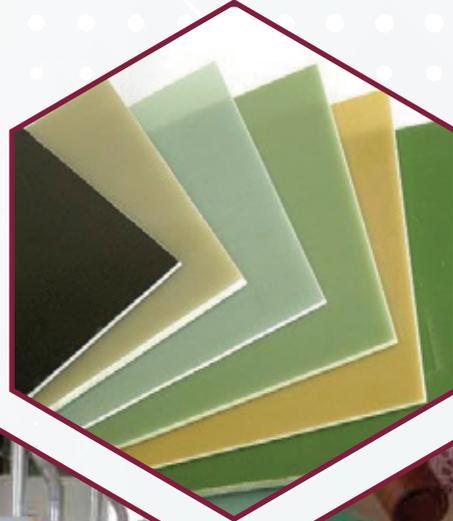


**D&W** D.C. WORT COMPOSITES CC

**insulectric (pty.) ltd.**

**D&W** D.C. WORT CC



# The Insulation Specialists

ADVANCED MATERIALS

**insulectric (pty.) ltd.**

## THE INSULATION SPECIALISTS

### ADVANCED MATERIALS

Manufacturers, stockists and distributors of a wide range of composite materials, engineering plastics, thermal and electrical insulation materials, pultruded products, high pressure laminates, Arc-chutes, insulation assemblies, custom fabrications, components, fittings, parts and spares to exact customer requirements.

Specialising in engineered precision components, we will design and manufacture fabricated parts using a wide range of composite materials, holding tight tolerances. Using CNC vertical machining centres is standard practice when manufacturing complex sizes and shapes to meet your specifications.

Our services extend to customers within the railway, aerospace, defence, furnace, ferrous and non-ferrous metal processing, metallurgical, mining, smelting, electrical supply and distribution, electro-technical and air power industries around the world.



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## PRODUCTS

An extensive range of the finest laminates and composites from around the world.

### HAYSITE REINFORCED PLASTICS

Insulectric have been representatives for HAYSITE REINFORCED PLASTICS for over 40 years and offer a range of their polyester glass composites..

### LAMTUF PLASTICS

DC Wort Composites have been distributors for LAMTUF PLASTICS for the past 20 years we can offer a complete range of their high quality phenolic paper and cotton fabric laminates.

### TENMAT ADVANCED MATERIALS

DC Wort Composites is the Southern Africa representative for TENMAT. We offer a wide range of their world leading advanced materials.

### THIOLYTE

An association with quality and South Africa for over 40 years. We offer a complete range of high quality laminates and composites.

DC Wort Composites and Insulectric have limited stock of TUFNOL, ILNORPLEX MICARTA and SPALDITE COMPOSITES materials.



## PHENOLIC COTTON

A wide range of applications in the mechanical and electrical fields.

### LAMTUF F1

Manufactured from a fine weave scoured cotton fabric. Has good electrical and mechanical properties and can be machined to a fine finish. Suitable for small and intricate machined items. Sheets are supplied as per tolerance specified in ISO:2036

### LAMTUF F1 GRAPHITE

Manufactured from a fine weave scoured cotton fabric. Contains graphite. Has good mechanical properties and is self-lubricating. Can be machined to a fine finish. Used only for mechanical applications, not for electrical use.

### LAMTUF F2

Manufactured from a medium weave scoured cotton fabric. Has good machining and punching properties and resistance of chemicals. Suitable for small machined parts. Sheets are supplied as per tolerance specified in ISO:2036.

### LAMTUF F3

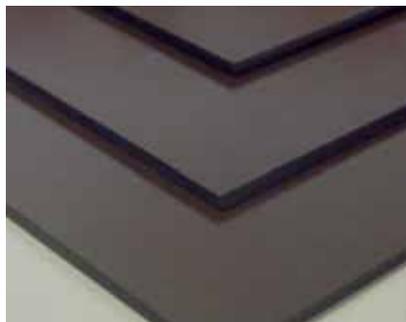
Manufactured from a coarse weave cotton fabric. A strong and tough material with good machining properties. Suitable for heavy duty gears and other applications requiring high impact strength. Sheets can be supplied up to 150mm thick. Supplied as per tolerance specified in ISO:2036.

### MICARTA NP342HTBN

A high performance composite manufactured from a fine weave cotton fabric. Retains high strength at elevated temperatures, up to 125°C continuously. Excellent impact and bond strength, machines cleanly, engineered not to shrink. Used in power generator applications and the air power industry. Tested and passes General Electric's specification; A50A341.

### SPAULDITE ARC2

A high performance composite manufactured from a medium weave cotton canvas. Blister free at higher temperatures, good wear resistance and high strength. Contains molybdenum disulfide lubricant in a proprietary temperature resistant resin capable of up to 145°C continuously and 200°C intermittently. Very low moisture absorption. Not for electrical applications.



## EPOXY COTTON

### ATTWATER B42

Fine weave scoured cotton. Can be easily machined to a fine finish with good anti track properties, coupled with high mechanical and electrical strength. Capable of up to 125°C continuously. Typical applications include high voltage insulation, chemical resistant components and precision machined parts.

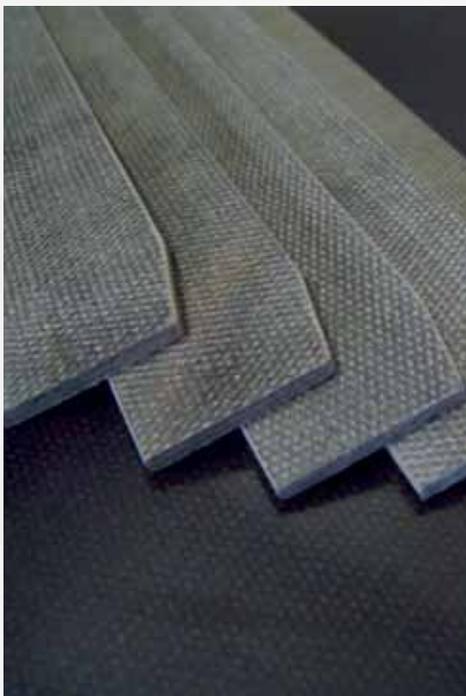
## PHENOLIC KEVLAR

### ILNORPLEX MICARTA NP193P

Aramid and soft glass fibres are combined to make a fabric that is stronger than pure aramid and less abrasive than glass fabrics. This material is impregnated with a high temperature phenolic resin matrix, which produces a composite with excellent mechanical strength at elevated temperatures up to 165°C and adverse environments. Applications include wear plates for conveyor systems, valve plates and compressor and pump vanes.

