

SPECIFICATION OF METALLIZED POLYESTER FILM CAPACITOR

(MPP TYPE)

	ITEM	CHARACTERISTICS
1.	TEMPERATURE RANGE	- 40°C ~ + 85°C
2.	RATED CAPACITANCE	0.0047 uF ~ 4.7 uF
3.	CAPACITANCE TOLERANCE	J = ± 5 % , K = ± 10 % , M = ± 20 %
4.	RATED VOLTAGE	100V , 250V , 400V , 630VDC
5.	DIELECTRIC STRENGTH	R . V × 1.6 1 MINUTE
6.	DISSIPATION FACTOR	0.1 % MAX. AT 25°C , 1 KHZ
7.	HIGH TEMPERATURE	85°C , NO VOLTAGE APPLIED $\frac{\Delta C}{C} = -5 \% \text{ MAX. , DF } < 0.2\%$
8.	LOW TEMPERATURE	-40°C , NO VOLTAGE APPLIED $\frac{\Delta C}{C} = +5 \% \text{ MAX. , DF } < 0.2\%$
9.	HIGH TEMPERATURE LOADING	85°C , R.V. × 1.5 , 1000 HRS. $\frac{\Delta C}{C} = -5 \% \text{ MAX. , DF } < 0.2\%$ IR > 30% OF INITIAL VALUE
10.	HUMIDITY	40°C + 2°C , 90 ~ 95% R.H. 96+ 4 HRS. $\frac{\Delta C}{C} = -3 \% \text{ MAX. OF INITIAL VALUE}$ IR > 30% OF INITIAL VALUE
11.	INSULATION RESISTANCE	CHARGING RATED VOLTAGE OR LESS THAN 500VDC (1) LESS THAN 0.1UF >= 30,000MΩ (2) MORE THAN 0.1UF > 10,000MΩ*UF

1 GENERAL INFORMATION

1.1 APPLICATIONS:

THE TYPE MPP (METALLIZED POLYPROPYLENE) CAPACITORS , DUE TO THEIR EXCELLENT CHARACTERISTICS HAVE A WIDE RANGE OF APPLICATIONS , ESPECIALLY AT HIGH FREQUENCIES FOR RESONANT CIRCUITS , SWITCHING MODE POWER SUPPLIES , LINE DEFLECTION SYSTEM , TEMPERATURE – STABILIZED OSCILLATOR CIRCUITS .

1.2 OPERATING TEMPERATURE RANGE : $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

1.3 STANDARD TESTING CONDITION :

TEMPERATURE : 25°C

HUMIDITY : 60 – 65 % R.H.

2 CONSTRUCTIONS : (SHOWN AS FIG I)

2.1 DIELECTRIC MATERIAL : POLYPROPYLENE FILM

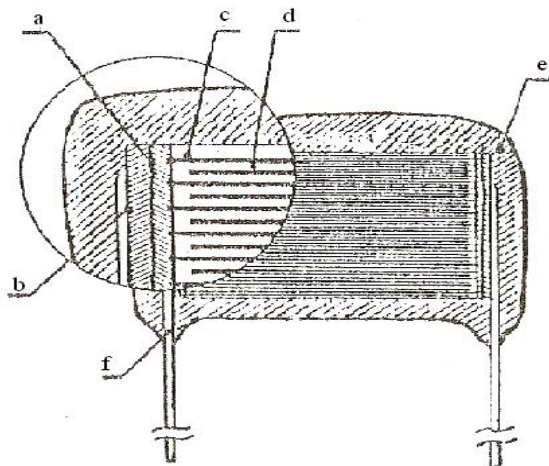
2.2 ELECTRODE MATERIAL : VACUUM EVAPORATED ALUMINIUM LAYER

2.3 OUTER COATING MATERIAL : EPOXY RESIN, FIRE RETARDANT ON REQUEST

2.4 TERMINAL MATERIAL : SOLDER-PLATED COPPER-CLAD STEEL WIRE

2.5 TERMINAL CONTACT : ELECTRICALLY WELDED

2.6 NON-INDUCTIVE WOUND



a. TWO LAYERS OF METAL ARE SPRAYED ON EACH END TO ENSURE GOOD, LASTING CONTACT TO EVERY LAYER.

