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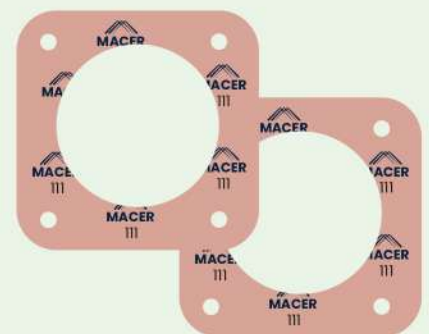
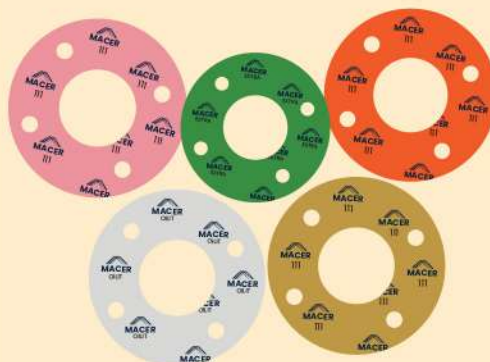
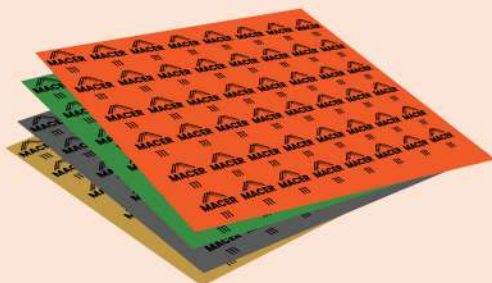
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## CAF JOINTING SHEETS





## MACER INDUSTRIES

All information and recommendations given in this brochure are correct to the best of our knowledge. Since conditions of use are beyond our control, the information provided can only serve as a guideline. Users must satisfy themselves that products are suitable for the intended processes and uses. We reserve the right to change product design and properties without notice.

Should you have any doubts about the choice of gasket material, please refer to us. Our engineering cell will be happy to assist you.

All metallic Jointing sheets are treated on one side with graphite. Both side graphite sheets can also be supplied on request.

3Δ finish can be provided on all jointings sheets i.e. antistick, anti corrosion capabilities.

General Data	Thickness	Thickness Tolerances	Quantity Tolerances
<b>Standard sheet size</b> 1500 x 4500, 1500 x 2250, 1500 x 1500 mm	0.25 to 6.0 mm Non metallic range 0.60 to 6.0 mm Metallic range	±10%	<b>Sheet Size</b> ± 10 % mm

## PROPERTIES APPLICABLE FOR 1.5 mm thick material as per test method

1. Density		gm/cm <sup>3</sup>
2. Compressibility		%
3. Recovery		%
4. Tensile Strength (Across Grain) Upto 1 mm		N/mm <sup>2</sup>
Tensile Strength (Across Grain) Above 1 mm		N/mm <sup>2</sup>
5. Stress Relaxation		N/mm <sup>2</sup>
6. Ignition Loss		%
7. Fluid Absorption		
A. ATSM OIL NO 3 (5 hrs, 150°C)		
Thickness Increase		%
Weight Increase		%
B. FUEL B (5 hrs, 25°C + 5°C)		
Thickness Increase		%
Weight Increase		%
C. WATER (48 hrs, 25°C + 5°C)		
Weight Increase		%
D. Acid Resistance		
Thickness Increase		%
65 % H <sub>2</sub> SO <sub>4</sub> Acid (48 hrs, 25°C + 5°C)		%
96 % H <sub>2</sub> SO <sub>4</sub> Acid (18 hrs, 25°C + 5°C)		%
50 % HNO <sub>3</sub> Acid (1 hr, 65°C + 1°C)		
Max Operating Conditions		
Max Operating Temperature		°C/°F
Max Operating Pressure		kg/cm <sup>2</sup> /PSI

1. Suitable for the application, Best suited in case adhered to MACER assembly guidelines.
2. Only for short term temp. excursions.
3. This area implies not recommended unless evaluated.



# MACER 111

- Chrysotile Asbestos Fibre
- Synthetic (NBR) & Natural Elastomer
- Inorganic Filler

## Application

- Suitable for low stress conditions.
- To seal air, water, steam & various alkaline chemicals.