### TENMAT FEROFORM F57

Developed using specially engineered resin and custom reinforcements. This material combines outstanding wear resistance with excellent dimensional stability. It is the ideal solution for rotor vanes in the ammonia boosters and compressors within the refrigeration industry. The industry standard for high temperature (in excess of 200°C) heavy duty applications.



## PHENOLIC PAPER

Thermal class E, wide range of applications in the electrical field.

### LAMTUF P1

A paper based laminate with good mechanical properties and can withstand low tension electrical applications under non humid conditions. Suitable for using as insulation structural parts.

### LAMTUF P1 BLACK

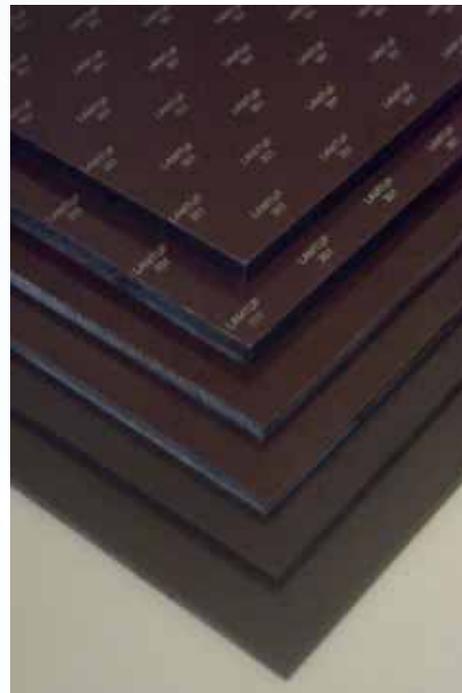
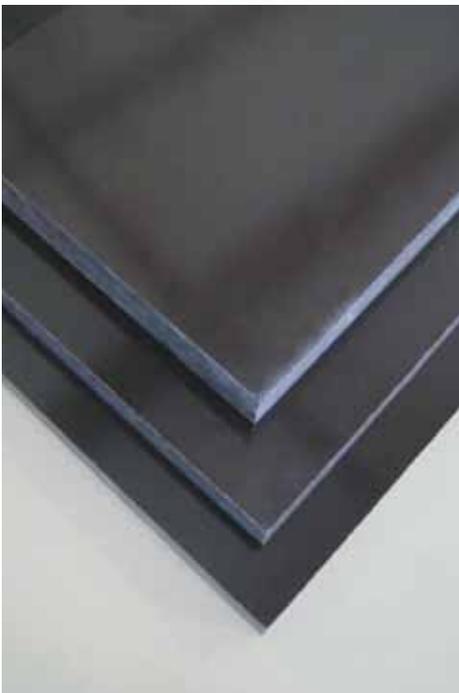
As per P1 but in black colour.

### LAMTUF P2

A paper based laminate with good mechanical properties and better electrical properties than P1. Suitable for the power electrical industry for high voltage applications at power frequencies. High electrical strength under oil. Good electrical strength in air under normal humidity.

### LAMTUF P3

A paper based laminate with good electrical and adequate mechanical properties with very low moisture absorption which makes it suitable for high voltage electrical application even under tropical conditions.



## EPOXY GLASS

High mechanical and electrical strength with low moisture absorption, wide range of mechanical and electrical applications.

### THIOLYTE FR4

An epoxy glass cloth laminate with high mechanical strength, good electrical properties under dry and humid conditions. Flame retardant. Suitable for a wide range of mechanical, electrical and electronic applications.

### THIOLYTE G11

An epoxy glass cloth laminate with high mechanical strength up to 155°C. Good electrical properties under dry and humid conditions. Suitable for insulation structural parts in the electrical, electronic and other industries.

### THIOLYTE G11 MAGNETIC

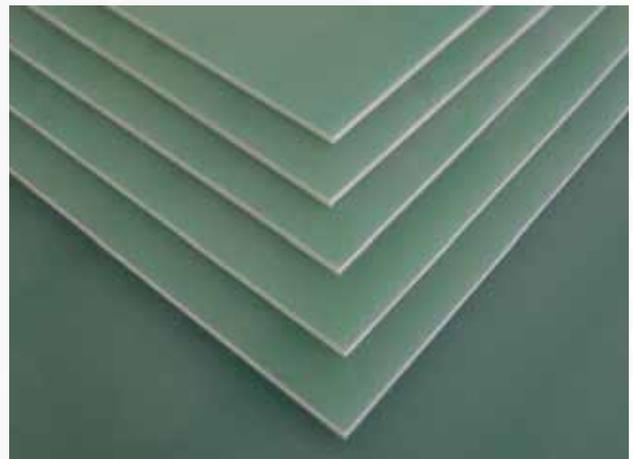
An epoxy glass cloth laminate for magnetic conductivity, high mechanical strength, heat resistant and good magnetic permeability. Suitable for manufacturing magnetic slot wedges.

### THIOLYTE G11 CLASS H

An epoxy glass cloth laminate with excellent retention of mechanical strength at elevated temperatures. Thermal class H (180°C). Markets include hydro power plants, nuclear power plants, railway industries and the high voltage industries among others.

### THIOLYTE EPGM305

An epoxy glass mat laminate with very good mechanical properties at elevated temperatures with good electrical properties and dimensional stability, suitable for class H applications. Excellent thermal resistance (temperature index 180°C). Low water absorption and good resistance to solvents. Suitable for mechanical, electrical and thermal stressed insulating parts among others



## POLYIMIDE GLASS

### HALLET PIGC301

A high temperature, high performance laminate developed for applications where good dimensional stability, good electrical, mechanical and rigidity are required at elevated temperatures. Capable of long term use at 200°C. Suitable for high temperature components and chemical resistant components among others.

## SILICON GLASS

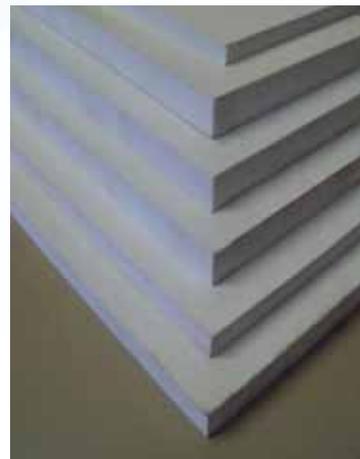
### THIOLYTE G7

A glass fabric combined with a proprietary silicon resin system. Has excellent strength with good electrical properties. Suitable for use in most heating and insulation applications up to 180°C.

