

BROCHURE OIL-SEALS

SECOND EDITION, 2021

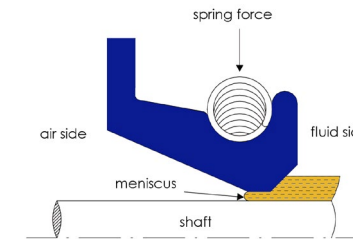
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OIL-SEALS

DESCRIPTION OF OIL SEALS

Oil seals, radial shaft seals or Simmerrings® have been designed for sealing shafts and spindles. Oil seals are one of the most frequently used rotary shaft seals. They separate oil or grease on the inside from dirt, dust and/or water on the outside. Most commonly, Oil-seals consist of a rubber sealing lip, a metal housing and a helical tensioned spring. NewDealSeals supplies various types of oil seals, both with and without dust lip, in accordance with DIN3760/3761 and ISO 6194. Standard available in NBR/Steel and FKM/Stainless steel. Besides the standardized sizes, NewDealSeals also designs special and custom oil-seals.



KEY FEATURES

- > Easy to install
- > Economical sealing solution

SUITABLE

- > Rotating applications

NOT SUITABLE

- > Dry running applications
- > High pressure applications (Pressure should be less than 0,5 [bar for most types] Special types available up to 2 [bar])

HOW DO OIL SEALS WORK?

The common radial oil seals works by creating a thin layer of oil between the rubber sealing lip and the shaft which results in the oil lifting the sealing lip clear of the shaft. This thin layer of oil performs a barrier and prevents leakage of the oil past the sealing lip. For this reason rubber oil seals are not suitable for dry running applications or high pressure.

TECHNICAL SPECIFICATIONS

MOVEMENT TYPE

Rotating

AVAILABLE MATERIALS

NBR,FKM,VMQ

AVAILABLE SIZES

Any size available upon request

HARDNESS RANGE

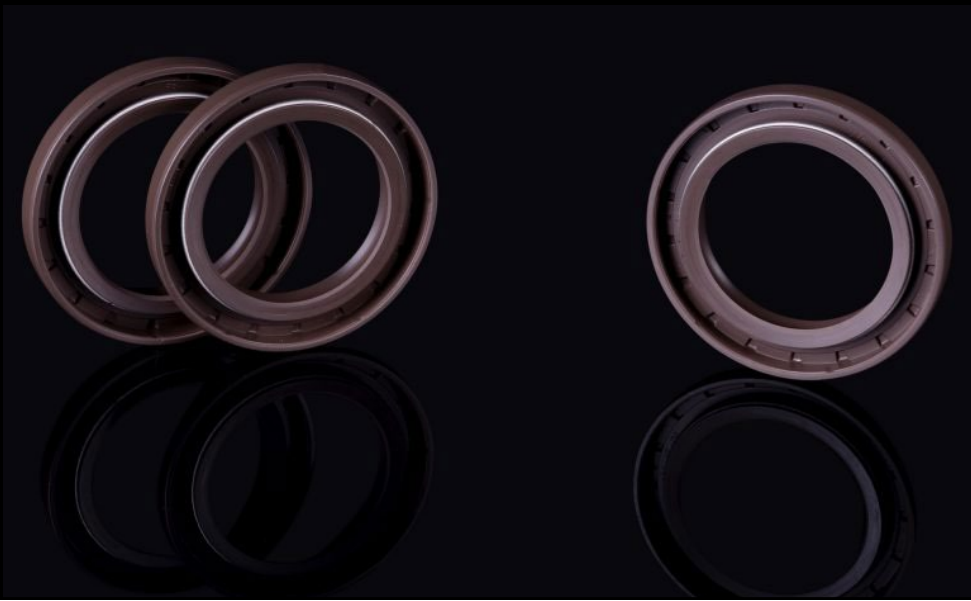
Shore 70

AVAILABLE STANDARDS

DIN 3760 DIN 3761

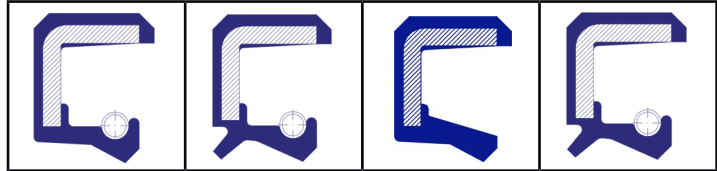
AVAILABLE COMPLIANCES

KTW, USP, NSF 51 61, WRC, WRAS, FDA, R67 01

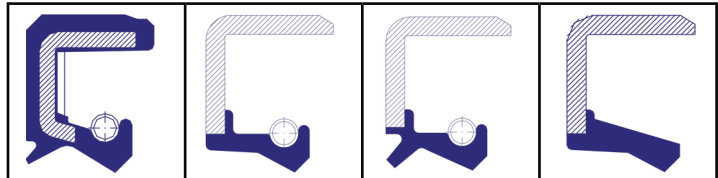




OIL SEALS TYPES



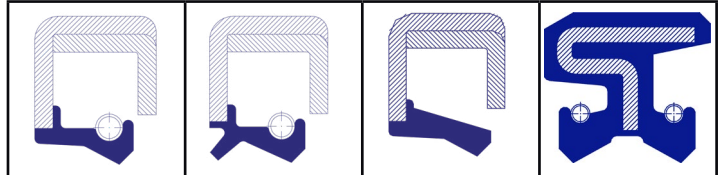
type	A	AS	AO	AS-P
movement type rotating	✓	✓	✓	✓
max. pressure	0.5 [bar]	0.5 [bar]	0[bar]	2[bar]
Pressure direction Single direction Bi-redirectional	✓ ✗	✓ ✗	✓ ✗	✓ ✗
max. speed FKM NBR	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]
dust lip	✗	✓	✗	✓
garter spring	✓	✓	✗	✓
rubber covered	✓	✓	✓	✓



type	AS-PX	B	BS	BO
movement type rotating	✓	✓	✓	✓
max. pressure	5 [bar]	0.5 [bar]	0.5[bar]	0[bar]
Pressure direction Single direction Bi-redirectional	✓ ✗	✓ ✗	✓ ✗	✓ ✗
max. speed FKM NBR	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]
dust lip	✓	✗	✓	✗
garter spring	✓	✓	✓	✗
rubber covered	✓	✗	✗	✗



