

OIL SEALS

LIDERING

GENERAL INFORMATION

Oil seals are employed for sealing rotating shafts. They are manufactured in a wide range of forms and materials, depending on working conditions. In this catalogue, you will find our standard range of oil seals, although other sizes, designs or materials can be supplied if the quantities justify it.

The basic design of an oil seal (fig.1) comprises a metal frame A which gives some consistence and allows assembly and fixing. The closing lip B is the only part subjected to relative movements and, therefore, subject to wear. Spring C which provides a constant force between lip and shaft. And finally a membrane D, which is the most important element in the assembly, since all rotating shafts have to cope with small but constant vibrations. Once the right contact pressure is achieved between the lip and the shaft, through the spring that allows the development of a lubricant film, these vibrations can increase the thickness of this film up to such degree that oil leakage occurs. The only way to avoid this leakage is trying to

maintain the film thickness more or less constant, which means that the membrane has to be sensitive enough to "accompany" the vibrating shaft.

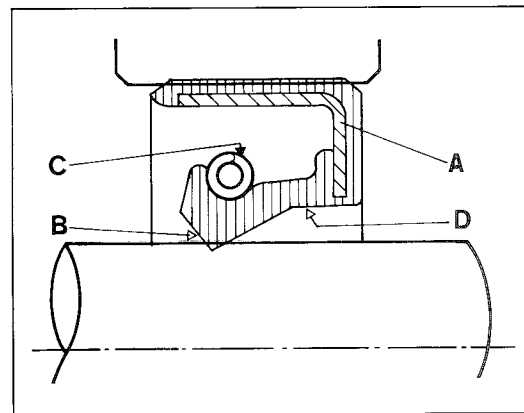


Figure 1

DEVELOPMENT OF LUBRICANT FILM

The lubricant film develops a few seconds after work has started as a capillarity effect but it may not occur if the shaft surface or the pressure of the seal is inadequate.

TEMPERATURE INCREASE ON THE LIP

Due to friction, the temperature in the lower area of the lip increases.

This increase can have a negative effect on the life of the seal as it can wear the seal material quickly. In this case, the oil dissipates the heat and reduces the heat leap between the area on the lip and the temperature of the rest of the oil.

For this reason the properties of the fluid as well as the quantity in contact with the seal are very important.

In figure A you will see the temperature increase under the lip with respect to the overall temperature and depending on the shaft diameter at a speed of 3000 rpm.

It also shows what influence the lubricant type and quantity have over this increase.

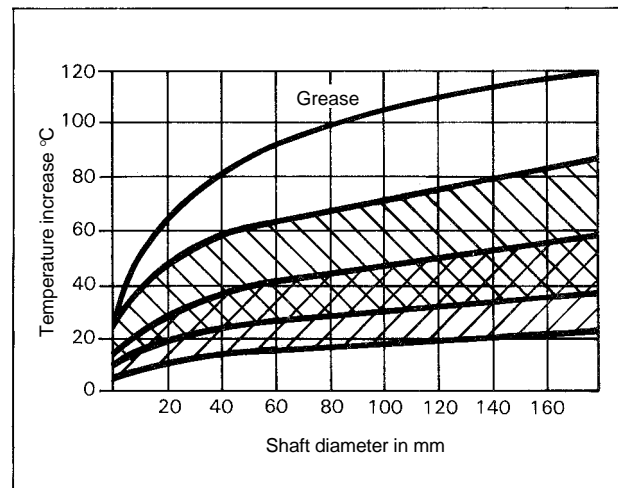




Figure A: Temperature increase at the lip

- Striped area  oil type SAE 90.
- Striped area  oil type SAE 20.

In both areas the upper curve indicates the value when the oil level just gets to the shaft, and the lower curve, when the seal is totally dipped in oil. You will also see the temperature increase with respect to the shaft diameter and speed. (figure B).

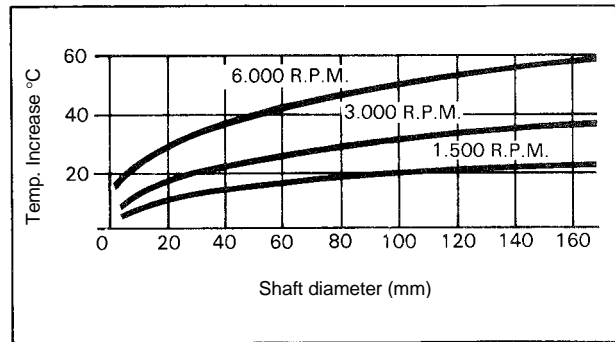


Figure B: Temperature increase

THE SHAFT

Material, finishes and tolerances

The best shaft materials are steel or cast iron, with a surface hardness of 50 HRC or higher. For special applications hard chrome plating or ceramic sleeves can be employed.

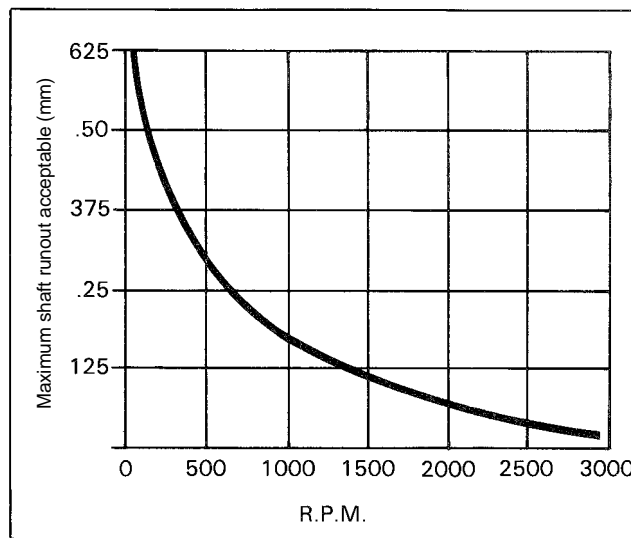
Machining is done through front feeding. Surface finish must be Ra 0,2 - 0,8 μm .

Recommended shaft tolerance ISO h11 (see table).

Shaft diameter (mm)	Tolerance h11 (mm)	Shaft diameter (mm)	Tolerance h11 (mm)
6 ÷ 10	+ 0 - 0,09	80 ÷ 120	+ 0 - 0,22
10 ÷ 18	+ 0 - 0,11	120 ÷ 180	+ 0 - 0,25
18 ÷ 30	+ 0 - 0,13	180 ÷ 250	+ 0 - 0,29
30 ÷ 50	+ 0 - 0,16	250 ÷ 315	+ 0 - 0,32
50 ÷ 80	+ 0 - 0,19	315 ÷ 400	+ 0 - 0,36

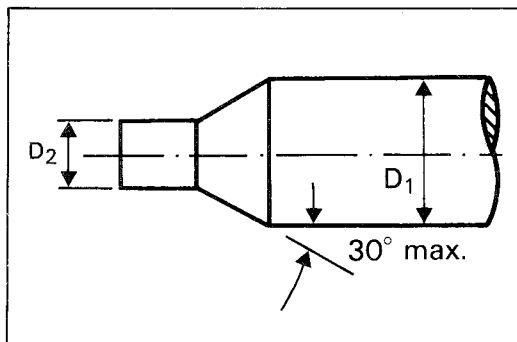
Shaft runout and vibrations

The shaft should rotate concentrically with respect to the housing. The following graphic shows the maximum value of shaft runout the oil seal can withstand at different speeds.



Chamfers

For easier assembly and in order to avoid damage to the seal, shafts should have the following chamfers:



D ₁ (mm)	D ₁ - D ₂ (mm)	D ₁ (mm)	D ₁ - D ₂ (mm)
Up to 10	1,5	50 : 70	4
10 ÷ 20	2	70 : 95	4,5
20 ÷ 30	2,5	95 : 130	5,5
30 ÷ 40	3	130 : 240	7
40 ÷ 50	3,5	240 : 400	11

Figure 2

HOUSING

The housing in which the seal is to be installed must be machined to a tolerance ISO H8, as shown in the following table. Longitudinal marks in shaft direction must be avoided.

MILLIMETERS				INCHES	
Housing diameter	Tolerance H8 mm	Housing diameter	Tolerance H8 mm	Housing diameter	Tolerance H8 (+ -)
6 ÷ 10	+0,022	50 ÷ 80	+0,046	Up to 4"	0,001
10 ÷ 18	+0,027	80 ÷ 120	+0,054	From 4,001 a 7"	0,001
18 ÷ 30	+0,033	120 ÷ 180	+0,063	From 4,001 a 7"	0,001
30 ÷ 50	+0,039	180 ÷ 250	+0,072	From 7,001"	0,002

A chamfer is indispensable for easier seal assembly.

