



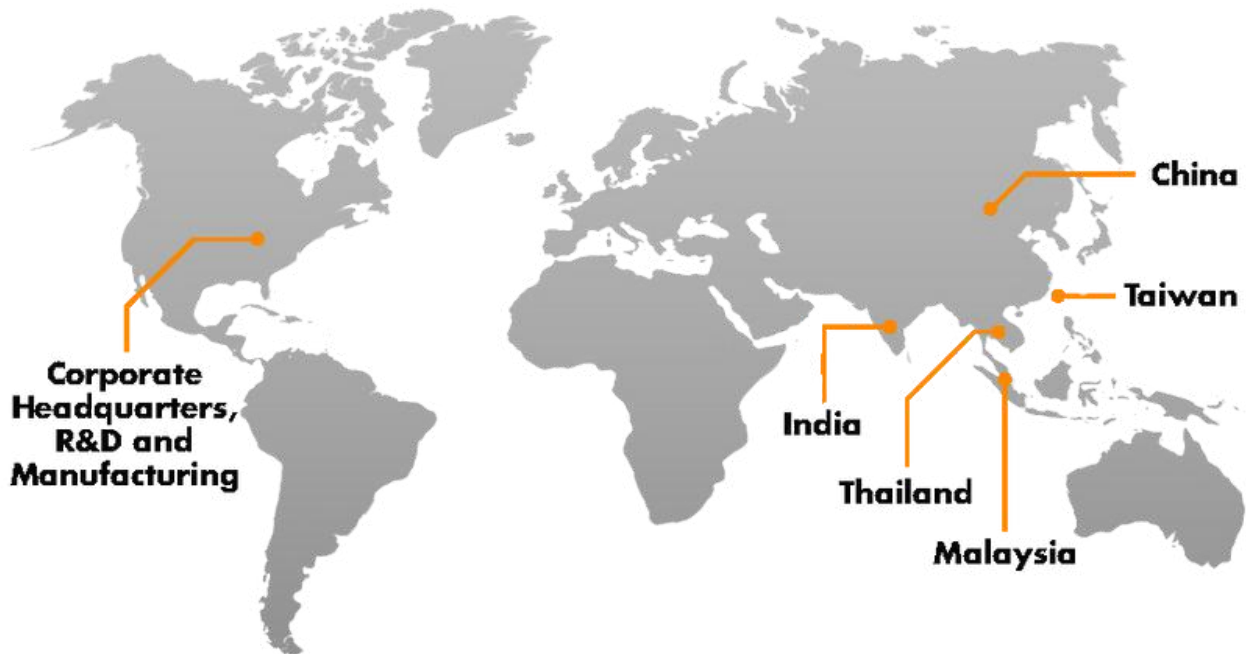
DUAL-FACE SEALS



Product Performance. Affordability. Availability

Black Hawk Seals, LLC is an innovative supplier of high quality, competitively priced seals developed exclusively for the fluid power industry, available through select, authorized dealers and distributors. Engineered for the most demanding seal applications using the latest manufacturing technology, superior materials and industry knowledge.

Black Hawk Seals manufactures heavy-duty dual-face seals with a focus on larger sizes. Every component of the seal is manufactured in one location, from the casting and machining to the O-rings and rubber components, enabling us to manage quality control over the entire manufacturing process and to ensure that our customers receive only the highest quality products.



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Dual-Face Seal Design Principle

The Dual-Face Seal sealing system consists of two separate floating metallic seals and two elastomeric load rings. As O-rings transfer pressure from housing to seal rings, it allows one metal seal ring to rotate with the housing while the other remains stable.

Seal rings interact with each other to form a contact sealing face perpendicular to the axis. As wearing occurs, the contact band will move inwards.

However, the O-ring releases elastic compensation, keeping mechanical face seals in a precise position to maintain its stability.

Floating Seal Features:

1. Wear and corrosion resistant, long service life, and maintenance free.
2. Exceptional seal capacity against exterior contaminants such as abrasive media, moisture, chemicals, and grease.



