



# Radio wave absorbers

For EMC anechoic chambers/For microwave anechoic chambers

**IP-BLB/IP/IP-BX/ITF/ICM/IB/IS/IS-SM/IS-V** series

Thin type

**IR/ISF** series

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The compatibility of electronic devices with various electromagnetic environments has become an important issue in recent years. This in turn has greatly increased the number applications which require radio wave absorbing materials in frequencies ranging from the MHz range to the GHz range and even to the milli-wave zone.

Applications for such materials include measures for reducing the radiated noise and improving the noise resistance of electronic devices

(such as communication devices, office electronics, computers, home appliances, and devices mounted on automobiles), the attenuation of radio wave reflections (such as ETC and radar's measures) and facilities for evaluating EMI measures (such as anechoic chambers).

TDK offers a wide range of radio wave absorbing materials based on our long tradition of developing electrical and magnetic material technologies as well as electronic and radio wave technologies.

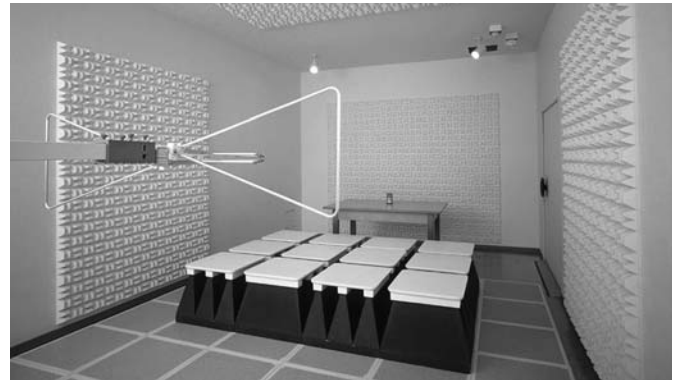
## APPLICATION EXAMPLES OF ELECTROMAGNETIC ABSORBERS

### ANECHOIC CHAMBERS

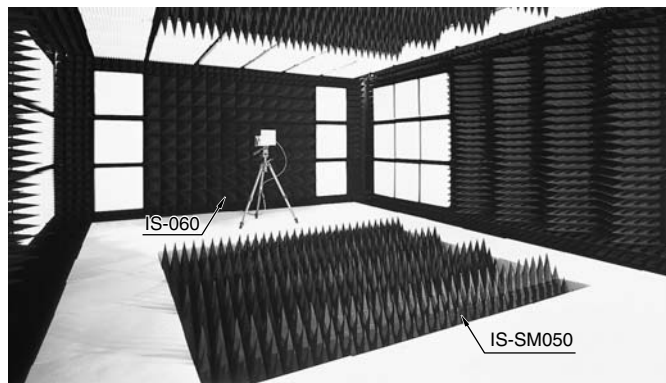
TDK's radio wave absorbing materials are widely used in anechoic chamber applications. The photos shown here are some examples.



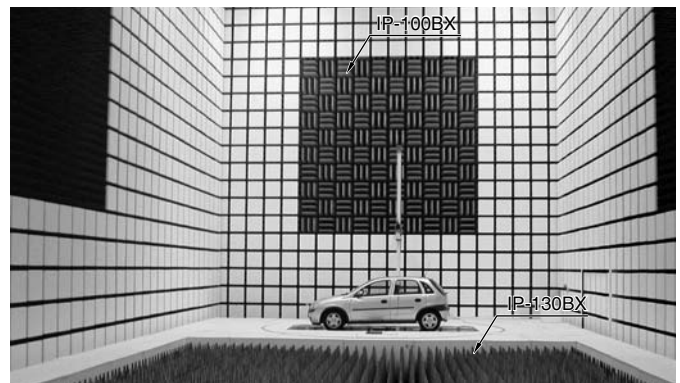
10-meter test range anechoic chamber (uses IP material for radio wave absorption)



Small-scale anechoic chamber (uses ICM material for radio wave absorption.)



Anechoic chamber for antenna evaluation (uses IS and IS-SM materials for radio wave absorption)



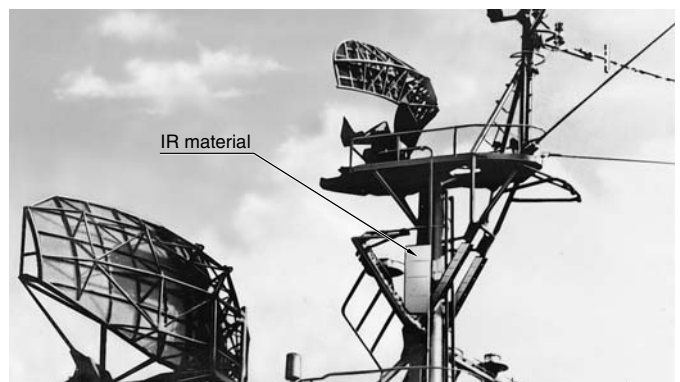
Anechoic chamber for antenna evaluation (uses IP-BX material for radio wave absorption)

### IMPROVE ETC COMMUNICATION ENVIRONMENTS



This is an example of electromagnetic absorbent panels (ISFE27F5) for ETC systems (Electronic Toll Collection System) installed at an ETC facility to improve the electromagnetic environment.

### PREVENTION OF FALSE IMAGE FROM A SHIP'S MAST



The photo shows the installation of TDK IR material on the main mast of a ship. This prevents false radar images from occurring by greatly reducing the amount of reflection taking place.

A key factor in absorbing unwanted electromagnetic energy efficiently and completely is selecting the most appropriate materials for the application. This selection process must take into account the device or system being interfered with, its operating conditions, and the ambient environment. It is not sufficient to merely choose any products, which absorb electromagnetic energy of the correct frequency range.

