APAR INDUSTRIES LTD.

(UNIT : UNIFLEX CABLES)

unicab

Innovative Cable Solutions

ELECTRON BEAM IRRADIATED SOLAR CABLES

100% Renewable Energy

CLEAN ENERGY
GREEN ENVIRONMENT

GO GREEN

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E-BEAM

ELECTRICAL

ELASTOMER

TELECOM

TÜVRheinland®
CERTIFIED

COMPANY PROFILE

APAR INDUSTRIES LTD founded by Late. Mr. Dharmsinh D. Desai, in the year 1958 is one among the best establishment company in India operating in the diverse field of Electrical, Metallurgical and Chemical engineering. Over the year it has evolved to be a Rs 5000 Cr diversified company, offering value added products and services in Power Transmission Conductors, Transformer Oils & Specialty Oil Products and Power distribution & Telecommunication Cables after merger of Uniflex Cables Ltd. with Apar Industries Ltd. Apar Industries is the 5th largest manufacturer of Transformer Oils in the world. Apar is also amongst the largest producer and exporter of Conductors having export to over 65 countries in the world having full range of ACSR and AAAC upto 1200 kv and recently introduced state of the art High Temperature Conductors.

Apar Industries Ltd. (Unit: UNIFLEX CABLES) has its plants at Umbergaon and at Khatalwad in south Gujarat (150 Km from Mumbai) for manufacture of Energy & Telecommunication Cables. Apar has also set up a state of the art 1.5 Mev and 3.0 MeV Electron Beam Accelerators along with suitable handling systems.

POWER CABLES

This includes XLPE Cables upto to 33 KV besides LV PVC and specialty Cables. The company has a state of the art manufacturing facility to manufacture Medium Voltage XLPE cables on a high precision CCV line from Royale Systems, USA. The company manufactures cables as per Indian as well as International standards. The facility is also equipped to manufacture LT and MV Aerial Bunched Cables upto and including 33 kv, Instrumentation pairs and Triad Cables, Control Cables, PVC Flexible cables for Building and Panel wiring. The company has also introduced Medium Voltage Covered Conductors and Anti Irradiated Power Theft Cables.

ELASTOMER CABLES

The company enjoys a pioneer status in manufacture of Elastomer Cables in India and has been supplying these types of cables since 1981 to various clients like Railways, Ship-Wiring, Steel and Cement Plants, Nuclear Plants, Windmills, Solar and Mining Sectors. The plant facility is capable to process various types of compounds like EPR, EPDM, PCP, CSP, CPE, Silicon, EVA Halogen free and Fire Resistant non Toxic Compounds. We offer cables with ATC, GI wire braid, Synthetics or Textile Yarn and Glass Fibre. Our range includes Trailing Cables, Locomotive Cables, Ship Wiring Cables, Wind Mills Cables, Solar Cables, Welding Cables, Mining Cables, LFH Cables & Wires, Fire Survival and Composite Cables having integrated Fibre Optic core.

OPTIC FIBRE CABLES

The company manufactures High Performance Data and Video Transmission cables which includes 2F to 24F Unitube and 2 F to 432 F Loose tube. Also manufactures Ribbon Cables of Unitube 144F and Multitube 588F.

The cables are manufactured in various configurations like Unarmoured, Armoured, ADSS, Fig.8, FTTH etc with Single mode or multimode fibers. These cables are extensively deployed with Telecom Operators like BSNL/BBNL, Relinace Infocom, Reliance Jio, and several multi service operators. Cables can be offered to any National or International Specifications.

ELECTRON BEAM IRRIDATION FACILITY

State of the Art Electron Beam Accelators (1.5 MeV and 3 MeV) in Western India at Khatalwad located about 20 kms away from Vapi, Gujarat. We have complete handling system for irradiation of various types of Electrical and Automotive Cables & Wires, PE sheets, Polymeric Tubes and Pipes, Heat Shrink Products, Gems and Diamonds, Medical product Sterlisation, reprocessing of PTFE scrap etc. The Electron Beam Cross Linked wires and cables offer superior performance in demanding application and in extreme environments. Our high performance EBXL cables have been Type approved by renowned organizations like TUV, DQAN, DRDO, RDSO, Railways, ABS, NPCIL etc.

