

# Tech Spec Sheet Copper Enamelled Wire

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	1	2	3	4	5	6	7
<b>Type of enamelled wire</b>	High mechanical strength	Self solderable & bondable	General purpose	High mechanical strength	High Thermal & mechanical strength	High temperature	High temperature
<b>SPECIFICATIONS/ STANDARD</b>	IS : 13730-1/ IEC-60317-1/ NEMA MW-15C/ JIS C 3202-PVF	IS : 13730-2/ IEC-60317-2	IS : 13730-3/ IEC-60317-3/ NEMA MW-5C	IS : 13730-4/ IEC-60317-4/ NEMA MW-75C/ JIS C 3202-UEW	IS : 13730-7/ IEC-60317-7	IS : 13730-8/ IEC-60317-8/ NEMA MW-30C/ 72C (Hermetic) JIS C 3202-EIW	IS : 13730-13/ IEC-60317-13/ NEMA MW-30C/ 73C (Hermetic)
<b>THERMAL CLASS</b>	130 (B)	130 (B)	155 (F)	130 (B)	200	180 (H)	200 (C)
<b>Chemical base of base/ Single coat</b>	Modified Polyvinyl Acetal	Polyurethane	Modified Polyester	Polyurethane	Polyimide	Polyesterimide	Theicpolyester/ Polyesterimide
<b>Chemical base of top coat</b>		Polyvinyl butyral/Polyamide					Polyamideimide
<b>Range of Wire (Diameter)</b>	6.400-0.500 mm	2.000-0.050 mm	6.400-0.050 mm	2.000-0.050 mm	6.400-0.020 mm	6.400-0.050 mm	6.400-0.050 mm
<b>Insulation Range</b>	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1 & 2 as per IEC (Single & Heavy as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)
<b>Standard colour</b>	Golden Yellow to Light Orange	As per requirements	Light Brown/ Medium Brown	As per requirements	Golden Yellow to Light Orange	Light Brown/ Medium Brown	Light Brown/ Medium Brown

<b>Heat shock (°C)</b>	155	155	175	155	240	200	220
<b>Cut through (°C)</b>	170	170	240	170	400	300	320
<b>Solderable temperature (°C)</b>	Not applicable	375	Not applicable	375	Not applicable	Not applicable	Not applicable
<b>Resistance to Abrasion for 1.00mm dia grade 2 wire (n)</b>	>11.3	>9.3	>10.4	>9.3	>6.6	>10.9	>11.3
<b>Resistance to refrigerants</b>	Very good	Not applicable	Not applicable	Not applicable	Very good	Good	Very good
<b>Flexibility &amp; Adherence</b>	Very good	Good	Good	Good	Very good	Good	Very good
<b>Bonding Temperature (°C)</b>	Not applicable	170/200 depending on overcoat	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>SPECIAL CHARACTERISTICS &amp; APPLICATION</b>	High mechanical properties, good transformer oil resistance, suitable for 130°C Hermetic applications, used in oil filled transformers & equipments requiring high mechanical properties such as auto electricals.	Solderable, thermoplastic bonded by heat or solvent, used for all self supported coils for television, electronics, small motors, relays, magnets, telephones & voice coils of all kinds can be bonded in forms by heating at 170/180°C	Upgraded thermo mechanical properties compared to ordinary polyesters, used in ignition coils, oil filled transformers, relays, contractors, fhp motors. This version can also be made for upgraded abrasion.	Self solderable property with good insulation resistance, high flexibility used in all communication equipments, relays, magnetic spools, universal & non-impregnated winding of all kinds of transformers.	Designed for using of wire for product with maximum value of the thermal and mechanical characteristics	Good resistance against refrigerants, transformer oil. High burnout resistance, used in fhp motors, hermetic application and thermal class 180°C equipments.	Very good resistance for refrigerants & chemicals, high burnout resistance, excellent windability, low coefficient of friction, high slotfill factor, used in special motors including Hermetic motors, Armatures, Alternators, Power Tools and high HP motors, suitable for high speed coil winding.
<b>Delivery Spools</b>	Please refer to Copper Enamelled Winding Wire Packing Range Chart						

<b>Special Notes</b>			Can be supplied with Polyamide (Nylon) topcoated for improved high-speed windability, if required.	Can be supplied with Polyamide (Nylon) topcoated for improved high-speed windability, if required.		Can be supplied with Polyamide (Nylon) topcoated for improved high-speed windability, if required.	Top coat Polyamide imide can be supplied of the type Self Lubricated, if required.
	* IS 13730 and IEC 60317 are harmonized standards						