b. LEAD CAREFULLY SPOT-WELDED TO END PLATE FOR STABILITY AND LOW INDUCTANCE

c. ALUMINIUM ELECTRODES

d. PLASTIC FILM

e. EPOXY RESIN COATING UL FILE NO.E154421

f. LEAD WIRE

3 EXPLANATION OF IMPORTANT TERMINOLOGY

3.1 RATED CAPACITANCE

THE RATED CAPACITANCE VALUE IN PICO FARADS IS EXPRESSED BY A THREE DIGIT NUMBER. THE FIRST TWO DIGITS ARE SIGNIFICANT FIGURES AND THE LAST DIGIT SPECIFIES THE NUMBER OF ZEROS TO FOLLOW .

EXAMPLE: 473 INDICATED 47000 PF OR 0.047 UF
 154 INDICATED 150000 PF OR 0.15 UF
 105 INDICATED 1000000 PF OR 1.0 UF

3.2 CAPACITANCE TOLERANCE

THE TOLERANCE IS THE PERMISSIBLE ACTUAL, CAPACITANCE RELATIVE TO THE RATED CAPACITANCE AND IT IS DEFINED IN PERCENT .

SYMBOL OF TOLERANCE SHOWN AS TABLE II.

SYMBOL TOLERANCE

F	$\pm 1\%$	J	$\pm 5\%$	M	$\pm 20\%$
G	$\pm 2\%$	K	$\pm 10\%$		

3.3 RATED VOLTAGE

EACH CAPACITOR IS DESIGNED FOR A SPECIFIED RATED VOLTAGE WHICH IT HAS TO STAND IN CONTINUOUS OPERATION WITHOUT DAMAGE .

THIS IS USUALLY ONLY VALID FOR AMBIENT TEMPERATURES OF $\leq +85^{\circ}\text{C}$.

IN THE CASE OF HIGHER TEMPERATURES A DERATING FACTOR MUST BE APPLIED TO THE RATED VOLTAGE AT 85°C

3.4 DISSIPATION FACTOR :

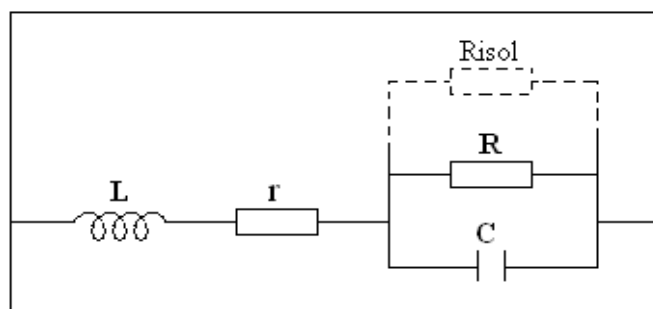
THE DISSIPATION FACTOR $\tan \delta$ IS THE QUOTIENT OF THE RESISTIVE AND REACTIVE PARTS OF THE IMPEDANCE . THE a.c. DIELECTRIC LOSSES ARE ILLUSTRATED BY R IN THE EQUIVALENT CIRCUIT DIAGRAM .

THE INSULATION RESISTANCE R_{is} IS IN PARALLEL WITH R , AND AFFECTS THE $\tan \delta$ ONLY AT VERY LOW FREQUENCIES .

THE DISSIPATION FACTOR IS ALSO AFFECTED BY THE RESISTANCE OF BOTH ELECTRODES AND OF THE TERMINATION ELECTRODE INTERFACE .

THIS IS REPRESENTED BY THE SERIES RESISTANCE r .

EQUIVALENT CIRCUIT SHOWN AS FIG II .



