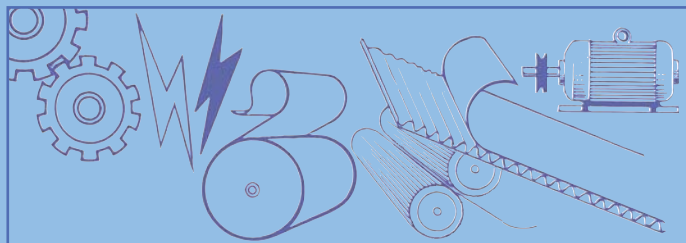
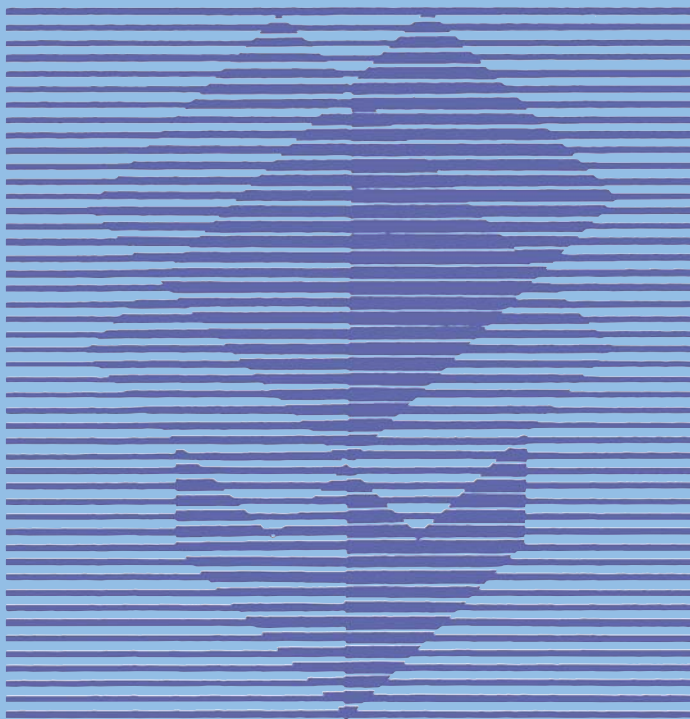


TECHNICAL INFORMATION BOOKLET

FOR PRIVATE CIRCULATION ONLY

FCBM 36:06

Units of Measurement and Conversion Factors



**FEDERATION OF CORRUGATED BOX
MANUFACTURERS OF INDIA**

FOREWORD

Units of Measurement are important to understand, estimate and communicate.

Over the years, the units have undergone changes *from inch to mm; from lb to kg, etc.*

This FCBM Technical Information Booklet is a ready reference book with conversion factors to enable the reader to convert units from one to another.

I do hope the readers will find this booklet an useful ready reckoner.

I, on behalf of FCBM, congratulate the R&D Committee headed by Shri Ram Kumar Sunkara for the excellent work.

Manohar Shetty

President

Federation of Corrugated Box

Manufacturers of India

MASS

Units of Measurement: Kilograms (Kgs), Pounds (lbs), Ton.

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Kilograms (Kgs)	2.204	Pounds (lbs)
2	Pounds (lbs)	0.45359	Kilograms (Kgs)
3	Ton	1000	Kilograms (Kgs)
4	Ton	2204	Pounds (lbs)
5	Short Ton	2000	Pounds (lbs)

AREA

Units of Measurement: Square inch (sq.in), Square centimeter (sq.cm), Square meter (sq.m)

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Square inch (sq.in)	6.4516	Square centimeter (sq.cm)
2	Square inch (sq.in)	0.00064516	Square meter (sq.m)
3	Square meter (sq.m)	10,000	Square centimeter (sq.cm)
4	Square centimeter (sq.cm)	0.0001	Square meter (sq.m)
5	Square meter (sq.m)	1550	Square inch (sq.in)
6	Square centimeter (sq.cm)	0.1550	Square inch (sq.in)

BASIS WEIGHT, GRAMMAGE

Units of Measurement: Grams per square meter (GSM, g/m^2), Pounds per 1000 square feet (lbs/MSF)

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Pounds per 1000 square feet (lbs/MSF) (Also expressed simply as "pounds" or "#")	4.8824	Grams per square meter (g/m^2) (GSM)
2	Grams per square meter (g/m^2) (GSM)	0.205	Pounds per 1000 square feet (lbs/MSF)

THICKNESS OR CALIPER

Units of Measurement: Millimeter (mm), Microns (μ), Inches (in)

