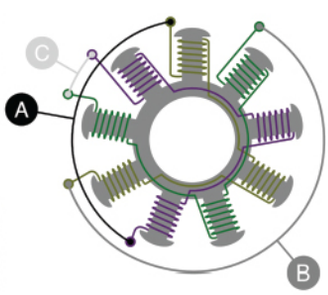
Wire for winding used in electrical equipment is generally called magnet wire. Simply put, “Magnet wire is used for interchanging electrical energy with magnetic energy”. Magnet wires are broadly divided into enamelled wire (coating insulation), covered conductor wire (fiber/film insulation), other specially formulated wire, and combinations thereof.

Both type and performance of magnet wire are quite varied. The following are the most important features of magnet wire:

(a) Small and uniform insulation thickness
(b) Good electrical characteristics such as dielectric strength and insulation resistance
(c) Tough coating, resistant to external forces such as bending, stretching and friction
(d) Heat-resistance
(e) Resistant to solvents, chemicals and varnishes
(f) Resistant to hydrolytic degradation
(g) Stable when combined with insulating material
(h) Resistant to water and moisture
(i) Easy to use

It is difficult to provide all of these characteristics in one product. Each type of wire has its own advantages and disadvantages. Therefore, it is important to consider operating conditions in order to select the correct product.





These wires are designed to be used in producing the coils for:

- Transformers.
- Electric motors.
- TV deflection yoke coils.
- Relays, electro valves solenoids.
- Measuring devices and compressors .

Test can done in enameled wire with category

1- Mechanical prop.

A) Elongation

B) Springiness

C) Resistance

D) Flexibility and adherence

2- Thermal prop.

A) Heat shock

B) Cut-through

C) Loss of mass

D) Temperature index

3- Chemical prop.

A) Resistance to solvent

B) Resistance to refrigerants

C) Solderability

D) Resistance to hydrolysis

4- Electrical properties

A) Breakdown voltage

B) Continuity of insulation

C) Electrical resistance

D) Pin hole test

5- Determination of dimensions

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Enameled Wire

Engineering Data

Copper Round Enmelled Wire

Products Description & Spool Diameter

IEC	Product Description	Thermal Class,°C
60 317- 12	Poly vinyl formal	120°C
60 317-20	Polyurethane	155°C
60 317-8	Polyesteri m ide	180°C
60 317-13	Polyesterimide + Polyamide-imide	200°C

Spool	k125	k160	k200	k250	k355	A 180/230	A 250/400	A 315/500	A 400/630	A 500/800
Diameter										
0.09- 0.20	gc³	gc³	gc³			gc³				
0.20- 0.30	gc³	gc³	gc³	gc³		gc³	gc³			
0.30- 0.40	gc³	gc³	gc³	gc³		gc³	gc³	gc³		
0.40- 0.50	gc³	gc³	gc³	gc³		gc³	gc³	gc³	gc³	
0.50- 0.63		gc³	gc³	gc³		gc³	gc³	gc³	gc³	gc³
0.63- 0.80			gc³	gc³		gc³	gc³	gc³	gc³	gc³
0.80- 1.00				gc³			gc³	gc³	gc³	gc³
1.00- 2.00				gc³	gc³		gc³	gc³	gc³	gc³
2.00- 3.15					gc³			gc³	gc³	
3.15- 4.00					gc³				gc³	
4.00- 5.00					gc³				gc³	

Thermal Class 120 °C

Insulation Type

Base Coat: Poly vinyl formal
Lubricant: Available

Standard

IEC60317- 12

The Range of conductor covered by this standard:

Grade	SIZE RANGE
grade 1	0,04 < 0 < 2.50 mm
grade 2	0,04 < 0 < 5,000 mm
grade 3	0,08 < 0 < 5,000 mm

Application Fields

Transformers (especially oil immersed type)

Properties

Thermal index of 120 °C
High flexibility
High chemical resistance
Excellent windability for hard turns
High resistance to abrasion
Excellent adherence

Technical Characteristics

Thermal

Heat Shock °C	> 155 °C
Cut-through Temperature °C	> 170 °C

Electrical

Breakdown Voltage V	> Recourding IEC Value

Chemical

Resistance to Solvent H	Pass
Resistance to Refrigerants	Pass

Thermal Class 155 °C

Insulation Type

Base Coat: Polyurethane
Lubricant: Available

Standard

IEC 60317- 20

The Range of conductor covered by this standard:

Grade	SIZE RANGE
Grade 1	0,018 < 0 < 0 ,800 mm
Grade 2	0,020 < 0 < 0 ,800 mm

Application Fields

Small Motors
Small Transformers
Relays & Solenoids
Automotive Components
TV & Telecomminication
Electronic Components

Properties

Thermal index of 155 °C
Solderabil ity at 375 °C

Technical Characteristics

Thermal

Thermal Index °C	155 °C
Heat Shock °C	> 175 °C
Cut-through Temperature °C	> 200 °C

Electrical

Breakdown Voltage V	> Recourding IEC Value

Chemical

Solderability to Solvent H	390 °C ±5
Resistance to Refrigerants	

Thermal Class 180 °C

Insulation Type

Base Coat: Palyesterimide

Lubricant: Available

Standard

IEC 60317-8

The Range of conductor covered by this standard:

Grade	SIZE RANGE
Grade 1	0,018 < 0 < 3,150 mm
Grade 2	0,020 < 0 < 5,000 mm
Grade 3	0,25 < 0 < 1,600 mm

Application Fields

Motors

Transformers (especially dry type)

Automotive Components

Alternators

Properties

Thermal index of 180 °C

Solderabil ity at 200 °C

Technical Characteristics

Thermal

Thermal Index °C	180 °C
Heat Shock °C	> 200 °C
Cut-through Temperature °C	> 300 °C

Electrical

Breakdown Voltage V	> Recourding IEC Value

Chemical

Resistance to Solvent H	Pass
Resistance to Refrigerants	Pass
Resistance to Transformer Oil	Pass

Thermal Class 200 °C

Insulation Type

Base Coat: Palyesterimide
Over Coat: Polyamide-Imide
Lubricant: Available

The Range of conductor covered by this standard:

Grade	SIZE RANGE
Grade 1	0,050 < 0 < 2,000 mm
Grade 2	0,050 < 0 < 5,000 mm

Standard

IEC 60317- 13

Application Fields

Motors
Transformers (especially dry type)
Automotive Components
Alternators

Properties

Thermal index of 200°C
Re-shape property for flattening of round wire at high mechanica l pressure
Suitable for high speed winding

Technical Characteristics

Thermal

Thermal Index °C	200 °C
Heat Shock °C	> 220 °C
Cut-through Temperature °C	> 320 °C

Electrical

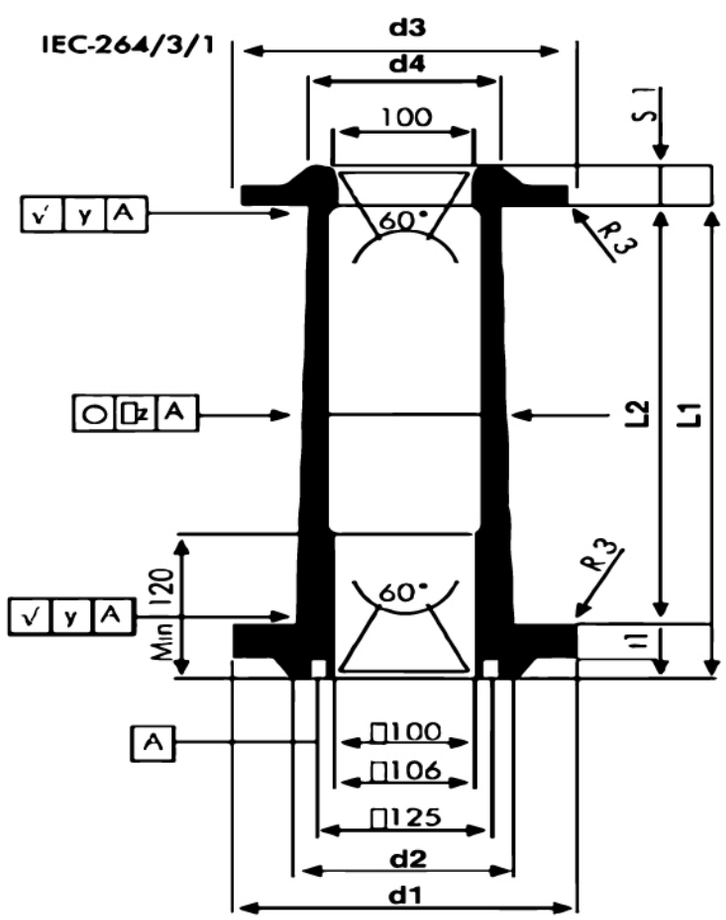
Breakdown Voltage V	> Recourding IEC Value

