

# Functional Flooring Series products come with a range high-level flooring features

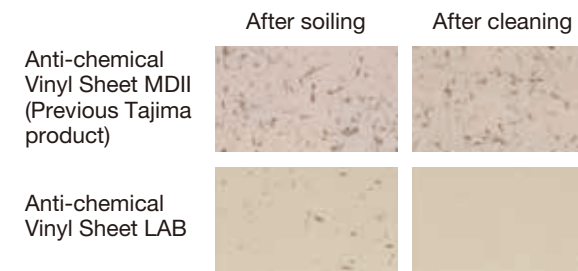
For instance in  
labs and hospitals

## Anti-chemical Vinyl Sheet LAB PLUS / LAB **NEW**

No wax maintenance, chemical resistance and static resistance, together in a single flooring. Addresses one of the major issues of antichemical sheeting, which is usually prone to staining. Revolutionary, multifunctional sheet flooring.

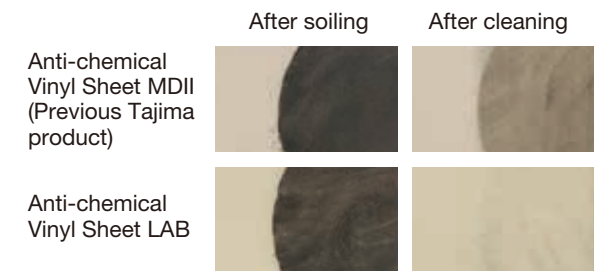
### No wax flooring with strong stain resistance

#### ■ Scuff mark testing



Drum-based scuff mark testing (JIS K 3920 scuff mark resistance)  
The inside of a hexagonal drum was lined with the samples to be tested and the drum was rotated with pieces of black rubber to apply scuff marks to the samples.

#### ■ Stain resistance testing



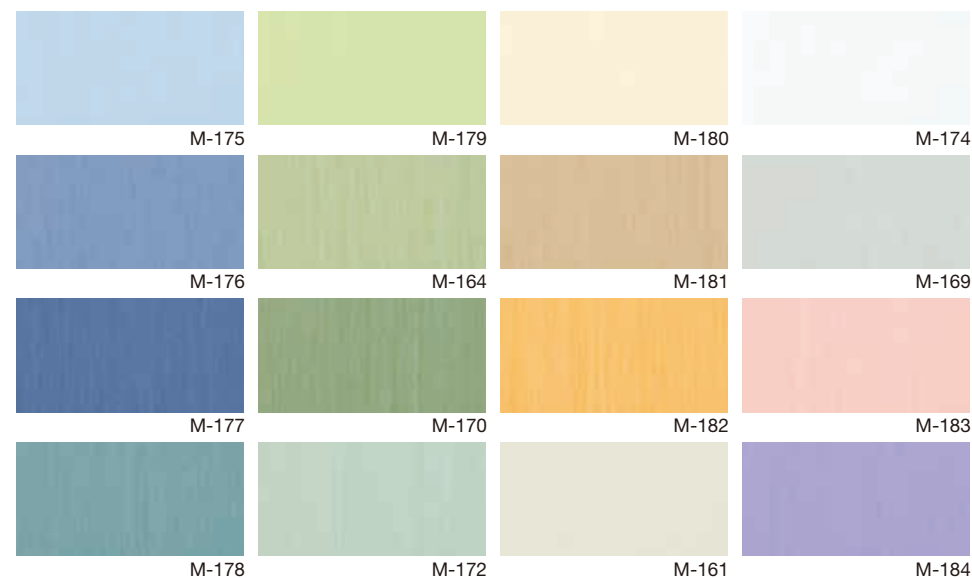
Overview of stain resistance testing (original in-house testing)  
A standardized soiling substance was applied to the surface of the flooring and wiped with a damp cloth after drying. The level of stain removal was observed.  
\* Standard soiling substance defined by the Japan Testing Center for Construction Materials (JSTM J 7602:2003).

For instance in  
operating rooms

## M FLOOR

M Floor (for transporting heavy loads) is available with a range of additional features and in ample color variations to match the most recent floors plans in advanced operating rooms.

Available in 16 colors to match your needs



#### Color patterns to ensure visibility of needles



M FLOOR



Standard color pattern vinyl sheet flooring

Available in colors patterns that allow needles to be easily spotted if dropped, for use in operating rooms.

### Flooring is also antistatic

#### ■ Electrical resistance

	Surface Resistance	Volume Resistance
Anti-chemical Vinyl Sheet LAB PLUS / LAB	$1.3 \times 10^9 \Omega$	$3.1 \times 10^8 \Omega$
In-House Standard Value	$5.0 \times 10^9 \Omega$ or less	$2.5 \times 10^9 \Omega$ or less

### Excellent chemical resistance

#### ■ Staining after applying iodine



Anti-chemical Vinyl Sheet LAB

Ordinary vinyl sheet flooring LAB

For more information on testing (JIS A 1454 standards) see page 13.

For instance in  
production facilities

## Conductive DS FLOOR M FLOOR

Flooring with good conductivity performance, electric charge prevention, durability to resist dynamic force from castor wheels, etc.

# Dynamic Load Resistant Out-gas Suppressing



Ordinary vinyl floors are prone to damage, swelling and peeling in areas subject to high dynamic loads. Such areas require flooring with excellent dynamic load resistance. Floors with high dynamic load resistance are excellent for areas such as advanced medical operating rooms where heavy medical equipment is wheeled about or production facilities where heavy loads are frequently carried back and forth on castor wheels. Additionally, floors with minimal outgassing are necessary in precision machinery cleanrooms to prevent issues with semiconductors.

Dynamic Load Resistance, Antistatic Vinyl Sheet Flooring

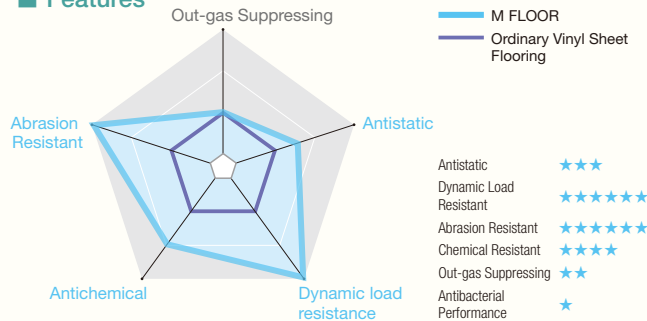
## M FLOOR



### ■ Specs

Material	Dynamic Load Resistance, Antistatic Homogeneous Vinyl Sheet Flooring TS
Classification	Vinyl Sheet Flooring TS
Dimensions	2.0mm (thickness)×1,820mm (width) ×9m (length)
Number of Colors	16

### ■ Features



- Vinyl flooring specially designed to resist dynamic force from castor wheels, etc.
- Unique, homogeneous material with excellent abrasion resistance
- Prevents dust adhesion from static electricity and quickly disperses electric charge

### ■ Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance 1.0×10<sup>9</sup>Ω or less  
Volume Resistance 5.0×10<sup>8</sup>Ω or less

### ■ Major applications

- 1 Hospital operating rooms
- 2 Semiconductor plants, computer assembly plants, electronic equipment production facilities
- 3 Production facilities such as pharmaceutical plants, foodstuff plants, cosmetic plants, etc.
- 4 Laboratories in various product facilities
- 5 Areas with bleachers, etc. in gymnasiums, citizen centers, event halls, etc.

