



An AFC Industries Company

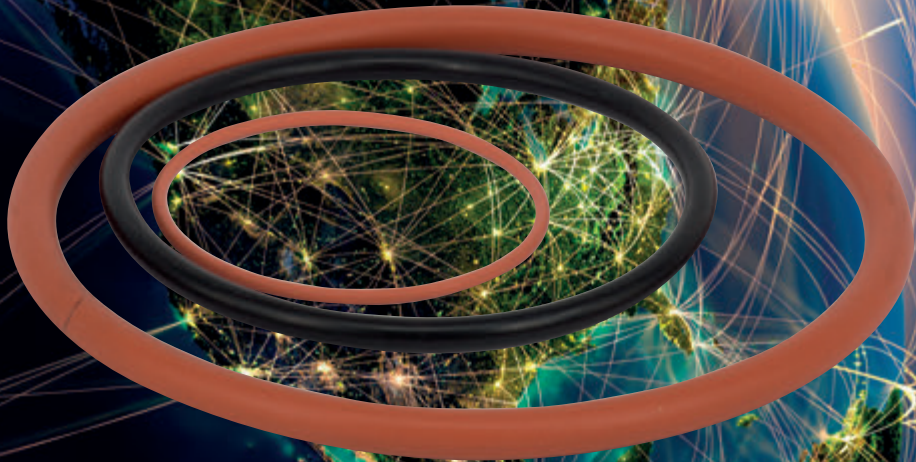
www.tfc.eu.com

Precision O-Rings

Back-up Rings

Quad-Rings

Cord-Rings



WHAT EVER THE INDUSTRY
WE HAVE A PART IN IT

Introduction

Welcome to our 9th Edition O -Ring Handbook, we are proud to say that this handbook has become a very popular and useful technical source of information.

Our Range of standard and non-standard sizes is always increasing along with the choice of special compounds to meet every industrial application. On pages 17 to 42 is an example of the most popular sizes available. The O-Ring is now without question the worlds most versatile seal due to its simple shape, low space requirement and its availability in a vast selection of sizes and compounds to meet every requirement.

This handbook is intended as a guide to assist in the selection of O-Rings in both Dynamic and Static applications, along with the choice of the correct compound for a given application. Recommendations are given for groove dimensions, installation procedures, sealing against vacuum, the use of Back-Up rings and Quad rings as an alternative to an O-Ring in certain applications.

We hope you will find our handbook of interest and assistance for your next sealing application, should you require further copies please do not hesitate to contact us.

Contents

O-Ring sealing principles.....	3-4
Constructional data	4
Directions for dynamic applications.....	3-4
Directions for static applications	
Running surface material, groove fits and lubrication.....	6
Installation instructions.....	7
Hardness to pressure ratio.....	8
The application of back-up rings.....	9
Table of groove dimensions	10
Groove dimensions for PTFE O-Rings.....	11
Recommendations for use of O-Ring compounds.....	12-13
Resistance properties of elastomers.....	14
Temperature requirements.....	15
Tolerances and ordering details	16

Tables of O-Ring dimensions.....17-42

Quick reference guides

AS/BS inch sizes.....	43
AS/BS standard sizes.....	44-46
Alternative number series	47
BS - Old standard and R Numbers.....	48-49

Sealing against vacuum	50
Degassed O-Rings	50
Quad-Ring sealing principles.....	51-53
Cord rings.....	54
O-Ring cords.....	54-55
FEP encapsulated O-Rings	56
Assortment boxes.....	57-58
Accessories.....	59-0

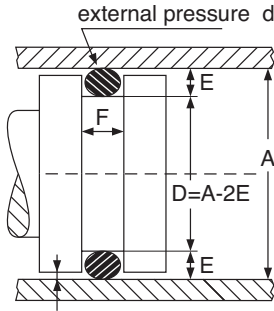
NOTE:

KALREZ®, VITON®, NEOPRENE®, TEFLON® and KRYTOX® are all registered trademarks of Du Pont Performance Elastomers. AFLAS® is the registered trademark of Asahi Glass Co.

Important Notice © Copyright

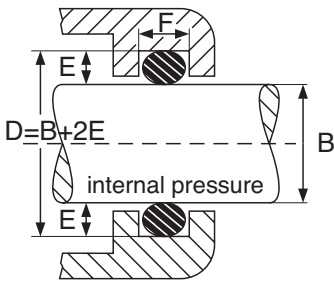
- A) No part of this handbook may be copied or reproduced.
- B) The contents of this handbook, may from time to time, change without notice.

Dynamic application



A

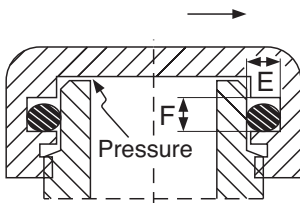
Sealing the reciprocating piston of a hydraulic cylinder or a valve in a housing. The O-Ring is mounted in a rectangular groove on the outside of the piston or the valve. The depth of the groove should be such that the O-Ring shows a little above the groove. When the piston is installed in the cylinder, the O-Ring will be compressed by 10-15%, so that an effective amount of sealing capacity will be obtained. The sealing is based on the elasticity of the rubber. Constructional data is given on page 4.



B

Sealing rotating shafts and reciprocating piston rods of a hydraulic cylinder or the spindle of a tap or valve. The O-Ring should be installed in a groove in the body, the depth of the groove should be such that the O-Ring projects a little above the groove. When the shaft or the rod is mounted, the O-Ring will be compressed by 10-15%, so that an effective amount of sealing will be obtained.

Static application (no flanges)



C

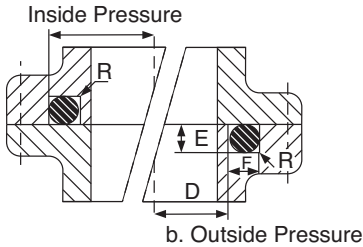
The application of O-Rings for sealing rotating parts is not always advisable. If it is necessary to use a compact sealing element, we recommend the application of a Quad-Ring or other suitable sealing element from our standard programme.

D

It is always advisable to select rings with the largest cross section available. The seal can then withstand higher pressures and will also be safe when the pressure load is subject to variations, particularly when the construction is also subjected to expanding and shrinking movements. The diametric compression of the O-Ring when used statically is approximately 15-20%.

Constructional data is given on page 4.

Static seals (flanges)



E

Flange sealing requires special groove dimensions. This construction provides an excellent seal against fluids and gases under low or high pressures, even when the pipes are subject to vibration. Constructional data is given on page 5. The dimensions must be such that when the O-Ring is exposed to internal pressure, its circumference is positioned close to the outer wall. In the case of external pressure the O-Ring must be positioned close to the inner circumference.

Construction data

We give the following supplementary information:

1. Guide for the choice of an O-Ring for dynamic parts.
2. Guide for the choice of an O-Ring for static parts.
3. Choice of running surface material, finish of running surface and groove, fits and lubrication.
4. Installation instructions.
5. Hardness to pressure ratio.
6. Application of back-up rings.
7. Groove dimensions for both dynamic and static parts and for PTFE O-Rings.
8. Recommendations for use of standard compounds.
9. Resistance properties of various elastomers.
10. Temperature requirements.

1. Guide for the choice of an O-Ring for dynamic parts

The optimum cross section can be obtained from the following table:

Cross Section	Rod Cylinder Diameter
≥ 1.6 mm	0 - 13 mm
≥ 2.4 mm	13 - 25 mm
≥ 3.5 mm	25 - 40 mm
≥ 5.3 mm	40 - 115 mm
≥ 7.0 mm	>115mm

Rubber behaves like water and can consequently not be compressed. Its volume will remain unchanged. When O-Rings tend to rotate with the shaft, the rubber may become subject to “winding”. When applied to a piston, the ring may twist. It is advisable, therefore, to observe the following rules:

When the outer circumference is exposed to friction:

Outside O-Ring diameter = (0,95 mm to 1,0 mm) x cylinder dia (= A).
 The diameter of the groove = cylinder dia (= A) - 2 x groove depth (= E).
 The groove depth is shown in the table on page 10.

When the inside circumference is exposed to friction:

Inside O-Ring dia = (0,95 mm to 1,0 mm) x rod dia (= B).
 The diameter of the groove - rod dia (= B) + 2 x groove depth (= E).
 The groove depth is shown in the table on page 10.

2. Guide for the choice of an O-Ring for static parts

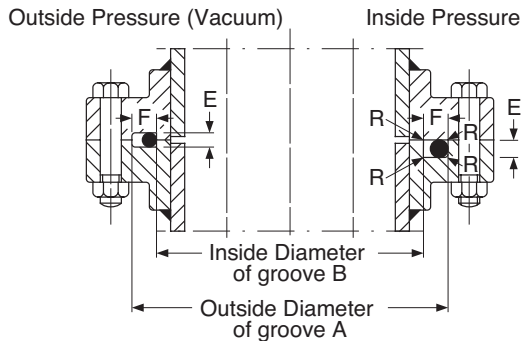
Although in principle any cross section is suitable, it is advisable to take O-Rings with the largest cross section available. The rings can then also be safely used for higher pressures and for varying pressure loads. A distinction must be made between flanges and other static parts.

For flanged seals the following rules are applicable:

Pressure from the inside:
 A=outside ring diameter (= inside dia + 2 x cross section), so that the O-Ring fits properly on the outside and has some clearance towards the inside.

Pressure from the outside (vacuum): B should be the inside ring diameter, so that the ring fits properly on the inside and has some clearance towards the outside.

For groove dimensions see table on page 10.



Other Static Parts

As far as other static parts are concerned, the same directions as indicated in the case of dynamic parts apply. The O-Ring may be expanded 0-5%, but should be as tight a fit as possible in the groove. The groove dimensions are shown in the table on page 10.

3. Choice of running surface material, running surface and groove finishes, fits and lubrication

The choice of running surface material

In order to obtain the maximum service life for O-Rings sealing dynamic parts, it is recommended to use polished hard steel shafts and rods and honed steel or cast iron cylinder walls.

Honing makes the best surface. Hardened steel causes the least friction, whereas chrome hardening causes considerable friction. Soft materials like aluminium alloys, copper, brass, monel or soft stainless steel are not advisable because their wear resistance is small. The initial friction of elastomers is high; the rubber tends to adhere to the grooves in the surface of the material. The use of harder compounds can reduce this initial friction, but when a very low initial friction is required, Eriflon seals are better suited. Further details on request.

Running surface finish and fits

A close fit between the dynamic parts and a superior surface finish of the sliding parts is of special importance to the proper sealing and long service life of O-Rings.

The sealing clearance

With regard to the allowable clearance values, the table below specifies the I.S.A. fits to be aimed at, dependent on the nominal diameters.

The roughness of the parts sliding against the rubber should be between 0.2 and 0.8 m(Ra) 8 - 32 Ru up to 10mm H9/e8. A surface finish finer than 0.15m (6 Ru) should be avoided, as it would be difficult to maintain a lubricating film.

Nomø	Clearance
up to 10mm	H9 / e8
10 to 60mm	H8 / e9
> 60mm	H7 / f7

The allowable sealing clearance depends on the pressure to be sealed and the hardness of the O-Ring compound used. At elevated pressures a part of the O-Ring will be forced into the sealing clearance. Particularly soft rubber types can be damaged severely. Dependent on the pressures to be sealed, the amount of sealing clearance is bound to maximum values.

Lubricants

For dynamic and pneumatic applications it is essential that the O-Ring should be located with the assistance of a lubricant to prolong service life and prevent initial wear. This is particularly important when installed in components which may not be activated for an indefinite period following assembly.

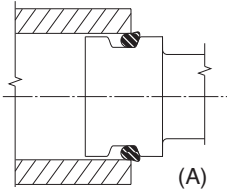
See page 59 for details.

4. Installation instructions

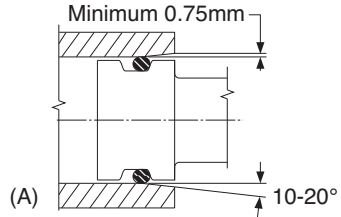
Bevelled edges

When designing O-Ring sealing devices it is of vital importance that bevelled edges are provided in order that the O-Ring will not be damaged when being installed. In many cases a simple rounding of sharp edges is insufficient. The following illustrations show why this is the case.

CYLINDERS

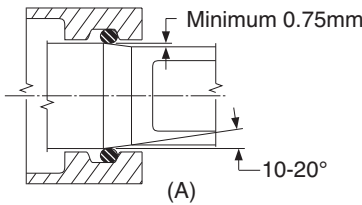


The ring will become wedged and subsequently destroyed because the edges have not been bevelled.

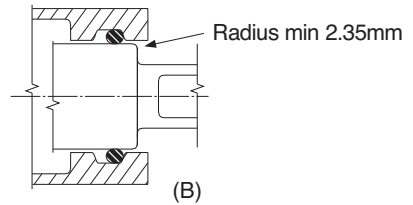


Correctly bevelled edges ensure simple, trouble-free mounting of rings

PISTON RODS & PLUNGERS



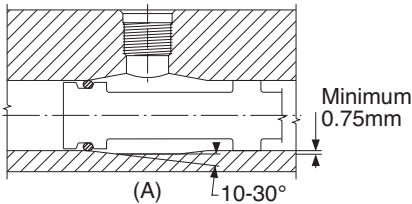
In the case of piston rods and plungers the above construction is preferable.



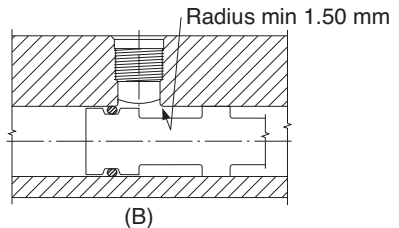
This construction is deemed satisfactory, but not preferable.

VALVES

When O-Rings must pass a hole while in the process of being installed, care should be taken in order that the rings are not pinched off or lost.



This construction is preferred



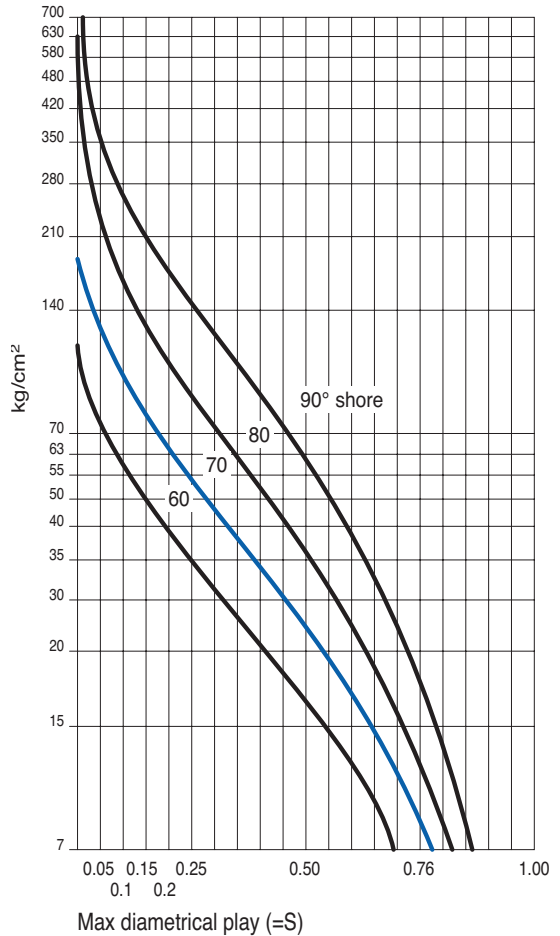
This construction is also workable

When a certain amount of passage is required, we suggest several small diameter holes are made as opposed to fewer larger holes.

5. Hardness to pressure ratio

The diagram opposite gives a guide to the connection between hardness, pressure and clearance.

At pressures over 85 kg/cm², it is always advisable to support the O-Ring by a back-up ring.

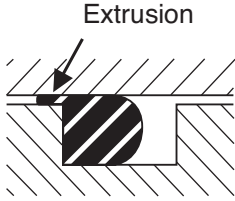


The table below specifies the allowable values at the pressures and O-Ring hardness stated for cross sections according to BS1806 and AS 568A. Dimensions in millimetres.

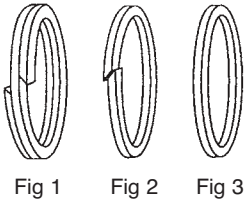
HARDNESS 70-80 ° SHORE A					
Cross section O-Ring "W"					
	1.78	2.62	3.53	5.33	7.00
Pressure	Clearance				
35 bar	0.20	0.25	0.30	0.36	0.41
70 bar	0.15	0.18	0.23	0.25	0.30
100 bar	0.10	0.13	0.15	0.18	0.20
150 bar	0.05	0.08	0.10	0.10	0.11
175 bar	0.03	0.04	0.05	0.06	0.06

HARDNESS 90 ° SHORE A					
Cross section O-Ring "W"					
	1.78	2.62	3.53	5.33	7.00
Pressure	Clearance				
35 bar	0.36	0.41	0.46	0.51	0.51
70 bar	0.30	0.36	0.41	0.46	0.46
100 bar	0.25	0.30	0.36	0.38	0.41
150 bar	0.20	0.23	0.25	0.30	0.30
175 bar	0.15	0.18	0.20	0.25	0.25
200 bar	0.16	0.15	0.18	0.20	0.20
350 bar	0.08	0.10	0.13	0.15	0.15

6. The application of back-up rings



When pressures exceed 85 bar it is advisable (with the exception of flange connections) to install back-up rings that protect the O-Ring from being forced out. They may particularly be needed when hard O-Rings cannot be used or when the tolerances are not close enough to prevent extrusion of the O-Rings. The usual material for back-up rings is PTFE. Other materials are available and can be supplied to special order.



The following types are available:

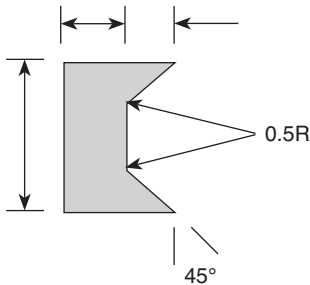
Fig 1 - Spiral back-up rings

Fig 2 - Split back-up rings

Fig 3 - Solid back-up rings

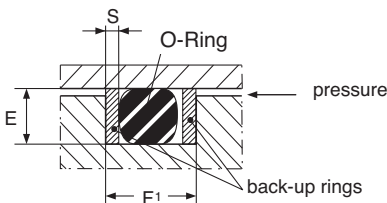
Spiral back-up rings, Fig 1 are the most popular type, and can be ordered by stating the size of the O-Ring with which they are to be used.

Spiral back-up rings are standard stock items, split and solid back-up rings, Fig 2 and Fig 3, are available to order at short notice.



The width of the back-up ring is identical to the depth of the O-Ring groove; the groove width of the O-Ring is increased by once or twice the thickness of the back-up ring.

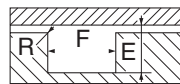
In critical high pressure situations of up to 40 bar the stresses within the O-Ring can rise sharply. In these circumstances we recommend the use of the profiled back-up ring which is specially designed to prevent splitting of the O-Ring at high pressures. These support rings are available in AS/BS standard sizes and are manufactured from a 90° Shore NBR compound.



We stock every size.

Theoretically it is sufficient to install a back-up ring on the side where extrusion can occur only, but in practice back-up rings are often installed on both sides for added protection.

7. Table of groove dimensions for dynamic and static sealing

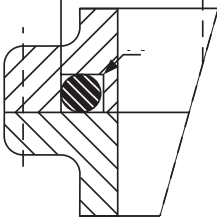


Cross Section	Groove Dimensions							
	Dynamic Application			Static Application				Groove Radius R
	Depth E +0,00 -0,05	Width + 0,10 F -0,00		Flange Seal		Other Static Parts		
		Reciprocating F +0,10 -0,00	Rotary F +0,00 -0,05	Groove Depth E +0,00 -0,05	Groove Width F 0,10	Groove Depth E +0,00 -0,05	Groove Width F 0,10	
1,0 to 1,02	0,81	1,57	1,20	0,68	1,57	0,73	1,30	
1,2	1,00	1,80	1,40	0,82	1,80	0,88	1,60	
1,25 to 1,27	1,04	1,85	1,45	0,85	1,85	0,92	1,70	
1,3	1,10	1,90	1,50	0,88	1,90	0,95	1,80	
1,42	1,16	2,08	1,60	0,96	2,08	1,03	2,00	
1,50 to 1,52	1,24	2,16	1,70	1,02	2,16	1,10	2,20	
1,60 to 1,63	1,30	2,20	2,10	1,10	2,20	1,15	1,15	0,5
1,78	1,45	2,40	2,30	1,20	2,40	1,30	1,30	
1,83	1,50	2,45	2,35	1,20	2,45	1,30	1,30	
1,93 to 2,0	1,60	2,70	2,50	1,50	2,70	1,55	1,55	
2,08	1,70	2,75	2,50	1,60	2,75	1,65	1,65	
2,21	1,80	3,00	2,55	1,70	3,00	1,75	1,75	
2,4	2,10	3,25	2,70	1,90	3,25	2,00	2,00	
2,46	2,15	3,30	2,75	1,95	3,30	2,00	2,00	
2,50	2,20	3,40	2,80	2,00	3,40	2,05	2,05	
2,62	2,30	3,60	2,90	2,10	3,60	2,20	2,20	
2,75	2,45	3,70	3,10	2,20	3,70	2,30	2,30	
2,95 to 3,0	2,65	4,05	3,35	2,40	4,05	2,50	2,50	
3,15	2,85	4,25	3,50	2,50	4,25	2,60	2,60	
3,5 to 3,53	3,10	4,80	3,90	2,80	4,80	2,90	4,30	1,0
4,0	3,55	5,50	4,35	3,30	5,50	3,50	4,60	
4,5	4,00	6,20	4,90	3,70	6,20	3,90	5,20	
5,0	4,40	6,80	5,50	4,10	6,80	4,30	5,70	
5,33	4,80	7,20	5,80	4,40	7,20	4,60	6,10	
5,5	4,95	7,50	6,30	4,55	7,50	4,70	6,30	
5,7	5,15	7,80	6,35	4,70	7,80	4,80	6,50	
6,0	5,40	8,20	6,70	4,95	8,20	5,20	6,90	
6,3 to 6,35	5,55	8,60	7,00	5,20	8,60	5,30	7,10	
7,0	6,10	9,50	7,80	5,80	9,50	6,90	8,00	1,5
8,0	7,20	10,80	8,90	6,70	10,80	6,80	9,30	
8,4	7,55	11,40	9,40	7,00	11,40	7,20	9,60	
10,0	9,00	13,70	11,20	8,30	13,70	8,50	11,40	
12,0	10,40	16,40	13,40	10,00	16,40	10,20	13,70	

Groove dimensions for P.T.F.E. O-Rings

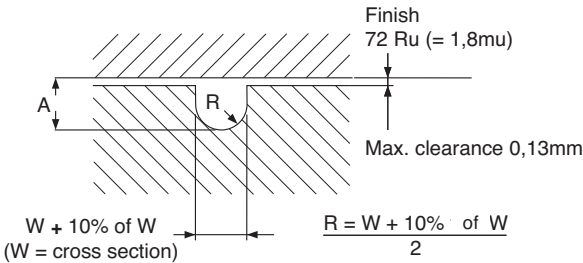
Owing to the less elastic properties of PTFE O-Rings, they should be used for static sealing in axial groove constructions only.

