SJV O-rings

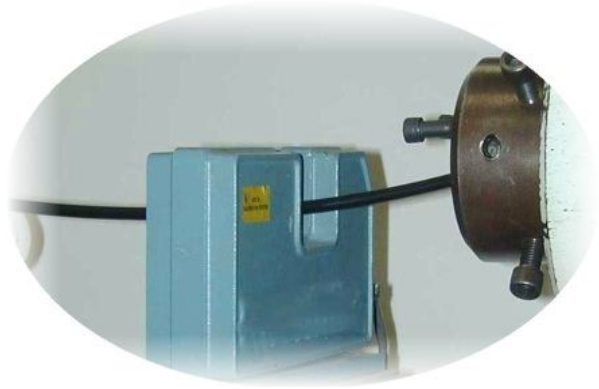
One of our most popular products is the Scarf cut and hot vulcanised joined cord ring ('SJV O-ring').

Our factory has developed a very successful method of producing O-rings from extruded cord to a very high technical standard.

The most important factors affecting the quality of this product is the mechanical characteristics and dimensional accuracy of the extruded cord stock. Over recent years we have selected special compounds, which give very low compression set figures that are critical for high quality vulcanising.

In addition to this the extrusion lines are all laser controlled for dimensional accuracy and the standard extruded finish cord tolerances are often tighter than ISO 3302-1 E1.

We offer the optional 'close-tol' cord, which can have the incredible tolerance of just +/- 0.05mm (0.002") and a super smooth surface finish.



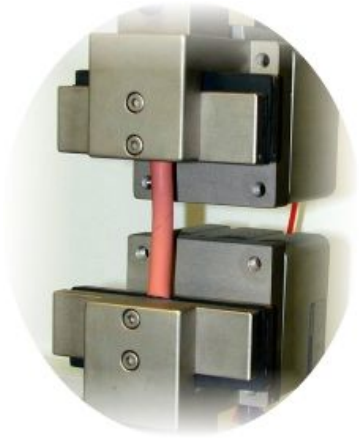
Joint Tensile Strength

As shown at the top of this page, we produce all our joints by scarf cutting at 45 degrees. This is very important in achieving high tensile strengths as the area of the vulcanising surface is greatly increased.

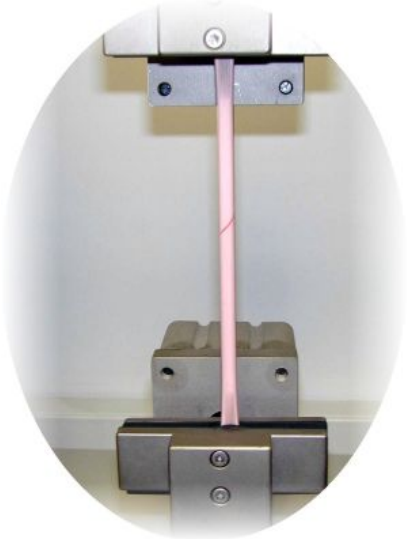
Routine tensile strength tests are carried out to satisfy quality control requirements, and in addition to this, we can offer 'production batch testing' (by prior arrangement) on your orders.

The testing is carried out on a custom built tensometer.

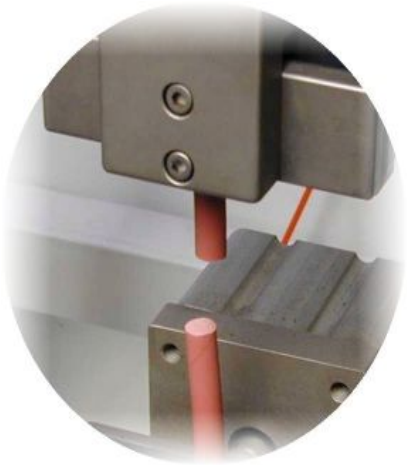
A typical joint sample is 140mm long and is held in specially designed clamps.



The joint sample is stretched until breakage occurs and, depending on the material, can result in a very high elongation.



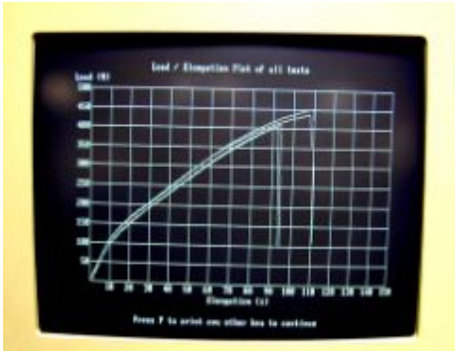
When the sample breaks it is often at the joint area. This does not infer weakness, but at such high elongation, any surface imperfection around the joint area will be the point of breakage.



The break, shown above, is at the joint area, but at 90 degrees to the cord stock.

This detail shows that the vulcanised area has not failed and indicates a good quality vulcanisation.