## MELAMINE GLASS

### THIOLYTE G5

A glass fabric reinforcement in a melamine resin binder. This grade is among the hardest of the glass based laminates and has excellent arc resistance. Good resistance to caustic chemicals and is flame resistant. Intended for mechanical and electrical applications.



## POLYESTER GLASS

A specially engineered fiberglass reinforced thermoset polyester composite. With excellent dielectric, thermal, corrosion and structural properties.

### HAYSITE H515

Exhibits excellent flexibility and retention of electrical properties at elevated temperatures. Typical applications include layer and core insulation for dry type transformers.

### HAYSITE H900

Recognised as a top performer in the electrical industry. Retains electrical properties without adverse effects to product strength and stability at elevated temperatures. Typical applications include general purpose electrical insulation, transformer spacers and supports, transportation components, high voltage appliance insulators, bus bar supports and switchgear.

### HAYSITE HST2

The benchmark in the industry for high temperature polyester glass materials that all others are measured against. Carries a U.L. thermal recognition of 220°C the highest thermal index ever achieved by any polyester glass laminate (U.L. File No. E81893). For use in elevated temperature applications where a high strength insulation material is required.

### HAYSITE ETR

A high performance electrical insulating material. Exceeds NEMA in dielectric strength, arc resistance and tracking resistance. Highly flame retardant and low smoke generating. Applications include high voltage appliance insulators, bus bar supports and barriers in switchgear.

### HAYSITE HCR100

A corrosion resistant composite with very low water absorption. Ideal for the water/waste water industry.

### HAYSITE H232

Special grade for unique applications. Low smoke and flame spread values coupled with high chemical resistance make these sheets a standard product choice in most laboratory environments.

### **HAYSITE H320**

Specially engineered composite which offers superior energy efficiency, temperature control and durability for high temperature mould and platen thermal applications. Does not crack or break easily and resists oils and fluids.

### **THIOLYTE 471 – Meets NEMA LI-1 GPO3, UPGM 203, DIN 7735 HM2471**

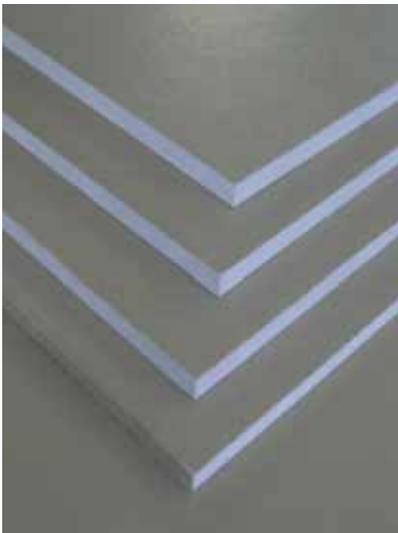
Excellent electrical insulation properties. Tracking resistance up to CTI 600. The most modern SMC press system allows for a sheet thickness of 130mm with a tolerance of  $\pm 0.1$ mm. A sheet length of up to 3720mm. Typical applications include the transformer, rail, switchgear and high-voltage industries.

### **THIOLYTE 575 – meets UPGM 205**

A high performance electrical insulating material with mechanical properties far higher than Thiolyte 471.

### **THIOLYTE 679 – meets NEMA LI-1 GPO1**

An ultramodern high performance high temperature polyester glass laminate. Capable of intermittent operating temperatures up to 240°C. For applications demanding high mechanical strength at elevated temperatures.



## SILICON MICA



Mica possess exceptional properties resisting everything, fire, electricity, chemicals, radiation and at the same time it is environmentally safe. Rigid mica sheets consisting of muscovite or phlogopite mica impregnated with a high temperature silicon binder have unique dielectric, thermal and mechanical properties. Superior in intensity, incombustibility and are flame resistant withstanding temperatures up to 800°C. Applications include but are not limited to thermal protection barriers where mechanical strength and high compression and pressure at high temperature is involved. As insulation between high temperature platens and moulds in hydraulic and forging presses. As high temperature insulation of electrode arms and busbars in electrical, induction and arc furnaces. Innumerable other uses.

Flexible mica sheets or rolls consisting of muscovite or phlogopite mica impregnated with a high temperature silicon binder are available plain or laminated with glass cloth or ceramic felt. Temperature resistant up to 1000°C (phlogopite). Mainly used as slip plane insulation between the crucible and induction coil in induction furnaces but with a wide variety of other uses.

## FIBRE CEMENT BOARD

Non-asbestos, chemically inert and non-combustible fibre reinforced cement boards.

### TENMAT SINDANYO H91

The leading industry standard for high temperature insulation boards, exhibiting excellent strength in demanding thermal applications even at temperatures up to 700°C. Proven to work even in the most arduous and harsh environments such as smelting, furnace insulation panels, cathode support pads, induction billet heater boxes, induction furnaces in aluminium, steel and glass works, as well as nuclear power plants

## TENMAT ADVANCED MATERIALS

Specifically designed for high temperature applications, materials such as FIREFLY, NITRASIL, SINDANYO and ARCLEX have proven themselves to work even in the most arduous and harsh environments such as aluminium, steel and glass works, as well as nuclear power plants.

SINDANYO is used in the potroom in strip form between pot covers and cathode frames and in pad or plate forms between the anode support, the control gear and the super structure

SINDANYO is ideal material for crust breaker discs, busbar and primary frame insulation.

ARCLEX and SINDANYO provides the necessary electrical insulation of the cathode frame on its concrete base and to insulate busbars from the steel retaining and cathode frames.

FIREFLY FF700 millboard is a popular choice for many sealing requirements including syphon tube gaskets in molten metal transfer equipment.

FIREFLY FF700 millboard provides the insulating layer between the crucible and its hot face refractory lining, reducing heat losses thereby maintaining melt temperature longer. It is also used underneath the pots. FF700 possesses the necessary strength to be used as a permanent former when casting concrete.

Inside the electrolysis pot FIREFLY FF700 millboard shields the anodes in order to exclude alumina whilst gas heating takes place during start up. Once operating temperature is reached the millboard becomes a sacrificial component in the pot.

RF1000 grade products are used as the insulation in crucibles, transport ladles and launder systems ensuring cost effective maintenance of liquid metal temperature for long periods of time.

CS1150 pouring nozzles have replaced conventional calcium silicate and cast iron tubes for flow control of liquid aluminium.



## ENGINEERING PLASTICS

A group of plastics materials (thermoplastics) that have better mechanical and or thermal properties than the more widely used commodity plastics. Engineering plastics have gradually replaced traditional engineering materials such as wood or metal in many applications.