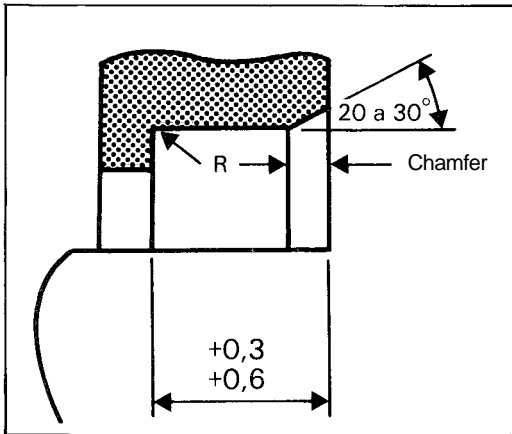


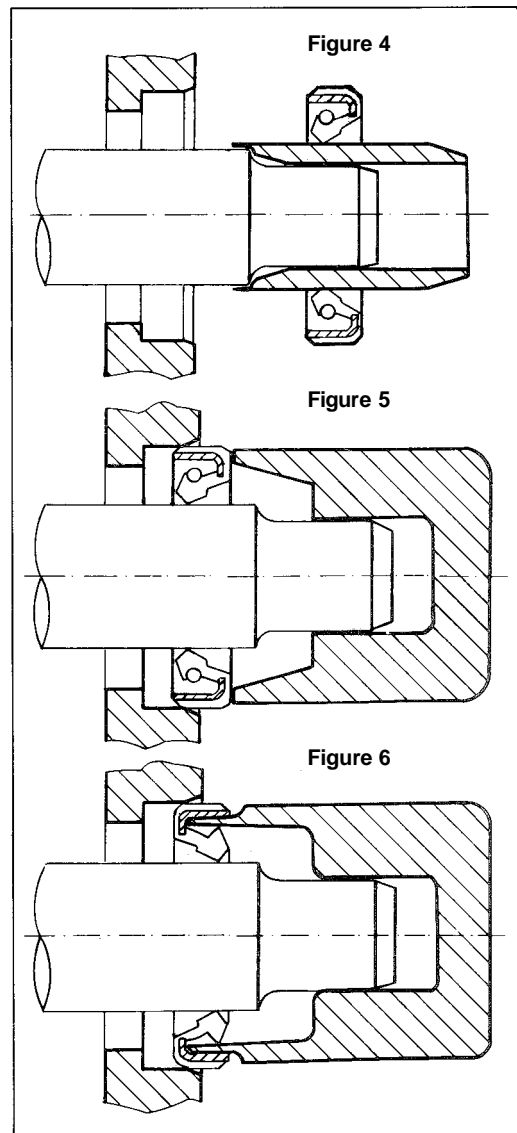
Figure 3

∅ Housing mm	Chamfer mm	R max.
Up to 100	0,7 a 1	0,75
From 100	1,2 a 1,5	1

ASSEMBLY

In order to assure a good performance of the seal the following details should be observed:

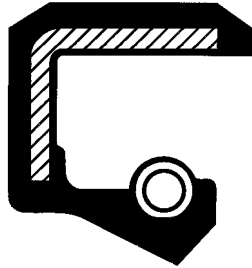
1. Before installation make sure seals are clean and in good condition.
2. Apply grease to the sealing lip. If it also has a dust lip, apply grease between both lips.
3. Check the proper installation of the spring into the housing.
4. The side where the spring is installed normally faces the oil to be sealed.
5. Check the shaft and eliminate any roughness, remains from machining, as well as any surface impurities. Sharp edges must be rounded or chamfered. If this is not possible, a sleeve with rounded edges and a slightly bigger diameter than that of the shaft (fig. 4) must be provided. Any small cut in the sealing lip during assembly will cause leakage.
6. When installing the seal into its housing a uniform pressure must be applied all around. Also make sure to install the seal in a perfectly perpendicular position to the shaft.
7. Assembly tools of the types shown in figures 5 and 6 are recommended. The outer diameter of the tool must be a little smaller than the housing diameter (0,1 to 0,4 mm).
8. The outer diameter of the seal must be greased before installation.



PRODUCTION PROGRAMME

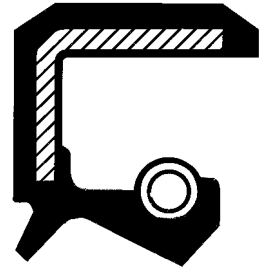
A

Manufactured according to DIN 3760 type A. Metal core covered with rubber.



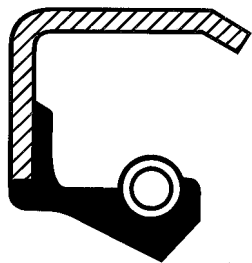
AS

The same as type A with a dust lip.



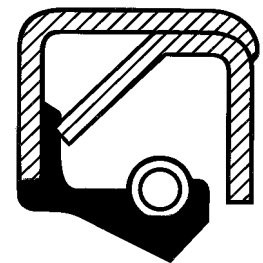
B

Manufactured according to DIN 3760 type B. Outer metal casing.



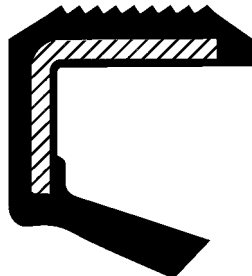
C

Manufactured according to DIN 3760 type C. Reinforced metal casing.



DINA

Seal without spring, thin walls, specially for ball bearings.



D5

Seal without metal core for applications where installation in one piece is difficult.



A DUO

Seal with two lips for sealing two different fluids.



AS P

Same as AS, for higher pressure.



Other designs upon request.

MATERIALS

Nitrile

Nitrile rubber (NBR) has good mechanical properties and a high resistance to wear. It is the most popular material for the manufacture of seals. It is chemically compatible with oils, vegetable and mineral greases, water, HFA, HFB and HFC fluids, etc.

Temperature range from -30° to +100°C.

Viton[®]

Viton[®] (FKM) has an excellent resistance to high temperatures, mineral oils, fuels, synthetic hydraulic fluids, oxygen, ozone, etc. It is resistant to the majority of fluids and lubricants which would attack Nitrile or Silicone.

Temperature range from -15° to +200°C.

Silicone

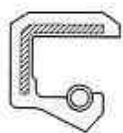
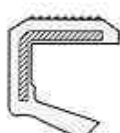
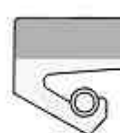
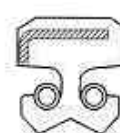
Silicone (MVQ) has a very good resistance to high and low temperatures. Good isolator, outdoor resistant and non-toxic.

Temperature range from -60° to +200°C.

PTFE

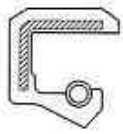
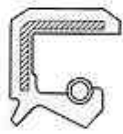
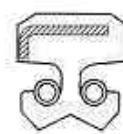
PTFE has exceptional mechanical properties and chemical resistance. It has a very low friction coefficient and allows high speed.

Temperature range from -50° to +270°C.

