



EMI SHIELDING SOLUTIONS

MICROWAVE ABSORBERS

FRD



Company Overview

Established in Shenzhen, China, in 1993, FRD manufactures a wide range of products including EMI Shielding Materials, Thermal Interface Materials and other related electronic materials. FRD is a registered National Hi-Tech Enterprise and certificate of ISO9001, ISO14001, QC080000 and OHSAS18001.

FRD works to satisfy the needs of its customers and we excels in speed and flexibility. FRD has long-term business relationships with customers such as Huawei, ZTE, Cisco, Nokia, Alcatel-Lucent, Juniper, Dell, H3C, Microsoft, Lenovo, Xiaomi, Samsung, Foxconn, Flextronics, Jabil, PEGATRON, SANMINA-SCI, O-Film Emerson, GREE, BYD, FUJI XEROX, TOSHIBA, etc.

As a leading manufacturer in its industry, FRD is growing tremendously. We are willing to provide quality products and services for more customers in various industries than our competition. These industries include networks & telecommunication equipment, consumer electronics, automotive, power supplies, lighting, military, aerospace, etc.

In future, FRD will continue to meet the challenge, to grow the FRD brand name, and to strive to become a world-class technology leader in new materials for all of our manufacturing processes.



FRD Building (Shenzhen)



New South China Base

Shenzhen Guangming FRD New Materials Park



East China Base

Kunshan FRD Electronic Materials Co.,Ltd.



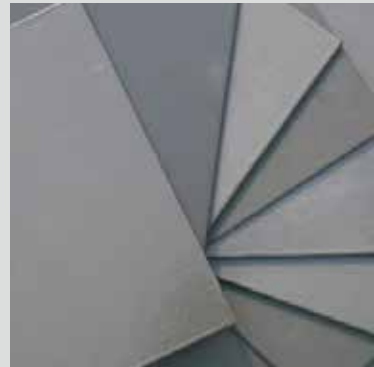
North China Base

Tianjin FRD Science & Technology Co.,Ltd.

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Microwave Absorbers



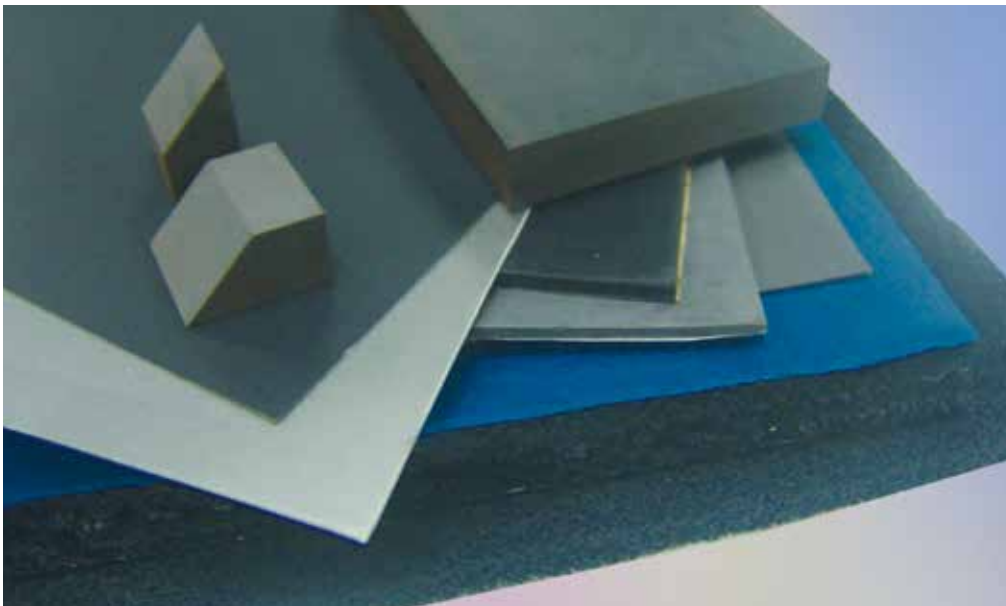
FRD[®] Microwave Absorbers

Since radio communications developed in the first half of the 20th century, interference between broadcast radio signals began to occur. The damaging effects of electromagnetic interference pose unacceptable risks in many areas of technology, such as switching devices, digital circuitries, ESD problems...

