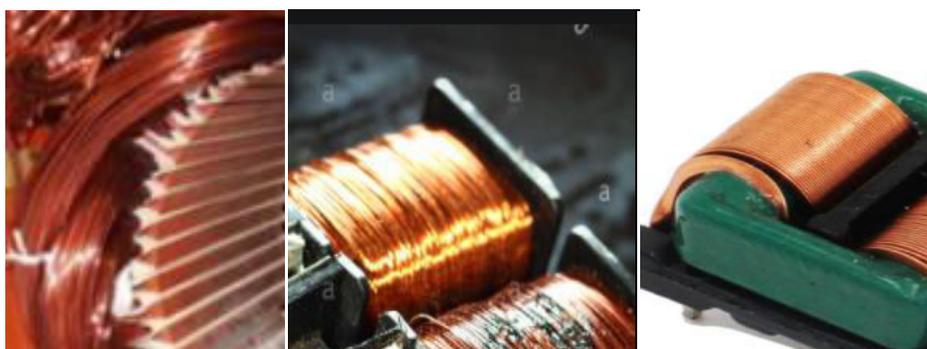




Strengthening Domestic Manufacturing and Import Reduction of

WINDING WIRE

HS Code 85441990



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WINDING WIRE

Nomenclature of the product:

On the basis of Import data-HS code and item assigned, following item has been identified:

Product: Winding Wire (Copper and Aluminum)

Main broader Sector has been identified:

Domestic House wiring with PVC insulated

Winding wire is a Critical & Strategic Input used in the manufacturing of all types of Electrical and Electronic equipments. Application of Winding Wire / Magnet wire / Enamel Wire is broadly in following sectors:

- Power Generation: Generators, Alternators, Pumps
- Power Transmission & Distribution: Transformers & Switchgears
- Railways & Defence
- Automobiles: Auto Electricals
- Consumer Durables, Refrigeration & Air Conditioning, etc.

The industry supplies input material to the following industry verticals:

- The rotating machinery industry. (Electric Motors and Alternators etc.)
- The transformer industry. (Transformers, rectifiers, Battery chargers, inverters, etc.)
- The automobile electrical industry. (Dynamos, Alternators, wiper motors, horns, window winders, etc.)
- The switchgear Industry. (Circuit breakers, switches, etc.)
- The luminaries industry. (Ballasts, chokes, etc.)
- The home appliance, industrial appliance Industry. (Washing Machine, mixies and food processors, Consumer Durables, Refrigeration, air conditioners, grinders, vacuum cleaners, fans, pumps, etc.)
- The Public sector Companies (State Electricity Boards, BHEL, NTPC, ONGC, All Railways, and Defence etc.)
- The repair industry (secondary market)
- The wires will be used for the upcoming sector EV i.e. motors and charging unit of the EV.

This study is broadly focus on **Enameled Winding Wire (Copper and Aluminum) of fine size SWG 25-35(0.508-0.213mm)**

COMMERCIAL DETAILS

- **HSN code of the product:**

HSN Code: 85441990

Insulated (including enameled or anodized) wire, cable (including co-axial cable) and other insulated electric conductors, whether or not fitted with connectors; Optical fiber cables, made up of individually sheathed fibers, whether or not assembled with – Other)

Our study is derived from the HSN code 85441990 import data; however, we will also incorporate broader category of winding wire in this study which includes almost all winding wires.

- **NIC code of the product:**

There is no separate NIC code for winding wire industry and its activity falls under wire and cable sector as mentioned below:

NIC Code: 27320

Manufacture of other electronic and electric wires and cables (insulated wire and cable made of steel, copper, aluminum) (*There is no separate category for winding wire under NIC 2008 code*).

- **Clusters already existing on the product if any:**

Although cable & wire industry is very significant in many regions of India, but winding wire industries are small in number in India. Today the Indian Industry Manufacturers are manufacturing mainly PVC Cables of small and medium sizes. In India, the Wire & Cable industry is located mainly in and around Delhi, Noida, Bhiwadi-Noida (National Capital Region) and various parts of Maharashtra, Delhi, Rajasthan and Gujarat. These areas are the main marketing spots catering to domestic market.

However, the units engaged in Manufacturing of winding wire are very less in number and are scattered in different parts of the country. In India, there are about 25,000 workmen employed in nearly 500 Units, majority are small. (Source: Winding Wires Manufacturers' Association of India, WWMAI). Winding wire is mainly manufactured in Haryana, Jaipur-Rajasthan, Silvassa-D&NH, Daman-Gujarat, Delhi and nearby states border area, Rajpura-Punjab, Baddi-Solan, Ullasnagar- Maharashtra etc. There are around 40 units in India which have state-of-the-art plant & machines supplying to even critical applications. Also, out of these units there are only 8-10 units engaged in fine size winding wire of Copper & Aluminum i.e. SWG 25-38.

- **Possibility to create establish clusters on the product:**

Mostly units engaged in winding wire are scattered in India. There are hardly 8-10 units in a particular state which are manufacturing winding wire in organized way. There are good numbers of units around 100 in Delhi & nearby region but most of these are unorganized and most of them are not using latest technology and quality standards. There are good number of clusters of wire & cable in different parts of the country, but winding wire sector is different due to its different manufacturing process, production and quality requirement. However, existing cluster of wire and cable can diversify **up to some extent** for the manufacturing of enameled winding wire.

Following areas have concentration of winding wire units and possibility for creating clusters:

- Delhi and nearby states border area
- Jaipur, Bhiwadi-Rajasthan
- Silvassa-D&NH, Daman, Gujarat
- Faridabad, Haryana,
- Baddi-Solan, etc.

- **Probable areas of districts where the products product manufacturing or project can be established:**

On the basis of availability of winding wire industries, supply chain, raw material-skill manpower availability, infrastructure, Industrial growth following areas are suggested:

State	District
Delhi	East
	Shahdara
	North West
Uttar Pradesh	Ghaziabad
	Noida
Rajasthan	Jaipur
	Alwar-Bhiwadi
Haryana	Sonapat
	Rohtak
	Palwal
Gujrat	Anand
	Dadra And Nagar Havelli-Silvassa, Daman
M.P.	Indore
H.P.	Baddi
Maharashtra	Thane
	Nasik
Tamil Nadu	Coimbatore

- **Number of industries registered as MSME is available in the manufacturing of the product :**

On the basis of data of MSMEs for NIC code 27300, there are total 5176 units registered for wire and cable category. 469 MSME units engaged in Manufacture of other electronic and electric wires and cables (insulated wire and cable made of steel, copper, aluminum) in Rajasthan, **471** in Gujarat, **148** in Haryana, 945 in Delhi- Faridabad-Delhi Border area. (This data is from Udhyan registration for NIC code **27320**, As on 13.04.2021). District wise MSME details of states having majority of wire & cable units is attached as Annexure-A.

In India, there are 500 Units, majority are small in winding wire sector. Installed capacity of these units cumulative is 350-400 KMT per annum. Presently these units are having capacity utilisation of only about 60%. (Source: Winding Wires Manufacturers' Association of India, WWMAI). Winding wire is mainly manufactured in Haryana, Jaipur-Rajasthan, Silvassa-D&NH, Daman-Gujarat, Delhi and nearby states border area, Rajpura-punjab, Baddi-Solan, Ullasnagar- Maharashtra etc. There are around 40 units in India having state-of-the-art plant & machines supplying to even critical applications. Also, out of these units there are only 8-10 units engaged in fine size winding wire of Copper & Aluminum i.e. SWG 25-38. Installed capacity of these units cumulative is 350-400 KMT per annum. Presently these units are having capacity utilisation of only about 50- 60%.

- **Number of industries available in large scale industries**

Most of the large scale units manufacturing winding wires are ahead in quality and volume. Those from the medium and large-scale units manufacturing, a few do make some special type design cables also. The large-scale manufacturers have generally imported the technology from internationally renowned manufacturers.

Some of the prominent Industries including large scale units engaged in winding wire manufacturing in India are as below (Source: Winding Wires Manufacturers' Association Of India, WWMAI):

1	Akshay Insulated Conductors, Pune
2	Apple Insulated Wires Pvt. Ltd, D& N H
3	Athivinayakar Wires Pvt. Ltd., Coimbatore
4	Beico Industries Pvt. Limited , Mumbai
5	Bharat Insulation Co. (India) Ltd , Thane
6	Bhilai Conductors Pvt. Ltd., Chhattisgarh
7	Chandra Electrical Industries, New Delhi
8	ESS ELL Cables Co. , New Delhi
9	G. K. Winding Wires Ltd., Greater Noida, Gautam Budh Nagar (U.P.)
10	Ganesh Transmission Pvt. Ltd., Kolkata
11	Vimlesh Industries Pvt. Ltd., Bahalgarh, Sonipat
12	K. Patel Metal Ind. Pvt. Ltd. , Mumbai
13	Khaitan Winding Wire Pvt. Ltd., Kolkata

