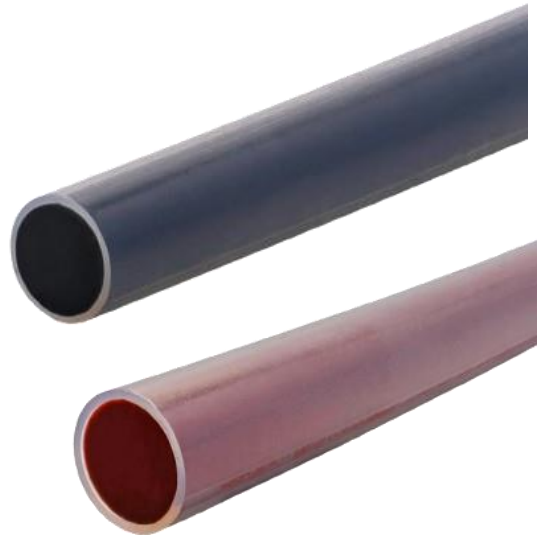




# ENCAPSULATED O-RINGS

## PRODUCT RANGE GUIDE



# ENCAPSULATED O-RINGS RANGE OVERVIEW

Our FEP encapsulated 'O'-rings provide a high performance and low-cost sealing solutions for a variety of chemically demanding applications, or where regulatory compliance is particularly important.

Encapsulated 'O'-ring seal is an 'O'-ring bound by a seamless and uniform Fluorinated Ethylene Propylene (FEP) or Pefluoroalkoxy Alkanes (PFA) encapsulation, which encloses an elastomeric core, completely protecting it from the media. The combination of elastomers and encapsulation choice enables our encapsulated seals to achieve a combination of temperature, chemical and cost performance unrivalled by pure elastomeric solutions.

FEP encapsulated O-rings are recommended when a standard O-ring has inadequate chemical resistance for an application. They are also recommended when a solid PTFE O-ring does not have the elasticity for reliable, long term fluid sealing. They are often used where chemical resistance and or hygiene is required.

**Typical Industries:** Food, Chemical, Petrochemical, Pharmaceutical

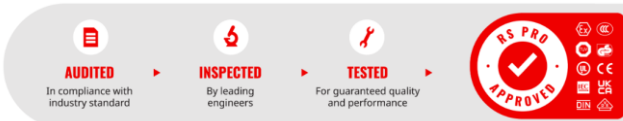
## FEP Silicone Encapsulated O-rings

Material	FEP Encapsulated Silicone
Encapsulation	FEP - Fluorinated Ethylene Propylene (transparent)
Core	Silicone (Red)
Hardness	85-90 Shore A
Minimum Operating Temperature	-60°C
Maximum Operating Temperature	+205°C
Temperature Range	-60°C to +205°C (-75°F to +400°F)



## FEP Viton®/FKM Encapsulated O-rings

Material	FEP Encapsulated Viton®/FKM
Encapsulation	FEP - Fluorinated Ethylene Propylene (transparent)
Core	Viton®/FKM
Hardness	90-95 Shore A
Minimum Operating Temperature	-20° C
Maximum Operating Temperature	+140° C
Temperature Range	-20° C to +140° C (-4° F to +284° F)



# ENCAPSULATED O-RINGS TYPICAL INDUSTRIES

## FOOD & BEVERAGE / DAIRY INDUSTRY

Our FEP encapsulated materials are designed to meet the highest regulatory compliance standards, including:

- FDA compliance
- USP Class VI
- EC 1935/2003
- ROHS
- REACH



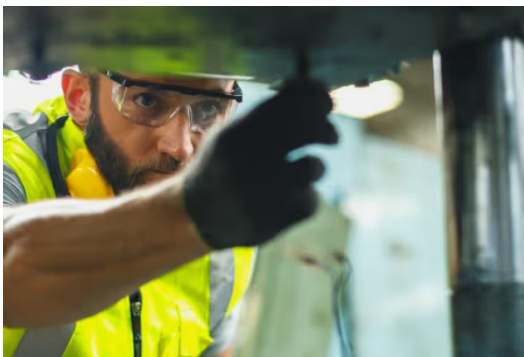
## CHEMICAL INDUSTRY

Our FEP Encapsulated O-Rings combine the flexibility of Viton™ or Silicone rubber with the chemical resistance and durability of FEP/PFA polymers. These O-Rings are designed to address common sealing challenges, providing a reliable solution for:

- **Hostile Chemicals:** Our encapsulated O-Rings resist chemical attack and swelling, the leading causes of seal failure.
- **Extreme Temperatures:** With a wide temperature range, they can handle the most volatile media, ensuring performance under even the harshest conditions.

## PHARMACEUTICAL INDUSTRY

FEP Encapsulated 'O'-Rings that **outperform traditional** solid PTFE alternatives. Unlike PTFE rings, which are prone to "Compression Set" and "Cold Flow," our encapsulated seals provide near-universal performance at a fraction of the cost of Perfluoroelastomer options. They also offer a **single-material solution** to replace various common elastomeric 'O'-Rings.



## GENERAL INDUSTRY

While Typical Industries for encapsulated O-Rings are: **Food, Chemical, Petrochemical, Pharmaceutical**

These Encapsulated O-Rings provide solutions for **many more industries and applications** where a standard O-ring has inadequate chemical resistance for an application. They are also recommended when a solid PTFE O-ring does not have the elasticity for reliable, long term fluid sealing. They are often used where chemical resistance and or hygiene is required.