Dynamic Load Resistance, Antistatic, Antibacterial Vinyl Sheet Flooring

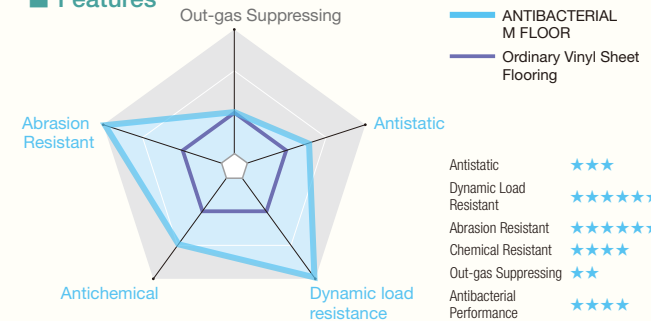
## ANTIBACTERIAL M FLOOR



### ■ Specs

Material	Dynamic Load Resistance, Antistatic, Antibacterial Homogeneous Vinyl Sheet Flooring TS
Classification	Homogeneous Vinyl Sheet Flooring TS
Dimensions	2.0mm (thickness) ×1,820mm (width) ×9m (length)
Number of Colors	16 (Build-to-Order Product)

### ■ Features



- (In addition to M Floor features)
- Antibacterial formulation for sustained antibacterial effect

### ■ Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance 1.0×10<sup>9</sup>Ω or less  
Volume Resistance 5.0×10<sup>8</sup>Ω or less

### ■ Major applications

- 1 Hospital operating rooms
- 2 Semiconductor plants, computer assembly plants, electronic equipment production facilities
- 3 Production facilities such as pharmaceutical plants, foodstuff plants, cosmetic plants, etc.
- 4 Laboratories in various product facilities
- 5 Areas with bleachers, etc. in gymnasiums, citizen centers, event halls, etc.

Out-gas Suppressing, Dynamic Load Resistance, Antistatic Vinyl Sheet Flooring

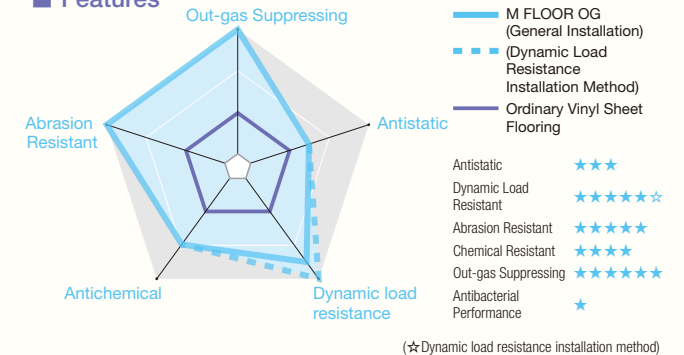
## M FLOOR OG



### ■ Specs

Material	Out-gas Suppressing, Dynamic Load Resistance, Antistatic Homogeneous Vinyl Sheet Flooring TS
Classification	Antistatic Homogeneous Vinyl Sheet Flooring TS
Dimensions	2.0mm (thickness) ×1,820mm (width) ×9m (length)
Number of Colors	4 (Build-to-Order Product)

### ■ Features



- (In addition to M Floor features)
- Greatly reduces outgassing from floor surface and chemical contamination, appropriate for areas such as cleanrooms where cleanliness is extremely important

### ■ Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance 1.0×10<sup>9</sup>Ω or less  
Volume Resistance 5.0×10<sup>8</sup>Ω or less

### ■ Major applications

- 1 Semiconductor plants, computer assembly plants, LCD panel plants, electronic equipment production facilities
- 2 Production facilities such as pharmaceutical plants, foodstuff plants, cosmetic plants, etc.
- 3 Laboratories in various product facilities
- 4 Hospital operating rooms

# Conductivity Antistatic



In modern, computerized offices, static electricity can cause issues such as equipment failure or high reject rates. Static electricity can also lead to explosions, fires or contamination in areas such as production or testing facilities. Antistatic flooring is one method of combating these issues. Using flooring that inhibits static buildup caused by walking and that quickly and gently disperses built up charge can help improve performance in such locations.

Conductive Vinyl Sheet Flooring

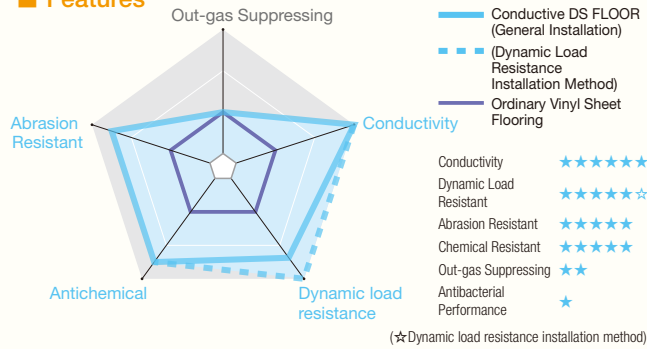
## Conductive DS FLOOR



### ■ Specs

Material	Conductive, Dynamic load resistant Heterogeneous Vinyl Sheet Flooring FS
Classification	JIS certified
Dimensions	2.0mm (thickness)×1,820mm (width)×9m (length)
Number of Colors	4

### ■ Features



- Conductivity that is not strongly affected by humidity, limiting electric charge and preventing dust adhesion
- Can meet NFPA recommended conductive flooring standards
- Special conductive welding rods ensure electrical uniformity of floor, allowing use of identical adhesive over entire surface
- Resists dynamic load from castor wheels, etc.
- More resistant to acids, alkalis and organic solvents than ordinary vinyl flooring

### ■ Electrical resistance

NFPA 99 compliant  
Surface Resistance  $2.5 \times 10^4 \Omega$  or more,  $1.0 \times 10^6 \Omega$  or less\*  
Ground Resistance  $2.5 \times 10^4 \Omega$  or more

### ■ Major applications

- 1 VLSI production facilities, etc.
- 2 Areas for assembly of printed circuit boards using semiconductor devices
- 3 Areas for machining, assembly and inspection of electronic device parts
- 4 Rocket/satellite controller unit production facilities, etc.
- 5 Transmission/data centers
- 6 Hospital operating rooms, MRI rooms, etc.

\*Specified value is maximum value of  $5.0 \times 10^6 \Omega$  or more/minimum value of  $1.0 \times 10^4 \Omega$  or more, as well as average value of  $2.5 \times 10^4 \Omega$  or more -  $1.0 \times 10^6 \Omega$  or less.

Conductive Vinyl Sheet Flooring

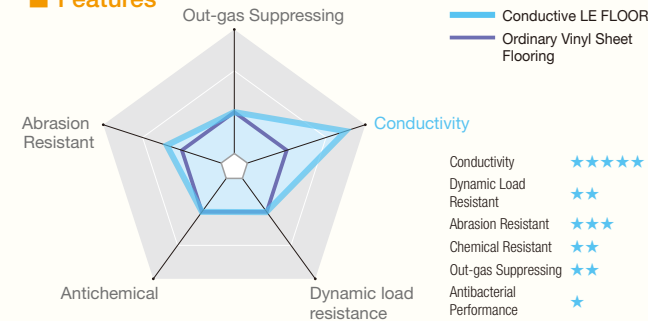
## Conductive LE FLOOR



### ■ Specs

Material	Conductive Heterogeneous Vinyl Sheet Flooring FS
Classification	JIS certified
Dimensions	2.0mm (thickness)×1,820mm (width)×9m (length)
Number of Colors	4

### ■ Features



- Conductivity that is not strongly affected by humidity, limiting electric charge and preventing dust adhesion  
\*For extremely dry environments, Conductive DS Floor is recommended.
- Special conductive welding rods ensure electrical uniformity of floor, allowing use of identical adhesive over entire surface

### ■ Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance  $1.0 \times 10^7 \Omega$  or less  
Volume Resistance  $1.0 \times 10^7 \Omega$  or less

### ■ Major applications

- 1 Production facilities, labs and cleanrooms in electronic plants, precision machinery plants, etc.
- 2 Semiconductor plants, general computer rooms
- 3 Telecom facilities, bank computer centers, etc.