14	Kumar Metals Private Ltd., New Delhi
15	Lakshmi Magnet Wires Pvt. Ltd, Faridabad
16	Mimani Wires Pvt. Ltd., Indore
17	Precision Wires India Ltd., Mumbai
18	Ram Ratna Wires Ltd., Mumbai
19	Slimlites Electricals Pvt. Ltd., Mumbai
20	Swarnagiri Wire Insulations Private Ltd., Hubli
21	Triveni Conductors Ltd., Indore
22	Versatile Wires Ltd., Kolkata
23	Vidya Wires Pvt. Ltd., Anand (Gujarat)
24	Viraj Conductors Pvt. Ltd., Dewas(MP)
25	Mahendra Industries., Bangalore
26	Sterling India. Greater Noida
27	Sharada Electricals., Baddi Distt. Solan
28	Izzy Metals Pvt. Ltd., Jaipur
29	Bansal Insulation Products Pvt. Ltd., New Delhi
30	Deakin Wires Industries., Haridwar
31	Shree Madhav Agencies Pvt. Ltd., Howrah
32	Khandelwal Cables Ltd.,, Vadodra (Gujarat)
33.	SH-Haryana Wires Ltd,Palwal,Haryana

• **Data about the imports of this product for the past three years:**

MSME-DI	MSME Item Description	ITCHS	Import					
			2017-18		2018-19		2019-20	
			Value (Rs. Cr.)	Value (Mill. USD)	Value (Rs. Cr.)	Value (Mill. USD)	Value (Rs. Cr.)	Value (Mill. USD)
224	Domestic House wiring with PVC Insulated Aluminium Cables (upto 120 sq. mm) (ISS:694)	85441990	715.92	111.09	865.42	123.38	742.93	104.88

(Source: DC MSME office website)

• **Data available for exports against this product for the past three years:**

MSME-DI	MSME Item Description	ITCHS	Export					
			2017-18		2018-19		2019-20	
			Value (Rs. Cr.)	Value (Mill. USD)	Value (Rs. Cr.)	Value (Mill. USD)	Value (Rs. Cr.)	Value (Mill. USD)
224	Domestic House wiring with PVC Insulated Aluminium Cables (upto 120 sq. mm) (ISS:694)	85441990	301.17	46.74	270.41	38.66	259.10	36.56

(Source: DC MSME office website)

- **Scope for the number of unit's number of years can be established further:**

As claimed by winding wire manufacturers association of India (WWMAI) and also as per our survey, it is found that presently existing units are not operating at 100% capacity (Presently these units are having capacity utilisation of only about 60% as reported by WWMAI.) due to market demand fluctuation and raw material issues. However, since there are few units in fine winding wire and same is imported mostly, there is a possibility to explore the setting up of plants for fine Cu-Al winding wire. Winding wire with high capacity of production and international quality standard units can only be set up with high investment 5-20 cr. and also, there is an issue of huge working capital requirement due to high cost of raw material i.e. Al & Cu and more than 80-90% cost of the final production is of raw material.

There is also a technology gap for very fine wire drawing and enameling. Also, raw material (Cu and Al) for fine winding wire qualitative requirement is not presently met in India. Some large & medium scale existing units engaged in winding wire production can setup new units in this sector.

- **The demand in the domestic market:**

Demand for electricity is expected to expand at a CAGR of 7.5 per cent over FY07–22 to 1,915 TWh. The government targets capacity addition of 100 GW under the 13th Five-Year Plan (2017–22). (Source: 19th Electric Power Survey (EPS) report by Central Electricity Authority) Electrical Equipment Industry, to grow to achieve the ambitious targets of GoI, needs a healthy Winding wire Industry as a key contributor.

Winding wire is used as input for Generators, Alternators, Pumps, Transformers & Switchgears, Auto Electricals, Refrigeration & Air Conditioning, etc. and these items are manufactured in India. Large Domestic Market is available, however we should be cost competitive and should be able to manufacture desired quality and quantity. Presently import of this item is in the tune of Rs 700 Cr. (FY2019, Source O/o DCMSME website).

There is huge potential of winding wires for upcoming Electric Vehicle (EV) sector.

- **Demand of the export market:**

Globally there is huge demand of winding wires and total world import for Year 2019 is US Dollar thousand \$ 1094888 (Approx. Rs 8000 Cr.) (6 digit HS 854419, Source Trade Map-ITC, web site www.trademap.org). Even the existing units have unutilized capacity for export need. However present quality, technology adoption and scale of production, international certifications etc. are stopping India to export this item. We should be technologically advanced, high scale of production, cost competitiveness and should be able to manufacture desired international quality and standards.

TECHNICAL DETAILS

- **Sector in which the product is falling:**

Broad sector is falling under Wire and Cable sector with Winding Wire sub sector. However, the plant and machinery, quality parameters for winding wire are entirely different from conventional PVC wire & cable.

- **End users of the products/sectors:**

Winding Wires is not an end product, but used as a main item for Electrical and Electronic Equipment Industry comprising of Motors, Transformers, Pump sets (both Industrial & Agricultural) Switchgears, Fans, Air conditioners, Refrigerators, Hand Tools, Domestic Appliances, Televisions, Watches, Computer Peripherals, EV charging units etc.

- **Governing Indian specification:**

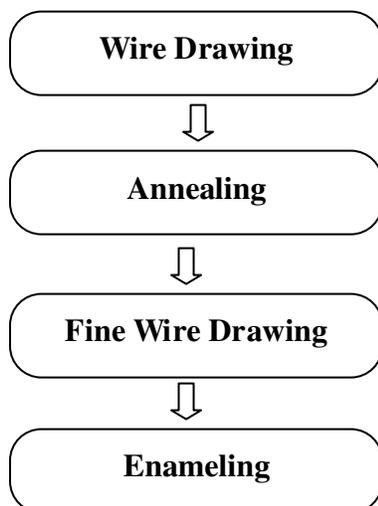
The BIS standard for winding wire is not under the mandatory license. Standard BIS 13730 is the main BIS standard for winding wire (Part wise details of IS 13730 is attached as Annexure-B). For Test Methods IS 13778-5 (2012) is applicable.

- **Governing international specification:**

IEC 60317 is main international standard for specification for types of winding wires. IEC 60851 Methods of test for winding wires. IEC 60172 Test procedure for the determination of the temperature index of enamelled and tape wrapped winding wires, IEC 60264 Packaging of winding wires.

Flow process chart of the manufacturing:

Flow process of manufacturing involves Wire Drawing, Annealing, Fine Wire Drawing Enameling and Packing as mentioned below:



- **Qualitative parameters of the product:**

Main quality parameters for winding wire are– Diameter, Electrical resistance Elongation, springiness, Heat Shock, flexibility and adherence, Temperature index. High temperature failure, insulation thickness Resistance to solvent, breakdown voltage, weight, etc.

Nowadays there is a large volume of copper Winding Wires produced out of Secondary (Scrap) Copper being offered to this segment of users. In an era of mounting international competition and standardization, quality assurance assumes heightened importance.

It is, therefore, necessary to create awareness amongst the Electrical Equipment consumers about the advantages of using Electrolytic Grade Refined Copper and the hazards of using goods made out of Copper not conforming to Electrolytic Grade.

BIS is also not mandatory for winding wire.

- **Details of the product Licenses to obtain:**

For establishment of manufacturing unit of winding wire following STATUTORY / GOVERNMENT APPROVALS are required:

- State Pollution control department NOC/ License: Pollution control requirement for enameling plant, wire drawing and other plant are in RED CATEGORY OF INDUSTRIES (“Industry or process involving metal surface treatment or process such as pickling/ plating/electroplating/ paint stripping/ heat treatment/ phosphating or finishing and anodising/ enameling/ galvanizing”) as per latest notification of Central Pollution Control Board. NOC from state pollution control board is to be obtained.
- Goods and Services Tax (GST) registration
- Professional tax registration
- Factory act license 1948
- Employee State Insurance Act (ESIC)
- Import Export Code registration-IEC code, (for exporter/importer)
- Fire safety license
- Approved building plan from competent authority
- BIS13730

To obtain the above license/ permission following basic documents are required:

- Udyam Registration Certificate
- Pan card
- Address proof
- Details of Bank account
- Registration of Partnership deed/ Proprietorship/ Company

- **Equipment required for the manufacturing of the product:**

Following machines are required for production of fine enameled winding wire:

- Wire Drawing Machine
- Fine Wire Drawing Machine
- Annealing Machine
- Enameling Plant
- Packing Machine

- **Test facilities required for the product:**

Following testing facilities are required to meet IS requirements and to insure raw material, in-process and final product quality :

<ul style="list-style-type: none"> ● Tensile Testing Machine ● Jerk/Scratch Abrasion/Spring/Pin hole Tester ● Kelvin Bridge ● H.V. Tester ● Elongation Tester 	<ul style="list-style-type: none"> ● Measuring Instruments & Gauges ● Temperature Index. ● Chemical Testing ● Weighing Balance ● Microscope, etc.
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- **The technology existing the manufacturing of the product:**

While most of the Medium and Large enterprises have adapted to world class technology, the same cannot be said for the micro and small scale sectors. The main factor for this is the very high cost of latest technology equipment and it does not commensurate economic viability of production scale. Certain Enamelled Wires such as Enamelled Wire for Submersible Pumps, Paper covered Enamelled Wires, tapped or yarn covered Enamelled Wires etc., are largely manufactured by micro and small-scale units. Conventional and Moderate level of Technology creates partial Technological obsolescence.

Latest machinery for wire drawing, enameling, annealing and testing are being used by some of the big manufacturers in Europe, Germany, Austria, Italy. The modern machines are also mainly manufactured at European countries, Germany, Austria, Italy etc. The leading edge of these Machines/Technology is in fine wire drawing and enameling process.

