

Forsheda® V-Ring



! This page is intentionally left blank.



■ Forsheda® V-Ring

■ General Description

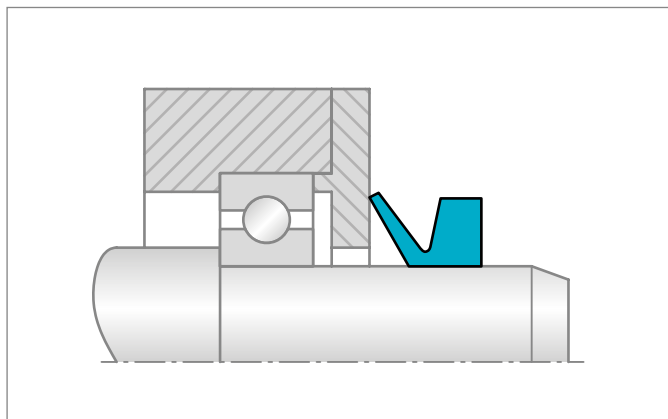


Figure 75: Method of operation of the V-Ring

The V-Ring is a unique all-rubber seal for rotary shafts. Developed in the 1960's by Forsheda AB, it has been used successfully by OEMs and on the replacement market world wide in a broad range of applications.

The V-Ring is the perfect seal to prevent the ingress of dirt, dust, water or combinations of these media while positively retaining grease. With its unique design and performance the V-Ring can be used with a wide range of bearing types. It can also be used as a secondary seal to protect primary seals that do not perform well in hostile environments.

DESCRIPTION, FEATURES AND BENEFITS

The V-Ring is normally stretched and mounted directly on the shaft, where it is held in position by the inherent tension of the rubber body. It rotates with the shaft and seals axially against a stationary counterface, perpendicular to the shaft. The counterface can be the side wall of a bearing or a washer, stamping, bearing housing, or even the metal case of an oil seal. The sealing lip is flexible and applies only a relatively light contact pressure against the counter-face and yet is still sufficient to maintain sealing function. The low contact pressure (that varies with the fitted width) allows the seal to run dry in many applications.

Due to influence of centrifugal force, the contact pressure of the lip decreases with increased speed. This means that frictional losses and heat are kept to a minimum, resulting in excellent wear characteristics and extended seal life. Once breakaway friction is overcome, the friction reduces steadily until around the 10 - 15 m/s range, when it reduces quite quickly. In the 15 - 20 m/s range the friction reduces to zero. The V-Ring then serves as a clearance seal and deflector. The power loss due to seal friction develops as shown in Figure 76.

The flexible lip and hinge allow the V-Ring to function even in the presence of a certain amount of run-out, eccentricity and shaft misalignment. Contact your local Customer Solution Center for advice on these and other application issues.

V-Rings are made entirely of rubber without fabric or sheet metal reinforcement. They are, therefore, particularly easy to install. V-Rings can be stretched and, depending on size, installed over flanges, pulleys and bearing housings without costly dismantling. For larger sizes, they can even be supplied as cut rings and joined by vulcanization on site.

DESIGN

V-Rings are available in seven standard cross-sections to meet various space and application requirements.

The cross-sections of profiles A and S increase with the shaft diameter, whilst the other types have the same cross-section for the whole diameter range.

Profile A is the most common and available for shaft diameters from 2.7 to 2,020 mm, inclusive.

Profile S is wide and tapered, which provides a very firm hold on the shaft. The rings are available for shaft diameters from 4.5 to 210 mm.

Profiles L and LX have narrow axial cross sections making them suitable for compact arrangements and are often used in combination with labyrinth seals. They are available for shaft diameters from 105 (135 for LX) to 2,025 mm.

Profiles RME, RM and AX are heavy-duty V-Rings that are designed primarily for large high-speed bearing arrangements, i.e. rolling mill and papermaking machine applications. Additionally they can be used as secondary seals for heavy duty applications where the primary seal has to be protected against water and or particulate contamination. The RME, RM and AX types can be axially and radially located on the shaft with specially designed clamping bands (see page 164). Available for shaft diameters from 300 mm and up.

Larger V-Ring sizes are available as joined seals. For more details please contact your local Customer Solution Center.

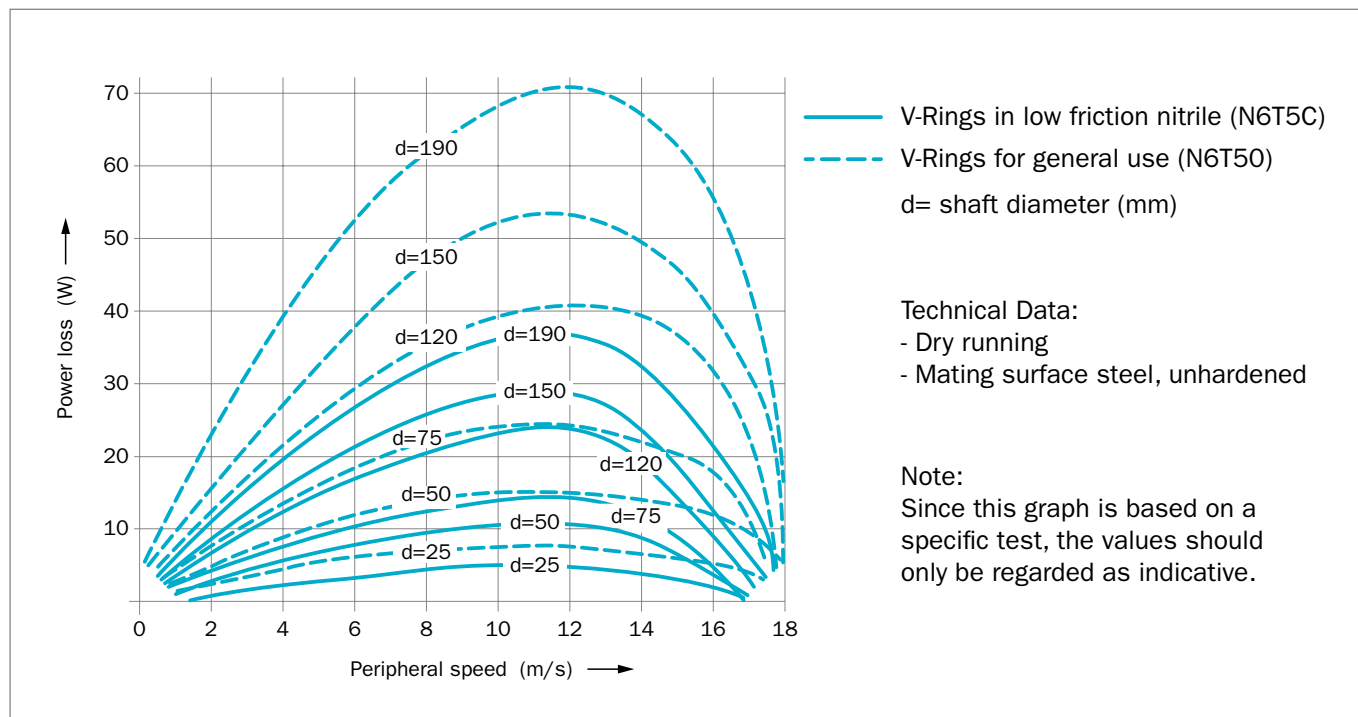


Figure 76: Power loss as a function of peripheral speed for various sizes

Materials

When selecting the correct rubber compound it is necessary to take the following requirements into account:

- good chemical resistance
- good resistance to high and low temperatures
- good resistance to ozone and weathering

It is also necessary to consider the need for the following attributes:

- high resistance to wear
- low friction
- low compression set
- good elasticity

MATERIAL TYPES

The most frequently selected material is the purpose made Nitrile rubber N6T50 which has excellent all round properties.

For applications with temperatures above +100 °C, or in chemically aggressive conditions, V-Rings made of fluorinated rubber (FKM) can be supplied. In fact, a wide range of rubber compounds are available and some of these are listed in Table 47.

Table 47: Guide to Selection of Rubber Material

TSS Code	Old Code	Type of Rubber	Characteristics
N6T50	NBR 510	Nitrile	For general use
N6T5C	NBR 562	Nitrile	Low friction
N7T50	NBR 555	Nitrile	Heavy duty conditions. Good tear and abrasion resistance
H7T50	HNBR 576	Hydrogenated Nitrile	Hypoid oils at high temp.
CDT50	CR 415	Chloroprene	For applications in the presence of ozone
E7T50	EPDM 762	Ethylene-Propylene	Good weather and ozone resistance, used with special chemicals such as acetone, ammonium carbonate and benzaldehyde
VDT50	FKM 900	Fluorinated	Very high temperature and chemical resistance
VDT51	FKM 907	Fluorinated	Very high temperature, chemical and wear resistance

Materials highlighted in blue - recommended materials.



TEMPERATURE RESISTANCE

Exposure to higher temperatures accelerates the aging of rubber, the elongation decreases, the compression set increases and finally the material becomes hard and brittle. Cracks at the sealing edge are a typical indication that the seal has been exposed to excessively high temperature. The aging of the rubber has an appreciable negative influence on the useful life of the seal.

The temperature limits for the principal materials are illustrated in Figure 77. They should only be regarded as approximate, since the media and time of exposure also affect the materials.

The temperature ranges within the shaded areas indicate temperatures that can be allowed for only certain periods of time. The higher the temperature, the shorter the service life. If the maximum temperature is exceeded, the elastomer may suffer permanent set or damage. Special elastomers are available for use in cold temperatures. If the elastomer is subjected to temperatures lower than the recommended values it will become hard and brittle, however it will regain its properties as soon as the temperature rises again.