## Specification Compliance

- Commercial Grade

IS 2712 : 1998

1.7 - 2.20

6-14

≥40

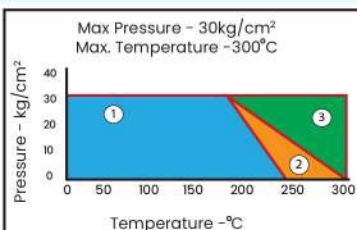
≥6

≥6.7

≤28

300/572

30/426



# MACER 222

- Chrysotile Asbestos Fibre
- Synthetic (NBR) & Natural Elastomer
- Inorganic Filler

## Application

- Suitable for low & medium stress conditions.
- To seal air, water, steam, saline solution, alkalies, ammonia & alkalies and mildly aggressive media.



## Specification Compliance

IS 2712 : 1998 Grade- W/3

IS 2712 : 1998

1.7 - 2.20

6-14

≥40

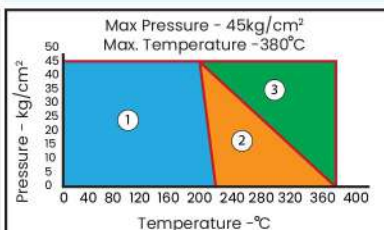
≥6.7

≥7.5

≤28

380/716

45/640



# MACER EXTRA

- Chrysotile Asbestos Fibre
- Synthetic (NBR) & Natural Elastomer
- Inorganic Filler

## Application

- Suitable for medium stress conditions.
- To seal air, water, steam, natural gas petrol, saline solution, alkalies, ammonia & several other non aggressive media.



## Specification Compliance

- IS 2712 : 1998 Grade- O/2 & W/2
- BS 1832 : 1991-B
- DIN 3754-IT 200 • JISR 3453-TYPE-2
- ASTM F 11294IM6

IS 2712 : 1998

1.7 - 2.20

6-14

≥40

≥9

≥12.8

≥17.5

≤28

≤35

≤30

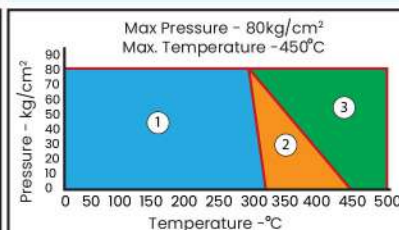
≤30

≤30

≤10

450/842

80/1136



# MACER 333

- Chrysotile Asbestos Fibre
- Synthetic Elastomer (NBR & SBR)
- Inorganic Filler

## Application

- Suitable for high stress conditions.
- To seal water, steam, producer gas, propane gas, alkalies, ammonia & other non aggressive media.



## Specification Compliance

- IS 2712 : 1998 Grade- W/1
- BS 1832 : 1991, Grade- A
- DIN 3754-IT 300 • ASTM F 11200IM7

IS 2712 : 1998

1.7 - 2.20

6-14

≥40

≥18

≥24

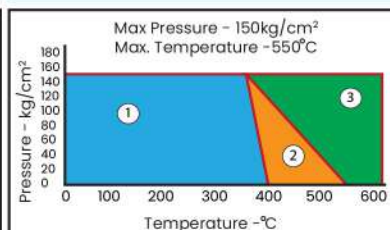
≥23

≤28

≤10

550/1022

150/2130



# MACER OIL

# MACER ACID

# MACER UNIVERSAL

# MACER 111 METALLIC

- Chrysotile Asbestos Fibre
- Synthetic Elastomer (NBR)

## Application

- Suitable for high stress conditions.
- To seal motor oil, steam, transmissions & hydraulic fluids, low temp. oil, hot oils & various aromatic Hydrocarbons solvents & Refrigerating oils.
- For IC engines, compressors chemical plants.



- Chrysotile Asbestos Fibre
- CSM Elastomer

## Application

- Suitable for low & medium stress conditions.
- To seal organic & inorganic acids, alkalis, alcohols, esters & ketones.