Following technological features are provided by leading OEMs in these plant & Machinery:

- Smooth wire cleaning (Non contact) via hot wire nozzle.
- Annealing: high efficient heat transfer, uniform heat input and energy efficient process
- High efficiency energy saving and speed of production for enameling, constant enamel feeding, explosion protection, exhaust heat recovery etc.
- Inline temperature measurement (non contact) optical measurement
- Compliance with international environment directions by trend setting technology.
- Expertise in fine wire drawing and enameling.
- Higher yield, long life of dies with high surface quality and fully automatic wire tension control etc.

- **Suggested modern technology for implementation or available in the market**

Modern technologies are in the area of expertise in fine wire drawing, quality and production capacity of enameling and zero pollution. Ultra fine winding wire is used for microelectronics to medium wire for motor and compressors horizontal machines deliver the best performance for ultra fine wire, vertical machine are used for heavy sizes. Some of imported machines OEM have claimed for concept of zero energy even in which energy of electric heater and heat generated from chemical conversion of solvents is recovered. Also these machines ensure high quality coating of enamel.

These machines cost around 5-50 cr., depending on the number of lines or production capacity. Electricity consumption is closed to be reduced by 50% less manpower and high reliability and yield of product. Production speed of these machines can reach up to the range of 1000 kg/hr/line for very fine size wire i.e. swg25-38. Industry 4.0 is to be implemented for making winding units more flexible and adoptable to product mix to meet upcoming demands of sensors, solenoid, equipments.

The main modern technologies, need of technologies and availability are summarize as below

Modern Technology For Implementation	Need of technology	Technology availability in the market
fine wire drawing, consistency in wire quality	For micro fine fire	There are very few manufacturers for the state of art technology for ultra fine winding wires in India. Some of the enamelling plant supplied by China are also been used in India. These are moderate in technology and having higher production capacity. The world class technology, machines are mainly manufactured at European countries, Germany, Austria, Italy etc. R&D work is also undertaken in these countries to make process more efficient and quality enhancement.
High speed enamelling process	Enamelling process production is bottleneck operation and it should be balanced with line.	
In-line quality control	Quality control	
Superior coating quality of enameling	Enamel coating is the core for winding wire life and energy efficiency.	
Low energy consumption	To make process for cost effective and reducing heat losses.	
High scale of production line	Due to wafer thin margin in manufacturing of winding wire, it is essential to scale up the quantum of production to make business viable.	
Industry 4.0	Industry 4.0 is to be implemented for making winding units more flexible and adoptable to product mix to meet upcoming demands of sensors, solenoid, and equipments.	
Zero pollution enamelling	National & international norms for pollution to be met	

- **Raw material required and availability**

The primary Raw Material for Enamelled Wires is Electrolytic Copper Rod/ Electrolytic Copper Cathode, Electrolytic Aluminium Rods or Electrolytic Aluminium Ingots, and Wire Enamel / Insulation Material/Varnish.

- i) Copper Rod: The Copper Wire of sizes ranging from 18 to 45 SWG is drawn from the 8.0 to 12mm diameter rods. To comply with manufacturing of different type of Wires & Cables with BIS Specifications, the Plain Annealed High Conductivity Copper Wire of Electrolytic Grade (continuously cast –CC Grade) are used having 99.9 % purity.
 - The main raw material suppliers are Hindalco and Vedanta (Sterlite).
 - There is shortage and price fluctuation due to closure of Vedanta’s Smelter owing to Environmental issues and also Planned and Unplanned shutdown by Hindalco affect the supplies and price.
- ii) Enamel varnish : Wire enamels containing Polyester ,polyester imides and/or polyamide imides with polyoxyalkylenediamines and other similar chemicals as molecular elements.
 - Wire Enamels are primarily sold by Elantas Beck India. Most of the other enamel producers have been bought out and merged into Elantas Beck. The cost of enamel has surged in the last 6 months to double of the previous year due to the international market and curbs of chemicals from China.
 - The OEM for this varnish in India is ELANTAS Bech India,Pune Company.The price and availability is governed by them.
- iii) Aluminum : EC Grade of Aluminum Rods (99.5 % of purity) of the Dia ranging from 8 – 12mm are used for manufacturing of hard drawn Aluminum Wire Conforming to IS: 5484: 1978
 - On the aluminium front the two primary suppliers are NALCO and BALCO (Sterlite / Vedant).
 - The desired quality required for the Enamelled Wire industry is not available from them as reported by WWMAI, however, currently the industry uses their material. There is price fluctuation and shortage time to time.

Covering Raw material standards Indian/International

Raw Material	Standards
Copper	IS12444:1988
Aluminium	IS5484:1997
Varnish for enamelling	IS10026-Part 2:1999 IEC 464-2(1986)

PROJECT REPORT

* The detailed bankable project report of the product.(Financials, space/manpower requirement, Technology)

PROJECT PROFILE ON ENAMELLED WINDING WIRE (ALUMINIUM/COPPER)

Product Name	ENAMELLED WINDING WIRE (Aluminum/Copper)
Product Standard	IS:13730
HSN Code	85441990
NIC code	27320 Manufacture of other electronic and electric wires and cables (There is no separate category for winding wire in NIC code)
Production Capacity Per Annum	300 MT
Turnover Value (Rs Per Annum)	18 Cr.
Month & Year of Preparation	April 2021
Prepared By	Br. MSME- Development Institute ITI Campus, Hansi Road Bhiwani -127021 Ph: & Fax: 01664-243200 Email: brdcdi-bhiw@dcmsme.gov.in

INTRODUCTION

Wires are manufactured by the Metal forming process known as wire drawing in which the large size wire rod is pulled with tensile force through the die having small hole (orifice) to get the rod or wire of desired cross sectional area generally it is carried out at room temperatures but sometimes to reduce the stresses it may be carried out at elevated temperatures, generally the process of wire drawing is used to produce the wires made of copper and aluminum which is further used in electrical winding purposes. This thin layer of insulation makes it useful for building transformers, motors, inductors, hard disk actuators, speakers, electromagnets etc.

MARKET POTENTIAL

The Winding wire is used in for electric winding purposes and the thin layer of insulation makes it useful for building transformers, motors, inductors, hard disk actuators, speakers, electromagnets etc. and this product has strong market potential as approximately there are 50 units which are engaged in this activity and using the high technology machines and about 100 units are there that are engaged in the same business and giving good output even they are not using much technology and these days the energy efficient transformers and motors are being used in industry sector and thus the market potential of this product is high as this product is being imported in India hence if it is produced here lots of opportunities are there in this business .

BASIS AND PREASSUMPTIONS

1. It is based on eight working hours a day and Twenty Five days in a month and the break even efficiency has been calculated on 75% capacity utilization.
2. Labour and wages are mentioned as per prescribed minimum wages and the proprietor.
3. Interest is considered @ 10% in the project for recurring and non-recurring investment.
4. The margin money as applicable to general categories of entrepreneurs may be 25% of the project cost.
5. The payback period may be 5years after the loan has been disbursed.
6. The cost of the land, construction charges, cost of machinery and equipment, raw materials and consumables, other contingent expenses etc. indicated in the profile are based on the prices prevailing at the time of project preparation and can be changed from time based on local conditions.

IMPLIMENTATION SCHEDULE

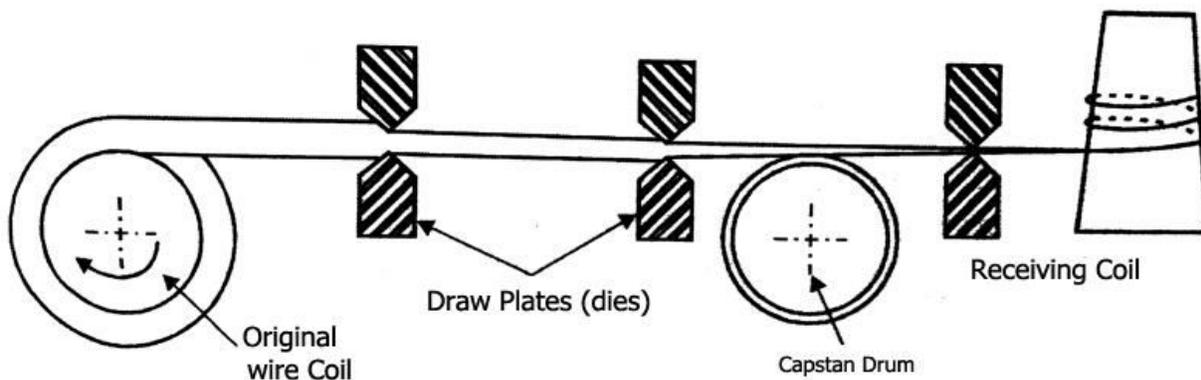
Sr. No.	Activity	Period in Days
1	Survey for collection of data in respect of demand, raw material including power and fuel, Procurement of technical knowhow etc.	0-45
2	Arrangement of finance for margin money and other financial assistance.	30-60
3	Preparation of project report.	30-60
4	Selection of site (rented building).	60-90

5	Placement of orders and receipt of machines and of workers/staff recruitment.	90-120
6	Procurement of raw material/bought out components/tools/measuring equipment/gauges etc.	120-150
7	Erection of machines/electrification and commissioning.	150-180
8	Trial Production.	180-200
9	Commercial Production.	200-220

TECHNICAL ASPECTS

PROCESS OF MANUFACTURE

Wires are manufactured by the Metal forming process known as wire drawing in which the large size wire rod is pulled with tensile force through the die having small hole (orifice) to get the rod or wire of desired cross sectional area generally it is carried out at room temperatures but sometimes to reduce the stresses it may be carried out at elevated temperatures, generally the process of wire drawing is used to produce the wires made of copper and aluminium which is further used in electrical winding purposes, for electrical winding wire basically both of the Copper and aluminum metals are being used as both the metals are good conductor of electricity and the process involved in drawing the wire is almost same that can be explained with the help of figure given below :-



Thick Wire Drawing Process: In wire winding as shown in picture above the coil of wire of generally 8mm to 12 mm cross-section is mounted over a drum/flywheel then the wire is pulled through the orifice with the help of dies and due to the plastic deformation the cross-sectional area of the wire is reduced and then wire is drawn from the series of die sets of less cross-sectional area to get the wire of desired size, generally the wire is drawn upto the size of 1.2mm and in case of copper wire due to the wire drawing process and large plastic deformation lots of

stresses are developed in the structure and if we further try to reduce the cross-section the wire will get break and to reduce the developed heat treatment is done.