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Mils	0.0254	Millimeter (mm)
2	Point	0.0254	Millimeter (mm)
3	Inches (in)	25.4	Millimeter (mm)
4	Millimeter (mm)	1000	Microns (μ)
5	Microns (μ)	0.001	Millimeter (mm)
6	Millimeter (mm)	0.03937	Inches (in)

BURSTING STRENGTH

Units of Measurement: Kilograms per square centimeter (Kg/cm^2), Pounds per square inch (psi), Kilopascals (kPa), Kilonewtons per square meter (kN/m^2), Points

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Pounds per square inch (psi)	6.89476	Kilopascals (kPa)
2	Points	6.89476	Kilopascals (kPa)
3	Kilograms per square centimeter (Kg/cm^2)	98.0665	Kilopascals (kPa)
4	Kilonewtons per square meter (kN/m^2)	1	Kilopascals (kPa)
5	Kilograms per square centimeter (Kg/cm^2)	14.2233	Pounds per square inch (psi)
6	Pounds per square inch (psi)	0.0703	Kilograms per square centimeter (Kg/cm^2)
7	Kilopascals (kPa)	0.1450	Pounds per square inch (psi)
8	Kilopascals (kPa)	0.0102	Kilograms per square centimeter (Kg/cm^2)
9	Kilopascals (kPa)	1	Kilonewtons per square meter (kN/m^2)

PUNCTURE RESISTANCE

Units of Measurement: Joules (J), Beach Unit (BU), Puncture Unit (PU), Scale Unit (SU), Inch ounces per tear inch (in-oz/in), Inch ounces force (in-ozf), Inch pound force (in-lbf), Centimeter Kilogram force (cm-Kgf), Foot pounds force (ft-lbf), GE units

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Centimeter Kilogram force (cm-Kgf)	0.0980665	Joules (J)
2	Centimeter Kilogram force (cm-Kgf)	3.2798	Puncture Unit (PU)
3	Centimeter Kilogram force (cm-Kgf)	3.2798	Beach Unit (BU)
4	Centimeter Kilogram force (cm-Kgf)	3.2798	Inch ounces per tear inch (in-oz/in)
5	Inch pound force (in-lbf)	0.112985	Joules (J)
6	Inch pound force (in-lbf)	3.7787	Puncture Unit (PU)
7	Inch pound force (in-lbf)	3.7787	Beach Unit (BU)
8	Inch pound force (in-lbf)	3.7787	Inch ounces per tear inch (in-oz/in)
9	Scale Unit (SU) (≈ 0.305 cm-Kgf)	0.0299	Joules (J)

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
10	Scale Unit (SU) (≈ 0.305 cm-Kgf)	1	Beach Unit (BU)
11	Scale Unit (SU) (≈ 0.305 cm-Kgf)	1	Inch ounces per tear inch (in-oz/in)
12	Foot pounds force (ft-lbf)	1.35582	Joules (J)
13	Inch ounces force (in-ozf)	0.00706155	Joules (J)
14	Puncture Unit (PU)	1	GE units
15	Puncture Unit (PU)	1	Inch ounces per tear inch (in-oz/in)
16	Puncture Unit (PU)	1	Beach Unit (BU)
17	Puncture Unit (PU)	0.365	Inch pound force (in-lbf)
18	Puncture Unit (PU)	0.305	Centimeter Kilogram force (cm-Kgf)
19	Puncture Unit (PU)	0.0299	Joules (J)
20	Joule (J)	33.4448	Inch ounces per tear inch (in-oz/in)

RING CRUSH TEST (RCT)

Units of Measurement: Kilograms per 6 inches length (Kgs/6 in), Pounds per 6 inches length (lbs/ 6 in), Kilonewtons per meter (kN/m), Kilograms per centimeter (Kgs/cm).

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Kilograms per 6 inches length (Kgs/6 in)	0.06435	Kilonewtons per meter (kN/m)
2	Pounds per 6 inches length (lbs/6 in)	0.02919	Kilonewtons per meter (kN/m)
3	Newtons per 6 inches length (N/6 in)	0.006562	Kilonewtons per meter (kN/m)
4	Kilograms per centimeter (Kgs/cm)	0.980665	Kilonewtons per meter (kN/m)
5	Kilonewtons per meter (kN/m)	34.258	Pounds per 6 inches length (lbs/6 in)
6	Kilonewtons per meter (kN/m)	15.54	Kilograms per 6 inches length (Kgs/6 in)

EDGE WISE COMPRESSIVE STRENGTH (ECT)

Units of Measurement: Kilograms per inch (Kg/in), Pounds per inch (lbs/in), Kilonewtons per meter (kN/m).