OIL SEALS TYPES



type	C	CS	C-O	A-DUO
movement type rotating	✓	✓	✓	✓
max. pressure	0.5 [bar]	0.5 [bar]	0 [bar]	0.3 [bar]
Pressure direction Single direction Bi-directional	✓ ✗	✓ ✗	✓ ✗	✓ ✗
max. speed FKM NBR	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]	30 [m/s] 10 [m/s]	10 [m/s] 10 [m/s]
dust lip	✗	✓	✗	✗
garter spring	✓	✓	✗	✓
rubber covered	✗	✗	✗	✓

*The seal should not be exposed to the max. temperature and the max. speed at the same time.



OIL SEALS STANDARD MATERIAL OPTIONS

The list below shows our standard material options for Oil Seals.

Oil Seals of NewDealSeals can be made in any other material/specifications based on your requirements. Questions? please contact us: sales@newdealseals.com

MATERIAL/SPEC	NBR	FKM
standard colour	black (N70N00E)	brown(V70M00E)
standard hardness	70 [shore A]	70 [shore A]
temp range min. max.	-35 [°C] +100 [°C]	-25 [°C] +200 [°C]
performs well in	<ul style="list-style-type: none"> > petroleum oils and fuels > silicone oils & greases > ethylene glycol > dilute acids > water below 100 [°C] 	<ul style="list-style-type: none"> > acids > gasoline > low outgassing applications > petroleum products > silicone fluids & solvens > solvents
does not perform well in	<ul style="list-style-type: none"> > ozone > strong acids > ketones > automotive brake fluids > aromatic hydrocarbons 	<ul style="list-style-type: none"> > amines > hot hydrofluoric acid > hydrocarbons > ketones > low temperatures

* this is a generic chart only showing a few key features of the standard materials. For more information about materials of our Oil Seals please look at our chemical resistance chart or contact a technical expert: engineering@newdealseals.com



OIL SEAL INTERCHANGE TABLE

NDS TYPE	A	AS	AS-P	A-O	A-DUO	B	BS	C	CS
DIN 3760	A	AS	-	-	-	B	BS	C	CS
Simrit-Freudenberg	BA	BASL	BABSL	BAOF	BADUO	B1	B1SL	B2	B2SL
Goetze	827N	827S	827SK	827NO	827D	822N	822S	824N	824S
Kako	DG	DGS	DGSP	DE	DGD	DF	DFS	DFK	DFSK
Simmerwerke	A	ASL	-	AOF	ADUO	B	BSL	C	CSL
Stefa	CB	CC	CF	CD	CK	BB	BC	DB	DC
Pioneer Weston	R21	R23	-	R26	R22	R4	R6	R1	-
Paulstra	IE	IEL	-	IO	IELR	EE	EEL	EEP	-
National	35	32	-	-	-	48	47	45	41
NOK	SC	TC	TCN	VC	DC	SB	TB	SA	TA
Dichtomatik	WA	WAS	WASY	WAO	WAD	WB	WBS	WC	WCS
Eriks	R	RST	-	-	-	M	MST	GV	GVST



SHAFT SEAL TYPE A

The type A shaft seal according to DIN3760 is the most commonly used oil seal for low pressure radial sealing. The rubber covered housing provides good sealing capacity even with rough housing bores.



Product specifications

type	A
movement type rotating	✓
max. pressure	0.5 [bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30[m/s] 10 [m/s]
dust lip	✗
garter spring	✓
rubber covered	✓

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us:
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KEY FEATURES

- > Rubber covered housing for improved sealing in the housing bore
- > Garter spring for improved sealing capacity on shaft.

MOVEMENT TYPE

- > Rotary

SUITABLE

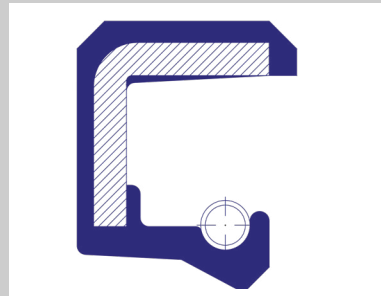
Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE

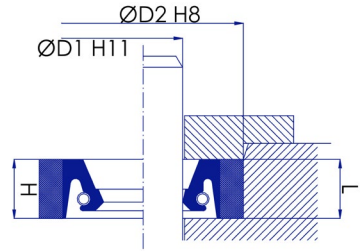
DIN3760



cross section drawing



SIZE CHART DIN DIMENSIONS
Other sizes available upon request

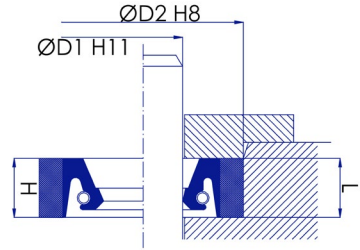


shaft diameter D1 [mm]	D2 [mm]	H (SEAL) [mm]	L (groove) [mm]
ø6	16	7	>7.3
ø6	22	7	>7.3
ø7	22	7	>7.3
ø8	22	7	>7.3
ø8	24	7	>7.3
ø9	22	7	>7.3
ø10	22	7	>7.3
ø10	25	7	>7.3
ø10	26	7	>7.3
ø12	22	7	>7.3
ø12	25	7	>7.3
ø12	30	7	>7.3
ø14	24	7	>7.3
ø14	30	7	>7.3
ø15	26	7	>7.3
ø16	30	7	>7.3
ø16	35	7	>7.3
ø18	30	7	>7.3
ø18	35	7	>7.3
ø20	30	7	>7.3
ø20	35	7	>7.3