**AUDITED** In compliance with industry standard

**INSPECTED** By leading engineers

**TESTED** For guaranteed quality and performance

# FEP Silicone

## Encapsulated O-rings Series



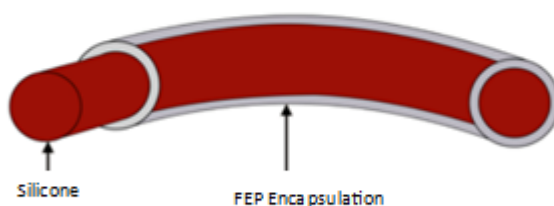
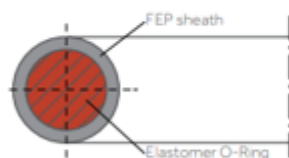
<b>Material</b>	FEP Encapsulated Silicone
<b>Encapsulation</b>	FEP - Fluorinated Ethylene Propylene (transparent)
<b>Core</b>	Silicone (Red)
<b>Hardness</b>	85-90 Shore A
<b>Minimum Operating Temperature</b>	-60°C
<b>Maximum Operating Temperature</b>	+205°C
<b>Temperature Range</b>	-60°C to +205°C (-75°F to +400°F)

### What is an Encapsulated O-ring?

FEP Encapsulated 'O'-ring seal is an 'O'-ring bound by a seamless and uniform Fluorinated Ethylene Propylene (FEP) encapsulation, which encloses an elastomeric core, completely protecting it from the media. The combination of elastomers and encapsulation choice enables our encapsulated seals to achieve a combination of temperature, chemical and cost performance unrivalled by pure elastomeric solutions. The elastomeric core provides the energising sealing force.

### Silicone Inner Core

Commercially the best inner core material option, providing a lower shore hardness and greater elasticity than Viton™/FKM - an excellent material choice for the majority of applications



### Technical Data

The FEP encapsulation is the essential component of the Chem-Ring® and it is resistant to practically all chemicals. Within normal application temperatures, FEP resins are vulnerable to only a few chemicals. In some instances, at or near the suggested service limit temperatures of FEP 205°C (400°F) a few chemicals at high concentrations have been reported to be reactive.



# FEP Silicone

## Encapsulated O-rings Series

### Groove Dimension Table

FEP Rings are designed to be used in all standard 'O'-ring grooves with the same housing dimensions and clearances as for standard elastomeric seals. Our recommendations for BS ISO 3601-1/AS 568 imperial standard 'O'-ring grooves are tabled here.

Cross Section	A	B Static	B Dynamic	B Pneumatic
1.78 mm 0.070"	2.36 – 2.49 mm 0.093 – 0.098"	1.42 – 1.52 mm 0.0563 – 0.060"	1.55 – 1.60 mm 0.061 – 0.063"	1.63 – 1.65 mm 0.064 – 0.065"
2.62 mm 0.103"	3.56 – 3.68 mm 0.140 – 0.145"	2.082 – 2.21 mm 0.082 – 0.087"	2.29 – 2.36 mm 0.090 – 0.093"	2.38 – 2.44 mm 0.094 – 0.096"
3.53 mm 0.139"	4.78 – 4.88 mm 0.187 – 0.192"	2.82 – 3.00 mm 0.111 – 0.118"	3.10 – 3.18 mm 0.122 – 0.125"	3.23 – 3.28 mm 0.127 – 0.129"
5.33 mm 0.210"	7.14 – 7.26 mm 0.281 – 0.286"	4.27 – 4.52 mm 0.168 – 0.178"	4.67 – 4.80 mm 0.184 – 0.189"	4.90 – 4.95 mm 0.193 – 0.195"
6.99 mm 0.275"	9.53 – 9.65 mm 0.375 – 0.380"	5.59 – 5.89 mm 0.220 – 0.232"	6.15 – 6.27 mm 0.242 – 0.247"	6.43 – 6.48 mm 0.253 – 0.255"

### Degree of squeeze

- 15/22% for static applications
- 10/15% for dynamic applications
- 8/10% for pneumatic applications

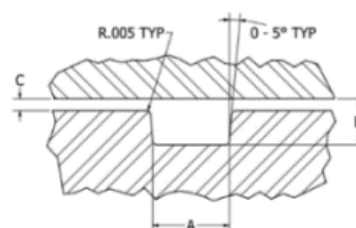
The amount of squeeze required varies with many factors, most critically, the pressure to be sealed.

### Seal Extrusions Radial Clearance Details

If the radial clearance gap (C on below diagram) between the sealing surface and the groove corners are too large and the pressure exceeds the deformation limit of the 'O' ring, extrusion of the ring material can occur. When this happens, the extruded material wears or frays with cycling and can cause seal failure. There are two possible options to minimise the potential for 'O' ring extrusion.

- Preferably, close the clearance gap (C) by modifying the shaft or housing dimensions, or use backup washers or other anti-extrusion devices.
- Alternatively, use the harder, higher modulus Viton™/FKM core, at the possible expense of higher friction and greater tendency to leak at lower pressure ranges.

Recommended maximum design radial clearance gap to prevent extrusions	
Maximum Pressure	
PSI	FEP / A Silicone
100	0.381mm /0.015"
250	0.355mm /0.014"
500	0.304 mm /0.012"
750	0.254mm /0.010"
1000	0.228mm /0.009"
1500	0.152mm /0.006"
2000	0.127mm /0.005"
3000	0.076mm/0.003"



