Tirupati Plastomatics

(Integrated Management Systems (IMS) Certified Company)

E-BEAM

91-141-2332902

contact@tirupatiplastomatics.com

www.tirupatiplastomatics.com

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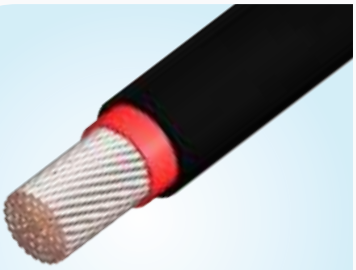
PRODUCT RANGE

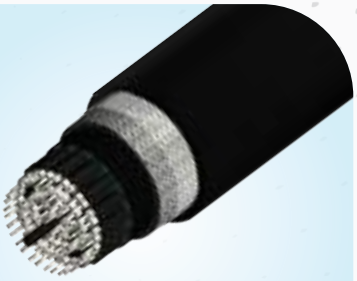
MVCC

Solar Cables

Solar cables as per TuV/ EN/UL specifications



Railway locomotive & rolling stock cables



Ship & submarine wiring cables

Wind mill cables up to 33 kV

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APPLICATIONS

The electron beam curing in "Wires and Cables" results into improvement of mechanical, thermal, chemical resistant, and other properties. The enhancement of properties results into improved physical properties with reduced thicknesses, higher temperature withstand capability, higher current carrying capacity and thus increased life of these cables. The e-beam cross-linking technology not only increases life and the current carrying capacity, but also prevents fires due to overload short circuits and thus saves precious lives and property.

Because of increased life and performance compared to conventional cables, e-beam cross-linked cables are being adopted in all high-tech applications such as

- Railways
- Ship-wiring
- Medical
- Diamonds
- Nuclear Plants
- Defense
- Solar Power

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(Integrated Management Systems (IMS) Certified Company)

OUR CLIENTELE

OUR CERTIFICATIONS

ADDRESS

B-141 (A), Road No. 9-D, V.K.I. Area,
Jaipur – 302013, Rajasthan, INDIA

www.tirupatiplastomatics.com

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SOLAR CABLES

Tirupati Plastomatics introduced a range of solar cables for emerging PV-based renewable energy installations backed by 30 years of experience in the manufacture of wide range of cables. We have installed electron beam irradiation facility with MeV accelerators and use this technology for cross-linking of elastomeric insulation and sheath of solar DC cables.

Our photovoltaic (PV) cables are used for interconnecting photovoltaic solar panel arrays in solar energy farms. These solar panel cables are suitable for fixed installations, both internal and external, and in open environments or in conduits.

The compounds have zero halogen, low smoke properties and are ultra violet ray as well as ozone resistant.

These cables can last for over 25 years. What's more, these can offer he rodent-resistance feature and are available in a range of options: copper, copper-coated aluminium or 8000 series luminium.

Tirupati Plastomatics

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SOLAR CABLES

Solar Cables are manufactured employing State-of-the-art Electron Beaming facility to meet continuous operating Temperature of 120 Deg. C, ensuring higher Current carrying capacity. These Cables are suited for all types of solar modules, Photovoltaic Plants / systems, Building integrated PV systems and solar Parks applications. These Cables are manufactured as per BS EN 50618 :2014 incorporating the corrigendum published in 2015.

Properties and characteristics of Solar cables are

Ozone & UV resistant.
Resistant to adverse weather condition
Oil, Chemical and Crack resistant.
Halogen free and flame propagation resistant.
Resistant to water, impact and abrasion.
Low smoke and toxic gas emission.
Tear resistant and withstands wide range of Temperature.
Enhanced Cable service life.

Cable Construction

Conductor composed of annealed tinned flexible (Class 5) Copper wires, Electron Beam Irradiated Crosslinked Polyolefin compound Insulated and Sheathed with Electron Beam Irradiated Crosslinked Polyolefin compound. Operating Voltage 1 kV AC and 1.5 kV DC. Permissible Operating Voltage (max.) 1.8 kV DC Conductor to Conductor for Non-Earthed system.

Test Voltage 6.5 kV (AC). Max. Conductor Temperature 40 to + 120 Deg. C. Ambient Temperature - 40 to + 90 Deg.C.