shaft diameter D1 [mm]	D2 [mm]	H (SEAL) [mm]	L (groove) [mm]
ø20	40	7	>7.3
ø22	35	7	>7.3
ø22	40	7	>7.3
ø22	47	7	>7.3
ø25	35	7	>7.3
ø25	40	7	>7.3
ø25	47	7	>7.3
ø25	52	7	>7.3
ø28	40	7	>7.3
ø28	47	7	>7.3
ø28	52	7	>7.3
ø30	40	7	>7.3
ø30	42	7	>7.3
ø30	47	7	>7.3
ø30	52	7	>7.3
ø32	45	7	>7.3
ø32	47	7	>7.3
ø32	52	7	>7.3
ø32	45	8	>8.3
ø32	47	8	>8.3
ø32	52	8	>8.3



SIZE CHART DIN DIMENSIONS
Other sizes available upon request

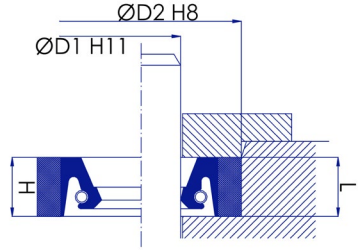


shaft diameter D1 [mm]	D2 [mm]	H (SEAL) [mm]	L (groove) [mm]
Ø35	47	7	>7.3
Ø35	50	7	>7.3
Ø35	52	7	>7.3
Ø35	55	7	>7.3
ØØ35	47	8	>8.3
Ø35	50	8	>8.3
Ø35	52	8	>8.3
Ø35	55	8	>8.3
Ø38	55	7	>7.3
Ø38	62	7	>7.3
Ø38	55	8	>8.3
Ø38	62	8	>8.3
Ø40	52	7	>7.3
Ø40	55	7	>7.3
Ø40	62	7	>7.3
Ø40	52	8	>8.3
Ø40	55	8	>8.3
Ø40	62	8	>8.3
Ø42	55	8	>8.3
Ø42	62	8	>8.3
Ø45	60	8	>8.3

shaft diameter D1 [mm]	D2 [mm]	H (SEAL) [mm]	L (groove) [mm]
Ø45	62	8	>8.3
Ø45	65	8	>8.3
Ø48	62	8	>8.3
Ø50	65	8	>8.3
Ø50	68	8	>8.3
Ø50	72	8	>8.3
Ø55	70	8	>8.3
Ø55	72	8	>8.3
Ø55	80	8	>8.3
Ø60	75	8	>8.3
Ø60	80	8	>8.3
Ø60	85	8	>8.3
Ø65	85	10	>10.3
Ø65	90	10	>10.3
Ø70	90	10	>10.3
Ø70	95	10	>10.3
Ø75	95	10	>10.3
Ø75	100	10	>10.3
Ø80	100	10	>10.3
Ø80	110	10	>10.3
Ø85	110	12	>12.3



SIZE CHART DIN DIMENSIONS
Other sizes available upon request



shaft diameter D1 [mm]	D2 [mm]	H (SEAL) [mm]	L (groove) [mm]
Ø85	120	12	>12.3
Ø90	110	12	>12.3
Ø90	120	12	>12.3
Ø95	120	12	>12.3
Ø95	125	12	>12.3
Ø100	120	12	>12.3
Ø100	125	12	>12.3
Ø100	126	12	>12.3
Ø105	130	12	>12.3
Ø110	130	12	>12.3
Ø110	140	12	>12.3
Ø115	140	12	>12.3
Ø120	150	12	>12.3
Ø125	150	12	>12.3
Ø130	160	12	>12.3
Ø135	170	12	>12.3
Ø140	170	15	>15.3
Ø145	175	15	>15.3
Ø150	180	15	>15.3
Ø160	190	15	>15.3
Ø170	200	15	>15.3

shaft diameter D1 [mm]	D2 [mm]	H (SEAL) [mm]	L (groove) [mm]
Ø180	210	15	>15.3
Ø190	220	15	>15.3
Ø200	230	15	>15.3
Ø210	240	15	>15.3
Ø220	250	15	>15.3
Ø230	260	15	>15.3
Ø240	270	15	>15.3
Ø250	280	15	>15.3
Ø260	300	20	>20.3
Ø280	320	20	>20.3
Ø300	340	20	>20.3
Ø320	260	20	>20.3
Ø340	380	20	>20.3
Ø360	400	20	>20.3
Ø380	420	20	>20.3
Ø400	440	20	>20.3
Ø420	460	20	>20.3
Ø440	480	20	>20.3
Ø460	500	20	>20.3
Ø480	520	20	>20.3
Ø500	540	20	>20.3



SHAFT SEAL TYPE AS

The type AS shaft seal according to DIN3760 is the second most commonly used oil seal for low pressure radial sealing. The rubber covered housing provides good sealing capacity even with rough housing bores. In addition to the A type, the AS has an extra lip for excluding dust.



Product specifications

type	A
movement type rotating	✓
max. pressure	0.5 [bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✓
garter spring	✓
rubber covered	✓

PRODUCT SIZES

See [page 10](#) page for standard size table. Is your size not available? Please contact us:

KEY FEATURES

- > Rubber covered housing for improved sealing in the housing bore.
- > Garter spring for improved sealing capacity on shaft.
- > Extra lip for excluding dust.