NYLON6 and 6-6

Polyamides (PA)

Polycarbonates (PC)

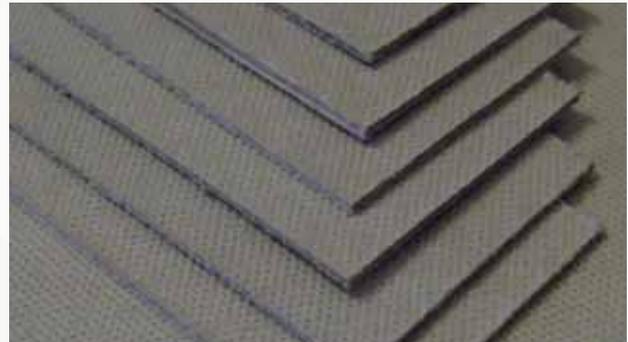
Polyetheretherketone (PEEK)

Polyimides

Polytetrafluoroethylene (PTFE/TEFLON)

## TRANSFORMER BOARD

Made from high grade sulphate cellulose without a resin or binder. Excellent physical and electrical properties. Used mainly in oil-filled transformers where a solid insulating structure is needed.



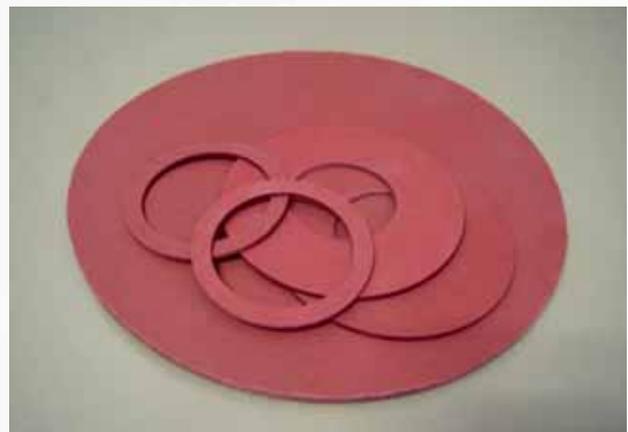
## DENSIFIED WOOD

Type 6, this unique material combines the dielectric properties and stability of thermosetting phenolic resin with the strength and toughness of wood. Manufactured from cross laminated high quality natural Beech wood cured and cooled under pressure to relieve stresses and get perfect dimensional stability and flatness. The material is suitable for use in oil up to 130°C and perfect for applications up to 400 kV transformers. Used for coil supports, clamp rings winding support flanges, supporting cleats and terminal boards etcetera.



## VULCANISED FIBRE

A chemically pure, cellulose material that contains no resins or bonding agents. It has extremely high internal bond strength, will not delaminate or separate even in water. Its resistance to electric tracking is outstanding and its heat resistance is superior to unconverted cellulose electrical insulation. Because of its unusual range of properties such as strength, toughness, ease of fabrication, resistance to oils, petroleum, most solvents and its wide range of qualities and forms it is the choice for countless mechanical and electrical applications.



## PHENOLIC COTTON RODS

Phenolic cotton fabric rolled and moulded rods in various diameters.

### THIOLYTE L

These rods are sold in the as moulded condition. Manufactured from a fine weave cotton fabric. Intended primarily for the manufacture of mechanical parts.

### LAMTUF F2 - meets the requirements of ASTM D709-92 grade LE

These rods have a clean smooth finish free from surface defects. Intended for mechanical components and not recommended for primary electrical insulation above 600 volts. The material is resistant to solutions of most acids and remains unaffected by most organic solvents. Can be machined in all directions.

## PHENOLIC PAPER RODS

Phenolic paper rolled and moulded rods used for electrical insulation purposes and can be supplied in various diameters.

### LAMTUF P3

These rods are moulded using the best quality bleached Kraft Paper, impregnated with a special grade of Phenolic resin to provide good insulating properties. These rods have a clean smooth finish.

### TUFNOL SWAN

Phenolic paper rolled and moulded rod to BS6128 PF CP 22

## EPOXY GLASS RODS

Used in mechanical and electrical applications.

### THIOLYTE FR4

Epoxy glass moulded rod, provides high mechanical strength at room temperature and has good dielectric and electric performance has low moisture absorption and is flame retardant. This grade is normally used for electrical and electronic insulation where low moisture absorption and high mechanical strength are required.

### TUFNOL 10G/40

Epoxy glass rolled and moulded rod to BS6128 EP GC 22



## PHENOLIC COTTON TUBES

Rolled Phenolic cotton tubes for general mechanical and electrical applications.

### THIOLYTE L

A medium weave Phenolic cotton rolled tube suitable for applications requiring a wear resistant material, it is also suitable for low voltage electrical work.

### LAMTUF F2

A fairly fine weave Phenolic cotton rolled tube with good mechanical strength and machining properties, it is suitable for low voltage electrical work.

## PHENOLIC PAPER TUBES

Rolled Phenolic paper tubes for general mechanical and electrical applications. Supplied in round, square and rectangular shapes.

### THIOLYTE SRBP

A commercial quality Phenolic paper rolled tube suitable for low voltage electrical applications.

### THIOLYTE SRBP SQUARE

A commercial quality Phenolic paper rolled square tube suitable for low voltage electrical applications and some mechanical uses.

### TUFNOL KITE

A rolled and moulded tube available in round, square and rectangular shapes. Meets the requirements of BS6128 PF CP 91 and PF CP 131. Also available in channel and angle.

## EPOXY GLASS TUBES

An epoxy resin binder with a glass fabric reinforcement. A versatile laminate with high mechanical strength, good dielectric loss properties and good electrical strength under both dry and humid conditions.

## THIOLYTE G11

General mechanical and electrical applications with temperatures up to 155°C. Colour is natural light green.

## SILICON GLASS TUBES

Proprietary silicon resin binder with a glass fabric reinforcement. Retains good electrical properties at elevated temperatures.

## THIOLYTE G7

Used in mechanical, electrical and electronic construction at elevated temperatures up to 180°C. Colour is white.

## SILICON MICA TUBES

Manufactured from muscovite or phlogopite mica bonded with a silicon resin system in an extensive range of diameters.

## PHLOGOPITE

Good dielectric and excellent mechanical strength. Used as insulation in all kinds of electrical equipment, motors, furnaces, electric-arc furnaces and other metallurgy industry applications with temperatures up to 700°C



## PROFILES AND SHAPES

Available in a variety of material and shape combinations.

### PHENOLIC PAPER

Available in;

TUFNOL L SECTIONS - In limited sizes.