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731823	5.29	8.85	1.78	BS009
731824	6.07	9.63	1.78	BS010
731825	7.65	11.21	1.78	BS011
731826	9.25	12.81	1.78	BS012
731828	10.82	14.38	1.78	BS013
731829	12.42	15.98	1.78	BS014
731830	14	17.56	1.78	BS015
731831	15.6	19.16	1.78	BS016
731832	17.17	20.73	1.78	BS017
731834	18.77	22.33	1.78	BS018
731835	20.35	23.91	1.78	BS019
731836	21.95	25.51	1.78	BS020
731837	23.52	27.08	1.78	BS021
731838	25.12	28.68	1.78	BS022
731839	26.7	30.26	1.78	BS023
731840	28.3	31.86	1.78	BS024
731841	29.87	33.43	1.78	BS025
731842	31.47	35.03	1.78	BS026
731843	33.05	36.61	1.78	BS027
731844	34.65	38.21	1.78	BS028
731845	37.82	41.38	1.78	BS029
731846	41	44.56	1.78	BS030
731847	44.17	47.73	1.78	BS031
731848	47.35	50.91	1.78	BS032
731850	50.52	54.08	1.78	BS033
731851	53.7	57.26	1.78	BS034
731852	56.87	60.43	1.78	BS035
731853	60.04	63.60	1.78	BS036
731854	63.22	66.78	1.78	BS037
731856	66.4	69.96	1.78	BS038
731857	69.57	73.13	1.78	BS039
731858	72.75	76.31	1.78	BS040
731723	75.92	79.48	1.78	BS041
731724	82.27	85.83	1.78	BS042
731725	88.62	92.18	1.78	BS043
731727	94.97	98.53	1.78	BS044
731728	101.32	104.88	1.78	BS045
731729	107.67	111.23	1.78	BS046
731730	114.02	117.58	1.78	BS047
731731	120.37	123.93	1.78	BS048



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731733	126.72	130.28	1.78	BS049
731734	133.07	136.63	1.78	BS050
731735	9.19	14.43	2.62	BS110
731736	10.77	16.01	2.62	BS111
731737	12.37	17.61	2.62	BS112
731738	13.95	19.19	2.62	BS113
731739	15.54	20.78	2.62	BS114
731740	17.12	22.36	2.62	BS115
731741	18.72	23.96	2.62	BS116
731742	20.29	25.53	2.62	BS117
731743	21.9	27.14	2.62	BS118
731744	23.47	28.71	2.62	BS119
731745	25.07	30.31	2.62	BS120
731746	26.65	31.89	2.62	BS121
731747	28.25	33.49	2.62	BS122
731749	29.82	35.06	2.62	BS123
731750	31.42	36.66	2.62	BS124
731751	33	38.24	2.62	BS125
731752	34.6	39.84	2.62	BS126
731753	36.17	41.41	2.62	BS127
731755	37.77	43.01	2.62	BS128
731756	39.35	44.59	2.62	BS129
731859	40.95	46.19	2.62	BS130
731860	42.52	47.76	2.62	BS131
731862	44.12	49.36	2.62	BS132
731863	45.7	50.94	2.62	BS133
731864	17.3	22.54	2.62	BS134
731865	48.9	54.14	2.62	BS135
731866	50.47	55.71	2.62	BS136
731867	52.07	57.31	2.62	BS137
731868	53.65	58.89	2.62	BS138
731869	55.25	60.49	2.62	BS139
731870	56.82	62.06	2.62	BS140
731871	58.42	63.66	2.62	BS141
731872	60	65.24	2.62	BS142
731873	61.6	66.84	2.62	BS143
731874	63.17	68.41	2.62	BS144
731875	64.77	70.01	2.62	BS145
731876	66.35	71.59	2.62	BS146
731878	67.95	73.19	2.62	BS147
731957	69.52	74.76	2.62	BS148
731958	71.12	76.36	2.62	BS149
731959	72.7	77.94	2.62	BS150
731960	75.87	81.11	2.62	BS151
731961	82.22	87.46	2.62	BS152



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731963	88.57	93.81	2.62	BS153
731964	94.92	100.16	2.62	BS154
731965	101.27	106.51	2.62	BS155
731966	107.62	112.86	2.62	BS156
731967	113.97	119.21	2.62	BS157
731968	120.32	125.56	2.62	BS158
731969	126.67	131.91	2.62	BS159
731970	133.02	138.26	2.62	BS160
731971	139.37	144.61	2.62	BS161
731972	145.72	150.96	2.62	BS162
731973	152.07	157.31	2.62	BS163
731974	158.42	163.66	2.62	BS164
731975	164.77	170.01	2.62	BS165
731976	171.12	176.36	2.62	BS166
731977	177.47	182.71	2.62	BS167
731979	183.82	189.06	2.62	BS168
731980	190.17	195.41	2.62	BS169
731981	196.52	201.76	2.62	BS170
731982	202.87	208.11	2.62	BS171
731418	209.22	214.46	2.62	BS172
731419	215.57	220.81	2.62	BS173
731420	221.92	227.16	2.62	BS174
731421	228.27	233.51	2.62	BS175
731422	234.62	239.86	2.62	BS176
731424	240.97	246.21	2.62	BS177
731425	247.32	252.56	2.62	BS178
731426	12.29	19.35	3.53	BS206
731427	13.87	20.93	3.53	BS207
731428	15.47	22.53	3.53	BS208
731429	17.04	24.10	3.53	BS209
731430	18.64	25.70	3.53	BS210
731431	20.22	27.28	3.53	BS211
731432	21.82	28.88	3.53	BS212
731433	23.39	30.45	3.53	BS213
731434	25	32.06	3.53	BS214
731435	26.57	33.63	3.53	BS215
731436	28.17	35.23	3.53	BS216
731437	29.75	36.81	3.53	BS217
731438	31.34	38.40	3.53	BS218
731440	32.92	39.98	3.53	BS219
731441	34.52	41.58	3.53	BS220
731442	36.1	43.16	3.53	BS221
731443	37.7	44.76	3.53	BS222
731444	40.87	47.93	3.53	BS223
731446	44.05	51.11	3.53	BS224