MOVEMENT TYPE

- > Rotary

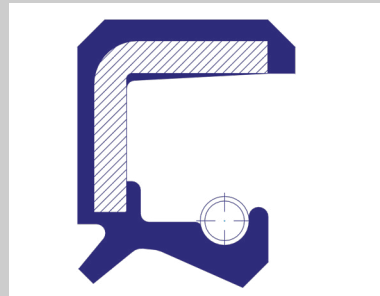
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE DIN3760



cross section drawing



SHAFT SEAL TYPE AO

The type AO shaft seal is the light/economical version of the most common type A oil seal. Suitable for light duty rotary shaft sealing. The rubber covered housing provides good sealing capacity even with rough housing bores.



Product specifications

type	A)
movement type rotating	✓
max. pressure	0[bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✗
garter spring	✗
rubber covered	✓

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us:
sales@newdealseals.com

KEY FEATURES

- > Rubber covered housing
- > Economic design

MOVEMENT TYPE

- > Rotary

SUITABLE

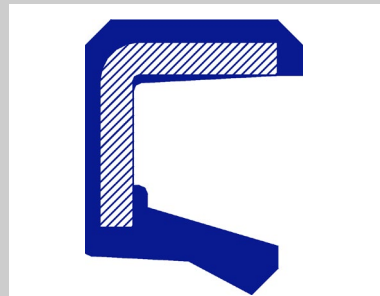
Low pressure light duty rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE

DIN3760



cross section drawing



SHAFT SEAL TYPE AS-P

The rubber covered housing provides good sealing capacity even with rough housing bores. In addition to the A type, the AS-P has an extra lip for excluding dust and an reinforced sealing lip for pressures up to 2 BAR.



Product specifications

type	AS-P
movement type rotating	✓
max. pressure	2[bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✓
garter spring	✓
rubber covered	✓

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us:
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KEY FEATURES

- > Rubber covered housing for improved sealing in the housing bore.
- > Garter spring for improved sealing capacity on shaft.
- > Extra lip for excluding dust.
- > Reinforced lip for over pressure

MOVEMENT TYPE

- > Rotary

SUITABLE

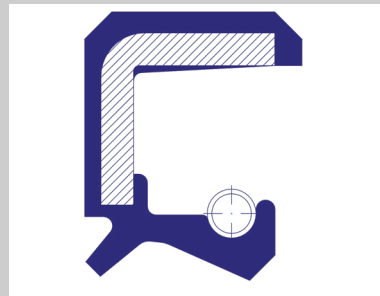
Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE

DIN3760



cross section drawing



SHAFT SEAL TYPE AS-PX

The rubber covered housing provides good sealing capacity even with rough housing bores. In addition to the A type, the AS-P has an extra lip for excluding dust and an metal reinforced sealing lip for pressures up to 5 BAR.



Product specifications

type	AS-PX
movement type rotating	✓
max. pressure	5 [bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✓
garter spring	✓
rubber covered	✓

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us:
sales@newdealseals.com

KEY FEATURES

- > Rubber covered housing for improved sealing in the housing bore.
- > Garter spring for improved sealing capacity on shaft.
- > Extra lip for excluding dust.
- > Reinforced metal lip for over pressure

MOVEMENT TYPE

- > Rotary

SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE

DIN3760

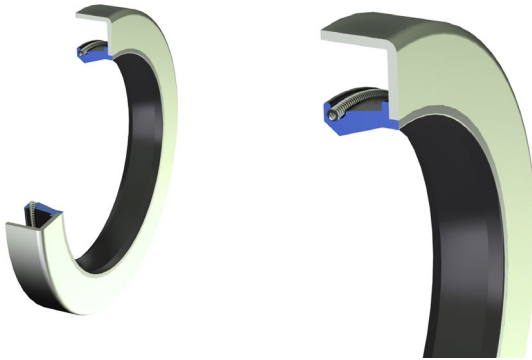


cross section drawing



SHAFT SEAL TYPE B

The Type B shaft seal has a steel/metal outer case. Not recommended in applications where housing bore roughness and tolerances are imperfect or where thermal expansion of the housing is expected.



Product specifications

type	B
movement type rotating	✓
max. pressure	0.5 [bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✗
garter spring	✓
rubber covered	✗

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us: sales@newdealseals.com

KEY FEATURES

- > Garter spring for improved sealing capacity on shaft

MOVEMENT TYPE

- > Rotary

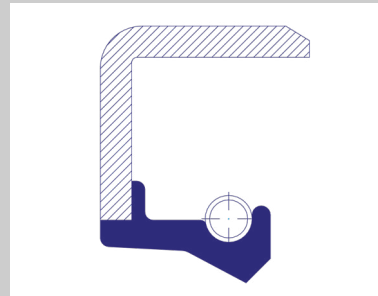
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, dry running applications. Rough surface housing bores. Large temperature fluctuations

STANDARD SIZE RANGE DIN3760



cross section drawing



SHAFT SEAL TYPE BS

The Type BS shaft seal has a steel/metal outer case. Not recommended in applications where housing bore roughness and tolerances are imperfect or where thermal expansion of the housing is expected. In addition to the B type, this seal also has an extra lip to exclude dust.



Product specifications

type	BS
movement type rotating	✓
max. pressure	0.5[bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✓
garter spring	✓
rubber covered	✗

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us:
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KEY FEATURES

- > Garter spring for improved sealing capacity on shaft
- > Extra lip for excluding dust

MOVEMENT TYPE

- > Rotary

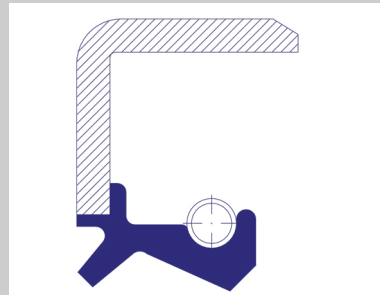
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE DIN3760

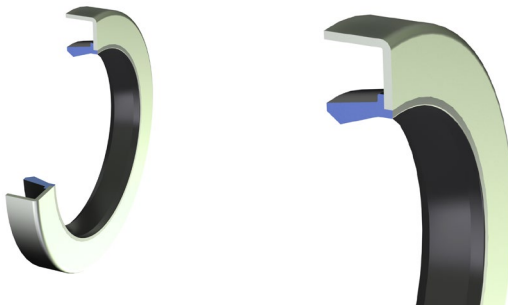


cross section drawing



SHAFT SEAL TYPE BO

The type BO shaft seal is the light/economical version of the type B oil seal. Suitable for light duty rotary shaft sealing. The Type BO shaft seal has a steel/metal outer case. Not recommended in applications where housing bore roughness and tolerances are imperfect or where thermal expansion of the housing is expected.