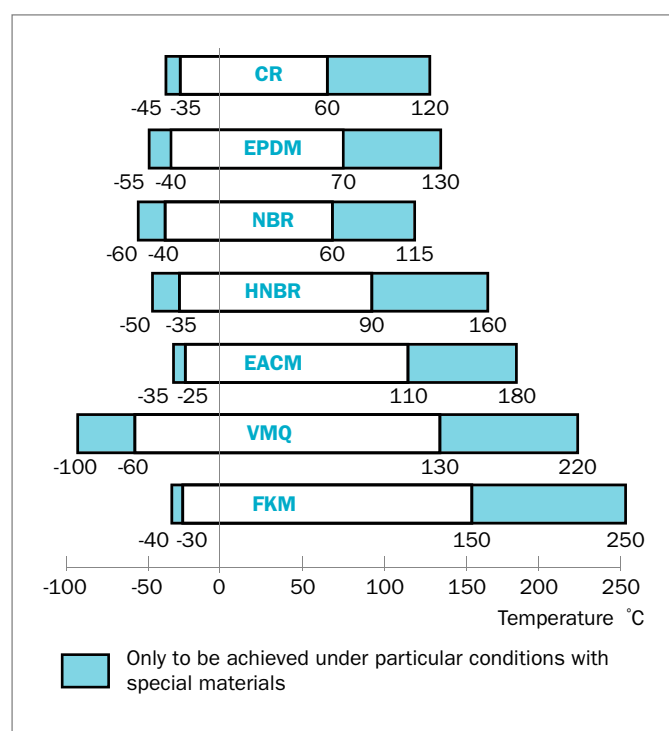


Figure 77: Temperature recommendations for V-Rings

OIL AND SOLVENT RESISTANCE

Since the V-Ring is used primarily for sealing grease-lubricated bearings exposed to water splash, dirt, dust, scale etc. the normal choice of compound is Nitrile Rubber N6T50.

However innumerable types of oil are available on the market and each of these has different effect on rubber. In addition, a given type of oil from different manufacturers may have different influence.

It is the additives in the oil that may affect the rubber. Especially so for hypoid oils, that contain sulfur. Since sulfur is used as the vulcanizing agent for Nitrile Rubber, it will initiate a secondary curing at temperatures above +80 °C. As a result of that, Nitrile Rubber will become hard and brittle. Hydrogenated Nitrile and Fluorinated rubbers, which are not vulcanized with sulfur, may therefore be considered for use with this type of oil. Oxidized oils represent another example illustrating the difficulty of tabulating the oil resistance of rubber materials. These oils are oxidized during operation and their properties will therefore change substantially. Such oils break down silicone rubber. Solvents could generally cause deterioration or swelling of the rubber, however mixtures of different solvents may cause considerably more damage than a single solvent. An example of this is mixing methanol and hydrocarbons.

For further information on oil and solvent resistance, we recommend you contact your local Customer Solution Center.

APPLICATION INSTRUCTIONS

The V-Ring is normally fully exposed to the media to be sealed. The requirements on the shaft and the counterface are mainly dependent on the media and the peripheral speed.

SHAFT DESIGN

The V-Ring is in most cases fitted on a rotating shaft. The requirements regarding diameter tolerances and surface roughness of the shaft are fairly moderate. As the V-Ring is an all-rubber seal it can be stretched to a varying degree and be used for a wide range of shaft diameters.

In applications where low power loss and long lifetime are important, it is recommended that the V-Ring size is selected, so that the shaft diameter falls between the minimum and nominal values within the recommended range. This is because the contact pressure of the sealing lip increases with the shaft diameter, due to the stretch of the V-Ring. At a higher stretch, a harder contact pressure is generated, causing an accelerated wear of the sealing lip. In order to prevent the V-Ring from sliding along the shaft, and to ensure the correct installation width, it is always recommended to arrange an axial support, especially for small cross-section profiles and larger shaft sizes, for example V-Ring type A, L and LX.



The surface roughness of the shaft should in general not exceed Ra 6.3 µm. For sealing fluids and fine particles, a maximum of Ra 3.2 µm is recommended. Sharp edges and burrs, which can damage the V-Ring must be avoided.

COUNTER-FACE DESIGN

The condition of the counterface has a great influence on the sealing function. The media to be sealed and the peripheral speed of the shaft determine the requirements regarding surface roughness and material of the counterface. It is important that it is smooth and flat without any sharp edges. To achieve the full effect of the flinger action, the V-Ring should always be designed in a relatively open space. Equally important is to keep the gap between the shaft and the counterface as small as possible, in order to prevent entry of the V-Ring lip during the installation. Recommended application dimensions are given in the dimension tables.

MATERIAL AND MATERIAL HARDNESS

Cold rolled steel sheet, stainless steel or zinc plated sheet are excellent materials for the counterface. However, the choice of material is highly dependent on the media to be sealed.

For normal running conditions, conventional mild steel with a hardness of min. 125 HB is sufficient. For sealing against grease, oil and dry particles, no further surface treatment is required. With an increase in speed and the presence of abrasive particles the hardness of the counterface must also be increased.

The following materials are normally used :

Material	Hardness HB	Media
Mild Steel	125 - 150	Water splash, sand, dust
Gray Cast Iron	190 - 270	Water splash, sand, dust
Sinter Bronze	100 - 160	Water, dust
Stainless Steel (Cr/Ni 18-8, C 0.1%)	150 - 200	Water
Stainless Steel (Cr/Ni 18-8, C 0.15%)	350	Water and abrasive particles
Work-hardened Acid Proof Steel	180 - 200	Chemicals
Tungsten Carbide	350 - 500	Water and scale
Forged Steel	200 - 255	Water and scale
Die-cast Aluminum	90 - 160	Water splash

SURFACE TREATMENT

When the counterface is exposed to water or other corrosive media, it must be protected accordingly.

Mild steel surfaces should either be zinc-plated and chromated, chromium plated, treated with an anticorrosion spray, or painted. The choice of treatment will depend on the overall running conditions.

Where the seal is immersed in water, stainless steel is recommended. However, due to the poor thermal conductivity of stainless steel it should not be used in dry-running conditions unless the speed is slow (< 1 m/s).

SURFACE FINISH

The rate of abrasion of the V-Ring is influenced by a number of factors, one of which is the surface finish of the counterface. The choice of surface finish will depend on the media to be sealed and the shaft speed as well. It is not only the surface finish value as such that is important, but also the surface character. For turned surfaces, it is recommended to buff the surface with fine emery cloth to remove any sharp peaks arising from the turning operation.

Surfaces with a finish that is too fine, e.g. certain cold rolled steel surfaces, may cause a suction effect between the V-Ring lip and the counterface resulting in noise problems and uneven running (so-called stick-slip effect).

The counterface surface must be free from scratch marks and other surface damages within the sealing area. This is important when sealing fluids and fine particles are present.

GUIDE TO RECOMMENDED SURFACE FINISH

Surface Finish µm Ra	Speed m/s	Media
0.4 - 0.8	> 10	Oil, water, scale, fiber
0.8 - 1.6	5 - 10	Oil splash, grease, water splash
1.6 - 2.0	1 - 5	Grease, dust, water splash, scale
2.0 - 2.5	< 1	Grease, dust

The surface finish should not be lower than Ra 0.05 µm.

FLATNESS

The flatness of the counterface is of importance, especially at higher shaft speeds. The maximum permissible flatness deviation is normally defined as 0.4 mm per 100 mm.



■ Installation

AXIAL SUPPORT

When used to retain oil and grease, an axial support for the V-Ring is always required. For applications with a lower degree of stretch than recommended in the dimension tables (e.g. for ease of assembly) or with a shaft speed exceeding 6 - 8 m/s (depending on the rubber compound selected) an axial support is also necessary.

An axial support can ensure that the correct installation width relative to the counterface is maintained for blind assemblies.

The V-Ring must always be supported over its entire base. The axial support should be designed in accordance with Figure 78. The dimensions A, c, d_1 , d_3 and B_1 are shown in the dimension tables.

Calculation of the axial support diameter d_5 is as follows;

Table 48: Axial Diameter d_5

V-Ring Type	min. Diameter d_5
A, S	$d_1 + 0.5 \times c$
L, LX	$d_1 + 3 \text{ mm}$
RM, RME	$d_1 + 10 \text{ mm}$
AX	$d_1 + 9 \text{ mm}$

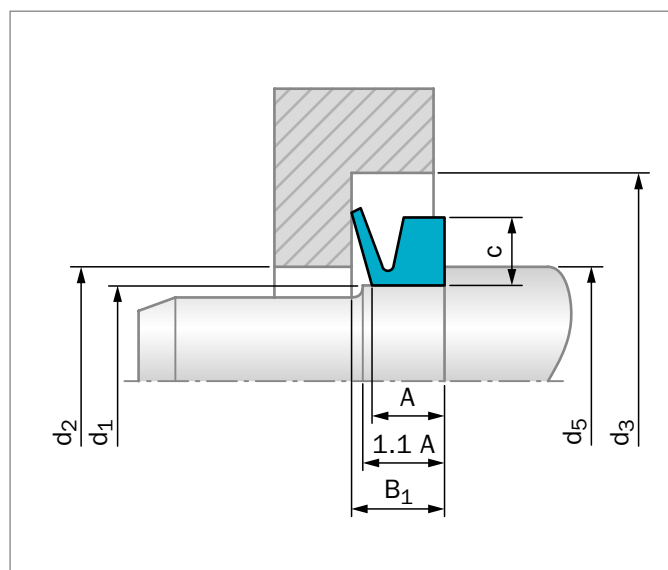


Figure 78: Axial support

RADIAL RETENTION

When the V-Ring is fitted on the shaft, the body of the V-Ring is subject to centrifugal force and tends to move or even lift off from the shaft at a certain speed.

At shaft speeds over 10 – 12 m/s, depending on the V-Ring material, the V-Ring in general requires radial retention. The speed when radial retention is required is also dependent on the degree of stretch of the V-Ring. V-Rings larger than 2,000 mm should always be fitted with radial retention, irrespective of the operating speed.