When using PTFE O-Rings in axial grooves or flange constructions, normal groove depths are suitable.



Considering the occurrence of cold flow of PTFE, the best results are achieved if the groove construction stated below is used.

P.T.F.E. O-Rings used in the groove construction as illustrated below are more effective than when installed in normal O-Ring grooves.



$A = W - 10 \text{ to } 20\% \text{ of } W$ (for cross sections 1.78 to 5.33 mm)

$A = W - 10 \text{ to } 15\% \text{ of } W$ (for cross sections 5.33 to 7 mm inclusive)

Compressing P.T.F.E. O-Rings requires higher loads than elastomer O-Rings, consequently P.T.F.E. O-Rings can be used for pressure sealing in axial grooves, not in radial grooves.

In radial grooves P.T.F.E. O-Rings can serve as a pressureless separating seal.

Because P.T.F.E. O-Rings are difficult to expand and difficult to compress, it is advisable to choose dimensions that create a sliding fit.

If P.T.F.E. O-Rings are heated to 80 to 100 °C, they become easier to install.

When the properties of P.T.F.E. are required for chemical or thermal conditions, and higher load pressures to obtain an optimum seal are not possible, we recommend the use of TEFLON-FEP Encapsulated O-Rings as referred to on page 56.

8. Recommendations for use of standard compounds

Recommended media and other data	Shore A ± 5 °	ERIKS Ref. No.	Temp Range °C	ASTM Code '92
<p>Buna N-Nitrile For use with hydraulic and lubricating oils, animal and vegetable oils, acetylene, alcohols, water, air and many other fluids. Good mechanical and physical properties. Compound 36624 is the most commonly used in all industrial applications.</p>	60 70 90	44501 36624 47702	-35 +110	NBR
<p>Ethylene-propylene Chemically resistant; fire resistant to hydraulic fluids, (skydrol, pydraul, lindol, celube 150, phosphate esters), pure aniline, fire extinguisher fluid, mild acids, heated water and steam. Excellent ozone and weathering resistance. Not resistant to mineral oils.</p>	70	55914	-55 +150	EPDM
<p>Chloroprene-NEOPRENE® Resistant to ozone and sunlight. Moderate resistance to petroleum based oils.</p>	70	32906	-45 +100	CR
<p>Fluorocarbon-VITON® Superior quality compound resistant to high temperatures, synthetic and hydraulic fluids and a wide range of chemicals, heavy oxidising fluids, many alkalis, acids and hot air. Exceptional in vacuum applications when a 100% virgin fluoroelastomer is used. See page 50. This is a Genuine Du Pont Performance Elastomer Compound.</p>	75 90	51414 514320	-15 +204	FKM
<p>Silicone For high temperatures, air, oxygen, heated water etc, alcohols and is also resistant to many chemicals. Good ozone resistance, moderate oil resistance and excellent electrical properties.</p>	50 60 70	714655 714166 714177	-60 +230	VMQ
<p>Fluorosilicone Resistant to most fuels and chemicals, silicone based fluids and silicate esters. Good heat and low temperature flexibility, electrical properties and excellent resistance to ozone and weathering.</p>	60	701966	-60 +230	FVMQ

Recommended media and other data	Shore A ± 5 °	ERIKS Ref. No.	Temp Range °C	ASTM Code '92
Polytetrafluoroethylene-PTFE Resistant to virtually all types of chemical attack. Not subject to change on ageing as a result of ozone exposure. Water absorption rate is less than 0.01%.			-120 +260	PTFE
Polyacrylate Outstanding ozone resistance and low temperature flexibility. Resistant to high aniline oils, extreme pressure lubricants and transmission fluids. Not recommended for use with water.	70	3351	-25 +160	ACM
Polyurethane Good abrasion resistance, tear strength and low temperature flexibility. Resistant to oils and fuels at normal ambient temperature.	70	522219	-30 +70	AU
Tetrafluoroethylene-AFLAS® Suitable for use with a wide range of chemicals together with superior ozone resistance. Has good physical properties and high abrasive resilience. Recommended for use with many automotive and aerospace lubricants and is excellent in hot water and steam applications.	80 90		-15 +204	TFE
FEP Encapsulated A seamless FEP encapsulated O-Ring with a Viton® or Silicone core. Extremely high chemical resistance with low vapour permeability and compression set.			-60 +204 +260	FEP PFA
Perfluorelastomer - KALREZ® Superior quality compound for high temperatures and most chemicals. The compound combines chemical properties of Teflon and the mechanical properties of Viton®. Compounds 4079, 1050LF and 6375 are the most commonly used and are readily available. For solvents, ketones, esters, ethers, inorganic and organic acids and lyes, highly oxidizing agents, chlorine and compounds of chlorine, fuels, hydraulic fluids, thermal fluids and steam. Note: Please refer to page 59 for details of KRYTOX® Lubricant.	80 75 75 90 80 85	1050LF 4079 6375 3018 2037 2035	-41 +280 -50 +316 -20 +275 -50 +288 -50 +210 -50 +210	FFKM

9. Resistance properties of various elastomers

We would emphasise that this chart should be used as a guide only. We will be glad to send you our detailed list of chemical resistance properties covering up to 15 elastomers and some 1500 fluids and gases, upon application.

	Buna-N Nitrile	Ethylene Propylene	Neoprene®	Urethane	Silicone	Fluoro-silicone	Fluoro- elastomer Viton	Poly-acrylate	Kalrez® perfluor elastomer	Teflex
ASTM code 1992 ISO	NBR	EPDM	CR	AU	VMQ	FVMQ	FKM	AC	FFKM	FEP
code 1987 Hardness	NBR	EPM	CR	EU	VMQ	FVMQ	FKM	ACM	FFPM	FEP
Shore A Tensile	40-95	40-80	20-90	50-90	10-90	40-80	60-90	50-90	80-90	80-90
Strength (p.s.i.)	2500	2500	3000	5000	1400	900	2000	2000	2000	
Tearing Strength	G	G	VG	E	N	N	G	G	G	G
Wear Resistance	G	G	G	VG	N	N	G	VG	G	G
Fire-proof Hyd. Fluids	N	VG	R	N	G	VG	R-N	N	E	E
Lubricating Oils Fuel	G	N	G	VG	G	E	E	VG	E	E
Oils	G	N	R	VG	R	E	E	VG	E	E
Hydraulic Oils	E	N	G	VG	G	E	E	U	E	E
Vegetable Oils	E	R	G	VG	G	E	E	U	E	E
Animal Fats	E	R	G	VG	G	E	E	U	E	E
Petrol (Normal)	VG	N	R	VG	R	E	E	VG	E	E
Petrol (High Octane)	G	N	N	VG	N	E	E	G	E	E
Kerosene	VG	N	R	VG	R	E	E	VG	E	E
Aromatic Hydrocarbons	R	N	N	G	N	E	E	R	E	E
Aliphatic Hydrocarbons	VG	N	G	VG	R	E	E	VG	E	E
Water (Under 80°C)	VG	E	R	R-N	E	E	E	N	E	E
Water (Above 80°C)	R	E	N	N	E	VG	G	N	E	E
Alcohols	VG	E	E	R	E	E	E	N	E	E
Ketones	N	G	N	N	G	N	N	N	E	E
Conc. Acids	N	R	N	N	R	G	VG	N	E	E
Diluted Acids	R	G	G	N	G	VG	E	N	E	E
Alkalis	R	VG	G	N	G	R	G	N	E	E
Chlorinated Solvents	R	N	N	R	N	E	E	R	E	E
Ozone & Sunlight	R	E	VG	VG	E	E	E	VG	E	E
Max. temp. at continuous service	110 °C	135 °C	105 °C	80 °C	230 °C	205 °C	205 °C	175 °C	250 °C to 316 °C	204 °C to 260 °C
Electrical Properties	N	N	N	N	N	N	N	N	N	N
Compression Set	VG	G	VG	N	E	VG	R	G	G	G
Flame Resistant	No	No	Yes	No	No	No	Yes	No	Yes	Yes

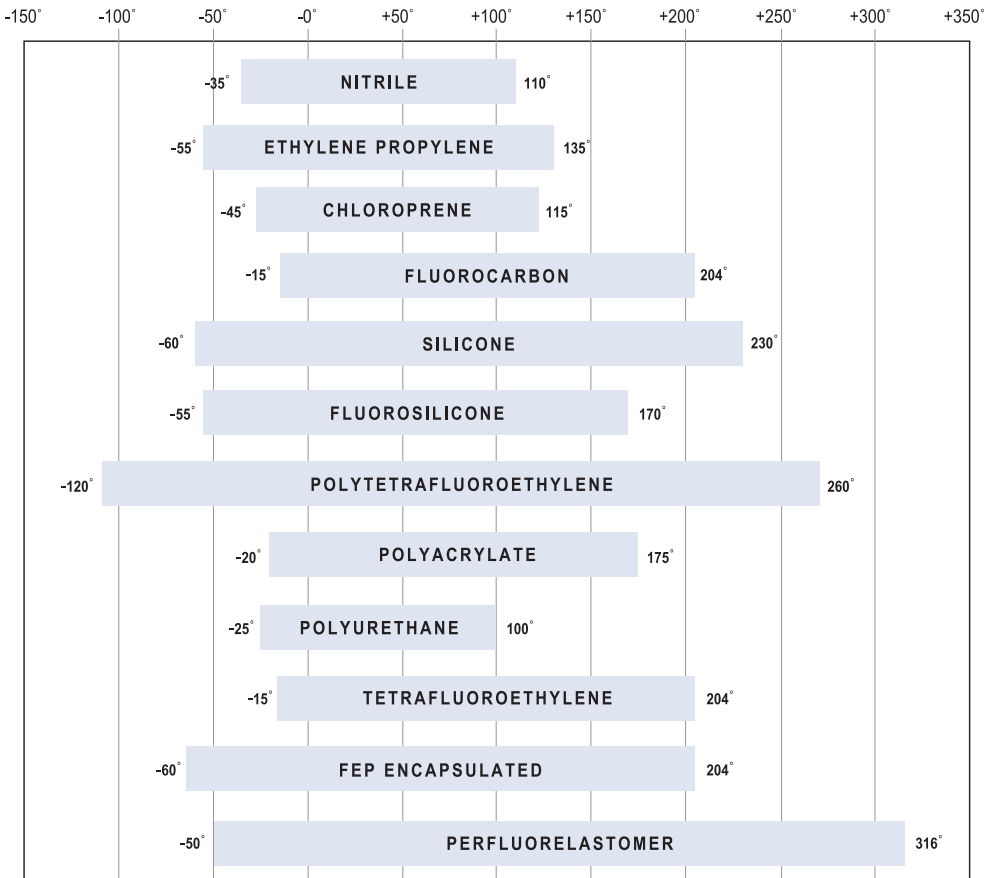
E= Excellent VG= Very Good G= Good R= Reasonable N= Not Recommended

10. Temperature Requirements

When considering a choice of compound, both high and low limits as well as operating temperature must be taken into consideration, together with the anticipated time element of each high and low point. The parameters shown in the chart are based on average conditions for a period of approximately one thousand hours. Most base polymers will exceed the recommended temperature guide for short intermittent periods.

the fact that rubber when exposed to extended periods of high temperature will expand, and therefore it may be necessary to increase the area of the groove, and in opposing conditions rubber exposed to prolonged periods of low temperature will tend to contract and a reduction of groove size may be desirable or alternatively a higher degree of squeeze should be allowed for on initial design.

Another important point to be considered in very critical conditions is



Dimensions chart

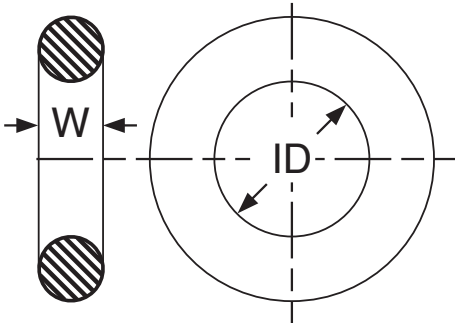
On pages 17 to 42 you will find over 2800 sizes listed in order of their inside diameters, followed by the cross section diameter. The sizes contained in our programme represents over 95% of the international market, and conform to the following world standards:-

American	AS 568A
British	BS 1806 & 4518
French	AFNOR 47501
German	DIN 3770 & DIN 3771
Japanese	JIS 2401 & JAS 06605
Swedish	SMS 1586

Hardness of O-Rings

The hardness of all elastomers is generally expressed in accordance with the internationally accepted scale Shore A.

All figures quoted are subject to a tolerance of +/- 5° and the higher the number the harder the compound. Standard O-Rings are usually available between 60° and 90° with 70° being the standard which will always be supplied in the absence of an alternative being requested.



Ordering

When ordering an O-Ring please state either the size reference number or the internal diameter, followed by the cross section diameter, and then the type of material and shore hardness required. All dimensions are quoted in mm.

Tolerances

O-Rings are manufactured to close tolerances as defined in BS 1806-1989, BS 4518- 1982, ISO 3601/1 and DIN 3771/1 up to and including an internal diameter of 670mm and cross section of 7mm.

The tables below relate to O-Rings manufactured from our standard Nitrile compound 36624 and refers to the smaller diameter within the specified range.

With other materials and shore hardness, slight deviations may occur due to the differing shrinkage behaviour of proprietary compounds

Inside diameter		Tolerances ±	
up to	-	2.50	0.13
2.50	-	6.30	0.14
6.30	-	110	0.16
10	-	18	0.18
18	-	30	0.22
30	-	50	0.31
50	-	80	0.47
80	-	100	0.71
100	-	120	0.87
120	-	150	1.00
150	-	180	1.24
180	-	250	1.44
250	-	300	1.93
300	-	350	2.25
350	-	400	2.56
400	-	450	2.91
450	-	500	3.20
500	-	650	3.54
650	-	800	4.46

Cross Section		Tolerances ±	
up to	-	1.80	0.08
1.80	-	2.65	0.09
2.65	-	3.55	0.10
3.55	-	5.33	0.13
5.33	-	7.00	0.15
7.00	-	8.00	0.18
8.00	-	10.00	0.21
10.00	-	12.00	0.25
12.00	-	16.00	0.28

Dimentions			Size
ID	x	C/S	Ref No
0.74	x	1.02	001
1.00	x	1.00	
1.07	x	1.27	002
1.15	x	1.00	R000
1.20	x	0.70	
1.25	x	1.00	
1.25	x	2.62	102
1.40	x	0.70	
1.42	x	1.52	003
1.50	x	1.00	
1.78	x	1.02	003.5
1.78	x	1.78	004
1.80	x	0.70	
1.80	x	1.20	
1.80	x	1.50	
2.00	x	1.00	
2.00	x	1.30	
2.00	x	1.50	
2.00	x	1.60	
2.00	x	2.00	
2.06	x	2.62	103
2.20	x	1.60	R00
2.30	x	0.90	
2.35	x	1.00	
2.40	x	1.05	
2.40	x	1.90	R 0
2.50	x	1.00	
2.50	x	1.20	
2.50	x	1.30	
2.50	x	1.50	
2.50	x	1.60	
2.54	x	1.02	607
2.57	x	1.78	005
2.60	x	1.20	
2.60	x	1.90	R1
2.60	x	2.40	
2.70	x	1.00	

Dimentions			Size
ID	x	C/S	Ref No
2.75	x	1.60	
2.80	x	1.60	
2.80	x	1.90	P3
2.85	x	2.62	104
2.90	x	1.78	006
2.90	x	2.62	
3.00	x	1.00	
3.00	x	1.25	
3.00	x	1.50	
3.00	x	2.00	
3.00	x	2.40	
3.00	x	3.00	
3.00	x	3.50	
3.10	x	1.60	
3.10	x	2.60	
3.17	x	1.78	801
3.20	x	1.78	
3.30	x	2.40	
3.40	x	1.90	R2
3.50	x	1.00	
3.50	x	1.20	
3.50	x	1.50	
3.50	x	2.00	
3.60	x	2.40	
3.63	x	2.62	105
3.68	x	1.78	007
3.70	x	1.00	
3.70	x	1.60	
3.80	x	1.25	
3.80	x	1.90	P4
4.00	x	1.00	
4.00	x	1.10	
4.00	x	1.20	
4.00	x	1.50	
4.00	x	2.00	
4.00	x	2.20	
4.00	x	2.50	

Dimentions			Size
ID	x	C/S	Ref No
4.00	x	3.00	
4.10	x	1.60	
4.20	x	1.40	
4.20	x	1.90	R3
4.30	x	2.40	
4.34	x	3.53	201
4.42	x	2.62	106
4.47	x	1.78	008
4.50	x	1.00	
4.50	x	1.50	
4.50	x	1.80	
4.50	x	2.00	
4.60	x	2.40	
4.70	x	1.42	901
4.70	x	1.60	
4.76	x	1.78	802
4.90	x	1.90	R4
5.00	x	1.00	
5.00	x	1.20	
5.00	x	1.50	
5.00	x	1.75	
5.00	x	2.00	
5.00	x	2.50	
5.00	x	3.00	
5.00	x	3.450	
5.00	x	4.00	
5.10	x	1.60	
5.23	x	2.62	107
5.28	x	1.78	009
5.30	x	2.40	
5.50	x	1.00	
5.50	x	1.50	
5.50	x	1.60	
5.50	x	2.00	
5.50	x	2.40	
5.50	x	2.50	
5.60	x	2.40	

Dimentions			Size
ID	x	C/S	Ref No
5.70	x	1.90	R5
5.80	x	1.90	P6
5.94	x	3.53	202
6.00	x	1.00	
6.00	x	1.50	
6.00	x	1.80	
6.00	x	2.00	
6.00	x	2.20	
6.00	x	2.30	
6.00	x	2.50	
6.00	x	3.00	
6.00	x	4.00	
6.02	x	1.63	902
6.02	x	2.62	108
6.07	x	1.78	010
6.10	x	0.84	
6.10	x	1.60	
6.30	x	2.40	
6.35	x	1.78	803
6.40	x	1.90	R5A
6.50	x	1.00	
6.50	x	1.50	
6.50	x	2.00	
6.50	x	3.00	
6.60	x	2.40	
6.75	x	1.78	
6.80	x	1.90	
6.86	x	1.78	610
7.00	x	1.00	P7
7.00	x	1.20	
7.00	x	1.50	
7.00	x	1.80	
7.00	x	2.00	
7.00	x	2.50	
7.00	x	3.00	
7.00	x	4.00	
7.10	x	1.60	

Dimentions			Size
ID	x	C/S	Ref No
7.20	x	1.90	R6
7.20	x	2.20	
7.30	x	2.40	
7.50	x	1.50	
7.50	x	2.00	
7.50	x	2.20	
7.50	x	2.50	
7.50	x	3.20	
7.52	x	3.53	203
7.60	x	1.20	
7.60	x	2.40	
7.60	x	2.62	109
7.65	x	1.63	903
7.65	x	1.78	011
7.80	x	1.90	P8
7.93	x	4.76	
7.94	x	1.78	804
8.00	x	1.00	
8.00	x	1.25	
8.00	x	1.50	
8.00	x	1.90	R6A
8.00	x	2.00	
8.00	x	2.40	
8.00	x	2.50	
8.00	x	3.00	
8.00	x	3.50	
8.00	x	4.00	
8.00	x	5.00	
8.10	x	1.60	
8.30	x	1.00	
8.30	x	2.40	
8.50	x	1.00	
8.50	x	1.27	
8.50	x	1.50	
8.50	x	2.00	
8.50	x	2.50	
8.60	x	2.40	

Dimentions			Size
ID	x	C/S	Ref No
8.73	x	1.78	611
8.90	x	1.83	904
8.90	x	1.90	R7
8.90	x	2.70	R8
9.00	x	1.00	
9.00	x	1.50	
9.00	x	2.00	
9.00	x	2.20	
9.00	x	2.50	
9.00	x	3.00	
9.00	x	3.50	
9.00	x	4.00	
9.10	x	1.60	
9.12	x	3.53	204
9.20	x	2.62	110
9.25	x	1.78	012
9.30	x	2.40	
9.50	x	1.00	
9.50	x	1.50	
9.50	x	1.60	
9.50	x	2.00	
9.50	x	2.50	
9.50	x	3.50	
9.52	x	1.78	
9.60	x	2.40	
9.75	x	1.78	
9.80	x	1.90	P10
9.80	x	2.40	P10A
9.92	x	2.62	613
10.00	x	1.00	
10.00	x	1.30	
10.00	x	1.50	
10.00	x	2.00	
10.00	x	2.20	
10.00	x	2.50	
10.00	x	3.00	
10.00	x	3.50	

