



SYNTECH CORPORATION

METAL FILM FIXED RESISTORS FMF (FLAME-PROOF COATING TYPE)

File No.:	FMF-02-D
Version:	A
Page:	1/11
Date :	2021.01.01

1. INTRODUCTION

The FMF series flame-proof type Metal Film Resistors are manufactured by vacuum deposit metal film on high thermal conductivity ceramic rods, and are coated with layers of gray color flame-proof lacquer.

These FMF flame-proof metal film resistor is designed to replace the metal oxide resistors and low power wire wound resistors, where when flame-proof and small size is needed.

APPROVED	CHECKED	DESIGNED	REMARK	DOCUMENT NO.
Carol	May	Chen		0201010054



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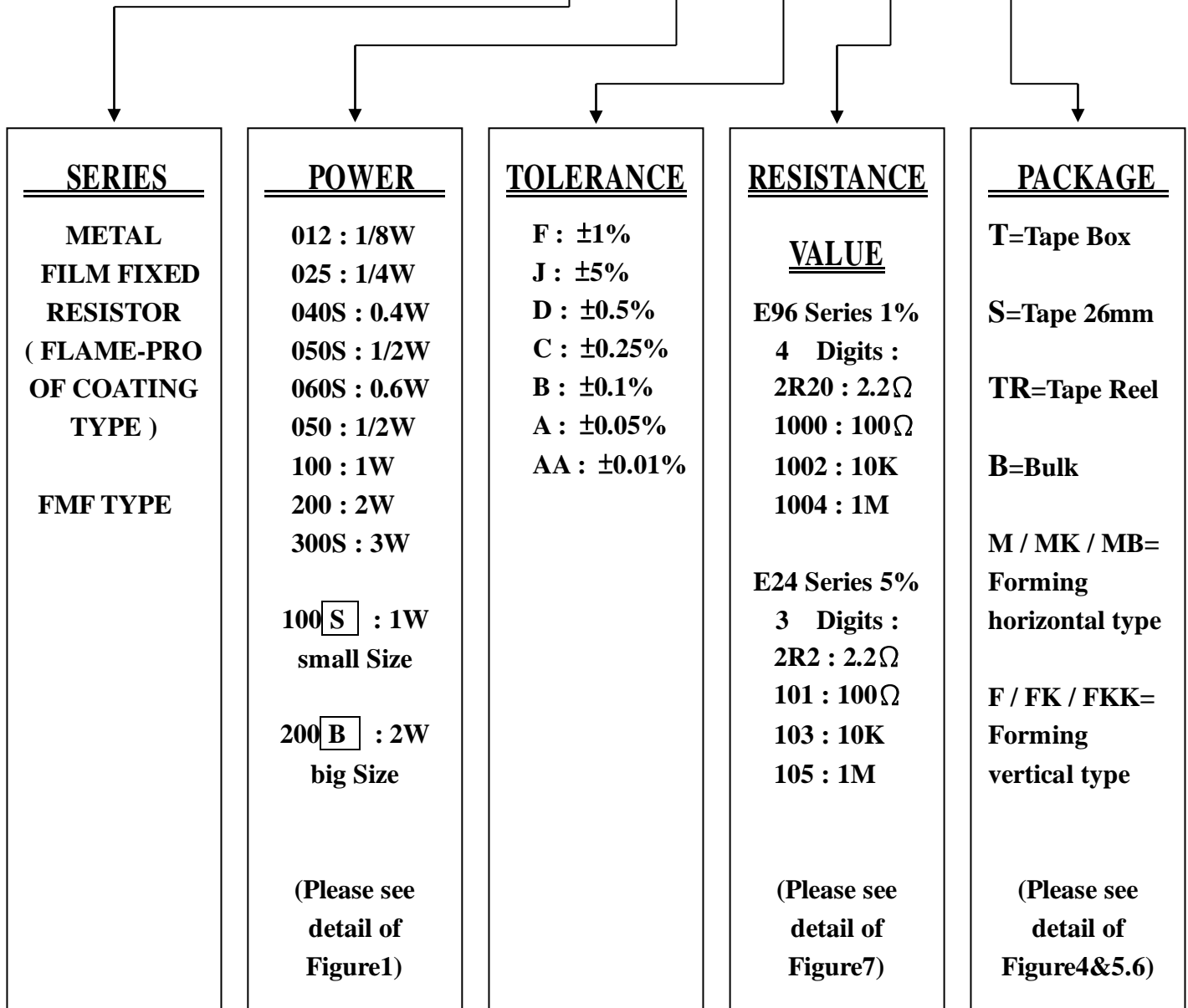
METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