Chemical

Resistance to Solvent H	Pass
Resistance to Refrigerants	Very Good
Resistance to Transformer	Very Good

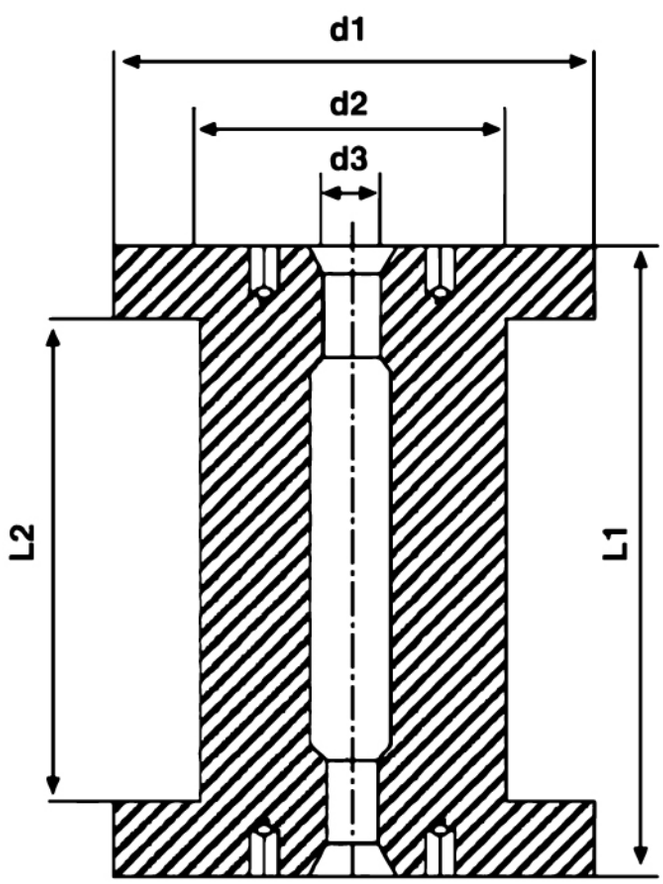
Tapered Plastic Spools

Type of spools	Dimensions				Gr. wt.
	d1		L1	L2	Kg.
A 180/230	180		230	200	0.600 ≈
A200/315	200		315	265	1.000 ≈
A250/400	250		400	335	2.250 ≈
A315/500	315		500	425	4.350 ≈
A400/630	400		630	530	7.300 ≈
AS00/800	500		800	670	2.100 ≈



Cylindrical Plastic Spools

Type of spools	Dimensions				Gr. wt.
	d1	d2	L1	L2	Kg.
K355	355	224	200	160	3.200
K250	250	160	200	160	1.080
K200	200	125	200	160	0.600
K160	160	100	160	128	0.350
K125	125	80	125	100	0.200



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Enameled Wire

Engineering Data

Aluminum Round Enmelled Wire

Production Process

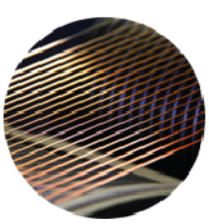
Aluminum Round Enmelled Wire

Step 1: Extruding & Drawing
Incoming quality control for each material under strict standards

Step 2: Stretch the thread
Precise in size control up to 0.001 mm.

Step 3: Wash with pure water
Incoming quality control for each material under strict standards

Step 4: Paint
Incoming quality control for each material under strict standards



Step 4: Paint
Incoming quality control for each material under strict standards

Step 6: Spooling
Incoming quality control for each material under strict standards

General Requirement for round enamelled aluminum wire
IEC 60317-0-3 Test done on wire
(Electrical, Mechanical, Chemical & Thermal)

1- Appearance

2- Dimension

3- Electrical resistance

4- Elongation

5- Flexibility and adherence

6- Heat shock

7- Resistance to abrasion (nominal conductor diameter and including 2.500 mm)