No. of Core & Crossection	Thickness of Insulation	Thickness of Sheath	Approx. Overall Diameter	Min. Insulation Resistance at 20 Deg.C	Min. Insulation Resistance at 90 Deg.C
No.x sqmm	mm	mm	mm	MegOhm.Km	MegOhm.Km
1x1.5	0.7	0.8	5.0	860	0.86
1x2.5	0.7	0.8	5.3	690	0.69
1x4	0.7	0.8	6.0	580	0.58
1x6	0.7	0.8	6.5	500	0.5
1x10	0.7	0.8	7.5	420	0.42
1x16	0.7	0.9	9.0	340	0.34
1x25	0.9	1.0	11.0	340	0.34
1x35	0.9	1.1	12.5	290	0.29
1x50	1.0	1.2	14.5	270	0.27
1x70	1.1	1.2	17.0	250	0.25
1x95	1.1	1.3	19.0	220	0.22
1x120	1.2	1.3	21.0	210	0.21
1x150	1.4	1.4	23.0	210	0.21
1x185	1.6	1.6	26.0	200	0.2
1x240	1.7	1.7	29.5	200	0.2

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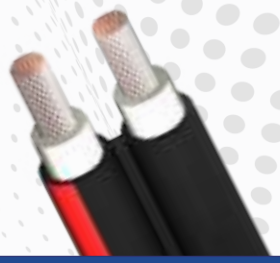

Current Carrying Capacity as per method of Installation

Cable Crossection	Single Cable in Free Air	Single Cable on a surface	Two Cables touching each other on a surface
Sqmm	Amps	Amps	Amps
1.5	30	29	24
2.5	41	39	33
4	55	52	44
6	70	67	57
10	98	93	79
16	123	125	107
25	176	167	142
35	218	207	176
50	276	262	221
70	347	330	278
95	416	395	333
120	488	464	390
150	566	538	453
185	644	612	515
240	775	736	620

The above Current Carrying Capacity is at ambient Temperature of 60 Deg. C and Maximum Conductor Temperature of 120 Deg.C.

Correction Factor for Variation in Temperature:

Ambient Temperature (Deg. C)	Correction Factor
Upto 60	0
70	0.91
88	0.82
90	0.71
100	0.58
110	0.41

Note: Permitted Short-circuit temperature is 250 Deg.C for a duration of 5 sec.

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E-BEAM CROSS LINKED CABLE

The modification and enhancement of mechanical and thermal properties of polymers can be carried out either by conventional means using silane or peroxide or by irradiation through high energy electron beam generated from electron accelerators. The electron beam curing in "Wires and Cables results into improvement of mechanical, thermal, chemical resistant, and other properties.

The enhancement of properties results into improved physical properties with reduced thicknesses, higher temperature withstand capability, higher current carrying capacity and thus increased life of these cables. The e-beam cross-linking technology not only increases life and the current carrying capacity, but also prevents fires due to overload short circuits and thus saves precious lives and property. Because of increased life and performance compared to conventional cables, e-beam cross-linked cables are being adopted in all high-tech applications such as Railways, Ship-Wiring, Nuclear Plants, Defense, Solar Power, Aerospace, and Automotive Sectors.

CABLE

- Solar PV Cable
- Locomotive Cable
- Ship-Wiring Cable
- Marine Cable
- EPR/LHLS/LFH Cable
- Water Blocking Cable
- Fire Survival Cable
- Appliance Wiring Material
- Wind Mill Cable
- Automotive Wire

OTHER PRODUCTS

- Heat Shrink tube
- Thin Wall Sleeve / Tube
- Medical Sterilization
  Moulded Components/O-Rings

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Advantages of E-Beam Cross-Linking Over Conventional Curing System -