## SELECTION GUIDELINE OF ELECTROMAGNETIC ABSORBERS

Application	TDK material name	
Anechoic chambers	3-meter, 10-meter test range	IP-BLB, ITF, ICM, IB
	Compact (3-meter test range)	IP-BLB, ITF, ICM, IB, IS-V
	EN, ETS	IP, IB
	Car antenna	IP-BX, IB, IS
	Antenna evaluation	IS, IS-SM
Improvement of ETC communication environment	ISF	
Prevents false radar image Prevents parabolic antenna side lobe Prevents unnecessary radiation	IR, ISF	

## TDK ELECTROMAGNETIC ABSORBERS FOR ANECHOIC CHAMBERS

TDK material name	IP-BLB, IP, IP-BX	ITF	ICM	IB
Features	Ultra wideband Fire retardant	Ultra wideband Fire retardant Lightweight	Ultra wideband Nonflammability Low-profile type	Wideband Nonflammability Thin type
Applicable frequency range	30MHz min.	30MHz min.	30MHz to 18GHz	30MHz to 1GHz
Basic composition	Carbon+ styrofoam	Conductive fiber-containing resistance film + Styrofoam support material	Ferrite+ inorganic material	Sintered ferrite
Composite material	IB	IB	IB	IP, IP-BX, ID, ICM
Standard shape	Wedge form Pyramid form	Original multifaceted	Wedge form	Board
Standard dimension (mm)	600×600×T	600×600×T	100×100×T	100×100×T
Operating temperature range (°C)	-40 to +60	-40 to +60	-40 to +60	-40 to +60

TDK material name	IS, IS-SM	IS-V
Features	Ultra wideband Fire retardant	Ultra wideband Fire retardant Small and lightweight
Applicable frequency range	100MHz min.	30MHz min.
Basic composition	Carbon+ polyethylene	Carbon+ polyethylene
Composite material	—	IB
Standard shape	Pyramid form Special pyramid form	Wedge form Pyramid form
Standard dimension (mm)	600×600×T 600×840×T	600×600×T
Operating temperature range (°C)	-40 to +60	-40 to +60

## TDK THIN TYPE ELECTROMAGNETIC ABSORBERS

TDK material name	IR	ISF
Features	Thin Flexible	Lightweight Fire retardant
Applicable frequency range	700MHz to 30GHz	800MHz min.
Basic composition	Magnetic material+ synthetic rubber	Carbon+ styrofoam
Standard dimension (mm)	300×300×T	500×500×T
Operating temperature range (°C)	-40 to +80	-40 to +60

## FOR EMC ANECHOIC CHAMBERS

### IP-BLB MATERIAL

Made of base material of styrofoam combined with IP radio wave absorber, which is known for its ohmic loss properties, and IB material, which is a ferrite radio wave absorber, these products were developed for anechoic chambers.

Our composite absorbers fully utilize the features of each loss material. In the 30 to 500MHz range the IB electromagnetic absorbers, and in the higher range of 500MHz and higher the IP electromagnetic absorbers, are designed to provide efficient electromagnetic absorption and deliver excellent electromagnetic absorption performance for frequencies as low as 30MHz.

\* Used in combination with ferrite radio wave absorber IB material.

#### IP-090BLB, IP-130BLB

TDK's composite electromagnetic absorbers highly praised around the world. These unit-configured electromagnetic absorbers are small, lightweight, inexpensive and deliver excellent electromagnetic absorption performance over a wide bandwidth. They are used widely in anechoic chambers for 3- and 10-meter ranges as well as in large anechoic chambers designed for specific applications.

#### FEATURES

- Ultra-wideband electromagnetic absorber.
- Stable against acids, bases and water vapor, and offers long service life.
- Uses materials that, when burned, emit gases that are relatively harmless to humans.
- Fire retardant (NRL Classes 1, 2 and 3; UL-94HBF).
- White end caps (sold separately) improve the illumination inside the chamber.

#### STANDARD MATERIALS

Material name	Length (cm)	Standard weight* (kg)	Applicable anechoic chambers
IP-030C	30	2	Compact, 3-meter test range
IP-045C	45	3	Compact (3-meter test range), 3-meter test range (EMS floors available)
IP-045BLB	45	1.5	Compact (3-meter test range), 3-meter test range
IP-065BLB	65	2	3-meter and 10-meter test ranges
IP-090BLB	93	3	3-meter and 10-meter test ranges
IP-130BLB	128	3.5	10-meter test ranges

\* Not including the mass of ferrite

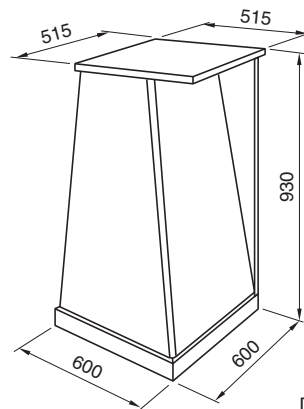


#### PRODUCT IDENTIFICATIONS

**I P - 090 BL B**  
 (1) (2) (3) (4) (5)

- (1) TDK electromagnetic absorbers
- (2) Base material code (P: Styrofoam)
- (3) Length dimensional code (090: 93cm)
- (4) Structure code
- (5) Version code

#### SHAPES AND DIMENSIONS



Dimensions in mm

#### TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)

Unit: dB

Material name	30MHz	50MHz	100MHz	500MHz	1GHz	5GHz	18GHz	40GHz
IP-030C	15	18	15	15	16	23	30	30
IP-045C	18	18	15	20	20	30	40	40
IP-045BLB	18	22	18	18	18	16	18	18
IP-065BLB	18	22	20	18	18	18	20	20
IP-090BLB	22	23	20	20	20	20	20	20
IP-130BLB	24	28	25	22	23	25	20	20

• 200v/m Can be applied to EMS tests

## FOR EMC ANECHOIC CHAMBERS

### ITF MATERIAL

It is a composite type radio wave absorber that combines Styrofoam as a support material, a radio wave absorber ITF material that utilizes the ohm loss of the resistance film, and a radio wave absorber material IB material that utilizes the magnetic loss of ferrite.