As the technology developed, with faster switching speeds (increasing emissions) and lower circuit voltages (increasing susceptibility), EMC (Electromagnetic compatibility) increasingly became a source of concern. Many more nations were aware of EMC as a growing problem and issued directives to the manufacturers of digital electronic equipment which set out the essential manufacturer requirements before their equipment could be marketed or sold.

Recently the ever-increasing use of mobile communications and broadcast media channels has put huge pressure on the available airspace; Regulatory authorities are squeezing band allocations closer and closer together. We need more sophisticated EMC design methods to keep cross-channel interference to acceptable levels. The use of Microwave Absorbers will offer a far easier way to implement highly EMC capability of different devices.

FRD has extensive experiences in making EMC materials, and FRD engineers know EMC design methods very well. With superior design capability, unique manufacturing processes and test procedures, FRD provide a wide range of standard to most needs, and custom parts to special requirements.



Features

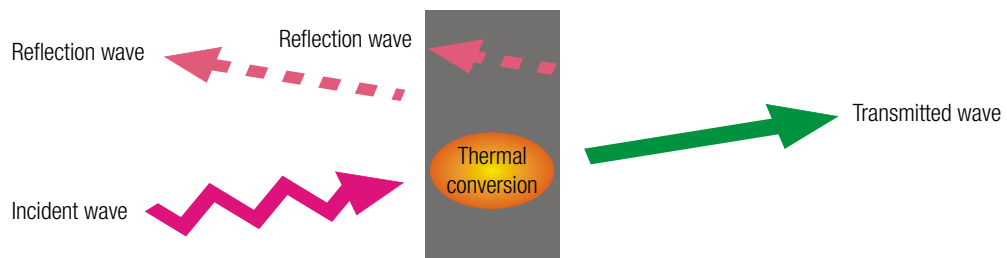
With over 300 kinds of absorbent fillers (Ferrites; Iron-base alloy; Nanomaterials; Amorphous fibers; Nanogranular films...) and computer Simulation, FRD's microwave absorbing material has:

- Excellent electromagnetic absorption performance in wide frequency range;
- High Permittivity and Permeability;
- Thin, Light and Flexible;
- Easy to use;

Applications

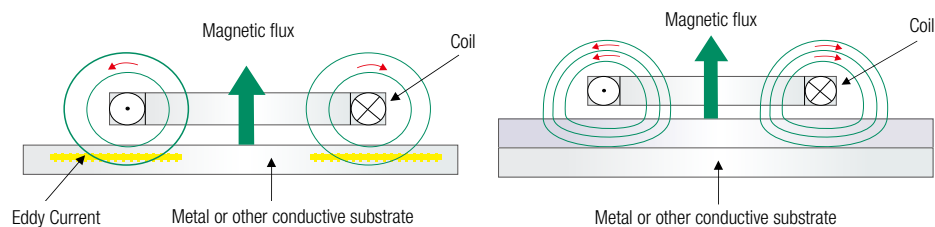
1

FRD's Microwave Absorbers is effective in reducing specular reflection, surface currents, cavity resonances and coupling, which is useful in radar systems, test chambers, antennas, microwave modules, microwave components...



2

As low loss pathway of magnetic energy, some absorbing material can be used in RFID and wireless recharge system to solve the interference effect from the metal surrounding.



JCXB-F Series

JCXB-F Series Features:

1. Ferrite, High permeability, Low loss;
2. Efficient reduce the metal interference in HF (13.56MHz) RFID system, enhance antenna signal, Lengthen communication distance;

Typical Applications:

1. Apply to NFC;
2. SIM-Pass/SD-Pass card, built-in Tag, stick Tag, E-Tag shielding metal and RFID, wireless charging technology, etc;
3. Digital and GPS products etc;

JCXB-F series absorber complies with worldwide directives ecological compatibility, such as RoHS standards and Halogen Free.