Dimentions			Size
ID	x	C/S	Ref No
10.00	x	4.00	
10.00	x	5.00	
10.10	x	1.60	
10.30	x	2.40	
10.47	x	5.33	309
10.50	x	1.50	
10.50	x	2.00	
10.50	x	2.50	
10.50	x	2.70	R9
10.51	x	1.83	905
10.60	x	2.40	
10.69	x	3.53	205
10.77	x	2.62	111
10.82	x	1.78	013
11.00	x	1.00	
11.00	x	1.30	
11.00	x	1.50	
11.00	x	2.00	
11.00	x	2.50	
11.00	x	3.00	
11.00	x	3.50	
11.00	x	4.00	
11.00	x	5.00	
11.10	x	1.60	
11.11	x	1.78	806
11.30	x	2.40	
11.50	x	2.50	
11.50	x	3.00	
11.60	x	1.20	
11.60	x	2.40	
11.70	x	5.80	
11.80	x	2.40	P12
11.90	x	1.98	906
11.91	x	1.78	
11.91	x	2.62	614
12.00	x	1.20	
12.00	x	1.50	

Dimentions			Size
ID	x	C/S	Ref No
12.00	x	2.00	
12.00	x	2.25	
12.00	x	2.50	
12.00	x	3.00	
12.00	x	3.50	
12.00	x	4.00	
12.00	x	4.50	
12.00	x	5.00	
12.00	x	7.00	
12.07	x	5.33	310
12.10	x	1.60	
12.10	x	2.70	R10
12.29	x	3.53	206
12.30	x	2.40	P12.5
12.37	x	2.62	112
12.42	x	1.78	014
12.50	x	1.50	
12.50	x	2.00	
12.50	x	2.50	
12.50	x	3.00	
12.60	x	2.40	
12.70	x	2.62	807
13.00	x	1.00	
13.00	x	1.30	
13.00	x	1.50	
13.00	x	2.00	
13.00	x	2.50	
13.00	x	3.00	
13.00	x	3.50	
13.00	x	4.00	
13.00	x	5.00	
13.10	x	1.60	
13.10	x	2.62	615
13.26	x	1.52	
13.30	x	2.40	
13.46	x	2.08	907
13.50	x	1.30	

Dimentions			Size
ID	x	C/S	Ref No
13.50	x	1.50	
13.50	x	2.00	
13.60	x	2.40	
13.60	x	2.70	R11
13.64	x	5.33	311
13.80	x	2.40	P14
13.87	x	3.53	207
13.95	x	2.62	113
14.00	x	1.00	
14.00	x	1.25	
14.00	x	1.50	
14.00	x	1.78	015
14.00	x	2.00	
14.00	x	2.50	
14.00	x	3.00	
14.00	x	3.50	
14.00	x	4.00	
14.00	x	5.00	
14.10	x	1.60	
14.30	x	2.40	
14.50	x	2.00	
14.50	x	3.00	
14.50	x	4.50	
14.60	x	2.40	
14.80	x	2.40	P15
15.00	x	1.00	
15.00	x	1.50	
15.00	x	2.00	
15.00	x	2.50	
15.00	x	3.00	
15.00	x	3.20	
15.00	x	3.50	
15.00	x	4.00	
15.00	x	5.00	
15.08	x	2.62	616
15.10	x	1.60	
15.10	x	2.70	R12

Dimintions			Size
ID	x	C/S	Ref No
15.20	x	1.78	
15.24	x	5.33	312
15.30	x	2.40	
15.47	x	3.53	208
15.50	x	1.50	
15.50	x	3.00	
15.50	x	4.00	
15.55	x	2.62	114
15.60	x	1.78	016
15.60	x	2.40	
15.80	x	2.40	P16
15.88	x	2.62	809
16.00	x	1.00	
16.00	x	1.25	
16.00	x	1.50	
16.00	x	2.00	
16.00	x	2.50	
16.00	x	3.00	
16.00	x	3.50	
16.00	x	4.00	
16.00	x	4.50	
16.00	x	5.00	
16.00	x	6.00	
16.10	x	1.60	
16.30	x	2.40	
16.36	x	2.20	908
16.40	x	1.00	
16.50	x	1.50	
16.50	x	2.00	
16.50	x	2.50	
16.60	x	2.40	
16.82	x	5.33	313
16.90	x	2.70	R13
17.00	x	1.00	
17.00	x	1.20	
17.00	x	1.50	
17.00	x	2.00	

Dimintions			Size
ID	x	C/S	Ref No
17.00	x	2.50	
17.00	x	3.00	
17.00	x	3.50	
17.00	x	4.00	
17.00	x	5.00	
17.04	x	3.53	209
17.10	x	1.60	
17.12	x	2.62	115
17.17	x	1.78	017
17.30	x	2.40	
17.46	x	2.62	810
17.50	x	1.00	
17.50	x	1.50	
17.50	x	2.00	
17.50	x	250	
17.60	x	2.40	
17.80	x	2.40	P18
17.86	x	2.62	617
17.93	x	2.46	909
18.00	x	1.00	
18.00	x	1.50	
18.00	x	2.00	
18.00	x	2.50	
18.00	x	3.00	
18.00	x	3.50	
18.00	x	4.00	
18.00	x	4.50	
18.00	x	5.00	
18.00	x	6.00	
10.10	x	1.60	
18.20	x	3.00	
18.30	x	2.40	
18.30	x	3.60	R15
18.40	x	2.70	R14
18.42	x	5.33	314
18.50	x	1.20	
18.50	x	1.50	

Dimintions			Size
ID	x	C/S	Ref No
18.50	x	2.00	
18.50	x	2.50	
18.50	x	3.00	
18.60	x	2.40	
18.64	x	3.53	210
18.72	x	2.62	116
18.77	x	1.78	018
19.00	x	1.00	
19.00	x	1.50	
19.00	x	2.00	
19.00	x	2.50	
19.00	x	3.00	
19.00	x	3.50	
19.00	x	4.00	
19.00	x	5.00	
19.10	x	1.60	
19.15	x	1.78	
19.18	x	2.46	910
19.20	x	3.00	
19.20	x	3.20	
19.30	x	2.40	
19.50	x	1.00	
19.50	x	1.50	
19.50	x	2.00	
19.50	x	2.40	P20
19.50	x	3.00	R16
19.80	x	2.40	315
19.80	x	3.60	
19.99	x	5.33	
20.00	x	1.00	
20.00	x	1.30	
20.00	x	1.50	
20.00	x	2.00	
20.00	x	2.50	
20.00	x	3.00	
20.00	x	3.50	
20.00	x	4.00	

Dimintions			Size
ID	x	C/S	Ref No
20.00	x	4.50	211
20.00	x	5.00	
20.00	x	6.00	
20.10	x	1.60	
20.22	x	3.53	
20.30	x	2.40	
20.30	x	2.62	
20.35	x	1.78	
20.50	x	2.00	
20.50	x	2.40	
20.50	x	2.50	
20.64	x	2.62	
20.80	x	2.40	
21.00	x	1.00	
21.00	x	1.50	
21.00	x	2.00	
21.00	x	2.50	
21.00	x	3.00	
21.00	x	3.50	
21.00	x	4.00	
21.00	x	4.50	
21.00	x	5.00	
21.10	x	1.60	
21.30	x	2.40	
21.30	x	3.60	
21.50	x	1.50	
21.50	x	2.00	
21.50	x	2.40	
21.50	x	3.00	
21.50	x	4.50	
21.59	x	5.33	
21.60	x	2.40	
21.70	x	3.50	
21.82	x	3.53	
21.90	x	2.62	
21.92	x	2.95	

Dimintions			Size
ID	x	C/S	Ref No
21.95	x	1.78	020
22.00	x	1.00	813
22.00	x	1.30	
22.00	x	1.50	
22.00	x	2.00	
22.00	x	2.50	
22.00	x	3.00	
22.00	x	3.50	
22.00	x	4.00	
22.00	x	4.50	
22.00	x	5.00	
22.10	x	1.60	
22.20	x	3.00	
22.23	x	2.62	
22.30	x	2.40	
22.50	x	1.50	
22.50	x	2.00	
22.50	x	2.50	
22.50	x	3.00	
22.60	x	1.10	
22.80	x	0.80	
23.00	x	1.00	
23.00	x	1.20	
23.00	x	1.50	
23.00	x	2.00	
23.00	x	2.50	
23.00	x	3.00	
23.00	x	3.60	
23.00	x	4.00	
23.00	x	4.50	
23.00	x	5.00	
23.00	x	6.00	
23.17	x	5.33	
23.39	x	3.53	
23.47	x	2.62	
23.47	x	2.95	
23.50	x	1.00	

Dimintions			Size
ID	x	C/S	Ref No
23.50	x	2.00	021
23.50	x	2.40	
23.52	x	1.78	
23.60	x	2.40	
23.70	x	3.50	
23.81	x	2.62	
24.00	x	1.00	
24.00	x	1.20	
24.00	x	1.50	
24.00	x	2.00	
24.00	x	2.50	
24.00	x	3.00	
24.00	x	3.50	
24.00	x	4.00	
24.00	x	5.00	
24.00	x	5.50	
24.00	x	6.00	
24.20	x	3.00	
24.20	x	5.70	
24.30	x	2.40	
24.40	x	3.10	
24.50	x	2.40	
24.50	x	3.00	
24.50	x	4.50	
24.60	x	3.00	
24.60	x	3.60	
24.70	x	3.50	
24.77	x	5.33	
24.9	x	3.53	
25.00	x	1.00	
25.00	x	1.50	
25.00	x	2.00	
25.00	x	2.50	
25.00	x	3.00	
25.00	x	3.50	
25.00	x	4.00	

Dimentions			Size
ID	x	C/S	Ref No
25.00	x	5.00	
25.00	x	6.00	
25.00	x	8.00	
25.07	x	2.62	120
25.10	x	1.60	
25.12	x	1.78	022
25.20	x	3.00	
25.30	x	2.40	
25.50	x	3.00	
25.80	x	3.53	618
26.00	x	1.00	
26.00	x	1.20	
26.00	x	1.50	
26.00	x	2.00	
26.00	x	2.50	
26.00	x	3.00	
26.00	x	3.50	
26.00	x	4.00	
26.00	x	4.50	
26.00	x	5.00	
26.00	x	6.00	
26.07	x	2.62	
26.20	x	3.00	
26.20	x	3.60	R20
26.34	x	5.33	319
26.50	x	3.00	
26.57	x	3.53	215
26.62	x	2.95	914
26.65	x	2.62	121
26.70	x	1.78	023
27.00	x	1.00	
27.00	x	1.50	
27.00	x	2.00	
27.00	x	2.50	
27.00	x	3.00	
27.00	x	3.50	
27.00	x	4.00	

Dimentions			Size
ID	x	C/S	Ref No
27.00	x	5.00	
27.10	x	1.60	
27.30	x	2.40	
27.30	x	2.70	
27.50	x	1.50	
27.50	x	2.00	
27.50	x	3.00	
27.60	x	2.40	
27.70	x	3.50	P28
27.80	x	3.60	R21
27.94	x	5.33	320
28.00	x	1.00	
28.00	x	1.20	
28.00	x	1.50	
28.00	x	2.00	
28.00	x	2.50	
28.00	x	3.00	
28.00	x	3.50	
28.00	x	4.00	
28.00	x	4.50	
28.00	x	5.00	
28.00	x	6.00	
28.17	x	3.53	216
28.25	x	2.62	122
28.30	x	1.78	024
28.70	x	3.50	P29
29.00	x	1.50	
29.00	x	2.00	
29.00	x	2.50	
29.00	x	3.00	
29.00	x	3.50	
29.00	x	4.00	
29.00	x	5.00	
29.00	x	8.00	
29.10	x	1.60	
29.10	x	2.55	
29.20	x	3.00	

Dimentions			Size
ID	x	C/S	Ref No
29.30	x	3.60	R22
29.40	x	1.00	
29.40	x	3.10	G30
29.50	x	1.50	
29.50	x	2.00	
29.50	x	2.50	
29.50	x	3.00	
29.50	x	4.50	
29.52	x	5.33	321
29.60	x	2.40	
29.74	x	2.95	916
29.74	x	3.53	217
29.82	x	2.62	123
29.87	x	1.78	025
29.90	x	1.00	
30.00	x	1.50	
30.00	x	2.00	
30.00	x	2.50	
30.00	x	3.00	
30.00	x	3.50	
30.00	x	4.00	
30.00	x	4.50	
30.00	x	5.00	
30.00	x	6.00	
30.00	x	7.00	
30.20	x	3.00	
30.30	x	2.40	
30.50	x	1.00	
30.80	x	3.60	R23
31.00	x	1.50	
31.00	x	2.00	
31.00	x	2.50	
31.00	x	3.00	
31.00	x	3.50	
31.00	x	4.00	
31.00	x	4.50	
31.00	x	5.00	

Dimentions			Size
ID	x	C/S	Ref No
31.12	x	5.33	322
31.34	x	3.53	218
31.42	x	2.62	124
31.47	x	1.78	026
31.50	x	2.00	
31.50	x	2.50	
31.50	x	3.00	
31.60	x	2.40	
31.70	x	3.50	P32
31.80	x	1.00	
31.80	x	1.40	
31.80	x	1.50	
32.00	x	1.00	
32.00	x	1.50	
32.00	x	2.00	
32.00	x	2.50	
32.00	x	3.00	
32.00	x	3.50	
32.00	x	4.00	
32.00	x	4.50	
32.00	x	5.00	
32.00	x	5.70	
32.00	x	6.00	
32.00	x	7.00	
32.00	x	8.00	
32.10	x	1.60	
32.20	x	3.00	
32.50	x	3.00	
32.50	x	3.60	R24
32.69	x	5.33	323
32.92	x	3.53	219
33.00	x	1.50	
33.00	x	2.00	
33.00	x	2.50	
33.00	x	2.62	125
33.00	x	3.00	
33.00	x	3.50	

Dimentions			Size
ID	x	C/S	Ref No
33.00	x	4.00	
33.00	x	5.00	
33.00	x	6.00	
33.05	x	1.78	027
33.30	x	2.40	
33.70	x	3.50	P34
34.00	x	1.50	
34.00	x	2.00	
34.00	x	2.50	
34.00	x	3.00	
34.00	x	3.50	
34.00	x	4.00	
34.00	x	4.50	
34.00	x	5.00	
34.00	x	5.50	
34.00	x	6.00	
34.10	x	3.60	R25
34.20	x	2.00	
34.20	x	5.70	
34.29	x	5.33	324
34.40	x	3.10	G35
34.42	x	2.95	918
34.50	x	3.00	
34.52	x	3.53	220
34.60	x	2.40	
34.60	x	2.62	126
34.65	x	1.78	028
34.70	x	3.50	P35
35.00	x	1.00	
35.00	x	1.20	
35.00	x	1.50	
35.00	x	2.00	
35.00	x	2.50	
35.00	x	3.00	
35.00	x	3.50	
35.00	x	4.00	
35.00	x	4.50	

Dimentions			Size
ID	x	C/S	Ref No
35.00	x	5.00	
35.00	x	6.00	
35.00	x	10.00	
35.10	x	1.60	
35.20	x	5.70	
35.50	x	3.00	
35.60	x	3.60	R26
35.70	x	3.50	P36
36.00	x	1.50	
36.00	x	1.78	
36.00	x	2.00	
36.00	x	2.50	
36.00	x	3.00	
36.00	x	3.50	
36.00	x	4.00	
36.00	x	4.50	
36.00	x	5.00	
36.00	x	6.00	
36.09	x	3.53	221
34.17	x	2.62	127
36.20	x	3.00	
36.27	x	1.78	517
36.50	x	1.00	
36.50	x	2.00	
36.50	x	3.00	
37.00	x	1.50	
37.00	x	2.00	
37.00	x	2.50	
37.00	x	3.00	
37.00	x	3.50	
37.00	x	4.00	
37.00	x	4.50	
37.00	x	5.00	
37.00	x	6.00	
37.10	x	1.60	
37.20	x	3.00	
37.30	x	3.60	R27

Dimentions			Size
ID	x	C/S	Ref No
37.46	x	3.00	920
37.47	x	5.33	325
37.50	x	3.00	
37.50	x	4.50	
37.60	x	2.40	
37.69	x	3.53	222
37.70	x	3.50	P38
37.77	x	2.62	128
37.82	x	1.78	029
38.00	x	1.00	
38.00	x	1.50	
38.00	x	2.00	
38.00	x	2.50	
38.00	x	3.00	
38.00	x	3.50	
38.00	x	4.00	
38.00	x	4.50	
38.00	x	5.00	
38.00	x	6.00	
38.00	x	7.00	
38.00	x	10.00	
38.70	x	3.50	P39
39.00	x	1.00	
39.00	x	1.50	
39.00	x	2.00	
39.00	x	2.50	
39.00	x	3.00	
39.00	x	3.50	
39.00	x	4.00	
39.00	x	4.50	
39.00	x	5.00	
39.00	x	5.50	
39.00	x	6.00	
39.00	x	6.50	
39.20	x	3.00	
39.20	x	5.70	
39.35	x	2.62	129

Dimentions			Size
ID	x	C/S	Ref No
39.40	x	3.10	G40
39.43	x	1.78	519
39.50	x	1.50	
39.50	x	2.00	
39.50	x	3.00	
39.60	x	2.40	
39.70	x	3.50	P40
39.70	x	3.53	824
40.00	x	1.00	
40.00	x	1.20	
40.00	x	1.50	
40.00	x	2.00	
40.00	x	2.50	
40.00	x	3.00	
40.00	x	3.50	
40.00	x	4.00	
40.00	x	4.50	
40.00	x	5.00	
40.00	x	6.00	
40.00	x	7.00	
40.64	x	5.33	326
40.70	x	3.50	P41
40.87	x	3.53	223
40.95	x	2.62	130
41.00	x	1.50	
41.00	x	1.78	030
41.00	x	2.00	
41.00	x	2.50	
41.00	x	3.00	
41.00	x	3.50	
41.00	x	4.00	
41.00	x	4.50	
41.00	x	5.00	
41.20	x	5.70	
41.28	x	3.53	825
41.50	x	3.00	
41.60	x	2.40	

Dimentions			Size
ID	x	C/S	Ref No
41.70	x	3.50	P42
42.00	x	1.00	
42.00	x	1.50	
42.00	x	2.00	
42.00	x	2.50	
42.00	x	3.00	
42.00	x	3.50	
42.00	x	4.00	
42.00	x	4.50	
42.00	x	5.00	
42.00	x	5.50	
42.00	x	6.00	
42.00	x	8.00	
42.00	x	10.00	
42.10	x	1.15	
42.20	x	3.00	
42.50	x	3.00	
42.50	x	5.33	
42.52	x	2.62	131
42.86	x	3.53	826
43.00	x	1.50	
43.00	x	2.00	
43.00	x	2.50	
43.00	x	3.00	
43.00	x	3.50	
43.00	x	4.00	
43.00	x	4.50	
43.00	x	5.00	
43.00	x	6.00	
43.40	x	3.60	
43.70	x	3.00	924
43.70	x	3.50	P44
43.82	x	5.33	327
44.00	x	1.50	
44.00	x	2.00	
44.00	x	2.50	
44.00	x	3.00	

Dimentions			Size
ID	x	C/S	Ref No
44.00	x	3.50	
44.00	x	4.00	
44.00	x	4.50	
44.00	x	5.00	
44.00	x	6.00	
44.04	x	3.53	224
44.12	x	2.62	132
44.17	x	1.78	031
44.20	x	3.00	
44.20	x	5.70	
44.40	x	3.10	
44.45	x	3.53	
44.50	x	3.00	
44.60	x	2.40	
44.70	x	3.50	G45
45.00	x	1.50	827
45.00	x	2.00	
45.00	x	2.50	
45.00	x	3.00	
45.00	x	3.50	P45
45.00	x	4.00	
45.00	x	4.50	
45.00	x	5.00	
45.00	x	5.50	
45.00	x	6.00	
45.00	x	7.00	
45.30	x	5.70	
45.50	x	1.50	
45.70	x	2.62	133
45.70	x	3.50	P46
45.84	x	1.78	
46.00	x	1.50	
46.00	x	2.00	
46.00	x	2.50	
46.00	x	3.00	
46.00	x	4.00	
46.00	x	4.50	

Dimentions			Size
ID	x	C/S	Ref No
46.00	x	5.00	
46.00	x	6.00	
46.04	x	3.53	828
46.99	x	5.33	328
47.00	x	1.50	
47.00	x	2.00	
47.00	x	2.50	
47.00	x	3.00	
47.00	x	3.50	
47.00	x	4.00	
47.00	x	4.50	
47.00	x	5.00	
47.00	x	6.00	
47.00	x	7.00	
47.20	x	5.70	
47.22	x	3.53	225
47.30	x	2.62	134
47.35	x	1.78	032
47.60	x	2.40	
47.62	x	3.53	829
47.70	x	3.50	P48
48.00	x	1.50	
48.00	x	2.00	
48.00	x	2.50	
48.00	x	3.00	
48.00	x	3.50	
48.00	x	4.00	
48.00	x	4.50	
48.00	x	5.00	
48.00	x	6.00	
48.00	x	6.50	
48.00	x	7.00	
48.00	x	8.00	
48.70	x	3.50	P49
48.90	x	2.62	135
49.00	x	1.50	
49.00	x	2.00	

Dimentions			Size
ID	x	C/S	Ref No
49.00	x	2.50	
49.00	x	3.00	
49.00	x	3.50	
49.00	x	4.00	
49.00	x	4.50	
49.00	x	5.00	
49.00	x	6.00	
49.00	x	6.50	
49.20	x	3.53	830
49.20	x	5.70	
49.40	x	3.10	G50
49.50	x	3.00	
49.60	x	2.40	
49.70	x	3.50	P50
50.00	x	1.50	
50.00	x	2.00	
50.00	x	2.50	
50.00	x	3.00	
50.00	x	3.50	
50.00	x	4.00	
50.00	x	4.50	
50.00	x	5.00	
50.00	x	5.50	
50.00	x	6.00	
50.00	x	6.50	
50.00	x	7.00	
50.17	x	5.33	329
50.39	x	3.53	226
50.47	x	2.62	136
50.52	x	1.78	033
50.80	x	3.53	831
51.00	x	2.00	
51.00	x	2.50	
51.00	x	3.00	
51.00	x	3.50	
51.00	x	4.00	
51.00	x	4.50	