Resistive film is a material that contains conductive fibers in a mixed organic / inorganic base material and is flame-retardant.

The composite type absorber is designed so that the radio wave absorber IB material efficiently absorbs radio waves in the low frequency region of about 30 to 500 MHz and the ITF material efficiently absorbs radio waves in the high frequency region of 500 MHz or more, making the best use of the characteristics of each loss material. It has excellent radio wave absorption performance from low frequency 30MHz.

\* Used in combination with ferrite radio wave absorber IB material.



#### ITF-090, ITF-130

It is a newly developed TDK compound radio wave absorber. It is a unit configuration type radio wave absorber that has excellent radio wave absorption characteristics over a wide band and has achieved compactness, weight reduction, and price reduction.

Widely used in 3m / 10m method anechoic chambers and large anechoic chambers for special purposes.

#### FEATURES

- Ultra-wideband electromagnetic absorber.
- Lightweight.
- Long service life.
- Fire retardant (UL94HBF)
- The exterior is white, creating a bright interior space.

#### STANDARD MATERIALS

Material name	Length (cm)	Standard weight* (kg)	Applicable anechoic chambers
ITF-045	45	1	Compact (3-meter test range), 3-meter test ranges
ITF-090	95	1.5	3-meter and 10-meter test ranges
ITF-130	130	2	10-meter test ranges
ITF-160	160	2.5	10-meter test ranges

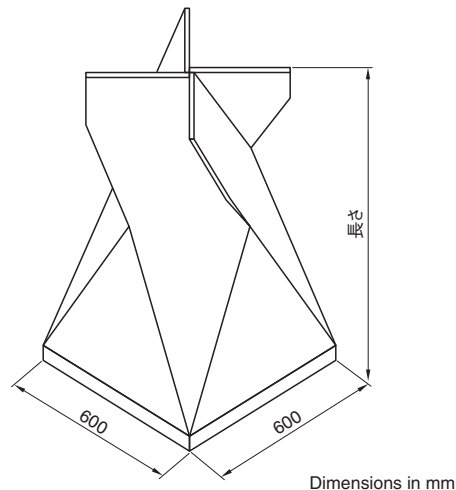
\* Not including the mass of ferrite

#### PRODUCT IDENTIFICATIONS

**I TF - 090**  
(1) (2) (3)

- (1) TDK electromagnetic absorbers
- (2) Base material code (TF: Styrofoam with resistance film)
- (3) Length dimensional code (090: 95cm)

#### SHAPES AND DIMENSIONS



#### TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)

Unit: dB

Material name	30MHz	50MHz	100MHz	500MHz	1GHz	5GHz	18GHz	40GHz
ITF-045	18	25	18	18	18	18	18	18
ITF-090	24	22	20	20	20	20	20	20
ITF-130	28	22	28	22	23	20	20	20
ITF-160	28	23	25	23	25	20	20	20

Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use. Please note that the contents may change without any prior notice due to reasons such as upgrading.



## FOR EMC ANECHOIC CHAMBERS

### ICM MATERIAL

A composite electromagnetic absorber utilizing the characteristics of the ICM electromagnetic absorber, which is a composite magnetic loss object made of an inorganic base and ferrite powder, and the IB electromagnetic absorber that utilizes the magnetic loss of ferrite. Our composite absorbers fully utilize the features of each loss material. In the 30 to 500MHz range the IB electromagnetic absorbers, and in the higher range of 500MHz and higher the ICM electromagnetic absorbers, are designed to provide efficient electromagnetic absorption and deliver excellent electromagnetic absorption performance for frequencies as low as 30MHz.

\* Used in combination with ferrite radio wave absorber IB material.



#### ICM-006A

A 6-cm long composite electromagnetic absorber for ECM anechoic chambers. The absorber is small but provides excellent electromagnetic absorption performance starting at low frequencies. This product is optimally suited for anechoic chambers with 3-meter test ranges and small chambers.

#### FEATURES

- Ultra-wideband electromagnetic absorber.
- It is composed of an inorganic material and a surface resin material and has a long life.

#### STANDARD MATERIALS

Material name	Length (cm)	Standard weight* (kg)	Applicable anechoic chambers
ICM-006A	6	0.6	Compact (3-meter test range), 3-meter and 10-meter test ranges (EMS floors available)

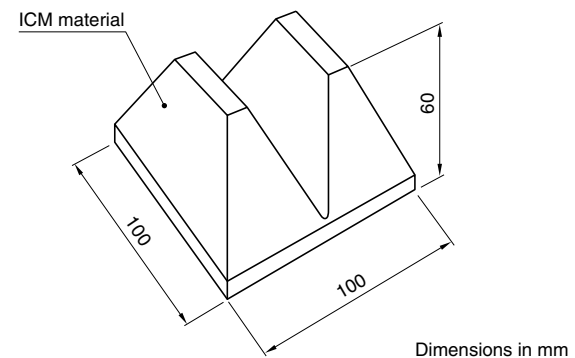
\* Not including the mass of ferrite

#### PRODUCT IDENTIFICATIONS

I	C	M	-	006	A
(1)	(2)	(3)	(4)	(5)	

- (1) TDK electromagnetic absorbers
- (2) Base material code (C: Inorganic material)
- (3) Ferrite material
- (4) Length dimensional code (006: 6cm)
- (5) Version code

#### SHAPES AND DIMENSIONS



#### Notes

- Perforated IB electromagnetic absorbers are used.
- Screws are sometimes used to install items to the ceiling and walls.

#### TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)

Unit: dB

Material name	30MHz	50MHz	100MHz	500MHz	1GHz	5GHz	10GHz	18GHz
ICM-006A	14	18	20	20	20	20	20	20

## FOR EMC ANECHOIC CHAMBERS

### IB MATERIAL

An electromagnetic absorber utilizing the magnetic resonance loss characteristic of ferrite. The sintered ferrite has been baked at a temperature of over 1000°C and possesses physical properties equivalent to those of external porcelain tiles.