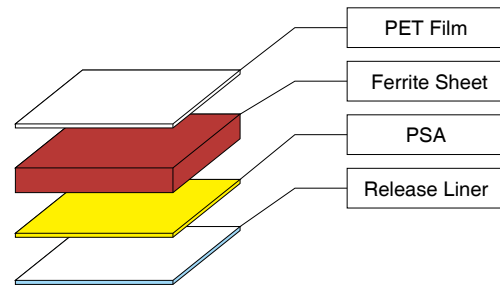
Standard size is 65mmx65mm custom size may be available upon request.

How to order:

JCXB-FX-XX.

Series number: F0; F2; F6...

Thickness(mm): 010 means 0.1mm, thickness tolerance: ± 0.01 mm.



Properties

Type	Permeability(13.56MHz)		Thickness(mm)	Operating Temperature($^{\circ}$ C)	Surface Resistance(Ω)	Frequency Range(MHz)
	μ'' typ	μ' typ				
JCXB-F0	$110 \pm 20\%$	$3 \pm 20\%$	0.12; 0.17; 0.22	-40~+85	$>10^8$	10~900 (13.56 MHz and is mainly used in the following)
JCXB-F2	$150 \pm 20\%$	$5 \pm 20\%$	0.12; 0.17; 0.22	-40~+85	$>10^8$	10~900 (13.56 MHz and is mainly used in the following)
JCXB-F3	$150 \pm 20\%$	$2.5 \pm 20\%$	0.08; 0.1; 0.19	-40~+85	$>10^8$	10~900 (13.56 MHz and is mainly used in the following)
JCXB-F6	$150 \pm 20\%$	$4 \pm 20\%$	0.07; 0.115;	-40~+85	$>10^8$	10~900 (13.56 MHz and is mainly used in the following)

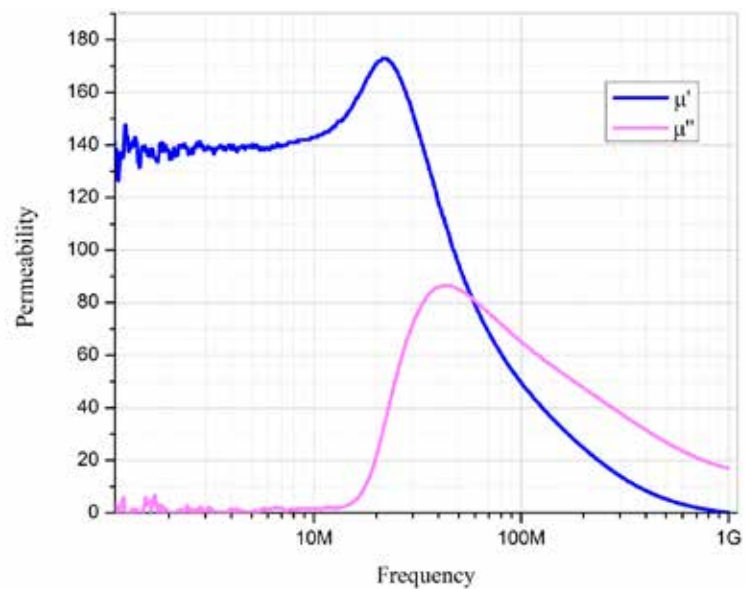
Classification

Type	Ferrite Thickness (mm)	Adhesive Thickness (mm)	PET Film Thickness (mm)	PET Film Colour
F310A	0.08 ^{±0.01}	0.013	0.01	Black
F310D	0.08 ^{±0.01}	0.013	0.012	White
F310G	0.08 ^{±0.01}	0.013	-----	-----
F312A	0.1 ^{±0.01}	0.013	0.01	Black
F312B	0.08 ^{±0.01}	0.013	0.03	Black
F312C	0.08 ^{±0.01}	0.013	0.03	White
F312D	0.1 ^{±0.01}	0.013	0.012	White
F312G	0.1 ^{±0.01}	0.013	-----	-----
F321A	0.19 ^{±0.01}	0.01	0.01	-----

Note: Product JCXB - F310G / F312G is with adhesive on both side, no pet film.