The radial retention can be designed as a recess, in which the V-Ring body fits, or consist of a number of separate clamping segments. Please contact your local Customer Solution Center for further guidance.

The clamping band type A or RM are other useful alternatives (see page 164).

STATIONARY ASSEMBLY

In cases where the peripheral speed of the shaft exceeds 10 – 12 m/s, an alternative method to radial clamping is to mount the V-Ring on a stationary component in the unit. The contact pressure of the lip will remain constant, as there will be no centrifugal force acting upon the lip.

In comparison to a rotating V-Ring, friction and power loss will be higher resulting in somewhat shorter service life. In order to compensate for this the following steps should be taken:

Counterface surface finish:

- machine to max. 0.8 $\mu\text{m Ra}$

V-Ring stretch:

- maximum 4 - 6%

Axial interference:

- keep to the minimum requirements for compensation of the axial movement within the assembly.

At higher peripheral speeds, adequate lubrication and heat transfer from the counterface are required.



TORQUE

The torque, and consequently the power loss due to the friction of the seal, is often of such a magnitude that it should be taken into consideration when deciding seal type. This applies particularly in the case of small electrical motors, conveyor rollers or any unit where low friction is an important requirement. The power losses are influenced by many factors such as the seal design and compound, surface finish of the counterface, fitted width and stretch, speed, media, lubricant, temperature, etc.

For this reason, it is difficult to give exact torque values for all running conditions.

Generally speaking, the power losses resulting from a V-Ring are always lower than a corresponding Radial Oil Seal. Grease lubrication gives higher power losses than oil lubrication or dry running.

By applying a suitable low friction dry film lubricant on the counterface surface, the friction and the heat generated can be reduced.

An increase of the fitted width of the V-Ring, giving a reduced lip pressure, will also lower the friction. However, the total axial movement in the assembly must be considered in order not to exceed the tolerances shown in the dimension tables. Whenever detailed information about power losses is required, consult your local Customer Solution Center.

INSTALLATION GUIDELINES

When the V-Ring is used as a grease seal/contaminant excluder, the V-Ring is normally mounted on the outside of a bearing housing, with or without, axial support.

General rules:

1. The V-Ring, the counterface and the shaft should be clean
2. The shaft should preferably be dry and free from grease or oil, particularly when the V-Ring is mounted without axial support
3. The lip of the V-Ring should be lubricated with a thin film of grease or silicone oil
4. In cases when friction must be reduced to a minimum, coat the counterface with a low friction agent, and do not apply grease to the lip
5. Ensure that the V-Ring is mounted with a uniform stretch around the shaft

When the V-Ring is mounted on the shaft the outer diameter of the lip is reduced. Unless the stretch is uniform this reduction will vary around the periphery. This may lead to partial entry of the lip in the bore of the counter-face when the seal is pushed into position.

In the case of large diameter seals, a uniform stretch can be achieved by inserting a blunt screwdriver or a piece of string under the V-Ring body and running it around the shaft twice. Take care not to damage seal or shaft.

The most convenient method of assembling large diameter V-Ring's, to ensure uniform stretch, is to mark off the body of the V-Ring and the shaft or seating with six equidistant marks. The marks should then be matched together when the V-Ring is fitted in position.

For more detailed installation instructions, contact your local Customer Solution Center.

CLAMPING BAND

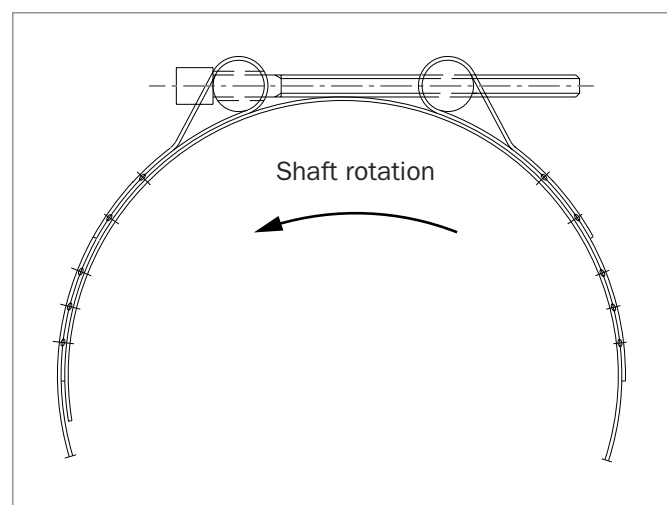


Figure 79: Clamping band RM

CLAMPING BAND RM

For clamping large diameter V-Rings of the RM and RME types, the Clamping Band RM is recommended.

Together with Clamping Band RM, a special series of "low stretch" V-Rings can be used for shaft diameters larger than 1,500 mm. This will reduce torque and facilitate the fitting of the V-Ring.



When ordering the Clamping Band RM, simply state the shaft diameter for which the clamping band is intended. Each clamping band is comprised of a set of standard lengths measuring 1,000 mm and 1,500 mm depending on the size, standard attachments and, if necessary, an adjustable length and two set of rivets. When the parts are assembled, the clamping band will fit the specific V-Ring.

All parts are made of acid-proof steel with the exception of the pop rivets, which are made of conventional stainless steel. If operation conditions dictate the use of acid-proof steel, the conventional rivets must be used in conjunction with the adjustable length.

FITTING THE CLAMPING BAND RM

Trim the adjustable clamping band to the right length by using a pair of shears. Rivet the adjustable length and the end attachment together by using a standard pop riveter and the three pop rivets.

Locate the V-Ring in the correct position relative to the counterface, i.e. the predetermined B_1 dimension.

Smear the V-Ring with a thin film of grease in the groove designed for the clamping band.

Using the attachments supplied with the band sections, join them together and position the complete band in the body groove with the screw heads facing the direction of shaft rotation. Turn the attachment screws a few turns one by one until the band is tight.

Check that the entire band fits snugly in the body groove.

CLAMPING BAND A/AX

The clamping band A/AX is meant to be used with V-Rings type A and AX on shaft diameters from 200 mm and larger. The clamping band keeps the V-Ring in position both axially and radially and can be re-used several times. The clamping band is supplied in 5 m lengths. Screw joints to connect the clamping band as well as the buckle are ordered on separate article numbers. The band is made of stainless steel AISI 301 and the screw joint is made of AISI 304 with galvanized screws. To order the right size and for correct installation, please contact your local Customer Solution Center.

TSS article numbers for clamping band A:

Clamping Band 5,000 mm	XZYDFAE002
Clamping Band RM	on request
Screw joint	XZYDF00022
Buckles	XZYDFAR001

IN-SITU JOINING

To avoid unnecessary downtime and difficult dismantling when carrying out preventive maintenance of process machinery, it is possible to split the V-Ring, fold it around the shaft and join it.

The V-Ring can be supplied either as a complete ring and cut on site, or supplied in the split condition from the factory. For V-Ring types RM and RME, it is preferable to split the seals at the factory due to the size of the section.

The best method of joining a V-Ring is by vulcanizing. Portable vulcanizing tools for the different V-Rings profiles, vulcanizing cement and detailed instructions are available from your local Customer Solution Center.

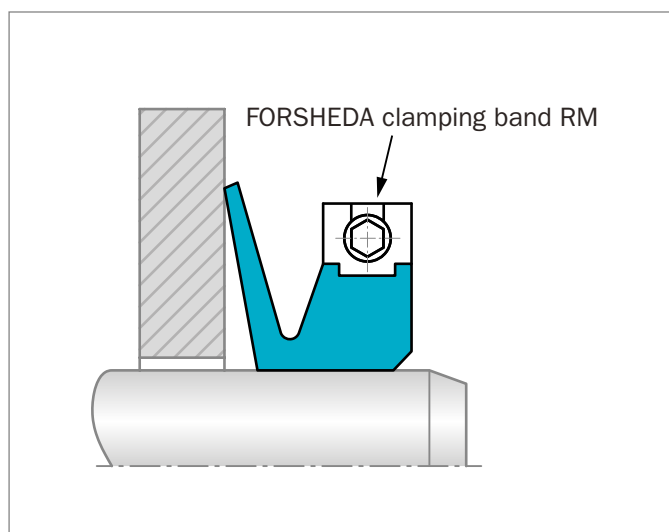


Figure 80: Clamping Band RM



V-Ring Type A

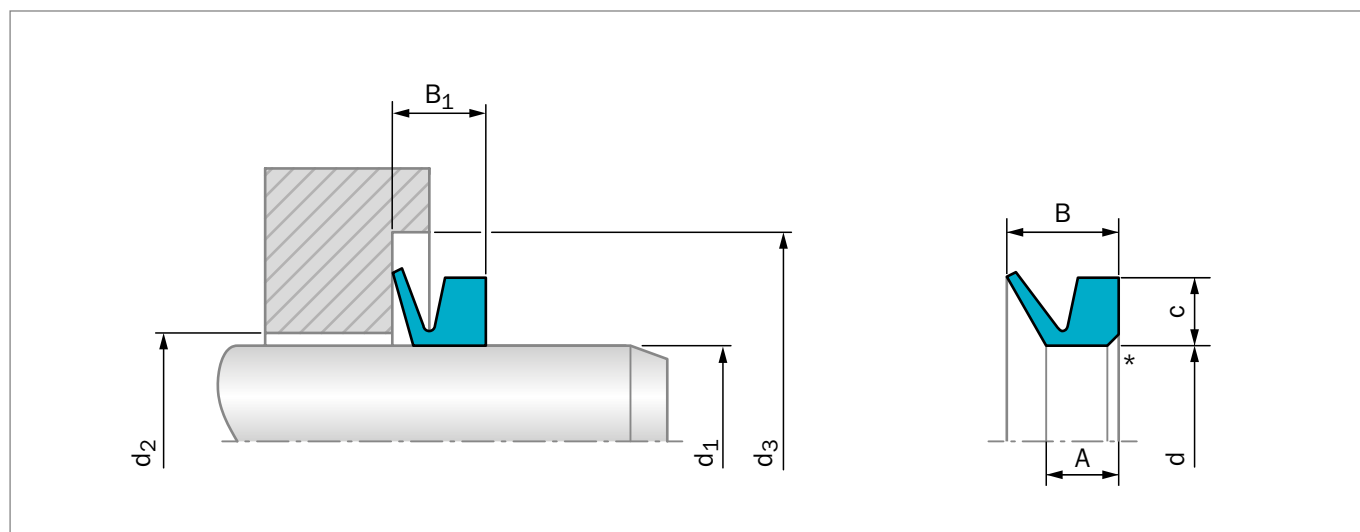


Figure 81: Installation Drawing

* V-ring type A partly with chamfer

When the shaft diameter d_1 is on the boundary between two sizes of V-Ring, select the larger V-Ring.
All dimensions in mm.

