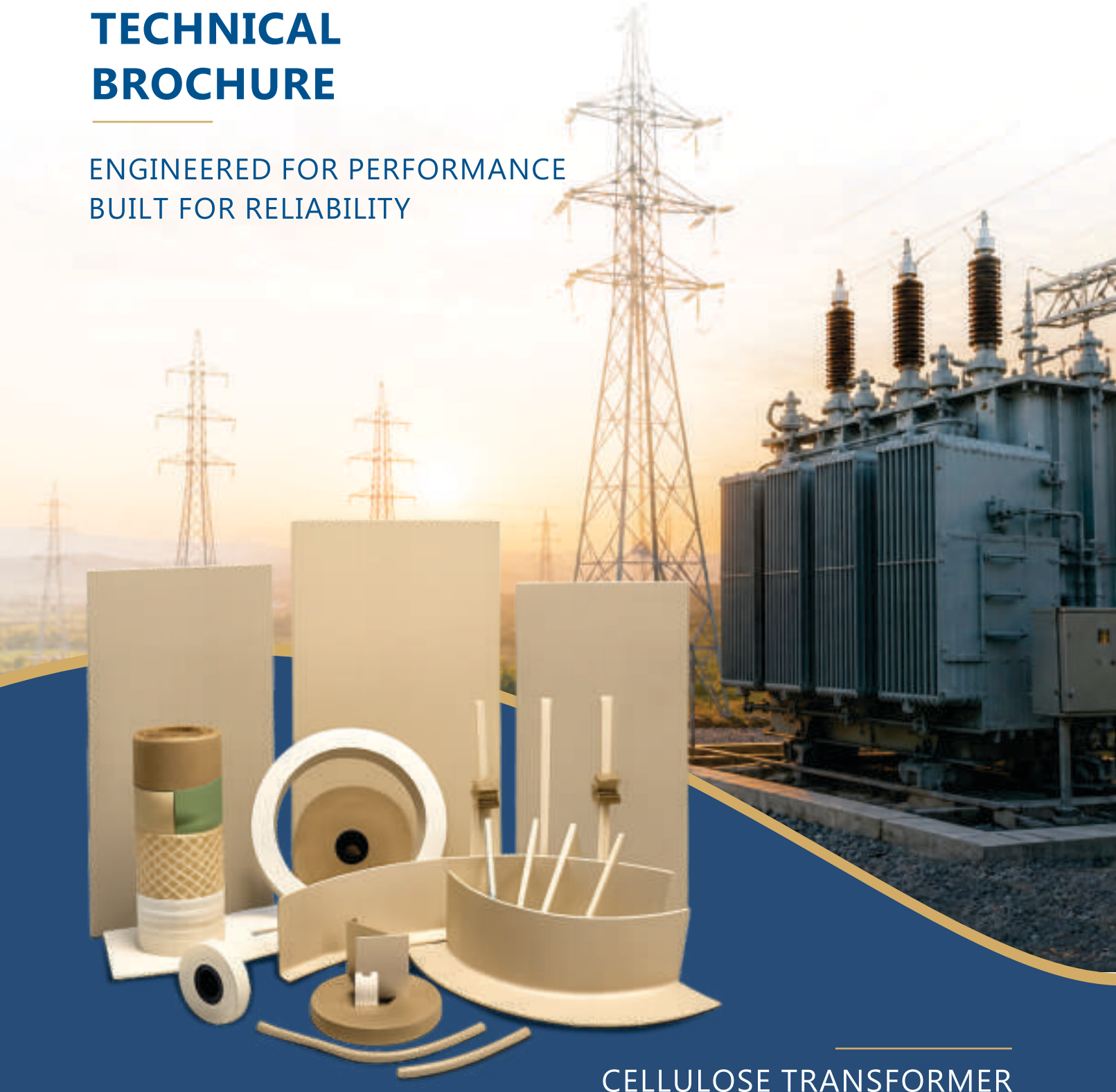
UMANG BOARDS LIMITED

TECHNICAL BROCHURE

ENGINEERED FOR PERFORMANCE
BUILT FOR RELIABILITY



CELLULOSE TRANSFORMER
INSULATION PRODUCTS

About
UMANG BOARDS

Estd. 1999

Building Trust
Delivering Reliability

At Umang Boards Limited, our journey began in 1999 with a clear focus on building a manufacturing business rooted in consistency, discipline, and long-term trust. Over the years, we have grown into a dependable name in our field, guided by a hands-on approach and a deep understanding of materials and processes.

What sets us apart is the way we work. From the careful selection of raw materials to the final stages of production, every step is carried out with attention and control. We place strong emphasis on maintaining consistency, refining our processes, and ensuring that what we deliver meets the expectations of a demanding and evolving industry.

As our capabilities have expanded, so has our role within the power sector. We specialise in cellulose-based insulation materials that support critical applications where reliability and performance are essential. These materials form an important part of transformer systems, where insulation plays a key role in ensuring operational stability and long-term durability.

Our manufacturing practices are supported by ISO-certified systems, reflecting a structured approach to quality, process control, and continuous improvement. This commitment helps us maintain consistency across production while aligning with globally recognised standards.

Over the years, we have built strong relationships with customers who rely on us not just for materials, but for dependability and clarity in the way we do business. As industries continue to grow and evolve, we remain focused on strengthening our capabilities and delivering solutions that stand the test of time.

20+
Country Exports

300+
Employee Strength

UNIT 1

UNIT 2

GLOBAL PRESENCE

Our product are trusted by costumers in over 20 Countries across 6 continents, reflecting our commitment to quality and reliability worldwide.

Certification

Integrated Manufacturing Facility

Built to meet the evolving insulation demands of modern transformer manufacturing, our facility combines scale, precision, and process control under one roof.

3 Pressboard lines

1 Lamination line

Dedicated Paper division

State-of-the-art machined & moulded sections

PRECISION MANUFACTURING

PROCESS CONTROL

QUALITY ASSURANCE

CUTTING EDGE PRODUCTION CAPABILITIES

INDEX

Raw Material

UNBLEACHED SOFTWOOD KRAFT PULP (UKP)

The Foundation of High-Performance Insulation

At Umang Boards Limited, the journey of excellence begins with the finest raw materials. We exclusively use 100% Unbleached Softwood Kraft Pulp (UKP), specifically selected for its long-fibre morphology - essential for achieving the high mechanical strength and superior dielectric properties demanded by EHV (Extra High Voltage) transformer insulation.

Every bale of pulp that enters our facility is tracked, tested, and validated input that directly determines the performance of the finished pressboard in the field.

STRATEGIC GLOBAL SOURCING

To ensure batch-to-batch consistency and uncompromising chemical purity, we partner exclusively with the world's most reputable pulp mills. Our global supply chain is engineered for reliable supply stream, technical consistency, and long-term quality assurance.