Dimentions			Size		
ID	x	C/S	Ref No		
51.00	x	5.00	P52		
51.10	x	1.60			
51.20	x	5.70			
51.60	x	2.40			
51.60	x	5.70			
52.00	x	1.50			
52.00	x	2.00			
52.00	x	2.50			
52.00	x	3.00			
52.00	x	3.50			
52.00	x	4.00			
52.00	x	5.00			
52.00	x	6.00			
52.00	x	8.00			
52.07	x	2.62		137	
52.40	x	3.53		832	
52.60	x	5.70	P5		
53.00	x	1.50	P58		
53.00	x	2.00			
53.00	x	2.50			
53.00	x	3.00			
53.00	x	3.50			
53.00	x	4.00			
53.00	x	4.50			
53.00	x	5.00			
53.00	x	5.70			
53.00	x	6.00			
53.10	x	3.00		928	
53.34	x	5.33		330	
53.50	x	1.20		P58	
53.57	x	3.53			227
53.64	x	2.62			138
53.70	x	1.78			034
53.97	x	3.53	833		
54.00	x	1.50			
54.00	x	2.00			
54.00	x	2.50			

Dimentions			Size	
ID	x	C/S	Ref No	
54.00	x	3.00	G55	
54.00	x	3.50		
54.00	x	4.00		
54.00	x	5.00		
54.00	x	5.50		
54.00	x	6.00		
54.00	x	7.00		
54.00	x	8.00		
54.20	x	3.00		
54.20	x	5.70		
54.40	x	3.10		
54.50	x	3.00		
54.60	x	2.40		
54.60	x	5.70		P55
55.00	x	1.50		
55.00	x	2.00		
55.00	x	2.50		
55.00	x	3.00		
55.00	x	3.50		
55.00	x	4.00		
55.00	x	5.00		
55.00	x	6.00		
55.00	x	7.00		
55.20	x	5.70		
55.25	x	2.62	139	
55.56	x	3.53	834	
55.60	x	5.70	P56	
56.00	x	1.50	P58	
56.00	x	2.00		
56.00	x	2.50		
56.00	x	3.00		
56.00	x	3.50		
56.00	x	4.00		
56.00	x	4.50		
56.00	x	5.00		
56.52	x	5.33		331
56.75	x	3.53		228

Dimentions			Size	
ID	x	C/S	Ref No	
56.82	x	2.62	140	
56.87	x	1.78	035	
57.00	x	1.50	P58	
57.00	x	2.00		
57.00	x	2.50		
57.00	x	3.00		
57.00	x	3.50		
57.00	x	4.00		
57.00	x	4.50		
57.00	x	5.00		
57.00	x	6.00		
57.00	x	6.50		
57.00	x	7.00		
57.00	x	8.00		
57.00	x	16.00		
57.15	x	3.53		835
57.20	x	5.70		
57.60	x	2.40		
57.60	x	5.70		
58.00	x	1.50		
58.00	x	2.00		
58.00	x	2.50		
58.00	x	3.00		
58.00	x	3.50		
58.00	x	4.00		
58.00	x	5.00		
58.00	x	6.00		
58.00	x	7.00		
58.42	x	2.62	141	
58.74	x	3.53	836	
59.00	x	1.50	P58	
59.00	x	2.00		
59.00	x	2.50		
59.00	x	3.00		
59.00	x	3.50		
59.00	x	4.00		
59.00	x	5.00		

Dimintions			Size
ID	x	C/S	Ref No
59.20	x	5.70	
59.36	x	3.00	
49.40	x	3.10	G60
59.50	x	3.00	
59.60	x	2.40	
59.60	x	5.70	P60
59.69	x	5.33	332
59.92	x	3.53	229
59.99	x	2.62	142
60.00	x	1.00	
60.00	x	1.50	
60.00	x	2.00	
60.00	x	2.50	
60.00	x	3.00	
60.00	x	3.50	
60.00	x	4.00	
60.00	x	4.50	
60.00	x	5.00	
60.00	x	6.00	
60.00	x	7.00	
60.00	x	8.00	
60.05	x	1.78	036
60.32	x	3.53	837
61.00	x	2.00	
61.00	x	2.50	
61.00	x	3.00	
61.00	x	3.50	
61.00	x	4.00	
61.00	x	4.50	
61.00	x	5.00	
61.00	x	6.00	
61.20	x	5.70	
61.60	x	2.40	
61.60	x	2.62	143
61.60	x	5.70	P62
61.90	x	3.53	838
62.00	x	1.50	

Dimintions			Size
ID	x	C/S	Ref No
62.00	x	2.00	
62.00	x	2.50	
62.00	x	3.00	
62.00	x	3.50	
62.00	x	4.00	
62.00	x	5.00	
62.00	x	5.50	
62.00	x	6.00	
62.20	x	5.70	
62.60	x	5.70	P63
62.87	x	5.33	333
63.00	x	1.50	
63.00	x	2.00	
63.00	x	2.50	
63.00	x	3.00	
63.00	x	3.50	
63.00	x	4.00	
63.00	x	4.50	
63.00	x	5.00	
63.00	x	6.00	
63.00	x	7.00	
63.00	x	9.00	
62.09	x	3.53	230
63.17	x	2.62	144
62.22	x	1.78	037
63.50	x	3.53	839
64.00	x	1.50	
64.00	x	2.00	
64.00	x	2.50	
64.00	x	3.00	
64.00	x	3.50	
64.00	x	4.00	
64.00	x	4.50	
64.00	x	5.00	
64.00	x	6.00	
62.20	x	5.70	
62.40	x	3.10	G65

Dimintions			Size
ID	x	C/S	Ref No
64.50	x	3.00	
64.60	x	2.40	
64.60	x	5.70	P65
64.77	x	2.62	145
65.00	x	1.50	
65.00	x	2.00	
65.00	x	2.50	
65.00	x	3.00	
65.00	x	3.50	
65.00	x	4.00	
65.00	x	4.50	
65.00	x	5.00	
65.00	x	6.00	
65.10	x	3.53	840
66.00	x	1.50	
66.00	x	2.00	
66.00	x	2.50	
66.00	x	3.00	
66.00	x	3.50	
66.00	x	4.00	
66.00	x	4.50	
66.00	x	5.00	
66.00	x	6.00	
66.04	x	5.33	334
66.27	x	3.53	231
66.34	x	2.62	146
66.40	x	1.78	038
66.60	x	5.70	P67
66.67	x	3.53	841
67.00	x	1.50	
67.00	x	2.00	
67.00	x	2.50	
67.00	x	3.00	
67.00	x	3.50	
67.00	x	4.00	
67.00	x	5.00	
67.00	x	6.00	

Dimentions			Size	
ID	x	C/S	Ref No	
67.20	x	5.70	147	
67.60	x	2.40		
67.95	x	2.62		
68.00	x	1.50		
68.00	x	2.00		
68.00	x	2.50		
68.00	x	3.00		
68.00	x	3.50		
68.00	x	4.00		
68.00	x	4.50		
68.00	x	5.00		
68.00	x	6.00		
68.00	x	7.00		
68.00	x	8.00		
68.26	x	3.53	842	
69.00	x	1.50	335	
69.00	x	2.00		
69.00	x	2.50		
69.00	x	3.00		
69.00	x	3.50		
69.00	x	4.00		
69.00	x	4.50		
69.00	x	5.00		
69.00	x	6.00		
69.00	x	6.00		
69.00	x	5.70		
69.22	x	5.33		
69.40	x	3.10		G70
69.44	x	3.53		232
69.50	x	3.00	843	
69.52	x	2.62		
69.57	x	1.78		039
69.60	x	2.40		
69.60	x	5.70		P70
69.85	x	3.53		
70.00	x	1.50		
70.00	x	2.00		
70.00	x	2.50		

Dimentions			Size	
ID	x	C/S	Ref No	
70.00	x	3.00		
70.00	x	3.50		
70.00	x	4.00		
70.00	x	4.50		
70.00	x	5.00		
70.00	x	5.50		
70.00	x	6.00		
70.00	x	6.50		
70.00	x	7.00		
70.00	x	8.00		
70.00	x	10.00		
71.00	x	1.50		149
71.00	x	2.00		
71.00	x	2.50		
71.00	x	3.00		
71.00	x	3.50		
71.00	x	4.00		
71.00	x	4.50		
71.00	x	5.00		
71.12	x	2.62		
71.20	x	5.70		
71.44	x	3.53	844	
72.00	x	1.50	336	
72.00	x	2.00		
72.00	x	2.50		
72.00	x	3.00		
72.00	x	3.50		
72.00	x	4.00		
72.00	x	5.00		
72.00	x	5.50		
72.00	x	6.00		
72.00	x	10.00		
72.20	x	5.70		
72.39	x	5.33		
72.62	x	3.53		233
72.70	x	2.62		150
72.75	x	1.78	040	

Dimentions			Size	
ID	x	C/S	Ref No	
73.00	x	1.50	845	
73.00	x	2.00		
73.00	x	2.50		
73.00	x	3.00		
73.00	x	3.50		
73.00	x	4.00		
73.00	x	4.50		
73.00	x	5.00		
73.00	x	6.00		
73.02	x	3.53		
74.00	x	1.50		640
74.00	x	2.00		
74.00	x	2.50		
74.00	x	3.00		
74.00	x	3.50		
74.00	x	4.00		
74.00	x	4.50		
74.00	x	5.00		
74.00	x	6.00		
74.00	x	7.00		
74.20	x	8.00		
74.30	x	5.70		
74.50	x	2.62		
74.50	x	3.00	G75	
74.60	x	3.53	846	
74.63	x	5.70	P75	
75.00	x	5.33	619	
75.00	x	1.50		
75.00	x	2.00		
75.00	x	2.50		
75.00	x	3.00		
75.00	x	3.50		
75.00	x	4.00		
75.00	x	4.50		
75.00	x	5.00		
75.00	x	6.00		

Dimentions			Size
ID	x	C/S	Ref No
75.00	x	7.00	
75.00	x	7.50	
75.00	x	9.00	
75.57	x	5.33	337
75.80	x	3.53	234
75.87	x	2.62	151
75.92	x	1.78	041
76.00	x	1.50	
76.00	x	2.00	
76.00	x	2.50	
76.00	x	3.00	
76.00	x	3.50	
76.00	x	4.00	
76.00	x	4.50	
76.00	x	5.00	
76.00	x	6.00	
77.00	x	1.50	
77.00	x	2.00	
77.00	x	2.50	
77.00	x	3.00	
77.00	x	3.50	
77.00	x	4.00	
77.00	x	5.00	
77.00	x	7.00	
77.20	x	5.70	
77.50	x	2.62	641
78.00	x	1.50	
78.00	x	2.00	
78.00	x	2.50	
78.00	x	3.00	
78.00	x	3.50	
78.00	x	4.00	
78.00	x	5.00	
78.00	x	6.00	
78.74	x	5.33	338
78.97	x	3.53	235
79.00	x	1.50	

Dimentions			Size
ID	x	C/S	Ref No
79.00	x	1.78	
79.00	x	2.00	
79.00	x	2.50	
79.00	x	3.00	
79.00	x	3.50	
79.00	x	4.00	
79.00	x	5.00	
79.00	x	6.00	
79.20	x	5.70	
79.40	x	3.10	G80
79.50	x	3.00	
79.77	x	5.33	620
80.00	x	2.00	
80.00	x	2.50	
80.00	x	3.00	
80.00	x	3.50	
80.00	x	4.00	
80.00	x	4.50	
80.00	x	5.00	
80.00	x	6.00	
80.00	x	8.00	
80.00	x	10.00	
80.60	x	2.62	642
81.00	x	2.00	
81.00	x	2.50	
81.00	x	3.00	
81.00	x	3.50	
81.00	x	4.00	
81.00	x	4.50	
81.00	x	5.00	
81.00	x	6.00	
81.20	x	5.70	
81.92	x	5.33	339
82.00	x	1.50	
82.00	x	2.00	
82.00	x	2.50	
82.00	x	3.00	

Dimentions			Size
ID	x	C/S	Ref No
82.00	x	3.50	
82.00	x	4.00	
82.00	x	5.00	
82.00	x	7.00	
82.14	x	3.53	236
82.20	x	5.70	
82.22	x	2.62	152
82.27	x	1.78	042
83.00	x	2.00	
83.00	x	2.50	
83.00	x	3.00	
83.00	x	3.50	
83.00	x	4.00	
83.00	x	4.50	
83.00	x	5.00	
83.00	x	5.50	
83.00	x	7.00	
83.80	x	2.62	643
84.00	x	1.50	
84.00	x	2.00	
84.00	x	2.50	
84.00	x	3.00	
84.00	x	3.50	
84.00	x	4.00	
84.00	x	5.00	
84.00	x	6.00	
84.00	x	9.00	
84.20	x	5.70	
84.40	x	3.10	G85
84.50	x	3.00	
85.00	x	1.50	
85.00	x	2.00	
85.00	x	2.50	
85.00	x	3.00	
85.00	x	3.50	
85.00	x	4.00	
85.00	x	4.50	

Dimentions			Size
ID	x	C/S	Ref No
85.00	x	5.00	
85.00	x	6.00	
85.00	x	7.00	
85.09	x	5.33	340
52.32	x	3.53	237
85.34	x	1.78	534
86.00	x	1.60	
86.00	x	2.00	
86.00	x	2.50	
86.00	x	3.00	
86.00	x	3.50	
86.00	x	4.50	
86.00	x	5.00	
86.00	x	6.00	
86.50	x	4.00	
87.00	x	1.50	
87.00	x	2.00	
87.00	x	2.50	
87.00	x	3.00	
87.00	x	3.50	
87.00	x	4.00	
87.00	x	5.00	
87.20	x	5.70	
88.00	x	1.50	
88.00	x	2.00	
88.00	x	2.50	
88.00	x	3.00	
88.00	x	3.50	
88.00	x	4.00	
88.00	x	5.00	
88.00	x	6.00	
88.27	x	5.33	341
88.30	x	7.00	
88.49	x	3.53	238
88.57	x	2.62	153
88.62	x	1.78	043
89.00	x	1.50	

Dimentions			Size
ID	x	C/S	Ref No
89.00	x	2.00	
89.00	x	2.50	
89.00	x	3.00	
89.00	x	3.50	
89.00	x	4.00	
89.00	x	4.50	
89.00	x	5.00	
89.20	x	5.70	
89.40	x	3.10	G90
89.50	x	3.00	
89.69	x	5.33	621
90.00	x	2.00	
90.00	x	2.50	
90.00	x	3.00	
90.00	x	3.50	
90.00	x	4.00	
90.00	x	4.50	
90.00	x	5.00	
90.00	x	6.00	
90.00	x	7.00	
90.00	x	10.00	
91.00	x	2.00	
91.00	x	2.50	
91.00	x	3.00	
91.00	x	3.50	
91.00	x	4.00	
91.00	x	5.00	
91.44	x	5.33	342
91.67	x	3.53	239
91.70	x	1.78	536
92.00	x	1.50	
92.00	x	2.00	
92.00	x	2.50	
92.00	x	3.00	
92.00	x	3.50	
92.00	x	4.00	
92.00	x	4.50	

Dimentions			Size
ID	x	C/S	Ref No
92.00	x	5.00	
92.00	x	6.00	
92.20	x	5.70	
92.75	x	2.62	
93.00	x	2.00	
93.00	x	2.50	
93.00	x	3.00	
93.00	x	3.50	
93.00	x	4.00	
93.00	x	5.00	
93.00	x	6.00	
94.00	x	2.00	
94.00	x	2.50	
94.00	x	3.00	
94.00	x	3.50	
94.00	x	4.00	
94.00	x	5.00	
94.10	x	5.70	
94.40	x	3.10	G95
94.50	x	3.00	
94.62	x	5.33	343
94.84	x	3.53	240
94.92	x	2.62	154
94.97	x	1.78	044
95.00	x	1.50	
95.00	x	2.00	
95.00	x	2.50	
95.00	x	3.00	
95.00	x	3.50	
95.00	x	4.00	
95.00	x	4.50	
95.00	x	5.00	
95.00	x	6.00	
95.00	x	7.00	
95.00	x	8.00	
96.00	x	1.50	
96.00	x	2.00	

Dimintions			Size
ID	x	C/S	Ref No
96.00	x	2.50	344
96.00	x	3.00	
96.00	x	3.50	
96.00	x	4.00	
96.00	x	5.00	
96.00	x	6.00	
96.60	x	1.60	
97.00	x	1.50	
97.00	x	2.00	
97.00	x	2.50	
97.00	x	3.00	
97.00	x	3.50	
97.00	x	4.00	
97.00	x	5.00	
97.20	x	5.70	
97.79	x	5.33	
98.00	x	1.50	
98.00	x	2.00	
98.00	x	2.50	
98.00	x	3.00	
98.00	x	3.50	
98.00	x	4.00	
98.00	x	4.50	
98.00	x	5.00	
98.00	x	6.00	
98.00	x	7.00	
98.02	x	3.53	241
98.05	x	1.78	538
99.00	x	2.00	G100
99.00	x	2.50	
99.00	x	3.00	
99.00	x	3.50	
99.00	x	4.00	
99.00	x	5.00	
99.00	x	6.00	
99.20	x	5.70	
99.40	x	3.10	

Dimintions			Size
ID	x	C/S	Ref No
99.50	x	3.00	P100
99.60	x	5.70	
100.00	x	1.50	
100.00	x	2.00	
100.00	x	2.50	
100.00	x	3.00	
100.00	x	3.50	
100.00	x	4.00	
100.00	x	4.50	
100.00	x	5.00	
100.00	x	5.33	622
100.00	x	6.00	345
100.00	x	7.00	
100.00	x	8.00	
100.00	x	10.00	
100.95	x	1.60	
100.97	x	5.33	
101.00	x	2.50	
101.00	x	3.00	
101.00	x	4.30	
101.20	x	3.53	
101.27	x	2.62	155
101.32	x	1.78	045
101.60	x	5.70	P102
102.00	x	2.00	G105
102.00	x	2.50	
102.00	x	3.00	
102.00	x	3.50	
102.00	x	4.00	
102.00	x	5.00	
103.00	x	2.00	
103.00	x	2.50	
103.00	x	3.00	
103.00	x	3.50	
103.00	x	4.00	
103.00	x	5.00	
103.00	x	6.00	

Dimintions			Size	
ID	x	C/S	Ref No	
104.00	x	2.50	346	
104.00	x	3.00		
104.00	x	4.00		
104.00	x	5.00		
104.00	x	5.70		
104.00	x	6.00		
104.14	x	5.33		243
104.37	x	3.53		540
104.40	x	1.78		G105
104.40	x	3.10		
104.50	x	3.00		
105.00	x	2.00		
105.00	x	2.50		
105.00	x	3.00		
105.00	x	3.50		
105.00	x	4.00		
105.00	x	4.50		
105.00	x	5.00		
105.00	x	6.00		
105.00	x	7.00		
106.00	x	2.00	347	
106.00	x	2.50		
106.00	x	3.00		
106.00	x	3.50		
106.00	x	4.00		
106.00	x	6.00		
106.00	x	7.00		
106.50	x	2.40		244
107.00	x	2.50		156
107.00	x	3.00		046
107.00	x	4.00		
107.00	x	5.00		
107.32	x	5.33		
107.54	x	3.53		
107.62	x	2.62		
107.67	x	1.78		

Dimintions			Size
ID	x	C/S	Ref No
108.00	x	2.50	G110
108.00	x	3.00	
108.00	x	3.20	
108.00	x	3.50	
108.00	x	4.00	
108.00	x	5.00	
108.00	x	6.00	
108.00	x	8.00	
109.00	x	2.00	
109.00	x	2.50	
109.00	x	3.00	
109.00	x	3.50	
109.00	x	4.00	
109.00	x	5.00	
109.00	x	5.50	
109.20	x	5.70	
109.40	x	3.10	
109.50	x	3.00	
109.50	x	5.50	
109.54	x	5.33	
110.00	x	2.00	
110.00	x	2.50	
110.00	x	3.00	
110.00	x	3.50	
110.00	x	4.00	
110.00	x	4.50	
110.00	x	5.00	
110.00	x	6.00	
110.00	x	7.00	
110.49	x	11.00	
110.72	x	5.33	
110.74	x	3.53	
111.00	x	1.78	
111.00	x	2.50	
111.00	x	3.00	
111.00	x	5.00	
111.00	x	6.00	
112.00	x	2.00	

Dimintions			Size
ID	x	C/S	Ref No
112.00	x	2.50	G115
112.00	x	3.00	
112.00	x	4.00	
112.00	x	5.00	
112.00	x	6.00	
113.00	x	2.50	
113.00	x	3.00	
113.00	x	3.50	
113.00	x	4.00	
113.00	x	5.00	
113.67	x	5.33	
113.67	x	7.00	
113.89	x	3.53	
113.97	x	2.62	
114.00	x	2.50	
114.00	x	3.00	
114.00	x	4.00	
114.00	x	5.00	
114.00	x	5.50	
114.00	x	6.00	
114.00	x	8.00	
114.00	x	9.00	
114.02	x	1.78	
114.30	x	5.70	
114.40	x	3.10	
114.50	x	3.00	
114.70	x	7.00	
115.00	x	1.60	
115.00	x	2.00	
115.00	x	2.50	
115.00	x	3.00	
115.00	x	4.00	
115.00	x	5.00	
115.00	x	6.00	
116.00	x	2.50	
116.00	x	3.00	
116.00	x	4.00	
116.84	x	5.33	