- Chrysotile Asbestos Fibre
- Synthetic Elastomer (NBR)

## Application

- Suitable for high stress conditions.
- To seal air, water, steam, alkalis, alcohols esters, ketones etc.
- Suitable for most fluid



- Chrysotile Asbestos Fibre
- Synthetic & Natural Elastomer
- Wire Reinforcement

## Application

- Suitable for low stress conditions with wire reinforcements.
- To seal water, steam, air & various alkaline chemicals.



## Specification Compliance

- IS 2712 : 1998 Grade- O/1
- BS 1832 : 1991, Grade- A
- JISR 3453 TYPE-1
- ASTM F 112331M7
- IS 2712 : 1998

## Specification Compliance

- IS 2712 : 1998 Grade- A/1
- DIN 3754-IT 'S'
- IS 2712 : 1998

## Specification Compliance

- DIN 3754- ITO,
- DIN 3754- ITC,
- DIN 3754- IT 400
- DIN 3754

## Specification Compliance

- No standard exists for wire reinforced sheets
- IS 2712 : 1998

1.7 - 2.20

1.7 - 2.20

1.7 - 2.20

1.8 - 2.20

6-14

6-14

5-15

6-14

≥40

≥40

≥40

≥40

≥18

≥18

≥21

≥7

≥24

≥24

≥30

≥7

≥23

≥23

≤26

≤24

≤28

≤28

≤25

≤20

≤20

≤15

≤20

≤15

≤20

≤15

≤10

≤10

≤20

≤8

≤12

550/1022

210/410

550/1022

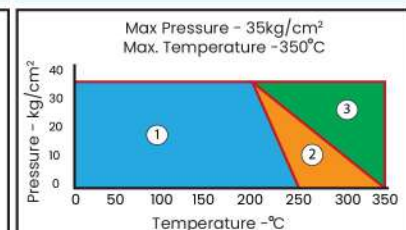
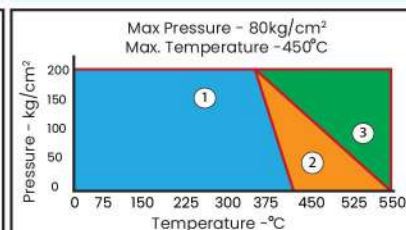
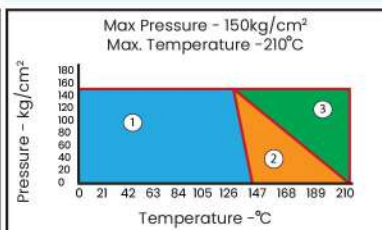
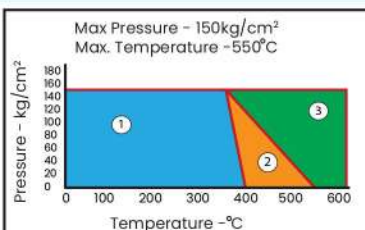
350/662

150/2130

150/2130

200/2840

35/497









Temperature and Pressure represent maximum values & should not be used simultaneously. They are also on the assembly conditions. Very important factors are: Thickness of the gaskets material, nature of, ser