ORDERING EXAMPLE

V-Ring Type A

Type:	A, for shaft diameter = 30.0 mm
Material:	N6T50 (Nitrile Elastomer)

TSS Article No. **TWVA00300 - N6T50**
TSS Part No. _____
Quality Index (Standard) _____
Material No. (Standard) _____

Table 49: Standard Installation Dimensions / TSS Part Number

For Shaft Diameter	Inside Dia.	Height of Cross-Section-Ø	Dimension	Free Width	Maximum	Minimum	Fitted Width	V-Ring FORSHEDA Ref.	TSS Part No.
d_1	d	c	A	B	d_2	d_3	B_1		
2.7 - 3.5	2.5	1.5	2.1	3.0	$d_1 + 1$	$d_1 + 4$	2.5 ± 0.3	V-3A	TWVA00030
3.5 - 4.5	3.2	2	2.4	3.7	$d_1 + 1$	$d_1 + 6$	3.0 ± 0.4	V-4A	TWVA00040
4.5 - 5.5	4	2	2.4	3.7	$d_1 + 1$	$d_1 + 6$	3.0 ± 0.4	V-5A	TWVA00050
5.5 - 6.5	5	2	2.4	3.7	$d_1 + 1$	$d_1 + 6$	3.0 ± 0.4	V-6A	TWVA00060
6.5 - 8.0	6	2	2.4	3.7	$d_1 + 1$	$d_1 + 6$	3.0 ± 0.4	V-7A	TWVA00070
8.0 - 9.5	7	2	2.4	3.7	$d_1 + 1$	$d_1 + 6$	3.0 ± 0.4	V-8A	TWVA00080
9.5 - 11.5	9	3	3.4	5.5	$d_1 + 1$	$d_1 + 9$	4.5 ± 0.6	V-10A	TWVA00100
11.5 - 12.5	10.5	3	3.4	5.5	$d_1 + 1$	$d_1 + 9$	4.5 ± 0.6	V-12A	TWVA00120
12.5 - 13.5	11.7	3	3.4	5.5	$d_1 + 1$	$d_1 + 9$	4.5 ± 0.6	V-13A	TWVA00130
13.5 - 15.5	12.5	3	3.4	5.5	$d_1 + 1$	$d_1 + 9$	4.5 ± 0.6	V-14A	TWVA00140
15.5 - 17	14	3	3.4	5.5	$d_1 + 1$	$d_1 + 9$	4.5 ± 0.6	V-16A	TWVA00160
17.5 - 19	16	3	3.4	5.5	$d_1 + 1$	$d_1 + 9$	4.5 ± 0.6	V-18A	TWVA00180



For Shaft Diameter	Inside Dia.	Height of Cross-Section-Ø	Dimension	Free Width	Maximum	Minimum	Fitted Width	V-Ring FORSHEDA Ref.	TSS Part No.
d_1	d	c	A	B	d_2	d_3	B_1		
19 - 21	18	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-20A	TWVA00200
21 - 24	20	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-22A	TWVA00220
24 - 27	22	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-25A	TWVA00250
27 - 29	25	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-28A	TWVA00280
29 - 31	27	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-30A	TWVA00300
31 - 33	29	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-32A	TWVA00320
33 - 36	31	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-35A	TWVA00350
36 - 38	34	4	4.7	7.5	$d_1 + 2$	$d_1 + 12$	6.0 ± 0.8	V-38A	TWVA00380
38 - 43	36	5	5.5	9.0	$d_1 + 2$	$d_1 + 15$	7.0 ± 1.0	V-40A	TWVA00400
43 - 48	40	5	5.5	9.0	$d_1 + 2$	$d_1 + 15$	7.0 ± 1.0	V-45A	TWVA00450
48 - 53	45	5	5.5	9.0	$d_1 + 2$	$d_1 + 15$	7.0 ± 1.0	V-50A	TWVA00500
53 - 58	49	5	5.5	9.0	$d_1 + 2$	$d_1 + 15$	7.0 ± 1.0	V-55A	TWVA00550
58 - 63	54	5	5.5	9.0	$d_1 + 2$	$d_1 + 15$	7.0 ± 1.0	V-60A	TWVA00600
63 - 68	58	5	5.5	9.0	$d_1 + 2$	$d_1 + 15$	7.0 ± 1.0	V-65A	TWVA00650
68 - 73	63	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-70A	TWVA00700
73 - 78	67	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-75A	TWVA00750
78 - 83	72	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-80A	TWVA00800
83 - 88	76	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-85A	TWVA00850
88 - 93	81	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-90A	TWVA00900
93 - 98	85	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-95A	TWVA00950
98 - 105	90	6	6.8	11.0	$d_1 + 3$	$d_1 + 18$	9.0 ± 1.2	V-100A	TWVA01000
105 - 115	99	7	7.9	12.8	$d_1 + 4$	$d_1 + 21$	10.5 ± 1.5	V-110A	TWVA01100
115 - 125	108	7	7.9	12.8	$d_1 + 4$	$d_1 + 21$	10.5 ± 1.5	V-120A	TWVA01200
125 - 135	117	7	7.9	12.8	$d_1 + 4$	$d_1 + 21$	10.5 ± 1.5	V-130A	TWVA01300
135 - 145	126	7	7.9	12.8	$d_1 + 4$	$d_1 + 21$	10.5 ± 1.5	V-140A	TWVA01400
145 - 155	135	7	7.9	12.8	$d_1 + 4$	$d_1 + 21$	10.5 ± 1.5	V-150A	TWVA01500
155 - 165	144	8	9.0	14.5	$d_1 + 4$	$d_1 + 24$	12.0 ± 1.8	V-160A	TWVA01600
165 - 175	153	8	9.0	14.5	$d_1 + 4$	$d_1 + 24$	12.0 ± 1.8	V-170A	TWVA01700
175 - 185	162	8	9.0	14.5	$d_1 + 4$	$d_1 + 24$	12.0 ± 1.8	V-180A	TWVA01800
185 - 195	171	8	9.0	14.5	$d_1 + 4$	$d_1 + 24$	12.0 ± 1.8	V-190A	TWVA01900
195 - 210	180	8	9.0	14.5	$d_1 + 4$	$d_1 + 24$	12.0 ± 1.8	V-199A	TWVA01990
190 - 210	180	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-200A	TWVA02000
210 - 235	198	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-220A	TWVA02200
235 - 265	225	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-250A	TWVA02500
265 - 290	247	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-275A	TWVA02750
290 - 310	270	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-300A	TWVA03000
310 - 335	292	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-325A	TWVA03250
335 - 365	315	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-350A	TWVA03500
365 - 390	337	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-375A	TWVA03750
390 - 430	360	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-400A	TWVA04000
430 - 480	405	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ± 4.0	V-450A	TWVA04500



For Shaft Diameter	Inside Dia.	Height of Cross-Section-Ø	Dimension	Free Width	Maximum	Minimum	Fitted Width	V-Ring FORSHEDA Ref.	TSS Part No.
d_1	d	c	A	B	d_2	d_3	B_1		
480 - 530	450	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-500A	TWVA05000
530 - 580	495	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-550A	TWVA05500
580 - 630	540	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-600A	TWVA06000
630 - 665	600	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-650A	TWVA06500
665 - 705	630	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-700A	TWVA07000
705 - 745	670	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-725A	TWVA07250
745 - 785	705	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-750A	TWVA07500
785 - 830	745	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-800A	TWVA08000
830 - 875	785	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-850A	TWVA08500
875 - 920	825	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-900A	TWVA09000
920 - 965	865	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-950A	TWVA09500
965 - 1,015	910	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1000A	TWVAX1000
1,015 - 1,065	955	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1050A	TWVAX1050
1,065 - 1,115	1,000	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1100A	TWVAW1100
1,115 - 1,165	1,045	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1150A	TWVAW1150
1,165 - 1,215	1,090	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1200A	TWVAW1200
1,215 - 1,270	1,135	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1250A	TWVAW1250
1,270 - 1,320	1,180	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1300A	TWVAW1300
1,320 - 1,370	1,225	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1350A	TWVAW1350
1,370 - 1,420	1,270	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1400A	TWVAW1400
1,420 - 1,470	1,315	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1450A	TWVAW1450
1,470 - 1,520	1,360	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1500A	TWVAW1500
1,520 - 1,570	1,405	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1550A	TWVAW1550
1,570 - 1,620	1,450	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1600A	TWVAW1600
1,620 - 1,670	1,495	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1650A	TWVAW1650
1,670 - 1,720	1,540	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1700A	TWVAW1700
1,720 - 1,770	1,585	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1750A	TWVAW1750
1,770 - 1,820	1,630	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1800A	TWVAW1800
1,820 - 1,870	1,675	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1850A	TWVAW1850
1,870 - 1,920	1,720	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1900A	TWVA W1900
1,920 - 1,970	1,765	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-1950A	TWVAW1950
1,970 - 2,020	1,810	15	14.3	25.0	$d_1 + 10$	$d_1 + 45$	20.0 ±4.0	V-2000A	TWVAW2000

V-Ring A for a shaft size larger than 2,020 mm can be made to order.



