

Own-weight Deflection of Four-side-supported Methacrylic Resin Sheet (Flat Sheet)

Unit: mm

Calculation conditions		Elastic modulus 2900 [MPa]			
Sheet thickness	Short side "a"	Long side "b"/Short side "a" ratio			
		1	Symbol	2	Symbol
2	450	1.7	○	4.2	
	600	3.8		6.6	
	900	8.0		13.6	
	1,200	12.6		20.2	
	1,500	17.4		29.0	
	1,800	22.0		34.0	
3	450	0.9	◎	2.7	
	600	2.4	○	6.3	
	900	7.2		13.5	
	1,200	12.0		19.5	
	1,500	17.1		27.6	
	1,800	21.0		36.0	
5	450	0.2	◎	1.2	○
	600	0.9	◎	3.3	
	900	4.1	○	10.5	
	1,200	9.5		18.5	
	1,500	14.3		26.5	
	1,800	20.5		33.5	
8	450	0.0	◎	0.2	◎
	600	0.2	◎	1.5	◎
	900	1.9	◎	6.6	
	1,200	5.6	○	15.2	
	1,500	11.2		22.8	
	1,800	16.4		32.0	
10	450	0.0	◎	0.1	◎
	600	0.1	◎	0.7	◎
	900	1.0	◎	5.0	
	1,200	4.0	○	12.0	
	1,500	8.2		21.0	
	1,800	14.0		30.0	

· The above values show the short-term own-weight deflections of the four-side-supported products calculated from the following large-deflection solution formula based on the calculation conditions specified above.

$$\frac{P}{E} \times \frac{(a^2 \times b^2)}{t^4} = 22 \left(\frac{\delta}{t} \right) + 3.9 \left(\frac{\delta}{t} \right)^3$$

P: Own-weight pressure [N/m²]
 E: Elastic modulus (calculation premise) [MPa]
 a: Short-side length [mm]
 b: Long-side length [mm]
 t: Sheet thickness [mm]
 δ: Max. deflection [mm]

· The amount of deflection is about twice as much in the long term.

· It is generally said that the deflection is less noticeable at 1/200 or less of the short-side length.
 Circles (○) in the table indicate the imposition of short-term stress, and double circles (◎) indicate the imposition of long-term stress both at 1/200 or less of the short-side length.

· CAD calculation by a design expert is required to calculate product deflection in the large-deflection solution formula.

Kuraray Co., Ltd.

Methacrylate Division

TOKIWABASHI TOWER, 2-6-4, Otemachi, Chiyoda-ku, Tokyo 100-0004

Kuraray Trading Co., Ltd.

Acrylic Products Department (Tokyo)

TOKIWABASHI TOWER, 2-6-4, Otemachi, Chiyoda-ku, Tokyo 100-0004
Tel.: +81-3-6701-2035

Acrylic Products Department (Osaka)

8-1, Kakuda-cho, Kita-ku, Osaka (Osaka Umeda Twin Towers North) 530-8611
Tel.: +81-6-7635-1805