# CHEMICAL RESISTANCE CHART

✓ RECOMMENDED

	MACER 222	MACER EXTRA	MACER 333	MACER OIL	MACER ACID	MACER UNIVERSAL	MACER 1000		MACER 222	MACER EXTRA	MACER 333
Acetates	✓	✓	✓	✓	✓	✓	✗	Ethyl Benzene	✗	✗	✗
Acetic Acid	✗	○	○	○	✓	✓	✗	Ethyl Bromide	✗	✗	✗
Acetic Aldehyde	✓	✓	✓	✓	○	✓	✗	Ethyl Chloride	✗	○	○
Acetic Anhydride	✗	✗	○	✓	✓	✓	✗	Ethylene	○	✓	✓
Acetone	✓	✓	✓	✓	✓	✓	○	Ethylene Chloride	✗	○	✓
Arcylic Acid	✗	✓	○	✓	✓	✓	✗	Ethylene Diamine	✗	○	○
Alcohols	○	✓	✓	✓	✓	✓	✓	Ethylene Glycol	✓	✓	✓
Aldehydes	○	✓	✓	✓	○	✓	✗	Fatty Acids	✗	○	○
Alum	✓	✗	✓	✓	✗	✓	✗	Flue Gases	✓	✓	✓
Ammonia	✓	✓	✓	✓	✓	✓	✓	Formaldehyde	✓	✓	✓
Ammonium Salts	✓	✓	✓	✓	✓	✓	✗	Formic Acid	✗	✗	✗
Benzaldehyde	✗	✗	✓	✓	○	✓	✗	Freon	✗	✗	○
Benzene	✗	○	✗	✓	✗	✓	✗	Fuel Oil	✗	○	○
Bromine	✗	✗	✓	✓	✓	✓	✗	Gelatine	✓	✓	✓
Butyl Alcohol	✓	✓	✓	✓	✓	✓	✓	Glycol	✓	✓	✓
Calcium Chloride	✓	✓	✓	✓	✓	✓	✓	Hexane	✗	○	✓
Carbolic Acid	✗	✓	✓	✓	✓	✓	○	Hydraulic (Mineral Oil)	✗	✗	✗
Carbon Disulfide	✗	○	✓	✓	✗	✓	✗	HCl Acid (Cone.)	✗	✗	✗
Carbon Monoxide	✓	✓	✓	✓	✗	✓	✗	Hydrogen	✓	✓	✓
Castor Oil	○	○	○	○	✗	✓	✓	Hydrogen Bromide	✗	✗	✗
Caustic Potash	○	○	✓	✓	✓	✓	✗	Hydrogen Sulfide	✗	✗	✗
Chlorinated Watrer	○	✗	✓	✓	✓	✓	✗	Isobutyl Alcohol	✗	✓	✓
Chlorobenzene	✗	✗	✗	✓	✗	✓	✗	Kerosene	✗	✗	○
Chloroform	✗	○	○	○	✗	✓	✗	Lactic Acid	✗	○	○
Chromic Acid	✗	✗	○	✓	✓	✓	✗	Lead Acetate	○	✓	✓
Citric Acid	✓	✓	✓	✓	✓	✓	✗	Linseed Oils	○	○	✓
Coal Gas	✓	✓	✓	✓	✗	✓	✓	Lubricating Oil	✗	✗	✗
Coconut Oil	✗	✓	○	✓	✗	✓	✗	Mercury Chloride	✓	✓	✓
Crude Oil	✗	✓	✗	✓	✗	✓	✓	Methenol	✓	✓	✓
Cyclohexanole	✓	✓	✓	✓	○	✓	✓	Methyl Chloride	✓	✓	✓
Cyclohexanone	○	✓	✓	✓	✗	✓	✓	Methyle Ethly Ketone	✓	✓	✓
Dibenzyl Ether	○	○	✓	✓	✓	✓	✗	Methylene Chloride	✗	✗	○
Dichloro Benzene	✗	○	✗	✓	✗	✓	✗	Mineral Oils	✗	✗	○
Diesel Oil	○	○	○	✓	✗	✓	✓	Motor Oils	✗	✗	○
Diethyl Glycol	○	✓	✓	✓	✓	✓	✓	Mustard	○	✓	✓
Dimethyl Ether	✗	✓	✗	✓	✓	✓	✗	Naphtclene ZD	✗	✗	○
Dioxane	✗	✓	✓	✓	✓	✓	✓	Naptha	✗	✗	✗
Dipentene	○	✓	✓	✓	✓	✓	✓	Napthalene	○	○	✓
Diphenyl	✗	✗	✓	○	✗	✓	✗	Natural Gas	✓	✓	✓
Electrolyte	✗	✗	✗	✓	✓	✓	✓	Nickel Chloride	✓	✓	✓
Essential Oils	○	○	○	✓	✗	✓	✗	Nitrobenzene	○	○	✓
Ethane	✗	✓	✓	✓	✓	✓	✓	Nitric Acid (Cone.)	✗	✗	✗
Ethanol Diamine	✗	○	○	✓	✗	✓	✗	Nitrogen	○	✓	✓
Ether	✗	○	○	✓	✓	✓	✓	Nitrogen Oxides	○	✓	✓



given only as a guidance, since they depend not only on the type of gaskets material but also on the service medium, type of flange & surface finish. Steam application requires special consideration.