Permeability Characteristics

JCXB-F3



Note: The data is only included in a typical value of laboratory testing and should not be regarded as technical specifications.

JCXB-N Series

JCXB-N series absorber use neoprene material and special fillers for cost-effective requirements. Its working temperature range is -40 °C ~125°C.

JCXB-N series absorber is typically used for solving the EMI problem in microwave modules and components. It suppresses radiated noise, creeping wave and surface current. It can also be used as “shielding wall” for chipsets and antennas for designed frequency range.

JCXB-N series absorber can improve magnetic field convergence and prevent interference between loop antennas and nearby metal objects with high magnetic permeability.



JCXB-N series absorber complies with worldwide directives ecological compatibility, such as RoHS standards, by containing no banned compounds.

JCXB-N series absorber will pass most flammability tests including the one according to UL 94 HB grade.

How to order:

JCXB-XX-P-XXX

(1) Series Number: N, NC, NZ, NQ, NM, standard size: 200mmx200mm.

(2) P: with PSA.

(3) Thickness(mm): 100 means 1.0mm, thickness tolerance: ±0.2mm.

Standard size is 200mmx200mm, custom size may be available upon request.

Properties

Product Number	Thickness(mm)	Frequency Range(GHz)	Max Reflectivity	Surface Resistivity	Surface Density
JCXB-NM-030	0.3	50-70GHz	>15dB	>10 ⁶	≤1.1
JCXB-NM-050	0.5	40-60GHz	>15dB	>10 ⁶	≤2.3
JCXB-NM-060	0.6	30-50GHz	>15dB	>10 ⁶	≤2.0
JCXB-NM-080	0.8	26-40GHz	>15dB	>10 ⁶	≤2.7
JCXB-N-100	1.0	8-18GHz	>15dB	>10 ⁶	≤5.0
JCXB-N-130	1.3	6-18GHz	>20dB	>10 ⁶	≤5.2
JCXB-N-150	1.5	6-18GHz	>20dB	>10 ⁶	≤5.9
JCXB-N-180	1.8	4-8GHz	>20dB	>10 ⁶	≤7.5
JCXB-NQ-200	2.0	2-18GHz	>15dB	>10 ⁶	≤6.3
JCXB-NF-200	2.0	8-18GHz	>20dB	>10 ⁶	≤6.3
JCXB-NC-200	2.0	0.5-8GHz	>15dB	>10 ⁶	≤9.5
JCXB-NC-250	2.5	0.5-8GHz	>20dB	>10 ⁶	≤10.2
JCXB-NC-300	3.0	0.5-3GHz	>20dB	>10 ⁶	≤11.4
JCXB-NZ-400	4.0	0.5-8GHz	>20dB	>10 ⁶	≤12.5

JCXB-R Series

JCXB-R series absorber consists Fe-based nanocrystalline fillers in elastomer. This absorber attenuates EMI for broadband radio frequency range (From 10 MHz to 10 GHz).

JCXB-R series absorber's common uses include cell phone (EMC and SAR), laptop, flat-panel TV and most of portable electronics.

JCXB-R series absorber can improve magnetic field convergence and prevent interference between loop antennas and nearby metal objects with high magnetic permeability. It can be used in NFC and other RFID systems.

JCXB-R series absorber complies with RoHS standards and it is Sulfur-free (Halogen free type available). Its working temperature range is -25~85°C.

How to order:

JCXB-XX(HF)-P-XXX-(L)

(1) Series Number: R---- relative magnetic permeability is 20, RF-----relative magnetic permeability is 40.

(2) HF: Halogen free.

(3) P: with PSA.

(4) Thickness(mm): 100 means 1.0mm, thickness tolerance: ± 0.2 mm.

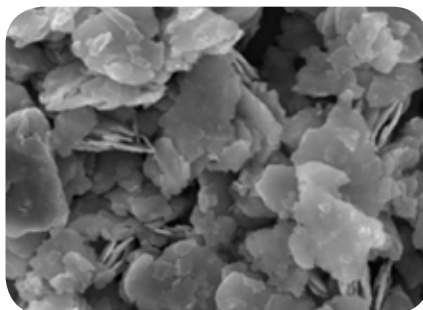
(5) L: Laminating Film.