#### IB-017

A sintered ferrite delivering excellent electromagnetic absorption performance particularly in the VHF band. This extremely thin electromagnetic absorber is 6 mm or less thick.

#### FEATURES

- This is a thin-type wide-band electromagnetic absorber.
- This is highly weather resistant.
- Can be used as building material.

#### PRODUCT IDENTIFICATIONS

I	B	- 017	100×100×5.2	WH
(1)	(2)	(3)	(4)	(5)

- (1) TDK electromagnetic absorbers  
 (2) Base material code (B: Sintered ferrite)  
 (3) Material code  
 (4) Dimension  
 (5) With hole

#### PHYSICAL PERFORMANCES

Bending strength (Pa)	$1.4 \times 10^8$
Tensile strength (Pa)	$3.1 \times 10^9$
Compression hardness (Pa)	$7.8 \times 10^{10}$
Thermal expansion coefficient ( $K^{-1}$ )	$1.1 \times 10^{-5}$
Thermal conductivity ( $W/(m \cdot K)$ )	4
Specific heat ( $J/(kg \cdot K)$ )	640

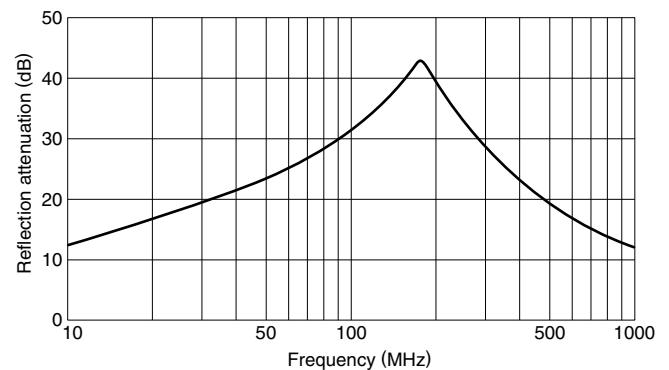
#### STANDARD MATERIALS

Material name	Standard dimensions (mm)	Standard weight (g)	Applications
IB-017	100×100×5.2WH	100×100×5.5 270	EMC anechoic chambers, VOR and others



#### REFLECTION ATTENUATION vs. FREQUENCY CHARACTERISTICS (Measured using coaxial tube)

##### IB-017



## FOR EMC ANECHOIC CHAMBERS

### IS-V MATERIAL

It is a composite type radio wave absorber that uses foamed polyethylene as a base material and combines the radio wave absorber IS-V material that utilizes the ohm loss of carbon and the radio wave absorber material IB material that utilizes the magnetic loss of ferrite. The composite type absorber makes the best use of the characteristics of each loss material so that the radio wave absorber IB material efficiently absorbs radio waves in the low frequency region of about 30 to 500MHz and the IS-V material efficiently absorbs radio waves in the high frequency region of 500 MHz or more. It is designed and has excellent radio wave absorption performance from a low frequency of 30MHz.

\* Used in combination with ferrite radio wave absorber IB material.

#### IS-V010

It is a composite type electromagnetic wave absorber for ECM anechoic chambers of 10cm length. It is compact and lightweight, and is ideal for small anechoic chambers such as in-vehicle component testing applications.

#### IS-V023A2

It is a composite radio wave absorber with a length of 23 cm. It can be used both as a floor radio wave absorber for EMS tests from 80 MHz

#### FEATURES

- Ultra-wideband electromagnetic absorber.
- Small and lightweight.
- Stable against chemicals and offers long service life.
- Uses materials that, when burned, emit gases that are relatively harmless to humans.
- Fire retardant (UL94 HBF equivalent)

and as a CISPR standard floor radio wave absorber at 1 GHz and above.



#### PRODUCT IDENTIFICATIONS

I	S-V	023	A2
(1)	(2)	(3)	(4)

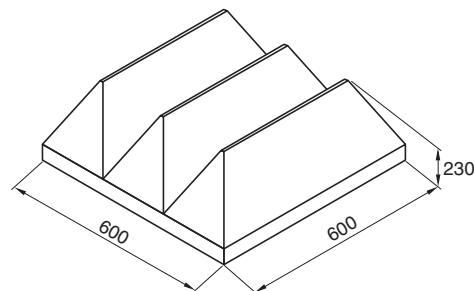
(1) TDK electromagnetic absorbers

(2) Base material code (S-V: Polyethylene foam (For IB material combination))

(3) Length dimensional code (023: 23cm)

(4) Version code

#### SHAPES AND DIMENSIONS



Dimensions in mm

#### STANDARD MATERIALS

Material name	Length (cm)	Standard weight* (kg)	Shape and number of columns	Applicable anechoic chambers
IS-V010	10	1.3	Wedge 5row	Compact
IS-V023	23	2.3	Wedge 3row	Compact
IS-V023A2	23	1.8	Pyramids 8row×8row	Compact (3-meter test range), 3-meter test range, 10-meter method floor

\* Not including the mass of ferrite

#### TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)

Unit: dB

Material name	30MHz	50MHz	100MHz	500MHz	1GHz	5GHz	18GHz	40GHz
IS-V010	15	20	20	12	13	13	20	20
IS-V023	15	22	18	13	15	20	25	25
IS-V023A2	15	22	20	12	15	15	20	20



## FOR EMS FLOORS

### IS-S MATERIAL

An electromagnetic absorber consisting of a polyethylene foam base and utilizing the ohmic loss of carbon. Specifically designed for oblique incidence, the IS-S electromagnetic absorber provides excellent oblique incidence characteristics and can be used as electromagnetic absorbent flooring material for EMS tests from frequencies as low as 80MHz. It can also be used in microwave anechoic chambers.