Annealing: Annealing is the heat treatment process which is also known as stress relieving process basically used to relive the stress and homogenising the structure of copper, in which the drawn wire coil is loaded in the annealing furnace and it is exposed to the high temperature and then it is kept at room temperature for slow cooling and developing the softness in the mechanical properties of copper.

The above mentioned heat treatment process is optional in case of aluminium as it posses the different mechanical properties.

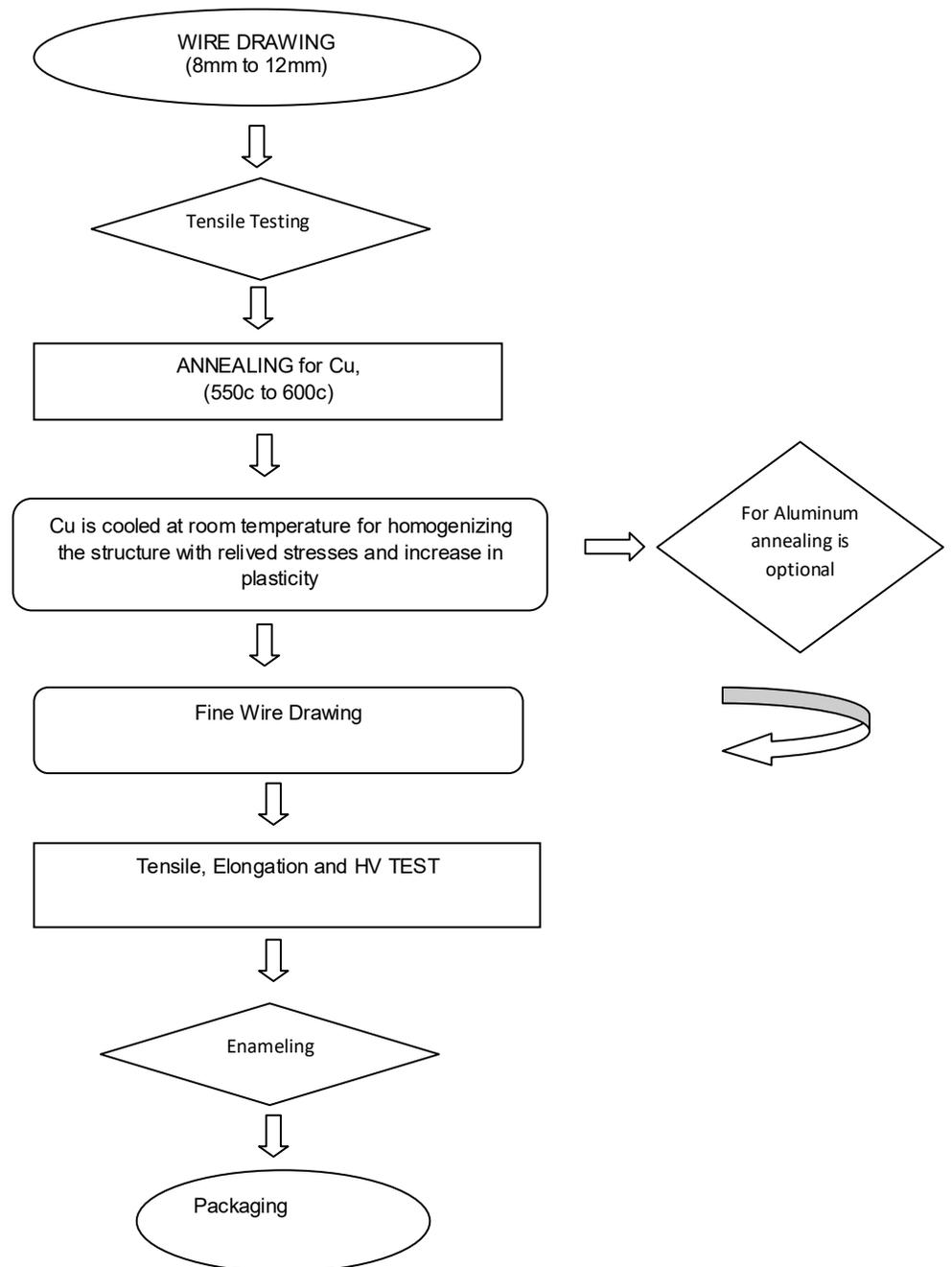
Fine Wire Drawing:After heat treatment, the wire is again passed through the set of dies having fine orifices for further reduction in cross-sectional area to the desired fine wire size.

Enamelling: The **enamelled wire**, also called magnet **wire**, basically refers to an aluminum or **copper wires** which has been given a coating. This thin layer of insulation makes it useful for building transformers, motors, inductors, hard disk actuators, speakers, electromagnets etc. The enamelling is basically a thin layer of coating and generally three types of chemicals are being used in this are:

1. Polyester
2. Polyesteramide
3. Polyimide
4. Dual enamel or super enamel

PROCESS FLOW CHART :

Manufacturing flow process chart for enameled winding wire is as below:



QUALITY CONTROL AND STANDARDS:

Main quality parameters for winding wire are dimension – Diameter, Electrical resistance Elongation, springiness, Heat Shock, flexibility and adherence, Temperature index. High temperature failure, insulation thickness Resistance to solvent, breakdown voltage, weight etc. IS 13730- Main BIS standard for winding wire and IS 13778-5 (2012) is related to Winding Wires – Test Methods.

POLLUTION CONTROL:

Pollution control requirement for enameling plant, wire drawing and other plant are in RED CATEGORY OF INDUSTRIES hence the high technology machinery must be installed that may arrest the polluting agents and turbo ventilators must be installed.

ENERGY CONSERVATION:

Suitable energy efficient motors i.e. BEE star rated motors, fittings, lights, ACs etc. are to be used on proposed machines with provisions of recommended shunt capacitors. The workers of this unit should be made aware of the need to conserve energy by switching off the energy sources when not required and machines with limit switches and actuators should be used that can stop working when idle or on No-Load condition.

ADDRESSES OF MACHINERY AND EQUIPMENT SUPPLIERS:

There are many domestic and international manufacturers and suppliers of Plant & machinery for winding wire. Some of them we are mentioning here.

WIRE DRAWING MACHINE SUPPLIERS:	
SAI ENGINEERING WORKS Plot No. 5, Rajender Nagar industrial Area, Krishna Compound, Mohan Nagar, Ghaziabad Uttar Pradesh 201007 Ph: 9313831782 E-mail saiengineering758@gmail.com	Usha Martin Limited 701, 'Surya Kiran' 19, Kasturba Gandhi Marg New Delhi 100 001 Tel: +91 11 2331 5156 / 57 / 58 2371 1232 / 2371 5220 Fax: +91 11 2332 0723 / 5586 Email: marketing-north@ushamartin.com
Sagar engineering works A-129, Road No.9-dV. K. I. Area, Jaipur, Rajasthan Email: Infosagar.in Ph No.0141-4064876,9829024358	Sai Machinery Kh. No. 816, Vikas Nagar Industrial Area, Sihani Road Ghazibad(U.P) Ph: 9810419983,7668623426 E-mail: saimachinery19@gmail.com
FINE WIRE DRAWING MACHINE SUPPLIERS:	
SAI ENGINEERING WORKS Plot No. 5, Rajender Nagar industrial Area, Ghaziabad, U P-201007	Sagar engineering works A-129, Road No.9-d, V. K. I. Area, Jaipur, Rajasthan Email: Infosagar.in