COUNTRIES WE SOURCE OUR UKP FROM


Canada


Sweden


Finland


New Zealand

Incoming Quality Testing

Every incoming shipment of Softwood Kraft Pulp is subjected to a comprehensive multi-parameter test protocol conducted in our in-house NABL-accredited laboratory before any bale is cleared for production use.

No pulp enters our process without full test clearance.

TEST PARAMETERS - INCOMING PULP INSPECTION

- Beating Degree (°SR)
- Wet Weight (g)
- Ash Content (%)
- Moisture Content(%)
- Conductivity of Aqueous Extract (µS/cm)
- pH of Aqueous Extract
- Kappa Number
- Degree of Polymerization (DP)

END TO END TRACEABILITY - FROM PULP TO TRANSFORMER BOARD

At Umang Boards Limited, we operate a closed-loop traceability system that links every bale of raw pulp to the finished pressboard it produces. This system ensures complete accountability across the entire manufacturing chain.


UKP Stock

Product

High Density Pressboards

- HD Grade

A premium rigid transformer board grade developed for applications requiring high strength, stability, and reliable insulation performance.

KEY PROPERTIES

01 | High mechanical strength and compressive resistance

02 | Excellent dimensional stability under operating conditions

03 | Low shrinkage and consistent flatness

04 | Strong electrical insulation characteristics

05 | Uniform density and dependable quality

Grade: UB-HD-3.1
Conforming to
IEC 60641-3-1 Type B 3.1A

APPLICATIONS

Commonly used for :

- Spacers
- Strips
- Cylinders
- Washers
- Plates
- Structural supports

MANUFACTURING ADVANTAGE

Produced through a controlled hot-press drying process that enhances rigidity, strength, and structural consistency.

Available in various thicknesses and sizes, with suitability for machining, cutting, and custom fabrication to meet transformer design requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
High Density - UB-HD-3.1	0.8 mm to 6.4 mm	4000	2100
		3200	2100
		2200	1100
		2000	1050

TECHNICAL SPECIFICATION

S. No.	Properties	Thickness	Units	Min. /Max. or range	Type
1.	Thickness Deviation from nominal	≤1.6 mm >1.6 mm	%	Max	± 7.5 % ± 5.0 %
2.	Apparent Density	≤1.6 mm >1.6 – 3.0 mm >3.0 mm	g/cm^3	Range	1.00 -1.20 1.10 -1.25 1.15 - 1.30
3.	Tensile Strength, Machine direction	≤1.6 mm >1.6 – 3.0 mm >3.0mm	MPa	Min.	100 105 110
4.	Tensile Strength, Cross Machine direction	≤1.6 mm >1.6 – 3.0 mm >3.0 mm	MPa	Min.	75 80 85
5.	Elongation - machine direction cross machine direction		%	Min.	2.5 3.5
6.	Compressibility C	≤1.6 mm >1.6 – 3.0 mm >3.0 – 6.0 mm >6.0 mm	%	Max.	10.0 7.5 5.0 4.5
7.	Reversible part of Compressibility C_{rev}	≤1.6 mm >1.6 – 3.0 mm >3.0 – 6.0 mm >6.0 mm	%	Min.	45 50 50 50
8.	Shrinkage - Machine direction Cross machine direction Thickness		%	Max.	0.5 0.7 6.0
9.	Plybond resistance		N/30 mm	Min.	250
10.	Moisture Content		%	Max.	6.00
11	Ash Content		%	Max.	0.7
12.	Conductivity of Aqueous Extract	≤1.6 mm >1.6 – 3.0 mm >3.0 – 6.0 mm >6.0 mm	(mS/m)	Max	5.0 6.0 8.0 10.0
13.	PH of Aq. Extract		--	Range	6.0 – 9.0
14.	Oil Absorption	≤1.6 mm >1.6 – 3.0 mm >3.0 – 6.0 mm >6.0 mm	%	Min.	11.0 9.0 7.0 6.0
15.	Electric Strength in air		kV/mm	Min.	12
16.	Electric Strength in oil	≤1.6 mm >1.6 mm	kV/mm	Min.	45 35
17.	Finish	**Conforming to IEC 60641 -3-1, Type B 3.1 A**			MATTE FINISH

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Product

High Density Pressboards

- DT Grade

Transformerboard used for low voltage rating transformers mainly 11 to 66 KV class.

KEY PROPERTIES

01 | High mechanical strength and compressive resistance

02 | Excellent dimensional stability under operating conditions

Grade: - UB-DT- 3.1
Conforming to IEC 60641-3-1, Type B. 3.1B

APPLICATIONS

Commonly used for :

- Spacers
- Strips

MANUFACTURING ADVANTAGE

Produced through a controlled hot-press drying process that enhances rigidity, strength, and structural consistency.

Available in various thicknesses and sizes, with suitability for machining, cutting, and custom fabrication to meet transformer design requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
Grade - UB-DT- 3.1	1.0 mm to 3.0 mm	2000	1050
		2200	1100

TECHNICAL SPECIFICATION

S. No.	Properties	Thickness	Units	Min. /Max. or range	Type
1.	Thickness Deviation from nominal	≤1.6 mm >1.6 mm	%	Max	± 7.5 % ± 5.0 %
2.	Apparent Density	≤1.6 mm >1.6 – 3.0 mm	g/cm^3	Range	0.95 -1.15 1.05 -1.2
3.	Tensile Strength, Machine direction	≤1.6 mm >1.6 – 3.0 mm	MPa	Min.	80 85
4.	Tensile Strength, Cross Machine direction	≤1.6 mm >1.6 – 3.0 mm	MPa	Min.	45 50
5.	Elongation - machine direction cross machine direction		%	Min.	3 4
6.	Compressibility C	≤1.6 mm >1.6 – 3.0 mm	%	Max.	11 7.5
7.	Reversible part of Compressibility C_{rev}	≤1.6 mm >1.6 – 3.0 mm	%	Min.	45 50
8.	Shrinkage - Machine direction Cross machine direction Thickness		%	Max.	0.7 1.0 6
9.	Plybond resistance		N/30 mm	Min.	250
10.	Moisture Content		%	Max.	6
11.	Ash Content		%	Max.	0.7
12.	Conductivity of Aqueous Extract	≤1.6 mm >1.6 – 3.0 mm	(mS/m)	Max	5 6
13	PH of Aq. Extract		--	Range	6.0 – 9.0
14.	Oil Absorption	≤1.6 mm >1.6 – 3.0 mm	%	Min.	13 11
15.	Electric Strength in air		kV/mm	Min.	12
16.	Electric Strength in oil	≤1.6 mm >1.6 mm	kV/mm	Min.	40 35
17.	Finish	**Conforming to IEC 60641-3-1, Type B. 3.1 B**			MATTE FINISH

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Product

Laminated Pressboards

Laminated pressboard is a heavy-duty insulation board designed for applications requiring greater thickness, superior rigidity, and strong structural performance. It is produced by laminating transformer board layers to create robust sections for demanding transformer assemblies.