TUFNOL RECTANGLE TUBES - In limited sizes.

### POLYESTER GLASS

A variety of the following shapes in various sizes.

HAYSITE GPO3 L SECTIONS

HAYSITE GPO3 ANGLE SECTIONS

HAYSITE GPO3 CHANNEL SECTIONS

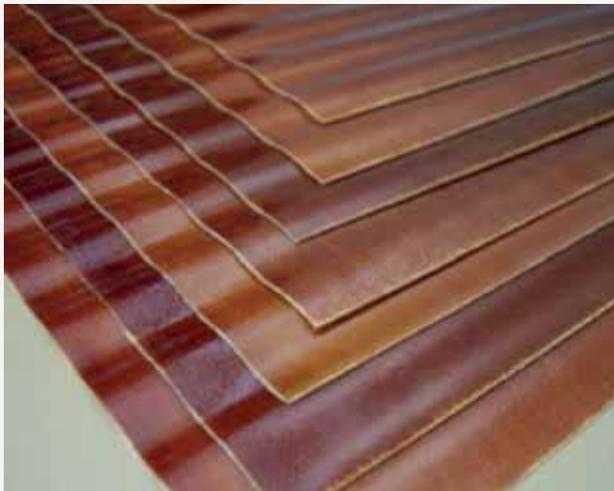
THIOLYTE DOGBONE SPACERS - Class H in various sizes.

### EPOXY GLASS

THIOLYTE PULTRUDED TOPSTICKS - In various sizes.

THIOLYTE G11 RIPPLE SPRINGS

Epoxy resin reinforced with glass fabric, is used in large electrical machines to hold the coils and dampen movement. This spring pressure also ensures that the dimensional changes caused by temperature variations are kept under control.



## PREPREG AND MOULDING COMPOUND

### PREPREG

#### G11

Glass Epoxy B-stage Prepreg, very good mechanical and electrical properties for the electrical and electronic industries.

### MOULDING COMPOUND

#### SMC/DMC/BMC

Unsaturated polyester resin filled with glass fibre, fillings, pigment and other chemical agents. Easily moulded, good aging resistance and other properties enable it to be widely applied in many industries.

### PAPERS, TAPES AND SLEEVES

Tying tapes (1 to 8 strand)

Poly Dynamo tape (12 to 35mm)

Poly-Twill Tape

Adhesive Kapton tape

Adhesive Glass tape

Adhesive Yellow Polyester tape

Adhesive Filament tape

Mica tape

Masking tape

Acrylic Glass Sleeving

Non Fray Sleeving

Silicon Glass Sleeving

Conflex N.P.N.

Aramid paper (410)

Aramid paper (411)

Crepe paper

Diamond Dotted paper



## HIGH TEMPERATURE MATERIALS

Fibre reinforced cement boards

Advanced thermal millboard

High temperature wool

Ceramic paper

Square Braided Ceramic Packing

Webbing Tape

Webbing Tape Glass Reinforced

Round Braided Rope

Rope Lagging



## ADHESIVES

### EPOXY

AR16/AH16 is a modified cold – or hot – setting two part component epoxy adhesive. It is designed for bonding metals, ceramics, wood and synthetic duroplastics.

### CONTACT

CBA109 adhesive is designed to form strong bonds between surfaces like wood, plastic, rubber, foam, cork and wood laminates etc.

### POLYESTER

## ABRASIVES

A complete sanding solution for composites and laminates

SHEET – recommended for manual wet sanding of plastics, lacquers and composite materials. The product has a latex impregnated paper as backing material and extra durable coating. Grit range P80 to P2000

ROLL – a tough sanding material for aggressive sanding. The polyester based cloth makes the product stable and durable against wear and tear. Grit range P40, P60 and P80

## TOOLS

A complete range for machining plastics, composites and laminates. TCT saw blades, diamond grit blades, router bit, fibre cut, composite cutter, end mill, slot drill and drills etc.

SOLID CARBIDE – especially designed tooling for composite materials

PCD – especially designed tooling for composite materials



## SERVICES

### CUT SHEET SERVICE

We appreciate that our customers may not require a full sheet or board. We hold stock of all grades of material ready for cutting to your specifications. We pride ourselves on fast turnabout times coupled with a very competitive pricing structure.

We also sell offcuts by weight.

### PRECISION COMPONENTS

Specialising in engineered precision components, DC Wort Composites and Insulectric will design and manufacture fabricated parts using a wide range of composite materials, holding tight tolerances. Using CNC vertical machining centres is standard practice when manufacturing complex sizes and shapes to meet your specifications.

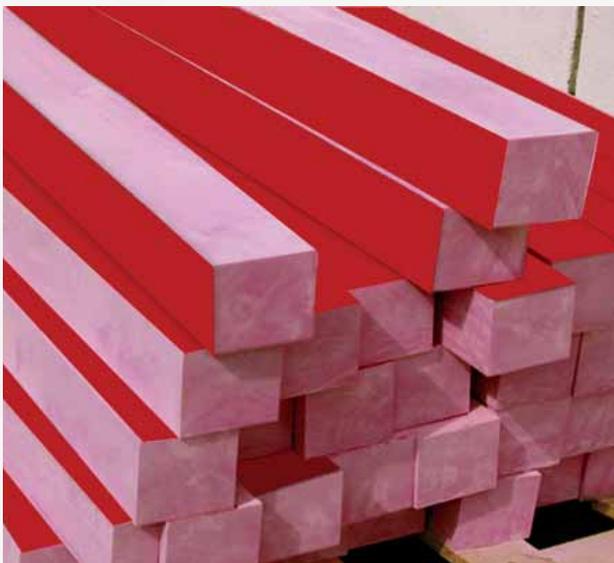
### TRADITION OF QUALITY

We are distributors of an extensive range from the leading manufacturers of laminates and composites from around the world. We are committed to our customers and the latest quality standards worldwide. Insulectric is standardised in terms of the ISO 9001 : 2008 Quality Management System.

### ARC CHUTES

We are specialised in the manufacture and refurbishment of a wide range of Arc-Chutes as well as the related spares, components and complete kits.

Insulectric enjoys OEM status with regard to certain 3kV Arc-Chute types.



## ROTOR VANES

For over 45 years DC WORT has manufactured rotor vanes for use in air motors, pumps, compressors, vacuum pumps and air tools. DC WORT use only high pressure laminate materials that meet specific performance characteristics of each rotor vane application. These materials are manufactured for special environmental conditions requiring high wear resistance, low moisture absorption with resistance to high temperature, shock, vibration and most chemicals, while remaining dimensionally stable. DC WORT enjoys OEM status for a number of South African air tools, air motors and vacuum pumps and is an exporter to a number of countries worldwide.