V-Ring Type S

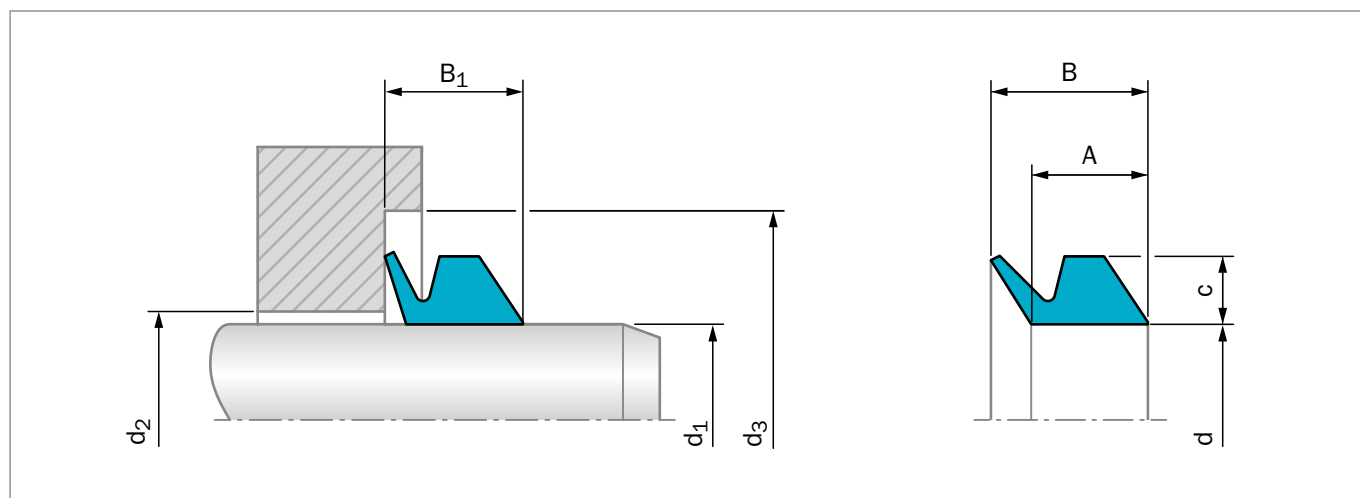


Figure 82: Installation Drawing

When the dimension d_1 is on the boundary between two sizes of V-Ring, select the larger V-Ring. All dimensions in mm.

ORDERING EXAMPLE

V-Ring Type S

Type: S, for shaft diameter = 30.0 mm

Material: N6T50 (Nitrile Elastomer)

TSS Article No. TWVS00300 - N6T50

TSS Part No. _____

Quality Index (Standard) _____

Material No. (Standard) _____

Table 50: Standard Installation Dimensions / TSS Part Number

For Shaft Diameter	Inside Dia.	Height of Cross-Section-Ø	Dimension	Free Width	Maximum	Minimum	Fitted Width	V-Ring FORSHEDA Ref.	TSS Part No.
d_1	d	c	A	B	d_2	d_3	B_1		
4.5 - 5.5	4	2	3.9	5.2	$d_1 + 1$	$d_1 + 6$	4.5 ± 0.4	V-5S	TWVS00050
5.5 - 6.5	5	2	3.9	5.2	$d_1 + 1$	$d_1 + 6$	4.5 ± 0.4	V-6S	TWVS00060
6.5 - 8.0	6	2	3.9	5.2	$d_1 + 1$	$d_1 + 6$	4.5 ± 0.4	V-7S	TWVS00070
8.0 - 9.5	7	2	3.9	5.2	$d_1 + 1$	$d_1 + 6$	4.5 ± 0.4	V-8S	TWVS00080
9.5 - 11.5	9	3	5.6	7.7	$d_1 + 1$	$d_1 + 9$	6.7 ± 0.6	V-10S	TWVS00100
11.5 - 13.5	10.5	3	5.6	7.7	$d_1 + 1$	$d_1 + 9$	6.7 ± 0.6	V-12S	TWVS00120
13.5 - 15.5	12.5	3	5.6	7.7	$d_1 + 1$	$d_1 + 9$	6.7 ± 0.6	V-14S	TWVS00140
15.5 - 17.5	14	3	5.6	7.7	$d_1 + 1$	$d_1 + 9$	6.7 ± 0.6	V-16S	TWVS00160
17.5 - 19	16	3	5.6	7.7	$d_1 + 1$	$d_1 + 9$	6.7 ± 0.6	V-18S	TWVS00180
19 - 21	18	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-20S	TWVS00200



For Shaft Diameter	Inside Dia.	Height of Cross-Section-Ø	Dimension	Free Width	Maximum	Minimum	Fitted Width	V-Ring FORSHEDA Ref.	TSS Part No.
d_1	d	c	A	B	d_2	d_3	B_1		
21 - 24	20	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-22S	TWVS00220
24 - 27	22	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-25S	TWVS00250
27 - 29	25	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-28S	TWVS00280
29 - 31	27	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-30S	TWVS00300
31 - 33	29	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-32S	TWVS00320
33 - 36	31	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-35S	TWVS00350
36 - 38	34	4	7.9	10.5	$d_1 + 2$	$d_1 + 12$	9.0 ± 0.8	V-38S	TWVS00380
38 - 43	36	5	9.5	13.0	$d_1 + 2$	$d_1 + 15$	11.0 ± 1.0	V-40S	TWVS00400
43 - 48	40	5	9.5	13.0	$d_1 + 2$	$d_1 + 15$	11.0 ± 1.0	V-45S	TWVS00450
48 - 53	45	5	9.5	13.0	$d_1 + 2$	$d_1 + 15$	11.0 ± 1.0	V-50S	TWVS00500
53 - 58	49	5	9.5	13.0	$d_1 + 2$	$d_1 + 15$	11.0 ± 1.0	V-55S	TWVS00550
58 - 63	54	5	9.5	13.0	$d_1 + 2$	$d_1 + 15$	11.0 ± 1.0	V-60S	TWVS00600
63 - 68	58	5	9.5	13.0	$d_1 + 2$	$d_1 + 15$	11.0 ± 1.0	V-65S	TWVS00650
68 - 73	63	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-70S	TWVS00700
73 - 78	67	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-75S	TWVS00750
78 - 83	72	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-80S	TWVS00800
83 - 88	76	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-85S	TWVS00850
88 - 93	81	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-90S	TWVS00900
93 - 98	85	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-95S	TWVS00950
98 - 105	90	6	11.3	15.5	$d_1 + 3$	$d_1 + 18$	13.5 ± 1.2	V-100S	TWVS01000
105 - 115	99	7	13.1	18.0	$d_1 + 4$	$d_1 + 21$	15.5 ± 1.5	V-110S	TWVS01100
115 - 125	108	7	13.1	18.0	$d_1 + 4$	$d_1 + 21$	15.5 ± 1.5	V-120S	TWVS01200
125 - 135	117	7	13.1	18.0	$d_1 + 4$	$d_1 + 21$	15.5 ± 1.5	V-130S	TWVS01300
135 - 145	126	7	13.1	18.0	$d_1 + 4$	$d_1 + 21$	15.5 ± 1.5	V-140S	TWVS01400
145 - 155	135	7	13.1	18.0	$d_1 + 4$	$d_1 + 21$	15.5 ± 1.5	V-150S	TWVS01500
155 - 165	144	8	15.0	20.5	$d_1 + 4$	$d_1 + 24$	18.0 ± 1.8	V-160S	TWVS01600
165 - 175	153	8	15.0	20.5	$d_1 + 4$	$d_1 + 24$	18.0 ± 1.8	V-170S	TWVS01700
175 - 185	162	8	15.0	20.5	$d_1 + 4$	$d_1 + 24$	18.0 ± 1.8	V-180S	TWVS01800
185 - 195	171	8	15.0	20.5	$d_1 + 4$	$d_1 + 24$	18.0 ± 1.8	V-190S	TWVS01900
195 - 210	180	8	15.0	20.5	$d_1 + 4$	$d_1 + 24$	18.0 ± 1.8	V-199S	TWVS01990



■ V-Ring Type L/LX

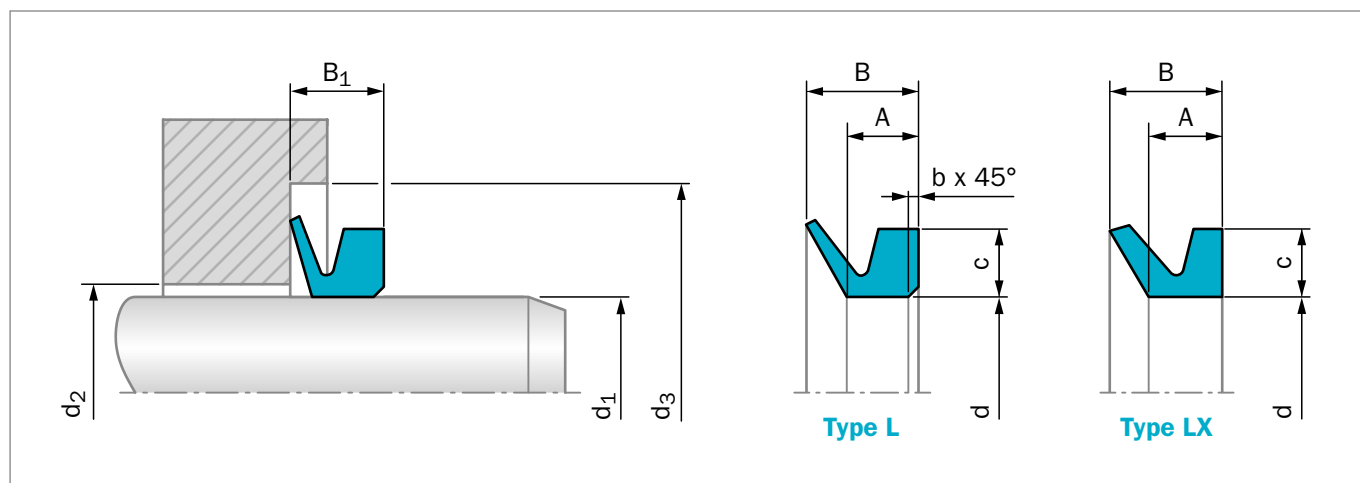


Figure 83: Installation Drawing

When the dimension d_1 is on the boundary between two sizes of V-Ring, select the larger V-Ring. All dimensions in mm.