File No.:	FMF-02-D
Version:	A
Page:	2/11
Date :	2021.01.01

2. EXPLANATIONS OF ORDERING CODE

DESCRIPTION : FMF 1W 1% 100Ω

SYNTON CODE : FMF 100 F 1000 T





SYNTON-TECH CORPORATION

METAL FILM FIXED RESISTORS FMF (FLAME-PROOF COATING TYPE)

File No.:	FMF-02-D
Version:	A
Page:	3/11
Date :	2021.01.01

3. ELECTRICAL CHARACTERISTICS

TYPE	FMF-12	FMF-25S	FMF-40S	FMF-25	FMF-50S	FMF-60S	FMF-50	FMF-100S	FMF-100	FMF-200S	FMF-200	FMF-300S
Power Rating at 70°C	1/16W 1/8W 1/6W	1/4W	0.4W	1/4W	1/2W	0.6W	1/2W	1W	1W	2W	2W	3W
Operating Temp. Range	-55°C ~ +155°C											
Maximum Working Volt.	200V	250V	350V	250V	350V	350V	350V	500V	500V	500V	500V	500V
Maximum Overload Volt.	400V	500V	700V	500V	700V	700V	700V	1000V	1000V	1000V	1000V	1000V
Dielectric withstanding Volt.	400V	500V	700V	500V	700V	700V	700V	1000V	1000V	1000V	1000V	1000V
Value Range ±0.5%. ±1%	10Ω~1MΩ											
Value Range ±0.1%. ±0.25%	100Ω~100KΩ											
Temp. Coefficient	±15ppm/°C, ±25ppm/°C, ±50ppm/°C, ±100ppm/°C											

Figure 1



SYNTON-TECH CORPORATION
METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

File No.:	FMF-02-D
Version:	A
Page:	4/11
Date :	2021.01.01

4. POWER RATING

(1)Power Derating : The rated power at the temperature in excess of 70°C shall be derated in accordance with figure2

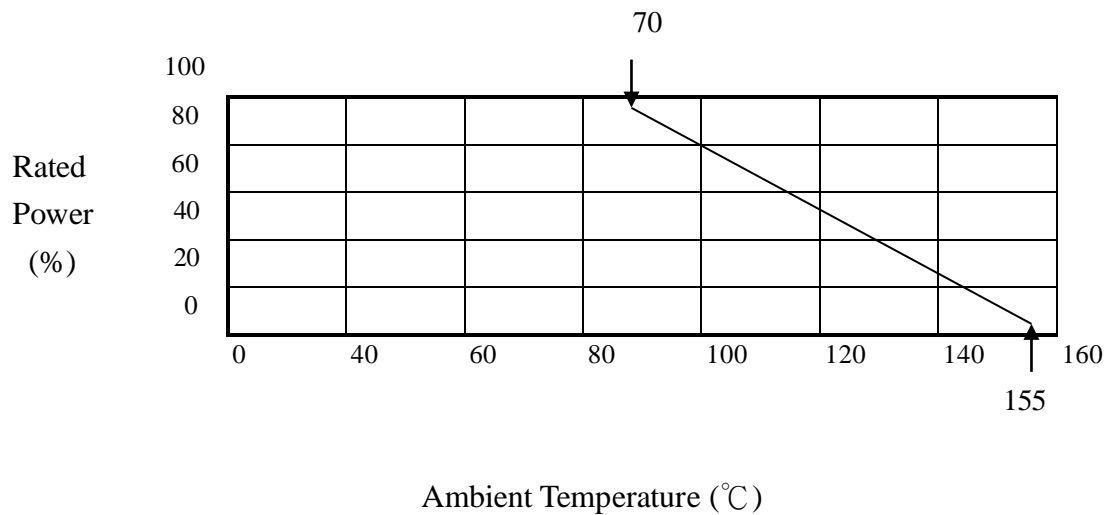


Figure2

(2)Rated Voltage : The DC or AC(rms) continuous working voltage corresponding to the rated power is determined by the following formula:

$$E = \sqrt{R \times P}$$

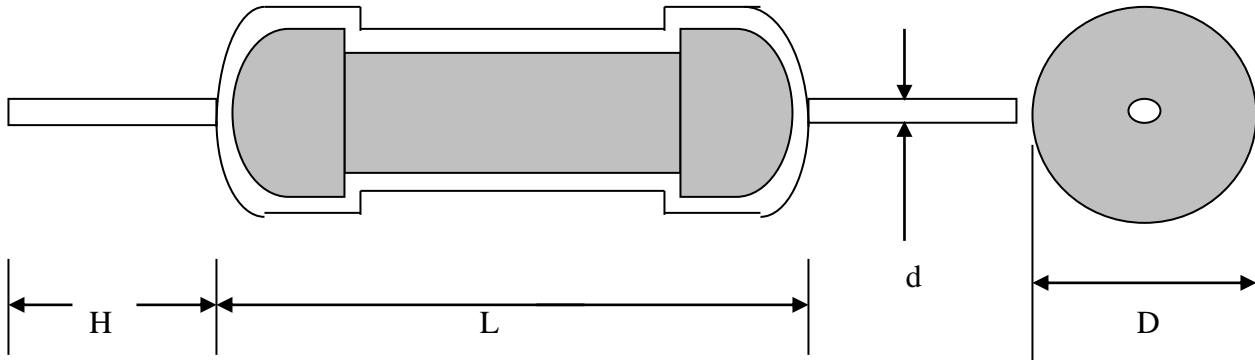
Where E : Continuous rated DC or AC (rms) working voltage (v)
P : Rated power (w)
R : Resistance value (Ω)



SYNTON-TECH CORPORATION
METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING)

File No.: FMF-02-D
 Version: A
 Page: 5/11
 Date : 2021.01.01

5. DIMENSIONS



Unit: m/m

TYPE	POWER	L	D	H	d
FMF-12	1/16W 1/6W 1/8W	3.5 ± 0.3	1.8 ± 0.3	25 ± 3	0.4 ± 0.05
FMF-25S	1/4W				
FMF-40S	0.4W				
FMF-25	1/4W	6.0 ± 0.5	2.3 ± 0.3	25 ± 3	0.45 ± 0.05
FMF-50S	1/2W				
FMF-60S	0.6W				
FMF-50	1/2W	9.0 ± 0.5	3.2 ± 0.5	25 ± 3	0.5 ± 0.10
FMF-100S	1W				
FMF-100	1W				
FMF-200S	2W	11 ± 1.0	4.5 ± 0.5	35 ± 3	0.65 ± 0.10
FMF-200	2W				
FMF-300S	3W				