Antistatic Vinyl Sheet Flooring

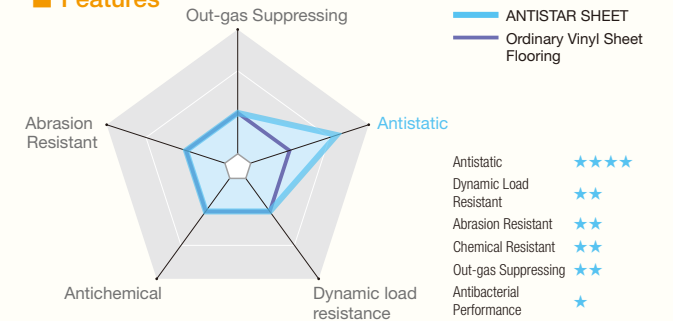
## ANTISTAR SHEET



### ■ Specs

Material	Antistatic Heterogeneous Vinyl Sheet Flooring FS
Classification	JIS certified
Dimensions	2.0mm (thickness)×1,820mm (width) ×9m (length)
Number of Colors	4

### ■ Features



- Low cost and prevents dust adhesion from static electricity/quickly disperses electric charge

### ■ Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance  $5.0 \times 10^8 \Omega$  or less  
Volume Resistance  $1.0 \times 10^8 \Omega$  or less

### ■ Major applications

- 1 Production facilities, labs and cleanrooms in electronic plants, precision machinery plants, etc.
- 2 Semiconductor plants, general computer rooms
- 3 Telecom facilities, bank computer centers, etc.
- 4 Hospital MRI rooms, etc.

# Chemical Resistant, Antistatic No Wax



Substances such as acids, alkalis and organic solvents can seep into standard vinyl floors, causing damage and discoloration. Using chemically resistant flooring in locations where this could occur, such as production facilities, research labs, hospital and school science rooms, can improve safety and keep floors looking beautiful for longer.

Chemical Resistant, Antistatic, Antibacterial Vinyl Sheet Flooring

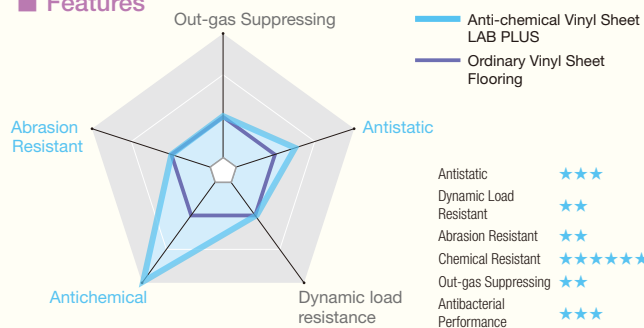
## Anti-chemical Vinyl Sheet LAB PLUS



### Specs

Material	Antichemical, Antistatic, Antibacterial Heterogeneous
Classification	Vinyl Sheet Flooring FS JIS certified
Dimensions	2.0mm (thickness)×1,820mm (width)×9m (length)
Number of Colors	14

### Features



- More resistant to acids and organic solvents than ordinary vinyl flooring
- Prevents dust adhesion from static electricity and quickly disperses electric charge
- Antibacterial formulation for sustained antibacterial effect
- Special coating that is stain resistant and easier to clean when staining does occur
- Ample color patterns for a more variety in floor design, improving environments for users

### Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance  $5.0 \times 10^9 \Omega$  or less  
Volume Resistance  $2.5 \times 10^9 \Omega$  or less

### Major applications

- 1 School science rooms, chemistry labs
- 2 Pharmaceutical/chemical labs and production facilities
- 3 Hospital pharmacies, drug storage rooms, prescription labs, test lab, clinical offices, etc.
- 4 Specialized plant cleanrooms
- 5 Semiconductor plants

Chemical Resistant, Antistatic, Antibacterial Vinyl Sheet Flooring

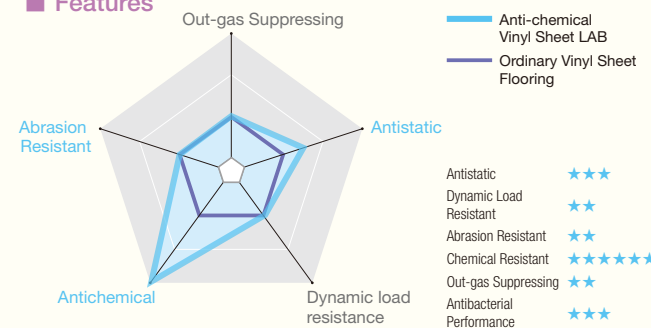
## Anti-chemical Vinyl Sheet LAB



### Specs

Material	Antichemical, Antistatic, Antibacterial Heterogeneous
Classification	Vinyl Sheet Flooring FS JIS certified
Dimensions	2.0mm (thickness)×1,820mm (width)×9m (length)
Number of Colors	6

### Features



- More resistant to acids and organic solvents than ordinary vinyl flooring
- Prevents dust adhesion from static electricity and quickly disperses electric charge
- Antibacterial formulation for sustained antibacterial effect
- Special coating that is stain resistant and easier to clean when staining does occur

### Electrical resistance

JIS K 6911 compliant (In-House Standard Value)  
Surface Resistance  $5.0 \times 10^9 \Omega$  or less  
Volume Resistance  $2.5 \times 10^9 \Omega$  or less

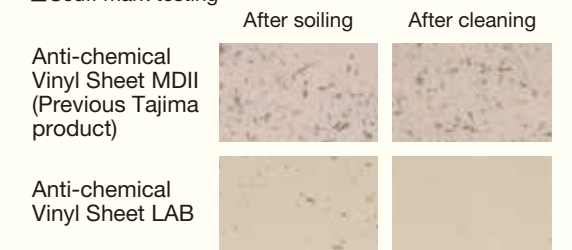
### Major applications

- 1 School science rooms, chemistry labs
- 2 Pharmaceutical/chemical labs and production facilities
- 3 Hospital pharmacies, drug storage rooms, prescription labs, test lab, clinical offices, etc.
- 4 Specialized plant cleanrooms
- 5 Semiconductor plants

## High chemical resistance plus a variety of additional features

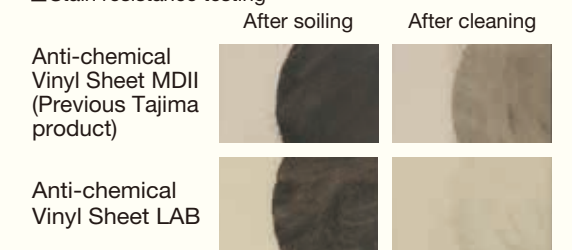
### ● No wax maintenance combined with powerful stain resistance

#### ■ Scuff mark testing



Overview of drum-based scuff mark testing (JIS K 3920 scuff mark resistance)

#### ■ Stain resistance testing



Stain resistance testing (original in-house testing)

### ● Contributes to static resistance

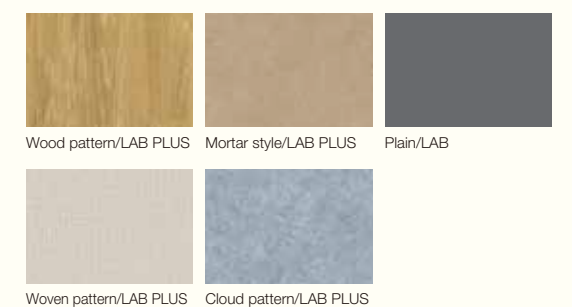
#### ■ Electrical resistance

	Surface Resistance	Volume Resistance
Anti-chemical Vinyl Sheet LAB PLUS / LAB	$1.3 \times 10^9 \Omega$	$3.1 \times 10^8 \Omega$
In-House Standard Value	$5.0 \times 10^9 \Omega$ or less	$2.5 \times 10^9 \Omega$ or less

### ● Antibacterial

Antibacterial, to meet the needs of a variety of facilities.

### ● A rich variety of color patterns to improve working environments



LAB PLUS comes in a variety of patterns, helping to create spaces that are more pleasant and where it is easier to concentrate for the people working inside. LAB PLUS is available in 14 colors, and LAB is available in 6 colors.

## Functional Flooring series features and major applications

Indoor environmental controls for production facilities continue to grow more advanced, and there are a variety of diverse and sophisticated features now demanded of flooring in such spaces, such as outgassing prevention, static prevention, chemical resistance, and enough durability to handle the movement of heavy machinery. Tajima's Functional Flooring series can help meet these needs.