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731447	47.22	54.28	3.53	BS225
731448	50.4	57.46	3.53	BS226
731449	53.57	60.63	3.53	BS227
731450	56.75	63.81	3.53	BS228
731983	59.92	66.98	3.53	BS229
731985	63.1	70.16	3.53	BS230
731986	66.27	73.33	3.53	BS231
731987	69.44	76.50	3.53	BS232
731988	72.62	79.68	3.53	BS233
731989	75.79	82.85	3.53	BS234
731990	78.97	86.03	3.53	BS235
731991	82.14	89.20	3.53	BS236
731992	85.32	92.38	3.53	BS237
731993	88.49	95.55	3.53	BS238
731994	91.67	98.73	3.53	BS239
731995	94.84	101.90	3.53	BS240
731996	98.02	105.08	3.53	BS241
731997	101.19	108.25	3.53	BS242
731998	104.37	111.43	3.53	BS243
731999	107.54	114.60	3.53	BS244
732001	110.72	117.78	3.53	BS245
732002	113.89	120.95	3.53	BS246
732003	117.07	124.13	3.53	BS247
732004	120.24	127.30	3.53	BS248
732005	123.42	130.48	3.53	BS249
732006	126.59	133.65	3.53	BS250
732007	129.77	136.83	3.53	BS251
732008	132.94	140.00	3.53	BS252
732009	136.12	143.18	3.53	BS253
732010	139.3	146.36	3.53	BS254
731646	142.47	149.53	3.53	BS255
731648	145.65	152.71	3.53	BS256
731649	148.82	155.88	3.53	BS257
731650	152	159.06	3.53	BS258
731651	158.35	165.41	3.53	BS259
731652	164.7	171.76	3.53	BS260
731654	171.05	178.11	3.53	BS261
731655	177.4	184.46	3.53	BS262
731656	183.75	190.81	3.53	BS263
731657	190.1	197.16	3.53	BS264
731658	196.45	203.51	3.53	BS265
731659	202.8	209.86	3.53	BS266
731660	209.15	216.21	3.53	BS267
731661	215.5	222.56	3.53	BS268
731662	221.85	228.91	3.53	BS269



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731663	228.2	235.26	3.53	BS270
731547	234.55	241.61	3.53	BS271
731548	240.9	247.96	3.53	BS272
731549	247.25	254.31	3.53	BS273
731550	253.6	260.66	3.53	BS274
731551	266.3	273.36	3.53	BS275
731553	279	286.06	3.53	BS276
731554	291.7	298.76	3.53	BS277
731555	304.4	311.46	3.53	BS278
731556	329.8	336.86	3.53	BS279
731557	355.2	362.26	3.53	BS280
731558	380.6	387.66	3.53	BS281
731559	405.26	412.32	3.53	BS282
731560	430.66	437.72	3.53	BS283
731561	456.06	463.12	3.53	BS284
731562	23.16	33.82	5.33	BS317
731563	24.77	35.43	5.33	BS318
731564	26.34	37.00	5.33	BS319
731565	27.94	38.60	5.33	BS320
731566	29.51	40.17	5.33	BS321
731567	31.12	41.78	5.33	BS322
731569	32.69	43.35	5.33	BS323
731570	34.29	44.95	5.33	BS324
731571	37.47	48.13	5.33	BS325
731572	40.65	51.31	5.33	BS326
731573	43.82	54.48	5.33	BS327
731575	46.99	57.65	5.33	BS328
731576	50.16	60.82	5.33	BS329
731577	53.34	64.00	5.33	BS330
731578	56.52	67.18	5.33	BS331
731579	59.69	70.35	5.33	BS332
731664	62.87	73.53	5.33	BS333
731665	66.04	76.70	5.33	BS334
731666	69.22	79.88	5.33	BS335
731667	72.39	83.05	5.33	BS336
731668	75.57	86.23	5.33	BS337
731670	78.74	89.40	5.33	BS338
731671	81.92	92.58	5.33	BS339
731672	85.09	95.75	5.33	BS340
731673	88.27	98.93	5.33	BS341
731674	91.44	102.10	5.33	BS342
731676	94.62	105.28	5.33	BS343
731677	97.79	108.45	5.33	BS344
731678	100.96	111.62	5.33	BS345
731679	104.14	114.80	5.33	BS346



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731680	107.32	117.98	5.33	BS347
731681	110.49	121.15	5.33	BS348
731682	113.67	124.33	5.33	BS349
731683	116.84	127.50	5.33	BS350
731684	120.02	130.68	5.33	BS351
731685	123.19	133.85	5.33	BS352
731686	126.37	137.03	5.33	BS353
731687	129.54	140.20	5.33	BS354
731688	132.72	143.38	5.33	BS355
731689	135.89	146.55	5.33	BS356
731690	139.07	149.73	5.33	BS357
731691	142.24	152.90	5.33	BS358
731692	145.42	156.08	5.33	BS359
731693	148.59	159.25	5.33	BS360
731581	151.77	162.43	5.33	BS361
731582	158.12	168.78	5.33	BS362
731583	164.47	175.13	5.33	BS363
731584	170.82	181.48	5.33	BS364
731585	177.17	187.83	5.33	BS365
731586	183.52	194.18	5.33	BS366
731879	189.87	200.53	5.33	BS367
731880	196.22	206.88	5.33	BS368
731881	202.57	213.23	5.33	BS369
731882	208.92	219.58	5.33	BS370
731884	215.27	225.93	5.33	BS371
731885	221.62	232.28	5.33	BS372
731886	227.97	238.63	5.33	BS373
731887	234.32	244.98	5.33	BS374
731888	240.67	251.33	5.33	BS375
731889	247.02	257.68	5.33	BS376
731757	253.37	264.03	5.33	BS377
731758	266.07	276.73	5.33	BS378
731759	278.77	289.43	5.33	BS379
731761	291.47	302.13	5.33	BS380
731762	304.17	314.83	5.33	BS381
731763	329.57	340.23	5.33	BS382
731764	354.97	365.63	5.33	BS383
731765	380.37	391.03	5.33	BS384
731766	405.26	415.92	5.33	BS385
731767	430.66	441.32	5.33	BS386
731768	456.06	466.72	5.33	BS387
731769	481.46	492.12	5.33	BS388
731770	506.86	517.52	5.33	BS389
731771	532.26	542.92	5.33	BS390
731772	557.66	568.32	5.33	BS391