#### IS-080S

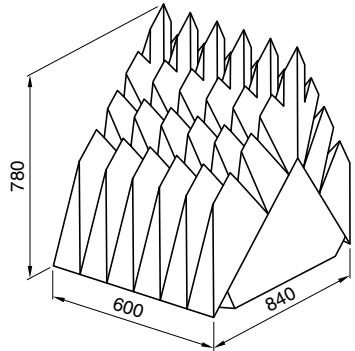
A specially designed wedged-shaped absorber with a length of 80cm. It can be used as electromagnetic absorbent flooring material for EMS tests from frequencies as low as 80MHz. It delivers excellent oblique incidence performance starting at low frequencies.

#### PRODUCT IDENTIFICATIONS

I S - 080 S  
(1) (2) (3) (4)

- (1) TDK electromagnetic absorbers
- (2) Base material code (S: Polyethylene foam)
- (3) Length dimensional code (080: 78cm)
- (4) For diagonal incidence

#### SHAPES AND DIMENSIONS




Dimensions in mm

#### TYPICAL ABSORPTION CHARACTERISTICS (45° INCIDENCE ANGLE)

Unit: dB

Material name		80MHz	100MHz	300MHz	500MHz	800MHz	1GHz	2GHz	3GHz
IS-080S	TE	15	15	25	27	35	35	37	55
	TM	15	15	25	27	30	35	40	55

- Representative power withstand performance: 50mW/cm<sup>2</sup> (200v/m Can be applied to EMS tests )

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## FOR MICROWAVE ANECHOIC CHAMBERS

## IS MATERIAL

An electromagnetic absorber consisting of a polyethylene foam base and utilizing the ohmic loss of carbon. Not only is the IS electromagnetic absorber capable of absorbing microwaves, it also delivers excellent electromagnetic absorption performance through millimeter and submillimeter waves (through 1THz).

**IS-030A2**

A 30-cm long pyramidal electromagnetic absorber. It delivers excellent electromagnetic absorption performance over a wide band between 0.8 and 110GHz.

It is optimally suited for applications in a wide range of wireless access applications and microwave anechoic chambers for conducting cellular phone related tests.

**FEATURES**

- Ultra-wideband electromagnetic absorber.
- Excellent electromagnetic absorption performance in the millimeter wave band.
- The tip is designed to reduce creep and deliver stable performance.
- Stable against chemicals and offers long service life.
- Uses materials that, when burned, emit gases that are relatively harmless to humans.
- Fire retardant (NRL Classes 1, 2 and 3; UL-94HBF).
- Walking material are also available.
- Available white end caps can be used to improve the indoor illumination.

**PRODUCT IDENTIFICATIONS**

**I S - 030 A**  
(1) (2) (3) (4)

- (1) TDK electromagnetic absorbers  
(2) Base material code (S: Polyethylene foam)  
(3) Length dimensional code (030: 30cm)  
(4) Version code

**TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)**

Unit: dB

Material name	0.1GHz	0.3GHz	0.5GHz	0.8GHz	1GHz	3GHz	5GHz	10GHz	30GHz	50GHz	110GHz
IS-005A	—	—	—	—	—	15	20	30	50	50	50
IS-012A	—	—	—	20	20	30	40	55	55	55	50
IS-015A	—	—	—	20	20	35	40	55	55	55	50
IS-023A	—	—	—	23	30	45	50	55	55	55	50
IS-030A2	—	—	—	30	35	45	50	55	55	55	50
IS-045A	—	—	30	35	40	45	50	55	55	55	50
IS-060	—	—	32	37	42	50	55	55	55	55	50
IS-075	—	25	35	40	45	55	55	55	55	55	50
IS-100	—	30	40	45	50	55	55	55	55	55	50
IS-150	30	35	40	40	45	55	55	55	55	55	50

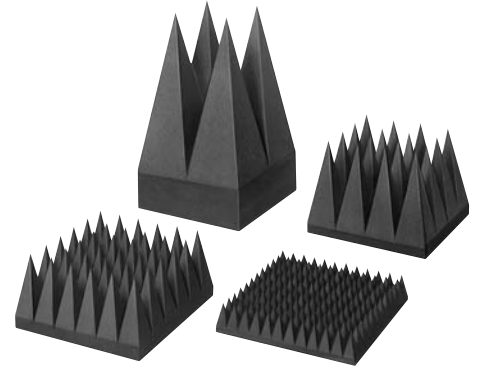
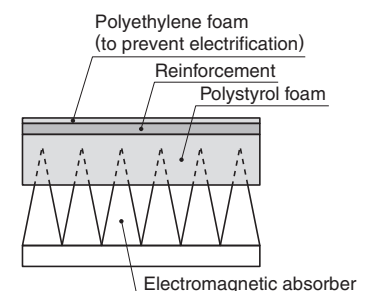
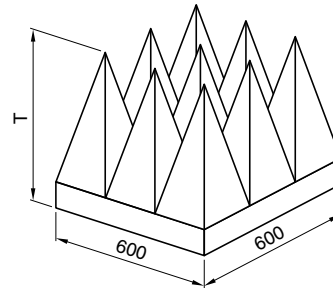
• Representative power withstand performance: 50mW/cm<sup>2</sup>

Material name	Length (mm)	Standard weight (kg)	Number of pyramids
IS-005A	50	0.7	24row×24row=576
IS-012A	120	1.6	15row×15row=225
IS-015A	150	2.2	15row×15row=225
IS-023A	230	3.0	8row×8row=64
IS-030A2	300	3.3	6row×6row=36
IS-045A	450	4.8	4row×4row=16
IS-060	600	6.0	3row×3row=9
IS-075	750	7.0	2row×2row=4
IS-100	1000	10.5	2row×2row=4
IS-150	1500	9.0	1row×1row=1

**ABSORBERS FOR WALKING MATERIAL****PRODUCT IDENTIFICATIONS**

**I S - ○○○ FL**  
(1) (2) (3) (4)

- (1) TDK electromagnetic absorbers  
(2) Base material code (S: Polyethylene foam)  
(3) Length dimensional code  
(4) Type (FL: walking material)

**SHAPES AND DIMENSIONS****SHAPES AND DIMENSIONS**

Dimensions in mm

## DESIGNED SPECIFICALLY FOR OBLIQUE INCIDENCE

## IS-SM MATERIAL

An electromagnetic absorber consisting of a polyethylene foam base and utilizing the ohmic loss of carbon. Not only is the IS-SM absorber, which is designed specifically for oblique incidence, capable of absorbing microwaves, it also delivers excellent electromagnetic absorption performance through millimeter waves.