S. No.	Parameter	E-Beam Cross-Linking	
1	Cross-linking Bond	C-S x-C or C-O x-C	C-C
2	Continuous Operating Temperature	90 deg. C	120 deg. C
3	Estimated Life of Cable	20-25 Years	40 Years
4	Variation in Mechanical Parameters after Ageing at 1350 C/7 Days	+25%	+5%
5	Volume Resistivity at room Temperature	5 x 10" Ohm-cm	1 x 10" Ohm-cm
6	Current carrying capacity (For a cable of size 25 sq.mm.)	123 amp	123 amp
7	Effect on High Overload Current	Burned	Not Burned
8	Cold Bend Test	-15 deg. C	-25 deg. C
9	Oxygen Index	29	35
10	Flammability Test IEC 60332-Part 3	Cat.-C	Cat.-A
11	Blooming Effects	Chances to bloom to outer layer leading to surface deterioration	No Effect
12	Polymer Degradation during cross-linking	Yes as Cross-linking occurs at higher temperature (90 deg. C-150 deg C)	No as EB Cross-linking occurs at room temperature
13	Oxidative degradation	Yes	No

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E-BEAM CABLES FOR ON BOARD INDIAN NAVAL SHIPS

EED-50-12 Thin walled, Insulated, Electron Beam Cross-linked Irradiated Electric Cables

Construction	:	Multipair, Multicore, Multitriad Cables, Unscreened/Individually screened/ Collectively Screened 600 V, 1800 V (for Single Core Cables)
Conductor	:	Circular Electroplated, Annealed Tinned flexible copper conductor (class V) conformity to IEC-60228
Insulation	:	Electron Beam Cross linked Polyolefin compound (EPR/EPDM LFH)
Screening	:	Annealed Tinned Copper Braid/ GI Wire Braid
Outer Sheath	:	Electron Beam Cross Linked Polyolefin Compound (EVA/EMA/EEA LFH)
Temperature Range	:	-65° C to 120° C
Application	:	For use on board surface ships and crafts for power, control, lighting. For submarines for communication and instrumentation circuits

EED-50-13-Fire Survival, High Temperature Zone, Fire Retardant Halogen Free Sheathed Electron Beam Cross-linked Irradiated Cables.

Construction	:	Single Core, Twin and 3 Core, Multicore, Multipair, Multitraid, Multiquad cables, Screened/Individually Screened/Collectively Screened.
Voltage Grade	:	440 V
Conductor	:	Circular Electroplated, Annealed Tinned Flexible Copper Wire (Class 5) confirming to IS: 8130-1984/IEC 60228
Temperature Range	:	-30°C to +120° C
Protective Barrier	:	Fibre Glass Braid/Lacquer Mica glass tape to meet the Fire Performance
Insulation	:	Electron Beam Cross Linked Silicone Rubber Compound
Separator Tape	:	Polyester Tape
Braiding	:	Annealed Tinned Copper Braid (wherever applicable)
Outer Sheath	:	Electron Beam Cross Linked Polyolefin Compound EED 50-12
Application	:	Power, Lighting, Control & Communication and Instrumentation Circuits in Surface Ships and Submarines. Used in Fuel and Lubrication Oils, Hydraulic Fluids and Water Surfaces

Tirupati Plastomatics

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MARINE/SHIPBOARD CABLES

DEF STAN-02-526 & 527 (NES 526/NES 527)

Power Cables, EPR Insulated, LFH Elastomeric Sheshed Single Core and Multi Core, fre survival cable

Construction	:	Multi Core Cables, Unscreened or Individually Screened or Collectively Screened, Limiled Fire Hazardous Sheathed
Conductor	:	Circular Electroplated & Annealed Tinned Copper
Insulation	:	Dual Layer of GPS and LFH Material/Silicon
Screening	:	Annealed Tinned Copper Braid, Individually Screened or Collectively Screened
Armouring	:	GI Wire Braided if applicable
Outer Sheath	:	LFH Elastomeric Compound
Temperature Range	:	30° C to +105° C
Application	:	For use on board surface ships, submarines for power, control, lighting and communication and instrumentation circoils with/without fire survival characterstics

IEC 60092-350, 353, 360 & 376

Construction	:	Single Core Multi Core, Single, Malti Pair, Screened & Unscreened, Armoured & Unamoured
Conductor	:	Electroplated Annealed Bare Tinned Copper of various classes.
Insulation	:	XLPE/EPR/HEPR, HF 90/S95
Screening	:	Almylar Screen along with Drain Wine
Inner Sheath	:	SHF1/SHF2/SH/SF
Armouring	:	Bare Copper/Tinned Copper/GI Wire Braid Armoured with 90% coverage
Outer Sheath	:	SHF1/SHF2/SH/SF
Application	:	For use on board surface ships for power, control, lighting and communication and instrumentation circuits