Grade: - UB-HD-3.1 Laminated

***Casein Glue - Conforming to IEC 60763-3-1 Type LB. 3.1A.1**

****Polyester Glue - Conforming to IEC 60763-3-1 Type LB. 3.1A.2**

KEY PROPERTIES

01 | High mechanical strength and load-bearing capability

02 | Excellent dimensional stability during service

03 | Strong electrical insulation performance

04 | Low shrinkage with durable bonded construction

05 | Suitable for heavy structural applications

APPLICATIONS

Commonly used for :

- Pressure rings
- Static rings
- Beams
- Clamping plates
- Support strips
- Heavy insulation structures

MANUFACTURING ADVANTAGE

Manufactured by bonding multiple layers of transformer board to achieve higher thicknesses beyond standard pressboard ranges, while maintaining strength and reliability.

ADHESIVE OPTIONS

Available with polyester as well as casein glue suitable bonding systems selected according to performance and processing requirements.

Offered in a wide range of thicknesses and sheet sizes, with options for machining and custom fabrication to meet specific transformer design needs.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
Casein	7.0 mm to 120.0 mm	2000 2100 3000 3100	1000 1050 2000 2100
Polyester	7.0 mm to 200.0 mm		

TECHNICAL SPECIFICATION

S. No.	Properties	Units		Casein (aqueous) LB3.1A.1	Polyester (non-aqueous) LB3.1A.2
1	Thickness Deviation ≤ 12 mm > 12 mm	% %	Max. Max.	5 4	5 4
2	Apparent Density	g/cm³	Range	1.15 - 1.3	1.15 - 1.35
3	Flatness 500mm < 20 mm 20 to 50 mm > 50 mm	mm	Max.	5 3 2	4 2 1
4	Flexural Strength Machine Direction Cross Machine Direction	MPa MPa	Min. Min.	100 80	110 90
5	Internal Ply Strength I) Dried, tested at 23°C II) Dried, tested at 120°C, retention III) Oil impregnated, tested at 23°C, retention IV) Aged for 1 week at 120°C in oil, tested at 23°C retention	MPa % % %	Min. Min. Min. Min.	80 60 80 90	90 60 80 90
6	Compressibility C C_{rev}	% %	Max. Min.	3.5 65	3 70
7	Shrinkage MD CMD Thickness	% % %	Max. Max. Max.	0.5 0.7 6.0	0.4 0.6 4.0
8	Moisture Content	%	Max.	8	5
9	Ash content	%	Max.	1	1
10	Contamination of dielectric liquid Neutralisation value Sludge content Dissipation factor	 mg KOH/g mg/l	 ± Max. ±	 0.08 500 0.005	 0.05 500 0.005
11	Conductivity of aqueous extract	mS/m	Max.	15	10
12	pH of aqueous extract		Range	6 - 10	5 - 8
13	Oil absorption	%	Min.	6	5
14	Electric Strength in Oil	kV/mm	Min.	8	8

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Product

Calendered Pressboards

Calendered pressboard is an economical insulation board developed for power and distribution transformer applications. It is designed for components where good formability, smooth finish, and dependable performance are required.

Grade: - UB-LD-2.1
Conforming to
IEC 60641-3-1, Type B. 2.1A

KEY PROPERTIES

01 | Good mechanical strength for standard applications

02 | Reliable electrical insulation characteristics

03 | Smooth calendered surface for easy processing

04 | Good elongation and pliability

05 | Consistent thickness and dimensional stability

APPLICATIONS

Commonly used for :

- Punched components
- Embossed parts
- Insulation inserts
- Formed pieces for distribution transformers like cylinders

MANUFACTURING ADVANTAGE

Produced through a calendering process that improves surface finish, density uniformity, and workability, making it suitable for shaped and converted parts.

PROCESSING BENEFITS

Well suited for punching, cutting, embossing, and general fabrication processes used in high-volume component manufacturing.

Offered in multiple thicknesses and sheet sizes to suit standard distribution transformer production requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
Calendered Boards - UB-LD-2.1	1.0 mm to 6.0 mm	2000	1000
		3000	2000

TECHNICAL SPECIFICATION

S. No.	Properties	Thickness	Units	Min. /Max. or range	Type
1.	Thickness Deviation from nominal	≤1.6 mm >1.6 mm	%	Max	± 7.5 % ± 5.0 %
2.	Apparent Density		g/cm	Range	1.00 -1.20
3.	Tensile Strength, Machine direction Cross Machine direction		MPa	Min.	 80 55
4.	Elongation – Machine direction Cross machine direction		%	Min.	 6 8
5.	Shrinkage - Machine direction Cross machine direction Thickness		%	Max.	 0.8 1.2 6.0
6.	Plybond resistance		N/30 mm	Min.	250
7.	Moisture Content		%	Max.	8.00
8.	Ash Content		%	Max.	0.7
9.	Conductivity of Aqueous Extract		(mS/m)	Max	8
10.	pH of Aq. Extract		--	Range	6.0 – 9.0
11.	Oil Absorption		%	Min.	13
12.	Electric Strength in air		kV/mm	Min.	12
13.	Electric Strength in oil	≤1.6 mm >1.6 mm	kV/mm	Min.	40 30
14.	Finish	***Confirming to IEC 60641-3-1, Type B 2.1 A***			*CALENDERED*

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Product

PSP 3050 Transformer Board

Pressboard PSP 3050 is a premium calendered insulation board developed for transformer applications requiring dependable electrical performance, smooth surface finish, and precise dimensional consistency. It is well suited for both insulating and fabricated components.

Grade: - UB 3050
Conforming to
IEC 60641-3-1, Type B 2.1B

KEY PROPERTIES

01 | Good mechanical strength and rigidity
02 | Reliable electrical insulation characteristics
03 | Smooth calendered surface for clean processing
04 | Consistent density and thickness control
05 | Low shrinkage with stable performance
06 | Good oil absorption and compatibility with insulating liquids

APPLICATIONS

Commonly used for :

- Core insulation
- Layer insulation
- Small insulating cylinders
- Punched components
- Precision fabricated insulation parts

MANUFACTURING ADVANTAGE

Produced from high-purity cellulose fibre using a controlled drying and calendering process, resulting in improved surface finish, uniform structure, and dependable quality.

PROCESSING BENEFITS

Suitable for punching, cutting, forming, and general machining, making it ideal for transformer component manufacturing.

