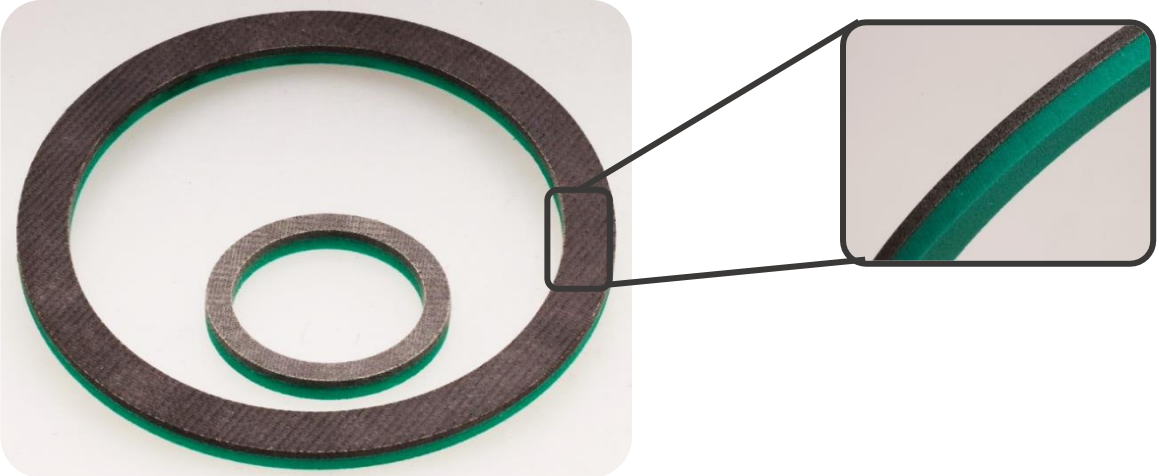
Material data sheet
deva.ThrustSeal® ND541

Short Discription

Deva.ThrustSeal® ND541 is a 2-layer-combination with one layer out of a composite sliding material and second layer out of an elastic material. The sliding layer is based on a epoxy resin, which contains solid lupricants (color: black) which has excellent tribological properties. The second layer (color: green) is a elastic PU (PolyUrethan) material.

Basic Designs



Explanations

Compound thickness and dimensions can be adapted to costumer applications
Slyding layer is machineable
Very good damping properties and excellent steadyness for shock resistence
Good wear behavior even at small relative movements
Additional lubrication ist not acceptable
Compound has a sealing function against aprasive particels if it is assempeld with axial pre-load

Main field of application of **deva.ThrustSeal®** are bearing systems for thrust washers, discs or plates where an additional function for sealing is needed. The elastic PU-Layer allow an assemplay with an initial pre-stressing. This will close the axial gaps and and the other bearings in the slding system will be protected against abrasive particles.

Typical Applications

Special purpose vehicle
Agriculture
Transportation
Machinery and constructions

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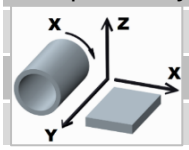
Bearing properties	Symbol	Materialcompound	Unit
Compressive strength (1)	σ_{dB}	300	N/mm²
Max. recommended static load	p_s	25	N/mm²
Max. recommended dynamic load	p_d	15	N/mm²
Friction coefficient (dry) (2)	μ	0,10 bis 0,24	-
Friction coefficient (water) (2)	μ	0,11 bis 0,25	-
Friction coefficient (grease) (3)	μ	-	-
Temperature range	T	-30 bis 70	°C
Max. recommended sliding speed	U_{max}	0,1	m/s
Max. recommended pU-value (dry)	pU	1,2	MPa*m/s
Max. recommended pU-value (water)	pU	0,9	MPa*m/s
Min. counterpart hardness	-	180	HB
Roughness of counterpart	Ra	0,4 bis 1,0	µm

Mechanical properties	Symbol	Sliding Layer	PU-Layer	Unit
Compressive strength flatwise to laminate (1)	σ_M	300	-	N/mm²
Compressive yield point flatwise to laminate(1)	σ_x	100	-	N/mm²
 E-Modul X- direction	E	4100	3,5	N/mm²
E-Modul Y- direction	E	4100	3,5	N/mm²
E-Modul Z- direction	E	2500	3,5	N/mm²