Dimintions			Size
ID	x	C/S	Ref No
116.84	x	7.00	426
117.00	x	2.50	G120
117.00	x	3.00	
117.00	x	4.00	
117.00	x	5.00	
117.07	x	3.53	
117.10	x	1.78	
117.48	x	5.33	
118.00	x	2.50	
118.00	x	3.00	
118.00	x	4.00	
118.00	x	5.00	
118.00	x	6.00	
119.00	x	2.50	
119.00	x	3.00	
119.00	x	4.00	
119.00	x	5.00	
119.20	x	5.70	
119.40	x	3.10	
119.50	x	3.00	
120.00	x	2.00	
120.00	x	3.00	
120.00	x	3.50	
120.00	x	4.00	
120.00	x	5.00	
120.00	x	6.00	
120.00	x	10.00	
120.02	x	5.33	
120.02	x	7.00	
120.25	x	3.53	
120.32	x	2.62	
12.37	x	1.78	
120.65	x	5.33	
121.00	x	2.50	
121.00	x	3.00	
121.00	x	4.00	
121.00	x	5.00	
121.50	x	2.20	

Dimintions			Size
ID	x	C/S	Ref No
122.00	x	2.50	
122.00	x	3.00	
122.00	x	3.50	
122.00	x	4.00	
122.00	x	5.00	
122.00	x	6.00	
123.00	x	2.50	
123.00	x	3.00	
123.00	x	4.00	
123.00	x	5.00	
123.00	x	6.00	
123.00	x	6.30	
123.19	x	5.33	352
123.19	x	7.00	428
123.42	x	3.53	429
123.44	x	1.78	546
123.83	x	5.33	862
124.00	x	2.50	
124.00	x	3.00	
124.00	x	3.25	
124.00	x	4.00	
124.00	x	5.00	
124.00	x	6.00	
124.00	x	18.00	
124.30	x	5.70	
124.40	x	3.10	G125
124.50	x	3.00	
124.60	x	7.00	625
125.00	x	2.40	
125.00	x	.250	
125.00	x	3.00	
125.00	x	3.50	
125.00	x	4.00	
125.00	x	5.00	
125.00	x	6.00	
125.00	x	8.30	
125.60	x	2.00	
126.00	x	2.50	

Dimintions			Size
ID	x	C/S	Ref No
126.00	x	3.00	
126.00	x	4.00	
126.00	x	5.00	
126.00	x	6.00	
126.37	x	5.33	353
126.37	x	7.00	429
126.60	x	3.53	250
126.67	x	2.62	159
126.72	x	1.78	049
127.00	x	2.50	
127.00	x	3.00	
127.00	x	4.00	
127.00	x	5.00	
127.00	x	5.33	863
128.00	x	2.50	
128.00	x	3.00	
128.00	x	4.00	
128.00	x	5.00	
128.00	x	6.00	
129.00	x	2.50	
129.00	x	3.00	
129.00	x	4.00	
129.00	x	5.00	
129.20	x	5.70	
129.40	x	1.78	548
129.40	x	3.10	G130
129.50	x	3.00	
129.54	x	5.33	354
129.54	x	7.00	430
129.77	x	3.53	251
130.00	x	2.00	
130.00	x	2.50	
130.00	x	3.00	
130.00	x	4.00	
130.00	x	5.00	
130.00	x	6.00	
130.18	x	5.33	864

Dimintions			Size
ID	x	C/S	Ref No
130.50	x	3.00	
131.00	x	2.50	
131.00	x	3.00	
131.00	x	4.00	
131.00	x	5.00	
131.20	x	5.70	
132.00	x	2.50	
132.00	x	3.00	
132.00	x	4.00	
132.00	x	5.00	
132.00	x	6.00	
132.72	x	5.33	355
132.72	x	7.00	431
132.95	x	3.53	252
133.00	x	2.50	
133.00	x	3.00	
133.00	x	4.00	
133.00	x	5.00	
133.02	x	2.62	160
133.07	x	1.78	050
133.35	x	5.33	865
134.00	x	2.50	
134.00	x	3.00	
134.00	x	4.00	
134.00	x	5.00	
134.00	x	6.00	
134.30	x	5.70	
134.40	x	3.10	G135
134.50	x	3.00	
134.50	x	7.00	626
135.00	x	2.50	
135.00	x	3.00	
135.00	x	4.00	
135.00	x	5.00	
135.00	x	6.00	
135.00	x	10.00	
135.76	x	1.78	550

Dimintions			Size
ID	x	C/S	Ref No
135.89	x	5.33	356
165.89	x	7.00	432
136.00	x	2.50	
136.00	x	3.00	
136.00	x	4.00	
136.00	x	5.00	
136.00	x	6.00	
136.12	x	3.53	253
136.53	x	5.33	866
137.00	x	2.50	
137.00	x	3.00	
137.00	x	4.00	
137.00	x	5.00	
138.00	x	2.50	
138.00	x	3.00	
138.00	x	4.00	
138.00	x	5.00	
138.00	x	6.00	
138.94	x	1.78	551
139.00	x	2.50	
139.00	x	3.00	
139.00	x	4.00	
139.00	x	5.00	
137.09	x	5.33	357
139.07	x	7.00	433
139.30	x	3.53	254
139.30	x	5.70	
139.37	x	2.62	161
139.40	x	3.10	G140
139.50	x	3.00	
139.70	x	5.33	867
140.00	x	2.00	
140.00	x	2.50	
140.00	x	3.00	
140.00	x	4.00	
140.00	x	5.00	
140.00	x	6.00	
140.00	x	8.00	

Dimintions			Size
ID	x	C/S	Ref No
140.00	x	10.00	
141.00	x	2.50	
141.00	x	3.00	
141.00	x	4.00	
141.00	x	5.00	
142.00	x	2.50	
142.00	x	3.00	
142.00	x	4.00	
142.00	x	5.00	
142.00	x	6.00	
142.11	x	1.78	552
142.24	x	5.33	358
142.24	x	7.00	434
142.47	x	3.53	255
142.88	x	5.33	868
143.00	x	2.50	
143.00	x	3.00	
143.00	x	4.00	
143.00	x	5.00	
144.00	x	2.50	
144.00	x	3.00	
144.00	x	4.00	
144.00	x	5.00	
144.10	x	8.40	
144.30	x	5.70	
144.40	x	3.10	G145
144.50	x	3.00	
144.60	x	5.70	P145
145.00	x	2.50	
145.00	x	4.00	
145.00	x	5.00	
145.00	x	5.50	
145.29	x	1.78	553
145.42	x	5.33	359
145.42	x	7.00	435
145.64	x	3.53	256
145.72	x	2.62	162
146.00	x	2.50	

Dimintions			Size
ID	x	C/S	Ref No
146.00	x	3.00	
146.00	x	4.00	
146.00	x	5.00	
146.00	x	6.00	
146.05	x	5.33	869
147.00	x	2.50	
147.00	x	3.00	
147.00	x	4.00	
147.00	x	5.00	
148.00	x	2.50	
148.00	x	3.00	
148.00	x	4.00	
148.00	x	5.00	
148.00	x	6.00	
148.46	x	1.78	554
148.59	x	5.33	360
148.59	x	7.00	436
148.82	x	3.53	257
149.00	x	2.50	
149.00	x	3.00	
149.00	x	4.00	
149.00	x	5.00	
149.10	x	8.40	
149.20	x	5.70	
149.23	x	5.33	870
149.50	x	3.00	
149.60	x	5.70	P150
150.00	x	2.00	
150.00	x	2.50	
150.00	x	3.00	
150.00	x	3.50	
150.00	x	4.00	
150.00	x	5.00	
150.00	x	6.00	
150.00	x	8.00	
150.00	x	10.00	
151.00	x	2.50	
151.64	x	1.78	555

Dimintions			Size
ID	x	C/S	Ref No
151.77	x	5.33	361
151.77	x	7.00	437
152.00	x	2.50	
152.00	x	3.00	
152.00	x	3.53	258
152.00	x	4.00	
152.00	x	5.00	
152.07	x	2.62	163
153.00	x	2.50	
153.00	x	5.00	
153.00	x	6.00	
154.00	x	2.50	
154.00	x	3.00	
154.00	x	4.00	
154.00	x	5.00	
154.00	x	6.00	
154.10	x	8.40	
154.30	x	5.70	G155
154.50	x	3.00	
154.80	x	5.70	
154.81	x	1.78	556
155.00	x	2.50	
155.00	x	3.00	
155.00	x	4.00	
155.00	x	5.00	
155.00	x	5.33	644
155.00	x	6.00	
155.60	x	7.00	872
156.00	x	2.50	
156.00	x	3.00	
156.00	x	4.00	
156.00	x	5.00	
156.00	x	6.00	
157.00	x	2.50	
157.00	x	3.00	
157.00	x	4.00	
157.00	x	5.00	
157.00	x	6.00	

Dimintions			Size
ID	x	C/S	Ref No
158.00	x	1.78	557
158.00	x	2.50	
158.00	x	3.00	
158.00	x	4.00	
158.00	x	5.00	
158.00	x	6.00	
158.12	x	5.33	362
158.12	x	7.00	438
158.34	x	3.53	259
158.42	x	2.62	164
159.10	x	8.40	
159.30	x	5.70	G160
159.50	x	3.00	
159.50	x	7.00	627
160.00	x	2.50	
160.00	x	3.00	
160.00	x	3.50	
160.00	x	4.00	
160.00	x	5.00	
160.00	x	6.00	
160.00	x	8.00	
160.00	x	9.00	
160.00	x	10.00	
161.00	x	2.50	
161.16	x	1.78	558
161.30	x	5.33	645
161.60	x	2.40	
161.90	x	7.00	874
162.00	x	2.50	
162.00	x	3.00	
162.00	x	4.00	
162.00	x	5.00	
162.00	x	6.00	
163.00	x	2.50	
164.00	x	2.50	
164.10	x	8.40	
164.20	x	5.70	
164.30	x	5.70	G165

Dimintions			Size
ID	x	C/S	Ref No
164.34	x	1.78	559
164.47	x	5.33	363
164.47	x	7.00	439
164.50	x	3.00	
164.70	x	3.53	260
164.77	x	2.62	165
164.80	x	5.70	
165.00	x	2.00	
165.00	x	2.50	
165.00	x	3.00	
165.00	x	4.00	
165.00	x	5.00	
165.00	x	6.00	
165.00	x	7.00	
166.00	x	2.50	
166.70	x	5.33	
166.70	x	7.00	628
167.00	x	2.50	
167.00	x	3.00	
167.51	x	1.78	560
167.70	x	5.33	646
168.00	x	3.00	
168.00	x	4.00	
168.00	x	5.00	
168.00	x	5.70	
168.30	x	7.00	876
169.00	x	2.50	
169.00	x	4.00	
169.00	x	5.00	
169.10	x	8.40	
169.30	x	5.70	G170
169.50	x	3.00	
169.80	x	5.70	
170.00	x	2.50	
170.00	x	3.00	
170.00	x	4.00	
170.00	x	5.00	

Dimentions			Size
ID	x	C/S	Ref No
170.00	x	6.00	
170.69	x	1.78	561
170.82	x	5.33	364
170.82	x	7.00	440
171.04	x	3.53	261
171.12	x	2.62	166
172.00	x	2.50	
172.00	x	3.00	
172.00	x	4.00	
172.00	x	5.00	
172.00	x	6.00	
173.87	x	1.78	562
174.00	x	2.50	
174.00	x	3.00	
174.00	x	3.20	
174.00	x	4.00	
174.00	x	5.00	
174.00	x	5.33	647
174.00	x	6.00	
17.00	x	8.00	
174.00	x	9.00	
174.10	x	8.40	
174.20	x	5.70	
174.50	x	3.00	
174.60	x	7.00	878
174.80	x	5.70	
175.00	x	2.50	
175.00	x	3.00	
175.00	x	4.00	
175.00	x	5.00	
175.00	x	6.00	
177.17	x	5.33	365
177.17	x	7.00	441
177.40	x	3.53	262
177.47	x	2.62	167
178.00	x	3.00	
178.00	x	4.00	
178.00	x	5.00	

Dimentions			Size
ID	x	C/S	Ref No
178.00	x	6.00	
178.00	x	10.00	
179.00	x	3.00	
179.10	x	8.40	
179.30	x	5.70	
179.50	x	3.00	
179.50	x	5.70	G180
180.00	x	2.00	
180.00	x	3.00	
180.00	x	4.00	
180.00	x	5.00	
180.00	x	6.00	
180.00	x	8.00	
180.00	x	10.00	
181.00	x	7.00	880
182.00	x	4.00	
182.00	x	4.00	
182.00	x	5.00	
182.00	x	6.00	
183.50	x	3.00	
183.52	x	5.33	366
183.52	x	7.00	442
183.74	x	3.53	263
183.82	x	2.62	168
184.00	x	4.00	
184.00	x	5.00	
184.00	x	6.00	
184.10	x	8.40	
184.30	x	5.70	G185
184.50	x	3.00	
185.00	x	3.00	
185.00	x	4.00	
185.00	x	5.00	
185.00	x	6.00	
186.00	x	3.00	
186.00	x	4.00	
187.30	x	7.00	882
188.00	x	3.00	

Dimentions			Size
ID	x	C/S	Ref No
188.00	x	4.00	
188.00	x	5.00	
188.00	x	6.00	
189.10	x	8.40	
189.20	x	5.70	G190
189.50	x	3.00	
189.30	x	5.70	
189.87	x	5.33	367
189.87	x	7.00	443
190.00	x	3.00	
190.00	x	4.00	
190.00	x	5.00	
190.00	x	6.00	
190.10	x	3.53	264
190.17	x	2.62	169
192.00	x	3.00	
192.00	x	4.00	
192.00	x	5.00	
192.00	x	7.00	
193.30	x	4.00	
193.70	x	7.00	884
194.00	x	2.00	
194.00	x	4.00	
194.00	x	6.10	
194.10	x	8.40	
194.30	x	5.70	G195
194.50	x	3.00	
195.00	x	4.00	
195.00	x	5.00	
195.00	x	6.00	
195.00	x	8.00	
195.00	x	10.00	
196.22	x	5.33	368
196.22	x	7.00	444
196.44	x	3.53	265
196.52	x	2.62	170

Dimintions			Size	
ID	x	C/S	Ref No	
198.00	x	4.00	G200	
198.00	x	5.00		
198.00	x	6.00		
199.10	x	8.40		
199.20	x	5.70		
199.50	x	3.00		
199.80	x	5.70		
200.00	x	2.00		
200.00	x	2.50		
200.00	x	3.00		
200.00	x	4.00		
200.00	x	5.00		
200.00	x	6.00		
200.00	x	7.00		886
200.00	x	8.00		
200.00	x	10.00		
200.00	x	15.00		
202.00	x	5.00		
202.00	x	6.00		
202.57	x	5.33		369
202.57	x	7.00	445	
202.80	x	3.53	266	
202.87	x	2.62	171	
203.00	x	3.00		
203.00	x	4.00		
203.00	x	5.00		
204.00	x	6.00		
204.20	x	5.70		
205.00	x	2.50		
205.00	x	3.00		
205.00	x	4.00		
205.00	x	4.50		
205.00	x	5.00		
205.00	x	6.00		
205.00	x	9.00		
205.00	x	10.00		
206.00	x	6.00		
208.00	x	3.00		

Dimintions			Size	
ID	x	C/S	Ref No	
208.00	x	4.00	445A	
208.00	x	5.00		
208.00	x	6.00		
208.00	x	10.00		
208.90	x	7.00		370
208.92	x	5.33		674
208.92	x	7.00		
209.10	x	8.40		
209.14	x	3.53		267
209.22	x	2.62		172
209.30	x	5.70		G210
209.50	x	3.00		
210.00	x	2.00		
210.00	x	3.00		
210.00	x	4.00		
210.00	x	5.00		
210.00	x	6.00		
210.00	x	8.00		
210.00	x	10.00		
212.00	x	3.00		
212.00	x	4.00		
212.00	x	5.00		
212.00	x	6.00		
212.00	x	6.30		
212.00	x	7.00		
215.00	x	3.00		
215.00	x	4.00		
215.00	x	5.00		
215.00	x	6.00		
215.27	x	5.33	371	
215.57	x	7.00	446	
215.50	x	3.53	268	
215.57	x	2.62	173	
216.00	x	8.00		
217.00	x	5.00		
218.00	x	3.00		
218.00	x	4.00		
218.00	x	4.50		

Dimintions			Size	
ID	x	C/S	Ref No	
218.00	x	5.00	G220	
218.00	x	5.80		
218.00	x	6.00		
219.10	x	8.40		
219.30	x	5.70		
219.50	x	3.00		
219.50	x	3.20		
220.00	x	3.00		
220.00	x	4.00		
220.00	x	5.00		
220.00	x	6.00		
220.00	x	8.00		
220.00	x	10.00		
221.60	x	7.00		446A
221.60	x	7.50		
221.62	x	5.33		372
221.84	x	3.53		269
221.92	x	2.62		174
222.00	x	6.00		
224.00	x	3.80		
225.00	x	3.00		
225.00	x	4.00		
225.00	x	5.00		
225.00	x	6.00		
225.00	x	10.00		
225.00	x	15.00		
226.00	x	8.00		
227.00	x	3.20		
227.97	x	5.33	373	
227.97	x	7.00	447	
228.00	x	3.00		
228.00	x	4.00		
228.00	x	5.00		
228.00	x	10.00		
228.20	x	3.53	270	
228.27	x	2.62	175	
229.00	x	6.00		
229.10	x	8.40		

Dimentions			Size
ID	x	C/S	Ref No
229.30	x	5.70	G230
229.50	x	3.00	
230.00	x	3.00	
230.00	x	4.00	
230.00	x	5.00	
230.00	x	6.00	
230.00	x	8.00	
233.00	x	3.00	
234.30	x	5.70	
234.30	x	7.00	447A
234.32	x	5.33	374
234.55	x	3.53	271
234.62	x	2.62	176
235.00	x	3.00	
235.00	x	4.00	
235.00	x	5.00	
235.00	x	6.00	
235.00	x	8.00	
236.00	x	12.00	
238.00	x	5.00	
238.00	x	6.00	
239.10	x	8.40	
239.30	x	5.70	G240
239.50	x	3.00	
240.00	x	3.00	
240.00	x	4.00	
240.00	x	5.00	
240.00	x	6.00	
240.00	x	8.00	
240.00	x	10.00	
240.67	x	5.33	375
240.67	x	7.00	448
240.90	x	3.53	272
240.90	x	2.62	177
242.00	x	8.00	
243.00	x	3.00	
243.00	x	17.00	
245.00	x	3.00	

Dimentions			Size
ID	x	C/S	Ref No
245.00	x	4.00	
245.00	x	5.00	
245.00	x	6.00	
245.00	x	8.00	
247.00	x	3.00	
247.00	x	5.00	
247.00	x	6.00	
247.00	x	7.00	448A
247.02	x	5.33	376
247.25	x	3.53	273
247.32	x	2.62	178
248.00	x	5.00	
249.10	x	8.40	
249.30	x	5.70	G250
249.50	x	3.00	
250.00	x	3.00	
250.00	x	4.00	
250.00	x	5.00	
250.00	x	6.00	
250.00	x	7.00	
250.00	x	8.00	
250.00	x	10.00	
253.37	x	5.33	377
253.37	x	7.00	449
253.60	x	3.53	274
255.00	x	3.00	
255.00	x	4.00	
255.00	x	5.00	
255.00	x	5.70	
257.00	x	3.00	
257.00	x	5.00	
258.00	x	4.00	
258.00	x	6.00	
259.30	x	3.00	
259.30	x	5.70	G260
259.70	x	7.00	449A
260.00	x	3.00	
260.00	x	4.00	

Dimentions			Size
ID	x	C/S	Ref No
260.00	x	5.00	
260.00	x	6.00	
260.00	x	8.00	
262.00	x	2.00	
262.00	x	4.00	
262.00	x	5.00	
264.00	x	3.00	
264.00	x	10.00	
265.00	x	4.00	
265.00	x	5.00	
265.00	x	6.00	
265.00	x	7.00	
265.00	x	8.00	
265.30	x	3.00	
266.07	x	5.33	378
26607	x	7.00	450
266.29	x	3.53	275
268.00	x	4.00	
268.00	x	5.00	
268.80	x	8.40	
269.30	x	5.70	G270
270.00	x	3.00	
270.00	x	4.00	
270.00	x	5.00	
270.00	x	6.00	
270.00	x	10.00	
272.40	x	7.00	450A
275.00	x	3.00	
275.00	x	4.00	
275.00	x	5.00	
275.00	x	6.00	
278.00	x	4.00	
278.00	x	5.00	
278.00	x	6.00	
278.77	x	5.33	379
278.77	x	7.00	451
278.99	x	3.53	276
279.00	x	8.00	

