



HTMS

High Tech Metal Seals



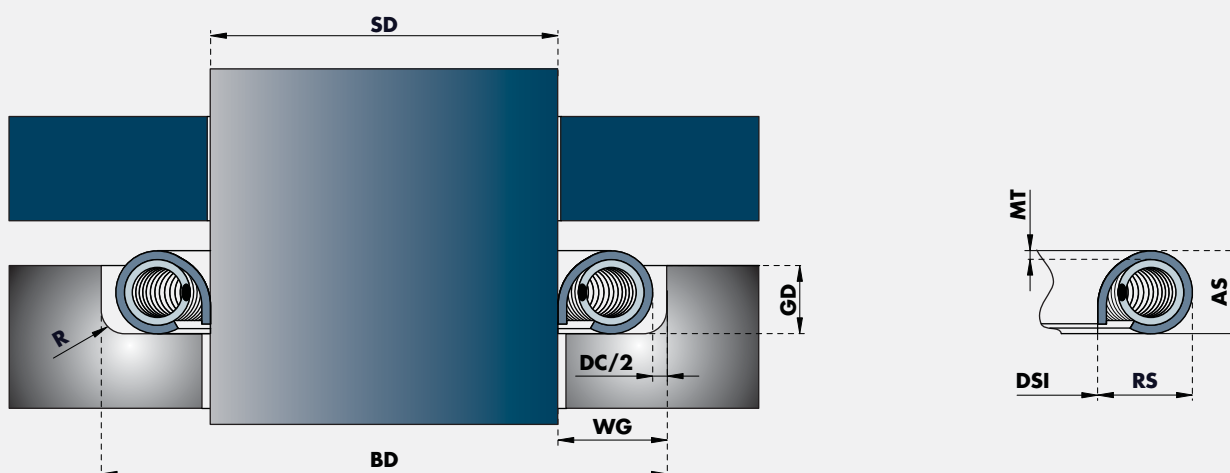
Seal dimension						Groove dimensions					Load
AS		RS		MT	DC	SD range	BD	Tol. SD	GD	R	Rad.
Axial section	Tolerance on AS (cross section)	Radial section	Material code	Material thickness	Diame-trical clearance	Shaft Diameter (range)	SD +	+0	Groove Depth (min/max)	Radius (max)	N/mm Circum-ference *
1,57	+/-0,03	1,79	M	0,15	0,03	20-150	3,61	-0,03	1,27-1,37	0,30	60
2,39	+/-0,05	2,73	M	0,25	0,05	35-200	5,51	-0,03	1,91-2,01	0,50	70
3,18	+/-0,08	3,63	M	0,38	0,06	45-200	7,32	-0,03	2,54-2,67	0,75	100
3,96	+/-0,08	4,52	M	0,41	0,08	60-200	9,12	-0,05	3,18-3,30	1,20	105
4,78	+/-0,10	5,46	M	0,51	0,10	100-200	11,02	-0,05	3,84-3,99	1,20	130

* Load and spring back figures are based on Inconel 718 in the heat treated condition. Actual load figures and to a lesser extend spring back can differ hugely from the given data. Tolerances on groove depth, plating, diametrical clearance and differences in material batches can create differences of up to 100% for the smaller cross sections, down to 50% for the bigger cross section.

Tightness

The tightness with a Commaseal® (COI) is more than with any other metal seal a function of the shaft condition. The surface finish of the shaft shall be mirror polished and the hardness shall be high enough so that the sliding motion of seal and shaft does not deteriorate either of them.

In addition we advise to silver plate Commaseal® for better tightness, reduced friction and wear.



example

COI-010000-3.96M-2/2-1-S50

Seal Type

COI: Dynamic side
at Shaft diameter

Cross Section

Select the proper axial cross section or radial section (RS)

Treatment

1: Work hardened

See Tab on the last page →

Seal Diameter (DSI)

010000 = 100,00 mm, for Bore Diameter (BD) = 109,71
The seal diameter is always the shaft diameter without plating.
DSI = SD

Plating

Plating Code "S"
= Silver Plating
Plating Thickness "50"
= 30 to 50 Microns

See Tab on the last page →

Material

The first digit designates the Commaseal® material, the second, the selected spring.