**IS-SM050**

A special pyramidal electromagnetic absorber with a length of 50cm. It provides excellent oblique incidence characteristics for a wide band between 0.8 and 110GHz. It is optimally suited for applications in a wide range of wireless access operations and as side-wall panels in microwave anechoic chambers for conducting cellular phone related tests.

Our line up includes IS-SM080 and IS-SM100 that deliver excellent electromagnetic absorption performance starting at low frequency ranges.

**FEATURES**

- Ultra-wideband electromagnetic absorber.
- Excellent electromagnetic absorption performance for oblique incidences.
- The product can be made thinner than pyramidal absorbers.
- The tip is designed to reduce creep and deliver stable performance.
- Stable against chemicals and offers long service life.
- Uses materials that, when burned, emit gases that are relatively harmless to humans.
- Fire retardant (NRL Classes 1, 2 and 3; UL-94HBF).

**PRODUCT IDENTIFICATIONS**

**I S - SM 050**  
(1) (2) (3) (4)

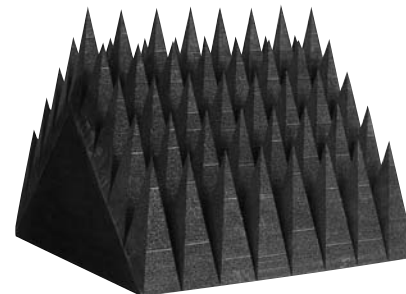
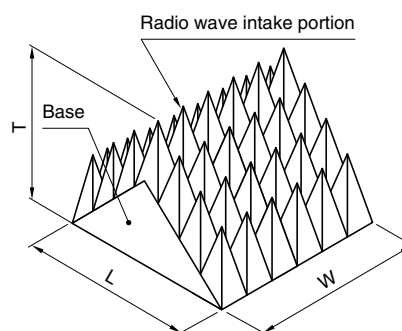
- (1) TDK electromagnetic absorbers  
 (2) Base material code (S: Polyethylene foam)  
 (3) Designed specifically for oblique incidence.  
 Supports millimeter waves.  
 (4) Length dimensional code (050: 50cm)

**TYPICAL ABSORPTION CHARACTERISTICS (50° INCIDENCE ANGLE)**

Unit: dB

Material name		0.3GHz	0.5GHz	0.8GHz	1GHz	3GHz	5GHz	10GHz	30GHz	50GHz	110GHz
IS-SM050	TE	—	—	35	40	45	50	55	55	55	50
	TM	—	—	30	35	45	50	55	55	55	50
IS-SM080	TE	—	30	40	40	55	55	55	55	55	50
	TM	—	30	40	45	55	55	55	55	55	50
IS-SM100	TE	30	35	40	45	55	55	55	55	55	50
	TM	20	30	40	45	55	55	55	55	55	50

• Representative power withstand performance: 50mW/cm<sup>2</sup>

**STANDARD DIMENSIONS**

Material name	Standard dimensions(mm) [L×W×T]	Standard weight (g)
IS-SM050	600×600×500	4.8
IS-SM080	840×600×800	10.0
IS-SM100	840×600×1000	12.5

## FOR FM BAND AND MICROWAVE ANECHOIC CHAMBERS

### IP-BX MATERIAL

A composite electromagnetic absorber made by combining the IP-BX electromagnetic absorber, which consists of a styrofoam base and utilizes the ohmic loss of carbon, and an electromagnetic absorber that uses the magnetic loss of ferrite. Each of the loss material are matched for impedance to deliver excellent electromagnetic absorption performance from as low as the 70MHz FM band.

\* Used in combination with a ferrite radio wave absorber.

#### IP-100BX, IP-130BX

TDK composite electromagnetic absorbers praised highly in tests for automobile antennas. IP-100BX delivers excellent electromagnetic absorption performance for vertical incidences starting at the FM band to the microwave range.

IP-130BX delivers excellent electromagnetic absorption performance for oblique incidences starting at the FM band to the microwave range.

These products are used widely in anechoic chambers for testing automobile antennas and large special purpose anechoic chambers.



#### FEATURES

- Ultra-wideband electromagnetic absorber.
- Stable against acids, bases and water vapor, and offers long service life.
- Uses materials that, when burned, emit gases that are relatively harmless to humans.
- Fire retardant (NRL Classes 1, 2 and 3; UL-94HBF).

#### PRODUCT IDENTIFICATIONS

**I P - 130 B X**  
(1) (2) (3) (4) (5)

- (1) TDK electromagnetic absorbers
- (2) Base material code (P: Styrofoam)
- (3) Length dimensional code (130: 130cm)
- (4) Version code
- (5) Ferrite material

#### STANDARD MATERIALS

Material name	Length (cm)	Standard weight* (kg)	Shapes
IP-045BX	45	3	Wedge form
IP-100BX	100	6	Wedge form
IP-130BX	130	6.5	Pyramid form

\* Not including the mass of ferrite

#### TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)

Unit: dB

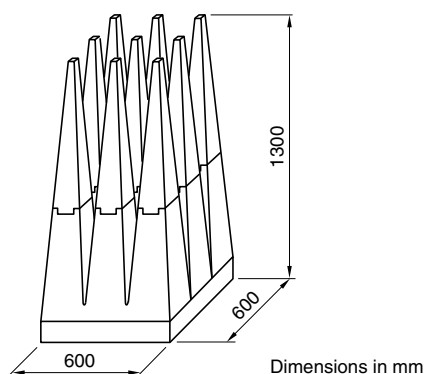
Material name	70MHz	80MHz	100MHz	500MHz	1GHz	5GHz	18GHz	40GHz
IP-045BX	23	25	23	20	22	25	40	40
IP-100BX	25	30	30	30	30	40	40	40