Dimintions			Size	Dimintions			Size	Dimintions			Size
ID	x	C/S	Ref No	ID	x	C/S	Ref No	ID	x	C/S	Ref No
279.30	x	5.70	G280	300.00	x	6.00		320.00	x	3.00	
280.00	x	3.00		300.00	x	6.30		320.00	x	3.50	
280.00	x	4.00		300.00	x	7.00		320.00	x	4.00	
280.00	x	5.00		300.00	x	9.00		320.00	x	5.00	
280.00	x	6.00		300.00	x	10.00		320.00	x	6.00	
280.00	x	7.00		304.17	x	5.33	381	320.00	x	6.50	
280.00	x	8.00		304.17	x	7.00	453	320.00	x	7.00	
280.00	x	10.00		304.39	x	3.53	278	320.00	x	8.00	
283.00	x	3.50		305.00	x	4.00		320.20	x	7.00	649
285.00	x	3.00		305.00	x	5.00		325.00	x	4.00	
285.00	x	4.00		305.00	x	6.00		325.00	x	5.00	
285.00	x	5.00		305.00	x	10.00		325.00	x	6.00	
285.00	x	6.00		308.00	x	4.00		325.00	x	10.00	
285.10	x	7.00	451A	308.00	x	5.00		326.00	x	8.00	
288.00	x	4.00		309.00	x	3.00		328.00	x	10.00	
288.00	x	5.00		309.30	x	5.70		329.57	x	5.33	382
288.00	x	6.00		310.00	x	5.00		329.57	x	7.00	455
289.30	x	5.70	G290	310.00	x	5.00		329.79	x	3.53	279
290.00	x	3.00		310.00	x	6.00		330.00	x	4.00	
290.00	x	4.00		310.00	x	8.00		330.00	x	5.00	
290.00	x	5.00		310.00	x	16.00		330.00	x	5.70	
290.00	x	6.00		310.50	x	7.00	648	330.00	x	6.00	
291.47	x	5.33	380	311.00	x	6.00		330.00	x	8.00	
291.47	x	7.00	452	312.00	x	4.00		330.00	x	10.00	
291.69	x	3.53	277	312.00	x	5.00		335.00	x	4.00	
292.00	x	10.00		315.00	x	3.00		335.00	x	5.00	
295.00	x	4.00		315.00	x	4.00		335.00	x	6.00	
295.00	x	5.00		315.00	x	5.00		335.90	x	7.00	650
295.00	x	6.00		315.00	x	5.33		339.00	x	8.40	
295.00	x	10.00		315.00	x	6.00		339.30	x	5.70	
297.00	x	4.00		315.00	x	6.33		340.00	x	4.00	
297.80	x	7.00	452A	315.00	x	10.00		340.00	x	5.00	
298.00	x	4.00		316.00	x	9.00		340.00	x	6.00	
298.00	x	5.00		316.87	x	7.00	454	340.00	x	10.00	
299.30	x	5.70	G300	318.00	x	4.00		340.00	x	16.00	
300.00	x	3.00		318.00	x	5.00		342.00	x	5.00	
300.00	x	4.00		319.20	x	3.53		342.27	x	7.00	456
300.00	x	5.00		319.30	x	5.70		345.00	x	4.00	

Dimintions			Size
ID	x	C/S	Ref No
345.00	x	5.00	
345.00	x	6.00	
345.00	x	7.00	
346.00	x	10.00	
347.00	x	6.00	
349.30	x	5.70	
350.00	x	3.00	
350.00	x	4.00	
350.00	x	5.00	
350.00	x	6.00	
350.00	x	8.00	
354.97	x	5.33	383
354.97	x	7.00	457
355.00	x	3.00	
355.00	x	4.00	
355.00	x	5.00	
355.00	x	6.00	
355.19	x	3.53	280
357.00	x	12.00	
358.00	x	6.00	
359.30	x	5.70	
360.00	x	4.00	
360.00	x	5.00	
360.00	x	6.00	
360.00	x	7.00	
360.00	x	8.00	
360.00	x	9.00	
360.00	x	10.00	
363.00	x	5.33	
365.00	x	4.00	
365.00	x	5.00	
365.00	x	6.00	
367.67	x	7.00	458
370.00	x	3.00	
370.00	x	4.00	
370.00	x	5.00	
370.00	x	6.00	
374.00	x	5.00	

Dimintions			Size
ID	x	C/S	Ref No
375.00	x	4.00	
375.00	x	5.00	
375.00	x	6.00	
375.00	x	7.00	
375.00	x	8.40	
378.00	x	4.00	
378.00	x	12.00	
379.30	x	5.70	
380.00	x	4.00	
380.00	x	5.00	
380.00	x	6.00	
380.00	x	8.00	
380.00	x	10.00	
380.37	x	5.33	384
380.37	x	7.00	459
380.59	x	3.53	281
385.00	x	3.00	
385.00	x	4.00	
385.00	x	5.00	
385.00	x	6.00	
387.00	x	20.00	
390.00	x	4.00	
390.00	x	5.00	
390.00	x	6.00	
390.00	x	9.00	
390.00	x	16.00	
392.00	x	6.00	
393.07	x	7.00	460
394.00	x	8.40	
395.00	x	4.00	
395.00	x	5.00	
395.00	x	6.00	
395.00	x	8.00	
396.00	x	12.00	
399.30	x	5.70	
400.00	x	4.00	
400.00	x	5.00	
400.00	x	6.00	

Dimintions			Size
ID	x	C/S	Ref No
400.00	x	7.00	
400.00	x	8.00	
402.00	x	4.00	
402.00	x	9.00	
405.26	x	3.53	282
405.26	x	5.33	385
405.26	x	7.00	461
406.00	x	3.10	
410.00	x	4.00	
410.00	x	5.00	
410.00	x	6.00	
410.00	x	7.00	
410.00	x	8.00	
410.00	x	9.00	
412.00	x	7.00	
412.00	x	8.00	
412.00	x	10.00	
415.00	x	5.00	
415.00	x	6.00	
415.00	x	7.00	
417.96	x	7.00	462
419.10	x	8.40	
419.30	x	5.70	
420.00	x	6.00	
420.00	x	8.00	
420.00	x	9.00	
420.00	x	10.00	
422.20	x	6.20	
422.20	x	6.90	
425.00	x	4.00	
425.00	x	5.00	
425.00	x	6.00	
425.00	x	7.00	
425.00	x	8.00	
426.00	x	5.70	
429.00	x	6.00	
430.00	x	8.40	
430.66	x	3.53	283

Dimintions			Size
ID	x	C/S	Ref No
430.66	x	5.33	386
430.66	x	7.00	463
439.30	x	5.70	
440.00	x	3.00	
440.00	x	4.00	
440.00	x	7.00	
443.36	x	7.00	464
445.00	x	9.00	
450.00	x	4.00	
450.00	x	6.00	
450.00	x	7.00	
450.00	x	8.00	
450.00	x	10.00	
451.00	x	9.00	
454.00	x	8.40	
455.00	x	5.00	
456.06	x	3.53	284
456.06	x	5.33	387
456.06	x	7.00	465
459.30	x	5.70	
460.00	x	5.00	
460.00	x	6.00	
460.00	x	7.00	
460.00	x	8.00	
460.00	x	12.00	
461.00	x	8.40	
462.00	x	10.00	
462.00	x	15.00	
465.00	x	5.00	
468.76	x	7.00	466
470.00	x	4.00	
470.00	x	5.00	
470.00	x	6.00	
470.00	x	8.00	
470.00	x	10.00	
475.00	x	8.00	
475.00	x	10.00	
478.00	x	6.00	

Dimintions			Size
ID	x	C/S	Ref No
479.30	x	5.70	
480.00	x	4.00	
480.00	x	5.00	
480.00	x	6.00	
480.00	x	7.00	
480.00	x	8.00	
480.00	x	9.00	
480.00	x	10.00	
481.38	x	5.33	388
481.46	x	7.00	467
483.00	x	8.40	
485.00	x	5.00	
485.00	x	5.70	
485.00	x	8.00	
488.00	x	6.00	
490.00	x	5.00	
490.00	x	7.00	
490.00	x	8.00	
490.00	x	10.00	
490.00	x	16.00	
491.49	x	5.33	
492.00	x	4.00	
494.16	x	7.00	468
498.00	x	14.00	
499.30	x	5.70	
500.00	x	3.00	
500.00	x	5.00	
500.00	x	6.00	
500.00	x	7.00	
500.00	x	8.00	
500.00	x	9.00	
500.00	x	10.00	
502.00	x	16.00	
505.00	x	3.00	
505.00	x	6.00	
505.00	x	10.00	
506.78	x	5.33	389
506.86	x	7.00	469

Dimintions			Size
ID	x	C/S	Ref No
510.00	x	5.00	
515.00	x	7.00	
515.00	x	8.00	
517.00	x	5.33	
518.50	x	3.00	
519.30	x	5.70	
520.00	x	8.00	
520.00	x	10.00	
520.06	x	7.00	
525.00	x	5.00	
525.00	x	6.00	
525.00	x	8.00	
528.00	x	3.00	
529.30	x	5.70	
530.00	x	5.00	
530.00	x	6.00	
530.00	x	7.00	
530.00	x	10.00	
532.18	x	5.33	390
532.26	x	7.00	470
534.00	x	16.00	
540.00	x	10.00	
541.00	x	7.00	
541.00	x	14.00	
545.00	x	9.00	
550.00	x	5.00	
550.00	x	6.00	
550.00	x	7.00	
550.00	x	8.00	
552.00	x	4.00	
552.00	x	5.33	
554.30	x	5.70	
555.00	x	6.00	
557.58	x	5.33	391
557.66	x	7.00	471
560.00	x	8.00	
560.00	x	10.00	
	x		

Dimentions			Size
ID	x	C/S	Ref No
562.00	x	7.50	
568.00	x	6.99	
570.00	x	10.00	
573.00	x	7.00	
575.00	x	4.00	
577.00	x	20.00	
580.00	x	8.00	
580.00	x	9.00	
580.00	x	10.00	
582.68	x	5.33	392
582.68	x	7.00	472
584.00	x	8.40	
585.00	x	16.00	
590.00	x	6.00	
590.00	x	10.00	
594.00	x	5.70	
595.00	x	6.00	
595.00	x	8.00	
600.00	x	7.00	
600.00	x	8.00	
600.00	x	10.00	
608.08	x	5.33	393
608.08	x	7.00	473
610.00	x	6.00	
610.00	x	6.35	
614.00	x	7.00	
614.00	x	8.00	
620.00	x	5.00	
620.00	x	8.00	
620.00	x	10.00	
625.00	x	3.00	
626.00	x	7.00	
630.00	x	8.00	
633.48	x	5.33	394
633.48	x	7.00	474
635.00	x	8.00	
637.00	x	10.00	
638.00	x	8.00	

Dimentions			Size
ID	x	C/S	Ref No
640.00	x	7.00	
643.00	x	7.00	
650.00	x	7.00	
650.00	x	8.00	
650.00	x	10.00	
658.88	x	5.33	395
658.88	x	7.00	475
660.00	x	9.00	
660.00	x	10.00	
662.00	x	6.99	
665.00	x	4.00	
670.00	x	7.00	
670.00	x	8.00	
674.00	x	7.00	
675.00	x	7.00	
675.00	x	8.00	
680.00	x	7.00	
680.00	x	8.00	
680.00	x	8.40	
680.00	x	16.00	
685.00	x	7.00	
690.00	x	10.00	
695.00	x	8.00	
699.00	x	7.00	
700.00	x	8.00	
700.00	x	10.00	
702.00	x	20.00	
705.00	x	5.33	
705.00	x	7.00	
719.00	x	6.99	
724.00	x	7.00	
725.00	x	5.70	
725.00	x	9.00	
730.50	x	7.00	
735.00	x	7.00	
736.00	x	5.33	
739.00	x	7.00	
740.00	x	8.40	

Dimentions			Size
ID	x	C/S	Ref No
743.00	x	10.00	
745.00	x	7.00	
760.00	x	7.00	
763.00	x	10.00	
776.00	x	7.00	
799.00	x	12.00	
800.00	x	7.00	
800.00	x	8.00	
805.00	x	20.00	
810.00	x	9.00	
820.00	x	7.00	
845.00	x	10.00	
847.00	x	5.33	
850.00	x	7.00	
860.00	x	7.00	
875.00	x	8.00	
878.00	x	5.33	
880.00	x	7.00	
890.00	x	5.70	
900.00	x	7.00	
925.00	x	10.00	
930.00	x	8.00	
930.00	x	9.00	
932.50	x	7.00	
950.00	x	10.00	
950.00	x	20.00	
997.00	x	7.00	
1000.00	x	10.00	
1014.00	x	5.33	
1014.00	x	7.00	
1075.00	x	7.00	
1075.00	x	10.00	
1185.00	x	7.00	
1245.00	x	7.00	

NOTE: New dimensions are continually being added to our standard stock programme. Please check with our sales desk if you do not see the exact size you require or see page 54, Cord-Rings.

Quick reference guide to standard inch sizes

Size reference numbers quoted are in accordance with BS 1806: 1989 and AS 568A: 1984

SECTION					SECTION						SECTION				
I.D.	1/16	3/32	1/8	3/16	I.D.	1/16	3/32	1/8	3/16	1/4	I.D.	3/32	1/8	3/16	1/4
1/32	001				2 3/16		139				7	167	262	365	441
3/64	002				2 1/4	035	140	228	331		7 1/4	168	263	366	442
1/16	003	102			2 5/16		141				7 1/2	169	264	367	443
5/64	004				2 3/8	036	142	229	332						
3/32	005	103			2 7/16		143				7 3/4	170	265	368	444
											8	171	266	369	445
1/8	006	104			2 1/2	037	144	230	333		8 1/4	172	267	370	445A
5/32	007	105			2 9/16		145				8 3/2	173	268	371	446
3/16	008	106	201		2 5/8	038	146	231	334		8 3/4	174	269	372	446A
7/32	009	107			2 11/16		147				9	175	270	373	447
1/4	010	108	202		2 3/4	039	148	232	335		9 1/4	176	271	374	447A
5/16	011	109	203		2 13/16		149				9 1/2	177	272	375	448
3/8	012	110	204		2 7/8	040	150	233	336		9 3/4	178	273	376	448A
7/16	013	111	205	309	3	041	151	234	337		10		274	377	449
1/2	014	112	206	310	3 1/8			235	338		10 1/4				449A
9/16	015	113	207	311	3 1/4	042	152	236	339		10 1/2		275	378	450
											10 3/4				450A
5/8	016	114	208	312	3 3/8			237	340		11		276	379	451
11/16	017	115	209	313	3 1/2	043	153	238	341		11 1/4				451A
3/4	018	116	210	314	3 5/8			239	342		11 1/2		277	380	452
13/16	019	117	211	315	3 3/4	044	154	240	343		11 3/4				452A
7/8	020	118	212	316	3 7/8			241	344		12		278	381	453
											12 1/2				454
15/16	021	119	213	317	4	045	155	242	345		13		279	382	455
1	022	120	214	318	4 1/8			243	346		13 1/2				456
1 1/16	023	121	215	319	4 1/4	046	156	244	347		14		280	383	457
1 1/8	024	122	216	320	4 3/8			245	348		14 1/2				458
1 3/16	025	123	217	321	4 1/2	047	157	246	349	425	15		281	384	459
1 1/4	026	124	218	322	4 5/8			247	350	426	15 1/2				460
1 5/16	027	125	219	323	4 3/4	048	158	248	351	427	16		282	385	461
					4 7/8			249	352	428					
1 3/8	028	126	220	324	5	049	159	250	353	429	16 1/2				462
1 7/16		127	221		5 1/8			251	354	430	17		283	386	463
1 1/2	029	128	222	325							17 1/2				464
											18		284	387	465
1 9/16	030	129			5 1/4	050	160	252	355	431	18 1/2				466
1 5/8		130	223	326	5 3/8			253	356	432					
1 11/16		131			5 1/2		161	254	357	433	19			388	467
1 3/4	031	132	224	327	5 5/8			255	358	434	19 1/2				468
1 13/16		133			5 3/4		162	256	359	435	20				469
											21			389	470
1 7/8	032	134	225	328	5 7/8			257	360	436	22				391
1 15/16		135			6		163	258	361	437	23				392
2	033	136	226	329	6 1/4		164	259	362	438	24				393
2 1/16		137			6 1/2		165	260	363	439	25				394
2 1/8	034	138	227	330	6 3/4		166	261	364	440	26				395

Quick reference guide to standard inch sizes

Size reference numbers quoted are in accordance with BS 1806: 1989 and AS 568A: 1984

Dimintions			Size
ID	x	C/S	Ref No
000 Series			
0.74	x	1.02	001
1.07	x	1.27	002
1.42	x	1.52	003
1.78	x	1.02	003.5
1.78	x	1.78	004
2.57	x	1.78	005
2.90	x	1.78	006
3.68	x	1.78	007
4.47	x	1.78	008
5.28	x	1.78	009
6.07	x	1.78	010
7.65	x	1.78	011
9.25	x	1.78	012
10.82	x	1.78	013
12.42	x	1.78	014
14.00	x	1.78	015
15.60	x	1.78	016
17.17	x	1.78	017
18.77	x	1.78	018
20.35	x	1.78	019
21.95	x	1.78	020
23.52	x	1.78	021
25.12	x	1.78	022
26.70	x	1.78	023
28.30	x	1.78	024
29.87	x	1.78	025
31.47	x	1.78	026
33.05	x	1.78	027
34.65	x	1.78	028
37.82	x	1.78	029
41.00	x	1.78	030
44.17	x	1.78	031
47.35	x	1.78	032
50.52	x	1.78	033
53.70	x	1.78	034
56.87	x	1.78	035
60.05	x	1.78	036
63.22	x	1.78	037
66.40	x	1.78	038
69.57	x	1.78	039
72.75	x	1.78	040
75.92	x	1.78	041
82.27	x	1.78	042

Dimintions			Size
ID	x	C/S	Ref No
88.62	x	1.78	043
94.97	x	1.78	044
101.32	x	1.78	045
107.67	x	1.78	046
114.02	x	1.78	047
120.37	x	1.78	048
126.72	x	1.78	049
133.07	x	1.78	050
100 Series			
1.25	x	2.62	102
2.06	x	2.62	103
2.85	x	2.62	104
3.63	x	2.62	105
4.42	x	2.62	106
5.23	x	2.62	107
6.02	x	2.62	108
7.60	x	2.62	109
7.20	x	2.62	110
10.77	x	2.62	111
12.37	x	2.62	112
13.95	x	2.62	113
15.55	x	2.62	114
17.12	x	2.62	115
18.72	x	2.62	116
20.30	x	2.62	117
21.90	x	2.62	118
23.47	x	2.62	119
25.07	x	2.62	120
26.65	x	2.62	121
28.25	x	2.62	122
29.82	x	2.62	123
31.42	x	2.62	124
33.00	x	2.62	125
34.60	x	2.62	126
36.17	x	2.62	127
37.77	x	2.62	128
39.35	x	2.62	129
40.95	x	2.62	130
42.52	x	2.62	131
44.12	x	2.62	132
45.70	x	2.62	133
47.30	x	2.62	134
48.90	x	2.62	135

Dimintions			Size
ID	x	C/S	Ref No
50.47	x	2.62	136
52.07	x	2.62	137
53.64	x	2.62	138
55.25	x	2.62	139
56.82	x	2.62	140
58.42	x	2.62	141
59.99	x	2.62	142
61.60	x	2.62	143
63.17	x	2.62	144
64.77	x	2.62	145
66.34	x	2.62	146
67.95	x	2.62	147
69.52	x	2.62	148
71.12	x	2.62	149
72.70	x	2.62	150
75.87	x	2.62	151
82.22	x	2.62	152
88.57	x	2.62	153
94.92	x	2.62	154
101.27	x	2.62	155
107.62	x	2.62	156
113.97	x	2.62	157
120.32	x	2.62	158
126.67	x	2.62	159
133.02	x	2.62	160
139.37	x	2.62	161
145.72	x	2.62	162
152.07	x	2.62	163
158.42	x	2.62	164
164.77	x	2.62	165
171.12	x	2.62	166
177.47	x	2.62	167
183.82	x	2.62	168
190.17	x	2.62	169
196.52	x	2.62	170
202.87	x	2.62	171
209.22	x	2.62	172
215.57	x	2.62	173
221.92	x	2.62	174
228.27	x	2.62	175
234.62	x	2.62	176
240.97	x	2.62	177
247.32	x	2.62	178

Dimintions			Size
ID	x	C/S	Ref No
200 Series			
4.34	x	3.53	201
5.94	x	3.53	202
7.52	x	3.53	203
9.12	x	3.53	204
10.69	x	3.53	205
12.29	x	3.53	206
13.87	x	3.53	207
15.47	x	3.53	208
17.04	x	3.53	209
18.64	x	3.53	210
20.22	x	3.53	211
21.82	x	3.53	212
23.39	x	3.53	213
24.99	x	3.53	214
26.57	x	3.53	215
28.17	x	3.53	216
29.74	x	3.53	217
31.34	x	3.53	218
32.92	x	3.53	219
34.52	x	3.53	220
36.09	x	3.53	221
37.69	x	3.53	222
40.87	x	3.53	223
44.04	x	3.53	224
47.22	x	3.53	225
50.39	x	3.53	226
53.57	x	3.53	227
56.75	x	3.53	228
59.92	x	3.53	229
63.09	x	3.53	230
66.27	x	3.53	231
69.44	x	3.53	232
72.62	x	3.53	233
75.80	x	3.53	234
78.97	x	3.53	235
82.14	x	3.53	236
85.32	x	3.53	237
88.49	x	3.53	238
91.67	x	3.53	239
94.84	x	3.53	240
98.02	x	3.53	241
101.20	x	3.53	242

Dimintions			Size
ID	x	C/S	Ref No
104.37	x	3.53	243
107.54	x	3.53	244
110.72	x	3.53	245
113.89	x	3.53	246
117.07	x	3.53	247
120.25	x	3.53	248
123.42	x	3.53	249
126.60	x	3.53	250
129.77	x	3.53	251
132.95	x	3.53	252
136.12	x	3.53	253
139.30	x	3.53	254
142.47	x	3.53	255
145.64	x	3.53	256
148.82	x	3.53	257
152.00	x	3.53	258
158.34	x	3.53	259
164.70	x	3.53	260
171.04	x	3.53	261
177.40	x	3.53	262
183.74	x	3.53	263
190.10	x	3.53	264
196.44	x	3.53	265
202.80	x	3.53	266
209.14	x	3.53	267
215.50	x	3.53	268
221.84	x	3.53	269
228.20	x	3.53	270
234.55	x	3.53	271
240.90	x	3.53	272
247.60	x	3.53	273
263.60	x	3.53	274
266.29	x	3.53	275
278.99	x	3.53	276
291.69	x	3.53	277
304.39	x	3.53	278
329.79	x	3.53	279
355.91	x	3.53	280
380.59	x	3.53	281
405.26	x	3.53	282
430.66	x	3.53	283
456.06	x	3.53	284