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CABLES FOR RAILWAYS SECTOR

Railway Signaling and Power Cables as per IRS Spec: IRS: S-63/2014 Rev 4 and IS 1554 for outdor application

Voltage Grade	:	1100 Volts
Conductor	:	Solid Single Strand Circular Copper or Multi strand Aluminum
Range	:	Up to 37 Cores (Signaling) and Up to 4 cores (Power)
Insulation	:	PVC
Inner Sheath	:	PVC
Armouring	:	Gl Round Wire or Flat Strip/Double Steel Tape Armoured Cables.
Outer Sheath	:	PVC
Application	:	For Power Supply, Control Purpose in Power & Switching Stations, Local Distribution Systems in Outdoor Installations, Track Changing and Communication.

Indoor Single and Multi Core Signaling Cables as per IRS: S-76/89 Amnd 3

Voltage Grade	:	660 Volts
Conductor	:	Solid Single Strand/Multi Strand/Flexible Circular Copper
Insulation	:	PVC
Screening	:	PVC (Multi Core
Inner Sheath	:	SHF1/SHF2/SH/SF

Electron Beam Irradiated Cross-linked Thin walled Flexible Elastomeric Single Core & Multi Core Cables as per ELRS/SPEC/ELC/0019 - Rev 3, CLW 458, CLW 459

Voltage Grade	:	Up to 750 V and 1.8/3.0 KV, 1.8/4.0 KV, 300 V, 600/1000 V
Conductor	:	Electrolytic Annealed Tinned Copper (Class 5)
Insulation	:	EPDM/EVA dual or Single Layer
Sheath	:	EVA/EVM etc
Temperature Range	:	-40° C to 120° C
Application	:	For Tap Changer Electric Locomotives and Coaching/AC/DC EMU, BG AC EMU & MEMU Stock.

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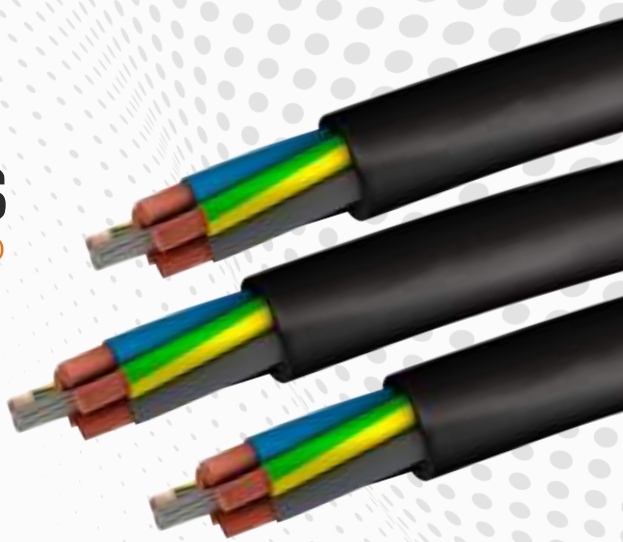


FLEXIBLE RUBBER CABLE

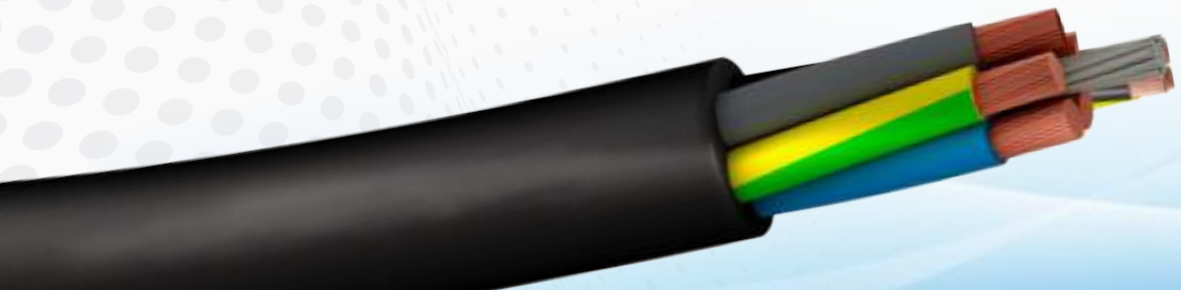
H07RN-F

APPLICATION

flexible rubber cable H07RN-F rubber cables are designed to supply power to low voltage appliances including electric motors and submersible pumps in deep water installations, as well as many other electrical equipment.