Dual-Face Seal (DO)

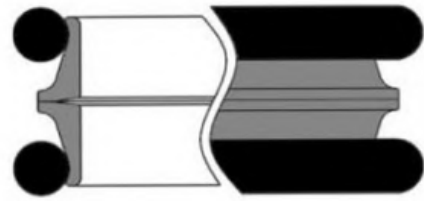
Dual-Face Seals consist of two separate metal seal rings and two O-rings that provide elastic compression within housing bores. Available metal seal ring sizes:

Outer Diameter: 35 -1422mm (Commonly used type: 200~1105mm)

Inner Diameter: 22 -1372mm

Thickness: 14 - 80mm

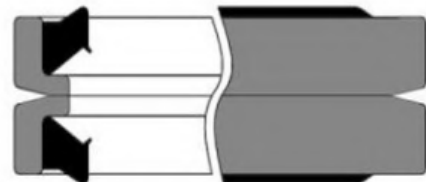
1. Metal seal rings are all manufactured by casting. Two kinds of material are offered.
2. O-ring material defines the operating temperature and pressure with four kinds of materials offered. Common NBR (NBR<40%), High Rubber NBR (NBR>60%), HNBR, and Silicone.
3. Dual-Face Seal advantages: lower price point & wider range of applications.
4. Primary Applications: conveyors, construction equipment, agricultural machinery, off-road and tracked vehicles, and mining equipment.



Media Conversion Dual-Face Seal

Media Conversion Dual-Face Seals consists of two separate metal seal rings and two square O-rings that provide elastic compression within housing bores.

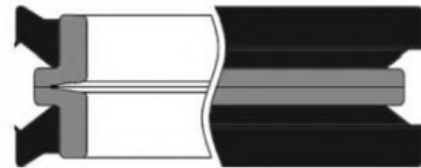
1. Available metal seal ring sizes: 209 - 700mm
2. Metal seal rings are all manufactured by casting. Two kinds of material are offered.
3. O-ring material defines the operating temperature and pressure with four kinds of materials offered. Common NBR (NBR<40%), High Rubber NBR(NBR>60%), HNBR, and Silicone.
4. Primary applications: conveyors and construction equipment.



Heavy Duty Dual-Face Seal (DF)

Heavy Duty Dual-Face Seals consist of two separate metal seal rings and two square O-rings that provide elastic compression within housing bores.

1. Available metal seal ring sizes:
 - Outer Diameter: 59 - 796mm (Commonly used type: 207~5305mm)
 - Inner Diameter: 42 - 750mm
 - Thickness: 14 - 54mm
2. Metal seal rings are all manufactured by casting. Two kinds of material are offered.
3. O-ring material defines the operating temperature and pressure with four kinds of materials Common NBR (NBR<40%), High Rubber, NBR (NBR>60%), HNBR, and Silicone.
4. Advantages: Easy to process housing bores & high sealing reliability.
5. Primary Applications: conveyors, construction equipment, agricultural machinery, off-road and tracked vehicles, and mining equipment.



Other Products

GH1



GH2



G



Installing Tool

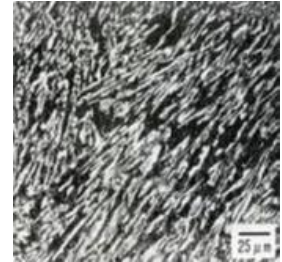


<p>Metal Seal Surface</p> 	<p>Black seal surface decreases rusting and increases O-ring gripping ability while eliminating O-ring sliding. For customers who require white seal surface, Black Hawk Seals offers anti-skid stripes to achieve the same effect.</p>
<p>Seal Face at 50x Magnification</p> 	<p>All the products are made by casting. As compared to forging, the cross hatched grooves make contact with the bands to ensure sufficient oil flow and heat management, enabling the seals to operate in the toughest industrial conditions.</p>
<p>CBN Grinding Surface</p> 	<p>All ground surfaces are made of CBN (Cubic Boron Nitride), ensuring spherical angular stability of products in the same batch and avoiding premature sealing failure.</p>
<p>High Rubber O-Ring</p> 	<p>O-ring manufacturing is performed on-site. The high elasticity increases the wear and corrosion resistance, providing a long service life for all products.</p>
<p>Spherical Cant Design</p> 	<p>The spherical cant design benefits the two connecting boundary lines, allowing self-centering to compensate for shaft misalignment.</p>

Metallographic Diagram

Metal Seal Ring Material

The metal seal rings are made of high alloy cast iron in a Rockwell hardness value of HRC 60-69. Recommended operating temperatures are between -50°C to 200°C. Since seal ring material has a direct effect on sealing ability, we have different recommendations according to application.



Black Hawk Seals offers two types of material. For specific conditions, contact us.