**A****AS****B****C****DINA****D5****A DUO****AS P**

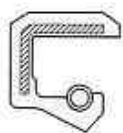
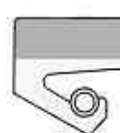
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DINA	4	8	2	NBR
A	4	11	6	FKM
A	4	16	4	NBR
A	5	15	6	NBR
A	5	16	6	NBR
A	5	16	7	FKM
DINA	6	10	2	NBR
B	6	11	4,5	NBR
DINA	6	12	1	NBR
A	6	14	6	NBR
A	6	14	6	FKM
A	6	15	4	NBR
A	6	15	4	FKM
A	6	16	6	FKM
A	6	16	7	NBR
A	6	16	7	FKM
A	6	19	6	NBR
A	6	19	6	FKM
A	6	19	7	NBR
A	6	20	6	FKM
A	6	21	7	NBR
A	6	22	7	NBR
A	6	22	7	FKM
A	6,35	19,05	6,35	FKM
A	7	16	7	NBR
A	7	16	7	FKM
A	7	22	7	NBR
A	7	22	7	FKM
DINA	8	12	3	NBR
DINA	8	15	3	NBR
A	8	16	7	NBR
A	8	16	7	FKM
A	8	18	5	FKM
A	8	22	7	NBR
AS	8	22	7	NBR
A	8	22	7	FKM
AS	8	22	7	FKM
A	8	24	7	NBR
A	8	24	7	FKM
A	9	16	4	NBR
AS P	9	20	6	NBR
A	9	22	7	NBR
A	9	22	7	FKM
A	9	24	7	NBR
A	9	24	7	FKM
A	9	26	7	NBR
A	9,52	22,22	6,35	NBR
DINA	10	14	3	NBR
DINA	10	17	3	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	10	18	4	NBR
A	10	19	7	NBR
A	10	19	7	FKM
A	10	22	6	NBR
AS P	10	22	6	NBR
A	10	22	7	NBR
A	10	22	7	FKM
A	10	24	7	NBR
A	10	24	7	FKM
A	10	26	7	NBR
A	10	28	7	FKM
A	10	28	8	FKM
A	10	30	7	NBR
A	10	30	7	FKM
A	11	22	7	NBR
A	11	22	7	FKM
A	11	26	7	NBR
AS	11	30	7	NBR
DINA	12	16	3	NBR
DINA	12	18	3	NBR
DINA	12	19	3	NBR
A	12	19	5	NBR
A	12	19	5	FKM
AS	12	20	5	NBR
A	12	22	4	FKM
A	12	22	4,5	FKM
A	12	22	5	NBR
A	12	22	7	NBR
A	12	22	7	FKM
AS	12	22	7	FKM
A	12	24	6,5	FKM
A	12	24	7	NBR
AS	12	24	7	NBR
A	12	24	7	FKM
A	12	26	8	NBR
A	12	28	7	NBR
A	12	28	7	FKM
A	12	30	7	NBR
A	12	30	7	FKM
A	12	32	7	NBR
A	12,45	26,97	6,35	NBR
A	12,5	20	5	NBR
A	12,5	20	6	NBR
AS	12,7	22,23	6,35	NBR
A	12,7	25,4	4,76	FKM
A	12,7	26	6	NBR
A	12,7	31,75	9,52	FKM
A	13	22	5	NBR
A	13	30	7	FKM

**A****AS****B****C****DINA****D5****A DUO****AS P**

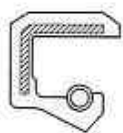
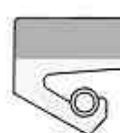
Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	13	30	7	NBR
A	13	35	10	NBR
DINA	14	20	3	NBR
DINA	14	21	3	NBR
A	14	22	4	NBR
A	14	22	4	FKM
A	14	24	7	NBR
AS	14	24	7	NBR
A	14	24	7	FKM
AS	14	25	7	NBR
A	14	27	7	FKM
A	14	28	7	NBR
A	14	30	7	NBR
A	14	30	7	FKM
A	14	35	7	NBR
DINA	15	21	3	NBR
DINA	15	23	3	NBR
A	15	24	5	NBR
A	15	24	5	FKM
A	15	24	7	NBR
AS	15	24	7	NBR
A	15	24	7	FKM
AS	15	24	7	FKM
A	15	25	5	NBR
AS	15	25	7	NBR
A	15	26	7	NBR
AS	15	26	7	NBR
A	15	27	7	NBR
A	15	28	7	FKM
A DUO	15	28	7	NBR
A	15	30	4,5	NBR
A	15	30	4,5	FKM
A	15	30	7	NBR
A	15	30	7	FKM
A	15	30	10	FKM
A	15	32	7	NBR
A	15	32	7	FKM
A	15	35	5	NBR
AS P	15	35	6	NBR
A	15	35	7	NBR
AS	15	35	7	NBR
A	15	35	7	FKM
A	15	35	8	NBR
A	15	35	10	NBR
A	15	37	7	FKM
A	15	40	10	NBR
A	15	42	7	NBR
A	15	42	7	FKM
A DUO	15	42	10	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	15,88	28,58	6,35	FKM
DINA	16	22	3	NBR
A	16	22	4	NBR
DINA	16	24	3	NBR
A	16	24	4	FKM
A	16	24	5	NBR
A	16	26	7	NBR
A	16	26	7	FKM
A	16	28	7	NBR
AS	16	28	7	NBR
A	16	28	7	FKM
AS	16	28	7	FKM
A	16	30	7	NBR
A	16	30	7	FKM
A	16	32	7	NBR
A	16	35	7	NBR
DINA	17	23	3	NBR
A	17	26	6	NBR
A	17	26	6	FKM
A	17	28	6	NBR
AS	17	28	6	FKM
A	17	28	7	NBR
AS	17	28	7	NBR
A	17	28	7	FKM
AS	17	28	7	FKM
A	17	28	8	NBR
A	17	28	8	FKM
A DUO	17	28	8	FKM
A	17	30	7	NBR
A	17	30	7	FKM
A	17	32	7	NBR
A	17	32	7	FKM
A	17	32	10	FKM
A	17	35	7	NBR
A	17	35	7	FKM
A	17	35	8	NBR
A	17	35	10	NBR
A	17	35	10	FKM
A	17	40	7	NBR
AS	17	40	7	NBR
A	17	40	7	FKM
A	17	40	8,5	NBR
A	17	40	10	NBR
A	17	47	7	FKM
AS	17	47	10	NBR
A	17,27	28,44	9,52	FKM
DINA	18	24	4	NBR
DINA	18	26	4	NBR
A	18	28	6	FKM

**A****AS****B****C****DINA****D5****A DUO****AS P**

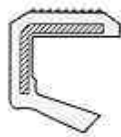
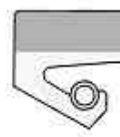
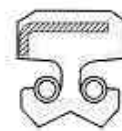
Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	18	28	7	NBR
AS	18	28	7	NBR
A	18	28	7	FKM
A	18	28	8	FKM
A	18	30	5	NBR
AS	18	30	6	NBR
A	18	30	7	NBR
A	18	30	7	FKM
AS	18	30	7	FKM
A	18	32	5	FKM
A	18	32	7	NBR
A	18	32	7	FKM
A	18	35	7	NBR
A P	18	35	10	NBR
A	18	40	7	NBR
A	18	40	7	FKM
AS P	19	27,2	5	NBR
AS	19	28	6	NBR
AS	19	32	7	NBR
A	19	47	10	NBR
AS	19,05	31,75	6,3	FKM
AS	19,05	31,75	6,3	NBR
DINA	20	26	4	NBR
DINA	20	28	4	NBR
AS	20	28	7	NBR
A	20	30	5	NBR
A	20	30	5	FKM
A	20	30	7	NBR
AS	20	30	7	NBR
A	20	30	7	FKM
AS	20	30	7	FKM
A	20	32	7	NBR
AS	20	32	7	NBR
A	20	32	7	FKM
A	20	33	10	FKM
AS P	20	35	6	NBR
AS P	20	35	6	FKM
A	20	35	7	NBR
AS	20	35	7	NBR
A	20	35	7	FKM
AS	20	35	8	NBR
A	20	35	10	NBR
A	20	35	10	FKM
A	20	38	7	NBR
A	20	38	8	FKM
A	20	40	7	NBR
A	20	40	7	FKM
AS	20	40	7	FKM
A	20	40	10	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	20	40	10	FKM
A	20	42	7	NBR
AS	20	42	7	NBR
A	20	42	7	FKM
AS	20	42	7	FKM
A	20	42	10	NBR
A	20	42	10	FKM
AS	20	45	7	NBR
A	20	47	7	NBR
A	20	47	7	FKM
A	20	47	10	NBR
A	20	47	10	FKM
A	20	48,4	7	NBR
A	20	52	7	FKM
B	20	55	10	FKM
AS	20,63	30,16	4,6	NBR
A	21	28	4	NBR
DINA	21	29	4	NBR
AS	21	40	7	NBR
B	21,3	55	10	FKM
DINA	22	28	4	NBR
DINA	22	30	4	NBR
A	22	32	5,5	NBR
A P	22	32	5,6	FKM
A	22	32	7	NBR
A	22	32	7	FKM
A	22	35	4,2	FKM
AS	22	35	4,2	FKM
A	22	35	7	NBR
AS	22	35	7	NBR
A	22	35	7	FKM
AS	22	35	7	FKM
A	22	35	8	FKM
A	22	35	10	NBR
A	22	36	7	NBR
A	22	38	7	FKM
A	22	38	7	NBR
AS	22	38	10	NBR
A	22	40	7	NBR
AS	22	40	7	NBR
A	22	40	7	FKM
AS	22	40	7	FKM
A	22	40	10	FKM
A	22	47	7	NBR
A	22	47	7	FKM
AS	22	47	10	NBR
A	22,23	35,15	9,5	FKM
AS	22,23	35,15	9,5	FKM
A	23,81	36,51	6,35	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