SPECIALITY CABLES:

The company offers various types of Hybrid / Speciality Cables. We have a diverse experience to design and offer specialized cables like Trailing Cables with Power/Control/Shielded cores, CRD cables with integrated Multimode Optical Fibre Cables, Underwater subsea cables, Festoon Cables, 11 KV landline Mining cables for Stacker/Reclaimer etc. We have to our credit for development of cables like Heavy TOW Cables and Light TOW cables for subsea applications, Torpedo cables (Fibre Optic Cables for Naval applications), Festoon Fibre Optic Cables for Large cranes, Elastomeric Cables utpo 33 KV for Mining and Windmill applications, Aluminium Conductor Elastomer Cables, Electron Beam Irridated Cables for Railway Locomotive and Ship Wiring, CRD cables with integrated Fibre Optic for ladel cranes for steel industry, Solar PV Cables for DC applications and Solar Cables with Rodent Resistance, Underwater Sub-sea Power Cables and Sub-Sea Fibre optic cables.

APAR ANUSHAKTI WIRES

Developed in House, APAR ANUSHAKTI Wires with Speciality developed PVC Compounds of 105°C rating enabling Protection against Electric Shock/Short Circuit, High Oxygen & Temperature Index for Fire Retardancy, Wires can easily take long term overload of over 40%, Insulation does not melt in contact with hot object, non softening, infusible and non dripping, High Insulation Resistance, Self Extinguishing and do not catch fire, better ageing properties and longer cable life.

CERTIFICATES >

ELECTRON BEAM IRRADIATION FACILITY:

Apar Industries has diversified into technological advanced state of the art green field project at Khatalwad, Dist. Vapi, Gujrat with 1.5 MeV and 3.0 MeV Electron Beam Accelerators alongwith handling systems suitable for irradiation of various types of Electrial Cables and Wires, PE Sheets, Polymeric Rubes/Pipes, Heat Shrink Products, Gems & Diamonds, Medical product sterlisation, reprocessing of PTFE scrap which is being imported into India for Industrial Lubricants, Greases, Waxes, Paints, Mouldings, PTFE Linking etc.

Electron Beam Irradiated Cables and Wires offer superior performance in extreme environments. Some of the improved properties are like Superior performance of cables and wires, Improved Mechanical properties, Improvement in Tensile Strength , Abrasion Resistance, Thermal Resistance, Stress Cracking Resistance, Flame Propagation Resistance, Deformation Resistance and cut through Resistance.

Due to high performance Railways for their Locos Electric/Diesel switched over to Electron Beam Cables & Wires. Similarly for Ship Wiring Cables, Automotive Cables, Solar PV Cables and Nuclear Radiation Resistant most of the users have switched over to E Beam Irradiated Cables. Since life of cables is much higher than chemically cross linked cables; many users have adopted Electron Beam Irradiated Cables. Even in Solar and Wind Energy cables developers have found that Electron Beam cables can withstand the harsh environmental conditions hence preferred to use Electron Beam Irradiated Cables over the conventional cables with Chemically Cross-linked cables.

APPLICATIONS OF ELECTRON BEAM (EB) TECHNOLOGY:

There are several applications where the Electron Beam Technology can be deployed. At Apar, the suitable handling systems have been installed to use the facility for following products. Further identification of applications are being explored.

EB cross-linking of wire & cables are well established and it is the most important commercial application of radiation technology. Polymeric based formulations that can be crossed-linked using EB accelerator have been developed to meet the customer specifications particularly for railways, Ship wiring Wind Mill cables, Solar PV cables & Building wires.