Standard size is 140mmx180mm, custom size may be available upon request.



Properties

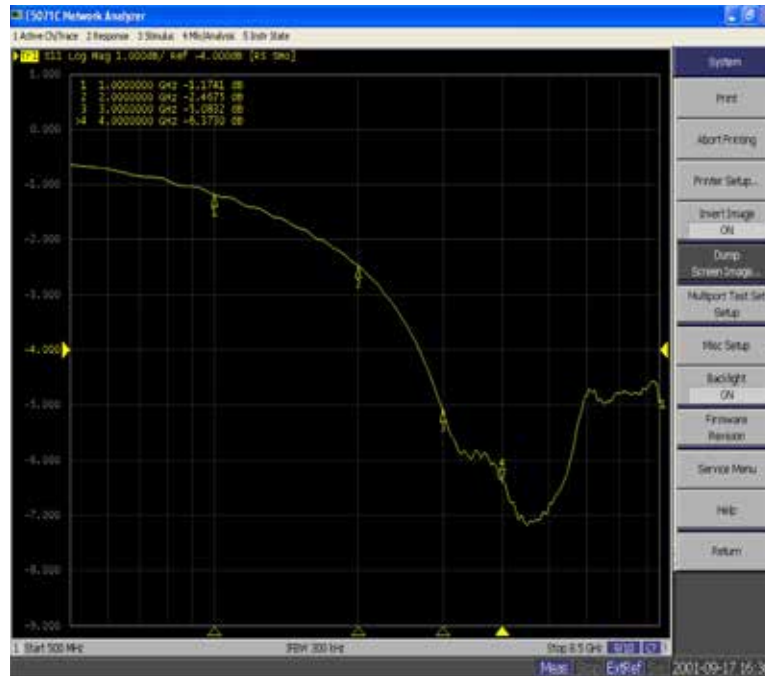
Product Number	Thickness(mm)	Frequency Range(GHz)	Surface resistivity	Surface density
JCXB-RF(HF)-010	0.1	10MHz-900MHz	$>10^5$	≤ 0.3
JCXB-RF(HF)-030	0.3	10MHz-900MHz	$>10^5$	≤ 0.7
JCXB-RF(HF)-050	0.5	10MHz-900MHz	$>10^5$	≤ 1.2
JCXB-R(HF)-030	0.3	10MHz-10GHz	$>10^5$	≤ 0.7
JCXB-R(HF)-050	0.5	10MHz-10GHz	$>10^5$	≤ 1.2
JCXB-R(HF)-080	0.8	10MHz-10GHz	$>10^6$	≤ 1.8
JCXB-R(HF)-100	1.0	10MHz-10GHz	$>10^6$	≤ 2.3



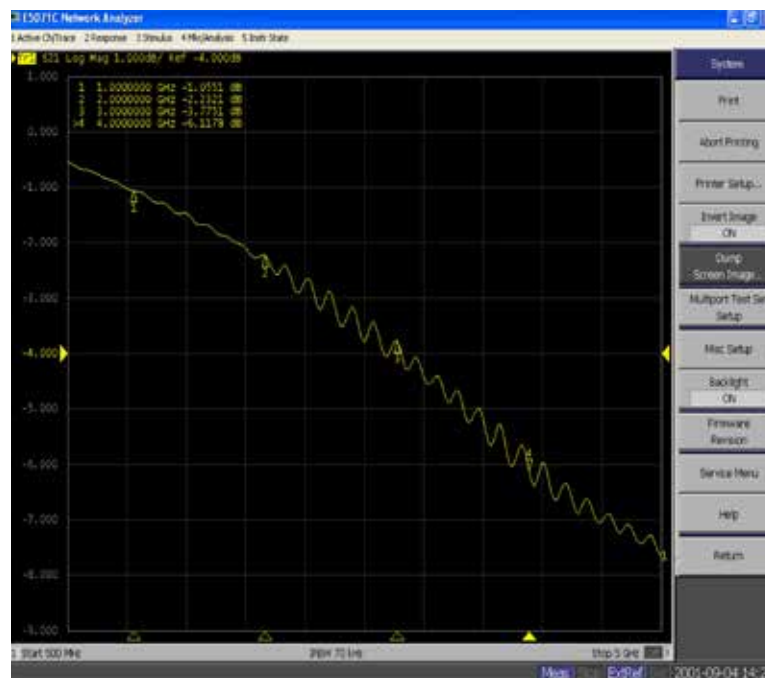
Absorbent

JCXB-R-050

Return loss (7mm Coaxial Method)