	8	9	10	11	12	13	14
<b>Type of enamelled wire</b>	Self solderable	Self solderable	Self solderable	High temperature	Self solderable		High temperature
<b>SPECIFICATIONS/ STANDARD</b>	IS : 13730-19/ IEC-60317-19/ NEMA MW-28C	IS : 13730-20/ IEC-60317-20/ NEMA MW-79C	IS : 13730-21/ IEC-60317-21	IS : 13730-22/ IEC-60317-22/ NEMA MW-76C	IS : 13730-23/ IEC-60317-23	IS : 13730 (Under/ preparation)/ IEC- 60317(Under preparation)/ NEMA MW- 24C	IS : 13730-26/ IEC-60317-26/ NEMA MW-81C
<b>THERMAL CLASS</b>	130 (B)	155 (F)	155 (F)	180 (H)	180 (H)	155 (F)	200 (C)
<b>Chemical base of base/ Single coat</b>	Polyurethane	Polyurethane	Polyurethane	Polyester/ Polyesterimide	Polyesterimide	Polyester	Polyamideimide
<b>Chemical base of top coat</b>	Nylon		Nylon	Nylon			
<b>Range of Wire (Diameter)</b>	2.000-0.050 mm	0.800-0.050 mm	1.60-0.050 mm	6.400-0.050 mm	1.60-0.050 mm	1.60-0.254 mm	1.60-0.071 mm
<b>Insulation Range</b>	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)

Standard colour	AS per requirements	AS per requirements	AS per requirements	Medium Brown to Dark Brown	Light Brown	AS per requirements	Light Brown
Heat shock (°C)	155	175	175	200	200	175	220
Cut through (°C)	170	200	200	265	265	240	350
Solderable temperature (°C)	375	390	390	Not applicable	470	Not applicable	Not applicable
Resistance to Abrasion for 1.00mm dia grade 2 wire (n)	>9.3	>8.3 (0.8 mm)	>9.3	>10.9	>10.9	>10.0	>7.05 (for gr.1)
Resistance to refrigerants	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Very good
Flexibility & Adherence	Good	Good	Good	Good	Good	Good	Good
Bonding Temperature (°C)	Not applicable	Not applicable	170/200 depending on overcoat	170/200 depending on overcoat	170/200 depending on overcoat	Not applicable	Not applicable
<b>SPECIAL CHARACTERISTICS &amp; APPLICATION</b>	Low coefficient of friction, besides properties of general purpose polyurethane. It is suitable for winding in small size motors, coils of electrical instruments, especially of high speed winding.	Self solderable property with its low dielectric dissipation factor under high frequency. It can be widely used in electrical instruments of machine tools, motors which have special requirements of this type of enamel.	Low coefficient of friction, besides properties of polyurethane, suitable for winding in small and medium electrical instruments, for high speed winding.	Used in all 180°C class equipment requiring high speed machine winding, low coefficient of friction.	Self solderable with high potential both under the dry and humid conditions, good properties in heat shock and cut through, it is suitable for the coils of various motor appliances, instruments and telephone equipments.	Good mechanical, electrical & chemical resistance properties. Improved for high speed winding. FHP motors, coils & relays, audio & instrument coils.	High burnout resistance, excellent windability, low coefficient of friction, high slot fill factor, used in special types of motors & electromotive tools.
<b>Delivery Spools</b>	Please refer to Copper Enamelled Winding Wire Packing Range Chart						

<b>Special Notes</b>		Can be supplied with Polyamide (Nylon) topcoated for improved high-speed windability, if required.					
* IS 13730 and IEC 60317 are harmonized standards							

	15	16	17	18	19	20	21
<b>Type of enamelled wire</b>	General purpose	Self solderable/Self bonding	Self solderable/Self bonding	Self bonding	General purpose	General purpose	Self solderable/High Temperature
<b>SPECIFICATIONS/ STANDARD</b>	IS : 13730-34/ IEC-60317-34/ JIS C 3202-PEW	IS : 13730-35/ IEC-60317-35 JIS C 3202-SBUEW	IS : 13730-36/ IEC-60317-36 JIS C 3202-SBUEW	IS : 13730-37/ IEC-60317-37	IS : 13730-45/ IEC-60317-45	IS : 13730-54/ IEC-60317-54	IS : 13730-51/ IEC-60317-51/ NEMA MW-82C
<b>THERMAL CLASS</b>	130 (B)	155 (F)	180 (H)	180 (H)	130 (B)	155 (F)	180 (H)
<b>Chemical base of base/ Single coat</b>	Polyester	Polyurethane	Polyesterimide	Polyesterimide	Polyester	Polyester	Polyurethane
<b>Chemical base of top coat</b>		Polyvinyl butyral/Polyamide	Polyvinyl butyral/Polyamide	Polyvinyl butyral/Polyamide			
<b>Range of Wire (Diameter)</b>	6.400-0.050 mm	0.800-0.050 mm	1.60-0.050 mm	1.60-0.050 mm	6.400-0.050 mm	6.400-0.050 mm	1.00-0.050 mm
<b>Insulation Range</b>	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1b,2b & 3b as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1b,2b & 3b as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1b,2b & 3b as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)	Grade 1,2 & 3 as per IEC (Single, Heavy & Triple as per NEMA)