Dimintions			Size
ID	x	C/S	Ref No
300 Series			
10.47	x	5.33	309
12.07	x	5.33	310
13.64	x	5.33	311
15.24	x	5.33	312
16.82	x	5.33	313
18.42	x	5.33	314
19.99	x	5.33	315
21.59	x	5.33	316
23.17	x	5.33	317
24.77	x	5.33	318
26.34	x	5.33	319
27.94	x	5.33	320
29.52	x	5.33	321
31.12	x	5.33	322
32.69	x	5.33	323
34.29	x	5.33	324
37.47	x	5.33	325
40.64	x	5.33	326
43.82	x	5.33	327
46.99	x	5.33	328
50.17	x	5.33	329
53.34	x	5.33	330
56.52	x	5.33	331
59.69	x	5.33	332
62.87	x	5.33	333
66.04	x	5.33	334
69.22	x	5.33	335
72.39	x	5.33	336
75.57	x	5.33	337
78.74	x	5.33	338
81.92	x	5.33	339
85.09	x	5.33	340
88.27	x	5.33	341
91.44	x	5.33	342
94.62	x	5.33	343
97.79	x	5.33	344
100.97	x	5.33	345
104.14	x	5.33	346
107.32	x	5.33	347
110.49	x	5.33	348
113.67	x	5.33	349
116.84	x	5.33	350

Dimintions			Size
ID	x	C/S	Ref No
120.02	x	5.33	351
123.19	x	5.33	352
126.37	x	5.33	353
129.54	x	5.33	354
132.72	x	5.33	355
135.89	x	5.33	356
139.07	x	5.33	357
142.24	x	5.33	358
145.42	x	5.33	359
148.59	x	5.33	360
151.77	x	5.33	361
158.12	x	5.33	362
164.47	x	5.33	363
170.82	x	5.33	364
177.17	x	5.33	365
183.52	x	5.33	366
189.87	x	5.33	367
196.22	x	5.33	368
202.57	x	5.33	369
208.92	x	5.33	370
215.27	x	5.33	371
221.62	x	5.33	372
227.97	x	5.33	373
234.32	x	5.33	374
240.67	x	5.33	375
247.02	x	5.33	376
253.37	x	5.33	377
266.07	x	5.33	378
278.77	x	5.33	379
291.47	x	5.33	380
304.17	x	5.33	381
329.59	x	5.33	382
354.97	x	5.33	383
380.37	x	5.33	384
405.26	x	5.33	385
430.66	x	5.33	386
456.06	x	5.33	387
481.38	x	5.33	388
506.78	x	5.33	389
532.18	x	5.33	390
557.58	x	5.33	391
582.68	x	5.33	392
608.08	x	5.33	393
633.48	x	5.33	394
658.88	x	5.33	395

Dimintions			Size
ID	x	C/S	Ref No
400 Series			
113.67	x	7.00	425
116.84	x	7.00	426
120.02	x	7.00	427
123.19	x	7.00	428
126.37	x	7.00	429
129.54	x	7.00	430
132.72	x	7.00	431
135.89	x	7.00	432
139.07	x	7.00	433
142.24	x	7.00	434
145.42	x	7.00	435
148.59	x	7.00	436
151.77	x	7.00	437
158.12	x	7.00	438
164.47	x	7.00	439
170.82	x	7.00	440
177.17	x	7.00	441
183.52	x	7.00	442
189.87	x	7.00	443
196.22	x	7.00	444
202.57	x	7.00	445
208.90	x	7.00	445A
215.27	x	7.00	446
221.60	x	7.00	446A
227.97	x	7.00	447
234.30	x	7.00	447A
240.67	x	7.00	448
247.00	x	7.00	448A
253.37	x	7.00	449
259.70	x	7.00	449A
266.07	x	7.00	450
272.40	x	7.00	450A
278.77	x	7.00	451
285.10	x	7.00	451A
291.47	x	7.00	452
297.80	x	7.00	452A
304.17	x	7.00	453
316.87	x	7.00	454
329.57	x	7.00	455
342.27	x	7.00	456
354.97	x	7.00	457
367.67	x	7.00	458
380.37	x	7.00	459

Dimintions			Size
ID	x	C/S	Ref No
393.07	x	7.00	460
405.26	x	7.00	461
417.96	x	7.00	462
430.66	x	7.00	463
443.36	x	7.00	464
456.06	x	7.00	465
468.76	x	7.00	466
481.46	x	7.00	467
494.16	x	7.00	468
506.86	x	7.00	469
532.26	x	7.00	470
557.66	x	7.00	471
582.68	x	7.00	472
608.08	x	7.00	473
533.48	x	7.00	474
658.88	x	7.00	475

Dimintions			Size
ID	x	C/S	Ref No
500 Series			
36.27	x	1.78	517
39.43	x	1.78	519
79.00	x	1.78	532
85.34	x	1.78	534
91.70	x	1.78	536
98.05	x	1.78	538
104.40	x	1.78	540
110.74	x	1.78	542
117.10	x	1.78	544
123.44	x	1.78	546
129.40	x	1.78	548
135.76	x	1.78	550
138.94	x	1.78	551
142.11	x	1.78	552
145.29	x	1.78	553
148.46	x	1.78	554
151.64	x	1.78	55
154.81	x	1.78	556
158.00	x	1.78	557
161.16	x	1.78	558
164.34	x	1.78	559
167.51	x	1.78	560
170.69	x	1.78	561
600 Series			
1.78	x	1.02	606
2.54	x	1.02	607
6.75	x	1.78	610
8.73	x	1.78	611
9.92	x	2.62	613
11.91	x	2.62	614
13.10	x	2.62	615
15.08	x	2.62	616
17.86	x	2.62	617
25.80	x	3.53	618
74.63	x	3.53	619
79.77	x	3.53	620
96.69	x	3.53	621
100.00	x	3.53	622
109.54	x	3.53	623
114.70	x	7.00	624
124.60	x	7.00	625
134.50	x	7.00	626
159.50	x	7.00	627
166.70	x	7.00	628
74.30	x	2.62	640

Dimintions			Size
ID	x	C/S	Ref No
77.50	x	2.62	641
80.60	x	2.62	642
83.80	x	2.62	643
155.00	x	5.33	644
161.30	x	5.33	645
167.70	x	5.33	646
174.00	x	5.33	647
310.50	x	7.00	648
323.20	x	7.00	649
335.90	x	7.00	650
20892	x	7.00	674
221.62	x	7.00	676
234.32	x	7.00	678
247.00	x	7.00	680
259.70	x	7.00	682
272.40	x	7.00	684
285.10	x	7.00	686
297.80	x	7.00	688
800 Series			
3.17	x	1.78	801
4.76	x	1.78	802
6.35	x	1.78	803
7.94	x	1.78	804
11.11	x	1.78	806
12.70	x	2.62	807
15.88	x	2.62	809
17.46	x	2.62	810
20.64	x	2.62	812
22.23	x	2.62	813
23.81	x	3.53	814
39.70	x	3.53	824
41.28	x	3.53	825
42.86	x	3.53	826
44.45	x	3.53	827
46.04	x	3.53	828
47.62	x	3.53	829
49.20	x	3.53	830
50.80	x	3.53	831
52.40	x	3.53	832
53.97	x	3.53	833
55.56	x	3.53	834
57.15	x	3.53	835
58.74	x	3.53	836
60.32	x	3.53	837
61.90	x	3.53	838
63.50	x	3.53	839
65.10	x	3.53	840

Dimintions			Size
ID	x	C/S	Ref No
66.67	x	3.53	841
68.26	x	3.53	842
69.85	x	3.53	843
71.44	x	3.53	844
73.02	x	3.53	845
74.60	x	3.53	846
117.48	x	5.33	860
120.65	x	5.33	861
123.83	x	5.33	862
127.00	x	5.33	863
130.18	x	5.33	864
133.35	x	5.33	865
136.53	x	5.33	866
139.70	x	5.33	867
142.88	x	5.33	868
146.05	x	5.33	869
149.23	x	5.33	870
155.60	x	7.00	872
161.90	x	7.00	874
168.30	x	7.00	876
174.60	x	7.00	878
181.00	x	7.00	880
187.30	x	7.00	882
193.70	x	7.00	884
200.00	x	7.00	886
900 Series			
4.70	x	1.42	901
6.07	x	1.63	902
7.65	x	1.63	903
8.90	x	1.83	904
10.51	x	1.83	905
11.90	x	1.98	906
13.46	x	2.08	907
16.36	x	2.20	908
17.93	x	2.46	909
19.18	x	2.46	910
21.92	x	2.95	911
23.47	x	2.95	912
25.04	x	2.95	913
26.62	x	2.95	914
29.74	x	2.95	916
34.42	x	2.95	918
37.46	x	3.00	920
43.70	x	3.00	924
53.10	x	3.00	928
59.36	x	3.00	932

Quick reference guide: BS - Old Standard and R Numbers.

BS Ref No	Old Std Ref No	R Series Ref No	BS Ref No	Old Std Ref No	R Series Ref No	BS Ref No	Old Std Ref No	R Series Ref No
004	-	R2007	117	D.1601 M	R3081	210	OS. 15	R4075
005	-	R2010	118	D.1602 M	R3087	211	OS. 16	R4081
006	OS.1	R2012	119	D.1603 M	R3093	212	OS. 17	R4087
007	OS.2	R2015	120	D.1604 M	R3100	213	OS. 18	R4093
008	OS.3	R2016	121	D.1605 M	R3106	214	OS. 19	R4100
009	OS.4	R2021	122	D.1606 M	R3112	215	OS. 20	R4106
010	OS.5	R2025	123	D.1607 M	R3118	216	OS. 21	R4112
011	OS.6	R2031	124	D.1608 M	R3125	217	OS. 22	R4118
012	OS.7	R2037	125	D.1609 M	R3131	218	OS. 23	R4125
013	D1501 M	R2043	126	D.1610 M	R3137	219	OS. 24	R4131
014	D1502 M	R2050	127	D.1611 M	R3143	220	OS. 25	R4137
015	D1503 M	R2056	128	D.1612 M	R3150	221	OS. 26	R4143
016	D1504 M	R2062	129	D.1613 M	R3156	222	OS. 27	R4150
017	D1505 M	R2068	130	D.1614 M	R3162	223	D.201 M	R4162
018	D1506 M	R2075	131	D.1615 M	R3168	224	D.202 M	R4175
019	D1507 M	R2081	132	D.1616 M	R3175	225	D.203 M	R4187
020	D1508 M	R2087	133	D.1617 M	R3181	226	D.204 M	R4200
021	D1509 M	R2093	134	D.1618 M	R3187	227	D.205 M	R4212
022	D15010 M	R2100	135	D.1619 M	R3193	228	D.206 M	R4225
023	D15011 M	R2106	136	D.1620 M	R3200	229	D.207 M	R4237
024	D15012 M	R2112	137	D.1621 M	R3206	230	D.208 M	R4250
025	D15013 M	R2118	138	D.1622 M	R3212	231	D.209 M	R4262
026	D15014 M	R2125	139	D.1623 M	R3218	232	D.210 M	R4275
027	D15015 M	R2131	140	D.1624 M	R3225	233	D.211 M	R4287
028	D15016 M	R2137	141	D.1625 M	R3231	234	D.212 M	R4300
110	OS.8	R3037	142	D.1626 M	R3237	235	D.213 M	R4312
111	O.S.9	R3043	143	D.1627 M	R3243	236	D.214 M	R4325
112	O.S.10	R3050	144	D.1628 M	R3250	237	D.215 M	R4337
113	O.S.11	R3056	145	D.1629 M	R3256	238	D.216 M	R4350
114	O.S.12	R3062	146	D.1630 M	R3262	239	D.217 M	R4362
115	O.S.13	R3063	147	D.1631 M	R3268	240	D.218 M	R4375
116	O.S.14	R3075	148	D.1632 M	R3275	241	D.219 M	R4387
			149	D.1633 M	R3281	242	D.220 M	R4400
						243	D.221 M	R4412

BS Ref No	Old Std Ref No	R Series Ref No
244	D.222 M	R4425
245	D.223 M	R4437
246	D.224 M	R4450
247	D.225 M	R4462
248	D.226 M	R4475
249	D.227 M	R4487
250	D.228 M	R4490
251	D.229 M	R4512
252	D.230 M	R4525
253	D.231 M	R4537
254	D.232 M	R4550
255	D.233 M	R4562
256	D.234 M	R4575
257	D.235 M	R4587
258	D.236 M	R4600
259	D.237 M	R4625
260	D.238 M	R4650
261	D.239 M	R4675
262	D.240 M	R4700
263	D.241 M	R4725
264	D.242 M	R4750
265	D.243 M	R4775
266	D.244 M	R4800
267	D.245 M	R4825
268	D.246 M	R4850
269	D.247 M	R4875
270	D.248 M	R4900
271	D.249 M	R4925
272	D.250 M	R4950
273	D.251 M	R4975
274	D.252 M	R5000
325	OS.28	R6150
326	OS.29	R6162
327	OS.30	R6175

BS Ref No	Old Std Ref No	R Series Ref No
328	OS.31	R6187
329	OS.32	R6200
330	OS.33	R6212
331	OS.34	R6225
332	OS.35	R6237
333	OS.36	R6250
334	OS.37	R6262
335	OS.38	R6275
336	OS.39	R6287
337	OS.40	R6300
338	OS.41	R6312
339	OS.42	R6325
340	OS.43	R6337
341	OS.44	R6350
342	OS.45	R6362
343	OS.46	R6275
344	OS.47	R6387
345	OS.48	R6400
346	OS.49	R6412
347	OS.50	R6425
348	OS.51	R6437
349	OS.52	R6450
425	OS.53	R8450
426	OS.54	R8462
427	OS.55	R8475
428	OS.56	R8487
429	OS.57	R8500
430	OS.58	R8512
431	OS.59	R8525
432	OS.60	R8537
433	OS.61	R8550
434	OS.62	R5865
435	OS.63	R8575
436	OS.64	R8587

BS Ref No	Old Std Ref No	R Series Ref No
437	OS.65	R8600
438	OS.66	R8625
439	OS.67	R8650
440	OS.68	R8675
441	OS.69	R8700
442	OS.70	R8725
443	OS.71	R8750
444	OS.72	R8775
445	OS.73	R8800
445A	OS.74	R8825
446	OS.75	R8850
446A	OS.76	R8875
447	OS.77	R8900
447A	OS.78	R8925
448	OS.79	R8950
448A	OS.80	R8975
449	OS.81	R81000
449A	OS.82	R81025
450	OS.83	R81050
450A	OS.84	R81075
451	OS.85	R81100
451A	OS.86	R81125
452	OS.87	R81150
452A	OS.88	R81175
453	OS.89	R81200
454	OS.90	R81250
455	OS.91	R81300
456	OS.92	R81350
457	OS.93	R81400
458	OS.94	R81450
459	OS.95	R81500
460	OS.96	R81550

Application of O-Rings against Vacuum

When constructing O-Ring grooves for vacuum sealing, it is important that the groove is filled by the O-Ring as much as possible. As a general rule we recommend to aim for 99% volume to void as when any elastomer is exposed to vacuum, it will shrink to a certain extent. This is also important to prevent the O-Ring from sliding or rolling. The surface to be sealed should be machined as smooth as possible but not less than 4RMS.

In the case of high vacuum sealing the gas permeability and the degassing properties of the O-Ring play an important part. These properties vary widely among the various elastomers and are also highly dependent on temperature and the medium handled.

Always avoid any kind of vibration on this type of application.

In the majority of cases Viton® is the preferred compound for sealing against vacuum, but it is essential that this is a 100% virgin fluoroelastomer, as supplied by Du Pont Performance Elastomers, and not a substitute FKM, often referred to as a commercial grade of Viton®, as these have been blended with hydrocarbon elastomers, significantly degrading their resistance to heat, permeation and compression set, rendering them unsuitable for use in a vacuum application.

When the requirements of high vacuum and elevated temperature prevail a Perfluoroelastomer may offer the best solution.

Cross Section	Groove Depth		Groove Width	
1.78	1.27	1.32	2.11	2.24
2.62	1.88	1.98	3.00	3.12
3.53	2.57	2.62	3.99	4.14
5.33	3.86	3.94	5.99	6.12
7.00	5.11	5.18	7.75	7.87

The figures above represent the cross section according to BS 1806 and AS 568A for vacuum sealing.

Degassed O-Rings

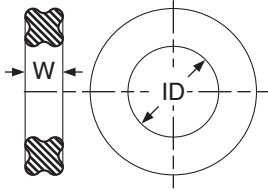
An increasing number of applications including Vacuum Nuclear, Semiconductor, Analytical & Pharmaceutical for example now require Seals to be Degassed prior to use.

This is a process we are able to offer in house at short notice together with our 24 hour express service. Following this procedure we can either bulk pack in sterile uv packaging or individually pack with customers own logo, barcodes, part number and any other relevant information subject to quantity.

The preferred compounds for this procedure are either 100% virgin fluoroelastomer being genuine Viton® and not a substitute FKM and Silicone-VMQ both of which are able to withstand the temperature required for the Degassing process, which is designed to release any volatile materials into a special vacuum enclosure.



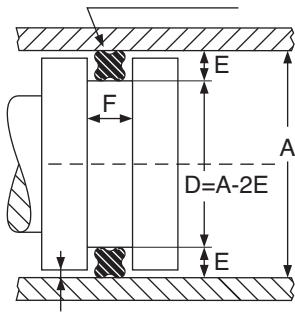
Quad-Rings



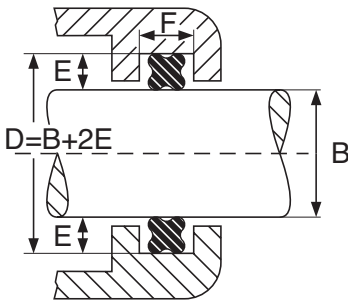
The Quad-Ring is a self-sealing rubber ring with four rounded sealing lobes. Quad-Rings were primarily designed to replace O-Rings in cases where the application of O-Rings is not satisfactory. The four contoured sealing lobes have greater sealing capacities and provide a useful oil groove. The diametrical compression required is lower than if O-Rings are used. Less compression means less friction and consequently less wear in dynamic applications.

The dimensions of Quad-Rings are equal to the dimensions of O-Rings in accordance with AS 568.

When a piston with an O-Ring makes its stroke, one section of the O-Ring will tend to roll with the piston, while the rest of it slides. In many cases the O-Ring will suffer from permanent torsion. The rubber will then begin showing signs of fatigue, so that leakage will occur. Eventually the O-Ring will break. When used for the same application, a Quad-Ring will resist the tendency to roll and twist, due to its relatively square cross section.



Like O-Rings, Quad-Rings are installed in rectangular grooves. Piston and rod seals are instances of dynamic applications. A piston seal is installed on the piston and seals the piston in relation to the cylinder wall. A rod seal seals along the outer circumference of the rod.



The contoured elastic sealing lobes guarantee easy and equal sealing. Quad-Rings are suitable for full vacuum and can be used in dynamic applications up to 100 atm., without back-up rings. In static applications the pressure may be over 100 atm.

The most popular compound is a Buna N -Nitrile which can be used in 90% of all cases and is available from stock in all AS/BS sizes. Viton® is also available from stock in most imperial sizes and EPDM is also available in a limited range of popular sizes.

Quad-Rings for rotating Shafts

Selecting Rings

Selecting the cross section of the rings

The service life of a ring is also dependent on the stroke length, frequency, continuous or intermittent service etc.. Larger rings and larger cross sections will last longer and will accept more play. It is advisable to select the largest cross section available of the ring size required.

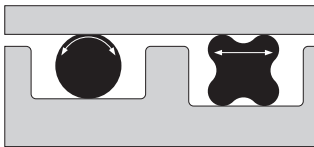
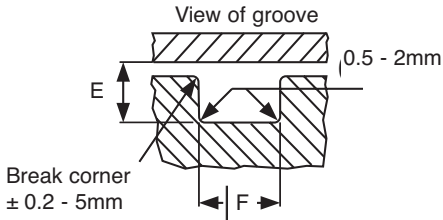
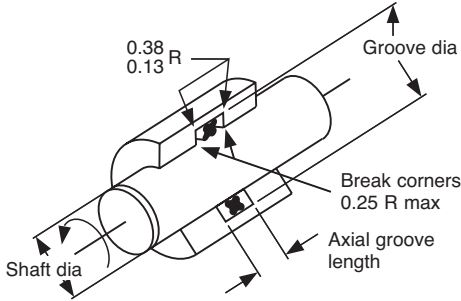
Surface Finish

Friction wear can be reduced to a minimum value by machining the sealing surface as smooth as possible. Recommended is a surface finish of 35 Ru or finer, provided the sealing surface remains capable of retaining a lubricating film.

Quad-Ring grooves

As a rule, like O-Rings, Quad-Rings are installed in non-adjustable grooves. The depth of the groove should be such that the Quad-Ring is compressed after installation. The minimum compression required depends on the application. In the case of fast moving seals the compression should not be too high, to avoid too much friction. The groove must be wide enough to accept deformation of the ring, since the volume of the Quad-Ring does not change, consequently the groove must be wider than the Quad-Rings. The possibility of swelling of the rings must be taken into consideration.

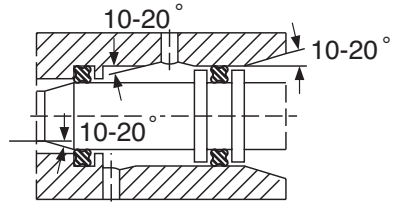
The groove should be rectangular, sometimes however, turning the groove is easier if the groove sides are slightly conical. If the bevel is not over 5°, such conical grooves are acceptable.



Diametrical clearance

When exposed to elevated pressures part of the Quad-Ring may be extruded into the clearance and the rings may be damaged to an unacceptable degree.

The amount of diametrical clearance is consequently tied to certain maximum values. The table below shows the admissible maximum clearances for the Quad-Ring sections stated if the hardness of the Quad-Ring material is 70° Shore.