Ph: 9313831782 E-mail saiengineering758@gmail.com	Ph No.0141-4064876,9829024358
Parovi Machines Plot No.- 318, Phase-V, Sector- 56, KIA, HSIIDC, Kundli, District Sonipat, Haryana- 131028 info@parovimachines.com +91- 783-800-6222	Henrich Henrich Maschinenfabrik GmbH Rehbergring 17 D-35745 Herborn,Germany Phone +49 2772 506-0 Fax +49 2772 506-196 E-Mail: henrich-gmbh@henrich.net
ANNEALING FURNANCE :	
M.G. FURNANCES(INDIA) Plot No.97, Sector 24, Faridabad Haryana – 121005 Ph: 8048601650	M/s Ritvik Engineering Works 7-B Chandan Badi, Behind Murli Restaurant, Kalwar Road, Govindpura Jaipur Ph: 7971269329
Sai Neelkanth Engineers RZ-E-56, EAST Dabri Extension Delhi, 110045 Ph: 8048609853	Delta Furnances Plot No. 305, HSIIDC Rai industrial Estate, Sonepat Haryana-131029 Ph: 8042973392
A.K.High-Tech Engineers 9/4928.A/16-B, EAST OLD SEELAMPURI DELHI-110031 Ph: 8048622183	
ENAMELLING MACHINE :	
Muskaan Engineering works #1/3482-D Street No. 6 Ram Nagar Extension, Ram Nagar Shahdara, Delhi	MAG machines GmbH Wirtschaftspark 44 / 46 8530 Deutschlandsberg Austria Phone: +43-3462-2545 Fax: +43-3462-2545-125 E-Mail: sales@mag.at
Velocity Engineers Private Limited 251, Dilshad Garden, New Delhi-110095 Ph: 8048938367	NEWTECH SRL Via Carovella, 10 28066 Galliate (NO) – Italy email: info@glnt.it 08.30- 12.30 – 13.30 – 17.30 Tel. +39 0321 80131 Fax +39 0321 801337 -8
TESTING MACHINERY AND EQUIPMENTS SUPPLIER :	
Kamal Metal Industries No. 3, Subhash Industrial Estate, Ramol Road, C. T. M. Amraiwadi, Ahmedabad - 380026, Gujarat, India Ph: 08048762745	Fine Testing Instrument (India) Co-operative colony, Monojesh Balaka Apartment, Ground Floor, Rahara, Khardah, Kolkata-700118, West Bengal, India Ph: 08048602596

ENAMEL VARNISH SUPPLIERS:	
Ohmer Chemicals Pvt Ltd., 15, Upper Level, Urvashi Complex, Mithakhali Six Road, Navrangpura, Ahmedabad-380 006. Gujarat, India (O): 91 79 26406486 E Mail:- ohmer_chem@yahoo.co.in	Elantas Beck India Ltd. 403, World Trade Centre, Babar Road, New Delhi - 110001 India Tel +91 11 2341-1664, 2341-7264
Bawa Polymers 65 West Avenue Road, Punjabi Bagh west (Head Office) New Delhi-110026 +91-11-25222083, 25222629 info@bawapolymers.com www.bawapolymers.com	

FINANCIAL ASPECTS OF PROJECT

FINANCIAL ASPECTS					
(i)	LAND AND BUILDING				Amount (In Rs.)
	Shed covered area 300sq.mts. (rent-ed)				50000
(ii)	MACHINES & EQUIPMENTS				
Sr.No.	Description	Imp./Ind.	Qty.	Rate(Rs.)	Amount (In Rs.)
1	Rod break down machine (SEW -13) (Pneumatic Spooler DIN 630MM including Motor CG 150HP-1440RPM and Motor CG 10HP and Panel with AC Drive and pointing cum threading)	Ind.	1	3074301	3074301
2	Fine Wire Drawing with Complete Die sets and Penal with AC drives	Ind.	1	599000	599000
3	Bright Annealing Machine Fixed Type	Ind.	1	300000	300000
4	Fine Wire Enameling machine 40 lines	Imp.	1	20000000	20000000
5	Digital Tensile Strength tester	Ind.	1	230000	230000
6	Elongation testing Machine	Ind.	1	50000	50000
7	H.V tester	Ind.	1	25000	25000

8	Worktables, racks	Ind.	L.S		80000
9	Tools, Dies and jigs and fixtures and measuring instruments	Ind.	L.S		100000
10.	200KVA TATA Diesel Generator	Ind.	1		1100000
			TOTAL		25558301
	Office furniture almira, chairs and tables.				200000
	Electrification & installation charges @ 10% of m/c cost				2555830
			TOTAL		28314131
(iii)	PRE - OPERATIVE EXPENES		L.S		100000
TOTAL FIXED CAPITAL {(i)+(ii)+(iii)}					2,84,14,131
B.	WORKING CAPITAL(PER MONTH)				
(i)	STAFF AND LABOUR				
Sr.No.	Designation		Nos.	Rate(Rs.)	Amount(In Rs.)
1	Supervisor/Foreman(maintenance)		2	30000	60000
2	Skilled Workers		6	15000	90000
3	Semi-Skilled Workers		4	10000	40000
4	Storekeeper		2	10000	20000
5	Clerk		2	10000	20000
6	Helper		5	6000	30000
7	MTS		3	8000	24000
8	Chowkidar/Watchman		2	8000	16000
			TOTAL		300000
(ii)	RAW MATERIALS(per month)				
Sr.No.	Particulars	Qty.		Rate(Rs.)	Amount(In Rs.)
1	Aluminium Wire rod of EC grade	12500Kg.		200/Kg	2500000
2	Copper	12500Kg.		700/Kg	8750000
3	Enameled Polyester Varnish	2460KG		106/KG	260760
	TOTAL				11510760
(iii)	UTILITIES				
Sr.No.	Description	AMOUNT (in Rs.)			
1	Power 200KVA @ Rs. 7.5/unit	1200000			
2	Water	15000			
	TOTAL	1215000			
(iv)	OTHER CONTINGENT EXPENSES				

Sr.No.	Description	AMOUNT (In Rs.)		
1	Consumable Stores	4000		
2	Stationery	10000		
3	Transportation	10000		
4	Repairs and Maintenance	10000		
5	Advertisement and Publicity	20000		
6	Miscellaneous	8000		
7	Insurance and Taxes	8000		
	TOTAL	70000		
(v)	TOTAL RECURRING EXPENDITURE (PER MONTH)			
Sr.No.	Description	AMOUNT (In Rs.)		
1	Staff and labour	300000		
2	Raw material	11510760		
3	Utilities	1215000		
4	Other contingent expenses	70000		
	TOTAL	13095760		
(vi)	*TOTAL WORKING CAPITAL (FOR 3MONTHS)	3,92,87,280		
C.	TOTAL CAPITAL INVESTMENT			
Sr.No.	Description	AMOUNT (In Rs.)		
1	Fixed capital	28414131		
2	Working capital for three months	39287280		
	TOTAL	67601411		
	FINANCIAL ANALYSIS			
Sr.No.	(1) Cost of production	AMOUNT (In Rs.)		
1	Total recurring cost	157149120		
2	Dep. On plant machinery @ 10%	2555830		
3	Dep. On tools and accessories @ 25%	25000		
4	Dep. on office equipments @ 25%	50000		
	Interest on total capital investment @10%	6760141		
	TOTAL	166540091		
	(2) Turn over(per month)			
Sr.No.	Particulars	Qty.	Rate(Rs.)	Amount(In Rs.)
1	By sale SUPER ENAMELED COPPER WIRE	12500kg	850	10625000

2	By sale SUPER ENAMELED Aluminium WIRE	12500Kg	375	4687500
	TOTAL	15312500x12=183750000		
	Turnover per year	183750000(18.375 cr.)		
	(3) NET PROFIT(PER YEAR)			
		TURN OVER - COST OF PRODUCTION		
		(183750000-166540091)		
		17209909		
	(4) PROFIT PERCENTAGE			
		{(NET PROFIT X 100)/ TOTAL TURNOVER}		
		(17209909x100)/183750000		
		9.3=>9		
	(5)RATE OF RETURN			
		{(NET PROFIT X 100)/ TOTAL INVESTMENT}		
		(17209909x100)/166540091		
		10.3		
	(6)BREAK EVEN POINT			
Sr.No.	FIXED COST (PER YEAR)	AMOUNT(In Rs.)		
i)	Depreciations(office equipments +	2630830		
ii)	Interest on total capital investment @ 10%	6760141		
iii)	40% of the salary wages	120000		
iv)	40% of the other contingent expenses	28000		
v)	Rent	600000		
	TOTAL FIXED COST	10138971		
	BREAK EVEN POINT CALCULATIONS			
		{(FIXED COST X 100)/(FIXED COST +PROFIT)}		
		(1013897100/27348880)= 37.07		
	BEP	37		

- **Details of test facilities available in India**

Following are the NABL Accredited Lab. where cluster units send their products for 3rd party Certificate / type test (like stress-strain Test, Surface Condition Test, Ultimate Braking Load Test etc.).For basic in-house testing requirements, test facilities can be setup by MSME with 10-20 Lakh investment.Following are some of the prominent Institutions /Labs to cater to this sector:

- CPRI, Bhopal
- ERDA, Varodara,
- IDEMI, Mumbai
- TC, Okhla, New Delhi
- TC,Mumbai
- ETDC, Jaipur. etc.

- **Details of Raw materials suppliers:**

Raw material supplier's details are as below:

- i) Copper Rod:
 - Hindalco
 - Vedanta (Sterlite)
 - Hindustan Copper Limited
- ii) Enamel Varnish:
 - ELANTAS Bech India
147 Mumbai Pune Road,
Pimpri, Pune 411 018
India
Phone +91 20 67190-600
Fax +91 020 67190-792
info.ELANTAS.Beck.India@altana.com
www.elantas.com/beck-india
- iii) Aluminum:
 - NALCO
 - Hindalco, Nalco &
 - BALCO-Vedanta

Details of the machinery suppliers:

Details of machine suppliers including prominent international machine suppliers are given in the project report section of this report.

SCHEMES AND CONSULTANCY SERVICES : ROAD MAP

- **Existing schemes available and their details**

Major problems faced by Manufacturers of winding wire regarding raw material, Quality, technology, cash flow, loans/finances etc.

Following Issues and interventions are suggested under scheme & programs of concerned Govt Organization:

1. Raw Material: Quality of Aluminum

On the aluminium front the two primary suppliers are NALCO and BALCO (Sterlite / Vedanta). The quality of material is not as per requirement of winding wire sector. As a result, winding wire user companies directly import the winding wires instead of imports raw material, as it costs less in comparison to manufacturing winding wires by imported raw material.