Standard colour	Medium Brown	As per requirements	Light Brown/ Dark Brown	Light Brown/ Dark Brown	Light Brown/ Medium Brown	Light Brown/ Medium Brown	As per requirements
Heat shock (°C)	155	175	200	200	155	175	200
Cut through (°C)	240	200	265	300	240	240	240
Solderable temperature (°C)	Not applicable	390	470	Not applicable	Not applicable	Not applicable	450
Resistance to Abrasion for 1.00mm dia grade 2 wire (n)	>10.4	>8.1	>10.9	>10.9	>10.4	>10.4	>7.8
Resistance to refrigerants	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Flexibility & Adherence	Good	Good	Good	Good	Good	Good	Good
Bonding Temperature (°C)	Not applicable	170/200 depending on overcoat	170/200 depending on overcoat	170/200 depending on overcoat	Not applicable	Not applicable	Not applicable
<b>SPECIAL CHARACTERISTICS &amp; APPLICATION</b>	Good thermal & electrical properties, used in general purpose rotating & static electrical equipments, oil transformers, control coils.	Solderable, thermoplastic bonded by heat or solvent, used for all self supported coils for television, electronics, small motors, relays, magnets, telephones & voice coils of all kinds can be bonded in forms by heating at 170/180°C	Solderable, thermoplastic bonded by heat or solvent, used for all self supported coils for television, electronics, small motors, relays, magnets, telephones & voice coils of all kinds can be bonded in forms by heating at 170/180°C	Class 180°C with self bonding property and all other properties of Polyesterimide.	General purpose 130°C polyester. Good thermal & electrical properties, used in general purpose rotating & static electrical equipments, oil transformers, control coils.	General purpose 155°C polyester with heat shock at higher mandrel diameter. Good thermal & electrical properties, used in general purpose rotating & static electrical equipments, oil	Good mechanical, electrical & chemical resistant properties. Improved thermal resistance. Fast solderability. Fractional & integral horsepower motors Class 155. Coils & relays. Instrument & audio coils.

transformers,  
control coils.

**Delivery Spools**

Please refer to Copper Enamelled Winding Wire Packing Range Chart

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	SPOOL TYPE	PT 1	125 mm	PT 4	160 mm	PT 10	200 mm	PT 15	250 mm	PT 25	PT 45	400 mm	PT 90	PT 190	PT 400
DIAMETERS (mm) / SWG	LARK SPOOL CODE (click on Spool Code to view figure)	<a href="#">1</a>	<a href="#">1</a>	<a href="#">2</a>	<a href="#">2</a>	<a href="#">4</a>	<a href="#">3</a>	<a href="#">3</a>	<a href="#">3</a>						
	App wire wt. Kgs	1.5	2 - 2.5	4	5	10	10	15	20	25	45	60	90	190	400
0.05 - 0.14 47 - 38		OO	OO	SP		SP	OO	OO							
>0.14 - 0.28 37 - 32		OO	OO	SP	—	SP	—	OO	—	OO	—	—	—	—	—
>0.28 - 0.50 31 - 26						OO		OO		SP	OO		OO	OO	OO
>0.50 - 0.70 25 - 23		—	—	—	—	OO	—	OO	—	SP	OO	OO	OO	OO	OO
>0.70 - 2.30 22 - 14							OO		SP	OO	OO	OO	OO	OO	OO
>2.30 - 4.50															

>2.50 - 4.50 13 - 8									OO	OO	OO	SP	OO	OO	
>4.50 - 6.60 7 - 3											OO	SP	OO	OO	
SP - Standard Packing										OO - On Order					

SPOOL CODE	Reel Description Size/Type	D1 Bottom Flange Dia. (mm)	D2 Bottom Barrel Dia. (mm)	D3 Top Flange Dia. (mm)	D4 Top Side Barrel Dia. (mm)	D5 Bore Size (mm)	L1 Total Length (mm)	L2 Inside Traverse Length (mm)	S1 Flange Thickness Bott./Top	Approx wire Weight (Kgs)	No. of Reels per box
S1	PT - 1	105	58	95	53	20	120	100	10	1.5	8
S2	125 mm.	125	60	125	60	25	93	70	12	2 - 2.5	8
S3	PT - 4	140	86	124	74	26	200	170	15	4	4
S4	160 mm.	160	100	160	100	22	160	128	11	5	4
S5	PT - 10	180	110	160	96	26/30	230	200	15	10	1
S6	200 mm.	200	110	200	110	38	155	120	15	10	1
S7	PT - 15	200	110	180	96	30	230	200	15	15	1
S8	250 mm.	250	110	250	110	38	153	125	15	20	1
S9	PT - 25	230	130	215	110	30/32/34	280	250	15	25	1
S10	PT - 45	250	160	236	140	106	400	335	32.5	45	1
S11	400 mm.	400	200	400	200	38	195	150	23	60	1
S12	PT - 90	315	200	300	180	106	500	425	37.5	90	1
S13	PT - 190	400	250	375	224	106	630	530	50	190	1
S14	PT - 400	500	315	475	280	100	800	670	65	400	1

Notes: 1) Spools could also be available as per DIN - 46383, 46399, IEC 264 or as per customer's requirement  
2) Information is for general guidance and is subject to change.  
3) Can supply Spools packed on pallets and shrinkwrapped.