Physical properties	Symbol	Sliding Layer	PU-Layer	Unit
Density (average)	ρ	1,8	-	g/cm³
Swelling in water	-	<0,10	-	%
Thermal conductivity	λ	~0.3	0,1	W/mK
Coefficient of thermal expansion flatwise to laminate (20°C - 80°C)	α	100 - 130	-	$x10^{-6}$ 1/K
Coefficient of thermal expansion parallel to laminate (20°C - 80°C)	α	40 - 50	-	$x10^{-6}$ 1/K

(1) Compressive test based on DIN EN ISO 604 2003

(2) Information is for sliding layer <15 MPa (friction coefficient is depending on the load); Fricticon coeffient PU µ ~ 0,7

(3) Additional lubrication is not recommended

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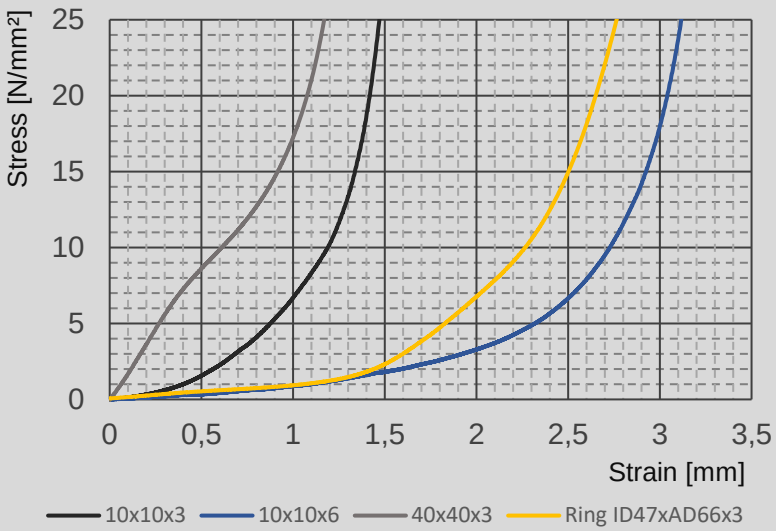
Technical construction and information

Spring characteristic by full fased contact

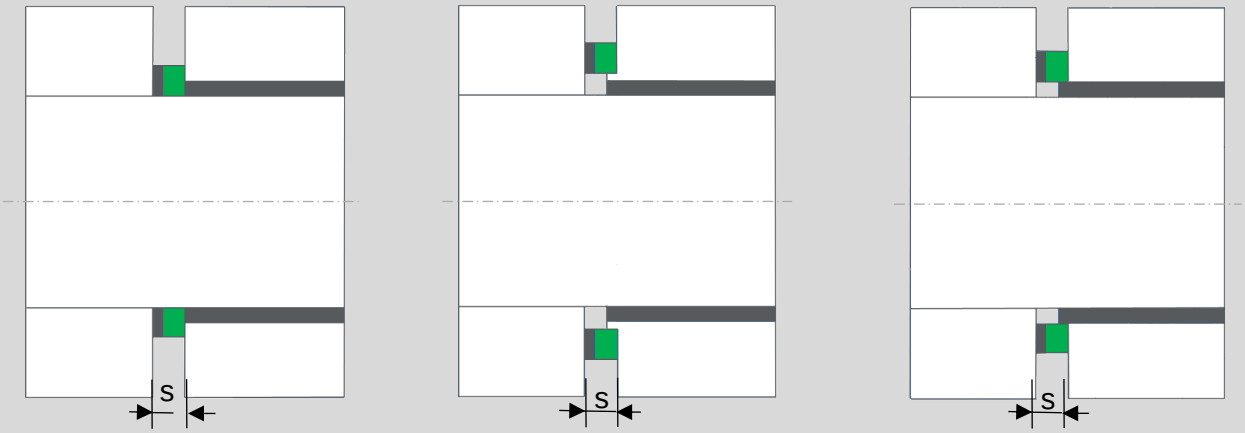


The graph shows the deformation behavior in dependence to the specific surface load.

Based to the different form factors (Square, Ring and two different thicknesses (3 and 6 mm ot the PU) characteristic curves was established.