Product Name	Features	Major applications	
Dynamic load resistance	<b>M FLOOR</b>	<ul style="list-style-type: none"> <li>Vinyl flooring specially designed to resist dynamic force from castor wheels, etc.</li> <li>Unique, homogeneous material with excellent abrasion resistance</li> <li>Prevents dust adhesion from static electricity and quickly disperses electric charge</li> </ul>	Semiconductor/electronic equipment plants Pharmaceutical/foodstuff plants Hospital operating rooms, etc.
	<b>ANTIBACTERIAL M FLOOR</b>	(In addition to M Floor features) <ul style="list-style-type: none"> <li>Antibacterial formulation for sustained antibacterial effect</li> </ul>	Pharmaceutical/foodstuff plants Hospital operating rooms, etc.
Out-gas Suppressing	<b>M FLOOR OG</b>	(In addition to M Floor features) <ul style="list-style-type: none"> <li>Greatly reduces outgassing and chemical contamination from floor's surface, appropriate for areas such as cleanrooms where cleanliness is extremely important</li> </ul>	Biological cleanroom Silicon wafer plants LCD panel plants, etc.
Conductivity, Antistatic	<b>Conductive DS FLOOR</b>	<ul style="list-style-type: none"> <li>Conductivity that is not affected by humidity, limiting electric charge and preventing dust adhesion</li> <li>Can meet NFPA recommended conductive flooring standards</li> <li>Special conductive welding rods ensure electrical uniformity of floor, allowing use of identical adhesive over entire surface</li> <li>Resists dynamic load from castor wheels, etc.</li> <li>More resistant to acids, alkalis and organic solvents than ordinary vinyl flooring</li> </ul>	VLSI production facilities Semiconductor printer circuit board plants Satellite controller unit production facilities Hospital operating rooms, etc.
	<b>Conductive LE FLOOR</b>	<ul style="list-style-type: none"> <li>Conductivity that is not affected by the type of subfloor, limiting electric charge and preventing dust adhesion</li> <li>*For extremely dry environments, Conductive DS Floor is recommended.</li> <li>Special conductive welding rods ensure electrical uniformity of floor, allowing use of identical adhesive over entire surface</li> </ul>	Semiconductor/electronic equipment plants Computer facilities, etc.
	<b>ANTISTAR SHEET</b>	<ul style="list-style-type: none"> <li>Low cost and prevents dust adhesion from static electricity/quickly disperses electric charge</li> </ul>	Electronic/precision machinery plants Industrial cleanrooms Computer facilities, etc.
	<b>Anti-chemical Vinyl Sheet LAB PLUS</b>	<ul style="list-style-type: none"> <li>More resistant to acids and organic solvents than ordinary vinyl flooring</li> <li>Prevents dust adhesion from static electricity and quickly disperses electric charge</li> <li>Special coating for sustained antibacterial effect</li> <li>Special coating that is stain resistant and easier to clean when staining does occur</li> <li>Ample color patterns for a more variety in floor design, improving environments for users</li> </ul>	School science rooms, chemistry labs Pharmaceutical/chemical labs and production facilities Hospital pharmacies and test labs Pharmaceutical/manufacturing plant cleanrooms Semiconductor plants
Anti-chemical Vinyl Sheet LAB	<ul style="list-style-type: none"> <li>More resistant to acids and organic solvents than ordinary vinyl flooring</li> <li>Prevents dust adhesion from static electricity and quickly disperses electric charge</li> <li>Special coating for sustained antibacterial effect</li> <li>Special coating that is stain resistant and easier to clean when staining does occur</li> </ul>	School science rooms, chemistry labs Pharmaceutical/chemical labs and production facilities Hospital pharmacies and test labs Pharmaceutical/manufacturing plant cleanrooms Semiconductor plants	

## Testing results

\*1 JIS K 6911 compliant  
\*2 JIS A 1455 compliant  
\*3 JIS A 1454 compliant  
\*4 JIS A 1454 A-2 method  
\*5 NFPA 99 compliant  
\*6 Specified value is maximum value of  $5.0 \times 10^8 \Omega$  or more/minimum value of  $1.0 \times 10^4 \Omega$  or more, as well as average value of  $2.5 \times 10^4 \Omega$  or more  $2 \times 10^6 \Omega$  or less.

\*Note: Unless otherwise specified, all values in technical documents are measured values, not guaranteed values.

		Unit	M FLOOR	ANTIBACTERIAL M FLOOR	M FLOOR OG	Conductive DS FLOOR	Conductive LE FLOOR	ANTISTAR SHEET	Anti-chemical Vinyl Sheet LAB PLUS	Anti-chemical Vinyl Sheet LAB	Ordinary vinyl sheet flooring
JIS material classification		—	TS	TS	TS	FS	FS	FS	FS	FS	FS
Dimensions		—	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m	2.0mm (thickness) 1,820mm×9m
External appearance		—	No abnormalities	No abnormalities	No abnormalities	No abnormalities	No abnormalities	No abnormalities	No abnormalities	No abnormalities	No abnormalities
Width and length	Width	mm	1,837	1,837	1,837	1,828	1,830	1,824	1,833	1,833	1,832
	Length	m	9.07	9.10	9.10	9.08	9.10	9.11	9.10	9.10	9.11
Thickness		mm	1.95	1.95	1.87	1.97	1.97	1.96	1.97	1.97	1.97
Indentation	23°C	mm	0.49	0.49	0.55	0.58	0.65	0.72	0.66	0.66	0.72
	45°C	mm	0.77	0.77	0.83	0.84	1.00	1.07	1.04	1.04	1.08
Residual indentation		mm	0.10	0.10	0.13	0.17	0.16	0.19	0.15	0.15	0.22
Dimensional stability after exposure to heat	Width	%	0.81	0.81	0.97	0.18	-0.13	0.18	-0.12	-0.12	0.13
	Length	%	-1.94	-1.94	-1.95	-0.66	-0.42	-0.44	-0.62	-0.62	-0.54
Slipperiness (Clean/dry)		—	0.84	0.84	0.83	0.85	0.87	0.90	0.83	0.83	0.81
Abrasion (Tabor abrasion test)		mm	0.18	0.18	0.09	0.09	0.08	0.08	0.06	0.06	0.07
Wear grade			Super Heavy Commercial Use	Super Heavy Commercial Use	Super Heavy Commercial Use	Super Heavy Commercial Use	Heavy Commercial Use	Heavy Commercial Use	Heavy Commercial Use	Heavy Commercial Use	Heavy Commercial Use
Staining	Sodium hydroxide aqueous solution	—	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect
	5% Hydrochloric acid	—	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect
	Cement paste	—	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Antibacterial effect (antibacterial performance rating)		—	—	2.0 or more	—	—	—	—	2.0 or more	2.0 or more	2.0 or more
Antistatic	Surface Resistance*1	$\Omega$	$7.2 \times 10^8$	$7.2 \times 10^8$	$5.4 \times 10^8$	$7.0 \times 10^4$	$6.6 \times 10^6$	$9.3 \times 10^7$	$1.3 \times 10^9$	$1.3 \times 10^9$	$10^{10} \sim 10^{11}$
	Volume Resistance*1	$\Omega$	$1.9 \times 10^8$	$1.9 \times 10^8$	$1.4 \times 10^8$	$4.3 \times 10^4$	$7.8 \times 10^6$	$1.8 \times 10^7$	$3.1 \times 10^8$	$3.1 \times 10^8$	$10^{10} \sim 10^{11}$
	Surface Resistance*1 In-House Standard Value	$\Omega$	$1.0 \times 10^9$ or less	$1.0 \times 10^9$ or less	$1.0 \times 10^9$ or less	$2.5 \times 10^4$ or more $1.0 \times 10^5$ or less *5 *6	$1.0 \times 10^7$ or less	$5.0 \times 10^8$ or less	$5.0 \times 10^9$ or less	$5.0 \times 10^9$ or less	—
	Volume Resistance*1 In-House Standard Value	$\Omega$	$5.0 \times 10^8$ or less	$5.0 \times 10^8$ or less	$5.0 \times 10^8$ or less	$2.5 \times 10^4$ or more (Ground resistance) *5	$1.0 \times 10^7$ or less	$1.0 \times 10^8$ or less	$2.5 \times 10^9$ or less	$2.5 \times 10^9$ or less	—
	U value*2/grade		3.5/II	3.5/II	3.5/II	6.2/I	6.0/I	4.5/II	3.1/III	3.1/III	1.0/IV
Volume electricity resistance *3	$\Omega$	$5.6 \times 10^8$	$5.6 \times 10^8$	$5.6 \times 10^8$	$8.7 \times 10^4$	$4.4 \times 10^6$	$6.6 \times 10^7$	$1.7 \times 10^9$	$1.7 \times 10^9$	$1.3 \times 10^{10}$	
Dynamic load resistance*4 (Time)			8.0	8.0	8.0	8.0 (Dynamic Load Resistance Installation Method)	1.5	1.5	1.5	1.5	1.5