Thanks to its extraordinary flexibility and mechanical strength, the flexible rubber cable H07RN-F cable is ideal for power transmission in both fixed installation or mobile service. The use nominal voltage up to 1000 V is accepted in fixed protected assemblies. flexible rubber cable H07RN-F cables are designed to power all types of electrical equipment including motors and submersible pumps in deep water installations (Ad8).

- Industrial use
- Mobile use
- Windmills
- Robotics
- Defense
- Temporary site installations



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FLEXIBLE RUBBER CABLE

H07RN-F

CHARACTERISTICS

Electrical performance

Low voltage: 450/750V.

Thermal performance

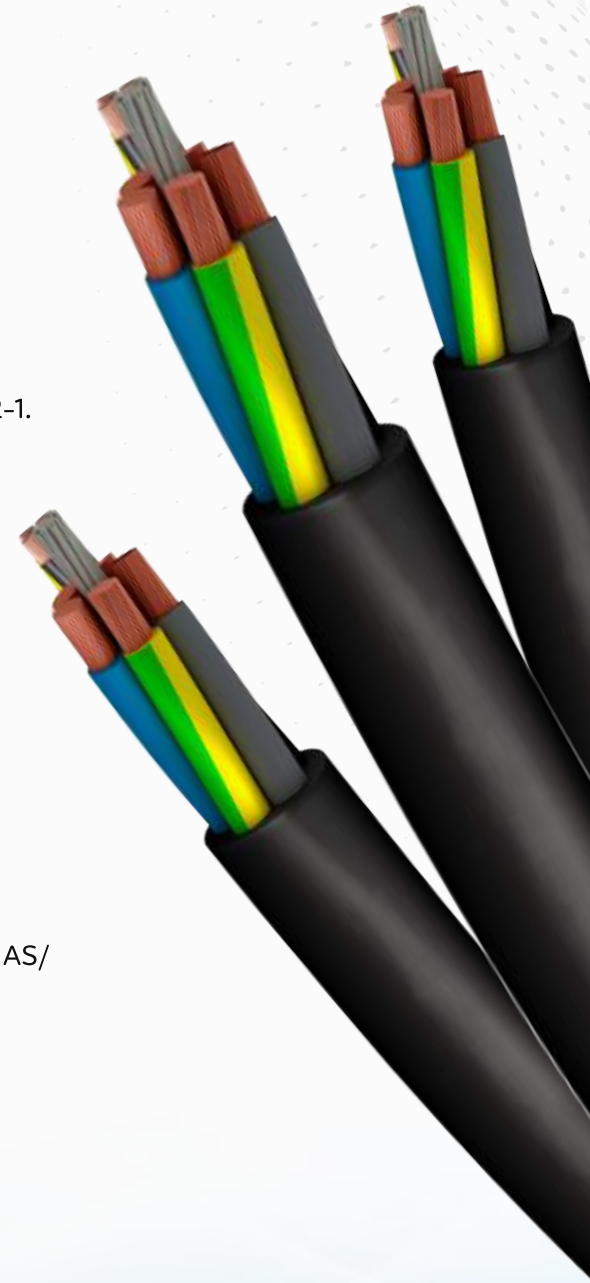
Maximum service temperature: 90°C.
Maximum short-circuit temperature: 250°C (max. 5 s).
Minimum service temperature: -40°C (fixed and protected installations) and -25°C (mobile use).

Fire performance

Flame non-propagation according to EN 60332-1/IEC 60332-1.
Reaction to fire CPR: Eca according to EN 50575.

Mechanical performance

Minimum bending radius:
3 x cable diameter < 12 mm.
4 x cable diameter > 12 mm.
Impact resistance: AG2 Medium severity.



Electrical performance

Chemical & Oil resistance: excellent.
Grease & mineral oils resistance: excellent.
Water resistance: AD8 Submersion.
Cable for submersible pumps in drinkable water according to AS/NZS 4020.
Deep wells | Drinkable water | AWQC.