✓ RECOMMENDED ○ RECOMMENDED DEPENDS ON OPERATING CONDITIONS ✗ NOT RECOMMENDED

MACER OIL	MACER ACID	MACER UNIVERSAL	MACER 1000		MACER 222	MACER EXTRA	MACER 333	MACER OIL	MACER ACID	MACER UNIVERSAL	MACER 1000
✓	✗	✓	✓	Oxygen up to 40 Bar	✗	✗	✓	✓	✗	✓	✓
✓	✗	✓	✗	Ozone	✗	✗	✓	✓	✗	✓	✓
✓	✗	✓	✗	Palmitic Acid	○	○	✓	✓	✓	✓	✓
✓	✗	✓	✗	Paraffin	✓	✓	✓	✓	✓	✓	✓
✓	✗	✓	✗	Petrol	○	✓	✓	✓	✗	✓	✓
✓	✗	✓	✓	Petroleum	✗	✗	○	✓	✗	✓	✓
✓	✗	✓	✓	Phenol	✗	○	✓	✓	✗	✓	✗
✓	✓	✓	✓	Phenyl Ether	✗	○	✓	✓	✓	✓	✗
✓	✓	✓	✓	Phenythdrazine	✗	✗	✗	✗	✓	✗	✗
✓	✓	✓	✓	Phosphoric Acid	○	○	○	✓	✓	✓	✗
✓	✗	○	✗	Picric Acid	✓	✗	○	○	✓	✓	✗
✓	✗	○	✗	Potassium Chloride	✓	✓	✓	✓	✓	✓	✓
✓	✗	○	✗	Potassium Cyanide	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	Potassium Hydroxide	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	Potassium Sulfate	✓	✓	✓	✓	✓	✓	✓
✓	✗	✓	✓	Producer Gas	✓	✓	✓	✓	✗	✓	✗
✓	✗	✓	✓	Propane	✓	✓	✓	✓	✗	✓	✗
✗	✓	✓	✓	Propyl Alcohol	○	✓	✓	✓	✓	✓	✓
○	✓	✓	✗	Pyridine	✗	○	✓	✓	✗	✓	✗
✗	✓	✓	✗	Sea Water	○	✓	✓	✓	✓	✓	✓
✓	✗	✓	✓	Silver Nitrate	○	○	✓	✓	✓	✓	✓
✓	✗	✓	✓	Sodium Carbonate	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	Sodium Chloride	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✗	Sodium Sulfate	✓	✓	✓	✓	✓	✓	✓
✓	○	✓	✓	Sodium Sulfide	✓	✓	✓	✓	✓	✓	✓
✓	✗	✓	✓	Spinning Solutions	○	○	✓	✓	○	✓	✗
✓	✓	✓	✓	Steam	✓	✓	✓	✓	○	✓	✓
✓	✓	✓	✗	Stearic Acid	○	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	Sulfur Dioxide	○	○	✓	✓	✓	✓	✗
○	✓	✓	✓	Sulfuric Acid (Cone.)	✗	✗	✗	✓	✓	○	✗
✓	✗	✓	✗	Sulfurous Acid	✗	✗	✗	✓	✓	✓	✗
✓	✗	✓	✓	Tar	✗	✗	○	✓	✗	✓	✓
✓	✗	✓	✓	Tar Oil	✗	✗	✗	✓	✗	✓	✓
✓	✓	✓	✓	Tartaric Acid	✓	✗	✓	✓	✓	✓	✗
✓	✗	✓	✓	Tetraline	✗	✗	○	✓	✗	✓	✓
✓	✗	✓	✓	Toluene	✗	✗	✗	✓	✗	✓	✓
✓	✗	✓	✓	Transformer Oil	○	○	○	✓	✗	✓	✓
✓	✗	✓	✓	Transmission Fluid	✗	✗	✗	✓	✗	✓	✓
✓	✓	✓	✓	Turpentine	○	○	○	✓	✗	✓	✓
✓	✗	○	✗	Vegetable Oils	✗	○	✓	✓	✗	✓	✓
✗	✓	○	✗	Xylene	✗	✗	✗	✓	✗	✓	✓
✓	✓	✓	✓	Zinc Chloride	✓	✓	✓	✓	✓	✓	✗
✓	✓	✓	✗	Zinc Sulphate	✓	✓	✓	✓	✓	✓	✗



Please contact us for any further details!



## MACER INDUSTRIES

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