Table 51: Installation Dimensions

Type	c	A	B	b	B_1	d_3 min	d_2 max
L	6.5	6	10.5	1	8 ± 1.5	$d_1 + 20$	$d_1 + 5$
LX	5	5.4	8.5	0	6.8 ± 1.1	$d_1 + 15$	$d_1 + 4$

ORDERING EXAMPLE

V-Ring Type L

Type:	L, for shaft diameter = 205 mm
Material:	N6T50 (Nitrile Elastomer)

TSS Article No. TWVL02000 - N6T50

TSS Part No. _____
 Quality Index (Standard) _____
 Material No. (Standard) _____

ORDERING EXAMPLE

V-Ring Type LX

Type:	LX, for shaft diameter = 205 mm
Material:	N6T50 (Nitrile Elastomer)

TSS Article No. TWLXV2000 - N6T50

TSS Part No. _____
 Quality Index (Standard) _____
 Material No. (Standard) _____


Table 52: Profile Dimensions – Assembly Dimensions

For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.	TSS Part No.
d ₁	d	FORSHEDA Ref.	Type L	Type LX
105 - 115	99	V-110L	TWVL01100	
115 - 125	108	V-120L	TWVL01200	
125 - 135	117	V-130L	TWVL01300	
135 - 145	126	V-140L/LX	TWVL01400	TWLX01400
145 - 155	135	V-150L/LX	TWVL01500	TWLX01500
155 - 165	144	V-160L/LX	TWVL01600	TWLXV1600
165 - 175	153	V-170L/LX	TWVL01700	TWLXV1700
175 - 185	162	V-180L/LX	TWVL01800	TWLXV1800
185 - 195	171	V-190L/LX	TWVL01900	TWLXV1900
195 - 210	182	V-200L/LX	TWVL02000	TWLXV2000
210 - 233	198	V-220L/LX	TWVL02200	TWLXV2200
233 - 260	225	V-250L/LX	TWVL02500	TWLXV2500
260 - 285	247	V-275L/LX	TWVL02750	TWLXV2750
285 - 310	270	V-300L/LX	TWVL03000	TWLXV3000
310 - 335	292	V-325L/LX	TWVL03250	TWLXV3250
335 - 365	315	V-350L/LX	TWVL03500	TWLXV3500
365 - 385	337	V-375L/LX	TWVL03750	TWLXV3750
385 - 410	360	V-400L/LX	TWVL04000	TWLXV4000
410 - 440	382	V-425L/LX	TWVL04250	TWLXV4250
440 - 475	405	V-450L/LX	TWVL04500	TWLXV4500
475 - 510	450	V-500L/LX	TWVLV5000	TWLXV5000
510 - 540	472	V-525L/LX	TWVLV5250	TWLXV5250
540 - 575	495	V-550L/LX	TWVLV5500	TWLXV5500
575 - 625	540	V-600L/LX	TWVLV6000	TWLXV6000
625 - 675	600	V-650L/LX	TWVLV6500	TWLXV6500
675 - 710	630	V-700L/LX	TWVLV7000	TWLXV7000
710 - 740	670	V-725L/LX	TWVLV7250	TWLXV7250
740 - 775	705	V-750L/LX	TWVLV7500	TWLXV7500
775 - 825	745	V-800L/LX	TWVL08000	TWLXV8000
825 - 875	785	V-850L/LX	TWVLV8500	TWLXV8500
875 - 925	825	V-900L/LX	TWVLV9000	TWLXV9000
925 - 975	865	V-950L/LX	TWVLV9500	TWLXV9500
975 - 1,025	910	V-1000L/LX	TWVLW1000	TWLXW1000
1,025 - 1,075	955	V-1050L/LX	TWVLW1050	TWLXW1050
1,075 - 1,125	1,000	V-1100L/LX	TWVLW1100	TWLXW1100
1,125 - 1,175	1,045	V-1150L/LX	TWVLW1150	TWLXW1150
1,175 - 1,225	1,090	V-1200L/LX	TWVLW1200	TWLXW1200
1,225 - 1,275	1,135	V-1250L/LX	TWVLW1250	TWLXW1250
1,275 - 1,325	1,180	V-1300L/LX	TWVLW1300	TWLXW1300
1,325 - 1,375	1,225	V-1350L/LX	TWVLW1350	TWLXW1350
1,375 - 1,425	1,270	V-1400L/LX	TWVLW1400	TWLXW1400
1,425 - 1,475	1,315	V-1450L/LX	TWVLW1450	TWLXW1450



For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.	TSS Part No.
d_1	d	FORSHEDA Ref.	Type L	Type LX
1,475 - 1,525	1,360	V-1500L/LX	TWVLW1500	TWLXW1500
1,525 - 1,575	1,405	V-1550L/LX	TWVLW1550	TWLXW1550
1,575 - 1,625	1,450	V-1600L/LX	TWVLW1600	TWLXW1600
1,625 - 1,675	1,495	V-1650L/LX	TWVLW1650	TWLXW1650
1,675 - 1,725	1,540	V-1700L/LX	TWVLW1700	TWLXW1700
1,725 - 1,775	1,585	V-1750L/LX	TWVLW1750	TWLXW1750
1,775 - 1,825	1,630	V-1800L/LX	TWVLW1800	TWLXW1800
1,825 - 1,875	1,675	V-1850L/LX	TWVLW1850	TWLXW1850
1,875 - 1,925	1,720	V-1900L/LX	TWVLW1900	TWLXW1900
1,925 - 1,975	1,765	V-1950L/LX	TWVLW1950	TWLXW1950
1,975 - 2,025	1,810	V-2000L/LX	TWVLW2000	TWLXW2000

V-Ring L or LX for a shaft size larger than 2,020 mm can be made to special order.



V-Ring Type RM/RME

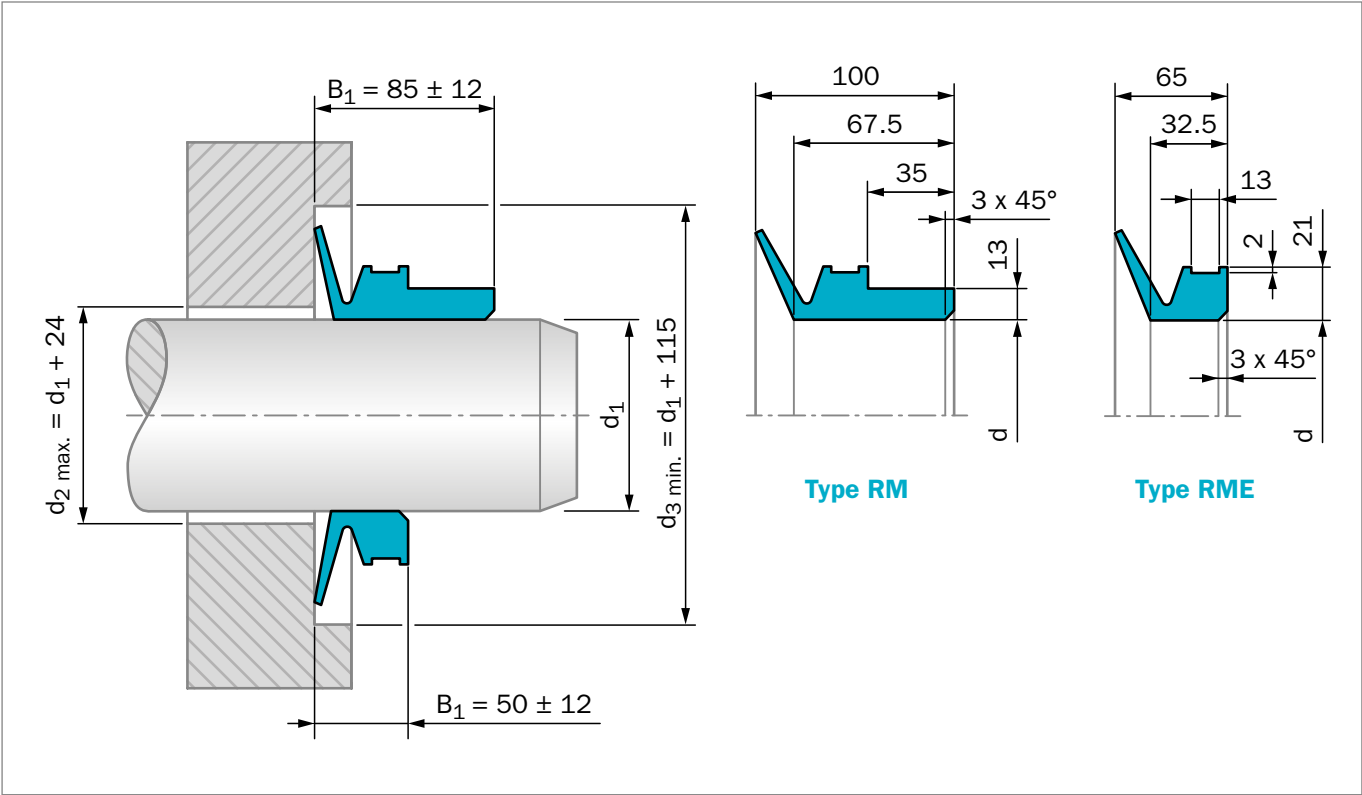


Figure 84: Installation Drawing

When the dimension d_1 is on the boundary between two sizes of V-Ring, select the larger V-Ring. All dimensions in mm.