**JCXB-R-050**

Transmission (7mm Coaxial Method)



Note: The data is only included in a typical value of laboratory testing and should not be regarded as technical specifications.

JCXB-S Series

JCXB-S series absorber is silicone based, which has wide working temperature range (-50~150°C) and low out-gassing.

JCXB-S series absorber is typically used for solving the EMI problem in microwave modules and components. It suppresses radiated noise, creeping wave and surface current. It can also be used as “shielding wall” for chipsets and antennas for designed frequency range.

JCXB-S series absorber can improve magnetic field convergence and prevent interference between loop antennas and nearby metal objects with high magnetic permeability.



JCXB-S series absorber complies with worldwide directives ecological compatibility, such as RoHS standards, by containing no halogenated or banned compounds.

JCXB-S series absorber will pass most flammability tests including the one according to UL 94 V-1 grade.

How to order:

JCXB-XX-P-XXX

(1) Series Number: S, SC, SZ, SQ, SM, standard size:200mmx200mm.

(2) P: with PSA.

(3) Thickness(mm): 100 means 1.0mm, thickness tolerance: ± 0.2 mm.

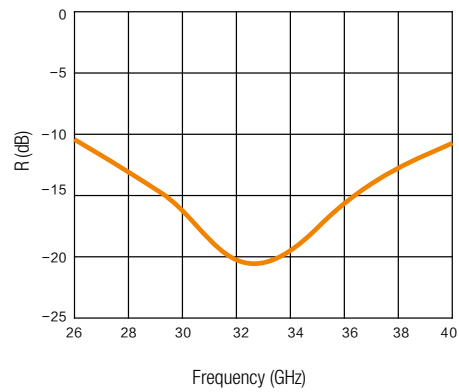
Standard size is 200mmx200mm, custom size may be available upon request.

Properties

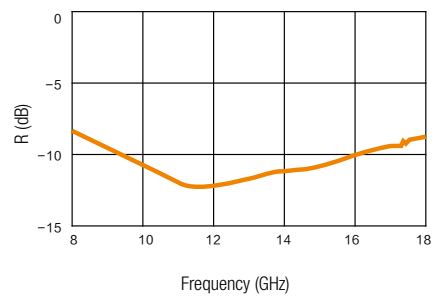
Product Number	Thickness(mm)	Frequency Range(GHz)	Max Reflectivity	Surface Resistivity	Surface Density
JCXB-SM-030	0.3	50-70GHz	>15dB	$>10^6$	≤ 0.9
JCXB-SM-050	0.5	40-60GHz	>15dB	$>10^6$	≤ 1.9
JCXB-SM-060	0.6	30-50GHz	>15dB	$>10^6$	≤ 1.6
JCXB-SM-080	0.8	26-40GHz	>15dB	$>10^6$	≤ 2.2
JCXB-S-100	1.0	8-18GHz	>15dB	$>10^6$	≤ 3.3
JCXB-S-130	1.3	6-18GHz	>20dB	$>10^6$	≤ 4.2
JCXB-S-150	1.5	6-18GHz	>20dB	$>10^6$	≤ 4.9
JCXB-S-180	1.8	4-8GHz	>20dB	$>10^6$	≤ 6.2
JCXB-SQ-200	2.0	2-18GHz	>15dB	$>10^6$	≤ 5.2
JCXB-SF-200	2.0	8-18GHz	>20dB	$>10^6$	≤ 5.2
JCXB-SC-200	2.0	0.5-8GHz	>15dB	$>10^6$	≤ 7.7
JCXB-SC-250	2.5	0.5-8GHz	>20dB	$>10^6$	≤ 8.5
JCXB-SC-300	3.0	0.5-3GHz	>20dB	$>10^6$	≤ 9.1
JCXB-SZ-400	4.0	0.5-8GHz	>20dB	$>10^6$	≤ 10