TYPICAL WORKING OF E BEAM

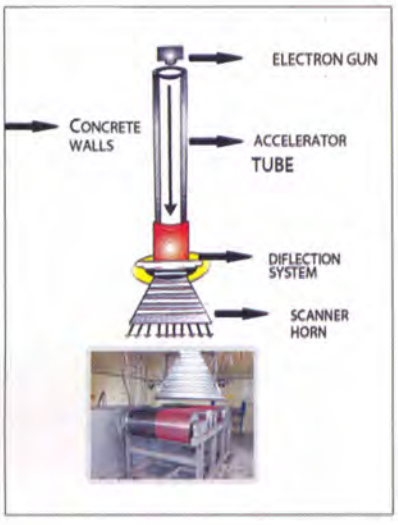
An electron Gun is housed in a thick vessel.

Number of Electrons are accelerated in an acceleration tube. Their power can be regulated and controlled.

The electrons are directed to a scanning device magnetically

The material which is required to be Irradiated are passed under the beam through set of under – beam equipments and given exposure to predetermined doeses.

Highly accelerated electrons penetrate the insulation or sheath of cables. This results in the generation of carbon radicals which links or cross links the polymer chains of the plastic tdhree dimensionally with each other.



DIFFERENT TYPES OF UNDER BEAM HANDLING SYSTEMS

E-BEAM IRRADIATED, SOLAR PV CABLES

Apar has in-house developed suitable XLPO compound for Electron Beam irradiation for a range of solar Photo-Voltaic Cables for emerging PV based renewable energy installations. Globally almost 90% of Solar PV cables are manufactured with this Electron Beam Irradiation technology only.

Application: ATC flexible conductor, Dual wall Electron Beam irradiation insulated for Photovoltaic Power applications for connection from PV Cell to Junction Box/Inverter in dry, damp or wet Conditions.

It can be installed in open trays or in ducts/conduits. Rodent resistant Design of Solar PV Cable also available as given below.

Construction: Annealed Electro-Tinned fine copper strands(bunched to meet class 5 flexibility as per IEC 60228/VDE 0295), Insulated and sheathed with Polyolefin Co-Polymer(XLPO), Electron Beam cross-linked.

Sheath colour: RED or Black, Black with Red stripe also available (Black recommended)

Rodent resistant cables also available

ADVANTAGES OF ELECTRON BEAM CROSS LINKED XLPO:

- Continuous operating Temperature 120° C, hence higher current carrying capacity.
- Better UV & Ozone resistance and improved weather resistance in adverse conditions.
- Improved oil & Chemical resistance, improved crack resistance.
- Improved Mechanical Properties of the cables in elevated temperature conditions.
- Improved Flammability properties, Halogen Free.

TECHNICAL SPECIFIATION:

Volltage Rating:U/U = 600/1000 V AC,1000/1800 V DC
Test Voltage: 6.5 KV 50 Hz 0r 15 KV DC for 5 min
Temperature Rating: -40° C up to +120° C
Ambient Temperature: -40° C up to+90° C
Max.Short circuit Temp: 250° C (for 5 Sec)
Oil & Chemical resistance: IEC 60811-1
Bending Radius: > 4×Ø(cable OD)

STANDARD/MATERIAL PROPERTIES

Fire Performance: IEC 60332-1-2
Smoke Emission: IEC 61034-2/EN 50268-2
(light Transmission > 60%)
Halogen Free: IEC 60754-1
(HCL content < 0.5%)
Expected life of cable: > 25 Years at 90°C
Conforming to TUV 2Pfg - 1169/08.2007 PV1 F

Solar DC Cables as per standard EN 50618 are also available.