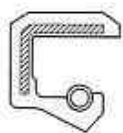
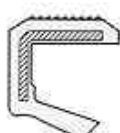
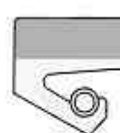
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DINA	24	32	4	NBR
A	24	35	6	FKM
A	24	35	7	NBR
A	24	35	7	FKM
AS	24	36	7	NBR
A	24	36	7	FKM
AS	24	36	7	FKM
A	24	37	7	NBR
A	24	38,5	10	FKM
A	24	40	7	NBR
AS	24	40	7	NBR
A	24	40	7	FKM
A	24	40	10	NBR
AS	24	42	7	NBR
AS	24	45	7	NBR
A	24	47	7	NBR
AS	24	47	10	NBR
A	24,5	40	8,5	NBR
A	24,5	40	8,5	FKM
DINA	25	32	4	NBR
DINA	25	32	4	FKM
A	25	32	6	FKM
A	25	32	7	NBR
DINA	25	33	4	NBR
A	25	33	6	NBR
A	25	33	6	FKM
DINA	25	35	4	NBR
AS	25	35	5	NBR
AS P	25	35	6	NBR
AS	25	35	6	NBR
AS P	25	35	6	FKM
A	25	35	7	NBR
AS	25	35	7	NBR
A	25	35	7	FKM
AS	25	35	7	FKM
A DUO	25	35	8	NBR
A	25	37	5	NBR
A	25	37	5	FKM
AS	25	37	7	NBR
AS	25	37	8	NBR
A	25	38	7	NBR
A	25	38	7	FKM
A	25	40	5	FKM
A	25	40	7	NBR
AS	25	40	7	NBR
A	25	40	7	FKM
AS	25	40	7	FKM
A	25	40	8	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	25	40	8	NBR
A DUO	25	40	8	FKM
A	25	40	10	NBR
A	25	40	10	FKM
A	25	42	7	NBR
AS	25	42	7	NBR
A	25	42	7	FKM
AS	25	42	7	FKM
A	25	42	8,5	NBR
A	25	42	10	NBR
A	25	42	10	FKM
A	25	45	7	NBR
A	25	45	10	NBR
A	25	45	10	FKM
A	25	46	7	NBR
A	25	47	7	NBR
A	25	47	8	FKM
A	25	47	10	NBR
A	25	47	10	FKM
A DUO	25	47	12	NBR
A	25	50	7	FKM
A	25	50	8	NBR
AS	25	50	10	NBR
A	25	50	10	FKM
A	25	52	7	NBR
AS	25	52	7	NBR
A	25	52	7	FKM
AS	25	52	7	FKM
A	25	52	8	NBR
A	25	52	10	NBR
A	25	52	10	FKM
B	25	54	10	NBR
A	25	62	7	FKM
A	25	62	10	NBR
A	25	62	10	FKM
AS	25,4	44,45	9,52	FKM
A	25,4	44,45	9,52	NBR
B	25,4	55	10	FKM
A	26	35	4	NBR
A	26	35	7	NBR
A	26	36	7	FKM
A	26	37	7	NBR
AS	26	37	7	NBR
A	26	42	7	NBR
AS	26	42	7	FKM
A	26	47	7	NBR
A	26	47	7	FKM
A	26	52	10	NBR
AS	26	52	10	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

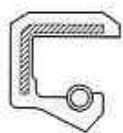
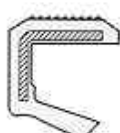
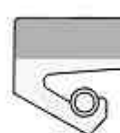
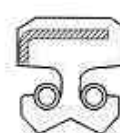
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AS	26	52	10	FKM
A	26,99	47,63	9,53	FKM
A	27	37	7	NBR
A	27	37	7	FKM
A	27	41	10	FKM
DINA	28	35	4	NBR
DINA	28	37	4	NBR
A	28	38	7	NBR
AS	28	38	7	NBR
A	28	38	7	FKM
A	28	40	7	NBR
A	28	40	7	FKM
A	28	40	10	FKM
A	28	42	7	NBR
A	28	42	10	NBR
A	28	42	10	FKM
A	28	45	7	FKM
AS	28	45	8	NBR
A	28	45	9	FKM
A	28	47	7	NBR
A	28	47	7	FKM
AS	28	47	7	FKM
A	28	47	10	NBR
A	28	47	10	FKM
AS	28	47	10	FKM
A	28	50	10	NBR
AS	28	50	10	NBR
A	28	50	10	FKM
A	28	52	7	NBR
A	28	52	7	FKM
AS	28	52	7	FKM
A	28	52	10	NBR
AS	28	70	10	NBR
A	28,57	41,27	9,52	FKM
AS	28,57	41,27	9,52	NBR
B	28,57	47	7	FKM
A	28,57	50,8	11,11	FKM
A	29	40	7	NBR
AS	29	46	10	NBR
DINA	30	37	4	NBR
A	30	40	4	NBR
DINA	30	40	4	NBR
A	30	40	5	NBR
A	30	40	5	FKM
A	30	40	7	NBR
AS	30	40	7	NBR
A	30	40	7	FKM
A	30	40	8	NBR
A DUO	30	40	8	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS P	30	42	6	NBR
A	30	42	7	NBR
AS	30	42	7	NBR
A	30	42	7	FKM
AS	30	42	7	FKM
AS	30	42	8	NBR
A	30	44	10	NBR
A	30	45	7	FKM
A	30	45	8	NBR
A	30	45	8	FKM
A	30	45	10	NBR
A	30	45	10	FKM
AS	30	46	7	NBR
A	30	47	6	NBR
A	30	47	7	NBR
AS P	30	47	7	NBR
A	30	47	7	FKM
AS	30	47	7	FKM
A	30	47	8	FKM
A	30	47	10	NBR
A	30	47	10	FKM
A	30	48	8	NBR
A	30	50	7	NBR
A	30	50	10	NBR
AS	30	50	10	NBR
A	30	50	10	FKM
A	30	52	5	FKM
A	30	52	7	NBR
AS	30	52	7	NBR
A	30	52	7	FKM
A	30	52	10	NBR
AS	30	52	10	NBR
A	30	52	10	FKM
AS	30	52	10	FKM
A	30	55	7	NBR
A	30	55	10	NBR
AS	30	55	10	NBR
A	30	55	10	FKM
AS	30	55	10	FKM
A	30	56	10	FKM
A	30	60	10	NBR
A	30	62	7	NBR
AS	30	62	7	NBR
A	30	62	7	FKM
A	30	62	10	NBR
A	30	62	10	FKM
AS	30	72	8	FKM
A	30	72	10	NBR
A	30	85	10	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