Installation conditions

Open Air.
Submersible pumps cable.

Other

Meter by meter marking.

Tirupati Plastomatics

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OUR BIS LICENSE OF SOLAR E-BEAM CABLE

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Dated 04/July

Our Ref: (8)(6)C343, 8400230711

Subject: Grant of ISI Product Certification Licence No.: 8400230711
as per IS 17293:2020

M/s Tirupati Plastomatics Pvt Ltd
B 341 A Road No 9D VKI Area Jaipur
Distt. – Jaipur (Rajasthan) -302013.

Dear Madam/Sir(s),

With reference to your application, we are pleased to inform you that the Certification Marks Licence has been granted to you to use the Standard Mark in respect of the following:

Product:- Electric Cables for Photovoltaic System for Rated Voltage 1500 V d.c.

Grade/Class/Type/Variety
Electric Cables for Photovoltaic System for rated Voltage 1500 V d.c. Nominal cross sectional area 1.5 sq.mm to 400 sq.mm Conductor Class-5

as per IS 17293:2020

1. The licence is granted on the explicit condition that you will mark your/commercial production which conforms to the Indian Standards.

2. The number assigned to this licence is CM/L- 8400230711 which has been made operative 2024-06-14 and is valid upto 2029-06-13. The licence number shall invariably be referred to in your future correspondence.

3. The licence is granted on the explicit condition that you shall mark entire production under scope of licence with Standard Mark and maintain conformity to the relevant Indian Standards. Accordingly, you shall cover the entire production under scope of licence with Standard Mark and materials conformity to the relevant Indian Standards. In addition, you shall display the ISI product certification licence held by you prominently at your premises and also mention the ISI product certification licence held by you in your commercial advertisements.

4. Further, you should cover the entire production under scope of licence with Standard Mark and maintain conformity to the relevant Indian Standards. In addition, you should display the ISI product certification licence prominently at your premises and also mention the ISI product certification licence held by you in your commercial advertisements.

5. According to Sub-Paragraph (1) & (3) of Paragraph 5 of scheme-I of Schedule-II under Bureau of Indian Standards (Conformity Assessment) Regulations, 2018, the annual licence fee of Rs. 1000.00 and the marking fee as notified is payable by you with effect from 2024-06-14 for the period of validity of the licence as referred.

6. Minimum marking fee stipulated Under Scheme-I of SOS (Conformity Assessment) Regulation 2018 is payable by you regardless of the fact whether you actually made your product in run with the Standard Mark.

7. The advance minimum marking fee will be carried over to the next year on every renewal. The actual marking fee calculated on the unit rate on the production, market or the minimum marking fee, whichever is higher, shall be payable by you at the time of renewal.

8. With a view to streamlining the reporting of quarterly marked, submission and settlement of marking fee on the said rate basis, there will be calculated on the production marked during the First nine months of operation of the licence at the time of first renewal, and on the production marked during twelve months comprising the last three months of the previous operative year and the first nine months of the current operative year, at the time of the second and subsequent renewals, in case the licence expires, the marks/production marked till the expiry date shall be taken into account for calculating the marking fee payable.

9. The Scheme of Inspection and Testing as specified by ISI Unit have to be implemented by your organization strictly and scrupulously. This supervision of the operation of the Scheme shall be done by a person responsible for the quality control function in your organization. Kindly inform us the name and designation of the person who will be held responsible for the operation and maintenance of the Scheme. Any future change in this respect will have to be communicated by you to us as and when these take place.

10. We are enclosing a sheet giving the preferred dimensions of the Standard Mark to enable you to prepare the designs of the Standard Mark for marking. For above product Photographic reduction in any size is permissible. This will ensure the relative proportions of the different dimensions maintained. Preferred dimensions be used as far as possible.

11. On commencement of marking of your product for which you are licensed, you may advertise your product with Standard Mark in various media only during the currency of your licence. The use of Standard Mark on letterheads and publicity literature will be permitted only on receipt of your acceptance that in the event of cancellation or lapsing of your licence, the Standard Mark on your letterheads, publicity literature etc. will be discontinued/eliminated.