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731773	582.7	593.36	5.33	BS392
731774	608.1	618.76	5.33	BS393
731775	633.5	644.16	5.33	BS394
731777	658.9	669.56	5.33	BS395
731778	113.67	127.65	6.99	BS425
731779	116.84	130.82	6.99	BS426
731780	120.02	134.00	6.99	BS427
731781	123.19	137.17	6.99	BS428
731783	126.37	140.35	6.99	BS429
731784	129.54	143.52	6.99	BS430
731785	132.72	146.70	6.99	BS431
731786	135.89	149.87	6.99	BS432
731787	139.07	153.05	6.99	BS433
731788	142.24	156.22	6.99	BS434
731789	145.42	159.40	6.99	BS435
731890	148.59	162.57	6.99	BS436
731891	151.77	165.75	6.99	BS437
731892	158.12	172.10	6.99	BS438
731893	164.47	178.45	6.99	BS439
731894	170.82	184.80	6.99	BS440
731895	177.17	191.15	6.99	BS441
731896	183.52	197.50	6.99	BS442
731897	189.87	203.85	6.99	BS443
731898	196.22	210.20	6.99	BS444
731900	202.57	216.55	6.99	BS445
731901	215.27	229.25	6.99	BS446
731902	227.97	241.95	6.99	BS447
731903	240.67	254.65	6.99	BS448
731904	253.37	267.35	6.99	BS449
731905	266.07	280.05	6.99	BS450
731907	278.77	292.75	6.99	BS451
731908	291.47	305.45	6.99	BS452
731909	304.17	318.15	6.99	BS453
731910	316.87	330.85	6.99	BS454
731911	329.57	343.55	6.99	BS455
731913	342.27	356.25	6.99	BS456
731914	354.97	368.95	6.99	BS457
731915	367.67	381.65	6.99	BS458
731916	380.37	394.35	6.99	BS459
731917	393.08	407.06	6.99	BS460
731918	405.26	419.24	6.99	BS461
731919	417.96	431.94	6.99	BS462
731920	430.66	444.64	6.99	BS463
731790	443.36	457.34	6.99	BS464
731791	456.06	470.04	6.99	BS465



# FEP Silicone

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731792	468.76	482.74	6.99	BS466
731793	481.46	495.44	6.99	BS467
731794	494.16	508.14	6.99	BS468
731795	506.86	520.84	6.99	BS469
731796	532.26	546.24	6.99	BS470
731797	557.66	571.64	6.99	BS471
731799	582.7	596.68	6.99	BS472
731800	608.1	622.08	6.99	BS473
731801	633.5	647.48	6.99	BS474
731802	658.9	672.88	6.99	BS475



# FEP Viton®/FKM

## Encapsulated O-rings Series



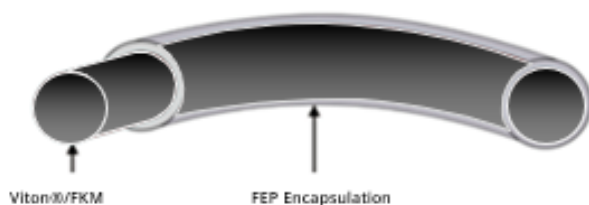
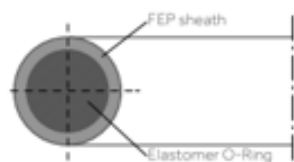
<b>Material</b>	FEP Encapsulated Viton®/FKM
<b>Encapsulation</b>	FEP - Fluorinated Ethylene Propylene (transparent)
<b>Core</b>	Viton®/FKM
<b>Hardness</b>	90-95 Shore A
<b>Minimum Operating Temperature</b>	-20° C
<b>Maximum Operating Temperature</b>	+140° C
<b>Temperature Range</b>	-20° C to +140° C (-4° F to +284° F)

### What is an Encapsulated O-ring?

FEP Encapsulated 'O'-ring seal is an 'O'-ring bound by a seamless and uniform Fluorinated Ethylene Propylene (FEP) encapsulation, which encloses an elastomeric core, completely protecting it from the media. The combination of elastomers and encapsulation choice enables our encapsulated seals to achieve a combination of temperature, chemical and cost performance unrivalled by pure elastomeric solutions. The elastomeric core provides the energising sealing force.

### Viton®/FKM Inner Core

Delivering greater chemical resistance than Silicone. If the encapsulation is damaged, Viton®/FKM provides greater resilience to chemical attack. This is the choice for LABS Silicone free product.



### Technical Data

The FEP encapsulation is the essential component of the Chem-Ring® and it is resistant to practically all chemicals. Within normal application temperatures, FEP resins are vulnerable to only a few chemicals. In some instances, at or near the suggested service limit temperatures of FEP 140°C (284°F) a few chemicals at high concentrations have been reported to be reactive.



# FEP Viton®/FKM

## Encapsulated O-rings Series

### Groove Dimension Table

FEP Rings are designed to be used in all standard 'O'-ring grooves with the same housing dimensions and clearances as for standard elastomeric seals. Our recommendations for BS ISO 3601-1/AS 568 imperial standard 'O'-ring grooves are tabled here.

