



JQA-2882  
JQA-EM0655  
JQA-OH0010

# FM4910 Listed Materials

 **TAKIRON™ FM Plate**

**FM Approvals  
Listed 4910  
Cleanroom Material**

Lot.No.

 **TAKIRON CO.,LTD.**

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## Delivery Schedule

Group	Code	Grade	Lead Free	Color	Size (mm)	Thickness (mm)															
						3	5	6	6.3	8	9.5	10	12	12.7	15	19	20	25	30	40	
◆ Opaque(PVC)																					
F M E T	4 3 2 3 (4325A*)	General P V C	Lead Free	New Ivory	1,000×2,000	④	③			①	①			①	①		①				
					1,212×2,424	③	②			①	①										
F M H	5 3 0 5	C-PVC Heat resistance	Lead Free	New Ivory	1,000×2,000	④	③					①		①		①					
					1,212×2,424		②					①									

※:Post Order Production. Please inquire.  
 ※1:Actual metric size of 1/8" is 3.1mm. Please notice the difference.  
 ※2:Actual metric size of 1" is 25.4mm. Please notice the difference.  
 ● Encircled figures indicate the number of plates contained in one case.

Group	Code	Grade	Lead Free	Color	Size (mm)	Thickness (mm)								
						3	5	8	10	12	15	20	25	
◆ Transparent														
FMRTS	4 6 0 5	General P V C	Lead Free	Transparent	1,000×2,000	④	③	①	①					
					1,212×2,424	③	②	①	①					
FMHS	5 6 5 0	C - P V C	Lead Free	Transparent	1,000×2,000	④	③	①	①					
					1,212×2,424	③	②							
FMND	7 6 0 5	C-PVC Static dissipative	Lead Free	Transparent	1,000×2,000	④	③	※	※					
					1,212×2,424	③	②	※	※					
FMND	*1 7 7 0 8	PVC Static dissipative	Lead Free	Transparent	1,000×2,000	④	③	①	①					
					1,212×2,424	③	②	①	①					
FMND	7 3 8 8 ※	PVC Static dissipative	Lead Free	Yellow Tinted	1,000×2,000	※2	※							
					1,212×2,424	※2	※							

※:Post Order Production. Please inquire.  
 ※1:FMRTS 3608 and FMND 7600 are old version. These are post order production.  
 ※2:FMND 7308 can be produced in case of 3mm thickness. (FMND 7388 is not available for 3mm thickness.) ● Encircled figures indicate the number of plates contained in one case.

Group	Code	Grade	Lead Free	Color	Size (mm)	Thickness (mm)									
						3	5	8	10	15	20	25	30	40	50
PVDF															
FMPVDF	F 3 0 0	PVDF	Lead Free	Natural	490×1,000						①	①	①	①	①
					1,000×2,000	①	①	①	①	①					

● Encircled figures indicate the number of plates contained in one case.

## Physical Property Data Sheet

◆ Opaque(PVC)

Item	Unit	Value										test method
		FMET4325A FMET4735A PVC Ivory FM4910	FMH5305 C-PVC Ivory FM4910	FMRTS4605 PVC FM4910	FMHS5650 C-PVC FM4910	FMHS6650 C-PVC FM4910	※1 FMND7600 C-PVC FM4910	FMND7708 PVC FM4910	FMND7388	FMPVDF F300		
Lead-Free	—	○	○	○	○	○	○	○	○	○		
Specific Gravity	—	1.45	1.55	1.40	1.55	1.46	1.44	1.41	1.40	1.78	ISO1183-1,-2(MOD ISO 1183)	
Tensile Stress at Yield	MPa	56	63	68	71	74	68	72	72	53	JIS K7162-1B/50 (IDT ISO 527-2)	
Nominal Tensile Strain at Break	%	13	20	9	12	12	17	8		15	JIS K7162-1B/50 (IDT ISO 527-2)	
Modulus of Elasticity in Tension	MPa	2900	3000	3100	3100	3300	2900			—	JIS K7162-1B/1 (IDT ISO 527-2)	
Flexural Stress	MPa	78	88	87	98	99	91	98	94	64	JIS K7171 (IDT ISO 178)	
Flexural Modulus	MPa	2900	3000	3100	3200	3300	3000	3300	3300	1800		
Charpy Impact Strength (Notched)	kJ/m <sup>2</sup>	5.2	7.2	1.6	2.2	1.6	2.7	2.0	1.6	10.0	JIS K7111-1epA (MOD ISO 179)	
Vicat Softening Temperature	℃	81	97	71	98	94	97	75	72	165	JIS K7206 (B method) (MOD ISO 306)	
Temperature of Deflection under load	℃	73	86	63	88	85	87	69	67	140	JIS K7191	
Dimensional Change on Heating (140℃, 55min.)	Longitudinal %	—2	—4	—3	—5	—5	—5	—5	—5		JIS K6745 (IDT ISO 11501)	
	Lattitudinal %	—1	—1	—1	—2	—1	—2	—1	—1			
Conforming Fire Retardant Standards	—	FM4910	FM4910	FM4910	FM4910	FM4910	FM4910	FM4910	FM4910		FM4910 Clean Room Materials	
	—	—	—	—	UL94V-0	—	UL94V-0	—	—		UL94	
Total Light Transmittance	%			78	54	71	51	67	67		JIS K7361-1	

●The above data are typical test results (of 5mm thick specimen) and given here without guarantee.  
 ※1:Combination with PVC as a surface and C-PVC as a core material.  
 ●All products can be affected by solvent contaminated-atmosphere or some surface active agents. Please check applications prior to the use of these products.