12. The licence is granted for your manufacturing premises situated **B 341 A Road No 9D VKI Area Jaipur Distt. – Jaipur (Rajasthan) -302013.** Purchasers under the licence shall not be restricted by any other firm, company/factory etc. This licence is not transferable in the event of shifting the manufacturing and testing equipments from the licensed premises to some other place, one of Standard Mark shall be accepted till the new premises are inspected and found to be satisfactory by ISI in respect of manufacturing and testing facilities available there and the address of the new premises is endorsed in the licence.

13. You are also advised to make yourself and other employees in your organization aware about the provisions of the BIS Act, 2016 and Rules and Regulations framed there under especially the implications in case of any unauthorized or contravention thereof.

14. It may be noted that this licence is granted based on undertaking that in the event of non-conformity of the sample or any deficiency noticed or your inability to submit the test report immediately but not later than 30 days from the date of last report confirmed by the laboratory, the licence shall be processed for cancellation. (Applicable for Go1, with undertaking for long duration test).

15 * It may be noted that this licence is granted under option 2 which is subject to the condition that if samples drawn on (07.04.2024) by ISI during the certification visit before grant of licence, fail to conform to the requirements of relevant Indian Standard for any requirement, the licence shall be put under suspension, and in case fresh sample after corrective action is not offered within one month or fresh sample fails to conform to the requirement of relevant Indian Standard, in any requirement, the licence shall be processed for cancellation (Applicable for Go1, under option 2).

16. The Original Licence document is enclosed for your reference and record.

Thanking you,

Yours faithfully,

(Ritesh Kalra)
Director & Head

Encl: As above

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

मानक चिन्ह उपयोग की अनुज्ञप्ति (लाइसेंस)
License for the use of STANDARD MARK

लाइसेंस सं. सीएम/एल – 8400230711
Licence No CM/L - 8400230711

By virtue of the power conferred on it by the BUREAU OF INDIAN STANDARDS ACT, 2016 (31 of 2016) the BUREAU hereby grants to

M/s Tirupati Plastomatics Pvt Ltd
B 341 A Road No 9D VKI Area,
Distt. – Jaipur (Rajasthan) -302013.

(hereinafter called 'the Licencee') this Licence to use the Standard Mark as set out in the first column of the First Schedule hereto, upon or in respect of the variation set out in the third column of the said Schedule which is manufactured in accordance with/conforms to the related Indian Standard(s) referred to in the second column of the said Schedule or from time to time amended or revised.

This Licence carries obligations on part of the licensee as conditions of licence. This licence shall be valid for the stated factory address and period as mentioned in the first schedule and may be renewed as prescribed in the scheme.

FIRST SCHEDULE

Schedule of Factory details and scope under Licence No.CM/L - 8400230711

Name : M/s Tirupati Plastomatics Pvt Ltd

Factory Address: B 341 A Road No 9D VKI Area, Distt. – Jaipur (Rajasthan)-302013.

Validity: From Fourteenth June Two Thousand Twenty Four to Thirteenth June Two Thousand Twenty Five

Standard Mark	Indian Standard	Scope of Licence	Marking Fee
(1)	(2)	(3)	(4)
IS 17293:2020 JST CM/L- 8400230711	आईएस 17293:2020 IS 17293:2020 Electric Cables for Photovoltaic System for Rated Voltage 1500 V d.c.	Electric Cables for Photovoltaic System for rated Voltage 1500 V d.c. Nominal cross sectional area 1.5 sq.mm to 400 sq.mm Conductor Class-5	

Signed, Sealed and Dated this Fourteenth day of July month of Year TWO THOUSAND TWENTY FOUR.

(हस्ताक्षरित)
(प्रमोद कालिया)
निदेशक एवं प्रमुख
भारतीय मानक ब्यूरो की ओर से
for BUREAU OF INDIAN STANDARDS

Tirupati Plastomatics

(Integrated Management Systems (IMS) Certified Company)

Phone
91-141-2332902

Email
contact@tirupatiplastomatics.com

Website
www.tirupatiplastomatics.com

Regd. Office Address
B-141 (A), Road No. 9-D, V.K.I. Area, Jaipur – 302013, Rajasthan, INDIA