Product specifications

type	BO
movement type rotating	✓
max. pressure	0[bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✗
garter spring	✗
rubber covered	✗

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us: sales@newdealseals.com

KEY FEATURES

- > Garter spring for improved sealing capacity on shaft
- > Economical design

MOVEMENT TYPE

- > Rotary

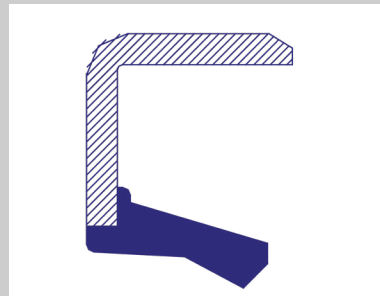
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE DIN3760

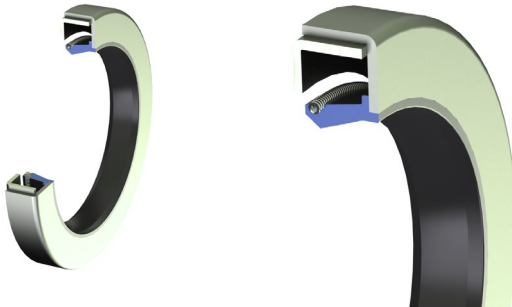


cross section drawing



SHAFT SEAL TYPE C

The Type C oil seal has an extra steel/metal reinforced housing. For improved structural stability. Not recommended in applications where housing bore roughness and tolerances are imperfect or where thermal expansion of the housing is expected.



Product specifications

type	C
movement type rotating	✓
max. pressure	0.5 [bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✗
garter spring	✓
rubber covered	✗

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us: sales@newdealseals.com

KEY FEATURES

- > Garter spring for improved sealing capacity on shaft
- > Reinforced housing for improved structural stability

MOVEMENT TYPE

- > Rotary

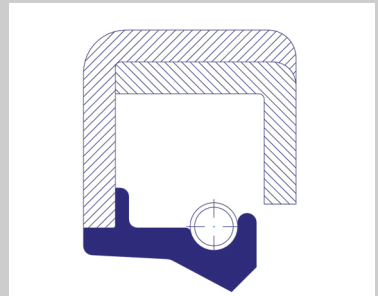
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE DIN3760

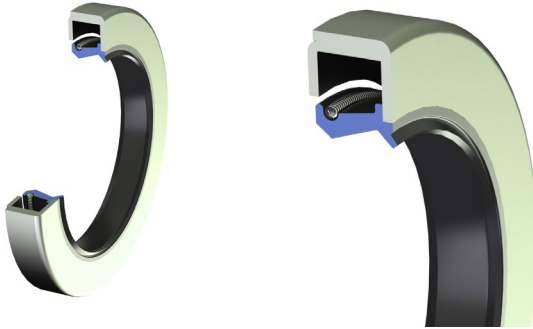


cross section drawing



SHAFT SEAL TYPE CS

The Type CS oil seal has an extra steel/metal reinforced housing. In addition to the C type, this seal also has an extra lip to exclude dust. Not recommended in applications where housing bore roughness and tolerances are imperfect or where thermal expansion of the housing is expected.



Product specifications

type	CS
movement type rotating	✓
max. pressure	0.5 [bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✓
garter spring	✓
rubber covered	✗

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us: sales@newdealseals.com

KEY FEATURES

- > Garter spring for improved sealing capacity on shaft.
- > Reinforced housing for improved structural stability.
- > Extra lip for excluding dust.

MOVEMENT TYPE

- > Rotary

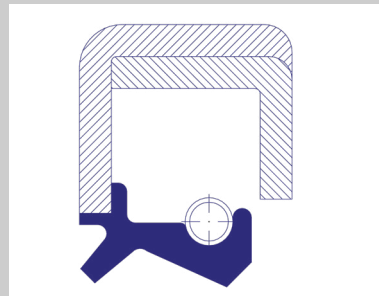
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE DIN3760

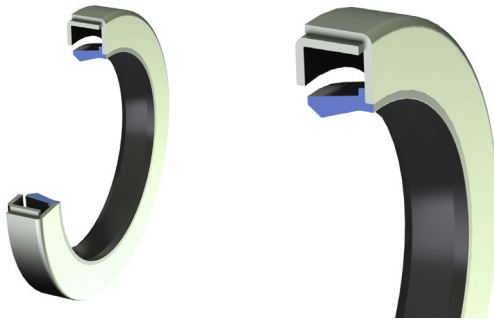


cross section drawing



SHAFT SEAL TYPE CO

The type CO shaft seal is the light/economical version of the type CO oil seal. Suitable for light duty rotary shaft sealing. The Type CO oil seal has an extra steel/metal reinforced housing. Not recommended in applications where housing bore roughness and tolerances are imperfect or where thermal expansion of the housing is expected.