Available in multiple thicknesses and sheet sizes to suit varied transformer production and design requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
PSP 3050-UB3050	1 mm to 3 mm	2000	1000
		2200	1100

TECHNICAL SPECIFICATION

S. No.	Properties	Thickness	Units	Min. /Max. or range	Type
1.	Thickness Deviation from nominal	≤1.6 mm >1.6 mm	%	Max	± 7.5 % ± 5.0 %
2.	Apparent Density		g/cm^3	Range	1.20 -1.30
3.	Area Weight Tolerance : ± 10	0.8 mm 1.0 mm 1.5 mm 2.0 mm 3.0 mm 4.0 mm	g/cm^3	Max.	1000 1250 1875 2500 3750 5000
4.	Area Yield	0.8 mm 1.0 mm 1.5 mm 2.0 mm 3.0 mm 4.0 mm	Approx. m^2/kg	Max.	1.00 0.80 0.53 0.40 0.27 0.20
5.	Tensile Strength Machine Direction		MPa	Min.	90
6.	Tensile Strength Cross Machine Direction		MPa	Min.	60
7.	Elongation – machine direction cross machine direction		%	Min.	 6.0 8.0
8.	Shrinkage - Machine direction Cross machine direction Thickness		%	Max.	 0.8 1.2 6.0
9.	Moisture Content		%	Max.	8.0
10.	Ash Content		%	Max.	0.7
11.	Conductivity of Aqueous Extract		(mS/m)	Max	8.0
12.	pH of Aq. Extract		--	Range	6.0 – 9.0
13.	Oil Absorption		%	Min.	6.00
14.	Electric Strength in air		kV/mm	Min.	12
15.	Electric Strength in oil	≤1.6 mm >1.6 mm	kV/mm	Min.	40 30

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Product

Mouldable Pressboards

Mouldable Transformerboard is a flexible insulation board specially developed for applications requiring tight bending, forming, and complex shaping. It is ideal for transformer components where conventional rigid boards may not be suitable.

Grade: - UB-M-4.1
Conforming to IEC 60641-3-1, Type B. 4.1

KEY PROPERTIES

01 | Excellent flexibility and formability

02 | Suitable for tight radii and intricate shapes

03 | Good mechanical strength for formed components

04 | Reliable electrical insulation performance

05 | Good oil absorption and compatibility with insulating liquids

06 | Stable and consistent material quality

APPLICATIONS

Commonly used for :

- Small insulating cylinders
- Tubes
- Folded insulation parts
- Edge protections
- Angle rings
- Custom formed transformer components

MANUFACTURING ADVANTAGE

Produced from high-quality cellulose fibre through a controlled manufacturing process that enhances bendability while maintaining structural integrity and insulation performance.

PROCESSING BENEFITS

Well suited for bending, rolling, folding, cutting, and fabrication processes requiring precise shaping without compromising performance.

Available in various thicknesses and sheet sizes to meet different transformer design and manufacturing requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
Mouldable Boards-UB-M-4.1	1.5 mm to 3.0 mm	2000	1000

TECHNICAL SPECIFICATION

S. No.	Properties	Thickness	Units	Min. /Max. or range	Type
1.	Thickness Deviation from nominal	≤1.6 mm >1.6 mm	%	Max	± 7.5 % ± 5.0 %
2.	Apparent Density		g/cm^3	Range	0.85 -1.10
3.	Tensile Strength, Machine direction Cross Machine direction		MPa	Min.	55 40
4.	Elongation – machine direction cross machine direction		%	Min.	7 8
5.	Shrinkage - Machine direction Cross machine direction Thickness		%	Max.	1.0 1.5 6 0
6.	Plybond resistance		N/30 mm	Min.	250
7.	Moisture Content		%	Max.	8.00
8.	Ash Content		%	Max.	0.7
9.	Conductivity of Aqueous Extract		(mS/m)	Max	8
10.	PH of Aq. Extract		--	Range	6.0 – 9.0
11.	Oil Absorption		%	Min.	18
12.	Electric Strength in air		kV/mm	Min.	9
13.	Electric Strength in oil	≤1.6 mm >1.6 mm	kV/mm	Min.	35 30

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Product

Insulation Kraft Paper

Insulation Kraft Paper is a high-quality, electrical, low density insulating paper developed primarily for conductor wrapping and insulation in liquid-filled transformers. Manufactured from virgin electrical grade kraft pulp, it provides dependable dielectric performance along with strong mechanical integrity for long-term service.

GRADE: - UB-IKP
Conforming to IEC 60554-3-5:1984

KEY PROPERTIES

01 | Reliable electrical insulation characteristics
02 | Good tensile strength and durability
03 | Uniform thickness and consistent density
04 | Smooth surface for efficient wrapping and processing
05 | Good oil absorption and compatibility with transformer oils
06 | Available in standard and thermally upgraded grades

APPLICATIONS

Commonly used for :

- Conductor wrapping
- Turn-to-turn insulation
- Layer insulation
- Coil winding applications
- General insulation in liquid-filled transformers.

MANUFACTURING ADVANTAGE

Produced through a multi-layer paper forming process that creates a homogeneous structure with excellent strength and reduced risk of pinholes, ensuring consistent insulation quality.

PROCESSING BENEFITS

Suitable for slitting, cutting, winding, and high-speed wrapping operations, supporting efficient transformer manufacturing.

Available in a wide range of thicknesses, roll widths, densities, and custom sizes to suit different conductor dimensions and transformer designs.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
UB-IKP	2 mil to 5 mil (0.05 mm to 0.125 mm) With Tolerance of +/- 10 %	Upto 1250	+/- 5

TECHNICAL SPECIFICATION

Properties		Unit	Range	Value
Thickness, Tolerance		(%)	Range	± 10.0
On Roll Width		(mm)	Range	± 5.0
Density		g/cc	Range	0.75 -0.85
Moisture Content		%	Maximum	8.0
Air Permeability		µm/Pa.s	Range	0.5-1.0
Conductivity of Aqueous extract		mS/m	Maximum	10.0
pH of aqueous extract			Range	6.0 – 8.0
Ash Content		%	Maximum	1.0
Water Absorption		mm	Minimum	10
Tensile Index	MD	Nm/g	Minimum	93
	CMD			34
Elongation	MD	%	Minimum	2
	CMD			4
Tear Index MD/CMD	≤ 4 Mil	mNm^2/g	Minimum	5/6
	> 4 Mil			6/7
Electric Strength Air		KV/mm	Minimum	7

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Product

Insulation Presspaper

Insulation Presspaper is a premium multi-ply electrical high density insulating paper developed for a wide range of transformer and electrical insulation applications. Manufactured from high-quality unbleached sulphate wood pulp, it offers an excellent balance of strength, insulation reliability, and processing versatility.

Conforming to IEC 60641-3-2 P2.1B

KEY PROPERTIES

01 | Thermal class performance (up to 105°C class)

02 | High mechanical strength and tear resistance

03 | Strong electrical insulation characteristics

04 | Uniform multi-layer structure with pinhole-free construction

05 | Consistent density and dependable dimensional stability

06 | Good oil absorption and compatibility with insulating liquids

07 | Available in natural finish and customised colour options

APPLICATIONS

Commonly used for :

- Conductor insulation
- Layer insulation
- Coil wrapping
- Slot insulation
- General transformer insulating components
- Fabricated paper parts.