JCXB-SM-080

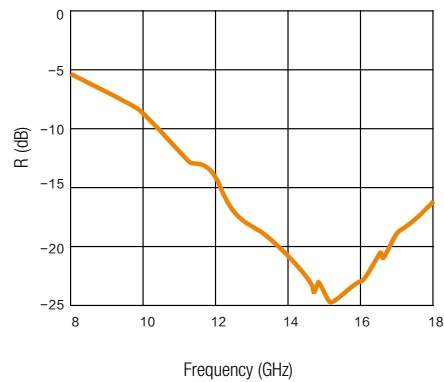
Typical Reflectivity performance

**JCXB-S-100**

Typical Reflectivity performance

**JCXB-S-130**

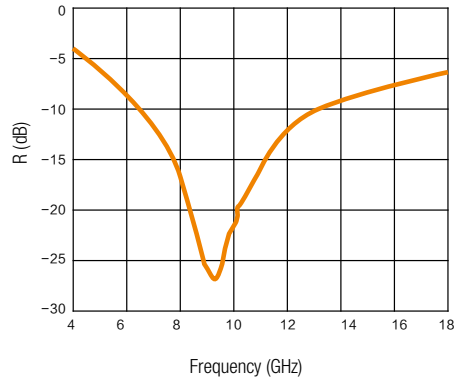
Typical Reflectivity performance



Note: The data is only included in a typical value of laboratory testing and should not be regarded as technical specifications.

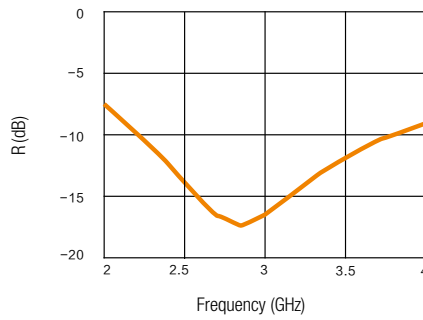
JCXB-S-150

Typical Reflectivity performance



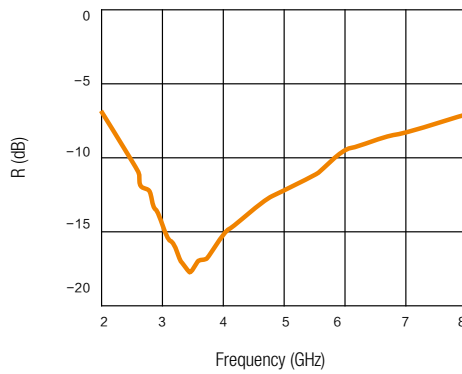
JCXB-SC-250

Typical Reflectivity performance



JCXB-SZ-400

Typical Reflectivity performance



Note: The data is only included in a typical value of laboratory testing and should not be regarded as technical specifications.

FLXB Series

FLXB series absorber is widely known and used foam sheet product which is high loss, low density, flexible and low cost.

FLXB series absorber is used to isolate the microwave transmission and specular reflection by insertion loss, and it can also lower cavity Q's. It is very useful in radar systems, RF components, telecom systems and test devices.

FLXB series absorber will not drop any conductive powders for safety use, and has weatherproof coating for outdoor applications.

FLXB series absorber complies with RoHS standards, and can achieve GB FH-1 flame retardant grade. Its working temperature range is -25~85°C.

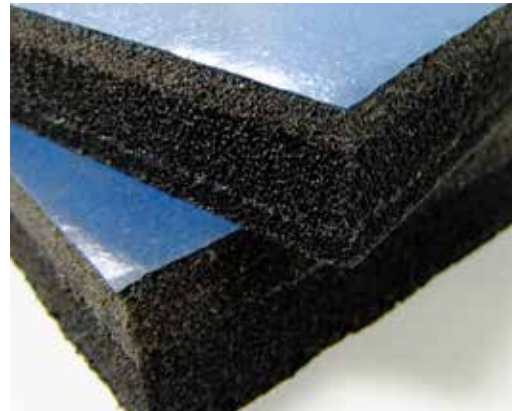
How to order:

FLXB-XX-X

(1) Thickness(mm): 05 means 5mm.