3.5 INSULATION RESISTANCE/TIME CONSTANT

THE INSULATION RESISTANCE IS NORMALLY EXPRESSED IN M OHM AND IS MEASURED AT A SPECIFIED VOLTAGE AFTER 1 MINUTE .

THE TIME CONSTANT DEFINES THE TIME IN SECONDS .

IN WHICH THE VOLTAGE ACROSS THE CAPACITOR SELF-DISCHARGES TO 37%

OF THE FULLY CHARGED STATE AND IT IS EXPRESSED AS $\tau = IR \times C$,

THE INSULATION RESISTANCE OR TIME CONSTANT VALUE DENOTES

THE QUALITY OF THE DIELECTRIC INSULATION .

3.6 SELF - HEALING

ALL METALLIZED PLASTIC FILM CAPACITOR MANUFACTURE BY SELF-HEALING THE ELECTRIC ARC, WHICH OCCURS WITH VOLTAGE BREAKDOWN OF THE DIELECTRIC, EVAPORATES THE METALLIZATION THE AREA OF THE BREAKDOWN WITHOUT IMPAIRING THE DIELECTRIC, THIS RESULT IN EFFECTIVELY ISOLATING THE REGION OF THE FAILURE .

THE TIME NECESSARY FOR THE SELF-HEALING PROCESS IS LESS THAN 10 U SEC SINCE ONLY FRACTION OF THE ENERGY STORED IN THE CAPACITOR ARE DISSIPATED IN THE SELF-HEALING PROCESS , THE POTENTIAL DROP REMAINS ACCORDINGLY LOW . THE CAPACITOR DESIGN ENSURE THAT SELF-HEALING PROCESSES OCCUR ONLY OCCASIONALLY , EVEN WHEN THE PARAMETERS OF CONTINUOUS MAXIMUM VOLTAGE AND MAXIMUM LIMIT TEMPERATURE APPLY . THE SELF-HEALING CHARACTERISTICS IS INDEPENDENT OF MAINTAINING THE SPECIFIED LIMIT CONDITION , AND CAN EVEN BE EFFECTIVE AT LOW VOLTAGE RATING WHERE ELECTROCHEMICAL ACTION TAKES PRECEDENCE .

4 ELECTRICAL TESTING METHODS :

4.1 CAPACITANCE :

TESTING FREQUENCY : 1 KHZ \pm 200HZ

TESTING VOLTAGE : 1 ~ 5 VRMS

4.2 DISSIPATION FACTOR : SAME AS 4.1 , DF SHALL BE LESS THAN 0.1 %

4.3 DIELECTRIC STRENGTH AT 25 °C

TESTED AT 160 % OF RATED VOLTAGE FOR 60 SECONDS THROUGH A LIMITING RESISTOR OF AT LEAST 1 OHM PER VOLT .

4.4 INSULATION RESISTANCE (I . R .) AT 25 °C

I . R . SHALL BE MEASURED AT RATED VOLTAGE OR LESS THAN 500VDC WITH A CHARGING TIME OF 60 SECONDS .

AND AT 25 °C . THE RESULT SHALL BE MEET THE REQUIREMENT TABLE I .