MANUFACTURING ADVANTAGE

Produced using a multi-ply cylinder process that builds homogeneous fibre layers into a continuous sheet, ensuring material consistency, smooth finish, and reliable performance.

PROCESSING BENEFITS

Suitable for slitting, cutting, winding, folding, and converting processes, making it ideal for both standard and custom insulation applications.

Offered in multiple thicknesses, roll widths, and customised formats to meet varied transformer manufacturing requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
UB-IPP	5 mil to 20 mil (0.125 mm to 0.25 mm) With Tolerance of +/- 10 %	Upto 1250	+/- 5

TECHNICAL SPECIFICATION

Properties	5.0 mil	7.0 mil	10.0 mil	12.0 mil	15.0 mil	20.0 mil
Thickness in mm	0.125	0.175	0.250	0.300	0.375	0.500
Thickness Tolerance (mm), Range	0.112 - 0.138	0.158 – 0.193	0.225 – 0.275	0.270 – 0.330	0.338 – 0.412	0.450 – 0.550
Density, (g/cc), min	0.90 – 1.0	0.90 – 1.0	0.90 – 1.0	0.90 – 1.0	0.90 – 1.0	0.90 – 1.0
Moisture content, (%), max	8.0	8.0	8.0	8.0	8.0	8.0
Shrinkage MD, (%), max	1. 0	1. 0	1. 0	1. 0	1. 0	1. 0
Shrinkage CD, (%), max	1.50	1.50	1.50	1.50	1.50	1.50
Shrinkage PD, (%), max	9.0	9.0	9.0	9.0	9.0	9.0
Conductivity of Aqueous extract, (mS/m), max	8	8	8	8	8	8
pH of. Aqueous extract, range	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0
Oil Absorption, (%), min	10.0	10.0	10.0	10.0	10.0	10.0
Ash Content, (%), max	1. 0	1. 0	1. 0	1. 0	1. 0	1. 0
Tensile Strength (MPa), min MD/CD	50/30	50/30	50/30	30/20	30/20	30/20
Elongation, (%), min, MD/CD	1.0/5.0	1.5/5.0	1.5/5.0	2.0/5.0	2.0/5.0	2.0/5.0
Dielectric Strength Air/Oil (kV/mm), min	9/60	8/50	7/50	5.5/50	5.5/45	5.5/40

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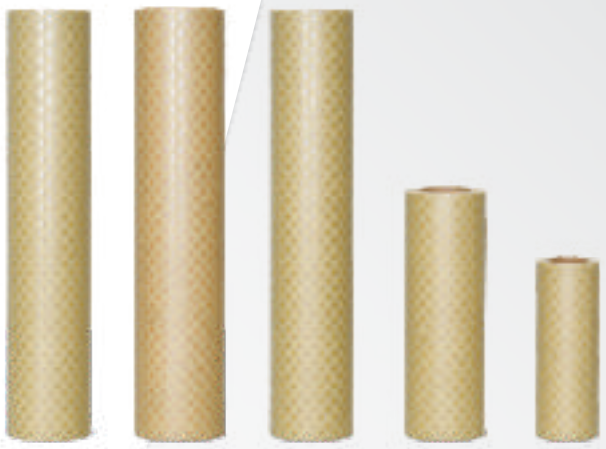
Product

Diamond Dotted Paper



Diamond Dotted Presspaper is a specialised electrical insulating paper designed to improve winding stability and bonding strength in oil-immersed transformers. It features a patterned thermosetting adhesive coating that creates secure bonding points during the heating and drying cycle of coil manufacturing.

KEY PROPERTIES

Conforming to IEC 60641-3-2 P4.1A

01 | Strong interlayer bonding after curing

02 | Maintains reliable electrical insulation performance

03 | Good mechanical strength and winding stability

04 | Controlled adhesive distribution for clean processing

05 | Good oil penetration and compatibility with insulating liquids

06 | Suitable for long-term thermal performance

APPLICATIONS

Commonly used for :

- Coil winding insulation
- Layer-to-layer bonding
- Foil winding applications
- Unsupported winding designs
- Power and distribution transformer coils

MANUFACTURING ADVANTAGE

Produced by applying precision adhesive dots in a patterned layout over high-quality insulating presspaper. This design enables effective bonding while preserving flexibility, drying efficiency, and oil impregnation characteristics.

PROCESSING BENEFITS

Easy to handle and wind in dry form, the resin dots activate during the heating cycle to create permanent bonds that enhance coil rigidity and manufacturing efficiency.

Available in multiple paper grades, thicknesses, roll widths, and slit sizes to meet varied transformer winding requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
UB-DDP	3 mil to 20 mil (0.075 mm to 0.25 mm) With Tolerance of +/- 10 %	Upto 1220	+/- 5

TECHNICAL SPECIFICATION

Technical Specification Epoxy Dotted Paper					
Properties	Units	3 mil	5 mil	8 mil	10 mil
Thickness	mm	0.075	0.125	0.200	0.250
Thickness, Range	%	0.068 to 0.08	0.112 tom 0.138	0.18 to 0.22	0.23 to 0.28
Area weight DDP	g/m²	90	140	225	280
Tolerance	%	±10	±10	±10	±10
Area yield	m²/kg	16.7	8.7	5.1	3.6
Apparent Density (Range)	g/cc	1.0 – 1.2	1.0 – 1.2	1.0 – 1.2	1.0 – 1.2
Tensile strength (Min.) MD CMD	 MPa MPa	 80 40	 80 40	 80 40	 80 40
Elongation (Min.) MD CMD	 % %	 1.0 5.0	 1.0 5.0	 1.0 5.0	 1.0 5.0
Shrinkage (Min.) MD CMD PD	% % %	1 1.5 7	1 1.5 7	1 1.5 7	1 1.5 7
Moisture content (Max.)	%	8	8	8	8
Ash content (Max.)	%	1	1	1	1
Conductivity of aqueous extract(Max.)	mS/m	8	8	8	8
pH of aqueous extract (Range)		6 - 9	6 - 9	6 - 9	6 - 9
Electric strength in Air, (Min.)	kV/mm	11	11	10	10
Electric strength in Oil, (Min.)	kV/mm	60	60	55	55
Recommended curing temperature	^{0}C	120 to 140	120 to 140	120 to 140	120 to 140
Recommended curing time	Hrs	6 - 8	6 - 8	6 - 8	6 - 8
Bonding Shear Strength @ 140 Deg C for 6 hours & load 2 psi	psi	60 - 70	80 - 90	80 - 90	70 - 80

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Product

Crepe Paper

Crepe Paper is a high-elongation electrical insulating paper developed for transformer applications that require flexibility, stretchability, and close conformity around irregular shapes. It is widely used where standard flat papers are less suitable for wrapping or forming complex components.