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Kilograms per inch (Kg/in)	0.38609	Kilonewtons per meter (kN/m)
2	Pounds per inch (lbs/in)	0.175127	Kilonewtons per meter (kN/m)
3	Kilonewtons per meter (kN/m)	5.710	Pounds per inch (lbs/in)
4	Kilonewtons per meter (kN/m)	2.590	Kilograms per inch (Kg/in)

FLAT CRUSH RESISTANCE OF CORRUGATED BOARD (FCT)

Units of Measurement: Kilograms per square centimeter (Kgs/cm²), Pounds per square inch (lbs/in²), Kilopascals (kPa).

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Kilograms per square centimeter (Kgs/cm ²)	98.0665	Kilopascals (kPa)
2	Pounds per square inch (lbs/in ²) (PSI)	6.89476	Kilopascals (kPa)
3	Kilopascals (kPa)	0.0102	Kilograms per square centimeter (Kgs/cm ²)
4	Kilopascals (kPa)	0.1450	Pounds per square inch (lbs/in ²) (PSI)

PLY BOND OF PAPER

Units of Measurement: Kilograms per square centimeter (Kgs/cm²), Pounds per square inch (lbs/in²), Kilopascals (kPa), Kilonewtons per meter (kN/m), Joules per square meter (J/m²), Foot-pound per square inch (ft-lb/in²), Pounds per inch (lbs/in), Kilograms per millimeters (Kgs/mm).

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Kilograms per square centimeter (Kgs/cm ²)	98.0665	Kilopascals (kPa)
2	Pounds per square inch (lbs/in ²)	6.89476	Kilopascals (kPa)
3	Pounds per inch (lbs/in)	0.175127	Kilonewtons per meter (kN/m)
4	Kilograms per millimeter (Kgs/mm)	9.80665	Kilonewtons per meter (kN/m)
5	Foot-pound per square inch (ft-lb/in ²)	2101.5	Joules per square meter (J/m ²)

TENSILE STRENGTH OF PAPER

Units of Measurement: Kilonewtons per meter (kN/m), Newtons per meter (N/m), Pounds per inch (lbs/in), Pounds per 15 mm (lbs/15 mm), Ounces per inch (oz/in), Kilograms per 15 mm (Kgs/15 mm), Kilograms per 25 mm (Kgs/25 mm), Kilograms per centimeters (Kgs/cm), Grams per millimeters (gms/mm), Newtons per 15 mm (N/15 mm).

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Pounds per inch (lbs/in)	0.175127	Kilonewtons per meter (kN/m)
2	Pounds per 15 mm (lbs/15 mm)	0.29655	Kilonewtons per meter (kN/m)
3	Ounces per inch (oz/in)	10.945	Newtons per meter (N/m)
4	Kilograms per 15 mm (Kgs/15 mm)	0.65378	Kilonewtons per meter (kN/m)
5	Kilograms per 25 mm (Kgs/25 mm)	0.39277	Kilonewtons per meter (kN/m)
6	Kilograms per centimeter (Kgs/cm)	0.980665	Kilonewtons per meter (kN/m)
7	Grams per millimeter (gms/mm)	9.80665	Newtons per meter (N/m)
8	Newtons per 15 mm (N/15 mm)	66.6667	Newtons per meter (N/m)

OTHERS

Units of Measurement:

S. No.	To convert values expressed in	Multiply by	To obtain values expressed as
1	Pounds (lbs)	4.44822	Newtons (N)
2	Pounds per square foot (lbs / sq.ft.)	16.01846	Kilograms per square meter (Kgs/m ²)
3	Grams per cubic centimeter (gms/cm ³)	1000	Kilograms per cubic meter (Kgs/m ³)
4	Kilograms (Kgs)	9.80665	Newtons (N)
5	Kilograms per millimeter (Kgs/mm)	9.80665	Kilonewtons per meter (kN/m)
6	Feet per minute (ft/min)	0.00508	Meters per second (m/s)
7	Feet per minute (ft/min)	0.3048	Meters per minute (m/min)
8	Parts per million (Area) (ppm)	1	Square millimeters per square meter (mm ² /m ²)
9	Parts per million (mass) (ppm)	1	Milligrams per Kilogram (mg/Kg)
10	Pounds (lbs)	0.45359	Kilograms (Kgs)
11	Ounces (oz)	28.3495	Grams (gms)
12	British Thermal units (Btu)	1.05506	Kilo Joules (kJ)
13	Horse Power hour (HP.h)	2684.52	Kilo Joules (kJ)
14	Kilowatt hour (kW.h)	3600	Kilo Joules (kJ)
15	Kilo calories (kcal)	4.1868	Kilo Joules (kJ)
16	Horse Power (HP)	0.7457	Kilowatt (kW)

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