5 MECHANICAL TESTING WETHODS :

5.1 LEAD TENSILE STRENGTH :

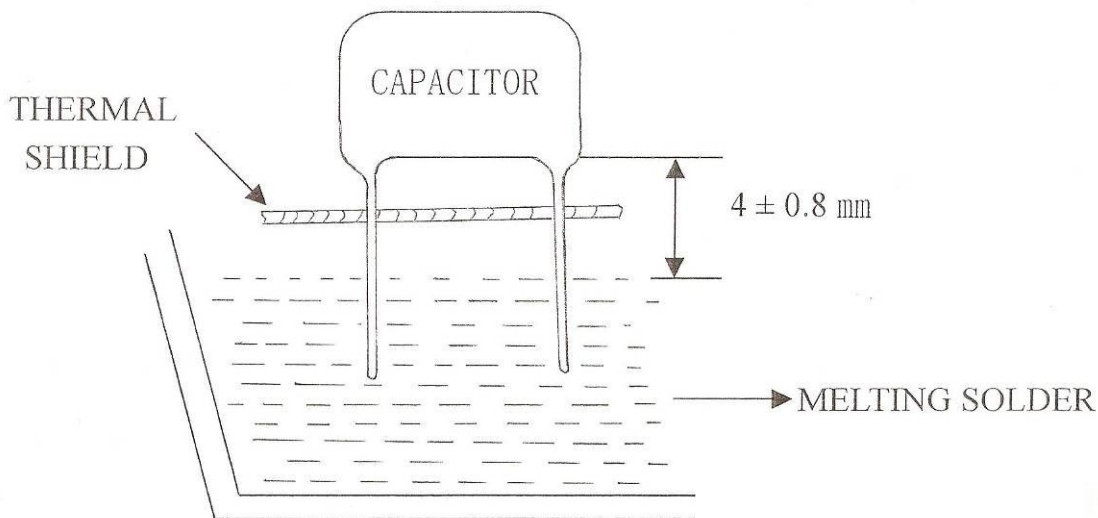
WITHSTANDS 2.2 LBS. OF STEADY PULL APPLIED RADIALLY TO THE LEAD WIRE FOR 5 SECS.

5.2 LEAD BENDING STRENGTH :

1 . 1 LBS . LOAD IS APPLIED TO THE LEADS . THE BODY OF CAPACITOR IS BENT 90 DEGREES AND RETURNED TO ITS ORIGINAL POSITION . AFTER THE TEST NO LOOSENING OR BREAKING OF THE TERMINAL SHOULD BE FOND .

5.3 SOLDERABILITY :

THE LEAD WIRE IS IMMERSSED UP TO $0.155'' \pm 0.030''$ FROM THE ROOT OF THE TERMINAL INTO THE SOLDER BATH AT $230 \pm 5^{\circ}\text{C}$ FOR 2 ± 0.5 SEC . SOLDER SHOULD COVER AT LEAST 75% OF THE CIRCUMFERENCE OF THE LEAD. . THE DIPPING SPEED INTO, AND RAISING SPEED FROM THE MOLTEN SOLDER SHALL BE 25 ± 6 MM/SEC . (SHOWN AS FIG III)



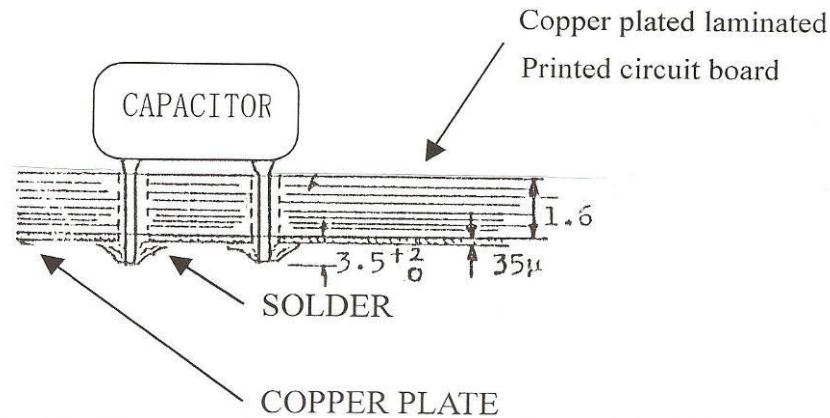
5.4 HEAT SHOCK :

THE LEAD OF CAPACITOR IS IMMERSSED INTO THE SOLDER BATH AT $260 \pm 5^{\circ}\text{C}$ FOR 5 ± 5 SEC. THE DIPPING SPEED INTO, AND RAISING SPEED FROM THE MOLTEN SOLDER SHALL BE 25 ± 6 MM/SEC. (SHOWN AS FIG III)