The electronics industry has grown increasingly sophisticated and modern offices have become more and more computerized. Static electricity in these environments can lead to explosions, fires or contamination, and can cause issues such as equipment failure or high reject rates. Such issues are often due to static electricity caused by human movement or built up electrical charge, and must be addressed comprehensively through choice of footwear, clothing and flooring.

Antistatic flooring:

- Inhibits static electricity cause by friction from walking.
  - Quickly disperses generated static electricity.
- Floors are graded higher the better they perform in both areas.  
Polyvinyl chloride flooring is generally classified as conductive, antistatic and ordinary.

■ Conductivity, Antistatic

\*Note: Unless otherwise specified, all values in technical documents are measured values, not guaranteed values.

Category	Conductive DS FLOOR	Conductive LE FLOOR	ANTISTAR SHEET	M FLOOR	ANTIBACTERIAL M FLOOR	M FLOOR OG	Anti-chemical Vinyl Sheet LAB PLUS	Anti-chemical Vinyl Sheet LAB	Ordinary vinyl sheet flooring
Surface Resistance *1	$7.0 \times 10^4$	$6.6 \times 10^6$	$9.3 \times 10^7$	$7.2 \times 10^8$	$7.2 \times 10^8$	$5.4 \times 10^8$	$1.3 \times 10^9$	$1.3 \times 10^9$	$10^{10} \sim 10^{11}$
Volume Resistance *1	$4.3 \times 10^4$	$7.8 \times 10^6$	$1.8 \times 10^7$	$1.9 \times 10^8$	$1.9 \times 10^8$	$1.4 \times 10^8$	$3.1 \times 10^8$	$3.1 \times 10^8$	$10^{10} \sim 10^{11}$
Surface Resistance *1 In-House Standard Value	$2.5 \times 10^4$ or more $1.0 \times 10^5$ or less	$1.0 \times 10^7$ or less	$5.0 \times 10^8$ or less	$1.0 \times 10^9$ or less	$1.0 \times 10^9$ or less	$1.0 \times 10^9$ or less	$5.0 \times 10^9$ or less	$5.0 \times 10^9$ or less	—
Volume Resistance *1 In-House Standard Value	$2.5 \times 10^4$ or more	$1.0 \times 10^7$ or less	$1.0 \times 10^8$ or less	$5.0 \times 10^8$ or less	$5.0 \times 10^8$ or less	$5.0 \times 10^8$ or less	$2.5 \times 10^9$ or less	$2.5 \times 10^9$ or less	—
Electric charge potential *2	3	9	10	10	10	10	40	40	500~1000
U value	6.2	6.0	4.5	3.5	3.5	3.5	3.1	3.1	1.0
Grade	I	I	II	II	II	II	III	III	IV
Volume electricity resistance *3	$8.7 \times 10^4$	$4.4 \times 10^6$	$6.6 \times 10^7$	$5.6 \times 10^8$	$5.6 \times 10^8$	$5.6 \times 10^8$	$1.7 \times 10^9$	$1.7 \times 10^9$	$1.3 \times 10^{10}$

\*1 JIS K 6911 compliant \*2 Using static electricity free shoes \*3 Specified value is maximum value of  $5.0 \times 10^9 \Omega$  or more/minimum value of  $1.0 \times 10^4 \Omega$  or more, as well as average value of  $2.5 \times 10^4 \Omega$  or more  $2 \times 10^8 \Omega$  or less.  
\*3 JIS A 1454 compliant \*4 NFPA 99 compliant

■ Method for evaluating antistatic performance

① Method for evaluation of resistance values of floor, only

1. JIS K 6911 surface resistance and volume resistance can be measured
2. JIS A 1454 only volume electric resistance can be measured

② Testing method for installed antistatic flooring

The most standard method of measurement prescribed in static electricity safety guidelines whereby resistance between floor surface and earth is measured on-site after installation. Conditions for installation require that resistance values between flooring and earth, other than of flooring itself, be sufficiently low. If resistance values of the subfloor, etc. are higher than flooring, consider using conductive tape installation method as a countermeasure.

③ Method for testing performance of installed conductive flooring

ANSI / NFPA 99. The method for testing of installed conductive flooring established by the NFPA. Surface resistance is defined as the value per yard (approx. 91 cm) and earth resistance is defined as the volume resistance between floor surface and earth.

④ Antistatic performance value (U value)

JIS A 1455. An index reflecting the maximum charging potential and half-value period. The higher this number, the greater the antistatic performance.

U value	Grade	Interpretation
5.2 or more	I	Flooring material/floors with extremely high static resistance
3.2 or more, less than 5.2	II	Flooring material/floors with relatively high static resistance
1.2 or more, less than 3.2	III	Flooring material/floors with static resistance
Less than 1.2	IV	Flooring material/floors without static resistance

Ordinary vinyl floors can be subject to damage, swelling and peeling in areas where heavy objects are frequently moved back and forth.

In order to create strong floors, it is important to not only select the right flooring materials and adhesives for these spaces, but also to prepare and strengthen subfloors. Taking extra care with all parts of a floor can help prevent issues before they occur.

The data below provides reference standards for how well different flooring can resist the force of repeated movement of castor wheels.

This is not the same as static load resistance, which refers to when a heavy object is left in place for a long period of time.

Testing method

■ Test overview

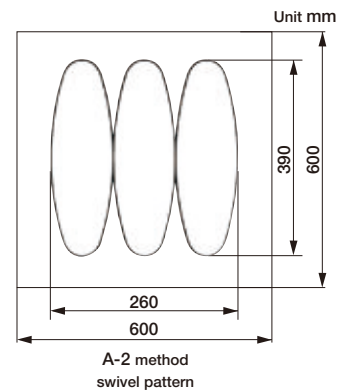
Compliant with JIS A 1454 polymer system flooring test method castor wheel pressure resistance testing

■ Test method

Castor wheel pressure resistance testing A method, A-2 method (2000N load). Additionally, for A method, a swivel pattern was used as shown in the illustration.

A-2 method

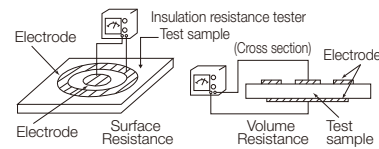
Weight:  $2000 \pm 10$  N; perpendicular stroke:  $390 \pm 2$  mm at a speed of  $7 \pm 0.4$  times/minute; parallel stroke:  $260 \pm 2$  mm at a speed of  $1.72 \pm 0.1$  times/minute; perpendicular and parallel speed ratio:  $4.07 \pm 0.03$ .