Product specifications

type	C-O
movement type rotating	✓
max. pressure	0[bar]
Pressure direction Single direction Bi-directional	✓ ✗
max. speed material: FKM material: NBR	30 [m/s] 10 [m/s]
dust lip	✗
garter spring	✗
rubber covered	✗

PRODUCT SIZES

See [page 10](#) for standard size table. Is your size not available? Please contact us:
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KEY FEATURES

- > Reinforced housing for improved structural stability.
- > Economic design

MOVEMENT TYPE

- > Rotary

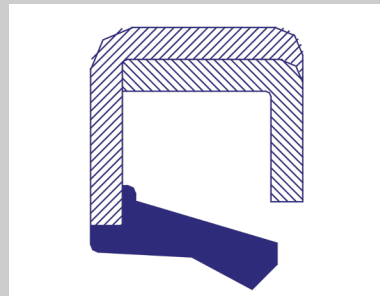
SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE
DIN3760



cross section drawing



SHAFT SEAL TYPE A-DUO

The radial shaft seal for sealing dual fluids. The dual lips with garter springs prevent contamination/mixing between the two fluids



Product specifications

type	A-DUO
movement type rotating	✓
max. pressure	0.3[bar]
Pressure direction Single direction Bi-redectional	✓ ✗
max. speed material: FKM material: NBR	10 [m/s] 10 [m/s]
dust lip	✗
garter spring	✓
rubber covered	✓

PRODUCT SIZES

Please contact us: sales@newdealseals.com

KEY FEATURES

- > Dual lips and springs for sealing dual fluids
- > Rubber covered housing for improved sealing in the housing bore.

MOVEMENT TYPE

- > Rotary

SUITABLE

Low pressure rotary shaft sealing.

NOT SUITABLE

Reciprocating movements, high pressure, dry running applications.

STANDARD SIZE RANGE



cross section drawing

DESIGN AND OPERATION

SHAFT REQUIREMENTS

The shaft surface finish is of essential for efficient sealing and long life-time. the hardness should increase with higher surface speeds. According to DIN 3760:

- > surface speed of 4 [m/s], the minimum hardness is 45 HRC
 - > surface speed of 10 [m/s], the minimum hardness is 55 HRC
- In case of partially hardened shafts: recommended hardness depth: 0.3 [mm]

Surface finish as specified by DIN 3760 must be Ra 0.2 to 0.8 [μm], Rz 1 to 5 [μm], Rougher surfaces generate more friction, thus higher temperatures and a shorter lifetime. Machining defects and scratches on the shaft must be avoided.

Even very small defects could cause leakage. There should be no spiral grinding or machining marks on the shaft, as this could cause the fluids to be pumped out of the oil seal trough the spiral mark.

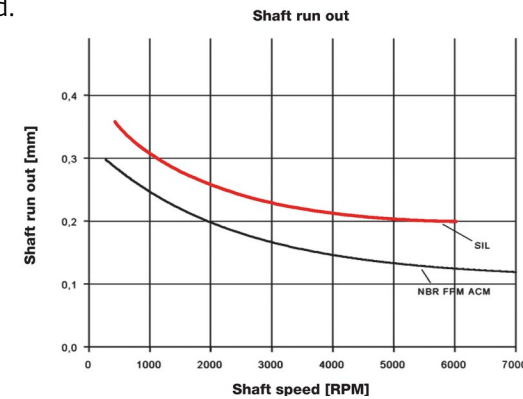
Shaft diameter [mm]		Tolerance [mm]
from	to	h11
6	10	0 -0.090
10	18	0 -0.110
18	30	0 -0.130
30	50	0 -0.160
50	80	0 -0.190
80	120	0 -0.220
120	180	0 -0.250
180	250	0 -0.290
250	315	0 -0.320
315	400	0 -0.360

DESIGN AND OPERATION

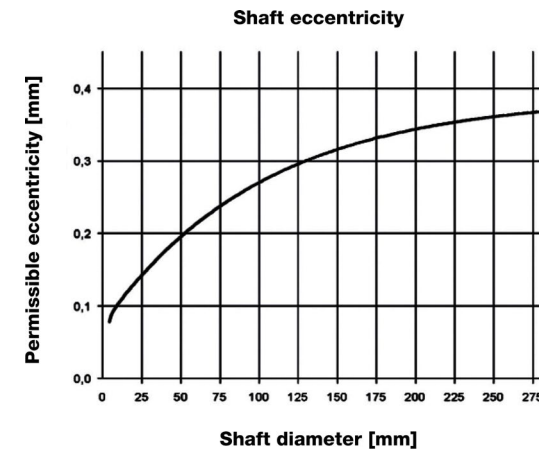
ECCENTRICITY AND SHAFT RUNOUT

In an ideal situation the shaft is moving completely centered and concentric to the axis of the oil-seal. In reality, shaft runout is unavoidable. Therefore the oil-seal must compensate for it.

Due to inertia, the sealing lip limits itself from following the movements of the shaft. For this reason it is advised to place the oil seals directly adjacent to the bearing. At this location, the oscillation is minimum. Below you can find a graph with the permissible shaft run out based on the shaft speed.



Eccentricity between shaft and housing bore centers must minimized to reduce the wear of the sealing lip. below you can find a graph showing the permissible eccentricity based on the shaft diameter.



DESIGN AND OPERATION

HOUSING BORE REQUIREMENTS

The housing bore design is critical as the oil seals are press fitted into the housing. Recommended machining tolerances of the housing bore diameter for rotary shaft seals are ISO H8 according to DIN 3760 (see table below).

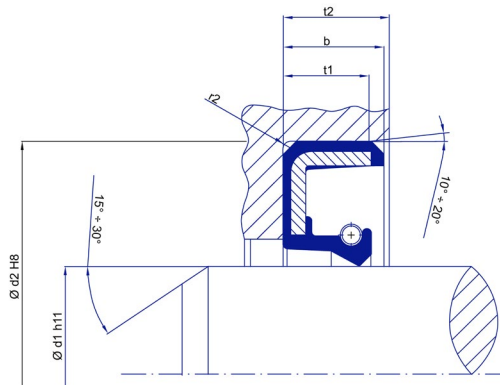
Shaft diameter [mm]		Tolerance [mm]
from	to	H8
10	18	+0.027 -0.0
18	30	+0.033 -0.0
30	50	+0.039 -0.0
50	80	+0.046 -0.0
80	120	+0.054 -0.0

Shaft diameter [mm]		Tolerance [mm]
from	to	H8
120	180	+0.063 -0.0
180	250	+0.072 -0.0
250	315	+0.084 -0.0
315	400	+0.089 -0.0
400	500	+0.097 -0.0

The maximum surface roughness of the housing according to DIN 3760 is Ra 1.6 to 6.3 [µm], Rz 10 to 20 [µm].