(2) P means with PSA.

Standard size is 400mmx400mm, custom size may be available upon request.

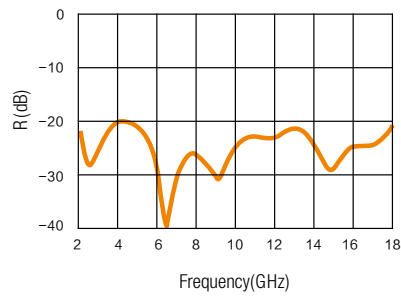


Properties

Product Number	Frequency Range(GHz)	Average Reflectivity	Thickness(mm)	Surface resistivity
FLXB-03	10 ~ 18	>10	3±1	0.3
FLXB-05	8 ~ 18	>10	5±1	0.5
FLXB-12	5 ~ 18	>10	12±2	1.0
FLXB-20	4 ~ 18	>15	20±2	1.5
FLXB-40	3 ~ 18	>20	40±3	3.0
FLXB-55	2 ~ 18	>20	55±4	4.0

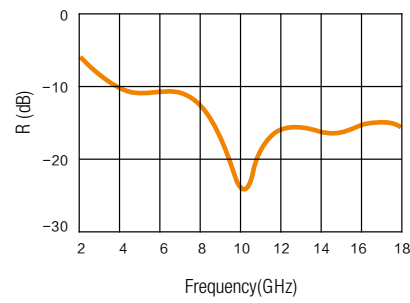
FLXB-55

Typical Reflectivity performance

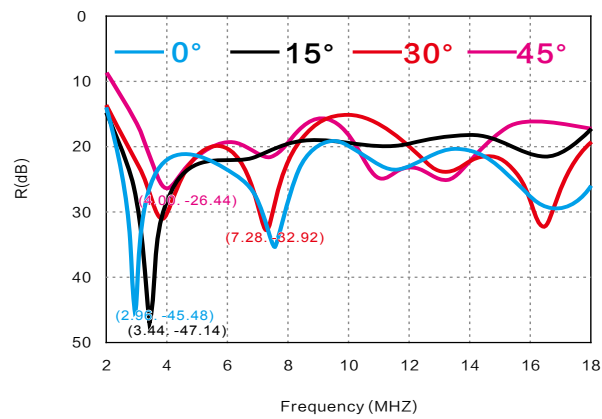


FLXB-12

Typical Reflectivity performance



Reflectivity



Note: The data is only included in a typical value of laboratory testing and should not be regarded as technical specifications.

Note



SHENZHEN FRD SCIENCE & TECHNOLOGY CO., LTD.

FRD Building, 8# Gaofa Industrial Park, Beihuan Blvd,
Nanshan District, Shenzhen, China
Tel: 86-755-8608-1680 8608-1686
Fax: 86-755-8608-1689

FRD (HONG KONG) CO., LTD.

Unit 503, 5/F, Silvercord, Tower 2, 30 Canton Road,
Tsimshatsui, Kowloon Hong Kong
Tel: 852-3519-5726
Fax: 852-3013-7466

KUNSHAN FRD ELECTRONIC MATERIALS CO., LTD.

FRD Industrial Park, 258 Dongping Road, Bacheng, Kunshan, China
Tel: 86-512-5785-1188
Fax: 86-512-5785-1199

TIANJIN FRD SCIENCE & TECHNOLOGY CO., LTD.

FRD Industrial Park, 160 Xiangyuan Road, JINGJIN Science&Tech Valley,
Wuqing District, Tianjin, China
Tel: 86-022-5969-5716
Fax: 86-022-5969-5718

● BEIJING ● SHANGHAI ● XI'AN ● WUHAN ● TAIPEI ● SAN JOSE (USA) ● SEATTLE (USA) ● NETHERLANDS

www.frd.cn info@frd.cn

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0802-V2.3-Yang