ORDERING EXAMPLE

V-Ring Type RM

Type:	RM, for clamping band, butt-vulcanized for shaft diameter = 500.0 mm
Material:	N6T50 (Nitrile Elastomer)

ORDERING EXAMPLE

V-Ring Type RME

Type:	RME, for clamping band, butt-vulcanized for shaft diameter = 500.0 mm
Material:	N6T50 (Nitrile Elastomer)

TSS Article No.	TWRMV5000	-	N6T50
TSS Part No.			
Quality Index (Standard)			
Material No. (Standard)			

TSS Article No.	TWVBV5000	-	N6T50
TSS Part No.			
Quality Index (Standard)			
Material No. (Standard)			

**Table 53: Profile Dimensions – Assembly Dimensions**

For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.	TSS Part No.
d ₁	d	FORSHEDA Ref.	Type RM	Type RME
300 - 305	294	V-300RM/RME	TWRMV3000	TWVBV3000
305 - 310	299	V-305RM/RME	TWRMV3050	TWVBV3050
310 - 315	304	V-310RM/RME	TWRMV3100	TWVBV3100
315 - 320	309	V-315RM/RME	TWRMV3150	TWVBV3150
320 - 325	314	V-320RM/RME	TWRMV3200	TWVBV3200
325 - 330	319	V-325RM/RME	TWRMV3250	TWVBV3250
330 - 335	323	V-330RM/RME	TWRMV3300	TWVBV3300
335 - 340	328	V-335RM/RME	TWRMV3350	TWVBV3350
345 - 350	338	V-345RM/RME	TWRMV3450	TWVBV3450
350 - 355	343	V-350RM/RME	TWRMV3500	TWVBV3500
355 - 360	347	V-355RM/RME	TWRMV3550	TWVBV3550
360 - 365	352	V-360RM/RME	TWRMV3600	TWVBV3600
365 - 370	357	V-365RM/RME	TWRMV3650	TWVBV3650
370 - 375	362	V-370RM/RME	TWRMV3700	TWVBV3700
375 - 380	367	V-375RM/RME	TWRMV3750	TWVBV3750
380 - 385	371	V-380RM/RME	TWRMV3800	TWVBV3800
385 - 390	376	V-385RM/RME	TWRMV3850	TWVBV3850
390 - 395	381	V-390RM/RME	TWRMV3900	TWVBV3900
395 - 400	386	V-395RM/RME	TWRMV3950	TWVBV3950
400 - 405	391	V-400RM/RME	TWRMV4000	TWVBV4000
405 - 410	396	V-405RM/RME	TWRMV4050	TWVBV4050
410 - 415	401	V-410RM/RME	TWRMV4100	TWVBV4100
415 - 420	405	V-415RM/RME	TWRMV4150	TWVBV4150
420 - 425	410	V-420RM/RME	TWRMV4200	TWVBV4200
425 - 430	415	V-425RM/RME	TWRMV4250	TWVBV4250
430 - 435	420	V-430RM/RME	TWRMV4300	TWVBV4300
435 - 440	425	V-435RM/RME	TWRMV4350	TWVBV4350
440 - 445	429	V-440RM/RME	TWRMV4400	TWVBV4400
445 - 450	434	V-445RM/RME	TWRMV4450	TWVBV4450
450 - 455	439	V-450RM/RME	TWRMV4500	TWVBV4500
455 - 460	444	V-455RM/RME	TWRMV4550	TWVBV4550
460 - 465	448	V-460RM/RME	TWRMV4600	TWVBV4600
465 - 470	453	V-465RM/RME	TWRMV4650	TWVBV4650
470 - 475	458	V-470RM/RME	TWRMV4700	TWVBV4700
475 - 480	463	V-475RM/RME	TWRMV4750	TWVBV4750
480 - 485	468	V-480RM/RME	TWRMV4800	TWVBV4800
485 - 490	473	V-485RM/RME	TWRMV4850	TWVBV4850
490 - 495	478	V-490RM/RME	TWRMV4900	TWVBV4900
495 - 500	483	V-495RM/RME	TWRMV4950	TWVBV4950
500 - 505	488	V-500RM/RME	TWRMV5000	TWVBV5000
505 - 510	493	V-505RM/RME	TWRMV5050	TWVBV5050
510 - 515	497	V-510RM/RME	TWRMV5100	TWVBV5100
515 - 520	502	V-515RM/RME	TWRMV5150	TWVBV5150



For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.	TSS Part No.
d ₁	d	FORSHEDA Ref.	Type RM	Type RME
520 - 525	507	V-520RM/RME	TWRMV5200	TWVBV5200
525 - 530	512	V-525RM/RME	TWRMV5250	TWVBV5250
530 - 535	517	V-530RM/RME	TWRMV5300	TWVBV5300
535 - 540	521	V-535RM/RME	TWRMV5350	TWVBV5350
540 - 545	526	V-540RM/RME	TWRMV5400	TWVBV5400
545 - 550	531	V-545RM/RME	TWRMV5450	TWVBV5450
550 - 555	536	V-550RM/RME	TWRMV5500	TWVBV5500
555 - 560	541	V-555RM/RME	TWRMV5550	TWVBV5550
560 - 565	546	V-560RM/RME	TWRMV5600	TWVBV5600
565 - 570	550	V-565RM/RME	TWRMV5650	TWVBV5650
570 - 575	555	V-570RM/RME	TWRMV5700	TWVBV5700
575 - 580	560	V-575RM/RME	TWRMV5750	TWVBV5750
580 - 585	565	V-580RM/RME	TWRMV5800	TWVBV5800
585 - 590	570	V-585RM/RME	TWRMV5850	TWVBV5850
590 - 600	575	V-590RM/RME	TWRMV5900	TWVBV5900
600 - 610	582	V-600RM/RME	TWRMV6000	TWVBV6000
610 - 620	592	V-610RM/RME	TWRMV6100	TWVBV6100
620 - 630	602	V-620RM/RME	TWRMV6200	TWVBV6200
630 - 640	612	V-630RM/RME	TWRMV6300	TWVBV6300
640 - 650	621	V-640RM/RME	TWRMV6400	TWVBV6400
650 - 660	631	V-650RM/RME	TWRMV6500	TWVBV6500
660 - 670	640	V-660RM/RME	TWRMV6600	TWVBV6600
670 - 680	650	V-670RM/RME	TWRMV6700	TWVBV6700
680 - 690	660	V-680RM/RME	TWRMV6800	TWVBV6800
690 - 700	670	V-690RM/RME	TWRMV6900	TWVBV6900
700 - 710	680	V-700RM/RME	TWRMV7000	TWVBV7000
710 - 720	689	V-710RM/RME	TWRMV7100	TWVBV7100
720 - 730	699	V-720RM/RME	TWRMV7200	TWVBV7200
730 - 740	709	V-730RM/RME	TWRMV7300	TWVBV7300
740 - 750	718	V-740RM/RME	TWRMV7400	TWVBV7400
750 - 758	728	V-750RM/RME	TWRMV7500	TWVBV7500
758 - 766	735	V-760RM/RME	TWRMV7600	TWVBV7600
766 - 774	743	V-770RM/RME	TWRMV7700	TWVBV7700
774 - 783	751	V-780RM/RME	TWRMV7800	TWVBV7800
783 - 792	759	V-790RM/RME	TWRMV7900	TWVBV7900
792 - 801	768	V-800RM/RME	TWRMV8000	TWVBV8000
801 - 810	777	V-810RM/RME	TWRMV8100	TWVBV8100
810 - 821	786	V-820RM/RME	TWRMV8200	TWVBV8200
821 - 831	796	V-830RM/RME	TWRMV8300	TWVBV8300
831 - 841	805	V-840RM/RME	TWRMV8400	TWVBV8400
841 - 851	814	V-850RM/RME	TWRMV8500	TWVBV8500
851 - 861	824	V-860RM/RME	TWRMV8600	TWVBV8600
861 - 871	833	V-870RM/RME	TWRMV8700	TWVBV8700