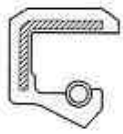
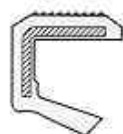
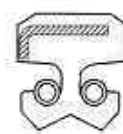
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A	30,16	44,45	6,35	FKM
A	31	47	7	FKM
AS	31,75	41,27	6,35	FKM
A	31,75	44,45	9,52	FKM
A DUO	31,75	44,45	9,52	FKM
DINA	32	42	4	NBR
A	32	42	7	NBR
AS	32	44	8	NBR
DINA	32	45	4	NBR
A	32	45	7	NBR
A	32	45	7	FKM
A	32	45	10	FKM
A	32	47	6	FKM
A	32	47	7	NBR
A	32	47	7	FKM
AS	32	47	10	NBR
A	32	48	8	FKM
A	32	50	8	NBR
A	32	50	10	NBR
A	32	50	10	FKM
A	32	52	7	NBR
AS	32	52	7	NBR
A	32	52	7	FKM
A	32	52	10	NBR
A	32	52	10	FKM
AS	32	54	10	NBR
AS	32	56	10	NBR
A	32	57	9,5	FKM
A	32	62	10	NBR
A	32	70	8	NBR
A	32	70	8	FKM
A	33	45	7	NBR
A	33	45	7	FKM
A	33	50	8	NBR
B	33,4	55	10	FKM
A	34	44	7	FKM
AS	34	48	7	NBR
A	34	49	8	FKM
A	34	50	10	NBR
A	34	52	7,5	FKM
A	34	52	8	NBR
A	34	52	10	NBR
A	34	55	10	FKM
A	34,92	60,32	12,7	NBR
DINA	35	42	4	NBR
DINA	35	42	4	FKM
A	35	44	7	FKM
DINA	35	45	4	NBR
A	35	45	7	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	35	45	7	NBR
A	35	45	7	FKM
A	35	45	10	NBR
A	35	47	4,5	NBR
A	35	47	6	FKM
A	35	47	7	NBR
AS	35	47	7	NBR
A	35	47	7	FKM
AS	35	47	7	FKM
AS P	35	47	10	NBR
A	35	50	7	NBR
A	35	50	7	FKM
A	35	50	8	FKM
A	35	50	10	NBR
A	35	50	10	FKM
AS	35	52	5,5	FKM
AS	35	52	6	NBR
AS	35	52	6	FKM
A	35	52	7	NBR
AS	35	52	7	NBR
A	35	52	7	FKM
A	35	52	10	NBR
A	35	52	10	FKM
AS	35	52	10	FKM
A	35	53	8	NBR
A	35	54	10	FKM
A	35	54	10	NBR
AS	35	55	8	NBR
A	35	55	10	NBR
AS	35	55	10	NBR
A	35	55	10	FKM
A	35	55,5	9	NBR
A	35	56	10	NBR
AS	35	56	10	NBR
A	35	56	10	FKM
A	35	60	10	NBR
A	35	62	7	NBR
AS P	35	62	7	NBR
A	35	62	7	FKM
A	35	62	10	NBR
AS	35	62	10	NBR
A	35	62	10	FKM
A	35	67	7	NBR
A	35	68	6	FKM
AS	35	68	10	NBR
A	35	68	10	FKM
A	35	72	10	NBR
AS	35	72	10	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

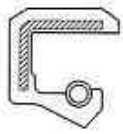
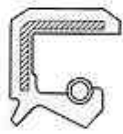
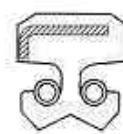
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A	35	72	10	FKM
AS	35	80	10	NBR
A	36	47	7	NBR
A	36	48	10	FKM
A	36	50	7	NBR
A	36	50	7	FKM
A	36	50	10	NBR
A	36	50	10	FKM
AS	36	52	6	FKM
A	36	52	7	NBR
AS	36	52	7	FKM
A	36	54	7,5	FKM
A	36	54	8	NBR
A	36	62	7	NBR
AS	36	62	7	FKM
DINA	37	47	4	NBR
A	37	52	10	FKM
DINA	38	48	4	NBR
A	38	50	7	NBR
A	38	50	7	FKM
A	38	52	7	NBR
AS	38	52	7	NBR
A	38	52	7	FKM
AS	38	52	7	FKM
AS	38	52	10	NBR
A	38	54	6,5	FKM
A	38	55	7	NBR
A	38	55	10	NBR
B	38	55	10	FKM
A	38	56	10	FKM
A	38	60	10	FKM
A	38	62	7	NBR
AS	38	62	7	NBR
AS	38	62	7	FKM
A	38	62	10	NBR
A	38	62	10	FKM
AS	38	62	10	FKM
A	38	65	8	FKM
A	38	72	10	NBR
A	38,1	50,29	12,7	NBR
DINA	40	47	4	NBR
A	40	50	4	NBR
DINA	40	50	4	NBR
AS	40	50	7	NBR
DINA	40	52	5	NBR
A	40	52	6	FKM
A	40	52	7	NBR
AS	40	52	7	NBR
A	40	52	7	FKM

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	40	52	7	FKM
AS	40	55	6	FKM
A	40	55	7	NBR
AS	40	55	7	NBR
A	40	55	7	FKM
AS P	40	55	7	FKM
A	40	55	8	NBR
AS	40	55	8	NBR
A	40	55	8	FKM
AS	40	55	8	FKM
B	40	55	8	NBR
A	40	55	10	NBR
A	40	56	8	NBR
AS	40	56	8	NBR
A	40	56	8	FKM
A	40	56	10	FKM
A	40	58	8	NBR
A	40	58	10	NBR
A	40	58	10	FKM
A	40	60	10	NBR
AS	40	60	10	NBR
A	40	60	10	FKM
AS	40	60	12	NBR
AS P	40	62	6	NBR
A	40	62	7	NBR
AS	40	62	7	NBR
A	40	62	7	FKM
AS	40	62	7	FKM
A	40	62	10	NBR
AS	40	62	10	NBR
A	40	62	10	FKM
A	40	63	10	NBR
A	40	65	10	NBR
A	40	65	10	FKM
AS	40	65	12	NBR
A	40	68	8	NBR
A	40	68	10	NBR
A	40	68	10	FKM
AS	40	68	10	FKM
A	40	70	10	NBR
A	40	72	7	NBR
A	40	72	7	FKM
A	40	72	10	NBR
A	40	72	10	FKM
AS	40	72	10	FKM
A	40	80	10	NBR
AS	40	80	10	NBR
A	40	80	10	FKM
AS	40	80	10	FKM

**A****AS****B****C****DINA****D5****A DUO****AS P**

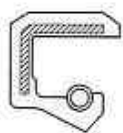
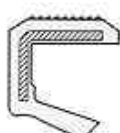
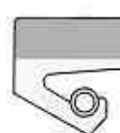
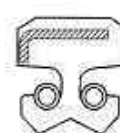
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AS	40	80	12	NBR
A	40	85	10	FKM
A	40	90	10	NBR
AS	40	90	12	FKM
A	40,08	50,85	4,1	NBR
AS	41,28	63,5	12,7	NBR
DINA	42	52	4	NBR
A	42	55	7	NBR
AS	42	55	7	FKM
A	42	55	8	NBR
A	42	55	8	FKM
B	42	55	8	NBR
A	42	56	7	NBR
AS	42	56	7	NBR
A	42	56	7	FKM
A	42	58	7	NBR
A	42	58	10	NBR
A	42	60	10	NBR
A	42	60	12	FKM
A	42	62	7	NBR
A	42	62	7	FKM
A	42	62	8	NBR
A	42	62	8	FKM
AS	42	62	8	FKM
A	42	62	10	NBR
A	42	62	10	FKM
A	42	65	10	NBR
A	42	65	10	FKM
AS	42	66	8	NBR
A	42	72	7	NBR
A	42	72	8	NBR
A	42	72	10	NBR
A	42	72	10	FKM
A	42	80	10	NBR
B	42,8	80	10	FKM
DINA	43	53	4	NBR
A	43	70	12	FKM
AS	44	62	10	NBR
A	44	65	10	FKM
B	44	80	10	FKM
A	44,45	63,5	9,52	FKM
DINA	45	52	4	NBR
A	45	55	4	NBR
DINA	45	55	4	NBR
A	45	55	7	NBR
A	45	55	7	FKM
AS	45	57	9	NBR
AS	45	58	7	NBR
A	45	60	7	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	45	60	7	FKM
A	45	60	8	NBR
A	45	60	8	FKM
A	45	60	10	NBR
A	45	60	10	FKM
AS P	45	62	7	NBR
A	45	62	7	FKM
AS	45	62	7	FKM
A	45	62	8	NBR
A	45	62	8	FKM
AS	45	62	8	FKM
A	45	62	10	NBR
A	45	62	10	FKM
A	45	62	12	FKM
A	45	65	8	NBR
AS	45	65	8	NBR
A	45	65	8	FKM
A	45	65	10	NBR
AS	45	65	10	NBR
A	45	65	10	FKM
A	45	66	6	FKM
A	45	66	10	NBR
A	45	68	10	NBR
A	45	68	10	FKM
A	45	70	12	FKM
A	45	72	7	NBR
A	45	72	8	NBR
AS	45	72	8	NBR
A	45	72	8	FKM
AS	45	72	8	FKM
A	45	72	10	NBR
A	45	72	10	FKM
A	45	72	12	NBR
A	45	75	8	NBR
AS	45	75	8	NBR
A	45	75	10	FKM
AS	45	75	10	FKM
A	45	80	10	NBR
AS	45	80	10	NBR
A	45	80	10	FKM
AS	45	80	10	FKM
A	45	80	13	NBR
A	45	85	10	NBR
AS	45	85	10	NBR
AS	45	85	10	FKM
AS	46	60	10	NBR
A	46	64	8	NBR
AS	46	64	14	NBR
A	47	58	6	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