- Lead Free
- PVC Ivory



(Post Order Production) **FMET 4323 (4325A)**

- PVC White



(Post Order Production) **FMET 4735A**

- C-PVC Ivory



**FMH 5305**

- C-PVC Transparent (Static Dissipative)



(Post Order Production) **FMND 7605**

- PVC Yellow Tinted (Static Dissipative)



(Post Order Production) **FMND 7388**

- PVC Transparent



**FMRTS 4605**

- C-PVC Transparent



**FMHS 5650**

- C-PVC Transparent



**FMHS 6650**

- PVC Transparent (Static Dissipative)



**FMND 7708**

- PVDF Plate



**FMPVDF F300**

**Notice**

Takiron Co.,Ltd. reserves the right to alter their products, colors or packaging from those shown in this leaflet. All details correct at time of going on press.

## Contribution to Safety against Fire in Semiconductor Plants

TAKIRON FM plate conforms to FM4910 standards, which was developed with TAKIRON's unique formulation technologies. The features are as follows.

### Excellent ignition and fire spread resistances

TAKIRON FM plate is hard to ignite, and if ignited, it does not easily permit fire to spread.

### A small amount of smoke is generated, if ignited

TAKIRON FM plate generates a smaller amount of smoke than other plastics when a fire breaks out.

### \*What is FM Global?

FM Global is a corporation which consists of the two organizations shown below

- FM Insurance Company, Ltd (a mutual insurance company of the American Industry Association)
- FM Approvals (a non-profit private organization which researches, tests, and approves material /equipment/ systems for fire prevention and safety work)

### \*What are FM4910 Standards?

FM4910 is a flame retardancy standard for materials used in clean rooms to prevent fire, set by FM Global (issued in October 1997).

The following two criteria are used to evaluate flame retardancy. FM4910 conforming products shall meet the numerical criterion of each index.

① FPI ( Fire Propagation Index)  $\leq 6$  ② SDI ( Smoke Damage Index)  $\leq 0.4$

### Excellent workability

TAKIRON FM plate displays excellent workability in welding, bonding, and heat bending, which is nearly equal to that of conventional plates for industry.

### Excellent chemical resistance

TAKIRON FM plate displays chemical resistance against various acids and alkalis, which is nearly equal to that of conventional plates for industry.

Note: Transparents product may be affected by the solvent environment or surface-active agents to a greater extent than opaque products. Check on working conditions prior to actual application.

**FM Approvals  
Listed 4910  
Cleanroom Material**

**TAKIRON CO.,LTD.**

(FM approval label)

## Limitation of Warranty

Values of physical properties herein are presented as typical test results in Takiron Co., Ltd., and are considered accurate to the best of our knowledges. It is offered solely for your consideration, examination and verification, and is not to be construed as a representation or warranty expressed or implied, for which Takiron Co., Ltd. assumes any legal responsibility. Our warranties are limited to those expressly stated in the formal contracts or in conditions of sale on our invoices and order acceptances. Conditions and methods of use may vary and are beyond the control of Takiron Co., Ltd., therefore, Takiron Co., Ltd. disclaims any liability incurred as a result of the use of Takiron FM Plates in accordance with the values of physical properties herein.

No information herein shall be construed as an offer of indemnity for infringement or as a recommendation to use Takiron FM Plates in such a manner as to infringe any patent, utility model and design, domestic or foreign. The values of physical properties of Takiron FM Plates cannot be automatically used when engineering finished fabricated components; and the fabricator or end user is responsible for insuring the suitability of Takiron FM Plates for their specific application or end use.

THERE ARE NO WARRANTIES AS TO TAKIRON FM PLATES DESCRIBED HEREIN. EITHER EXPRESSED OR IMPLIED. INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.



## Notes on Handling Takiron FM Plates

### ① Notes on usage

- 1-1. For the best suitable selection of Takiron FM Plates, ensure to carefully check temperature, chemicals, ultra violet effect, external stress and other actual conditions on which Takiron FM Plates are to be used.
- 1-2. In your design, it is important to consider not only the theory of strength calculation but also your experiences related to the fabricating conditions and methods.
- 1-3. Figures of physical properties and other aspects are typical test values, not guaranteed performances.
- 1-4. According to your intended use, ensure to select suitable Takiron FM Plates.
- 1-5. Ensure that Takiron FM Plates are not in contact with materials that may contain harmful substances to the plates, such as flexible PVC and rubber.

### ② Notes on fabricating

- 2-1. During your fabricating of Takiron FM Plates, ensure to wear the protections such as gloves and goggles according to necessity and use appropriate machines and tools.
- 2-2. During your cutting and welding of Takiron FM Plates, gas may be generated. Ensure that the fabricating room is adequately ventilated.
- 2-3. When you use adhesives and solvents, there is a risk of gas poisoning, fire, gas explosion and other accidents. Be careful of fire, and ensure there is adequate ventilation. Take the correct precautions according to the notes and indications on the materials to be used.

### ③ Notes on storage and transportation

- 3-1. During storing and transporting Takiron FM Plates, ensure to keep the plates placed horizontally. If Takiron FM Plates are stored and transported leaning against a wall, the plates may warp.
- 3-2. It should be noted that some masking materials protecting Takiron FM Plates may not peel off, if the plates become wet.
- 3-3. Ensure that Takiron FM Plates and their fabricated plates are not exposed to direct sunlight. Don't store and transport them in a high temperature environment.

### ④ Notes on disposal

- 4-1. If you dispose of Takiron FM Plates, always dispose the plates as industrial waste in compliance with the relevant laws and regulations.

\* FM labels are necessary to verify the status of FM-certified products, and to trace the causes of any problems that may arise. Ensure to maintain FM labels with care.



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