Suggestion:

- It is suggested that the aluminium rod quality needs to be substantially improved for the Enamelled Wire Industry. Matter to be examined and may be resolved by interaction between raw material manufacturers, research institute, quality testing labs and BIS etc.

Scheme: Awareness program under PMS with Industry association, MSMEs, Research Institutes, Technology Centre (TC), NALCO, BALCO etc.

2. Raw Material: cost

Raw material (Copper) rates are very fluctuating. It is not possible to store raw material by MSME sector manufacturer as it involves very high cost. It costs 93% of total product cost, value addition in raw material is very less as winding wires. GST on raw material is very high; it is 18% at present. It makes the finished product uncompetitive in comparison to imported product.

Suggestions:

- Matter may be examined for some tax rebate may be given to this sector by putting the finished product in low GST slab. BIS shall be mandatory for imported as well as domestic product and some subsidy component shall be introduced for domestically manufactured ISI marked product.
- Raw material assistance of NSIC, Ministry of MSME may be explored to provide Economics of Purchases like bulk purchase, cash discount etc. Also, raw material bank for Copper and Aluminium under MSE-CDP may be explored.

Scheme: Raw Material Assistance Scheme-NSIC, MSE-CDP scheme (Ministry of MSME)

3. Quality standard: BIS certification

India is a large producer of Enamelled Wires and has been producing since the 1950's. The quality of most commonly consumed grade are up to the international standards. However very few units have opted for ISI marking. The reason is that the country consumed a lot of wire in the Standard Wire Gauge (SWG) and the ISI only has standards for the metric size (millimetres) since ISI standards for Winding Wires are harmonised with IEC. If ISI be asked to introduce a standard for SWG sizes and their making fees were made reasonable more companies would opt for ISI marking.

Concurrently for any country who does not have equivalent bilateral trade agreements for quality certifications must be charged high fees for ISI marking of imports into India of their products without which import may not be permitted.

Suggestions:

- Matter has been already forwarded to BIS for their comments/solution. Matter may be examined for mandatory BIS license for imported as well as domestic product and some subsidy component shall be introduced for domestically manufactured ISI marked product

Scheme: ZED certification

Re-imburement under Z- certification shall also covers the ISI certification cost.

4. Quality standard: International certification:

There is a need for getting certification from International agencies like Underwriters Laboratory (UL), and REACH (European) for Chemicals (insulation Materials) etc for export . These international certifications agency have very high charges for certification, sometimes these are unaffordable for MSME sector and these charges act as a barrier for exporters because company requires it before an order is placed.

But in India importers do not require such certification and as a result cost of exporter is reduced and it gives competition to Indian manufacturers. It de-motivates the manufacturing sector and supports the importers only. Result is increased bill of imports and loss in exports.

Suggestions:

- Concurrently for any country who does not have equivalent bilateral trade agreements for quality certifications must be charged high fees for ISI marking of imports into India of their products without which import may not be permitted. It is suggested the ZED certification may include the provision for reimbursement of international certification and all certifications under BIS scheme & program for ISI marking of imports into India.

Scheme : ZED certification Re-imbusement under Z- certification shall also covers the International certification cost also.

5. Insufficient access to technology and R & D Issues

Conventional and Moderate level of Technology creates partial Technological obsolescence. Majority of MSEs are using outdated technology. The main factor for this is the cost of latest technology equipment is very high and these type of plants are mainly manufactured in Europe, Germany, Austria, Italy. They are the leaders in this sector and continuously reducing their production cost with EET, increasing scale of manufacturing and improving quality parameters. These plants of fine wire drawing and enameling are very costly which a MSME can't afford and also without them they does not commensurate economic viability of production scale. The Enameled Wire Industry is gearing up to face the new technologies for the electric vehicle industry. The wires will be used for the motors and charging unit of the EV.

We hardly have any Govt./Pvt agency working for R& D, Technology development or TOT and quality parameters for winding wire in India.

Suggestion:

- It is suggested that R& D organisations such as ERDA (Electrical Research and Development Association), Central Power Research Institute (CPRI) which tests electrical products should work in this field. The Enameled Wire Industry is gearing up to face the new technologies for the electric vehicle industry. The wires will be used for the motors and charging unit of the EV.
- Wires & Cable Industry sector which includes winding wire also is provided in the approved technology list under CLCSS at Sr. No. XX, however only extruder machine and testing lab for BIS are added under this category , Also the cost of advanced machinery is very higher than the maximum limit of the scheme. It is suggested that following machines may be added under this category:
 - Wire Drawing Machine
 - Fine Wire Drawing Machine
 - Annealing Machine
 - Enamelling PlantAs the definition of MSE has also been changed it is suggested the upper ceiling of 1 Cr. of P&M to be revised to 5 Cr. under CLCSS scheme.
- Participation in National and International technology based Trade Fairs and Exposure Visit to make the entrepreneurs and their technical persons more innovative and creative. For example there is prominent fair namely ELECRAMA is organized in India and units shown interest in participation. There are also International trade fair organised with focus on this sector.

- IDMI or other concerned Technology Centre may take lead for further examination and future action with CSIR-ERDA, CPRI, IEEMA etc. & Industry associations of this sector for Technology development & transfer and R&D framework for quality improvement.
- Prospects for establishing for Testing Centre & R&D Lab. for upcoming or existing TCs like IDME for wire and cable with specialization on winding wire may be explored.

Scheme: CLCSS, SCLCSS (Ministry of MSME), CGTMSE

PMS and IC scheme. (It is suggested since the units of winding wire are scattered across states, less than 10 units from one state may be allowed under PMS scheme for domestic trade fair.)

6. Cash flow

One of the biggest problems faced by winding wire MSME's is Cash flow due to high cost of raw material. Specifically in the case of Enamelled Wires, currently raw material cost is almost 90% of our selling price of wire. Copper and Aluminium Metal is sold either on advance payment terms or secured under letters of credit or such documentary credit. The sale of Enamelled Wires is on credit, at an average of 60 days. The trough put from purchase of material to delivery is about 30 days. Therefore the cash flow cycle is 90 days, if the customer pays on time. In most cases the outstanding are totally unsecured and at best be supported by a post-dated cheque.

Suggestions:

- NSIC may examine raw material issue for winding wire sector under their scheme for raw material to provide Economics of Purchases like bulk purchase cash discount etc.
- Mainly the units organised sector in winding wire falls under Medium or large scale, hence couldn't take help of MSEFC. However MSE units can get assistance from MSEFC to address the delay payment issue.
- Maximum buyer-sellers should be on board at TReDS

Scheme: NSIC-Raw Material Purchase

MSEFC-Delay Payment Act

TReDS scheme propagation and on boarding

7. Lack of cluster approach:

Winding wire units are in scattered form in country and organised units are mostly in medium and large scale. They are not located in cluster form, hence difficult to adopt common consortia approach for them.

Suggestion:

- Possibility may be explored for setting up of CFC for Testing, Calibration, product & tools design, skill development, raw material bank, etc to address customer quality requirement including Information Centre for international markets, help desk for International help desk, linkages and information regarding the latest technologies & management practices, etc.

- Possibility may be explored for up gradation of Infrastructural Facilities like – development of Separate Industrial Area, existing industrial area etc. under ID scheme under MSE- CDP of Ministry of MSME, Government of India which may includes entire supply chain of winding wire and wire & cable industry in close proximity and near-by area/states for optimizing their operations .

Scheme:CFC and ID component of MSE-CDP scheme,Ministry of MSME

8. Import duty and related issues:

As per the opinion of association and stakeholders, it is mentioned that there has been a reduced rate of duty for copper enameled wire used in the electronic industry for decades. This is the reason that the fine enameled wire industry did not flourish in India.

Suggestion:

- Matter may be examined considering views of all stakeholders. Associations and MSMEs of winding wire sector has a point that Copper was to be bought upon payment of duty and the Winding could be imported duty free. Such instances of inverted duty shall be examined.

It has been reported by associations that the Enameled winding Wires has been imported with under invoicing. It is also suggested that Winding wire should have dedicated HS code. For example HS 85441990 is in “others”category,due to this issue it is not possible to get exact import data of winding wire item wise.

Suggestion:

- Matter may be examined considering views of all stakeholders. If feasible Customs should evaluate the rate of Enameled Wires and compare with other actual user importers in all ports of India. If any under invoicing is found, appropriate action shall be taken to safeguard the Indian manufacturers. Also examination/rationalization of HS code for winding wire industry is suggested.

There are several industries that have completely stopped consuming Enameled Wires locally. They are importing semi knocked-down components from China and other Asian countries which they assemble with a screwdriver. This is true for the refrigeration compressor industry in particular and also for cellular network tower transformers. Our entire growth has been transferred to China.

Suggestion:

- It is therefore suggested that there should be at least 80% indigenous components and screwdriver technology / assembling should be strongly discouraged. Matter may be examined with consumers of this raw materials and suitable action may be taken.

Basic Customs Duty (BCD) on Copper wire Rod is 5%. Domestic Copper Producers charges this 5% as Multiplying Factor in their Prices of Copper Cathode. Insulating Varnish (CTH : 3208), Basic Customs Duty 10% .Multiplication Factor levied (In lieu of Customs Duty) by Domestic Copper Producers .Copper producers uses Copper Concentrate and Unrefined Copper (Blister Copper, Copper Anode) as their raw material and enjoy almost Nil rate of Customs Duty on their inputs as they import under FTA /PTA.Import Duty on Copper Scrap from 5% to 7.5%, which not only creates pollution while processing but also makes inferior quality Electrical Equipment resulting in loss of precious energy and hazardous for safety.