Figure3

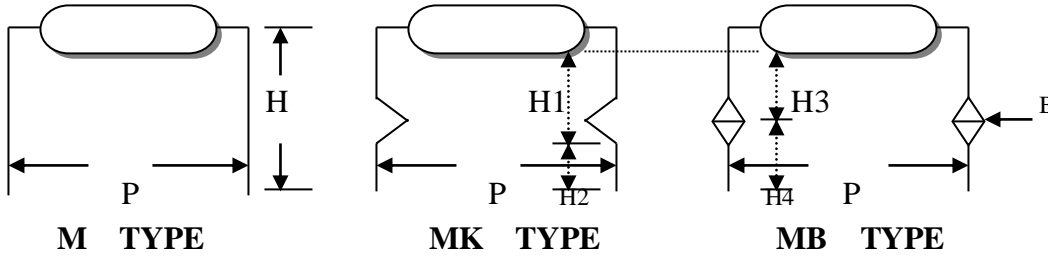


SYNTON-TECH CORPORATION
METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

File No.: FMF-02-D
 Version: A
 Page: 6/11
 Date : 2021.01.01

(1) FORMING PACKING

M / MK / MB= Forming horizontal type



Unit : m/m

TYPE	POWER	FORMING Type	P ± 1	H ±2.5	H1 ± 1	H2 ± 1	H3 ± 1	H4 ± 1
FMF-12 FMF-25S FMF-40S	1/8W 1/4W 0.4W	M	5~	5~	—	—	—	—
FMF-25 FMF-50S FMF-60S	1/4W 1/2W 0.6W	M MK	10~	5~ —	— 5 8	— 3~	—	8~ —
FMF-50 FMF-100S	1/2W 1W	M MK.MB	12.5~	10~ —	— 5 8	— 3~	— 5 8	— 5~
FMF-100 FMF-200S	1W 2W	M MK.MB	15~	10~ —	— 5 8	— 3~	— 5 8	— 5~
FMF-200 FMF-300S	2W 3W	M MK MB	20~	10~ —	— 5 8	— 3~	— 5 8	— 5~

Remark : 1. B = 1.15 ~

2. ALTERNATE MARKING METHOD ALSO AVAILABLE ON REQUEST.

Figure4

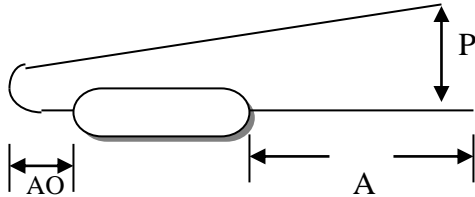


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METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

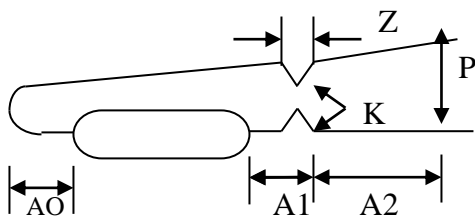
File No.:	FMF-02-D
Version:	A
Page:	7/11
Date :	2021.01.01

(2) FORMING PACKING

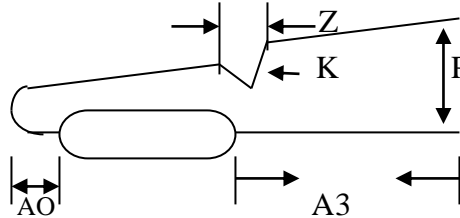
F / FK / FKK=Forming vertical type



F TYPE



FKK TYPE



FK TYPE

Unit : m/m

TYPE	POWER	FORMING Type	P ± 1	A ± 1	A1 ± 1	A2 ± 1	A3 ± 1	A0 Max
FMF-12 FMF-25S FMF-40S	1/8W 1/4W 0.4W	F	—	25±3	—	—	—	4.0
FMF-25 FMF-50S FMF-60S	1/4W 1/2W 0.6W	F	5~10	25±3	—	—	—	4.0
		FK	5~10	—	—	—	25±3	4.0
		FK FKK	5~10	—	4	3~	5~	4.0
FMF-50 FMF-100S	1/2W 1W	F	5~10	5~	—	—	—	4.0
		FK	5~10	—	—	—	25±3	4.0
		FK FKK	5~10	—	4	3~	5~	4.0
FMF-100 FMF-200S	1W 2W	F	5~10	5~	—	—	—	4.0
		FK FKK	5~10	—	4	3~	5~	4.0
FMF-200 FMF-300S	2W 3W	F	5~10	5~	—	—	—	4.0
		FK FKK	5~10	—	4	3~	5~	4.0