KEY PROPERTIES

Conforming to IEC 60554-3-3:1980

01 | High elongation and excellent flexibility

02 | Conforms easily to uneven surfaces and contours

03 | Reliable electrical insulation performance

04 | Low dissipation factor for high-voltage applications

05 | Good mechanical strength and tear resistance

06 | Compatible with insulating oils and drying processes

APPLICATIONS

Commonly used for :

- Lead and taping conductor insulation
- Wire wrapping
- Bushings
- Instrument transformers
- Shielded rings
- End winding insulation component

MANUFACTURING ADVANTAGE

Produced from high-quality electrical grade kraft pulp using a controlled creping process that enhances elasticity and pliability while maintaining mechanical and dielectric performance.

PROCESSING BENEFITS

Well suited for wrapping, forming, and joining applications where flexibility and secure fitting around varying shapes are essential.

Available in multiple grades, grammages, widths, and slit roll sizes to suit different transformer manufacturing requirements.

STANDARD AVAILABILITY

Type	Thickness	Sheet Size	
		Length (mm)	Width (mm)
UB-Crepe	3 mil to 5 mil (0.075 mm to 0.125 mm) With Tolerance of +/- 10 %	Upto 1000	+/- 5

TECHNICAL SPECIFICATION

Properties	Units	Specified values under IEC
Thickness	mm	0.075 - 0.125
Density	g/cc	Not Specified
Hill count per 10mm		10 - 18
Tensile Index MD	Nm/g	39
Elongation at break (MD)	%	The elongation /stretch at break shall be within 15% of that specified by purchaser
Moisture content	%	8
Ash content	%	1
Conductivity of aqueous extract	mS/m	10 max
pH of aqueous extract		6 to 8
Electric strength Air	kV/mm	Not specified
Electric strength Oil	kV/mm	Not specified

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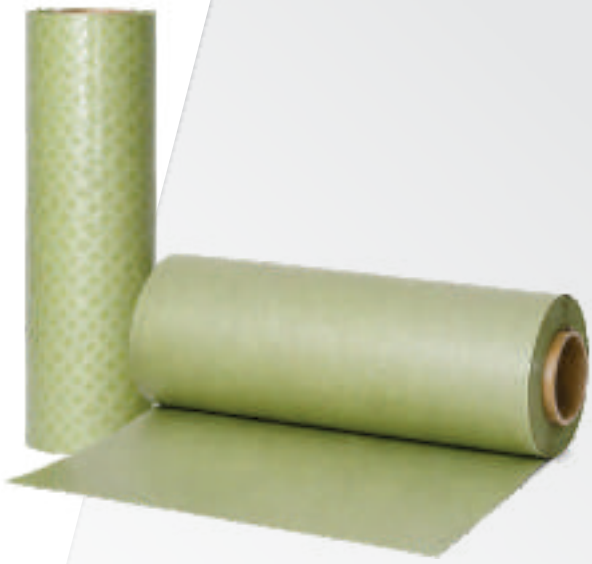
Product

Thermally Upgraded Paper

Thermally Upgraded Paper is a chemically enhanced, specialised electrical insulating paper developed for transformer applications requiring higher thermal endurance, longer insulation life, and dependable electrical performance. It is available in a distinctive green colour.



Conforming to IEC 60554-2:2001

KEY PROPERTIES

01 | Higher thermal class performance (up to 120°C class)

02 | Slower ageing under elevated operating temperatures

03 | Improved moisture and acid management during service life

04 | Strong electrical insulation characteristics

APPLICATIONS

Commonly used for :

- Layer insulation
- Conductor wrapping
- End fill strips
- Coil winding insulation
- Distribution transformer windings
- Power transformer insulation systems

PERFORMANCE ADVANTAGE

Compared with standard insulating papers, thermally upgraded grades help transformers operate at higher temperatures, support compact designs, and improve long-term reliability. They are well suited for modern energy-efficient transformer designs.

PROCESSING BENEFITS

Suitable for slitting, cutting, winding, forming, and automated production processes. Bonded variants activate during heat cycles to improve winding strength and coil stability.

AVAILABLE VARIANTS

The product family is offered in three variants :

- Standard thermally upgraded presspaper
- Crepe thermally upgraded presspaper
- Diamond dotted thermally upgraded presspaper

Available in multiple thicknesses, widths, roll sizes, and customised formats to match transformer design and manufacturing requirements.

STANDARD AVAILABILITY

Type	Thickness	Master Roll width (mm)	
UB-TUP	3 mil to 20 mil (0.075 mm to 0.25 mm) With Tolerance of +/- 10 %	Upto 1500	+/- 5
UB-TUP(C)	3 mil to 5 mil (0.075 mm to 0.125 mm) With Tolerance of +/- 10 %	Upto 1000	+/- 5
UB-TUP(DDP)	3 mil to 20 mil (0.075 mm to 0.25 mm) With Tolerance of +/- 10 %	Upto 1450	+/- 5

Product

Machined Components

Machined Components are precision-fabricated transformer insulation parts manufactured from high-quality transformerboard and pressboard materials. Designed for dimensional accuracy and dependable performance, these components play a critical role in maintaining clearances, structural stability, and electrical insulation within transformer assemblies.

KEY PROPERTIES

01 | High mechanical strength and rigidity

02 | Reliable electrical insulation performance

03 | Precise dimensions and clean machining finish

04 | Good oil compatibility and long-term stability

05 | Suitable for standard and customised designs

AVAILABLE COMPONENTS

- **Spacers**
- **Strips**
- **Washers**

APPLICATIONS

Commonly used in power and distribution transformers for winding assemblies, clamping structures, insulation supports, and internal spacing systems

Available in a wide range of sizes, thicknesses, profiles, and custom-machined configurations to meet specific transformer design requirements.

MACHINED COMPONENTS RANGE

Item	Dimension (mm)	Standard (mm)	Tolerance (mm)
Plain Strips	1.5 - 10	5.0 - 70	Upto 4000
Dovetail Strips	5 - 8	15 - 30	Upto 4000
T-strips	1.5 - 10	15 - 30	Upto 4000
Spacers Punched	1.0 - 3.0	30 - 70	35 - 200
Plain Blocks	1.0 - 80	30 - 100	35 - 200
Common Taper block	4.0 - 30	30 - 100	60 - 200

Item	Inner Dia	Outer Dia	ID-OD	Thick (mm)
Washers -150 - 400	150 - 400	200 - 450	50 - 100	1.00 - 4.00
Washers - 450 - 1500	450 - 1000	500 - 1500	30 - 250	1.00 - 4.00

Product

Moulded Components

Moulded Components are precision-formed cellulose insulation parts developed for transformer applications requiring shaped, rigid, and reliable insulating structures. Manufactured from high-purity unbleached sulphate kraft mouldable pressboards, these components are designed for high mechanical strength.

