The two extruded rubber tolerance tables outlined in this section are indicative of our typical tolerance capabilities. Most often Minor Rubber will quote profiles to [i]RMA E2 Precision tolerances. However, E3 Commercial tolerances may be quoted due to the size, hardness and shape of the part required. Should you require a tighter tolerance, please indicate your tolerance requirements and we will analyze your requirement and determine whether the part is suited to be extruded to a tighter tolerance. Please note that tighter tolerances require greater control when extruding and typically result in higher manufacturing costs. These tolerances apply to outside diameters (O.D.), inside diameters (I.D.), wall thickness, width, height, and general cross sectional dimensions for extrusions.

Extruded Rubber Tolerance Tables

RMA Class.....2
Drawing Designation.....E2 – Precision

Dimensions in Millimeters

Above	*Up To*	*Tolerance Range*
0	1.5	±.25
1.5	2.5	±.35
2.5	4.0	±.40
4.0	6.3	±.50
6.3	10	±.70
10	16	±.80
16	25	±1.00
25	40	±1.30
40	63	±1.60
63	100	±2.00

Dimensions in Inches

Above	*Up To*	*Tolerance Range*
0	.06	±.010
.06	.10	±.014
.10	.16	±.016
.16	.25	±.020
.25	.39	±.027
.39	.63	±.031
.63	.98	±.039
.98	1.57	±.051
1.57	2.48	±.063
2.48	3.94	±.079

RMA Class.....3
Drawing Designation.....E3 – Commercial

Dimensions in Millimeters

Above	*Up To*	*Tolerance Range*
0	1.5	±.40
1.5	2.5	±.50
2.5	4.0	±.70
4.0	6.3	±.80
6.3	10	±.1.00
10	16	±1.30
16	25	±1.60
25	40	±2.00
40	63	±2.50
63	100	±3.20

Dimensions in Inches

Above	*Up To*	*Tolerance Range*
0	.06	±.015
.06	.10	±.020
.10	.16	±.027
.16	.25	±.031
.25	.39	±.039
.39	.63	±.051
.63	.98	±.063
.98	1.57	±.079
1.57	2.48	±.098
2.48	3.94	±.126

Note: There is a relationship between hardness and the amount of tolerance which will be used. The lower the hardness the more tolerance necessary.

*General cross sectional dimensions below .040”(1mm) are impractical.

Standard Dimensional Tolerance Table – Molded Rubber Products

Drawing Designation "A3" Commercial

Size (Millimeters)	*Fixed*	*Closure*	*Size (Inches)*	*Fixed*	*Closure*
0 – 10	±.20	±.32	0 - .40	±.008	±.013
10 – 16	±.25	±.40	.40 - .63	±.010	±.016
16 – 25	±.32	±.50	.63 – 1.00	±.013	±.020
25 – 40	±.40	±.63	1.00 – 1.60	±.016	±.025
40 – 63	±.50	±.80	1.60 – 2.50	±.020	±.032
63 – 100	±.63	±1.00	2.50 – 4.00	±.025	±.040
100 – 160	±.80	±1.25	4.00 – 6.30	±.032	±.050
Over 160 – Multiply by	.005	.008	**Over 6.30 Multiply by**	.005	.008

FACTORS THAT AFFECT TOLERANCES IN MOLDED RUBBER PRODUCTS.

There are several factors that affect the tolerances of molded rubber products. The following are brief explanations which are intended to aid in the design of cost effective rubber components.

MOLD DESIGN – Molds are designed and built to varying degrees of precision, however, the more precise dimensions must be, the more expensive the mold is. A mold designer will typically design a mold to maximize the precision of the mold while also taking into account the mold life per dollar cost. When the mold is being produced a mold maker will take into account shrinkage and adjust the size of the mold as a result.

SHRINKAGE – All rubber compounds experience shrinkage after being molded, each compound to a different degree than another. Several factors affect the shrinkage of a part, such as; rubber batch variance, cure time, temperature, pressure, post cure and inserts. Even though molds are built to accommodate these variables, a mold must be built with adequate dimensional tolerances. Rubber manufacturers will always aim to reduce the variables that affect the shrinkage; however they cannot be eliminated entirely.

INSERTS – Inserts that are included in rubber products generally will have their own tolerances. When an insert is designed to be molded into a rubber product, other factors must be considered, such as the fit into the mold cavity, location of the insert with respect to the dimensions of the finished rubber part as well as proper spacing to match with the mold pins and that room temperature inserts are put into a hot mold. A rubber manufacturer will be able to advise of design features that will allow an insert to be properly utilized.

TRIM AND FINISH – The main purpose of trim and finish operations are to remove rubber excess that is not part of the finished product, such as flash. Most times the dimensions of a part will not be altered by this operation, however, in some instances material is removed from the part itself affecting the finished part dimensions. This process can also be utilized to control the finished part dimensions in cases where a lip or projection has occurred at the mold parting line.

DISTORTION – Rubber is a flexible material, as a result its shape can be affected by temperature. Distortion of a part can occur when it is removed from a mold or packed for shipment. To best measure the dimensions of a part, the part should be kept in a relaxed state at room temperature for 24 hours.

Environmental Storage Conditions

Temperature – Although the coefficient of the expansion of rubber is high compared to other materials, rubber changes in dimension with changes in temperature. This effect can be minimized by stabilizing the product at a predetermined humidity and temperature for a period of 24 hours or more, prior to measuring.

Humidity – Some rubber materials absorb moisture. Hence the dimensions of a rubber part will be affected by the amount of moisture that has been absorbed This effect can be minimized by stabilizing the product at a predetermined humidity and temperature for a period of 24 hours or more, prior to measuring.

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[i] [i]The above information have been taken from the Rubber Manufacturers Association "*Rubber Handbook For Molded, Extruded, Lathe Cut and Cellular Products*". Please visit the Rubber Manufacturers Association at www.rma.org.