A shoulder or a spacer ring is recommended to support the oil seal to make sure that the oil seal is installed perpendicularly to the shaft axis.

To prevent damage during installation, the opening of the groove should have a chamfer inclined by 10° <-> 20° and a depth according to the ring thickness (see graph/table below). The end of the shaft should have a chamfer inclined by 15° - 30°, with a rounded and polished edge to prevent damage and make the installation more easy.



b[mm]	t1 [mm] (0.85xb)	t2[mm] (b+0.3)	r2[mm]
	min.	min.	max.
7	5.95	7.3	0.5
8	6.8	8.3	0.5
10	8.5	10.3	0.5
12	10.2	12.3	0.7
15	12.75	15.3	0.7
20	17	20.3	0.7

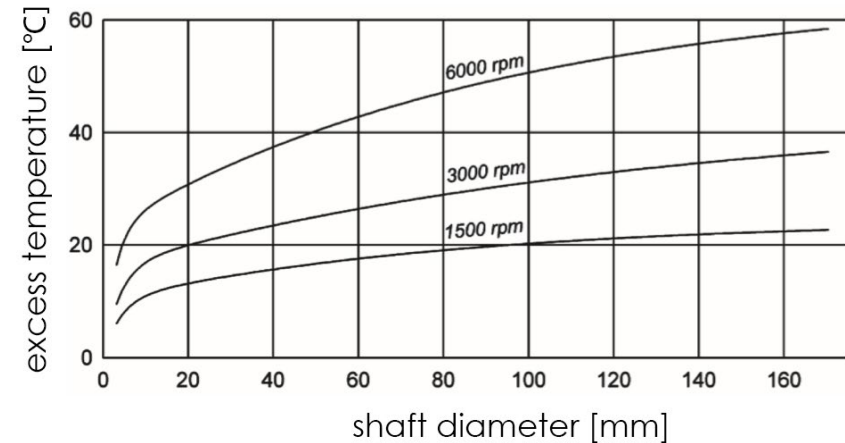
DESIGN AND OPERATION

LUBRICATION

Lubrication is essential for functioning of an rubber oil seal. The lip of an oil seal is floating on a film of lubrication. Without this lubrication, the oil seal can be damaged within a matter of hours. The thickness of this film is usually between 1 - 3 [µm], but is influenced by many factors such as oil viscosity, shaft surface finish, seal radial load and other mechanical parameters.

It must be pointed out that an oil seal has a bedding-in time. During the first hours of operation, the lubrication film forms and the sealing edge flattens. During the bedding-in time limited leakage is possible.

Proper lubrication reduces friction between sealing lip and shaft and also acts as a coolant to the generated heat. When fluids with poor lubrication properties are used (water and aqueous solutions) shaft seal types with a dust lip are recommended. A graph with the excess temperature is shown below.



(This is a generic graph based on a standard NBR type A oil-seal in a pressure free situation with recommended design parameters. Actual values may vary as the frictional heat depends on seal design and material, surface speed, sealing lip pressure, shaft size, surface finish, media type, etc.)

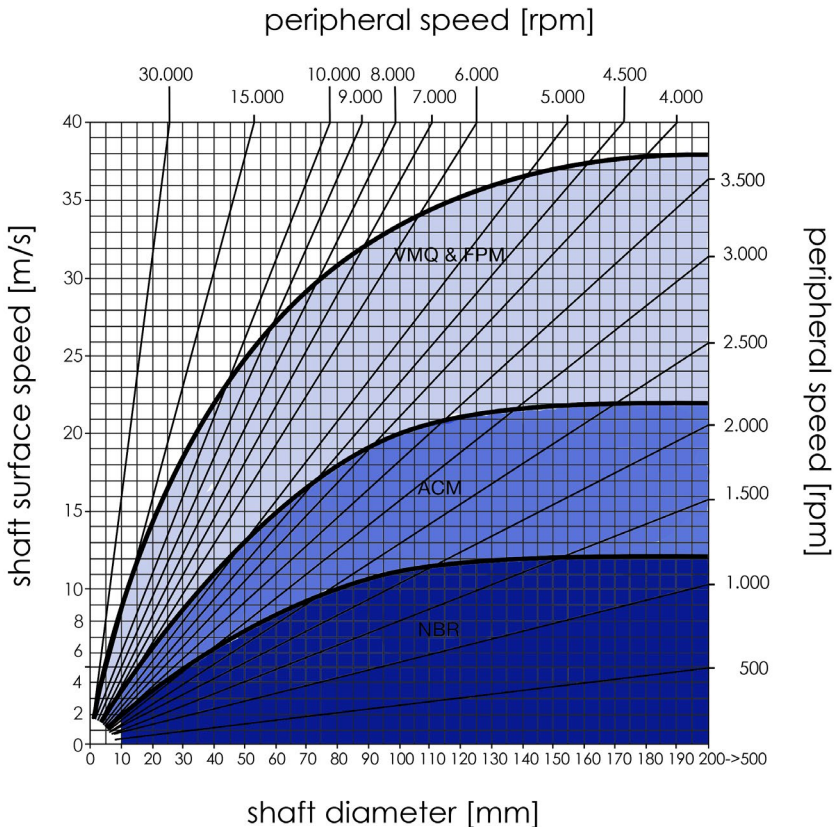


DESIGN AND OPERATION

SPEED

The temperature of the sealing lip is the fluid temperature increased by the temperature caused by frictional heat (graph of the previous page). The higher the effective operating temperature is, the faster the ageing of the elastomer will be, thus affecting the performance and lifetime of the oil seal. A generic chart with recommended speed/size parameters can be found below:

Permissible speeds in pressure-free state according to DIN 3760





DESIGN AND OPERATION

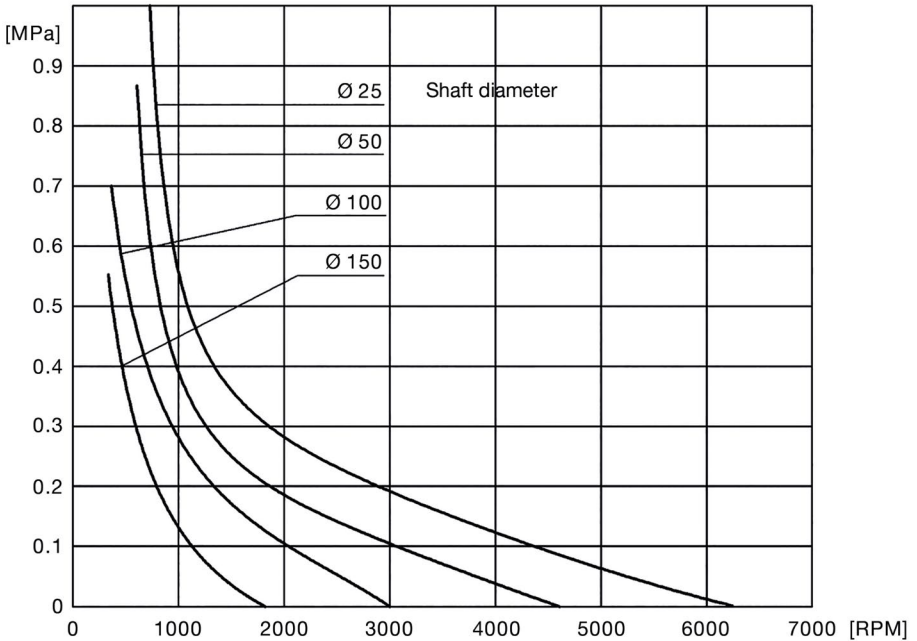
PRESSURE

The design of an oil seal is intended to be used for non pressurised applications. In situations where the oil seal is exposed to internal pressure, the sealing lip is pressed against the shaft. This increases the force and friction on the seal.

It is advised to use special designed oil seals (AS-P or AS-PX) with a stronger sealing lip and support in the following situations:

- > pressure > 0.02 [MPa] in combination with a surface speed > 2[m/s]
- > pressure > 0.05 [MPa]

Permissible overpressures with P-type oil seals are limited (see diagram below for AS-PX type). For higher pressures and improved lifetime, it is recommended to move to other sealing solutions such as PTFE lip seals.





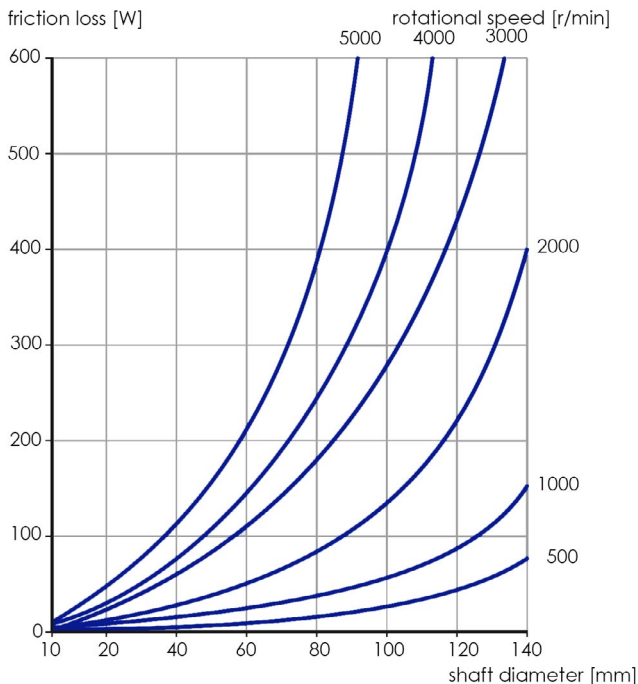
DESIGN AND OPERATION

FRICTION

In order to seal, the lip of an oil seal is pressed on the counter face. The friction resulting from this radial load is only part of the total contact friction and power loss at the sealing position. Other contributing factors include:

- > lubrication
- > temperature
- > pressure differential across the seal
- > rotational speed
- > shaft diameter
- > design of the counter surface

In the graph below, an indication of the friction losses is shown for a conventional NBR type A oils seal. (with recommended design parameters and lubrication)





ORDER CODE

Enquiries can be send to: sales@newdealseals.com

OIL-SEAL	-	XXXX	-	00/00/00	-	00
SEAL GROUP		TYPE		SIZE		MATERIAL
OIL-SEAL		A,AS,AO,AS, ASP,ASPX,B,BS,- BO,C,CO,CS,ADUO		ØSHAFT/ØBORE/ THICKNESS [mm]		01 = NBR 02 = FKM 03 = VMQ 04 = ACM

EXAMPLE

OIL-SEAL - AS - 220/240/10 - 01

OIL-SEAL, TYPE AS, shaft diameter=220[mm] bore diameter =240[mm]

thickness of seal = 10[mm] Material=NBR

NEWDEALSEALS B.V.
Energiestraat 2
1749 DN Warmenhuizen
The Netherlands

+31 (0)226 36 22 33
info@newdealseals.com
www.newdealseals.com

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