5.5 VIBRATION (SHOWN AS FIG IV)

WHEN THE CAPACITOR IS SUBJECTED TO THE VIBRATION TEST SPECIFIED BY THE VARIABLE FREQUENCY CYCLE, 1 MINUTE PER CYCLE FROM 10 HZ TO 55 HZ AND THEN 10 HZ WITH AN AMPLITUDE OF 1.5MM IN THREE DIRECTIONS (VERTICAL , HORIZONTAL AND LATERAL) FOR 2 HOURS EACH WITH A TOTAL OF 6 HOURS. AFTER THIS , INSPECT SHALL SATISFY THE INITIAL REQUIREMENT .

THE CAPACITOR SHALL BE MOUNTED BY THE FOLLOWING METHODS :
 THE CAPACITOR LEAD WIRES SHALL BE INSERTED VERTICALLY AS DEEP AS THEIR ROOT INTO A COPPER - FOILED LAMINATED BOARD FOR PRINTED CIRCUIT BOARD SHOWN AS FIG I , AND THE LEAD WIRE SHALL BE SOLDERED TO THE COPPER FOIL . THEN , THE COPPER FOILED LAMINATED BOARD WITH THE CAPACITOR SHALL BE RIGIDLY FIXED TO THE VIBRATION TEST PLATE.



6 WEATHERABILITY TESTING METHODS

6.1 HIGH TEMPERATURE

PLACE THE CAPACITOR IN A THERMOSTATIC OVEN KEPT AT 85°C , AFTER REACHING THE THERMAL STABILITY , THE RESULT OF MEASUREMENT SHALL SATISFY THE REQUIREMENT GIVEN IN FOLLOWING ITEM :

- 6.1.1 CAPACITANCE DRIFT : THE RATE - 5 % OF INITIAL VALUE .
- 6.1.2 DISSIPATION FACTOR : LESS THAN 0.2 % AT 1 KHZ .

6.2 LOW TEMPERATURE

PLACE THE CAPACITOR IN A THERMOSTATIC OVEN KEPT AT -40°C , AFTER REACHING THE THERMAL STABILITY , THE RESULT OF MEASUREMENT SHALL SATISFY THE REQUIREMENT GIVEN IN FOLLOWING ITEM :

- 6.2.1 CAPACITANCE DRIFT : + 5 % MAX . OF INITIAL VALUE .
- 6.2.2 DISSIPATION FACTOR : LESS THAN 0.2 % AT 1 KHZ .

6.3 HIGH TEMPERATURE LOADING

PLACE THE CAPACITOR IN A THERMOSTATIC OVEN KEPT AT $+85^{\circ}\text{C}$ FOR 1 HOUR . AND THEN APPLIED 150% OF THE RATED VOLTAGE FOR 1000 HOUR . AFTER THIS , TAKE OUT THE CAPACITOR FROM THE THERMOSTATIC OVEN FOR 1 TO 2 HOURS . THE RESULT OF MEASUREMENT SHALL SATISFY THE REQUIREMENT GIVEN IN FOLLOWING ITEM :

- 6.3.1 CAPACITANCE DRIFT : + 5 % MAX . OF INITIAL VALUE .
 - i. DISSIPATION FACTOR : LESS THAN 0.2% AT 1 KHZ .
 - ii. INSULATION RESISTANCE : OVER THAN 30% OF INITIAL VALUE .