Angle Rings

Cap Rings

Snouts

AVAILABLE COMPONENTS

- **Angle Rings**
- **Cap Rings**
- **Snouts**

MANUFACTURING ADVANTAGE

Produced from specially processed low-density mouldable pressboard that is soaked and moulded into required shapes under controlled conditions, ensuring accuracy, consistency, and durable performance.

Available in multiple dimensions, sector constructions, and custom profiles to match specific transformer designs and OEM requirements.

STANDARD DIMENSIONS OF MOULDED COMPONENTS

S.N.	Characteristics	Angle Rings & Cap Rings	Snouts	Disc Angle Rings & Disc Cap Rings
1	Thickness 'T' mm	2.0 – 5.0	2.0 – 4.0	1.50 – 3.0
2	Height 'H' mm	Up to 180	Up to 150	12 Max.
3	Flange "F' mm	Up to 200	Up to 150	15 Max.
4	Radius 'R' mm	5 – 30	5 – 25	1.5 Max.
5	Diameter 'D' mm	400 – 2000 (Supplied in Sectors)	400 – 2000	450 – 2000 (Supplied in Sectors)
6	Scarfing Length	30 times thickness	30 times thickness	Up to 45mm
7	Tube Height	–	200	–

NOTES

- Scarfing will be done on each sector for thickness > 2.00mm.
- Larger Diameters above 2000mm can be manufactured on request.
- For details about the number of sectors, scarfing length and tolerance please refer to tolerance sheet for molded component.
- For Angle Rings consider ID & for Angle Caps consider OD

ANGLE RING SECTOR /CAP RING SECTOR RANGE

DIAMETER (OD) (mm)	NUMBER OF SECTORS
400 ≤ 950	4
951 ≤ 1450	6
1451 ≤ 1800	8
1801 ≤ 2000	10

TOLERANCES FOR MOULDED COMPONENTS

S.N.	Dimension	Standard (mm)	Tolerance
1	Thickness 'T'	2.0	± 0.50
		3.0 – 5.0	± 1.0
2	Height 'H'	Up to 180	± 3.0
3	Flange 'F'	up to 200	± 3.0
4	Radius 'R'	5	± 2.0
		5 – 15	± 3.0
		16 – 25	± 4.0
		> 25	± 5.0
5	Diameter 'D'	400 – 800	± 5.0
		800 – 1200	± 10.0
		1200 - 2400	± 15.0
6	Scarfing Length	500 - 120	± 10.0

TOLERANCES FOR SNOUTS

S.N.	Dimension	Standard	Tolerance
1	Thickness 'T'	2.0 – 4.0 mm	± 1.0 mm
2	Height 'H'	Upto 150mm	± 3.0 mm
3	Flange 'F'	Upto 150mm	± 3.0 mm
4	Radius 'R'	Standard tolerance	± 5.0 mm
5	Ring Diameter 'D'	400 – 1200 mm	± 5.0 mm
6	Scarfing Length	50-100	± 10.0 mm
7	Snout tube Length	< 100 mm	± 3.0 mm
		> 100 mm	± 5.0 mm
8	Snout Tube Width 'W'	As per Customer requirement	± 3.0 mm
9	Snout Tube Angle	As per Customer requirement	± 3 Deg
10	Snout Tube Height 'H'	As per Customer requirement	± 3.0 mm

TOLERANCES FOR DISC ANGLE RING, DISC ANGLE CAP

S.N.	Dimension	Standard	Tolerance
1	Thickness 'T'	1.00 – 1.50 mm	± 10.0 %
2	Height 'H'	up to 12 mm	± 3.0 mm
3	Flange 'F'	up to 15 mm	+0, -2.0
4	Radius 'R'	1.5 Max..	1.5
5	Diameter 'D'	450 – 2000 mm	≤ 1000 mm - ±3.0 %
			> 1000 mm - ±5.0 %
6	Scarfing Length	45	± 10 mm

Product

Laminated Densified Wood

Laminated Densified Wood is a high-strength structural insulation material widely used in transformer applications requiring exceptional mechanical durability and dimensional stability. Manufactured from specially selected wood veneers that are compressed and bonded under controlled conditions, it provides reliable performance under high electrical and mechanical stresses.

KEY PROPERTIES

01 | High mechanical and compressive strength

02 | Excellent dimensional stability under load

03 | Good electrical insulation characteristics

APPLICATIONS

Commonly used for :

- Beams and structural members
- Load-bearing insulation assemblies
- Heavy-duty transformer support components

PROCESSING BENEFITS

Suitable for machining, drilling, cutting, and custom fabrication, allowing precise manufacturing of complex structural insulation parts.

> Available in multiple thicknesses, densities, and customised machined configurations to suit varied transformer design requirements.

TECHNICAL SPECIFICATION

TECHNICAL DATA	STAMDARD	UNIT		PARALLEL				CROSSWISE				TANGENTIAL	
PHYSICAL PROPERTIES													
Density	IEC61061	g/cm³		0.7 ÷ 0.9	0.9 ÷ 1.1	1.2 ÷ 1.3	1.3 ÷ 1.4	0.7 ÷ 0.9	0.9 ÷ 1.1	1.2 ÷ 1.3	1.3 ÷ 1.4	0.9 ÷ 1.1	1.2 ÷ 1.3
Oil Absorption	IEC61061	%		32	30	7	/	30	28	10	/	28	7.5
Continuos Working Temperature	-	°C		105	105	105	100	105	105	105	100	105	105
Temperature Limit For Drying Process	-	°C		140	140	140	130	140	140	140	130	140	140
Contamination Of Diaelectric Liquids	IEC61061	Δtg δ		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
MECHANICAL PROPERTIES													
Flexural Strength 1)	IEC61061 UNI EN ISO 178	MPa		145	150	200	220	120	130	140	150	135	180
Modulus of Elasticity In Flexure	IEC61061 UNI EN ISO 178	Gpa		10	14	16	18	7.5	9.5	12	15	11	13
Compressive Strenght	IEC61061 UNI EN ISO 604	MPa		130 95	130 95	145 130	170 160	150 60	210 75	245 110	240 170	140 /	160 /
ELECTRICAL PROPERTIES													
Electri Strenght	IEC 61061 IEC 60243	KV/mm	/ F 0	15 16 17	16 17 18	18 19 20	7 8 9	15 16 17	16 17 18	18 19 18	7 8 9	16 17 18	18 19 20
Breakdown Voltage	IEC 61061 IEC 60243	KV/25mm		>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
Surface Resistivity	IEC 60093	Ω		10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}
Volume Resistance	IEC 60093	Ω cm		10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}	10^{12}
Dissipation Factor	IEC 60250	tg δ		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Relative Permittivity	IEC 60250	ε r		3.3	3.5	3.8	4.2	3.3	3.5	3.8	4.2	3.5	3.8