Testing method

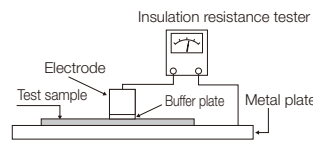
①-1 Testing method

Resistance when applying 500 V for one minute was measured using an insulation resistance tester. Measurement conditions: 20 °C, 65% RH



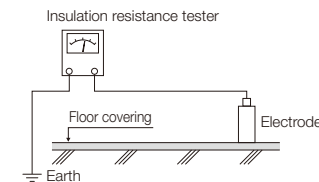
①-2 Testing method

Resistance when applying 500 V for 30 seconds was measured using an insulation resistance tester. Metals columns affixed firmly to the test surface via a buffer plate were used as electrodes. JIS A 1454 compliant Measurement conditions: 23 °C, 25% RH



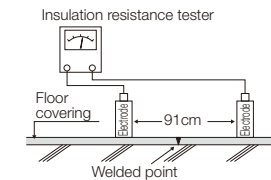
② Testing method for installed conductive/antistatic floors

(Earth resistance) Resistance was measured while applying 500 V for one minute between the earthing terminal and floor surface.



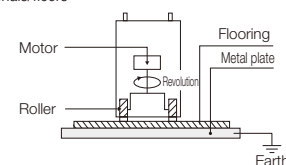
(Surface resistance)

Electrodes were placed along approximately 91 cm of the flooring surface at an arbitrary location and resistance values for that area were measured while applying 500 V over one minute.



④ Test method

Flooring was installed atop a grounded metal plate and maximum charging potential and half-value period were measured when applying 50 V, as shown in the illustration. Measurement conditions: 23 °C, 25% Compliant with JIS A 1455 methods for measurement and evaluation of static electricity resistance of flooring materials/floors



■ Castor wheel pressure resistance testing (JIS A 1454) A-2 method (2000N load)

Thickness (mm)	0	1h	2h	3h	4h	5h	6h	7h	8h	9h	Condition
M FLOOR	2.0	Swelling									Swelling
ANTIBACTERIAL M FLOOR	2.0	Swelling									Swelling
Conductive DS FLOOR (Dynamic Load Resistance Installation Method)	2.0	Swelling									Swelling
M FLOOR OG	2.0	Swelling									Swelling
Conductive DS FLOOR (General Installation)	2.0	Swelling									Swelling
Conductive LE FLOOR	2.0	Swelling									Swelling
ANTISTAR SHEET	2.0	Swelling									Swelling
Anti-chemical Vinyl Sheet LAB PLUS	2.0	Swelling									Swelling
Anti-chemical Vinyl Sheet LAB	2.0	Swelling									Swelling
Ordinary vinyl sheet flooring	2.0	Swelling									Swelling

■ Tips for installing in buildings/areas where dynamic load resistance is required

Dynamic load resistance factors: Load, flooring materials, subfloor, installation

Load: Load placed on flooring and subfloor will differ depending on weight, width of castor wheels and flooring material. The harder the castor wheels and the smaller the point of contact with floor, the more extreme the force will become.

Flooring materials: Materials that are more resistant to damage (homogeneous construction) are better.

Subfloor: Subfloors should be smooth and dry with sufficient surface strength. If subfloors are concrete, Dynamic load resistant floor Primer can be applied to the entire surface to strengthen surface and provide a good finish.

\*For more details, enquire with any Tajima branch or distributor.

Installation: Epoxy resin adhesive should be used.

\*Note: Unless otherwise specified, all values in technical documents are measured values, not guaranteed values.

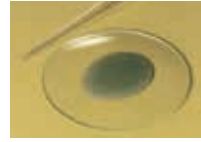


■ Example loads of carts/equipment: M FLOOR series / Conductive DS FLOOR (Dynamic Load Resistance Installation Method)

Durability can differ depending on the type of cart, load involved, frequency of use, etc. Possible estimates for cart and equipment loads are provided below. \*Be aware that rubber wheels may leave black rubber marks on floor. \*Material, diameter and width of wheels should also be taken into consideration.

Type	Transport device	Assumed weight	Vertical load per wheel
Hand cart	Pallet truck	Around 1,500 kg	70kg/cm <sup>2</sup> or less
Automated cart	Forklift <battery powered>	Around 5,000 kg	30kg/cm <sup>2</sup> or less
	Pallet truck	Around 1,500 kg	60kg/cm <sup>2</sup> or less
Unmanned carrier	Unmanned carrier	Around 700 kg	30kg/cm <sup>2</sup> or less
Equipment	Had-powered transport	Medical equipment Computers	Around 800 kg 170kg/cm <sup>2</sup> or less
	Self-moving	Bleachers	Around 6,500 kg 20kg/cm <sup>2</sup> or less

Spilled chemicals and contaminants can seep into a floors, which is a constant issue in locations such as production facilities, labs and hospitals. It is important to choose safe, antichemical flooring for such spaces.



**■ Evaluation standards**  
 A: No change  
 B: A slight change is apparent  
 C: A change is apparent  
 D: A significant change is apparent

**■ Chemical Resistant**

	Chemical (product) name	Concentration	Anti-chemical Vinyl Sheet LAB PLUS		Anti-chemical Vinyl Sheet LAB		M FLOOR	
			Color	Gloss	Color	Gloss	Color	Gloss
Inorganic acid	Hydrochloric acid	37%	B	A	B	A	B	B
	Nitric acid	61%	C	A	C	A	C	B
	Sulfuric acid	50%	A	A	A	A	A	B
	Sulfuric acid	98%	D	D	D	D	D	C
	Phosphoric acid	85%	A	A	A	A	B	B
	Hydrofluoric acid	46%	A	A	A	A	C	A
Organic acid	Acetic acid	99%	A	A	A	A	B	B
	Formic acid	90%	A	A	A	A	B	B
	Lactic acid	85%	A	A	A	A	D	B
	Oxalic acid	Saturation	A	A	A	A	B	B
	Citric acid	Saturation	A	A	A	A	A	B
Alkali	Aqueous ammonia	28%	A	A	A	A	A	A
	Sodium hydroxide	30%	B	A	B	A	B	A
	Potassium hydroxide	30%	B	A	B	A	B	B
	Calcium hydroxide	Saturation	B	C	B	C	A	A
Saline	Potassium permanganate	7.5%	D	B	D	B	D	A
	Silver nitrate	2.0%	B	A	B	A	B	A
	Ferric chloride	Saturation	A	A	A	A	B	A
Organic solvents	Methanol		A	A	A	A	A	B
	Toluene		A	A	A	A	A	B
	Xylene		A	A	A	A	A	B
	Methyl ethyl ketone		A	A	A	A	A	B
	Ethyl acetate		A	A	A	A	A	B
	Tetrahydrofuran		A	B	A	B	B	B
	1,2-dichloroethane		A	A	A	A	A	B
	Trichlorethylene		A	A	A	A	A	B
Disinfectants	Benzalkonium chloride (Osvan)	10%	A	A	A	A	A	A
	Alkyldiaminoethylglycine hydrochloride (Tego-51)	10%	A	A	A	A	A	A
	Chlorhexidine gluconate (Hibitane)	5.0%	A	A	A	A	A	A
	Disinfectant ethanol	80%	A	A	A	A	A	B
	Povidone iodine (isodine)	10%	B	A	B	A	D	A
	Iodine (yodochinki/iodine tincture)	6.0%	D	A	D	A	D	A
	Acrinol (acrinol solution)	0.1%	C	A	C	A	B	A
	Mercurochrome	2.0%	B	A	B	A	B	A
	Oxydol	3.0%	A	A	A	A	A	A
	Sodium hypochlorite	5.0%	A	A	A	A	A	A
	Glutaral (sterihyde)	20%	A	A	A	A	A	A
	Formalin	35%	A	A	A	A	A	A
	Cresol soap	50%	A	B	A	B	B	B
	Oxygen bleach		A	A	A	A	A	A
Eosin alcohol	1.0%	C	A	C	A	D	A	
Foodstuffs	Coffee		B	A	B	A	B	A
	Curry		B	A	B	A	C	A
	Milk		A	A	A	A	A	A
Former JIS contaminants	Soybean oil		A	A	A	A	A	A
	Lubricating oil		A	A	A	A	A	A
	Ethanol	95%	A	A	A	A	B	B
	Sodium hydroxide aqueous solution	2%	A	A	A	A	A	A
	Acetic acid	5%	A	A	A	A	B	A
	Hydrochloric acid	5%	A	A	A	A	A	A
Cement paste		A	A	A	A	A	A	



**■ Test overview**  
 JIS A 1454 compliant

**■ Test method**  
 2 ml of the test reagent was applied to the surface of the flooring and was covered by a watch glass after spreading. The spots were left for 24 hours, after which the surface was wiped clean. Once dry, the area was observed for changes in color, etc.