"APAR ANUSHAKTI" E-BEAM IRRADIATED ATC FLEXIBLE CONDUCTOR, XLPO INSULATED, XLPO SHEATHED SOLAR CABLE

Size	Conductor	Insulation Thickness	Sheath Thickness	Cable OD	Weight of Cable	Current Rating (A)			Max. DC resistance of conductor at 20°C (Ohm/Km)
sq.mm	No./Dia of strand (mm) (nom.)	mm (Minimum)	mm (Minimum)	mm (Nominal)	Kg/Km (Approx.)	At 60°C In Air	Single Cable on Surface	2 Cables Adjacent on Surfaces	
2.5	50/0.25	0.5	0.5	4.2	35	41	39	33	8.21
4	56/0.3	0.5	0.5	4.7	50	55	52	44	5.09
6	84/0.3	0.5	0.5	5.5	70	70	67	57	3.39
10	80/0.4	0.5	0.5	6.5	110	98	93	79	1.95
16	126/0.4	0.5	0.5	8.3	170	132	125	107	1.24
25	196/0.4	0.5	0.5	11.0	285	176	167	142	0.795
35	276/0.4	0.5	0.5	12.0	385	218	207	176	0.565
50	396/0.4	0.8	1.0	14.0	535	276	262	221	0.393
70	360/0.5	0.9	1.0	16.0	735	347	330	278	0.277
95	475/0.5	0.9	1.1	18.0	945	416	395	333	0.21
120	608/0.5	1.0	1.1	20.0	1190	488	464	390	0.164
150	756/0.5	1.2	1.2	22.5	1485	566	538	453	0.132
185	925/0.5	1.4	1.3	25.0	1830	644	612	515	0.108
240	1221/0.5	1.5	1.4	28.0	2375	775	736	620	0.0817
300	1525/0.5	1.6	1.5	31.0	2975	895	850	716	0.0654

Rating Factor:						
Ambient Temp °C	< 60	70	80	90	100	110
Rating factor	1	0.91	0.82	0.71	0.58	0.41

"APAR ANUSHAKTI" LT XLPE (120° C) INSULATED POWER CABLE

The XLPE cables are conventionally manufactured by Chemical Cross Linking Process and are suitable for max operating temperature of 90° C. Apar has successfully developed Electron Beam Cross Linked XLPE (120° C) Insulated Power & Control Cables Suitable for Insulation rating 120° C (max continuous operating temperature). These cables are provided with 105° C rated inner & outer PVC Sheath to support cable usage at higher operating temperature.

It can be installed in open trays or in ducts/conduits. Rodent resistant Design of Solar PV Cable also available as given below.
The following factors are generally considered for selecting a suitable cable size LT cables for connection from inverter output (AC) to LT Panels, LT Panels/Switchgear to Transformer Primary, Protection equipments and other auxiliary equipments.

- Maximum Load Current.
- Magnitude and duration of possible overload and of Short circuit current.
- Voltage Drop and line Length.
- **Type of Installation:**
  - Underground (Direct or in Ducts), in Air, Combination of Underground and in Air.
  - Cables in the vicinity especially in Ducts/Cable trays.
  - Fire Safety requirements.
- Max & Min ambient temperature.
- Chemical and physical properties of soil for UG Installations
- Technical Specifications and any Special requirements

The cable system designer selects the cable size taking into account all the de-ratings of installation conditions such that there is sufficient cushion available for any unforeseen situtaions and possibility of any future overloading. Therefore, for normal (90° C) LT XLPE cables, the Cable System designer tends to load the cable maximum up to 75° C to Perhaps 80° C Max operating temperature, keeping the balance as cushion. The Solar Installations are generally taking Place in high ambient Zones, like Rajasthan, AP, TN and Gujarat etc where the ambient temperature in summer reaches as high as 50° C to 55° C. Since the cable cannot be loaded beyond 80° C, occasionally the cable designer opts for over sized cable, leading to higher capital costs.

Apar Anushakti LT XLPE cables suitable for max 105° C (though its XLPE Insulation is rated 120° C) can be considered for full loading of cable up to 90° C Keeping balance 15° C as available cushion for any future overloading. It offers 2 options:

a) Keep the conductor size same, it allows cable system designer to consider cable loading up to 90 °C (Keeping Balance as cushion) and it will ensure a much longer life of cable.

b) There exists an opportunity for cable system designer to consider one size lower thus offering unprecedented cost reduction benefits technical advantage.

Cable construction:

0.65/1.1KV Grade Stranded Aluminium or copper conductor, EB-XLPE Insulated, PVC Inner/Outer Sheathed, Armoured/Un-Armoured Cables Conforming to IS:7098 or IEC:60502-1 or other International Standards.