Remark : 1. Z = 3 ±1. K = 2 ±0.5,

2. ALTERNATE MARKING METHOD ALSO AVAILABLE ON REQUEST.

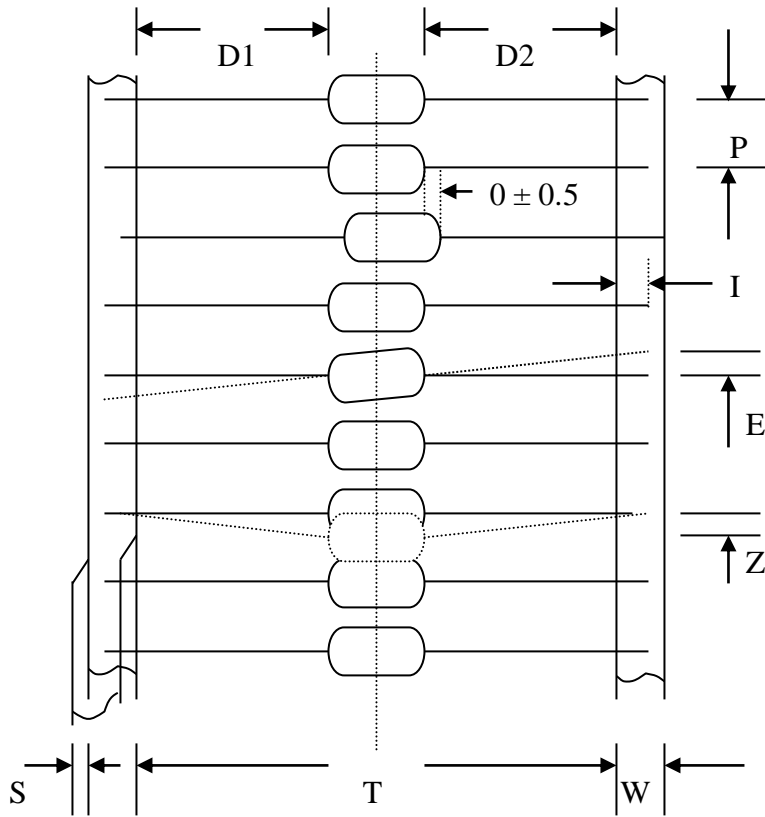
Figure5



SYNTON-TECH CORPORATION
METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

File No.: FMF-02-D
 Version: A
 Page: 8/11
 Date : 2021.01.01

(3) TAPE PACKING (T-TYPE)



Unit:m/m

TYPE	SIZE	T	P ±0.5	W ±0.5	D1—D2 Max.	E Max.	Z Max.	S Max.	I Min.
FMF-12	T-26	26±1.0	5	6	0.8	1	1.2	1	3
FMF-25S	T-52	52±2.0	5	6	0.8	1	1.2	1	3
FMF-40S									
FMF-25	T-26	26±1.0	5	6	1.0	1	1.2	1	3
FMF-50S	T-52	52±2.0	5	6	1.0	1	1.2	1	3
FMF-60S									
FMF-50	T-52	52±2.0	5	6	1.2	1	1.2	1	3
FMF-100S									
FMF-100 FMF-200S	T-52	52±2.0	5	6	1.2	1	1.2	1	3
	T-63	63±2.0	5	6	1.4	1	1.2	1	3
	T-74	74±2.0	5	6	1.4	1	1.2	1	3
FMF-200 FMF-300S	T-52	52±2.0	10	6	1.2	1	1.2	1	3
	T-63	63±2.0	10	6	1.4	1	1.2	1	3
	T-74	74±2.0	10	6	1.4	1	1.2	1	3

Figure5



SYNTON-TECH CORPORATION

METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

File No.:	FMF-02-D
Version:	A
Page:	9/11
Date :	2021.01.01

6. CHARACTERISTICS

(1) Short Time Overload

Test Method : 2.5 times RCWV for 5 seconds

Acceptance Standard : $\pm(0.5\%+0.05\ \Omega)$

(2) Insulation Resistance

Test Method : in V-Block

Acceptance Standard : $>1,000M\Omega$

(3) Solderability

Test Method : 260°C for 5 ± 0.5 seconds

Acceptance Standard : 95% min. coverage

(4) Resistance to Solvent

Test Method : Trichroethane for 1 min. with ultrasonic

Acceptance Standard : no deterioration of coatings and marking

(5) Terminal Strength

Test Method : Direct load for 10 sec. in the direction of the
terminal leads

Acceptance Standard : $\geq 2.5\text{kg}$ (24.5N)

(6) Pulse Overload

Test Method : 4 times RCWV 10000 cycles (1 sec. on , 25 sec. off)

Acceptance Standard : $\pm (2\%+0.05\ \Omega)$

(7) Load Life in Humidity

Test Method : $40\pm 2^{\circ}\text{C}$ 90~95% RH at RCWV for 1000 hours.