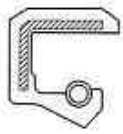
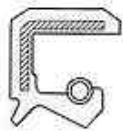
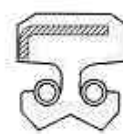
Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	47	58	6	FKM
A	47	80	10	FKM
A	47,63	69,85	12,7	FKM
AS	48	58	4	NBR
A	48	62	8	NBR
A	48	62	8	FKM
A	48	65	10	NBR
AS	48	65	10	NBR
A	48	65	10	FKM
AS	48	65	10	FKM
AS	48	68	10	NBR
B	48	68	10	FKM
AS	48	70	10	NBR
A	48	72	8	NBR
A	48	72	8	FKM
AS	48	72	8	FKM
A	48	72	10	NBR
A	48	72	10	FKM
AS	48	72	12	NBR
A	48	80	10	NBR
A	48	80	10	FKM
A	49	65	10	NBR
AS	49,2	76,2	12,7	NBR
B	49,22	69,85	9,52	NBR
DINA	50	58	4	NBR
A	50	60	7	FKM
A	50	62	5	NBR
DINA	50	62	5	NBR
A	50	62	7	FKM
A	50	62	10	NBR
A	50	65	8	NBR
AS	50	65	8	NBR
A	50	65	8	FKM
AS	50	65	8	FKM
A	50	65	10	NBR
A	50	68	8	NBR
AS	50	68	8	NBR
A	50	68	8	FKM
AS	50	68	8	FKM
A	50	68	10	NBR
AS	50	68	10	NBR
A	50	68	10	FKM
A	50	70	10	NBR
AS	50	70	10	NBR
A	50	70	10	FKM
A	50	70	12	FKM
AS P	50	72	7	NBR
AS	50	72	7	FKM
A	50	72	8	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	50	72	8	FKM
AS	50	72	8	FKM
A	50	72	10	NBR
AS	50	72	10	NBR
A	50	72	10	FKM
AS	50	72	10	FKM
AS	50	72	12	NBR
A	50	72	12	FKM
A DUO	50	72	14	NBR
B	50	75	10	FKM
AS	50	75	12	NBR
A	50	80	8	NBR
AS	50	80	8	NBR
A	50	80	8	FKM
AS	50	80	8	FKM
A	50	80	10	NBR
A	50	80	10	FKM
AS	50	80	13	FKM
AS	50	80	13	NBR
A	50	90	10	NBR
AS	50	90	10	NBR
A	50	90	10	FKM
A	50,8	63,5	6,35	FKM
A	50,8	69,85	9,52	FKM
A	52	62	8	NBR
A	52	62	8	FKM
A	52	68	8	NBR
A	52	68	8	FKM
A	52	69	10	FKM
A	52	72	8	NBR
A	52	72	8	FKM
AS	52	72	8	FKM
A	52	72	10	FKM
AS	52	72	12	NBR
A	52	75	12	NBR
A	52	75	12	FKM
A	52	85	10	NBR
A	53,97	79,37	12,7	FKM
A	54	70	12	FKM
A	54	72	12	FKM
A	54	74	8	NBR
AS	54	81	10	NBR
AS	54	85	10	NBR
A	54	85	10	FKM
A	54	90	10	FKM
A	54	90	13	NBR
A	54	90	13	FKM
DINA	55	63	5	NBR
A	55	68	8	FKM

**A****AS****B****C****DINA****D5****A DUO****AS P**

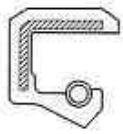
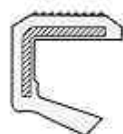
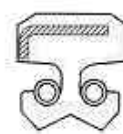
Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	55	70	8	NBR
A	55	70	8	FKM
AS	55	70	8	FKM
A	55	70	10	NBR
A	55	70	10	FKM
A	55	72	8	NBR
AS	55	72	8	NBR
A	55	72	8	FKM
AS	55	72	8	FKM
A	55	72	10	NBR
A	55	72	10	FKM
AS	55	72	10	FKM
A	55	75	10	NBR
A	55	75	10	FKM
A	55	75	12	NBR
A	55	75	12	FKM
AS	55	78	12	FKM
A	55	80	6	NBR
A	55	80	8	NBR
A	55	80	8	FKM
A	55	80	10	NBR
A	55	80	10	FKM
AS	55	80	10	FKM
A	55	85	8	NBR
AS	55	85	10	NBR
A	55	90	8	NBR
AS	55	90	8	NBR
A	55	90	10	NBR
A	55	90	10	FKM
A	55	100	12	NBR
A	55	100	13	NBR
AS	56	69	10	NBR
A	56	70	8	NBR
A	56	70	8	FKM
A	56	72	8	NBR
A	56	80	8	NBR
A	56	80	12	FKM
A	56	85	8	NBR
A	56	85	8	FKM
A	56	90	10	NBR
B	57	80	10	FKM
A	57,15	82,55	12,7	FKM
A	57,94	84,93	7,93	NBR
A	58	72	8	NBR
A	58	72	8	FKM
A	58	72	10	FKM
A	58	72	10	NBR
A	58	75	8	FKM
A	58	75	10	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	58	78	13	FKM
A	58	80	8	NBR
A	58	80	8	FKM
AS	58	80	9	FKM
A	58	80	10	NBR
AS	58	80	10	NBR
A	58	80	10	FKM
AS P	58	80	10	FKM
A	58	90	10	NBR
A	60	70	7	NBR
A	60	72	8	FKM
A	60	75	8	NBR
AS	60	75	8	NBR
A	60	75	8	FKM
AS	60	75	8	FKM
A	60	75	10	FKM
A	60	78	10	FKM
A	60	80	5	NBR
AS	60	80	7	NBR
AS P	60	80	7	FKM
A	60	80	8	NBR
A	60	80	8	FKM
AS	60	80	8	FKM
A	60	80	10	NBR
AS	60	80	10	NBR
A	60	80	10	FKM
AS	60	80	10	FKM
A DUO	60	80	10	NBR
A	60	80	12	NBR
A	60	80	12	FKM
AS	60	80	12	FKM
A	60	80	13	NBR
A	60	82	12	NBR
A	60	85	8	NBR
A	60	85	8	FKM
A	60	85	10	NBR
AS	60	85	10	NBR
A	60	85	10	FKM
AS	60	85	10	FKM
AS	60	85	10	FKM
AS	60	85	12	NBR
A	60	90	8	NBR
A	60	90	8	FKM
A	60	90	10	NBR
A	60	90	10	FKM
AS	60	90	10	FKM
A	60	90	13	FKM
A	60	95	10	FKM
A	60	95	12	FKM
A	60	110	13	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	60	110	13	FKM
A	61,91	95,73	12,7	FKM
A	62	76	10	FKM
AS	62	80	10	NBR
A	62	80	10	FKM
A	62	85	10	NBR
A	62	85	10	FKM
AS	62	85	12	NBR
A	62	85	12	FKM
A	62	90	10	NBR
A	62	95	10	NBR
A	62	100	12	NBR
A	62	110	13	NBR
AS	63	80	9	NBR
A	63	85	10	NBR
A	63	85	10	FKM
AS	63	85	10	FKM
A	63	90	10	NBR
A	63,5	73,03	6,35	FKM
A	63,5	82,55	9,52	FKM
A	63,5	88,9	11,11	FKM
A	64	80	8	NBR
A	65	80	8	NBR
A	65	80	8	FKM
AS	65	80	8	FKM
AS	65	80	10	NBR
AS	65	80	10	FKM
A	65	85	5	NBR
A	65	85	8	FKM
A	65	85	10	NBR
AS	65	85	10	NBR
A	65	85	10	FKM
A	65	85	12	NBR
AS	65	85	13	FKM
A	65	90	10	NBR
AS	65	90	10	NBR
A	65	90	10	FKM
AS	65	90	10	FKM
AS	65	90	12	NBR
A	65	95	10	NBR
A	65	95	10	FKM
AS	65	95	13	NBR
A	65	100	10	NBR
AS	65	100	10	NBR
A	65	100	10	FKM
A	65	125	12	NBR
A	65,08	85,72	9,5	NBR
A	66,68	85,73	9,53	FKM
A	66,68	92,02	11,9	FKM