LAMTUF F2 – economical, general purpose rotor vanes for air tools and air motors.

LAMTUF F1 – economical, lower moisture absorption than Lamtuf F2, for air motors.

LAMTUF FG – contains graphite as an internal lubricant, for small tools and air motors.

ARC-2 – high temperature laminate with Molybdenum disulfide as an internal lubricant.

NP193P – high temperature laminate with excellent mechanical strength, for vacuum pumps.

NP342HTBN – high performance composite engineered not to shrink, for compressors and pumps.

LEL-635 – low moisture absorption with high mechanical strength for air motors.

ARG – glass reinforced epoxy, moisture has little dimensional effect.

FEROFORM F57 – the industry standard for drip feed oil-lubricated vacuum pumps.

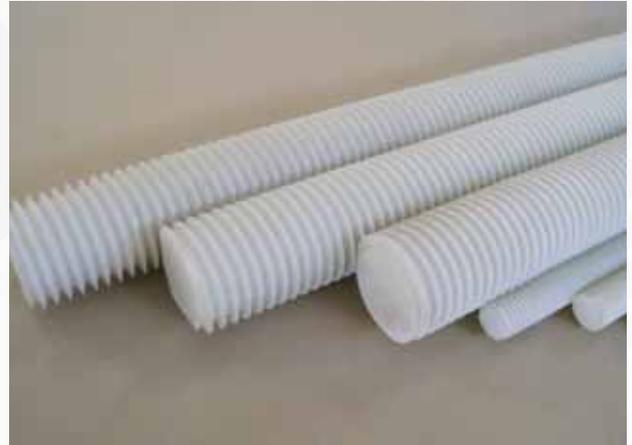
FEROFORM AE2 – economical, general purpose rotor vane for fully oil-lubricated pumps.



## FASTENERS

### THREADED ROD

Ranging from M6 to M30 and a length up to 1900mm. Metric threads, fine pitch threads, National and Whitworth threads. Manufactured from glass fibre reinforced resins. Temperatures from -40°C up to 250°C and voltages up to 150kV.



### NUTS

All conventional types in metric as well as inch-design in a variety of composites and laminates. Standard ranges from M6 to M30.



### WASHERS

Used for the perfect load distribution of connections made in a variety of composites and laminates.



## INDUSTRIES

### AEROSPACE INDUSTRY

Busbar supports and clamping systems  
Wear plates and pads  
Heat shields  
Antifriction liners

### AIRPOWER INDUSTRY

DC Wort cc is a manufacturer of high performance rotor vanes and enjoys OEM status on vanes for a number of South African manufactured air motors and vacuum pumps.

Air tool vanes  
Air motor vanes  
Compressor and blower vanes  
Vacuum exhaustor vanes  
Vacuum pump vanes

Milking pump vanes  
Tanker Discharge pump vanes  
Industrial type pump vanes  
Bushes  
Gaskets

### DEFENCE INDUSTRY

We offer technical composite materials widely recognised as the industry standard for demanding applications.

Insulated cable ducting  
Heat liners  
Propulsion system components

Bushes  
Gaskets  
Pads



## ELECTRICAL INDUSTRY

We offer a range of products to meet all electrical insulation needs. We can provide our customers with options when faced with critical material requirements.

- Busbar supports and clamping sets
- Bustube supports and clamping sets
- Mast base insulation
- Insulation tubes and bushes
- Insulation disks and washers
- Insulated threaded rods and fastener kits
- H/V and M/V insulation components and kits
- Standoff insulators
- Phase barriers
- Rectifier insulation components
- Many other applications...

- Flash barriers and dividers
- Insulation slot wedges and liners
- Insulation panels
- Circuit breaker components
- DC Switch components and kits
- Winding insulation kits
- Insulation flanges and gaskets
- Insulation pads and spacers
- Transducer insulation parts
- Transformer insulation components



## MARINE INDUSTRY

Composite materials recognised as the industry standard for bearings and wear parts.

Water lubricated bearings  
Gears  
Bushes

Pads  
Wear plates  
Insulation cable ducting and clamp sets

## METALLURGICAL AND FURNACE INDUSTRY

World leading specific materials for harsh environments such as aluminium, steel and glass works.

Furnace insulation spares and components  
Furnace roof insulation  
Heat shields  
Bustube clamp assemblies

Liners  
Scraper plates  
Crust breaker insulators  
Bushes, tubes and washers

Arc furnace electrode system insulation and insulation sets  
High temperature gasketing (molten metal syphons and exhaust systems)  
Hot gas filtration insulation components.  
Furnace pre-heater assemblies and components

## MINING INDUSTRY

DC Arc-chutes  
Locomotive insulation parts  
Insulation tubes and bushes  
Insulation pads and washers  
Insulation panels  
Bearings and bushes  
Gaskets and spacers  
Non-metallic structural parts

Composite wheels and rollers  
Insulation flanges, gaskets and rigid seals  
H/V and M/V insulation components  
Wear plates  
Liners  
Sliding pads  
Flanges  
Thrust washers



## PLATEN INDUSTRY

Haysites mould and platen insulation products are specially engineered thermoset composites which offer superior energy efficiency, temperature control and durability for high temperature mould and platen thermal applications.

## RAILWAY INDUSTRY

Specialised with regard to the manufacture and refurbishment of a wide range of arc-chutes as well as the related spares and components. Insulectric (pty) ltd enjoys OEM status with regard to certain 3kV DC Arc-chute types. Haysite composite materials are an excellent fit for transit applications, from rail transit car sub-floor material to third rail protection. Haysite transit products are formulated to meet stringent specification for smoke , flame and toxicity.

Universal 200 and 300 series arc-chutes

RJR series 3kV DC arc-chutes

Arc-chute kits, components and fittings

Antifriction liners and pads

Mast base insulation

Insulation panels

Train floor materials (Dura-Core 100)

Bushes

Vacuum exhaustor vanes

HSCB components and kits

DC switch components and kits

Bushes, tubes and insulation washers

Wear plates

Insulated busbar supports

Pivot liners

Tread Plates and Stripes



## TEXTILE MACHINERY

Bobbins

Gears

Bushes and bearings

## WATER TREATMENT, HYDRO AND CORROSION

Haysite brings years of experience supplying corrosion resistant products for the treatment and laboratory fume hood markets. High quality, consistent sheets make excellent fume hood liners and the corrosion resistant materials offer very low water absorption. Tenmat materials are resistant to abrasive conditions such as water containing silt, as proven by independent third party testing and confirmed by many years of uninterrupted service. The ability to work in both dry and wet conditions without grease lubrication makes them the ideal choice for a wide variety of applications within the hydropower industry. The ability of Tenmat bearings to work with sea water in dirty abrasive environments gives design engineers robust bearing and wear pad solutions for the offshore industries. A non-metallic material that will eliminate metal to metal corrosion, a common problem with traditional bearings.