Suggestion:

- Matter may be examined with DGFT,export trade bodies and other stakeholders
- BIS may examined the IS implementation for the items in effective and phased mannerso that the more energy efficient equipment /appliance would be in use.
- Examination by DGFT and other stakeholders for following inputs of association:
 - Maintain Same Import Duty on Copper Wire Rod (HS: 740811/19) i.e. 5%
 - Grant Deemed Export Status to Supplies to Electronics Industry
 - Increase Duty on Copper Scrap (from 5% to 7.5%)

- **Proposed scheme (if existing is not suitable):**

1.**Upscale CLCSS scheme:**Technology bank may be developed for Import substitution items and these machineries purchase to be covered under CGTMSE fund. Existing and new entrepreneurs may be encouraged by providing easy credit, subsidy without collateral to them. OEMs of these machineries domestic and abroad may be registered under this scheme. There is a similar scheme namely Loan for Purchase of Equipment for Enterprise’s Development (SPEED) is in operation by SIDBI. It is suggested that Ministry of MSME may launch **Upscale CLCSS** scheme for few selected sector having Import substitution potential with increase in Ceiling of P&M up to 5-10 Cr.(MSE ceiling as per new definition also enhanced) with enhance subsidy 25-50% and for credit this scheme may be linked with SIDBI financing model like their SPEED scheme for existing MSMEs and under CGTMSE for new or prospective entrepreneurs may be adopted.

2. **Scheme for Quality Insurance for Import Goods:**Many Buyers/MNC’s are transferring quality failures of their products to the Enameled Wire Industry. In case of a product failure at their customers end, winding wire industry are obliged to sign an agreement to absorb losses incurred for recall and any other claims that their customers may make. There is no insurance policy available in India for product liability. Arbitration or contesting a legal issue overseas is not a viable option. Export Promotion council offers insurance for bad debts but not for product liability.

It is suggested to explore the possibility to develop the product insurance scheme/policies to the deserving Indian companies. BIS, ECGC, NSIC, RITES, DGFT etc bodies may work on it,especially for the exported goods.

- **Details of agencies that can provide guidance**

(CSIR, MSME TCs, Sector councils etc.)

Following agencies are working in the field of wire and cable including winding wire :

- ERDA (Electrical Research and Development Association) which tests electrical products also development work in the field of wire & cable is being done.
- Central Power Research Institute (CPRI) provides facilities for testing the raw materials. CPRI is also engaged in the development of indigenous technology for some of the items like anti-oxidant, etc.
- R&D efforts are being made by the Wire Drawing and other plant & machinery manufacturers for the development and up gradation. Usha Martin Industries & the Aluminum Industries have made some the R&D efforts in Wire Drawing Machinery Manufacturing. But their technology is limited to their products.
- Indian Electrical & Electronics Manufacturers' Association (IEEMA), is the apex industry association of manufacturers of electrical, industrial electronics and allied equipment in India. IEEMA represents the complete value chain in power generation, transmission and distribution equipment. IEEMA members have a combined annual turnover in excess of US\$ 42 billion and have contributed to more than 95% of the power equipment installed in India. IEEMA has one separate division and committee for Winding wire sector. IEEMA is doing activities for winding wire sectors.
- Winding Wires Manufacturers' Association Of India (WWMAI) Incorporated in November 1973, (WWMAI) is the Representative Association of Indian Copper Winding Wires Manufacturers. The pan India Members of the Association are generally engaged in the production of winding wire.
- IDMI: Technology Centre of Ministry of MSME can provide assistance in testing and technological issues.
- OEMs of Technology providers.

Role of research institute w.r.t. winding wire industry is mainly limited to testing. They are lacking in R&D for upgrading production process, lack of new product innovation services, and lack of new design inputs.

India needs to upgrade manufacturing output by adopting Technology to enhance competitiveness compared to other countries. It is therefore, important for India to become **Aatmnirbhar Bharat** by having collaborations with world class companies across the globe for new Technology. Winding wire industry would also have to focus on innovative technologies and R&D.

CONSULTATION & REFERENCES

Following associations and departments have been consulted-Interacted for preparation of this report

- Indian Electrical & Electronics Manufacturers' Association (IEEMA)
- Large Scale Units
- MSME-Technology Centres & DIs
- Raw material Suppliers
- Winding Wires Manufacturers' Association Of India (WWMAI)
- Machine Suppliers/OEMs
- MSMEs

Annexure-A

State wise and district wise total number of applications of States having significant MSMEs with 5 digits NIC code (27320-Manufacture of other electronic and electric wires and cables (insulated wire and cable made of steel, copper, aluminium) As on 13.04.2021 (as per Udyam Registration webportal)

State wise unit(As on 24.04.2021)

S.No.	StateName	Micro	Small	Medium	Total
1	ANDHRAPRADESH	51	9	0	60
2	ARUNACHALPRADESH	2	0	0	2
3	ASSAM	17	3	3	23
4	BIHAR	130	1	1	132
5	CHHATTISGARH	35	7	3	45
6	GOA	5	4	0	9
7	GUJARAT	352	82	16	450
8	HARYANA	147	26	16	189
9	HIMACHALPRADESH	17	5	6	28
10	JHARKHAND	93	7	1	101
11	KARNATAKA	175	48	6	229
12	KERALA	40	12	2	54
13	MADHYAPRADESH	135	29	7	171
14	MAHARASHTRA	922	97	27	1046
15	MANIPUR	6	0	0	6
16	MEGHALAYA	0	0	0	0
17	MIZORAM	0	0	0	0
18	NAGALAND	0	0	0	0
19	ODISHA	40	12	1	53
20	PUNJAB	85	18	7	110

21	RAJASTHAN	379	67	23	469
22	SIKKIM	0	0	0	0
23	TAMILNADU	383	60	10	453
24	TELANGANA	91	27	11	129
25	TRIPURA	5	0	0	5
26	UTTARPRADESH	365	87	19	471
27	UTTARAKHAND	34	6	4	44
28	WESTBENGAL	61	31	11	103
29	ANDAMANANDNICO MANANDNICO- BARISLANDS	4	0	0	4
30	CHANDIGARH	7	4	0	11
31	DADARANDNAGAR- HAVELI	3	6	3	12
32	DAMANANDDIU	3	5	1	9
33	DELHI	508	161	22	691
34	JAMMUANDKASH- MIR	50	8	2	60
35	LADAKH	0	0	0	0
36	LAKSHADWEEP	0	0	0	0
37	PUDUCHERRY	5	2	0	7
	Total	4150	824	202	5176

A. Haryana: (As on 13.04.2021)

SI No.	District Name	Total Applications
1	AMBALA	11
2	BHIWANI	3
3	FATEHABAD	4
4	GURUGRAM	27
5	HISAR	12
6	JHAJJAR	1
7	JIND	5
8	KAITHAL	3
9	KARNAL	9
10	KURUKSHETRA	3
11	MAHENDRAGARH	2
12	NUH	2
13	PALWAL	1
14	PANCHKULA	5
15	PANIPAT	7
16	REWARI	14
17	ROHTAK	4
18	SIRSA	2
19	SONIPAT	28
20	YAMUNANAGAR	5
	Total	148

B. Rajasthan:(As on 13.04.2021)

Sl No.	District Name	Total Applications
1	AJMER	9
2	ALWAR	44
3	BANSWARA	1
4	BARAN	2
5	BARMER	3
6	BHARATPUR	5
7	BHILWARA	6
8	BIKANER	17
9	BUNDI	2
10	CHITTORGARH	5
11	CHURU	4
12	DAUSA	10
13	DHOLPUR	2
14	DUNGARPUR	2
15	GANGANAGAR	4
16	HANUMANGARH	2
17	JAIPUR	224
18	JAISALMER	4
19	JALORE	8
20	JHUNJHUNU	2
21	JODHPUR	33
22	KARAULI	4
23	KOTA	11
24	NAGOUR	15
25	PALI	8
26	PRATAPGARH	2
27	RAJSAMAND	3
28	SAWAI MADHOPUR	1
29	SIKAR	18
30	SIROHI	2
31	UDAIPUR	16
		469

C.Gujrat

S.NO.	District Name	Total Applications
1.	Ahmadabad	145
2.	Amreli	2
3.	Anand	12
4.	Arvalli	1
5.	Banas Kantha	5
6.	Bharuch	14
7.	Bhav Nagar	2
8.	Botad	1
9.	Dadra And Nagar Havelli	12
10.	Daman	9
11.	Devbhoomi Dwarka	1
12.	Gandhi Nagar	19
13.	Jam Nagar	16
14.	Junagadh	2
15.	Kachchh	9
16.	Kheda	2
17.	Mahesana	9
18.	Morbi	7
19.	Navsari	2
20.	Panch Mahals	3
21.	Patan	3
22.	Rajkot	79
23.	Sabar Kantha	4
24.	Surat	45
25.	Surendra Nagar	3
26.	Vadodara	37
27.	Valsad	27
		471

D.Delhi-UP(under DI-Okhla): (As on 13.04.2021)

Sl No.	District Name	Total Applications
1	CENTRAL	36
2	EAST	161
3	FARIDABAD	41
4	GAUTAM BUDDHA NA- GAR	94
5	GHAZIABAD	119
6	NEW DELHI	24
7	NORTH	62
8	NORTH EAST	47
9	NORTH WEST	142
10	SHAHDARA	85
11	SOUTH	45
12	SOUTH EAST	12
13	SOUTH WEST	23
14	WEST	54
		945