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	68	90	10	NBR
AS	68	90	10	NBR
A	68	90	10	FKM
AS	68	90	10	FKM
A	68	100	10	NBR
A	68	100	10	FKM
A	69,85	88,9	9,53	FKM
DINA	70	78	5	NBR
A	70	85	7	FKM
A	70	85	8	NBR
A	70	85	8	FKM
A	70	85	10	NBR
A	70	88	9	FKM
A	70	90	5	NBR
AS P	70	90	7	NBR
AS	70	90	7	NBR
A	70	90	10	NBR
AS	70	90	10	NBR
A	70	90	10	FKM
AS	70	90	10	FKM
A DUO	70	90	10	FKM
A	70	90	12	NBR
A	70	90	12	FKM
A	70	90	13	FKM
A DUO	70	90	13	FKM
A	70	92	12	NBR
A	70	95	10	NBR
A	70	95	10	FKM
A	70	95	13	NBR
AS	70	100	8	FKM
A	70	100	10	NBR
AS	70	100	10	NBR
A	70	100	10	FKM
AS	70	100	10	FKM
A	70	100	12	FKM
A	70	100	13	FKM
AS	70	110	10	NBR
A	70	110	10	FKM
A	70	110	12	NBR
A	70	120	12	NBR
AS	71	88	8	NBR
A	72	85	10	NBR
A	72	85	10	FKM
A	72	90	10	NBR
A	72	90	10	FKM
A	72	95	10	NBR
A	72	95	10	FKM
A	72	95	12	NBR
AS	72	95	13	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	72	96	9	NBR
A	72	100	10	NBR
A	72	110	12	NBR
B	73	95	10	FKM
A	75	90	8	NBR
AS	75	90	8	NBR
A	75	90	8	FKM
A	75	90	10	NBR
A	75	90	10	FKM
A	75	95	5	NBR
AS	75	95	9	NBR
A	75	95	10	NBR
A	75	95	10	FKM
AS	75	95	10	FKM
A	75	95	12	NBR
A	75	95	12	FKM
A	75	95	13	NBR
A	75	100	10	NBR
AS	75	100	10	NBR
A	75	100	10	FKM
AS	75	100	10	FKM
A	75	100	12	FKM
A	75	100	13	NBR
A	75	105	12	NBR
A	75	110	12	NBR
AS	75	110	12	NBR
A	75	110	12	FKM
A	75	110	13	FKM
A	75	120	12	NBR
A	76,2	107,95	12,7	FKM
A	77,78	114,3	12,7	FKM
A	78	100	10	NBR
A	78	100	10	FKM
A	78	110	12	NBR
A	78	110	12	FKM
A	80	95	8	NBR
A	80	100	7	NBR
AS P	80	100	7	NBR
AS	80	100	7	NBR
A	80	100	10	NBR
AS	80	100	10	NBR
A	80	100	10	FKM
AS	80	100	10	FKM
D5	80	100	10	NBR
A DUO	80	100	12	NBR
AS	80	100	13	NBR
AS	80	100	13	FKM
A DUO	80	100	14	FKM
A	80	105	10	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	80	105	12	FKM
B	80	105	13	NBR
A	80	110	10	NBR
AS	80	110	10	NBR
AS	80	110	10	FKM
A	80	110	12	FKM
A	80	115	12	FKM
A	80	140	12	NBR
AS	80,96	120,65	12,7	NBR
A	82	105	12	NBR
A	85	95	8	NBR
A	85	105	10	NBR
A	85	105	13	NBR
A	85	110	7	NBR
A	85	110	12	NBR
AS	85	110	12	NBR
A	85	110	12	FKM
AS	85	110	12	FKM
B	85	110	13	NBR
BS	85	110	13	FKM
AS P	85	120	7,5	NBR
AS P	85	120	7,5	FKM
A	85	120	12	NBR
A	85	120	12	FKM
AS	85	120	12	FKM
AS	85	125	13	NBR
A	85	126	12	NBR
A	85	130	12	NBR
AS	85	130	12	NBR
AS	85	130	13	FKM
A	85	140	12	NBR
A	86	100	7	FKM
A	88	110	12	NBR
A	88,9	127	12,7	NBR
A	90	105	10	NBR
A	90	110	7	NBR
A	90	110	10	NBR
A	90	110	12	NBR
AS	90	110	12	NBR
A	90	110	12	FKM
AS	90	110	12	FKM
A	90	110	13	NBR
AS	90	110	13	FKM
A	90	115	9	NBR
A	90	115	9	FKM
A	90	115	13	NBR
AS	90	117,5	12,5	FKM
A	90	120	12	NBR
A	90	120	12	FKM



A



AS



B



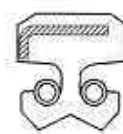
C



DINA



D5



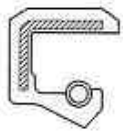
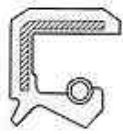
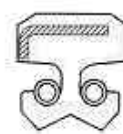
A DUO



AS P

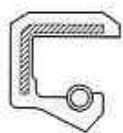
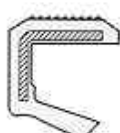
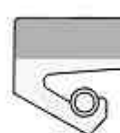
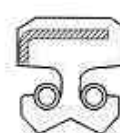
Reference	int. \AA	ext. \AA	Height	Material
A	90	120	13	NBR
A	90	120	13	FKM
A	90	130	12	NBR
A	92	120	13	NBR
A	92	120	13	FKM
D5	92,07	117,47	12,7	NBR
A	93	115	13	FKM
B	95	110	9	FKM
A	95	110	10	NBR
A	95	110	10	FKM
A	95	115	12	NBR
AS	95	115	13	FKM
A	95	120	7	NBR
A	95	120	12	NBR
A	95	120	12	FKM
AS	95	120	13	FKM
AS	95	120	15	NBR
A	95	125	12	NBR
AS	95	125	12	NBR
A	95	125	12	FKM
AS	95	125	12	FKM
AS	95	125	13	FKM
A	96	112	10	NBR
AS	100	115	9	FKM
A	100	120	12	NBR
AS	100	120	12	NBR
A	100	120	12	FKM
AS	100	120	12	FKM
A	100	120	13	FKM
A DUO	100	120	13	FKM
A	100	125	12	NBR
A	100	125	12	FKM
A	100	125	13	FKM
A	100	130	12	NBR
AS	100	130	12	NBR
A	100	130	12	FKM
AS	100	130	12	FKM
A DUO	100	130	13	NBR
A DUO	100	130	13	FKM
A	100	130	14	NBR
A	100	130	14	FKM
A	100	135	13	NBR
A	104	120	13	FKM
A	104,77	136,39	12,7	FKM
A	105	125	13	NBR
AS	105	125	13	NBR
A	105	125	13	FKM
AS	105	125	13	FKM
A	105	130	12	NBR

Reference	int. \AA	ext. \AA	Height	Material
AS	105	130	12	NBR
A	105	130	12	FKM
AS	105	130	13	FKM
A	105	130	15	NBR
A	105	130	15	FKM
A	105	140	12	NBR
A	105	140	12	FKM
D5	105	140	12	NBR
A	110	130	8	NBR
A	110	130	8	FKM
A	110	130	12	NBR
A	110	130	12	FKM
AS	110	130	12	FKM
A	110	130	13	NBR
A	110	130	13	FKM
A	110	130	14,5	NBR
A	110	130	14,5	FKM
A	110	140	10	NBR
A	110	140	12	NBR
A	110	140	12	FKM
AS	110	140	12	FKM
A	110	140	13	NBR
A	110	140	13	FKM
AS	110	145	13	FKM
B	110	145	15	FKM
D5	110	150	16	NBR
A	112	140	13	NBR
A	115	135	9	FKM
A	115	140	10	NBR
A	115	140	10	FKM
A	115	140	12	NBR
AS	115	140	12	NBR
A	115	140	12	FKM
AS	115	140	12	FKM
AS	115	140	16	NBR
A	115	150	12	NBR
A	115	150	12	FKM
AS	118	148	15	NBR
A DUO	118	150	15	FKM
A	120	140	10	FKM
A	120	140	13	NBR
AS P	120	140	13	NBR
A	120	140	13	FKM
AS P	120	140	13	FKM
A	120	150	12	NBR
AS	120	150	12	NBR
A	120	150	12	FKM
AS	120	150	12	FKM
D5	120	150	12,5	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