(1.5 hrs. on , 0.5 hrs. off)

Acceptance Standard : $\pm (1.5\%+0.05\ \Omega)$



SYNTON-TECH CORPORATION

METAL FILM FIXED RESISTORS FMF (FLAME-PROOF COATING TYPE)

File No.:	FMF-02-D
Version:	A
Page:	10/11
Date :	2021.01.01

(8) Load Life

Test Method : 70°C at RCWV for 1000 hours.

(1.5 hrs. on , 0.5 hrs. off)

Acceptance Standard : $\pm (1\%+0.05 \Omega)$

(9) Temperature Cycling

Test Method : $-55^{\circ}\text{C} \rightarrow \text{room temp.} \rightarrow 155^{\circ}\text{C} \rightarrow \text{room temp.}$ for 5 cycles

Acceptance Standard : $\pm (0.5\%+0.05 \Omega)$

(10) Resistance to Soldering Heat

Test Method : $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for 3 ± 0.5 seconds

Acceptance Standard : $\pm (0.5\%+0.05 \Omega)$

(11) Soldering Recommendation

Test Method : The Standard Length of epoxy on the terminal of our product is less than 1.5mm. Also, the Standard Welding Point must be over than 1.6mm from Resistor body.

● Rated continuous Working Voltage (RCWV)

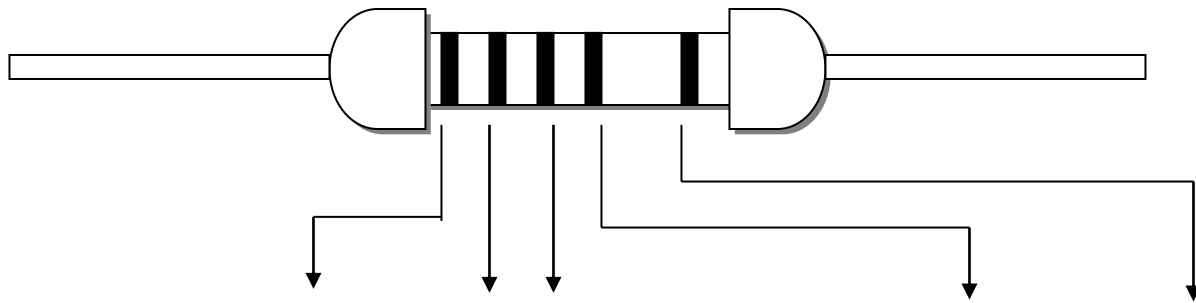
$$= \sqrt{\text{power rating} \times \text{resistance value}}$$



SYNTON-TECH CORPORATION
METAL FILM FIXED RESISTORS
FMF (FLAME-PROOF COATING TYPE)

File No.: FMF-02-D
 Version: A
 Page: 11/11
 Date : 2021.01.01

7. COLOR CODING



Color	1st, 2nd 3rd (Significant Figure)			(Multiplier)	(Tolerance)
	1st	2nd	3rd		
Black	0	0	0	10^0	—
Brown	1	1	1	10^1	F ($\pm 1\%$)
Red	2	2	2	10^2	G ($\pm 2\%$)
Orange	3	3	3	10^3	—
Yellow	4	4	4	10^4	—
Green	5	5	5	10^5	D ($\pm 0.5\%$)
Blue	6	6	6	10^6	C ($\pm 0.25\%$)
Violet	7	7	7	10^7	B ($\pm 0.1\%$)
Gray	8	8	8	10^8	—
White	9	9	9	10^9	—
Gold	—	—	—	10^{-1}	J ($\pm 5\%$)
Silver	—	—	—	10^{-2}	—
Plain	—	—	—	10^{-3}	—

Figure7