LABORATORY / TESTING FACILITIES

At UBL, quality is at the core of everything we manufacture. Our products undergo rigorous testing and validation to ensure consistent performance, reliability, and compliance with industry standards. All tests are conducted at our in-house NABL-accredited laboratory, reflecting our commitment to precision, traceability, and internationally recognised quality practices

To maintain the highest standards, our materials are evaluated across key performance parameters :


National Accreditation Board for Testing and Calibration Laboratories

CERTIFICATE OF ACCREDITATION

UMANG BOARDS LIMITED

ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

TESTING

Mechanical Tests
• Tensile Strength & Elongation
• Flexural Strength
• Internal Ply Strength
• Compressibility
• Ply bond resistance
• Thickness
• Apparent Density
• Shrinkage

Chemical tests
• Moisture Content
• KF Titration Test
• Ash Content
• Conductivity of Aqueous Extract
• Ph of Aqueous Extract
• Degree of Polymerization
• Contamination of Liquid Dielectrics
• Metallic Particles

Electrical test
• Breakdown Voltage /Electric Strength
• Partial Discharge Inception/Extinction Voltage
• Dissipation Factor (Tan δ)

Dispatch, Transport & Storage

Ensuring Material Integrity at Every Stage

Transformerboard is manufactured from high-purity, unbleached kraft pulp-derived from natural wood fibres. Its unique structure allows it to respond to environmental conditions by absorbing or releasing moisture, making controlled handling essential throughout dispatch, transport, and storage.

PACKAGING & DELIVERY PROTOCOLS

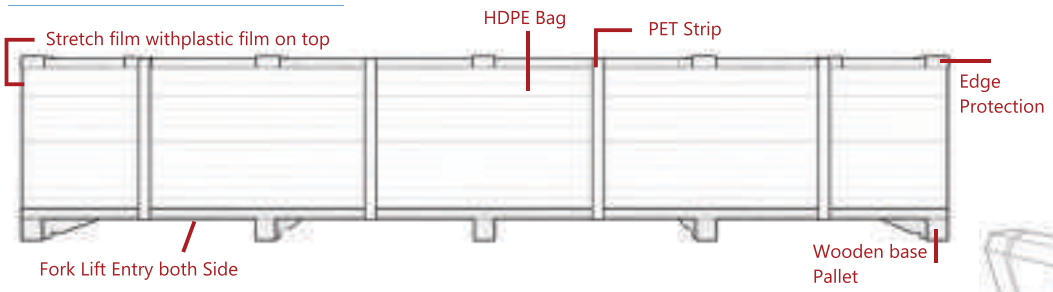
To preserve its mechanical and electrical properties, Transformerboard is carefully packed using moisture-resistant materials.

- Boards are wrapped in protective plastic foil, acting as a primary barrier against humidity, dust, and contaminants.
- Standard dispatch formats include palletized stacks, wooden boxes, or U-shaped packaging, depending on size and application.
- Reinforced strapping and edge protection ensure dimensional stability during transit.

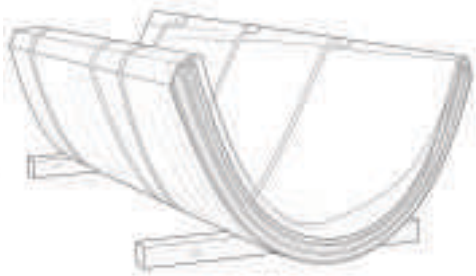
This multi-layered packaging approach safeguards the material from environmental exposure and handling stress.

Transformer Boards Sheets Sizes in mm		Wooden Pallet Gross Sizes (mm)		
		A	B	C
4200	2100	4250	2150	400 - 700
3200	2100	3250	2150	400 - 700
2100	1050	2150	1100	400 - 700

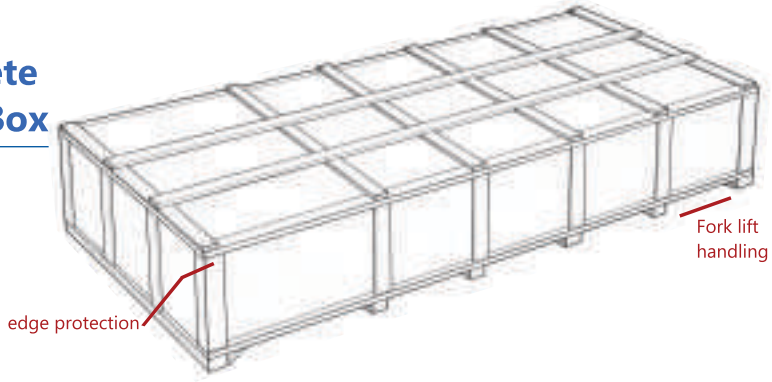
A Palletized Stack



U Shaped packing



A Complete Wooden Box



Storage & Handling of Cellulosic Insulation Materials

WHY PROPER HANDLING MATTERS

Electrical insulation materials such as transformerboard, presspaper, and machined or moulded components are inherently hygroscopic, meaning they readily absorb and release moisture from the surrounding environment. Variations in climate, improper packaging, or unsuitable storage conditions can lead to continuous moisture exchange with ambient air. This may result in

- Dimensional instability
- Warping or surface irregularities
- Reduced electrical insulation performance
- Delamination in laminated products.

In severe cases, poor handling and storage practices can compromise product performance and reduce transformer reliability.

RECOMMENDED STORAGE CONDITIONS

For optimal performance, Transformerboard must be stored under controlled conditions:

- Dry, well-ventilated indoor environments are essential
- Avoid exposure to direct sunlight, heat sources, and drafts
- Do not place material directly on the floor, use pallets or racks
- Maintain original packaging for as long as possible prior to use

For extended storage periods, additional wrapping (plastic or barrier paper) is recommended to minimise moisture variation and prevent sheet distortion.

Recommended Packaging Practices
Effective packaging plays a key role in limiting moisture absorption:

- Use protective materials such as polyethylene films, multilayer wraps, or stretch films
- Store in sealed wooden or plastic containers where possible
- Ensure packaging is properly sealed rather than loosely covered

HANDLING GUIDELINES

Since exposure to ambient conditions is unavoidable during manufacturing, careful handling is essential:

- Handle with care to avoid edge damage or surface deformation
- Use appropriate lifting equipment for palletized loads
- Avoid sudden environmental changes before processing (allow acclimatisation if required)
- Open packaging only when required and reseal unused material immediately
- Keep exposure time to air as short as possible
- Avoid direct sunlight and unnecessary air circulation during processing
- Maintain clean handling environments to prevent contamination

Proper handling ensures consistent machining performance and preserves dielectric properties.

By following recommended practices, customers can ensure long-term reliability, process efficiency, and product consistency.

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