Rollers

Lift Guides

Bearings

Bushes

Seals

Wear pads



## TECHNICAL DATA - PHENOLIC COTTON

| PRODUCT  | UNIT         | LAMTUF F1 | LAMTUF F2 | LAMTUF F3 |
|----------|--------------|-----------|-----------|-----------|
| STANDARD | BS2572       | F1        | F2        | F3        |
|          | IEC60893-3-4 | PFCC203   | PFCC203   | PFCC201   |
|          | DIN7735      |           | HGW2083   |           |

### MECHANICAL

|                   |                     |      |      |      |
|-------------------|---------------------|------|------|------|
| TENSILE STRENGTH  | Kgf/cm <sup>2</sup> | 780  | 700  | 700  |
| FLEXURAL STRENGTH | Kgf/cm <sup>2</sup> | 1475 | 1275 | 1300 |
| SHEAR STRENGTH    | Kgf/cm <sup>2</sup> | 740  | 745  | 735  |
| IMPACT - CHARPY   | kg/m <sup>2</sup>   | 8    | 9    | 10   |
| SPECIFIC GRAVITY  |                     | 1.35 | 1.35 | 1.35 |
| WATER ABSORPTION  | mg                  | 201  | 201  | 220  |

### ELECTRICAL

#### INSULATION RESISTANCE

|                       |          |    |    |    |
|-----------------------|----------|----|----|----|
| In water 24hrs @ 20°C | Meg Ohms | 50 | 15 | 10 |
|-----------------------|----------|----|----|----|

#### ELECTRICAL STRENGTH

|                  |       |     |     |     |
|------------------|-------|-----|-----|-----|
| In oil @ 90°C    |       |     |     |     |
| Flatwise (1.6mm) | kv/mm | 2.5 | 1.5 | 1.2 |
| Edgewise (3.2mm) | kv    | 4   | 2   | 2   |

#### THERMAL CLASSIFICATION

|  |  |         |         |         |
|--|--|---------|---------|---------|
|  |  | E (120) | E (120) | E (120) |
|--|--|---------|---------|---------|

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## TECHNICAL DATA - EPOXY GLASS

| PRODUCT                     | UNIT              | THIOLYTE FR4         | THIOLYTE G11         | THIOLYTE 305        | TEST         |
|-----------------------------|-------------------|----------------------|----------------------|---------------------|--------------|
| STANDARD                    | NEMA L1           | FR - 4               | G - 11               |                     |              |
| <b>MECHANICAL</b>           |                   |                      |                      |                     |              |
| FLEXURAL STRENGTH           | MPa               | 350                  | 350                  | 320                 | A            |
|                             | MPa               |                      | 207                  | 160                 | E-1/150 T150 |
| BONDING STRENGTH            | MPa               | 6500                 | 6500                 |                     | A            |
| IMPACT STRENGTH             | Kj/M <sup>2</sup> | 37                   | 37                   | 50                  | E-48/50      |
| <b>PHYSICAL</b>             |                   |                      |                      |                     |              |
| SPECIFIC GRAVITY            |                   | 1.8                  | 1.8                  | 1.8                 |              |
| WATER ABSORPTION 3mm        | %                 | 0.15                 | 0.15                 | 0.2                 | D-24/23      |
| <b>ELECTRICAL</b>           |                   |                      |                      |                     |              |
| ARC RESISTANCE              | s                 |                      |                      |                     | ASTM D 495   |
| INSULATION RESISTANCE       | Ohms              | 50 x 10 <sup>9</sup> | 50 x 10 <sup>9</sup> | 5 x 10 <sup>9</sup> | D-24/23      |
| ELECTRICAL STRENGTH         |                   |                      |                      |                     | A            |
| Flatwise (3mm)              | kv/mm             | 14.2                 | 14.2                 | 10.5                |              |
| RELATIVE PERMITTIVITY 50 Hz |                   | 5.5                  | 5.5                  | 5                   | A            |
| DISSIPATION FACTOR AT 50 Hz |                   | 0.04                 | 0.04                 | 0.02                | A            |
| THERMAL ENDURANCE           | °C                |                      | 155                  | 180                 |              |
| FLAMMABILITY                |                   | FV0                  |                      |                     |              |

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## TECHNICAL DATA - PHENOLIC PAPER

| PRODUCT                | UNIT                | LAMTUF P1 | LAMTUF P2 | LAMTUF P3 |
|------------------------|---------------------|-----------|-----------|-----------|
| STANDARD               | BS2572              | P1        | P2        | P3        |
|                        | IEC60893-3-4        | PFCP201   | PFCP203   | PFCP206   |
|                        | NEMA LI 11989       | X         | XX        | XXX       |
|                        | DIN7735             | HP2061    | HP2061,5  | HP2061,6  |
| <b>MECHANICAL</b>      |                     |           |           |           |
| TENSILE STRENGTH       | Kgf/cm <sup>2</sup> | 1050      | 850       | 600       |
| FLEXURAL STRENGTH      | Kgf/cm <sup>2</sup> | 1450      | 1450      | 1100      |
| SHEAR STRENGTH         | Kgf/cm <sup>2</sup> | 900       | 820       | 800       |
| IMPACT - CHARPY        | kg/m <sup>2</sup>   | 6.2       | 6.2       | 5.5       |
| SPECIFIC GRAVITY       |                     | 1.38      | 1.38      | 1.36      |
| WATER ABSORPTION 3mm   | mg                  | 270       | 95        | 72        |
| <b>ELECTRICAL</b>      |                     |           |           |           |
| INSULATION RESISTANCE  |                     |           |           |           |
| In water 24hrs @ 20°C  | Meg Ohms            | 25        | 150       | 5000      |
| ELECTRICAL STRENGTH    |                     |           |           |           |
| In oil @ 90°C          |                     |           |           |           |
| Flatwise (3mm)         | kv/mm               | 3         | 7.6       | 8.5       |
| Edgewise (3mm)         | kv                  | 5         | 30        | 40        |
| THERMAL CLASSIFICATION |                     |           |           |           |
|                        |                     | E (120)   | E (120)   | E (120)   |