\* Degree of change may differ depending upon the color tone of the flooring. Testing was performed on relatively lighter floors. In cases where a slight change ('B') was apparent, a similar change might be less apparent on darker floors.  
 \* For listed chemicals that contain dyes, etc., coloration may also occur.

Conductive DS FLOOR		Conductive LE FLOOR		ANTISTAR SHEET		Ordinary vinyl sheet flooring	
Color	Gloss	Color	Gloss	Color	Gloss	Color	Gloss
A	B	C	C	B	B	C	B
C	B	C	C	C	B	C	B
A	B	A	B	A	A	A	A
D	B	D	C	D	C	D	C
B	A	C	B	C	B	C	B
D	B	D	B	B	A	D	B
A	A	C	C	C	C	C	C
A	B	C	B	B	B	B	B
B	A	C	B	B	B	B	B
A	A	A	B	A	A	A	B
A	A	A	A	A	A	A	A
A	A	A	B	A	A	A	A
A	B	C	C	B	B	A	B
A	A	C	C	C	C	A	B
A	A	A	A	A	A	A	A
D	A	D	A	D	A	D	A
C	A	C	A	C	A	B	A
B	A	C	A	B	A	B	A
A	A	C	C	B	B	B	B
A	B	A	A	A	A	A	A
A	A	A	A	A	A	A	A
A	A	A	B	A	B	A	B
A	B	A	A	A	B	A	A
C	B	A	C	A	C	A	C
A	C	A	C	A	C	A	C
A	B	A	B	A	B	A	B
A	A	A	A	A	B	A	B
A	A	A	A	A	A	A	A
A	A	A	A	A	A	A	A
A	A	A	A	A	A	A	A
A	A	B	B	B	B	A	B
C	A	C	B	C	A	C	A
D	A	D	A	D	A	D	A
B	A	B	A	A	A	A	A
D	A	C	A	C	A	B	A
A	A	A	A	A	A	A	A
A	A	B	B	B	B	A	B
B	A	A	B	A	B	A	A
A	A	A	A	A	A	A	A
A	A	A	A	A	A	A	A
A	B	B	C	B	B	A	B
A	A	A	A	A	A	A	A
A	A	A	A	A	A	B	A
A	A	A	A	A	A	A	A
A	A	A	A	A	A	A	A

The abrasion resistance (durability) of flooring is greatly affected by factors such as the geographical conditions of the building, the direct environment (particularly whether sand or grit is present), traffic, types of footwear being worn and frequency of maintenance.

There are many JIS methods for testing abrasion resistance but we have calculated durability (abrasion index) based on JIS A 1451 data as this most closely reflects a realistic step feeling.

■ Buildings/areas requiring abrasion resistance

- ① Plants with unmanned carriers, forklifts, etc.
- ② Hospitals where heavy objects such as mobile operating tables and medical equipment are transported
- ③ Portions of gymnasiums, citizen centers and event halls (bleachers)

■ Tips

- ① Selecting flooring: Floorings with a higher wear index will last longer
- ② Grade: A practical guideline is how much longer it will last compared to P TILE
- ③ Appropriate maintenance will greatly extend product lifespan

① Abrasion resistance of various floors (abrasion durability)

Product Name	Wear amount (mm)	*1 Wear index	3,000 6,000 12,000 24,000				
Conductive DS FLOOR	0.07	14,000	[Bar chart showing wear amount]				Super Heavy Commercial Use
Conductive LE FLOOR	0.07	7,100	[Bar chart showing wear amount]				Heavy Commercial Use
ANTISTAR SHEET	0.06	6,700	[Bar chart showing wear amount]				Heavy Commercial Use
M FLOOR	0.07	26,000	[Bar chart showing wear amount]				Super Heavy Commercial Use
ANTIBACTERIAL M FLOOR	0.07	26,000	[Bar chart showing wear amount]				Super Heavy Commercial Use
M FLOOR OG	0.07	26,000	[Bar chart showing wear amount]				Super Heavy Commercial Use
Anti-chemical Vinyl Sheet LAB PLUS	0.05	6,000	[Bar chart showing wear amount]				Heavy Commercial Use
Anti-chemical Vinyl Sheet LAB	0.05	6,000	[Bar chart showing wear amount]				Heavy Commercial Use
Ordinary vinyl sheet flooring	0.06	6,700	[Bar chart showing wear amount]				Heavy Commercial Use
P TILE (2mm)	0.34	6,000	[Bar chart showing wear amount]				Heavy Commercial Use

\*1 Abrasion index: The number of rotations, after 1,000 rotations of JIS A 1451 testing, to remove the entire effective layer. Reflects flooring surface shape and quality. (Embossed flooring includes minus-correction, etc.)

Testing method

■ Test overview  
JIS A 1451 construction materials/components abrasion test methods compliant

■ Test method  
The surface of the test sample was sprinkled with sand and an abrasive steel plate, brush and bar was rotated over the surface in order at a speed of once per minute. After 1,000 rotations, the difference in thickness before and after testing was measured.



Product defects caused by outgassing from interior floors can sometimes be a concern during production of electronic parts or other items that require a high degree of cleanliness. M FLOOR OG limits outgassing and can help address such concerns.

① Diffusion testing

Unit:  $\mu\text{g}/\text{m}^2\cdot\text{h}$  (toluene conversion)

Product Name	Initial Occurrence Value	After 7 Days
M FLOOR OG	180	76
M FLOOR	306	129

Materials chosen for M FLOOR OG produce less output when tested with silicon wafers. In addition to containing no highly volatile organic substances (solvents, alcohol, etc.), this flooring also contains no phthalic acid-based substances or plasticizers. This reduces chemical contamination compared to previous flooring.

② Silicon Wafer Test

Unit:  $\text{ng}/\text{cm}^2$  (hexadecane conversion\*1)

Product Name	Total Adhesive Organic Substance Amount
M FLOOR OG	20
M FLOOR	36

\*1 Hexadecane conversion  
Hydrocarbon sensitivity of organic matter stuck to sample surfaces, as a relative comparison between samples. Calculated as (standard: H hexadecane), does not indicate an absolute measurement of substance.

③ Ion components

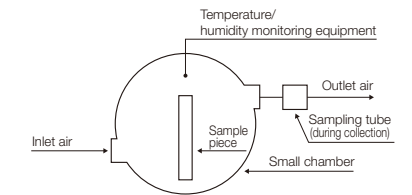
(ng/cm<sup>2</sup>)

	NH <sub>4</sub> <sup>+</sup>	Cl <sup>-</sup>	NO <sub>2</sub> <sup>-</sup>	NO <sub>3</sub> <sup>-</sup>	SO <sub>4</sub> <sup>2-</sup>
M FLOOR OG	<10	<10	<10	<10	<10

Testing method

①-1 Test overview  
JIS A 1901 compliant

①-2 Test method  
Immediately after manufacture a test sample was placed inside a small chamber and allowed to produce outgas from its surface under 28°C conditions. This gas was collected over 24 hours to calculate the amount of outgas produced over 1 hour.

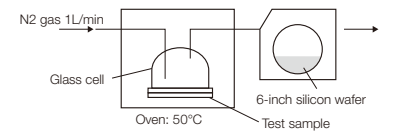


②-1 Test overview

Wafer thermal desorption--gas chromatography--mass spectrometry

②-2 Test method

Immediately after manufacture a test sample was heated to 50°C in an inert gas flow for one hour while exposing a silicon wafer to gas produced from the flooring surface. Organic matter that attached to the wafer was measured as an indication of chemical contamination.