IS 13730 Parts and scope

IS Number	IS Title
IS 13730 : Part 0 : Sec 1 : 2018/IEC 60317-0-1: 2013 (2 Revision)	Specifications for particular types of winding wires: Part 0 general requirements: Sec 1 enamelled round copper wire (Second Revision)
IS 13730 : Part 0 : Sec 2 : 2018/IEC 60317-0-2 : 2013 (2 Revision)	Specifications for particular types of winding wires: Part 0 general requirements: Sec 2 enamelled rectangular copper wire (Second Revision)
IS 13730 : Part 0 : Sec 3 : 2012/IEC 60317-0-3 (1 Revision)	Specifications for particular types of winding wires: Part 0 general requirements: Sec 3 enamelled round aluminium wire (First Revision)
IS 13730 : Part 0 : Sec 4 : 2018/IEC 60317-0-4: 2015 (2 Revision)	Specification for particular types of winding wires: Part 0 general requirements: Sec 4 glass - Fibre wound resin or varnish impregnated, bare or enamelled rectangular copper wire (Second Revision)
IS 13730 : Part 0 : Sec 5 : 2012/IEC 60317-0-5	Specifications for particular types of winding wires: Part 0 general requirements: Sec 5 glass - Fibre braided, resin or varnish impregnated, bare or enamelled rectangular copper wire (First Revision)
IS 13730 : Part 0 : SEC 6 : 2012/IEC 60317-0-6 (1 Revision)	Specifications for particular types of winding wires: Part 0 general requirements: Sec 6 glass - Fibre wound resin or varnish impregnated, bare or enamelled round copper wire
IS 13730 : Part 1 : 1993	Particular types of winding wires: Part 1 Polyvinyl acetal enamelled round copper wire, class 105 (superseding by IS 4800(Part 4):1968)
IS 13730 : Part 12 : 2012/IEC 60317-12 : 2010	Specifications for particular types of winding wires: Part 12 polyvinyl acetal enamelled round copper wire, class 120
IS 13730 : Part 13 : 2014/IEC 60317-13 : 2010 (1 Revision)	Specifications for particular types of winding wires: Part 13 polyester or polyesterimide overcoated with polyamide - Imide enamelled round copper wire, class 200 (First Revision)
IS 13730 : Part 15 : 1994	Particular types of winding wires: Part 15 polyesterimide enamelled round aluminium wire, class 180
IS 13730 : Part 16 : 1996/IEC 60317-16	Specifications for particular types of winding wires: Part 16 polyester enamelled rectangular copper wire class 155
IS 13730 : Part 17 : 2014/IEC 60317-17 : 2010 (1 Revision)	Specifications for particular types of winding wires: Part 17 polyvinyl acetal enamelled rectangular copper wire, class 105 (First Revision)
IS 13730 : Part 2 : 2018/IEC 60317-2: 2012 (2 Revision)	Specification for particular types of winding wires: Part 2 solderable polyurethane enamelled round copper wire, class 130, with a bonding layer (Second Revision)
IS 13730 : Part 20 : 2018/IEC 60317-20 (2 Revision)	Specifications for particular types of winding wires: Part 20 solderable polyurethane enamelled round copper wire, class 155 (Second Revision)
IS 13730 : Part 21 : 2017/IEC 60317-21:2013	Specifications for particular types of winding wires: Part 21 solderable polyurethane enamelled round copper wire overcoated with polyamide, class 155
IS 13730 : Part 23 : 2017/IEC 60317-23:2013	Specifications for particular types of winding wires: Part 23 solderable polyesterimide enamelled round copper wire, class 180

IS 13730 : Part 25 : 2015/IEC 60317-25	Specifications for particular types of winding wires: Part 25 polyester or polyesterimide overcoated with polyamide - Imide enamelled round aluminium wire, class 200
IS 13730 : Part 26 : 1996/IEC 60317-26	Specifications for particular types of winding wires: Part 26 polyamide - Imide enamelled round copper wire, class 200
IS 13730 : Part 27 : 2018/IEC 60317-27 (1 Revision)	Specifications for Particular Types of Winding Wires Part 27 Paper Tape Covered Rectangular Copper Wire (First Revision)
IS 13730 : Part 28 : 2018/IEC 60317-28 (1 Revision)	Specifications for particular types of winding wires: Part 28 polyesterimide enamelled rectangular copper wire, class 180 (First Revision)
IS 13730 : Part 29 : 1996/IEC 60317-29	Specifications for particular types of winding wires: Part 29 polyester or polyesterimide overcoated with polyamide - Imide enamelled rectangular copper wire, class 200
IS 13730 : Part 3 : 2012/IEC 60317-3 (1 Revision)	Specifications for particular types of winding wires: Part 3 polyester enamelled round copper wire, class 155 (First Revision)
IS 13730 : Part 31 : 2018/IEC 60317-31 (1 Revision)	Specifications for particular types of winding wires: Part 31 glass fibre wound, resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 180 (First Revision)
IS 13730 : Part 32 : 2018/IEC 60317-32 (1 Revision)	Specifications for particular types of winding wires: Part 32 glass fibre wound, resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 155 (First Revision)
IS 13730 : Part 33 : 2018/IEC 60317-33 (1 Revision)	Specifications for particular types of winding wires: Part 33 glass fibre wound, resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 200 (First Revision)
IS 13730 : Part 34 : 2000/IEC 60317-34 (1 Revision)	Specifications for particular types of winding wires: Part 34 polyester enamelled round copper wire, class 130 L (First Revision)
IS 13730 : Part 35 : 2017/IEC 60317-35:2013	Specifications for particular types of winding wires: Part 35 solderable polyurethane enamelled round copper wire, class 155, with a bonding layer
IS 13730 : Part 36 : 2017/IEC 60317-36:2013	Specifications for particular types of winding wires: Part 36 solderable polyesterimide enamelled round copper wire, class 180, with a bonding layer
IS 13730 : Part 37 : 2017/IEC 60317-37:2013	Specifications for particular types of winding wires: Part 37 polyesterimide enamelled round copper wire, class 180, with a bonding layer
IS 13730 : Part 38 : 2018/IEC 60317-38	Specifications for particular types of winding wires: Part 38 polyester or polyesterimide over coated with polyamide - Imide, enamelled round copper wire, class 200, with a bonding layer
IS 13730 : Part 39 : 2018/IEC 60317-39 (1 Revision)	Specifications for particular types of winding wires: Part 39 glass - Fibre braided resin or varnish - Impregnated, bare or enamelled rectangular copper wire, temperature index 180 (First Revision)
IS 13730 : Part 4 : 2018/IEC 60317-4 (2 Revision)	Specification for particular types of winding wires: Part 4 solderable polyurethane enamelled round copper wire, class 130, (Second Revision)

IS 13730 : Part 43 : 2013/IEC 60317-43 (1 Revision)	Specification for particular types of winding wires: Part 43 aromatic polyimide tape wrapped round copper wire, class 240 (First Revision)
IS 13730 : Part 44 : 2013/IEC 60317-44(1 Revision)	Specification for particular types of winding wires: Part 44 aromatic polyimide tape wrapped rectangular copper wire, class 240 (First Revision)
IS 13730 : Part 45 : 1999/IEC 60317-45	Specifications for particular types of winding wires: Part 45 polyester enamelled round copper wire, class 130
IS 13730 : Part 46 : 2017/IEC 60317-46:2013	Specifications for particular types of winding wires: Part 46 aromatic polyimide enamelled round copper wire, class 240
IS 13730 : Part 47 : 2017/IEC 60317-47:2013	Specifications for particular types of winding wires: Part 47 aromatic polyimide enamelled rectangular copper wire, class 240
IS 13730 : Part 48 : 2018/IEC 60217-48 (1 Revision)	Specifications for particular types of winding wires: Part 48 glass - Fibre wound resin or varnish impregnated, bare or enamelled round copper wire, temperature index 155 (First Revision)
IS 13730 : Part 49 : 2018/IEC 60217-49 (1 Revision)	Specifications for particular types of winding wires: Part 49 glass - Fibre wound, high temperature resin or varnish - Impregnated, bare or enamelled round copper wire, class 180 (First Revision)
IS 13730 : Part 5 : 2018	Specification for Particular Types of Winding Wires Part 5 Polyester Enamelled Round Aluminium Wire, Class 155
IS 13730 : Part 50 : 2018/IEC 60217-50 (1 Revision)	Specifications for particular types of winding wires: Part 50 glass - Fibre wound, silicone resin or varnish impregnated, bare or enamelled round copper wire, class 200 (First Revision)
IS 13730 : Part 53 : 2018/IEC60317-53 (1 Revision)	Specifications for particular types of winding wires: Part 53 aromatic polyimide (Aramid) tape wrapped rectangular copper wire, temperature index 220 (First Revision)
IS 13730 : Part 6 : 1994	Specification for particular types of winding wires: Part 6 oleo - Resinous enamelled round aluminium wire, class 105
IS 13730 : Part 8 : 2014/IEC 60317-8:2010 (1 Revision)	Specification for particular types of winding wires: Part 8 polyetherimide enamelled round copper wire, class 180 (First Revision)
IS 13730 : Part 9 : 1994	Specification for particular types of winding wires: Part 9 polyester enamelled round aluminium wire, class 138