6.4 HUMIDITY

PLACE THE CAPACITOR IN A THERMOSTATIC OVEN KEPT AT TEMPERATURE 40 ± 2 °C AND HUMIDITY 95 ± 2 % FOR 96 ± 4 HRS . AFTER THIS , TAKE OUT THE CAPACITOR FROM THE THERMOSTATIC OVEN FOR 16 HRS . THE RESULT OF MEASUREMENT SHALL SATISFY THE REQUIREMENT GIVEN IN FOLLOWING ITEM :

- 6.4.1 CAPACITANCE DRIFT : ± 3 % MAX . OF INITIAL VALUE .
- 6.4.2 INSULATION RESISTANCE : OVER THAN 30 % OF INITIAL VALUE .
- 6.4.3 DISSIPATION FACTOR : LESS THAN 0.2%

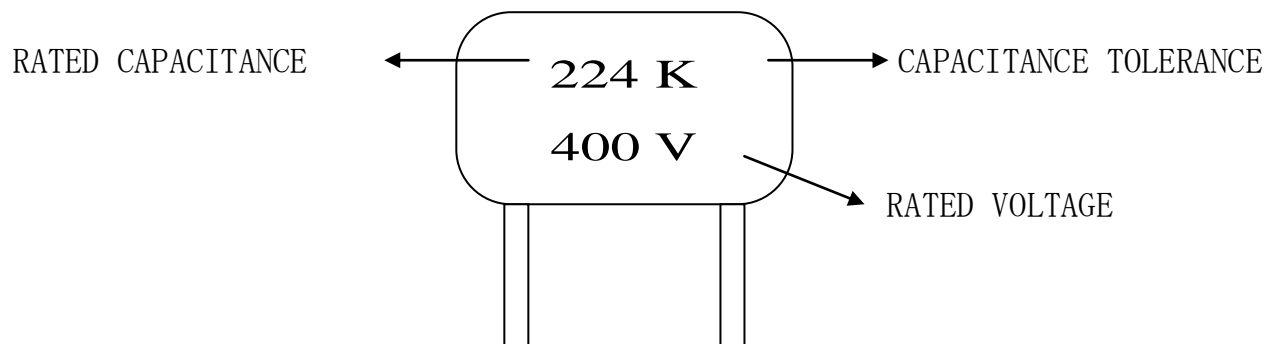
7 MARKING

7.1 MARKING ON INDIVIDUAL CAPACITOR INCLUDES : (SHOWN AS FIG V)

- 7.1.1 RATED CAPACITANCE : SUCH AS 223 , 154 OR 105 IN PF OR UF
- 7.1.2 RATED VOLTAGE : SUCH AS 100V , 250V , 630V IN DC
- 7.1.3 CAPACITANCE TOLERANCE : SUCH AS J . K OR M
- 7.1.4 MANUFACTURER'S SYMBOL :

7.2 MARKING ON PACKAGE

EACH PACKAGE UNIT SHALL CARRY THE TYPE , RATING , QUANTITY AND DATE OF MANUFACTURE , LOCATION OF MANUFACTURE , AND THE MANUFACTURER'S NAME .



8 PACKING

THE CAPACITOR SHALL BE CAREFULLY PACKED TO PREVENT DAMAGE OWING TO MOISTURE ABSORPTION , VIBRATION OR IMPACT DURING STORAGE

9 ACCEPTABLE QUALITY LEVEL

THE ACCEPTABLE QUALITY LEVEL IS SPECIFIED AS FOLLOWING :

