

Silicone

Tolerance margin

In the extrusion processes of silicone rubbers, greater tolerances are needed than those of molding processes since when the silicone extrudes and it comes out through the tooling / die, it expands and during the curing and post-curing processes it suffers contractions and deformations.

The deformation at the extrusion exit can be controlled by different supports, which will depend on the degree of control, size and section required. The characteristics of the profile to be manufactured determine the applicable tolerance in each dimension. For certain synthetic rubbers, the E1 standard cannot be achieved.

In the longitudinal cutting process, precision and tolerance will be determined by the technology we use in cutting.

In the molding process, every part has to be manufactured with a surplus of rubber to complete the shape of the mold and thus the surplus flows through the burr cutter, an excess of material will cause the dimensions of the vertical axis (Thickness) to vary. We must bear in mind that for the correct application of the standard, there are fixed dimensions, which are those of the horizontal part of the mold (H) and those of thickness (V), which are those of the vertical axis. For the calculation of vertical tolerances, the maximum height of the part must be used.

There are 3 types of internationally accepted tolerances, "E" for Extrusion, "L" for Longitudinal cutting and "M" for Molding:

Class E1, L1 and M1 = Maximum Quality
 Class E2, L2 and M2 = Good Quality
 Class E3, L3 and M3 = Not Critical
 Class M4 = Medium Quality

EXTRUSION TOLERANCES IN THE PROFILE SECTION FOR UNREINFORCED RUBBER (ISO 3302-1: 2014 (E) CLASS E)

Nominal Dimension	from	to	Class E1	Class E2	Class E3
	(mm)	(mm)	(+ / - mm)	(+ / - mm)	(+ / - mm)
	0	1,5	0,15	0,25	0,40
	1,5	2,5	0,20	0,35	0,50
	2,5	4,0	0,25	0,40	0,70
	4,0	6,3	0,35	0,50	0,80
	6,3	10	0,40	0,70	1,00
	10	16	0,50	0,80	1,30
	16	25	0,70	1,00	1,60
	25	40	0,80	1,30	2,00
	40	63	1,00	1,60	2,50
	63	100	1,30	2,00	3,20

CUTTING TOLERANCES FOR UNREINFORCED SILICONE RUBBER EXTRUDED PROFILES
 (ISO 3302-1: 2014 (E) CLASS L)

Nominal Length	from	to	Class E1	Class E2	Class E3
	(mm)	(mm)	(+ / - mm)	(+ / - mm)	(+ / - mm)
	0	40	0,70	1,00	1,60
	40	63	0,80	1,30	2,00
	63	100	1,00	1,60	2,50
	100	160	1,30	2,00	3,20
	160	250	1,60	2,50	4,00
	250	400	2,00	3,20	5,00
	400	630	2,50	4,00	6,30
	630	1000	3,20	5,00	10,00
	1000	1600	4,00	6,30	12,50
	1600	2500	5,00	10,00	16,00
	2500	4000	6,30	12,50	20,00
	4000	---	0,16%	0,32%	0,50%

MOLDING TOLERANCES FOR RUBBER

(ISO 3302-1:2014 (E) CLASE M)

Nominal Dimension	from	to	Class M1		Class M2		Class M3		Class M4
	(mm)	(mm)	V (+ / - mm)	H	V (+ / - mm)	H	V (+ / - mm)	H	F(+ / - mm)H
	0	4	0,08	0,10	0,10	0,15	---	---	---
	4	6,3	0,1	0,12	0,15	0,20	0,25	0,40	0,50
	6,3	10	0,10	0,15	0,20	0,20	0,30	0,50	0,70
	10	16	0,15	0,20	0,20	0,25	0,40	0,60	0,80
	16	25	0,20	0,20	0,25	0,35	0,50	0,80	1,00
	25	40	0,20	0,25	0,35	0,40	0,60	1,00	1,30
	40	63	0,25	0,35	0,40	0,50	0,80	1,30	1,60
	63	100	0,35	0,40	0,50	0,70	1,00	1,60	2,00
	100	160	0,40	0,50	0,70	0,80	1,30	2,00	2,50
	160	---	0,3%	0,4%	0,5%	0,7%	0,8%	1,30%	1,50%

TOLERANCES FOR CALENDERED SILICONE SPONGE SHEET

Nominal Dimension	from (mm)	to (mm)	Tolerance (+ / - mm)
	1.6	7.00	0.50
	7.50	10.00	0.80
	11.00	11.50	1.00
	>11.50	17.00	1.50
	>17.00	19.00	1.90
	>19.00	20.00	2.00
	>20.00	25.00	2.50
	>25.00	50.00	10%