Available Materials & Codes			
Jacket		Spring	
Code	Material	Code	Material
1	Alloy X-750 *	1	Alloy X-750 *
2	Alloy 718	2	Alloy 718
(*) X-750 will become obsolete Other materials on special request			

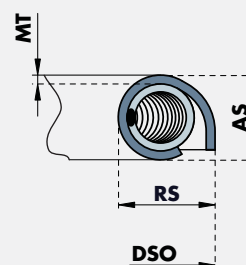
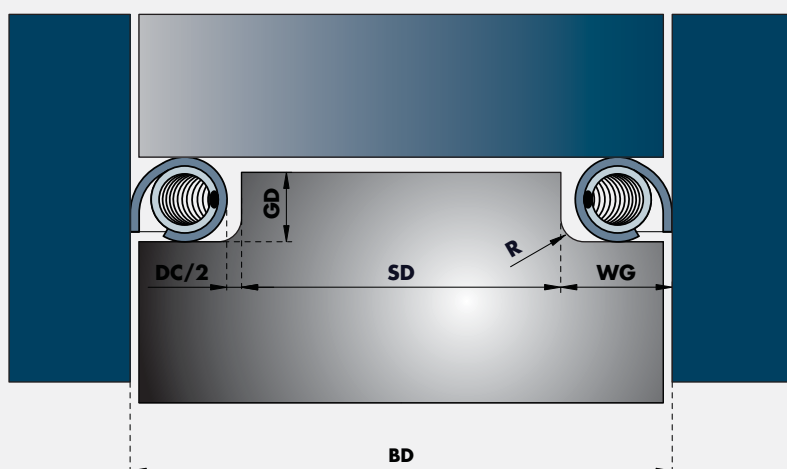
Seal dimension						Groove dimensions					Load
AS		RS		MT	DC	SD range	BD	Tol. SD	GD	R	Rad.
Axial section	Tolerance on AS (cross section)	Radial section	Material code	Material thickness	Diame-trical clearance	Shaft Diameter (range)	SD +	+0	Groove Depth (min/max)	Radius (max)	N/mm Circum-ference *
1,57	+/-0,03	1,79	M	0,15	0,03	20-150	3,61	-0,03	1,27-1,37	0,30	60
2,39	+/-0,05	2,73	M	0,25	0,05	35-200	5,51	-0,03	1,91-2,01	0,50	70
3,18	+/-0,08	3,63	M	0,38	0,06	45-200	7,32	-0,03	2,54-2,67	0,75	100
3,96	+/-0,08	4,52	M	0,41	0,08	60-200	9,12	-0,05	3,18-3,30	1,20	105
4,78	+/-0,10	5,46	M	0,51	0,10	100-200	11,02	-0,05	3,84-3,99	1,20	130

* Load and spring back figures are based on Inconel 718 in the heat treated condition. Actual load figures and to a lesser extend spring back can differ hugely from the given data. Tolerances on groove depth, plating, diametrical clearance and differences in material batches can create differences of up to 100% for the smaller cross sections, down to 50% for the bigger cross section.

Tightness

The tightness with a Commaseal® (COE) is more than with any other metal seal a function of the bore condition. The surface finish of the bore shall be mirror polished and the hardness shall be high enough so that the sliding motion of seal versus the bore does not deteriorate either of them.

In addition we advise to silver plate Commaseal® for better tightness, reduced friction and wear.



example

COE-010000-3.18M-2/2-1-C30

Seal Type

COE: Dynamic side
at Bore diameter

Cross Section

Select the proper cross section or radial section (RS)

Treatment

1: Work hardened

See Tab on the last page →

Seal Diameter (DSO)

010000 = 100,00 mm, for Shaft Diameter (SD) = 92,19
The seal diameter is always the bore diameter without plating.
DSO = BD

Plating

Plating Code "C"
= Copper Plating
Plating Thickness "30"
= 10 to 30 Microns

See Tab on the last page →

Material

The first digit designates the Commaseal® material, the second, the selected spring.

Available Materials & Codes			
Jacket		Spring	
Code	Material	Code	Material
1	Alloy X-750 *	1	Alloy X-750 *
2	Alloy 718	2	Alloy 718
(*) X-750 will become obsolete Other materials on special request			

Tolerances

The actual as produced seal diameter shall be as close as possible to the groove diameter.

By compressing the seal in the groove, the seal outside diameter for internal pressure seals will try to grow and the seal inside diameter for external pressure will try to shrink.

This phenomena is covered by the DC or diametrical clearance. The DC will give allowance for this increase or decrease of the seal diameter.

The seal tolerance and also groove tolerance shall be kept as small as possible. It is better for the seal performance to keep the DC in compressed condition as small as possible.

Ideally, once compressed the seal outer diameter should slightly touch the groove outer diameter or for an external pressure seal the inner seal diameter should slightly touch the groove ID.