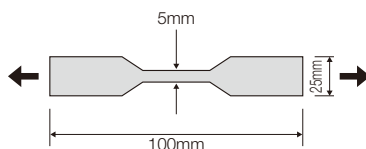
After being poured, concrete dries out over many year, contracting and often leading to hair line cracks. In areas where functional flooring is required, it is often preferable to limit dust produced by such cracks from spreading. Compared to hard coated floors, flooring in this series is more flexible and resistant to breaking, and thus better at preventing dust from leaking into rooms.

Product Name	Tensile strength	Elongation
	N/cm <sup>2</sup>	%
Conductive DS FLOOR	1,240	60
Conductive LE FLOOR	780	70
ANTISTAR SHEET	710	100
M FLOOR	1,550	90
ANTIBACTERIAL M FLOOR	1,400	90
M FLOOR OG	1,350	110
Anti-chemical Vinyl Sheet LAB PLUS	750	139
Anti-chemical Vinyl Sheet LAB	750	139
Ordinary vinyl sheet flooring	700	150
Ordinary epoxy coated floor	435	2.5
Ordinary urethane coated floor	100	140

Testing method

■ Test overview  
JIS A 6008 compliant

■ Test method  
A test sample was created as shown in the illustration. Both ends were fixed in place and stretched in the direction of the arrows using a tension tester at a speed of 200 mm/minute. Strength (N) was measured at the moment when the piece broke. The amount of elongation at the time of break was also measured to calculate how far the piece had stretched from its original length.



Anti-chemical Vinyl Sheet LAB PLUS, Anti-chemical Vinyl Sheet LAB and Antibacterial M Floor are made with an antibacterial formulation. Additionally, Antibacterial M Floor is mold resistant. Products with an antibacterial activity of 2.0 or greater are deemed as being effective.

① Antibacterial

Product Name	Antibacterial	
	Bacteria 1	Bacteria 2
Anti-chemical Vinyl Sheet LAB PLUS	Effective	Effective
Anti-chemical Vinyl Sheet LAB	Effective	Effective
ANTIBACTERIAL M FLOOR	Effective	Effective

Products are deemed as having mold resistance if no mold growth is apparent to the naked eye.

② Mold Resistance

Product Name	Mold Resistance
ANTIBACTERIAL M FLOOR	No apparent mold

\*Note: Unless otherwise specified, all values in technical documents are measured values, not guaranteed values.

Testing method

①-1 Test overview  
JIS Z 2801 compliant  
Antibacterial product testing and effectiveness standards

①-2 Test method

A bacterial solution was introduced to the testing surface and covered with a film to ensure uniform contact. After 24 hours the amount of viable bacteria was measured. Antibacterial performance was evaluated by calculating antibacterial activity from the viable count of the film specimen (B) and the viable count of treated product (C). Antibacterial activity=log(B/C)

②-1 Test overview

JIS Z 2911 compliant  
Mold resistance test method: compliant with plastic product testing method A

②-2 Test method

A spore suspension was applied evenly to the surface of the test sample and after four weeks under controlled conditions the surface was inspected with the naked eye (or by microscope if necessary) for fungal spread.



Multifunctional sheet vinyl flooring developed for spaces subject to extreme dynamic loads, such as hospital operating rooms, plants (computer assembly, electronics, foodstuffs, pharmaceuticals, etc.) and event halls

Problems can often occur when ordinary construction and finishing methods are used for floors subject to extreme dynamic loads from castor or other wheels. These issues cannot be solved simply by using strong floor coverings. The surface strength of the base subfloor must also be improved. When using M FLOOR it is important to first carry out necessary checks at each stage, including grasping the conditions under which the floor will be used, investigating the type of subfloor present and its level of strength, reinforcing the subfloor surface (if necessary), installing floor coverings and curing after installation.

Examples of issues that can occur with dynamic load flooring



Cracks/peeling in laid flooring

Peeling of vinyl sheet flooring

**Subfloor type and pre-check**      **Check subfloor before installation**      **Subfloor surface reinforcement (as necessary)**      **Floor covering installation**      **Curing**      **Maintenance**

- Grasp conditions of use
- Types of carts/equipment being used, associated loads and frequency
- Check subfloor type and surface strength
- Check subfloor dryness
- Please consult with us regarding subfloor reinforcement
- Installation is not possible on self-leveling subfloors

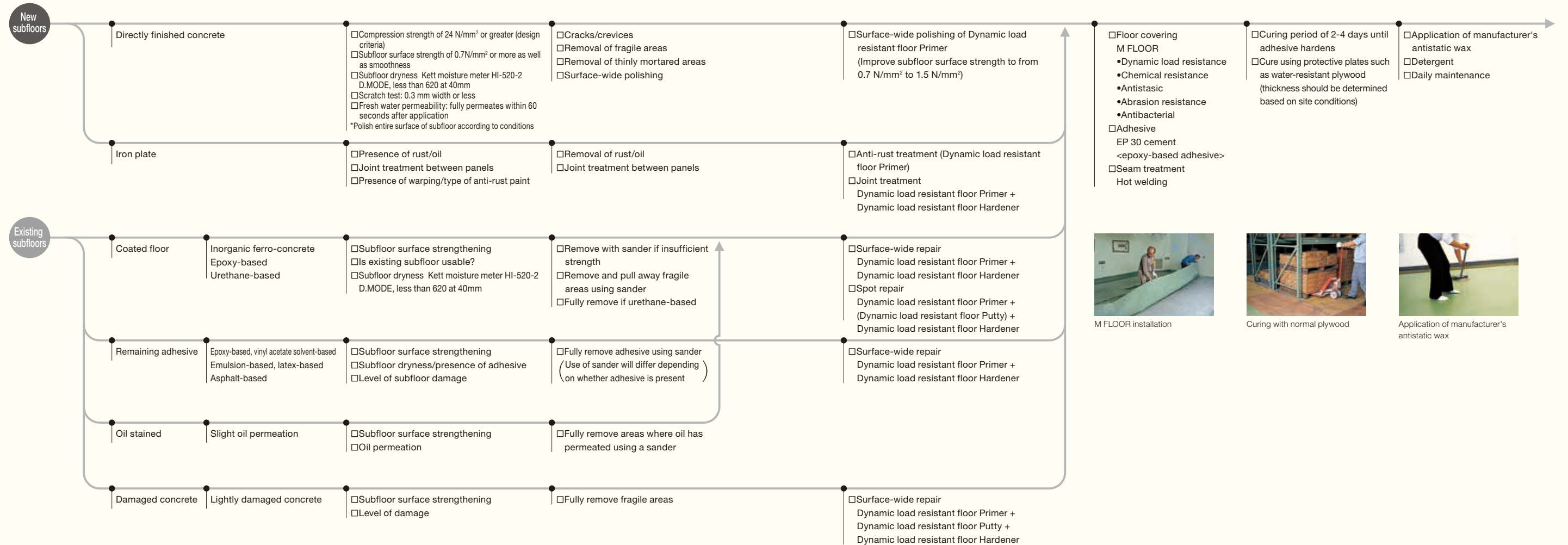
- Check for missing areas
- Check for fragile areas
- Check for oil, rust, adhesives, etc.
- Polish entire subfloor surface to improve adhesion

- Uniform subfloor surface reinforcement
  - Application of subfloor surface reinforcement material
- Dynamic load resistant floor Primer
  - Dynamic load resistant floor Hardener
  - Dynamic load resistant floor Putty

- Use M FLOOR
- Affix with EP30 cement
- Seam treatment (Hot weld with designated welding rod)

- Maintain proscribed curing period
- Cure fully using protective plates, etc.

- Selection of wax, detergents, etc.
- Please consult with us on appropriate maintenance methods for various production facilities



M FLOOR installation



Curing with normal plywood



Application of manufacturer's antistatic wax

**Caution**

- Use Dynamic load resistant floor Primer, etc. as necessary.
- Please enquire for more details.