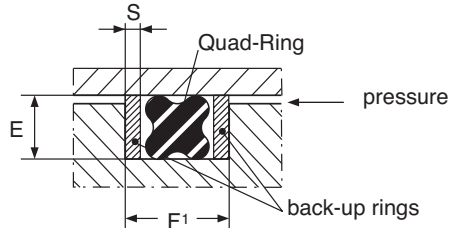
Installation

When the Quad-Rings are installed, they must be protected from being damaged. Sharp edges and corners should be rounded, and in the majority of cases shafts, rods, and cylinder ends should be bevelled.

If a Quad-Ring has to pass a hole in the cylinder wall, the sharp edge of this hole should also be bevelled.

Quad-Rings must never be used over threaded ends.

It is always advisable to apply a lubricant when installing Quad-Rings.



For the applications of back-up rings please refer to page 9.

Quad-Ring Size No	Cross Section	Depth		Width No Backup Ring	Width With 1 Backup Ring	Width With 2 Backup Ring	Radius R	Max ø Clearance S max
		Dynamic E1	Static E2					
4001	1.02	0.8	0.75	1.2	-	-	0.1	0.05
4002	1.27	1.0	0.9	1.4	-	-	0.15	0.05
4003	1.52	1.3	1.2	1.7	-	-	0.25	0.08
4003 ½	1.02	0.8	0.75	1.2	-	-	0.1	0.05
4004-4050	1.78	1.55	1.4	2.0	3.5	5.0	0.25	0.10
4102-4178	2.62	2.35	2.25	3.0	4.4	5.8	0.4	0.15
4201-4282	3.53	3.25	3.0	4.0	5.4	6.8	0.4	0.15
4309-4395	5.33	4.95	4.75	6.0	7.8	9.5	0.6	0.20
4425-4475	7.00	6.50	6.2	8.0	10.5	13.0	0.6	0.20

Cord Rings

When the exact size required is not available in a standard moulded O-Ring it is often quite acceptable in a static application to use a Cord Ring. These can be made to any size at very short notice in our own in-house workshop from the extensive range of cords listed.

Standard general purpose cords are normally extruded to Class E2, it follows therefore that Cord Rings produced from this range will have a greater cross section tolerance than that of a moulded O-Ring. The reverse however applies to our Special Purpose cords which are specially extruded to a very tight tolerance which we classify as Class A1 and which are less than those of a moulded O-Ring.

Cord Rings with a 3mm to 12mm cross section are produced with a 45° scarf joint and Cord Rings above a 12mm cross section are produced with a 90° butt joint.

Cross Section	Tolerance +/-	
	Class E1	Class E2
Up to 2.5	0.2	0.35
2.5 to 4.0	0.25	0.40
4.0 to 6.3	0.35	0.50
6.3 to 10	0.40	0.70
10 to 16	0.50	0.80
16 to 25	0.70	1.00

Cross Section	Tolerance +/- Class A1
Up to 3.0	0.0635
3.0 to 4.0	0.0762
4.0 to 4.5	0.0889
4.5 to 5.0	0.1016
5.0 to 7.0	0.1270
7.0 to 9.50	0.1778
9.50 to 12.70	0.2540
13.00 to 14.00	0.3050
14.00 to 16.00	0.5580

values in millimetres

Standard O-Ring cords

Size mm	Nitrile Black 70°	EPDM Black 70°	Neoprene® Off White 60°	Silicone Translucent 60°	Silicone White 60°
1.60	✓	✓			†
1.78	✓	✓			†
2.00	✓	✓			✓
2.40	✓				†
2.50	✓				
2.62	✓	✓			✓
3.00	✓	✓	✓	✓	✓
3.53	✓	✓	✓	✓	✓
4.00	✓	✓	✓	✓	✓
4.50	✓				✓
5.00	✓	✓	✓	✓	✓
5.34	✓	✓			✓
5.70	✓	✓		✓	†
6.00	✓	✓	✓	✓	✓
6.35	✓	✓			✓
6.50					✓
7.00	✓	✓	✓	✓	✓
7.50	✓				†
8.00	✓	✓	✓	✓	✓
8.40	✓	✓		✓	✓
9.00	✓		✓	✓	✓
9.50	✓				✓
10.00	✓	✓	✓	✓	✓

✓=Stock Sizes †=Available to Order

Size mm	Nitrile Black 70°	EPDM Black 70°	Neoprene® Off White 60°	Silicone Translucent 60°	Silicone White 60°
11.00	✓	✓			
12.00	✓	✓	✓		✓
13.00	✓		†		
14.00	✓	✓	†		†
15.00	✓	✓	†		†
16.00	✓	✓	†	✓	†
18.00	✓		†		
20.00	✓	✓	†		✓
22.00	✓				
25.00	✓		✓		
30.00	✓	†	✓		
32.00	✓				
40.00	✓				

Special Purpose O-Ring cords - Class A1

Size mm	VITON® Black 75°	VITON® Green 75°	VITON® Black 90°	Silicone Red 70°	Aflas® Black 75°	EPDM Black 70°
1.60	✓					
1.78	✓		†	†	†	
2.00	✓		†	†	†	
2.40	✓		†	†	†	
2.50	✓				†	
2.62	✓	✓	✓	✓	✓	✓
3.00	✓		†	✓	†	✓
3.53	✓	✓	✓	✓	✓	✓
4.00	✓		†	✓	†	✓
4.50	✓			†		†
5.00	✓		†	✓	†	✓
5.33	✓	✓	✓	✓	✓	✓
5.70	✓		†	✓	†	✓
6.00	✓	✓	†	✓	†	✓
6.35	✓		†	✓	†	✓
6.50	✓		†			†
7.00	✓	✓	✓	✓	✓	✓
7.50	✓			†	†	†
8.00	✓		✓	✓	✓	✓
8.40	✓		†	†	†	✓
9.00	✓		†	†		†
10.00	✓		†	✓	†	✓
11.00	✓			†		†
12.00	✓		†	✓	†	†
12.70	✓		†	†		†
13.00	✓		†			†

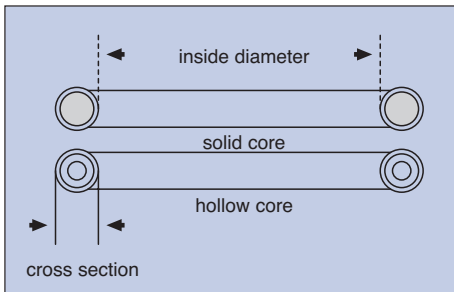
Our Silicone & EPDM cord is manufactured entirely of raw materials which are allowable ingredients under FDA protocols.

Encapsulated O-Rings

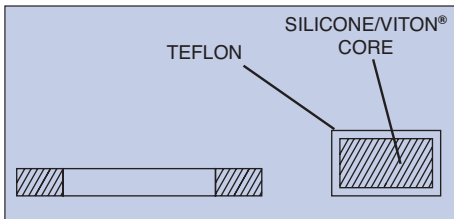
Consisting of a seamless and uniform TEFLON-FEP encapsulation which completely encloses a core material of either Silicone ZZR-765B or Viton® elastomers.

The dimensions of the O-Ring are characterised by the inside diameter and the cross section I.D. x C.S.

The seal with a solid core will provide the best resistance to compression set and also has good recovery characteristics, whilst the seal with a hollow core will provide effective sealing in cases where the amount of force is limited. The seal with a hollow core is also particularly useful in sealing delicate objects such as glass or plastics.



The encapsulated seal can also be supplied in rectangular sections. For these profiles the section diameter must not be less than 2-62mm to provide sufficient elasticity.



Function

The seamless uniform and integral TEFLON-FEP encapsulation of the O-Ring is responsible for the sealing effect, whereas the continuous reset and the constant pressure of the encapsulation on to the sealing point is accomplished by the elastomer core. The result is an overall sealing compression increasing with medium pressure. The encapsulated O-Ring behaves like a highly viscous fluid, any pressure exerted on the seals is transmitted practically undiminished in all directions.

Properties

- 1) High chemical resistance due to the TEFLON-FEP encapsulation .
- 2) Operational temperature range of -60°C to +204°C.
- 3) Anti-adhesive properties / non stick surface.
- 4) Sterilisable - FDA approved
- 5) Low vapour permeability & minimal water absorption.
- 6) Low compression set.

Remarks

Encapsulated O-Rings are resistant to practically all chemicals due to the TEFLON-FEP encapsulation. The FEP encapsulation is integral and has no weak points such as obvious seams.

- 98% of all technical applications are within the operating temperature range of the O-Ring.
- The TEFLON-FEP encapsulation of the O-Ring has a very low coefficient of friction.
- The elastomer core of the O-Ring ensures a continuous intensive contact with the sealing surface.

Combining the best qualities of TEFLON-FEP resins and Silicone or Viton® elastomers the O-Ring is an inexpensive, efficient and economical solution to many critical sealing problems.

For further information send for separate brochure.

O-Ring Assortment Boxes

A comprehensive range of O-Ring assortment boxes covering all the most popular international sizes. The assortment boxes are a convenient and economical way of keeping a selection of the most popular sizes readily available for an emergency, or as an essential part of the equipment of the maintenance or service engineer. The rigid plastic containers will also provide ideal storage conditions.

Type A British and American Standard

30 x 006 (2.90x1.78)	30 x 007 (3.69x1.78)	30 x 008 (4.47x1.78)	30 x 009 (5.28x1.78)	30 x 010 (6.07x1.78)
30 x 011 (7.65x1.78)	30 x 012 (9.25x1.78)	30 x 013 (10.82x1.78)	30 x 014 (12.42x1.78)	30 x 015 (14.00x1.78)
30 x 016 (15.60x1.78)	30 x 017 (17.17x1.78)	30 x 018 (18.77x1.78)	30 x 110 (9.20x2.62)	30 x 111 (10.78x2.62)
30 x 112 (12.37x2.62)	30 x 113 (13.95x2.62)	30 x 114 (15.54x2.62)	30 x 115 (17.12x2.62)	30 x 116 (18.72x2.62)
30 x 117 (20.30x2.62)	30 x 118 (21.90x2.62)	30 x 119 (23.47x2.62)	30 x 210 (18.64x3.53)	30 x 211 (20.22x3.53)
30 x 212 (21.82x3.53)	30 x 213 (23.39x3.53)	30 x 214 (24.99x3.53)	30 x 215 (26.57x3.53)	30 x 216 (28.17x3.53)

Contains 435

O-Rings in 30 sizes

O-Ring Compounds
Nitrile 70° shore A
Viton® 75° shore A

Type B British and American Standard

15 x 019 (20.35x1.78)	15 x 020 (21.95x1.78)	15 x 120 (25.07x2.62)	15 x 121 (26.65x2.62)	15 x 122 (28.25x2.62)	15 x 123 (29.82x2.62)
15 x 124 (31.42x2.62)	15 x 125 (33.00x2.62)	15 x 126 (34.60x2.62)	15 x 217 (29.74x3.53)	15 x 218 (31.34x3.53)	15 x 219 (32.92x3.53)
15 x 220 (34.52x3.53)	10 x 221 (36.09x3.53)	10 x 222 (37.69x3.53)	10 x 223 (40.87x3.53)	10 x 224 (44.04x3.53)	10 x 225 (47.22x3.53)
10 x 226 (50.39x3.53)	10 x 325 (37.47x5.34)	10 x 326 (40.64x5.34)	10 x 327 (43.82x5.34)	5 x 328 (46.99x5.34)	5 x 329 (50.19x5.34)

Contains 295

O-Rings in 24 sizes

O-Ring Compounds
Nitrile 70° shore A
Viton® 75° shore A

Type C DIN 3771 Metric Standard

20x 4 x 2	20x 6 x 2	20x 8 x 2	20x 10 x 2	20x 12 x 2
20x 3.3 x 2.4	20x 4.3 x 2.4	20x 5.3 x 2.4	20x 6.3 x 2.4	20x 7.3 x 2.4
20x 8.3 x 2.4	20x 9.3 x 2.4	15x 10.3 x 2.4	15x 11.3 x 2.4	15x 12.3 x 2.4
15x 13.3 x 2.4	15x 14.3 x 2.4	10x 15.3 x 2.4	10x 16.3 x 2.4	10x 17.3 x 2.4
10x 10 x 3	10x 12 x 3	10x 14 x 3	10x 16 x 3	10x 18 x 3
10x 19.2 x 3	5x 20 x 3	5x 22 x 3	5x 24 x 3	5x 26.2 x 3

Contains 425

O-Rings in 30 sizes

Compounds
Nitrile 70° shore A
Viton® 75° shore A

Type D DIN 3771 Metric Standard

15x 18 x 2	15x 20 x 2	15x 25 x 3	15x 26.2 x 3	15x 28 x 3	15x 29.2 x 3
15x 32.2 x 3	15x 34.2 x 3	15x 36.2 x 3	15x 30 x 4	15x 32 x 4	15x 34 x 4
15x 35 x 4	10x 38x 4	10x 40 x 4	10x 42 x 4	10x 45 x 4	10x 46 x 4
10x 48 x 4	10x 35 x 5	10x 40x5	10x 45 x 5	5x 48 x 5	5x 50 x 5

Contains 295

O-Rings in 24 sizes

Compounds
Nitrile 70° shore A
Viton® 70° shore A

Type R-1 French AF47501 Metric Standard

50 x R0 2.4 X 1.9	50 x R1 2.6 X 1.9	50 x R2 3.4 X 1.9	50 x R3 4.2 X 1.9	50 x R4 4.9 X 1.9
40 x R5 5.7 X 1.9	40 x R6 7.2 X 1.9	40 x R7 8.9.1.9	20 x R8 8.9 X 2.7	20 x R9 10.5 X 2.7
15 x R10 12.1 X 2.7	15 x R11 13.6 X 2.7	15 x R12 15.1 X 2.7	15 x R13 16.9 X 2.7	15 x R14 18.4 X 2.7

**Contains 485
O-Rings in 15 sizes**

Compounds
Nitrile 70° shore A
Viton® 75° shore A

Type R-2 French AF45501 Metric Standard

20 x R10 12.1 X 2.7	20 x R11 13.6 X 2.7	20 x R12 15.1 X 2.7	20 x R13 16.9 X 2.7	20 x R14 18.4 X 2.7	15 x R15 18.3 X 3.6
15 x R16 19.8 X 3.6	15 x R17 21.3 X 3.6	15 x R18 23 X 3.6	15 x R19 24.6 X 3.6	15 x R20 26.2 X 3.6	15 x R21 27.8 X 3.6
10 x R22 29.3 X 3.6	10 x R23 30.8 X 3.6	10 x R24 32.5 X 3.6	10 x R25 34.1 X 3.6	10 x R26 35.6 X 3.6	10 x R27 37.3 X 3.6
5 x R28 37.47 X 5.33	5 x R29 40.64 X 5.33	5 x R30 43.82 X 5.33	15 x R31 46.99 X 5.33	5 x R32 50.17 X 5.33	5 x R33 53.34 X 5.33

**Contains 295
O-Rings in 24 sizes**

Compounds
Nitrile 70° shore A
Viton® 70° shore A

Type SV-1 Swedish SMS1568 Metric Standard

20x 8.1 x 1.6	20x 9.1 x 1.6	20x 10.1 x 1.6	20x 11.1 x 1.6	20x 12.1 x 1.6
20x 13.1 x 1.6	20x 14.1 x 1.6	20x 15.1 x 1.6	20x 16.1 x 1.6	20x 5.3 x 2.4
20x 6.3 x 2.4	20x 7.3 x 2.4	15x 8.3 x 2.4	15x 9.3 x 2.4	15x 10.3 x 2.4
15x 11.3 x 2.4	15x 12.3 x 2.4	10x 13.3 x 2.4	10x 14.3 x 2.4	10x 15.3 x 2.4
10x 16.3 x 2.4	10x 17.3 x 2.4	10x 19.2 x 3	10x 22.2 x 3	10x 24.2 x 3
10x 26.2 x 3	5x 29.2 x 3	5x 32.2 x 3	5x 34.2 x 3	5x 36.2 x 3

**Contains 425
O-Rings in 30 sizes**

Compounds
Nitrile 70° shore A
Viton® 75° shore A

Type R-2 French AF45501 Metric Standard

15x 15.3 x 2.4	15x 16.3 x 2.4	15x 17.3 x 2.4	15x 32.2 x 3	15x 34.2 x 3	15x 36.2 x 3
10x 39.2 x 3	10x 42.2 x 3	10x 44.2 x 3	10x 49.5 x 3	10x 54.5 x 3	10x 59.5 x 3
5x 64.5 x 3	5x 69.5 x 3	5x 74.5 x 3	5x 79.5 x 3	5x 84.5 x 3	5x 89.5 x 3
5x 94.5 x 3	5x 99.5 x 3	5x 104.5 x 3	5x 44.2 x 5.7	5x 49.2 x 5.7	5x 54.2 x 5.7

**Contains 210
O-Rings in 24 sizes**

Compounds
Nitrile 70° shore A
Viton® 70° shore A

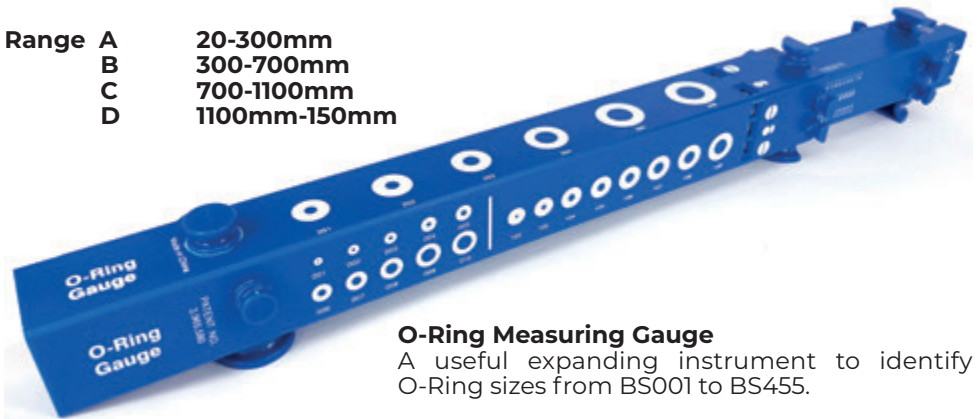
Accessories



Circometer

The use of this measuring tape enables the exact circumference of an O-Ring or Gasket to be determined.

Range A	20-300mm
B	300-700mm
C	700-1100mm
D	1100mm-1500mm



O-Ring Measuring Gauge

A useful expanding instrument to identify O-Ring sizes from BS001 to BS455.

KRYTOX® - Oil & Grease

A high quality lubricant with unique properties derived from its fluorinated structure of polyhexafluoropropylene oxide, making it a highly lubricious liquid with extremely low volatility, ideal for use in severe environments. Krytox® oil is insoluble in water, acids, base and all other solvents and is non-toxic and completely safe for use in all oxygen services. We recommend it as an O-Ring lubricant in high temperature applications, together with Vacuum, Aerospace, Nuclear, Semiconductor and other demanding applications.

O-Ring Tool Kit

Installing and extracting O-Rings can in some cases be a problem and a time consuming operation. In these situations the specially designed tools are an invaluable asset to the engineer. The tools are fabricated from a corrosion resistant material and may be used in sterile applications.

Use of tool kit

The use of the tools will become familiar to you within a short period of time. However several examples are given as illustrated.

Piercing tool

Use this tool to remove small O-Rings in difficult locations, where damage of the O-Ring is of no consequence. (Fig 1)

Pointed prying tool

Use to remove O-Rings in difficult locations by prying from the bottom of the groove. Insert as shown (Fig 2), rotate and move handle toward the wall. (Fig 3)

Flat face prying tool

Use to remove O-Rings from grooves as shown (Fig 4). To install in the groove, pull upward until the O-Ring snaps in place. (Fig 5)

Jogging and removal tool

To install O-Rings in their grooves, push the ring past the groove (Fig 6). Use the heel of the tool to push a section of the O-Ring into the groove (Fig 7), then use the tip to pull the entire O-Ring into position. (Fig 8)

Prodding tool

Use to remove O-Rings in cases where the groove is close to the surface (Fig 9). This tool will also be helpful to seat the O-Ring in the groove (Fig 10) as well as applying lubricant to an O-Ring that is already in position.

Tweezers

Use to hold the O-Ring for dipping into a lubricant, as well as for holding the O-Ring in position when fitting into difficult applications.

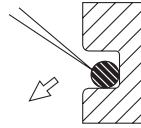


Fig 1.

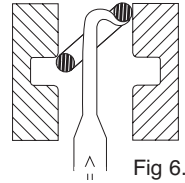


Fig 6.

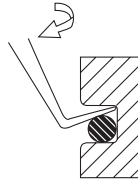


Fig 2.

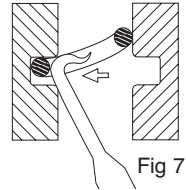


Fig 7.

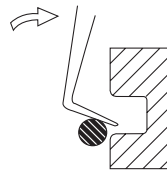


Fig 3.

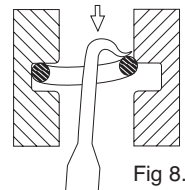


Fig 8.

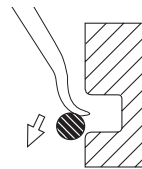


Fig 4.

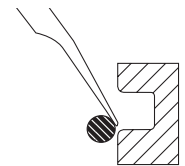


Fig 9.

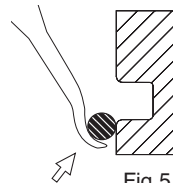


Fig 5.

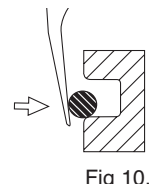


Fig 10.



An AFC Industries Company

TFC Europe Ltd Head Office, Hale House, Ghyll Industrial Estate,
Heathfield, East Sussex, TN21 8AW

t: 01435 866011 w: www.tfc.eu.com e: enquiries@tfc.eu.com