Cross Section	A	B Static	B Dynamic	B Pneumatic
1.78 mm 0.070"	2.36 - 2.49 mm 0.093 - 0.098"	1.42 - 1.52 mm 0.0563 - 0.060"	1.55 - 1.60 mm 0.061 - 0.063"	1.63 - 1.65 mm 0.064 - 0.065"
2.62 mm 0.103"	3.56 - 3.68 mm 0.140 - 0.145"	2.082 - 2.21 mm 0.082 - 0.087"	2.29 - 2.36 mm 0.090 - 0.093"	2.38 - 2.44 mm 0.094 - 0.096"
3.53 mm 0.139"	4.78 - 4.88 mm 0.187 - 0.192"	2.82 - 3.00 mm 0.111 - 0.118"	3.10 - 3.18 mm 0.122 - 0.125"	3.23 - 3.28 mm 0.127 - 0.129"
5.33 mm 0.210"	7.14 - 7.26 mm 0.281 - 0.286"	4.27 - 4.52 mm 0.168 - 0.178"	4.67 - 4.80 mm 0.184 - 0.189"	4.90 - 4.95 mm 0.193 - 0.195"
6.99 mm 0.275"	9.53 - 9.65 mm 0.375 - 0.380"	5.59 - 5.89 mm 0.220 - 0.232"	6.15 - 6.27 mm 0.242 - 0.247"	6.43 - 6.48 mm 0.253 - 0.255"

### Degree of squeeze

- 15/22% for static applications
- 10/15% for dynamic applications
- 8/10% for pneumatic applications

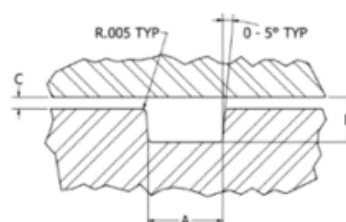
The amount of squeeze required varies with many factors, most critically, the pressure to be sealed.

### Seal Extrusions Radial Clearance Details

If the radial clearance gap (C on below diagram) between the sealing surface and the groove corners are too large and the pressure exceeds the deformation limit of the 'O' ring, extrusion of the ring material can occur. When this happens, the extruded material wears or frays with cycling and can cause seal failure. There are two possible options to minimise the potential for 'O' ring extrusion.

- Preferably, close the clearance gap (C) by modifying the shaft or housing dimensions, or use backup washers or other anti-extrusion devices.
- Alternatively, use the harder, higher modulus Viton™/FKM core, at the possible expense of higher friction and greater tendency to leak at lower pressure ranges.

Recommended maximum design radial clearance gap to prevent extrusions	
Maximum Pressure	
PSI	FEP / Viton®/FKM
100	0.457 mm / 0.018"
250	0.406 mm / 0.016"
500	0.355 mm / 0.014"
750	0.304 mm / 0.012"
1000	0.279 mm / 0.011"
1500	0.228 mm / 0.009"
2000	0.152 mm / 0.006"
3000	0.101 mm / 0.004"



# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
732011	5.29	8.85	1.78	BS009
732012	6.07	9.63	1.78	BS010
731452	7.65	11.21	1.78	BS011
731453	9.25	12.81	1.78	BS012
731454	10.82	14.38	1.78	BS013
731455	12.42	15.98	1.78	BS014
731456	14	17.56	1.78	BS015
731457	15.6	19.16	1.78	BS016
731458	17.17	20.73	1.78	BS017
731459	18.77	22.33	1.78	BS018
731460	20.35	23.91	1.78	BS019
731461	21.95	25.51	1.78	BS020
731462	23.52	27.08	1.78	BS021
731463	25.12	28.68	1.78	BS022
731464	26.7	30.26	1.78	BS023
731465	28.3	31.86	1.78	BS024
731466	29.87	33.43	1.78	BS025
731467	31.47	35.03	1.78	BS026
731468	33.05	36.61	1.78	BS027
731469	34.65	38.21	1.78	BS028
731470	37.82	41.38	1.78	BS029
731471	41	44.56	1.78	BS030
731472	44.17	47.73	1.78	BS031
731473	47.35	50.91	1.78	BS032
731474	50.52	54.08	1.78	BS033
731475	53.7	57.26	1.78	BS034
731476	56.87	60.43	1.78	BS035
731477	60.04	63.60	1.78	BS036
731478	63.22	66.78	1.78	BS037
731479	66.4	69.96	1.78	BS038
731480	69.57	73.13	1.78	BS039
731481	72.75	76.31	1.78	BS040
732013	75.92	79.48	1.78	BS041
732014	82.27	85.83	1.78	BS042
732015	88.62	92.18	1.78	BS043
732017	94.97	98.53	1.78	BS044
732018	101.32	104.88	1.78	BS045
732019	107.67	111.23	1.78	BS046
732020	114.02	117.58	1.78	BS047
732021	120.37	123.93	1.78	BS048

# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
732023	126.72	130.28	1.78	BS049
732024	133.07	136.63	1.78	BS050
732025	9.19	14.43	2.62	BS110
732026	10.77	16.01	2.62	BS111
732027	12.37	17.61	2.62	BS112
732028	13.95	19.19	2.62	BS113
732029	15.54	20.78	2.62	BS114
732030	17.12	22.36	2.62	BS115
732031	18.72	23.96	2.62	BS116
732032	20.29	25.53	2.62	BS117
732033	21.9	27.14	2.62	BS118
732034	23.47	28.71	2.62	BS119
732035	25.07	30.31	2.62	BS120
732036	26.65	31.89	2.62	BS121
732037	28.25	33.49	2.62	BS122
732039	29.82	35.06	2.62	BS123
732040	31.42	36.66	2.62	BS124
732041	33	38.24	2.62	BS125
732042	34.6	39.84	2.62	BS126
732043	36.17	41.41	2.62	BS127
731482	37.77	43.01	2.62	BS128
731483	39.35	44.59	2.62	BS129
731484	40.95	46.19	2.62	BS130
731485	42.52	47.76	2.62	BS131
731486	44.12	49.36	2.62	BS132
731487	45.7	50.94	2.62	BS133
731488	17.3	22.54	2.62	BS134
731489	48.9	54.14	2.62	BS135
731490	50.47	55.71	2.62	BS136
731491	52.07	57.31	2.62	BS137
731492	53.65	58.89	2.62	BS138
731493	55.25	60.49	2.62	BS139
731494	56.82	62.06	2.62	BS140
731495	58.42	63.66	2.62	BS141
731496	60	65.24	2.62	BS142
731497	61.6	66.84	2.62	BS143
731498	63.17	68.41	2.62	BS144
731499	64.77	70.01	2.62	BS145
731500	66.35	71.59	2.62	BS146
731501	67.95	73.19	2.62	BS147
731587	69.52	74.76	2.62	BS148
731588	71.12	76.36	2.62	BS149
731589	72.7	77.94	2.62	BS150
731590	75.87	81.11	2.62	BS151
731591	82.22	87.46	2.62	BS152



# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731592	88.57	93.81	2.62	BS153
731593	94.92	100.16	2.62	BS154
731594	101.27	106.51	2.62	BS155
731595	107.62	112.86	2.62	BS156
731597	113.97	119.21	2.62	BS157
731598	120.32	125.56	2.62	BS158
731599	126.67	131.91	2.62	BS159
731600	133.02	138.26	2.62	BS160
731601	139.37	144.61	2.62	BS161
731340	145.72	150.96	2.62	BS162
731341	152.07	157.31	2.62	BS163
731342	158.42	163.66	2.62	BS164
731343	164.77	170.01	2.62	BS165
731345	171.12	176.36	2.62	BS166
731346	177.47	182.71	2.62	BS167
731347	183.82	189.06	2.62	BS168
731348	190.17	195.41	2.62	BS169
731349	196.52	201.76	2.62	BS170
731351	202.87	208.11	2.62	BS171
731694	209.22	214.46	2.62	BS172
731695	215.57	220.81	2.62	BS173
731696	221.92	227.16	2.62	BS174
731698	228.27	233.51	2.62	BS175
731699	234.62	239.86	2.62	BS176
731700	240.97	246.21	2.62	BS177
731701	247.32	252.56	2.62	BS178
731702	12.29	19.35	3.53	BS206
731703	13.87	20.93	3.53	BS207
731705	15.47	22.53	3.53	BS208
731706	17.04	24.10	3.53	BS209
731707	18.64	25.70	3.53	BS210
731708	20.22	27.28	3.53	BS211
731709	21.82	28.88	3.53	BS212
731711	23.39	30.45	3.53	BS213
731712	25	32.06	3.53	BS214
731713	26.57	33.63	3.53	BS215
731714	28.17	35.23	3.53	BS216
731715	29.75	36.81	3.53	BS217
731716	31.34	38.40	3.53	BS218
731717	32.92	39.98	3.53	BS219
731718	34.52	41.58	3.53	BS220
731719	36.1	43.16	3.53	BS221
731720	37.7	44.76	3.53	BS222
731721	40.87	47.93	3.53	BS223
731722	44.05	51.11	3.53	BS224





# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731352	47.22	54.28	3.53	BS225
731353	50.4	57.46	3.53	BS226
731354	53.57	60.63	3.53	BS227
731355	56.75	63.81	3.53	BS228
731356	59.92	66.98	3.53	BS229
731357	63.1	70.16	3.53	BS230
731358	66.27	73.33	3.53	BS231
731359	69.44	76.50	3.53	BS232
731360	72.62	79.68	3.53	BS233
731361	75.79	82.85	3.53	BS234
731362	78.97	86.03	3.53	BS235
731363	82.14	89.20	3.53	BS236
731364	85.32	92.38	3.53	BS237
731365	88.49	95.55	3.53	BS238
731367	91.67	98.73	3.53	BS239
731368	94.84	101.90	3.53	BS240
731369	98.02	105.08	3.53	BS241
731370	101.19	108.25	3.53	BS242
731371	104.37	111.43	3.53	BS243
731373	107.54	114.60	3.53	BS244
731374	110.72	117.78	3.53	BS245
731375	113.89	120.95	3.53	BS246
731376	117.07	124.13	3.53	BS247
731377	120.24	127.30	3.53	BS248
731378	123.42	130.48	3.53	BS249
731379	126.59	133.65	3.53	BS250
731380	129.77	136.83	3.53	BS251
731381	132.94	140.00	3.53	BS252
731382	136.12	143.18	3.53	BS253
731383	139.3	146.36	3.53	BS254
731803	142.47	149.53	3.53	BS255
731804	145.65	152.71	3.53	BS256
731806	148.82	155.88	3.53	BS257
731807	152	159.06	3.53	BS258
731808	158.35	165.41	3.53	BS259
731809	164.7	171.76	3.53	BS260
731810	171.05	178.11	3.53	BS261
731812	177.4	184.46	3.53	BS262
731813	183.75	190.81	3.53	BS263
731814	190.1	197.16	3.53	BS264
731815	196.45	203.51	3.53	BS265
731816	202.8	209.86	3.53	BS266
731817	209.15	216.21	3.53	BS267
731818	215.5	222.56	3.53	BS268
731819	221.85	228.91	3.53	BS269



# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731820	228.2	235.26	3.53	BS270
731821	234.55	241.61	3.53	BS271
731822	240.9	247.96	3.53	BS272
731921	247.25	254.31	3.53	BS273
731922	253.6	260.66	3.53	BS274
731923	266.3	273.36	3.53	BS275
731924	279	286.06	3.53	BS276
731925	291.7	298.76	3.53	BS277
731926	304.4	311.46	3.53	BS278
731927	329.8	336.86	3.53	BS279
731929	355.2	362.26	3.53	BS280
731930	380.6	387.66	3.53	BS281
731931	405.26	412.32	3.53	BS282
731932	430.66	437.72	3.53	BS283
731933	456.06	463.12	3.53	BS284
731935	23.16	33.82	5.33	BS317
731936	24.77	35.43	5.33	BS318
731937	26.34	37.00	5.33	BS319
731938	27.94	38.60	5.33	BS320
731939	29.51	40.17	5.33	BS321
731941	31.12	41.78	5.33	BS322
731942	32.69	43.35	5.33	BS323
731943	34.29	44.95	5.33	BS324
731944	37.47	48.13	5.33	BS325
731945	40.65	51.31	5.33	BS326
731946	43.82	54.48	5.33	BS327
731947	46.99	57.65	5.33	BS328
731948	50.16	60.82	5.33	BS329
731949	53.34	64.00	5.33	BS330
731950	56.52	67.18	5.33	BS331
731951	59.69	70.35	5.33	BS332
731384	62.87	73.53	5.33	BS333
731385	66.04	76.70	5.33	BS334
731386	69.22	79.88	5.33	BS335
731387	72.39	83.05	5.33	BS336
731389	75.57	86.23	5.33	BS337
731390	78.74	89.40	5.33	BS338
731391	81.92	92.58	5.33	BS339
731392	85.09	95.75	5.33	BS340
731393	88.27	98.93	5.33	BS341
731395	91.44	102.10	5.33	BS342
731396	94.62	105.28	5.33	BS343
731397	97.79	108.45	5.33	BS344
731398	100.96	111.62	5.33	BS345
731399	104.14	114.80	5.33	BS346



# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731400	107.32	117.98	5.33	BS347
731402	110.49	121.15	5.33	BS348
731403	113.67	124.33	5.33	BS349
731404	116.84	127.50	5.33	BS350
731405	120.02	130.68	5.33	BS351
731406	123.19	133.85	5.33	BS352
731407	126.37	137.03	5.33	BS353
731408	129.54	140.20	5.33	BS354
731409	132.72	143.38	5.33	BS355
731410	135.89	146.55	5.33	BS356
731411	139.07	149.73	5.33	BS357
731412	142.24	152.90	5.33	BS358
731413	145.42	156.08	5.33	BS359
731414	148.59	159.25	5.33	BS360
731415	151.77	162.43	5.33	BS361
731416	158.12	168.78	5.33	BS362
731952	164.47	175.13	5.33	BS363
731953	170.82	181.48	5.33	BS364
731954	177.17	187.83	5.33	BS365
731955	183.52	194.18	5.33	BS366
731503	189.87	200.53	5.33	BS367
731504	196.22	206.88	5.33	BS368
731505	202.57	213.23	5.33	BS369
731506	208.92	219.58	5.33	BS370
731507	215.27	225.93	5.33	BS371
731508	221.62	232.28	5.33	BS372
731509	227.97	238.63	5.33	BS373
731510	234.32	244.98	5.33	BS374
731511	240.67	251.33	5.33	BS375
731512	247.02	257.68	5.33	BS376
731602	253.37	264.03	5.33	BS377
731604	266.07	276.73	5.33	BS378
731605	278.77	289.43	5.33	BS379
731606	291.47	302.13	5.33	BS380
731607	304.17	314.83	5.33	BS381
731608	329.57	340.23	5.33	BS382
731609	354.97	365.63	5.33	BS383
731610	380.37	391.03	5.33	BS384
731611	405.26	415.92	5.33	BS385
731612	430.66	441.32	5.33	BS386
731613	456.06	466.72	5.33	BS387
731614	481.46	492.12	5.33	BS388
731615	506.86	517.52	5.33	BS389
731616	532.26	542.92	5.33	BS390
731617	557.66	568.32	5.33	BS391



# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731618	582.7	593.36	5.33	BS392
731620	608.1	618.76	5.33	BS393
731621	633.5	644.16	5.33	BS394
731622	658.9	669.56	5.33	BS395
731623	113.67	127.65	6.99	BS425
731624	116.84	130.82	6.99	BS426
731626	120.02	134.00	6.99	BS427
731627	123.19	137.17	6.99	BS428
731628	126.37	140.35	6.99	BS429
731629	129.54	143.52	6.99	BS430
731630	132.72	146.70	6.99	BS431
731632	135.89	149.87	6.99	BS432
731633	139.07	153.05	6.99	BS433
731513	142.24	156.22	6.99	BS434
731514	145.42	159.40	6.99	BS435
731515	148.59	162.57	6.99	BS436
731516	151.77	165.75	6.99	BS437
731517	158.12	172.10	6.99	BS438
731519	164.47	178.45	6.99	BS439
731520	170.82	184.80	6.99	BS440
731521	177.17	191.15	6.99	BS441
731522	183.52	197.50	6.99	BS442
731523	189.87	203.85	6.99	BS443
731525	196.22	210.20	6.99	BS444
731526	202.57	216.55	6.99	BS445
731527	215.27	229.25	6.99	BS446
731528	227.97	241.95	6.99	BS447
731529	240.67	254.65	6.99	BS448
731531	253.37	267.35	6.99	BS449
731532	266.07	280.05	6.99	BS450
731533	278.77	292.75	6.99	BS451
731534	291.47	305.45	6.99	BS452
731535	304.17	318.15	6.99	BS453
731536	316.87	330.85	6.99	BS454
731537	329.57	343.55	6.99	BS455
731538	342.27	356.25	6.99	BS456
731539	354.97	368.95	6.99	BS457
731540	367.67	381.65	6.99	BS458
731541	380.37	394.35	6.99	BS459
731542	393.08	407.06	6.99	BS460
731543	405.26	419.24	6.99	BS461
731544	417.96	431.94	6.99	BS462
731545	430.66	444.64	6.99	BS463
731634	443.36	457.34	6.99	BS464
731635	456.06	470.04	6.99	BS465



# FEP Viton®/FKM

## Encapsulated O-rings Series

Product Code	Inner Diameter (mm)	Outside Diameter (mm)	Thickness	BS Standard
731636	468.76	482.74	6.99	BS466
731637	481.46	495.44	6.99	BS467
731638	494.16	508.14	6.99	BS468
731639	506.86	520.84	6.99	BS469
731640	532.26	546.24	6.99	BS470
731641	557.66	571.64	6.99	BS471
731642	582.7	596.68	6.99	BS472
731643	608.1	622.08	6.99	BS473
731644	633.5	647.48	6.99	BS474
731645	658.9	672.88	6.99	BS475

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