8- Resistance to solvents

9- Break down voltage

10- Continuity of insulation

11- Temperature index

12- Pin hole test

Thermal Class 105 °C

Insulation Type

Base Coat: P.V.A.(POLY VINIYL ACETAL)
Lubricant: Available

Standard

IEC 60317-14

Application Fields

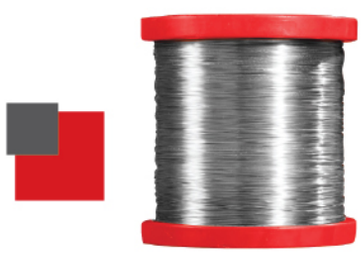
Transformers

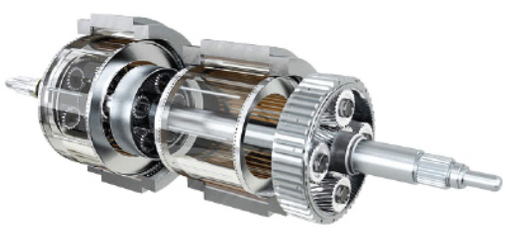
Properties

Thermal index of 105 °C
High flexibility
High chemical resistance
Excellent windability for hard turns
High resistance to abrasion
Excellent adherence

Technical Characteristics

Thermal	
Heat Shock °C	> 155 °C
Cut-through Temperature °C	> 170 °C
Electrical	
Breakdown Voltage V	> Recourding IEC Value
Chemical	
Resistance to Solvent H	Pass
Resistance to Refrigerants	Pass





Thermal Class 180 °C

Insulation Type

Base Coat: P.E.I (POLY ESTER IMIDE)
Lubricant: Available

Standard

IEC 60317-15

The Range of conductor covered by this standard:

Grade	SIZE RANGE
grade 1	0,40 < 0 < 1.60 mm
grade 2	0,40 < 0 < 5,000 mm

Application Fields

Transformers

Properties

Thermal index of 180 °C
High flexibility
High chemical resistance
Excellent windability for hard turns
High resistance to abrasion
Excellent adherence

Technical Characteristics

Thermal

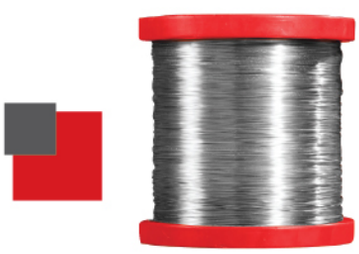
Heat Shock °C	> 200 °C
Cut-through Temperature °C	> 170 °C

Electrical

Breakdown Voltage V	> Recourding IEC Value

Chemical

Resistance to Solvent H	Pass
Resistance to Refrigerants	Pass



Thermal Class 180 °C

Insulation Type

Base Coat: P.E.I (POLY ESTER IMIDE)
Over: P.A. I (POLY AMIDIMEDE)

The Range of conductor covered by this standard:

Grade	SIZE RANGE
grade 1	0,250 < 0 < 1.60 mm
grade 2	0,40< 0 < 5,000 mm

Standard

IEC 60317-24

Application Fields

Transformers

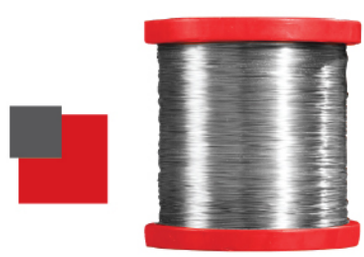
Properties

Thermal index of 180 °C
High flexibility
High chemical resistance
Excellent windability for hard turns
High resistance to abrasion
Excellent adherence

Technical Characteristics

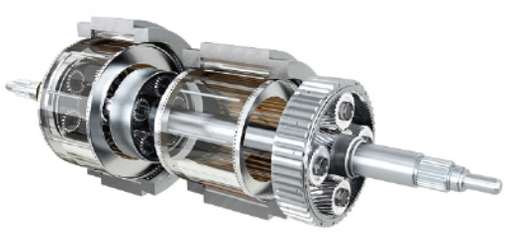
Thermal

Heat Shock °C	> 200 °C



Electrical

Breakdown Voltage V	> Recourding IEC Value



Chemical

Resistance to Solvent H	Pass
Resistance to Refrigerants	Pass

Thermal Class 200 °C

Insulation Type

Base Coat: Base: P.E.I (POLY ESTER IMIDE)
Over: P.A. I (POLY AMIDIMEDE)

The Range of conductor covered by this standard:

Grade	SIZE RANGE
grade 1	0,40 < 0 < 3.150 mm
grade 2	0,40< 0 < 5,000 mm

Standard

IEC 60317-25

Application Fields

Transformers

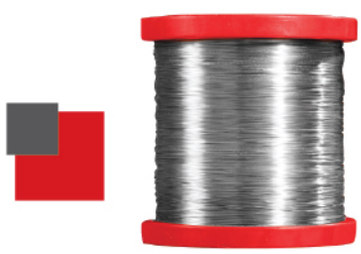
Properties

Thermal index of 200 °C
High flexibility
High chemical resistance
Excellent windability for hard turns
High resistance to abrasion
Excellent adherence

Technical Characteristics

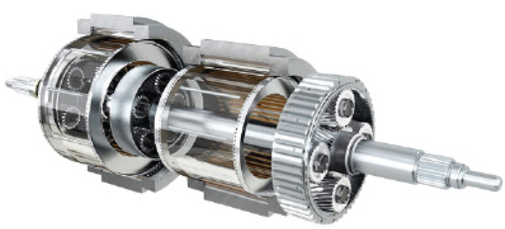
Thermal

Heat Shock °C	> 220 °C



Electrical

Breakdown Voltage V	> Recourding IEC Value

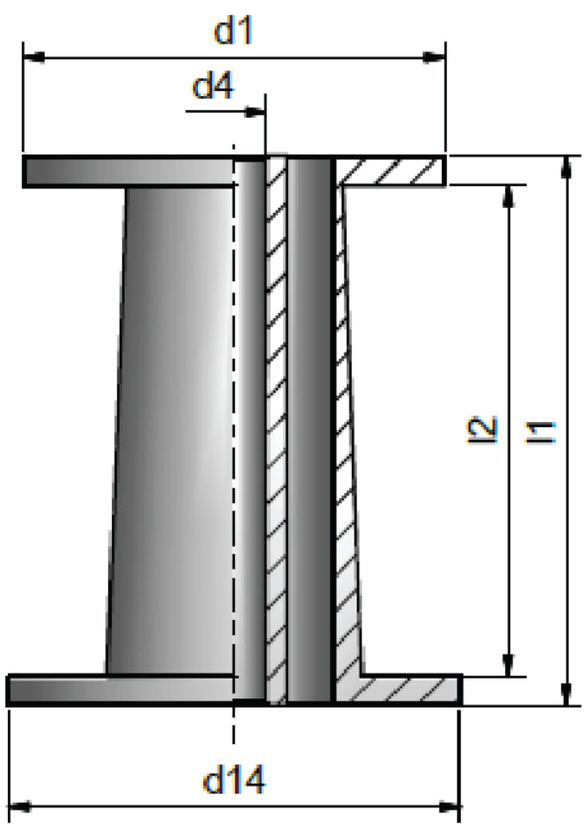


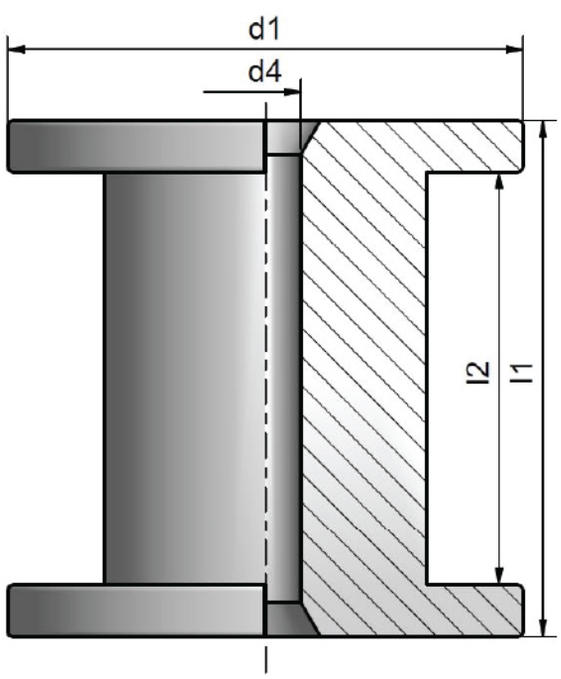
Chemical

Resistance to Solvent H	Pass
Resistance to Refrigerants	Pass

Spool Type for Aluminum and Weight

Type K 250	= 5~7 Kg KG
Type K 355	=10~12 Kg KG
Type A250\ 400	=12~15 Kg KG
Type A315\ 500	= 25~30 Kg KG
Type A400\630	= 50~60 Kg KG





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