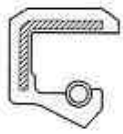
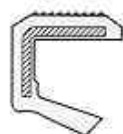
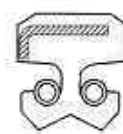
Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	120	150	13	NBR
A	120	150	13	FKM
AS	120	150	15	NBR
AS	120	150	15	FKM
A	120	160	12	NBR
A	120	160	12	FKM
A	120	160	15	NBR
A	120	160	15	FKM
A	125	140	10	NBR
A	125	140	10	FKM
A	125	150	12	NBR
AS	125	150	12	NBR
A	125	150	12	FKM
AS	125	150	12	FKM
A	125	155	12	NBR
AS	125	155	12	NBR
A	125	155	12	FKM
AS	125	155	12	FKM
A	125	160	12	NBR
A	125	160	12	FKM
AS	126	146	10	NBR
A	127	152,4	12,7	NBR
A	127	152,4	12,7	FKM
A	128	150	13	NBR
A	128	150	13	FKM
A	128	158	20	FKM
A	130	150	10	NBR
A	130	150	10	FKM
AS	130	150	12	NBR
AS	130	150	12	FKM
AS	130	150	15	NBR
AS	130	155	12	NBR
A	130	160	12	NBR
A	130	160	12	FKM
AS	130	160	12	FKM
A	130	160	13	NBR
A	130	160	13	FKM
A	130	160	15	NBR
AS	130	160	15	NBR
A	130	160	15	FKM
AS	130	160	15	FKM
A	130	165	15	NBR
A	130	170	12	NBR
A	130	170	12	FKM
A	130	170	13	NBR
A	130	170	13	FKM
A	132,5	155,6	13	NBR
B	134,54	155,57	9,52	NBR
A	135	160	12	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	135	160	12	FKM
AS	135	160	15	FKM
A	135	170	12	NBR
A	135	170	12	FKM
A	138	160	15	NBR
A	138	160	15	FKM
B	140	160	13	NBR
A	140	165	12	NBR
A	140	165	15	NBR
A	140	170	12	NBR
AS	140	170	12	NBR
A	140	170	12	FKM
AS	140	170	12	FKM
A	140	170	15	NBR
A	140	170	15	FKM
D5	140	175	16	NBR
A	140	180	12	NBR
A	140	180	12	FKM
A	140	180	13	NBR
A	140	180	13	FKM
A	140	180	15	NBR
A	140	180	15	FKM
A	140	180	15	FKM
A	144	160	12	NBR
B	144	160	12	NBR
A	145	175	15	NBR
A	145	175	15	FKM
A	145	180	12	NBR
A	145	180	12	FKM
A	145	180	13	NBR
A	145	180	13	FKM
A	145	180	14	NBR
A	145	180	14	FKM
A	148	170	14,5	NBR
A	148	170	14,5	FKM
A	150	170	12	NBR
A	150	170	12	FKM
A	150	180	12	NBR
A	150	180	12	FKM
A	150	180	13	NBR
AS	150	180	13	NBR
A	150	180	13	FKM
D5	150	180	13	NBR
A	150	180	15	NBR
A	150	180	15	FKM
AS	150	180	18	NBR
AS	152,4	187,32	19	NBR
AS	155	174	12	NBR
A	155	175	12	NBR
AS	155	185	15	FKM

**A****AS****B****C****DINA****D5****A DUO****AS P**

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
D5	155	195	16	NBR
D5	155	195	16	FKM
A	160	185	10	NBR
A	160	185	10	FKM
AS P	160	190	8	FKM
A	160	190	15	NBR
AS	160	190	15	NBR
A	160	190	15	FKM
AS	160	190	15	FKM
A	160	200	12	NBR
B	160	200	15	FKM
A	165	190	13	NBR
A	165	190	13	FKM
A	165	200	15	NBR
A	170	190	15	NBR
A	170	190	15	FKM
A	170	200	12	NBR
A	170	200	12	FKM
A	170	200	15	NBR
AS	170	200	15	NBR
A	170	200	15	FKM
AS	170	200	15	FKM
D5	170	200	15	NBR
D5	170	210	16	NBR
A	175	200	15	NBR
A	175	200	15	FKM
A	175	210	14	NBR
A	175	210	14	FKM
A	180	200	13	NBR
A	180	200	13	FKM
AS	180	200	16	FKM
A	180	210	15	NBR
AS	180	210	15	NBR
A	180	210	15	FKM
AS	180	210	15	FKM
A	180	215	16	NBR
A	180	215	16	FKM
A	180	220	15	NBR
A	180	220	15	FKM
A	184,15	222,25	14,2	FKM
A	184,15	222,25	14,5	NBR
A	185	210	13	FKM
A	185	215	16	NBR
D5	185	216,8	15,9	NBR
AS	190	215	16	NBR
A	190	220	15	NBR
A	190	220	15	FKM
A	190	225	16	NBR
AS	190	225	16	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	190	225	16	FKM
AS	190	230	16	NBR
D5	190	230	16	NBR
B	199	241,3	14	NBR
A	200	225	15	NBR
A	200	225	15	FKM
A	200	230	13	NBR
A	200	230	13	FKM
A	200	230	15	NBR
AS	200	230	15	NBR
A	200	230	15	FKM
AS	200	230	15	FKM
D5	200	240	16	NBR
D5	200	240	16	FKM
A	200	250	15	NBR
A	200	250	15	FKM
A	205	230	16	NBR
A	205	230	16	FKM
A	210	240	15	NBR
A	210	240	15	FKM
A	210	250	15	NBR
A	210	250	15	FKM
A	210	250	15	FKM
A	210	290	20	NBR
AS	210	290	20	NBR
A	210	290	20	FKM
AS	210	290	20	FKM
A	220	250	15	NBR
AS	220	250	15	NBR
A	220	250	15	FKM
A	220	255	16	NBR
A	220	260	16	NBR
A	220	260	16	FKM
D5	220	260	16	NBR
D5	220	270	16	FKM
D5	227	277,81	25,4	NBR
A	230	260	15	NBR
AS	230	260	15	NBR
A	230	260	15	FKM
AS	230	260	15	FKM
D5	230	270	16	NBR
A	230	280	15	NBR
A	230	280	15	FKM
A	240	270	15	NBR
A	240	270	15	FKM
D5	240	270	15	FKM
A	240	275	16	NBR
A	240	280	15	NBR
A	240	280	15	FKM
A	250	280	15	NBR

**A****AS****B****C****DINA****D5****A DUO****AS P**

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
A	250	280	15	FKM
A	260	300	20	NBR
A	260	300	20	FKM
D5	260	300	20	NBR
A	265	290	16	NBR
A	265	290	16	FKM
D5	265	315	18	NBR
D5	270	310	20	NBR
A	280	310	15	NBR
A	280	310	15	FKM
A	280	320	20	NBR
A	280	320	20	FKM
AS	280	320	20	FKM
D5	280	320	20	NBR
A	280	350	16	FKM
A	300	340	18	NBR
A	300	340	18	FKM
D5	300	340	18	NBR
C	310	350	18	FKM
D5	315	360	16	NBR
A	320	360	20	NBR
A	320	360	20	FKM
C	320	360	20	NBR
D5	330	374	20	FKM
A	340	380	18	NBR
A	340	380	18	FKM
A	350	390	18	NBR
A	350	390	18	FKM
A	370	410	15	NBR
A	370	410	15	FKM
D5	370	410	20	NBR
A	380	420	20	NBR
AS	380	420	20	NBR
A	380	420	20	FKM
AS	380	420	20	FKM
D5	380	440	25	NBR
A	390	430	20	NBR
A	390	430	20	FKM
A	394	420	16	NBR
AS	394	420	16	NBR
A	394	420	16	FKM
A	400	440	20	NBR
A	400	440	20	FKM
A P	400	450	25	NBR
D5	406,4	457,2	22,2	NBR
A	420	460	20	NBR
A	420	460	20	FKM
C	420	460	20	NBR
AS	420	470	20	NBR

Reference	int. \bar{A}	ext. \bar{A}	Height	Material
AS	420	470	20	FKM
A	440	480	20	NBR
A	440	480	20	FKM
A	450	500	22	NBR
A	450	500	22	FKM
A	480	520	20	NBR
A	480	520	20	FKM
A	500	540	20	NBR
AS	500	540	20	NBR
A	500	540	20	FKM
AS	500	540	20	FKM
D5	510	560	22	NBR
D5	560	610	22	FKM

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