#### TYPICAL ABSORPTION CHARACTERISTICS (60° INCIDENCE ANGLE)

Unit: dB

Material name		70MHz	80MHz	100MHz	500MHz	1GHz	5GHz	18GHz	40GHz
IP-130BX	TE	10	10	12	35	45	50	50	50
	TM	20	20	20	35	45	50	50	50

#### SHAPES AND DIMENSIONS



## FOR EMC/MICROWAVE ANECHOIC CHAMBERS

### IP MATERIAL

A composite electromagnetic absorber made by combining the IP electromagnetic absorber, which consists of a styrofoam base and utilizes the ohmic loss of carbon, and an electromagnetic absorber that uses the magnetic loss of ferrite.

These composite absorbers fully utilize the features of each loss material. In ranges of 500MHz or lower the IB electromagnetic absorbers, and in the higher range of 500MHz and higher the IP electromagnetic absorbers, are designed to provide efficient electromagnetic absorption.

\* Used in combination with a ferrite radio wave absorber.

#### IP-045E

TDK composite electromagnetic absorbers praised highly for their application in EMC/microwave tests.

IP-045E delivers excellent electromagnetic absorption performance for vertical incidences starting at 30MHz to the microwave range.

Additionally, our line up includes IP-100C and IP-150C that deliver excellent electromagnetic absorption performance starting at low frequency ranges. These are optimally suited for six-sided anechoic chambers (for EN and ETSI compliance).



#### FEATURES

- Ultra-wideband electromagnetic absorber.
- Stable against acids, bases and water vapor, and offers long service life.
- Uses materials that, when burned, emit gases that are relatively harmless to humans.
- Fire retardant (NRL Classes 1, 2 and 3; UL-94HBF).

#### PRODUCT IDENTIFICATIONS

**I P - 100 C**  
(1) (2) (3) (4)

- (1) TDK electromagnetic absorbers
- (2) Base material code (P: Styrofoam)
- (3) Length dimensional code (100: 100cm)
- (4) Version code

#### STANDARD MATERIALS

Material name	Length (cm)	Standard weight* (kg)	Applicable anechoic chambers
IP-045E	45	3	EMC and antenna evaluation etc.
IP-100C	100	6	EN and ETSI compliant
IP-150C	150	8.5	EN and ETSI compliant

\* Not including the mass of ferrite

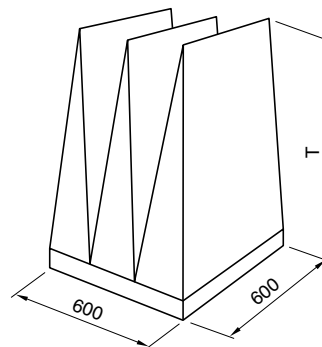
#### TYPICAL ABSORPTION CHARACTERISTICS (VERTICAL INCIDENCE)

Unit: dB

Material name	30MHz	50MHz	100MHz	500MHz	1GHz	5GHz	18GHz	40GHz
IP-045E	14	14	14	20	30	40	40	40
IP-100C	17	17	18	25	30	40	40	40
IP-150C	20	23	30	30	32	40	40	40

- 200v/m Can be applied to EMS tests

#### SHAPES AND DIMENSIONS



Dimensions in mm

## THIN TYPE

### IR MATERIAL (IR-A AND IR-B ABSORBERS)

A composite ferrite electromagnetic absorber made by mixing ferrite powder into synthetic rubber. This product is flexible because it uses synthetic rubber as its base. By adjusting the ferrite composition and the amount of addition, it is designed to absorb radio waves in the microwave region of 0.7 to 8GHz.

#### IR-B024

An electromagnetic absorber designed for the 2.4GHz band. It delivers excellent electromagnetic absorption performance and is optimally suited for improving communication environments including wireless LANs.

#### IR-A051

An electromagnetic absorber designed for the 5.1GHz band. It delivers excellent electromagnetic absorption performance and is optimally suited for improving communication environments including wireless LANs.



#### FEATURES

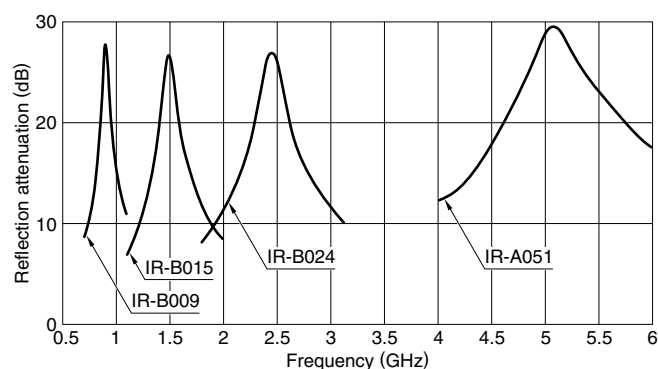
- Excellent electromagnetic absorption performance.
- Flexible and easy to work with.

#### PRODUCT IDENTIFICATIONS

**I R - B 024 300×300 × T**  
 (1) (2) (3) (4) (5) (6)

- (1) TDK electromagnetic absorbers
- (2) Base material code (R: Synthetic rubber)
- (3) Ferrite material
- (4) Center frequency code (024: 2.4GHz)
- (5) Dimensions (mm)
- (6) Thickness dimension (mm)

#### REFLECTION ATTENUATION vs. FREQUENCY CHARACTERISTICS



#### STANDARD MATERIALS AND TYPICAL ABSORBENT CHARACTERISTICS

Material name	Center frequency (GHz)	20dB bandwidth (GHz)	Standard thickness T (mm)	300×300mm standard weight (kg)	Application
IR-B009	0.9	0.08	8.4	2.4	Cellular phone
IR-B015	1.5	0.15	6.3	1.6	Prevents false radar images
IR-B024	2.4	0.35	5.7	1.3	Wireless LAN
IR-A051	5.1	1.10	5.1	1.2	Wireless LAN



### THIN TYPE

#### IR MATERIAL (IR-E ABSORBER)

A composite magnetic radio wave absorber made by mixing carbonyl iron powder into synthetic rubber. This product is flexible because it uses synthetic rubber as its base.