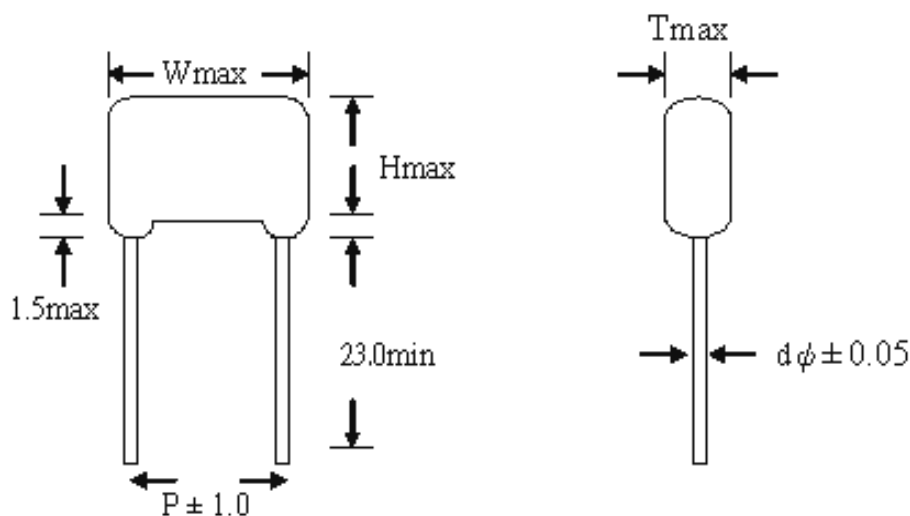
- 9.1 APPEARANCE AQL : 4.0
- 9.2 DIMENSION AQL : 1.5
- 9.3 MECHANICAL CHARACTERISTICS AQL : 1.5
- 9.4 ELECTRICAL CHARACTERISTICS INCLUDES C, IR, WV, DF AND ECT . AQL : 1.0

10 DIMENSION

TYPE : MPP

Metallized Polypropylene Film Capacitor (Coating)

OUTLINE DRAWING



尺寸 DIMENSION :

單位 Unit : mm

CAPACITANCE		250VDC					400VDC					630VDC				
SYMBO	uF	W	H	T	P	d	W	H	T	P	d	W	H	T	P	d
103	0.010	13.0	10.0	6.0	10.0	0.6	13.0	10.0	6.0	10.0	0.6	13.0	11.0	7.0	10.0	0.6
153	0.015	13.0	10.0	6.0	10.0	0.6	13.0	10.0	6.0	10.0	0.6	13.0	11.0	7.5	10.0	0.6
223	0.022	13.0	11.0	7.0	10.0	0.6	13.0	11.0	7.0	10.0	0.6	18.0	11.0	7.0	15.0	0.8
333	0.033	13.0	11.0	7.0	10.0	0.6	13.0	11.0	7.0	10.0	0.6	18.0	12.5	8.0	15.0	0.8
473	0.047	13.0	11.0	7.0	10.0	0.6	13.0	11.0	7.0	10.0	0.6	18.0	14.5	9.0	15.0	0.8
683	0.068	18.0	12.5	7.0	15.0	0.8	18.0	12.5	7.0	15.0	0.8	24.0	14.5	9.0	20.0	0.8
104	0.10	18.0	12.5	7.0	15.0	0.8	18.0	12.5	8.0	15.0	0.8	24.0	14.5	10.0	20.0	0.8
154	0.15	13.0	12.0	7.5	10.0	0.6	24.0	14.5	8.0	20.0	0.8	24.0	17.5	11.5	20.0	0.8
224	0.22	18.0	14.5	9.0	15.0	0.8	18.0	14.5	9.0	15.0	0.8	31.0	20.0	11.5	27.5	0.8
334	0.33	24.0	14.5	9.0	20.0	0.8	24.0	17.5	11.5	20.0	0.8	31.0	20.0	13.0	27.5	0.8
474	0.47	24.0	14.5	10.0	20.0	0.8	31.0	20.0	11.0	27.5	0.8	31.0	24.0	15.5	27.5	0.8
684	0.68	24.0	17.5	11.5	20.0	0.8	31.0	20.0	12.0	27.5	0.8	31.0	25.5	17.0	27.5	0.8
105	1.0	31.0	20.0	11.5	27.5	0.8	31.0	21.0	15.5	27.5	0.8					
155	1.5	31.0	22.0	13.0	27.5	0.8	31.0	25.0	17.0	27.5	0.8					
225	2.2	31.0	25.0	15.5	27.5	0.8										
335	3.3	31.0	27.0	17.0	27.5	0.8										
274	0.27											31.0	20	13.0	27.5	0.8

可依需求制作特殊規格 (SPECIAL SIZE OR ITEMS ON REQUEST)