After breakage the load cell transfers data to computer software, which is then analysed and expressed in graph form, and as industry standard Mpa tensile strength.



It is then possible to include this testing with general certification (by prior agreement).

By conducting joint tests and inserting them into the actual production schedule, we can obtain a true representation of the integrity and consistency of the vulcanising process, particularly useful on higher volume orders.

Size Range

Mantek can produce SJV O-rings with cross sections ranging from 1.78mm to 25.4mm (larger by special request). These will have a surface finish as extruded unless otherwise requested.

Unlike moulded O-rings, SJV O-rings have a limit on how small the inside diameter can be. This is regulated by the cross section. The following table shows the smallest sizes that can be produced.

Cross section Ø	Smallest Inside Ø
1.78 – 8.40	30
9.00 – 12.70	45
13.00 – 15.90	60
18.00 – 19.05	150
20.63 – 25.40	250

Please note the prices for these smaller SJV O-rings are more expensive because they are more difficult to manufacture.

There is however no upper limit to diameter.

The largest SJV O-ring our factory has ever produced, so far, has been an amazing 22 metres in diameter! The only difficulty is checking the inside diameter at quality control!

Cord Tolerances

Our SJV O-ring cords are a premium quality with tolerances matching or exceeding ISO 3302-1 E1 tolerances.

We can also offer the cord with a ground finish with cross-section tolerance better than a moulded O-ring.

Cross section	Tolerances	
	Extrusion	Ground cord
1.78	±0.10	±0.05
2.00	±0.10	±0.05
2.40	±0.12	±0.05
2.62	±0.12	±0.05
3.00	±0.12	±0.05
3.18	±0.15	±0.05
3.53	±0.15	±0.05
4.00	±0.15	±0.05
4.50	±0.20	±0.05
4.80	±0.20	±0.05
5.00	±0.20	±0.05
5.34	±0.20	±0.05
5.50	±0.25	±0.05
5.70	±0.25	±0.05
6.00	±0.25	±0.05
6.35	±0.25	±0.05
6.50	±0.25	±0.05
6.99	±0.25	±0.05
7.50	±0.25	±0.05

Cross section	Tolerances	
	Extrusion	Ground cord
8.00	±0.25	±0.05
8.40	±0.25	±0.10
9.00	±0.25	±0.10
9.52	±0.25	±0.10
10.00	±0.33	±0.10
11.10	±0.38	±0.10
12.00	±0.45	±0.10
12.70	±0.45	±0.10
13.00	±0.45	±0.10
14.00	±0.50	±0.10
14.30	±0.50	±0.10
15.00	±0.50	±0.10
15.90	±0.50	±0.10
18.00	±0.70	Enquire
19.05	±0.76	Enquire
20.00	±0.76	Enquire
20.63	±0.76	Enquire
22.00	±0.76	Enquire
25.40	±0.86	Enquire

Every inch of the extruded products are checked for compliance to the above tolerances by state of the art 'laser micrometers'. This is the only way to guarantee 100% cross-section diameter inspection

Each batch of extrusion is passed through a laser micrometer and the laser measures the cord 250 times per second and then produces a report after each batch showing details of high, low, and average diameters.

Internal diameters

Internal diameters are toleranced according to ISO 3302-1 M2F as SJV O-rings frequently fall outside the range of diameters controlled by BS or AS standard sizes.

Inside diameter	Tolerance
25mm thru 40mm	+/- 0.35
40.1mm thru 63mm	+/- 0.40
63.1mm thru 100mm	+/- 0.50
100.1mm thru 160mm	+/- 0.70
Hereafter the tolerance will be +/- 0.5% of the nominal inside diameter of the ring. Example: inside diameter of 310.0mm tolerance = +/- 1.55mm (0.5%).	

Benefits of SJV O-rings

The main benefits of using SJV O-rings are as follows:

- Moulds are not required resulting in huge cost savings
- No upper diameter restrictions like moulding
- Tolerances can be closer than moulding
- No flash lines are present
- Can be used in standard housings
- Shapes other than round are possible
- Joints in some cases 90% of cord strength
- Short lead times (48 hour turn around possible)

Restrictions of SJV O-rings

There are however areas where SJV O-rings are restrictive:

- Small diameters cannot be produced
- Dynamic applications where roll may occur.
- Excessive stretching- low strength materials.
- Not possible below of 60° Shore A hardness.
- Not competitive against moulded rings when diameters are small and large quantities are required

Lead Times for SJV O-rings

Standard 'price list' compound SJV O-rings up to 100 pieces are generally shipped within a few working days from receipt of order. For breakdowns we offer an emergency service and delivery can be within 72 hours.

Material availability

Our standard grades of Nitrile, EPDM, Neoprene, Silicone and Viton® are premium grades all offering exceptional application performance, however some applications will have more demanding conditions.

For these applications we offer a range of speciality materials which are made to the same high quality as our everyday grades.