The PU Thickness is nearly linear for the total deformation. The resulting relation between lateral face and loaded surface affected the rising of the characteristic curves.

Possibilities for assembly

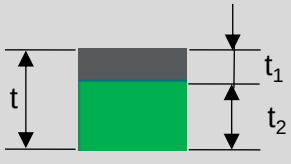


bevor bearing | with a ledge at the housing | with overlaying bushing

Design-information

s … gap clearene for assembly
t ... total thichness Thrustseal
t_1 ... thickness slyding layer
t_2 ... thicknes PU Layer
x ... oversize for prestressing
(typ. Minimum oversize x = 0,1 mm)

Minimum thickness slyding layer:	t_1 = 1 mm
Minimum thickness PU layer:	t_2 = 3 mm
Total thickness t:	t = (s + x) $^{+0,5}_{-0}$
Standardtolerance contour:	0,3 mm



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Chemical resistence

Medium	Conc.	Temp.	Compound	Medium	Conc.	Temp.	Compound
Alcohols							
Allyl alcohol			⊘	Hydroxy acetone			-
Amyl alcohol			-	Isobutyl alcohol			-
Butyl alcohol			⊘	Isopropyl alcohol			-
Ethyl alcohol			-	Methyl alcohol			-
Ethylene glycol			-	Propyl alcohol			-
Solvents							
Aceton***	100%	23°C	⊙	Naphthalene			-
Benzene			⊘	Toluene			-
Methyl chloride			-	Trichioromethane			-
Methyl ethyl ketone			⊘				
Fuels							
Petrol			⊙	Kerosene			✓
Diesel fuel			✓				
Oils							
Cotton seed oil			-	Hydraulic oil			⊙
Curde oil			✓	Linseed oil			⊙
Gear oil			✓	Motor oil			✓
Gases							
Acetylene			-	Fluorine			⊘
Äther			-	Carbon dioxid			-
Bromine			⊘	Ozone			✓
Butane			-	Propane			-
Chlorine			⊘	Nitrogen			-
Natural gas			-	Hydrogen			-
Sulfur dioxide			-				
Salts							
Ammonium chloride			-	Magnesium carbon			-
Ammonium nitrate			-	Magnesium sulphate			-
Ammonium sulphate			-	Sodium acetate			-
Iron chloride			-	Sodium bisulphate			-
Magnesium chloride			-	Sodium carbonate			-
Acids							
Arsenic acis	10%		⊘	Carbonic acid	10%		⊘
Boric acid	10%		-	Hydrochloric acid*	10%	23°C	✓
Acetic acid	10%		✓	Citric acid	10%		-
Hydroflouric acid	10%		⊘	Sulphuric acid*	10%	23°C	✓
Phosphoric acid*	10%	23°C	✓		10%	70°C	⊙
	10%	70°C	✓	Hydrogen peroxide*	35%	23°C	✓
Nitric acid*	10%	23°C	⊙		35%	70°C	⊙
	10%	70°C	⊘				

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Medium	Conc.	Temp.	Compound	Medium	Conc.	Temp.	Compound
Bases							
Ammonium hydroxide			✓	Sodium hydroxide*	5%	23°C	✓
Calcium hydroxide			✓		5%	70°C	⊙
Potassium hydroxide*	5%	23°C	⊙	Sodium hypochlorite*	15%	23°C	⊙
	55%	70°C	⊘		1%	70°C	⊘
Magnesium hydroxide			-				
Others							
Ammoniak			⊘	Calcium oxide			-
Ethylene glycol			✓	Sodium nitrate			✓
Freon			-	Water*	100%	23°C	✓
Formaldehyde			-		100%	70°C	✓
Inhibitor Glycol-based e.g. Dowcal N *	50%	70°C	-		100%	100°C	⊘
				Steam >100°C			⊘
Inhibitor Potassium hydroxide-based e.g.Performax CL1300*	3%	70°C	-	Zinc sulphate			-

Additional information for PU material and bonding

The used PU material is a closed cell system, therefore the absortion of water is low (only in the machined surfaces where the cells were cut) >> generally water swelling behavior is negligible.

* based on DIN EN ISO 175:2010 (only for the sliding layer)

✓ = durable
⊙ = limited/conditioned durable
⊘ = not durable
- = actual no information available

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