Internal Pressure			
Groove OD Tolerance			
Type ----- Cross Section	O Ring	C Ring & Oyster Seal	CS Ring
0,79	+ 0.05	+ 0.05	-----
0,89	+ 0.10	+ 0.05	-----
1,19	+ 0.10	+ 0.08	-----
1,57	+ 0.10	+ 0.08	-----
2,00	-----	-----	+ 0.10
2,39	+ 0.15	+ 0.10	+ 0.10
3,18	+ 0.15	+ 0.10	+ 0.13
3,96	+ 0.15	+ 0.13	+ 0.15
4,78	+ 0.20	+ 0.15	+ 0.15
5,60	-----	+ 0.20	+ 0.20
6,35	+ 0.20	+ 0.20	+ 0.20
7,90	+ 0.20	+ 0.20	+ 0.20
9,53	+ 0.25	+ 0.25	+ 0.25
12,7	+ 0.25	+ 0.25	+ 0.25

External Pressure			
Groove ID Tolerance			
Type ----- Cross Section	O Ring	C Ring & Oyster Seal	CS Ring
0,79	- 0.05	- 0.05	-----
0,89	- 0.10	- 0.05	-----
1,19	- 0.10	- 0.08	-----
1,57	- 0.10	- 0.08	-----
2,00	-----	-----	- 0.10
2,39	- 0.15	- 0.10	- 0.10
5,60	- 0.15	- 0.10	- 0.13
3,96	- 0.15	- 0.13	- 0.15
4,78	- 0.20	- 0.15	- 0.15
5,60	-----	- 0.20	- 0.20
6,35	- 0.20	- 0.20	- 0.20
7,90	- 0.20	- 0.20	- 0.20
9,53	- 0.25	- 0.25	- 0.25
12,7	- 0.25	- 0.25	- 0.25

Groove tolerances for face type seals

Warranty

HTMS is experienced in the design and manufacture of resilient metal seals for extreme environmental service conditions. HTMS metal seals, O-Rings, C-Rings, spring energised C Rings and O-Rings are produced from high quality alloy materials with full lot control, full traceability and inspection procedures at all production steps.

All production procedures starting from purchase to shipment are controlled by our Q.A. manual. HTMS is an ISO 9001 certified manufacturer of resilient metal seals. Regular internal audits verify that work procedures are maintained and compliant with our Q.A. manual.

HTMS works closely with their customers to analyse as correct as possible the sealing problem and based on this application data, design and manufacture the best seal for the given application.

We strive to manufacture only correct products and are confident that our seals will be free of all material or manufacturing defects. Should a mistake being made then we will replace, free of charge, any defective products with the highest priority.

Our warranty is limited to the replacement value of the defective seals only, and does not include any additional or consequential liabilities.

Resilient metal seals are by design and depending on the performance requirement sensible seals, where other parameters such as, handling, effective groove sizes and surface roughness are evenly important to achieve the desired results.

The seal, being only one part of the sealing solution, HTMS cannot guarantee any leakrate, nor can we accept any liability for costs following poor sealing results.

However, should the problem be related to faulty parts HTMS will replace free of charge the parts.

Except for the general recommendations found in this design manual, we cannot give specific warranties for life-expectancy, leak-rate or other operational parameter.

Customers are always advised to qualify seals, preferably by real life test, or by similarity, in the exact configuration of their intended use.

Resilient Metal Seals Application Data Sheet

Company		Data	
Address		Phone	
Zip		Fax	
City		E-Mail	
Contact		Title	

Application and/or Equipment			
Current seal			
Customer Item Number			
Closing load			
Surface finish			
Flange Materials			
Flange Hardness			
Static Pressure		Cyclic	
Internal Pressure		Frequency	
External pressure		Amplitude	
Fluid Medium		Max. Leak	
Leak test procedure		Max. Leak	
Additional Info			

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	(Add Units)	At Test	Minimum	Maximum		Operating
Temperature						
Pressure						
Groove Depth (GD)						
Groove Width (GW)						
Groove OD (DG) for Internal Pressure						
Groove ID (DG) for External Pressure						
Yearly Quantities						
Lot Sizes						
Sample Size						

Sketch

Plating Code	Plating / Coating
S	Silver - max 430°C
G	Gold - max 930°C
C	Copper - max 930°C
N	Nickel - max 1200°C
L	Lead - max 200°C
T	PTFE - max 290°C
SN	Tin-max 200°C
IN	Indium-max 130°C

Thickness Code	Plating Thickness in μ
30	10 - 30
50	30 - 50
70	50 - 70

Temper Code	Temper Description
1	Work hardened-----All
2	Age Hardened----- X-750 & 718
3	Annealed----- X-750,718, Nickel Alloy 600, Alu 1050
4	Sol. and Prec. HT----- X-750&718
5	Nace MR0175 -- Inco 718
6	Nace Alloy 625
7	Stress Relief Haynes 214
8	HT Elgiloy



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