Listed below are the grades we currently offer. SJV O-rings shown as a price list item are our standard compound grades. Please ask if the grade you need is not listed.

Material Code	Price list?		Ground finish only?	Material	Colour	Special property	SG g/cm³	Typical test values			
	Cord	SJV O-ring						Hardness Shore A	Elongation at break %	Tensile strength Mpa	Compression set
231-312				Nitrile 65	BLACK	FDA/3-A metal detectable	1.47	60	554	6.3	17.4
231-161		Yes		Nitrile 60	BLACK		1.26	64	378	10.7	20.0
231-185		Yes		Nitrile 75	BLACK	FDA	1.37	71	379	11.7	19.6
231-238	Yes	Yes		Nitrile 75	BLACK		1.27	79	310	19.0	18.0
231-241	Yes	Yes		Nitrile 90	BLACK		1.31	86	217	14.6	17.0
231-195			Yes	Carboxylated Nitrile 75	BLACK		1.21	75	349	15.6	29.0
231-153			Yes	Hydrogenated Nitrile 75	BLACK		1.24	72	360	18.0	21.0
231-299		Yes		Chloroprene 60	BLACK	FDA	1.54	62	390	17.0	77.0
231-186		Yes		Chloroprene 75	BLACK	FDA	1.6	74	499	12.8	42.0
231-144		Yes		Chloroprene 75	BLACK		1.55	75	370	9.5	16.5
231-155				EPDM 60	BLACK		1.34	57	537	9.0	16.0
231-251				EPDM 60	BLACK	FDA	1.22	62	280	8.0	9.5
231-278		Yes		EPDM 60	BLACK		1.13	63	831	12.3	36.0
231-311				EPDM 65	BLACK	FDA/3-A metal detectable	1.61	67	285	7.4	15.1
231.309				EPDM 70	BLACK	FDA/3-A/USP Class VI	1.18	68	365	12.5	11.6
231-187		Yes		EPDM 75	BLACK	FDA/3-A	1.31	73	418	11.8	13.9
231-130	Yes	Yes		EPDM 75	BLACK		1.38	73	439	8.9	42.0
231-214	Yes			EPDM 90	BLACK		-	-	-	-	-
231-134	Yes	Yes		Viton® 'A' 60	BLACK		2	65	292	12.0	6.7
231-184	Yes			Viton® 'A' 60	BROWN		2.14	65	476	12.5	5.4
231-327				Viton® 'A' 70	BLUE	FDA/3-A metal detectable	2.25	66	237	12.0	7.7
231-307				Viton® 'A' 70	BLACK	FDA/3-A/USP Class VI	2.17	72	192	15.8	5.3
231-179			Yes	Viton® 'GLT' 75	BLACK		1.78	74	231	19.4	14.5
231-220			Yes	Viton® 'GFLT' 75	BLACK		1.83	75	195	13.0	22.0
231-276				Viton® 'GF-S' 75	BLUE		2.36	76	362	16.4	13.0
231-275				Viton® 'GFLT-S' 75	BLUE		2.37	76	232	12.0	13.0
231-229				Viton® 'A' 75	WHITE	FDA/3-A	2.44	77	335	12.1	6.2
231-172	Yes	Yes		Viton® 'A' 75	BLACK	FDA/3-A	2.32	78	302	13.5	5.8
231-162				Viton® 'A' 70	BLACK		1.95	78	247	12.5	22.0
231-152	Yes	Yes		Viton® 'A' 75	BLACK		2.32	79	233	11.5	4.6
231-170	Yes	Yes		Viton® 'A' 75	BROWN		2.26	79	273	13.5	5.4
231-129				Viton® 'GF' 75	BLACK		1.88	79	328	19.3	14.0
231-150	Yes	Yes		Viton® 'A' 75	GREEN		2.32	80	232	10.2	5.5
231-226	Yes			Viton® 'A' 90	BROWN		2.51	87	129	11.2	9.4
231-204			Yes	Viton® 'B' 90 EDR	BLACK	Explosive decompression	1.87	90	220	12.5	7.0
231-126	Yes	Yes		Viton® 'A' 90	BLACK		1.82	90	193	15.8	5.7
231-167	Yes			Viton® 'A' 90	GREEN		2.51	90	93	15.0	8.4
231-164				Aflas® 75	BLACK		1.73	80	331	14.9	54.5
231-115				Aflas® 90	BLACK		1.6	88	184	21.0	18.0
231-249				Fluorosilicone 80	BLUE		1.77	81	84	7.3	26.0
231-330				Silicone 70	BLUE	FDA/3-A metal detectable	1.33	69	167	4.7	14.8
231-308				Silicone 70	TRANS.	FDA/3-A/USP Class VI	1.19	67	369	9.9	17.8
231-203		Yes		Silicone 75	RED	FDA/3-A	1.58	73	165	7.5	9.2