By adjusting the amount of carbonyl iron powder added, it is designed to absorb radio waves in the microwave region of 10 to 26GHz.

#### IR-E240

An electromagnetic absorber designed for the 24GHz band. It delivers excellent electromagnetic absorption performance and is optimally suited for improving communication environments including wireless access.



#### FEATURES

- Excellent electromagnetic absorption performance.
- Flexible and easy to work with.

#### PRODUCT IDENTIFICATIONS

I R - E 240 300×300 × T  
 (1) (2) (3) (4) (5) (6)

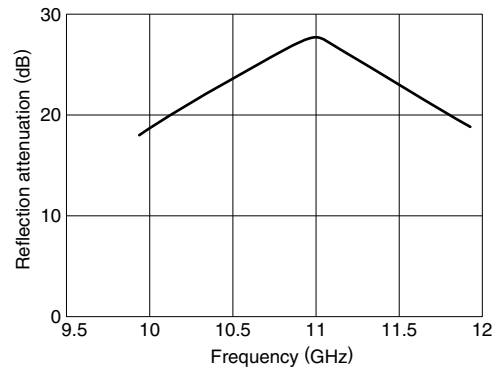
- (1) TDK electromagnetic absorbers
- (2) Base material code (R: Synthetic rubber)
- (3) Carbonyl iron
- (4) Center frequency code (240: 24GHz)
- (5) Dimensions (mm)
- (6) Thickness dimension (mm)

#### STANDARD MATERIALS AND TYPICAL ABSORBENT CHARACTERISTICS

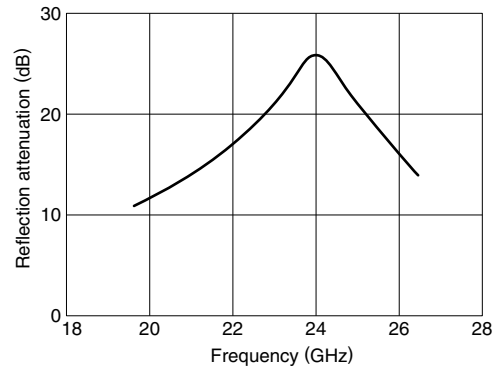
Material name	Center frequency (GHz)	20dB bandwidth (GHz)	Standard thickness T (mm)	300×300mm standard weight (g)
IR-E110	11	1.5	1.4	430
IR-E140	14	1.5	1.3	370
IR-E240	24	2.0	1.0	250


#### REFLECTION ATTENUATION vs. FREQUENCY CHARACTERISTICS

##### IR-E110



##### IR-E240



 Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use. Please note that the contents may change without any prior notice due to reasons such as upgrading.

## THIN TYPE

### ISF MATERIAL

A flat plate electromagnetic absorber consisting of a polyethylene foam base and utilizing the ohmic loss of carbon.

This absorber delivers excellent electromagnetic absorption performance due to its structure, which consists of laminations of materials with different carbon contents. It is lightweight due to its polyethylene foam base. It is highly weather resistant making it a good choice for outdoor applications.

#### IS-FB75

An electromagnetic absorber designed for the 0.8 to 1.8GHz band for cellular phones. It delivers excellent electromagnetic absorption performance for vertical incidences.

#### ISFE27F5

An electromagnetic absorber designed for the 5.8GHz band. It delivers excellent electromagnetic absorption performance even at steep oblique incidences and is optimally suited for improving ETC and DSRC communication environments. This product is used widely on the ceilings of ETC toll gates and other facilities.

#### FEATURES

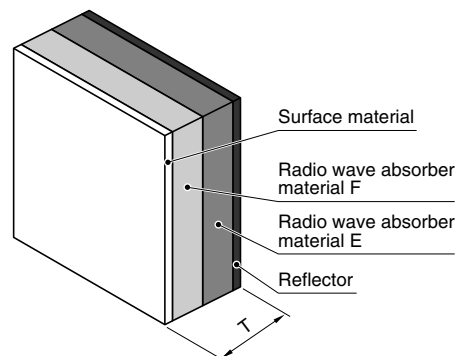
- Excellent electromagnetic absorption performance in the micro-wave range.
- Lightweight and easy to work with.
- Fire retardant (NRL Classes 1, 2 and 3; UL-94HBF).
- Provides excellent weather resistance and can be used outdoors. Please consult us for outdoor applications.

#### STANDARD MATERIALS AND TYPICAL ABSORBENT CHARACTERISTICS

Material name	Center frequency (GHz)	Typical absorbent characteristics (dB)	Standard thickness T (mm)	Standard weight (kg/m <sup>2</sup> )	Applications
IS-FB75	0.8 to 1.9	15	80	6.0	Cellular phone
ISFA24	2.4	15	24	1.7	Wireless LAN
ISFE27F5	5.8	20	32	2.2	ETC, DSRC
ISFA10	76 to 77	15	10	0.8	Millimeter wave radar

- ETC/DSRC electromagnetic absorbent panels using ISFE27F5 were co-developed by Sekisui Jushi Corporation. Please note that these products are not sold alone.
- TDK reserves the right to determine the product name.

#### COMPOSITION EXAMPLE OF RADIO WAVE ABSORBERS



#### PRODUCT IDENTIFICATIONS

I	S	F	E27	F5
(1)	(2)	(3)	(4)	(5)

- (1) TDK electromagnetic absorbers
- (2) Base material code (S: Polyethylene foam)
- (3) Flat plate
- (4) Material and thickness (E27: E material 27mm)
- (5) Material and thickness (F5: F material 5mm)