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## TECHNICAL DATA - SILICON MICA / TENMAT SINDANYO

| PRODUCT                | UNIT              | MICA M                 | MICA P                 | SINDANYO               |
|------------------------|-------------------|------------------------|------------------------|------------------------|
| THICKNESS RANGE        |                   | 0,4 - 30               | 0,4 - 50               | 6 - 75                 |
| <b>MECHANICAL</b>      |                   |                        |                        |                        |
| TENSILE STRENGTH       | Mpa               | 100                    | 100                    |                        |
| FLEXURAL STRENGTH      | MPa               | 130                    | 130                    | 30                     |
| IMPACT STRENGTH        |                   |                        |                        |                        |
| DENSITY                | g/cm <sup>2</sup> | 2.1                    | 2.1                    | 1.6                    |
| WATER ABSORPTION       | %                 | 1                      | 1                      | 15                     |
| <b>ELECTRICAL</b>      |                   |                        |                        |                        |
| DIELECTRIC STRENGTH    | KV/mm             | 15                     | 15                     | 2.1                    |
| ARC RESISTANCE         | s                 | 300                    | 300                    | 184                    |
| SURFACE RESISTANCE     | Ohms              | 10 <sup>13</sup>       | 10 <sup>13</sup>       |                        |
| DIELECTRIC CONSTANT    | Min               | 3.8                    | 3.8                    |                        |
| COMPARATIVE INDEX      | V                 | 600                    | 600                    |                        |
| <b>THERMAL</b>         |                   |                        |                        |                        |
| CONTINUOUS TEMPERATURE | °C                | 500                    | 700                    | 700                    |
| THERMAL EXPANSION      | u/u/K             | 4,7 x 10 <sup>-5</sup> | 4,7 x 10 <sup>-5</sup> | 6,0 x 10 <sup>-5</sup> |
| THERMAL CONDUCTIVITY   | W/mK              | 0.16                   | 0.16                   | 0.33                   |

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## TECHNICAL DATA - POLYESTER GLASS

| PRODUCT                       | TEST        | H900                | HST2                | THIOLYTE 575        | UNIT       |
|-------------------------------|-------------|---------------------|---------------------|---------------------|------------|
| STANDARD                      | NEMA L1     | GPO3                |                     |                     |            |
|                               | EN60893     | UPGM203             |                     | UPGM205             |            |
| <b>MECHANICAL</b>             |             |                     |                     |                     |            |
| TENSILE STRENGTH              | ISO 527     | 76                  | 89                  | 160                 | Mpa        |
| FLEXURAL STRENGTH             | ISO 178     | 152                 | 172                 | 350                 | MPa        |
| MODULUS OF ELASTICITY         | ISO 178     | 10300               | 12248               | 20000               | Mpa        |
| COMPRESSIVE STRENGTH          | ISO 604     | 207                 | 227                 | 500                 | Mpa        |
| IMPACT STRENGTH - IZOD        | ISO 180     | 4.3                 | 5.4                 |                     | J/cm       |
| SHEAR STRENGTH                | ASTM D-732  | 94                  | 107                 |                     | Mpa        |
| BOND STRENGTH                 | ASTM D-229  | 6228                | 6228                |                     | N          |
| BARCOL HARDNESS               | ASTM D-2583 | 62                  | 52                  |                     |            |
| SPECIFIC GRAVITY              | ISO 1183    | 1.85                | 1.62                | 1.9                 |            |
| WATER ABSORPTION              | ISO 62      | 0.2                 | 0.3                 | 0.1                 | %          |
| <b>ELECTRICAL</b>             |             |                     |                     |                     |            |
| TRACK RESISTANCE              | IEC60587    | 1000                |                     |                     | Min        |
| ARC RESISTANCE                | D-495       | 190                 | 150                 |                     | Seconds    |
| COMPARATIVE TRACKING INDEX    | IEC60112    | 600+                |                     | 600                 |            |
| DIELECTRIC STRENGTH, PERP.    | IEC60243-1  | 22                  | 15.8                | 13                  | kV/mm      |
| DIELECTRIC STRENGTH, PARALLEL | IEC60243-1  | 55                  | 62                  | 60                  | kV         |
| DIELECTRIC CONSTANT @ 60 Hz   | IEC60250    | 5.2                 | 4.2                 |                     |            |
| DISSIPATION FACTOR @ 60 Hz    | IEC60250    | 0.06                | 0.01                |                     |            |
| UL FLAME RESISTANCE           | UL94        | V-O                 |                     | V-O                 |            |
| FLAME RESISTANCE              | ASTM D-229  |                     |                     |                     |            |
| IGNITION TIME                 | METHOD 2    | 120                 | 77                  |                     | Seconds    |
| BURNING TIME                  |             | 65                  | 256                 |                     | Seconds    |
| RADIANT PANEL                 | ASTM E-162  | 5                   |                     |                     |            |
| SMOKE DENSITY @ 4 Min. FLAME  | ASTM E-662  | 0.33                |                     |                     |            |
| FLAME SPREAD INDEX            | UL E-84     | < 25                |                     |                     |            |
| SMOKE DEVELOPED INDEX         | UL E-84     | 340                 |                     |                     |            |
| UL THERMAL INDEX, ELEC/MECH   | UL 746 B    | 160/150             | 220/210             | 155                 | °C         |
| COEFFICIENT OF THERMAL EXP.   | ASTM D696   | $27 \times 10^{-6}$ | $29 \times 10^{-6}$ | $20 \times 10^{-6}$ | $\mu/u/°C$ |
| NF16-101 ROLLING STOCK        | NF P92-501  | M1                  |                     |                     |            |
| FIRE BEHAVIOUR                | STM S-001   | F0                  |                     |                     |            |

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## insulectric (pty.) ltd.

## QUALITY

Insulectric operates an ISO 9001:2008 QUALITY MANAGEMENT SYSTEM for the manufacture of engineering components.

Here at DC Wort and Insulectric we have always made quality a top priority. We work with great determination to meet the highest quality standards. We aim to apply checks during all phases of the machining process and are committed to deliver great products that exceeds our customer's expectations. We endeavor to constantly enhance our performance and uphold only the most impressive quality standards.



Our extensive range of laminates and composites are of the highest quality and meet the highest performance specifications.



**THIOLYTE**®



PLASTICS

COMPOSITES

LAMINATES

PLASTICS

COMPOSITES

LAMINATES

PLASTICS

COMPOSITES

LAMINATES

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