For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.	TSS Part No.
d ₁	d	FORSHEDA Ref.	Type RM	Type RME
871 - 882	843	V-880RM/RME	TWRMV8800	TWVBV8800
882 - 892	853	V-890RM/RME	TWRMV8900	TWVBV8900
892 - 912	871	V-900RM/RME	TWRMV9000	TWVBV9000
912 - 922	880	V-920RM/RME	TWRMV9200	TWVBV9200
922 - 933	890	V-930RM/RME	TWRMV9300	TWVBV9300
933 - 944	900	V-940RM/RME	TWRMV9400	TWVBV9400
944 - 955	911	V-950RM/RME	TWRMV9500	TWVBV9500
955 - 966	921	V-960RM/RME	TWRMV9600	TWVBV9600
966 - 977	932	V-970RM/RME	TWRMV9700	TWVBV9700
977 - 988	942	V-980RM/RME	TWRMV9800	TWVBV9800
988 - 999	953	V-990RM/RME	TWRMV9900	TWVBV9900
999 - 1,010	963	V-1000RM/RME	TWRMW1000	TWVBW1000
1,010 - 1,025	973	V-1020RM/RME	TWRMW1020	TWVBW1020
1,025 - 1,045	990	V-1040RM/RME	TWRMW1040	TWVBW1040
1,045 - 1,065	1,008	V-1060RM/RME	TWRMW1060	TWVBW1060
1,065 - 1,085	1,027	V-1080RM/RME	TWRMW1080	TWVBW1080
1,085 - 1,105	1,045	V-1100RM/RME	TWRMW1100	TWVBW1100
1,105 - 1,125	1,065	V-1120RM/RME	TWRMW1120	TWVBW1120
1,125 - 1,145	1,084	V-1140RM/RME	TWRMW1140	TWVBW1140
1,145 - 1,165	1,103	V-1160RM/RME	TWRMW1160	TWVBW1160
1,165 - 1,185	1,121	V-1180RM/RME	TWRMW1180	TWVBW1180
1,185 - 1,205	1,139	V-1200RM/RME	TWRMW1200	TWVBW1200
1,205 - 1,225	1,157	V-1220RM/RME	TWRMW1220	TWVBW1220
1,225 - 1,245	1,176	V-1240RM/RME	TWRMW1240	TWVBW1240
1,245 - 1,270	1,195	V-1260RM/RME	TWRMW1260	TWVBW1260
1,270 - 1,295	1,218	V-1280RM/RME	TWRMW1280	TWVBW1280
1,295 - 1,315	1,240	V-1300RM/RME	TWRMW1300	TWVBW1300
1,315 - 1,340	1,259	V-1325RM/RME	TWRMW1325	TWVBW1325
1,340 - 1,365	1,281	V-1350RM/RME	TWRMW1350	TWVBW1350
1,365 - 1,390	1,305	V-1375RM/RME	TWRMW1375	TWVBW1375
1,390 - 1,415	1,328	V-1400RM/RME	TWRMW1400	TWVBW1400
1,415 - 1,440	1,350	V-1425RM/RME	TWRMW1425	TWVBW1425
1,440 - 1,465	1,374	V-1450RM/RME	TWRMW1450	TWVBW1450
1,465 - 1,490	1,397	V-1475RM/RME	TWRMW1475	TWVBW1475
1,490 - 1,515	1,419	V-1500RM/RME	TWRMW1500	TWVBW1500
1,515 - 1,540	1,443	V-1525RM/RME	TWRMW1525	TWVBW1525
1,540 - 1,570	1,467	V-1550RM/RME	TWRMW1550	TWVBW1550
1,570 - 1,600	1,495	V-1575RM/RME	TWRMW1575	TWVBW1575
1,600 - 1,640	1,524	V-1600RM/RME	TWRMW1600	TWVBW1600
1,640 - 1,680	1,559	V-1650RM/RME	TWRMW1650	TWVBW1650
1,680 - 1,720	1,596	V-1700RM/RME	TWRMW1700	TWVBW1700
1,720 - 1,765	1,632	V-1750RM/RME	TWRMW1750	TWVBW1750
1,765 - 1,810	1,671	V-1800RM/RME	TWRMW1800	TWVBW1800



For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.	TSS Part No.
d_1	d	FORSHEDA Ref.	Type RM	Type RME
1,810 - 1,855	1,714	V-1850RM/RME	TWRMW1850	TWVBW1850
1,855 - 1,905	1,753	V-1900RM/RME	TWRMW1900	TWVBW1900
1,905 - 1,955	1,794	V-1950RM/RME	TWRMW1950	TWVBW1950
1,955 - 2,010	1,844	V-2000RM/RME	TWRMW2000	TWVBW2000

V-Ring RM or RME for a shaft size larger than 2,010 mm can be made to special order.



■ V-Ring Type AX

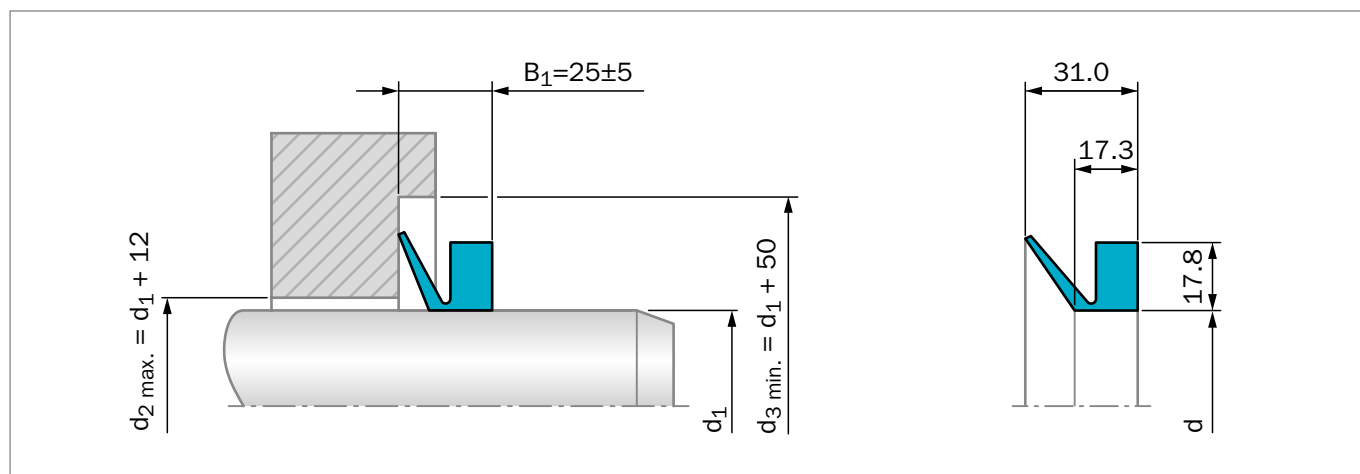


Figure 85: Installation Drawing

When the dimension d_1 is on the boundary between two sizes of V-Ring, select the larger V-Ring. All dimensions in mm.

ORDERING EXAMPLE

V-Ring Type AX

Type: AX, for shaft diameter = 1,190 mm

Material: N6T50 (Nitrile Elastomer)

TSS Article No. **TWAXW1200 - N6T50**

TSS Part No. _____

Quality Index (Standard) _____

Material No. (Standard) _____

Table 54: Profile Dimensions – Assembly Dimensions

For Shaft Diameter d_1	Inside Diameter d	V-Ring FORSHEDA Ref.	TSS Part No.
200 - 205	192	V-200AX	TWAXV2000
205 - 210	196	V-205AX	TWAXV2050
210 - 215	200	V-210AX	TWAXV2100
215 - 219	204	V-215AX	TWAXV2150
219 - 224	207	V-220AX	TWAXV2200
224 - 228	211	V-225AX	TWAXV2250
228 - 232	215	V-230AX	TWAXV2300
232 - 236	219	V-235AX	TWAXV2350
236 - 240	223	V-240AX	TWAXV2400
240 - 250	227	V-250AX	TWAXV2500
250 - 260	236	V-260AX	TWAXV2600
260 - 270	245	V-270AX	TWAXV2700
270 - 281	255	V-280AX	TWAXV2800
281 - 292	265	V-290AX	TWAXV2900
292 - 303	275	V-300AX	TWAXV3000
303 - 313	285	V-310AX	TWAXV3100
313 - 325	295	V-320AX	TWAXV3200



For Shaft Diameter	Inside Diameter	V-Ring	TSS Part No.
d ₁	d	FORSHEDA Ref.	
325 - 335	305	V-330AX	TWAXV3300
335 - 345	315	V-340AX	TWAXV3400
345 - 355	322	V-350AX	TWAXV3500
355 - 372	328	V-360AX	TWAXV3600
372 - 390	344	V-380AX	TWAXV3800
390 - 415	360	V-400AX	TWAXV4000
415 - 443	385	V-425AX	TWAX04250
443 - 480	410	V-450AX	TWAXV4500
480 - 530	450	V-500AX	TWAXV5000
530 - 580	495	V-550AX	TWAXV5500
580 - 630	540	V-600AX	TWAXV6000
630 - 665	600	V-650AX	TWAX06500
665 - 705	630	V-700AX	TWAXV7000
705 - 745	670	V-725AX	TWAXV7250
745 - 785	705	V-750AX	TWAXV7500
785 - 830	745	V-800AX	TWAXV8000
830 - 875	785	V-850AX	TWAXV8500
875 - 920	825	V-900AX	TWAXV9000
920 - 965	865	V-950AX	TWAXV9500
965 - 1,015	910	V-1000AX	TWAXW1000
1,015 - 1,065	955	V-1050AX	TWAXX1050
1,065 - 1,115	1,000	V-1100AX	TWAXW1100
1,115 - 1,165	1,045	V-1150AX	TWAXW1150
1,165 - 1,215	1,090	V-1200AX	TWAXW1200
1,215 - 1,270	1,135	V-1250AX	TWAXW1250
1,270 - 1,320	1,180	V-1300AX	TWAXW1300
1,320 - 1,370	1,225	V-1350AX	TWAXW1350
1,370 - 1,420	1,270	V-1400AX	TWAXW1400
1,420 - 1,470	1,315	V-1450AX	TWAXW1450
1,470 - 1,520	1,360	V-1500AX	TWAXW1500
1,520 - 1,570	1,405	V-1550AX	TWAXW1550
1,570 - 1,620	1,450	V-1600AX	TWAXW1600
1,620 - 1,670	1,495	V-1650AX	TWAXW1650
1,670 - 1,720	1,540	V-1700AX	TWAXW1700
1,720 - 1,770	1,585	V-1750AX	TWAXW1750
1,770 - 1,820	1,630	V-1800AX	TWAXW1800
1,820 - 1,870	1,675	V-1850AX	TWAXW1850
1,870 - 1,920	1,720	V-1900AX	TWAXW1900
1,920 - 1,970	1,765	V-1950AX	TWAXW1950
1,970 - 2,020	1,810	V-2000AX	TWAXW2000

V-Ring AX for a shaft size larger than 2,020 mm can be made to special order.