Product	Material	Process	Cost	Lifetime	Corrosion Resistant	Scratch Resistance
Chromium Molybdenum Alloy	15CrMo	Casting	Medium	Medium	Medium	Medium
High Chromium Molybdenum Alloy	15CRr3Mo	Casting	High	High	High	High

O-Ring Material

At standard operating temperatures, O-rings exhibit a shore hardness of 65, minimum tensile strength of 12 MPa , and elongation at fracture of a minimum of 300% at 100° and after continuous immersion in oil elasticity changes in the range of ±5° while compression is 12%. The O-ring material defines its operating temperatures and pressure, to be chosen according to the application.

Black Hawk Seals offers three types of material. For specific details, please contact us.

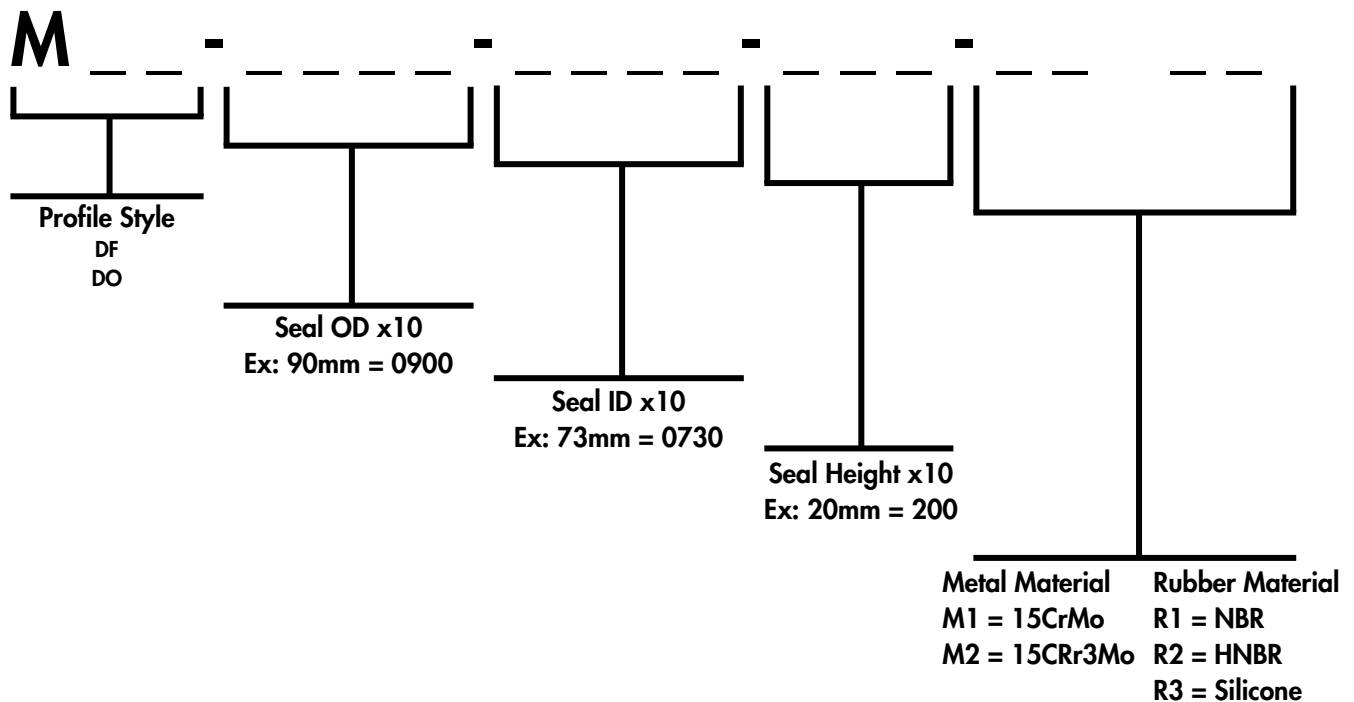
Product	Temperature	Main Content	Pressure Resistant	Tear Resistant	MFG Cost	Application	Reaction w/ Oil
NBR	-25°C to 90°C	40% NBR	Good	Good	Medium	Secondary Part	< 1%
HNBR	-40°C to 160°C	60% HNBR	Excellent	Excellent	High	Key Part	< 0.5%
Silicone	-50°C to 200°C	40% SI	Low	Medium	Medium	High Temp Part	> 2%

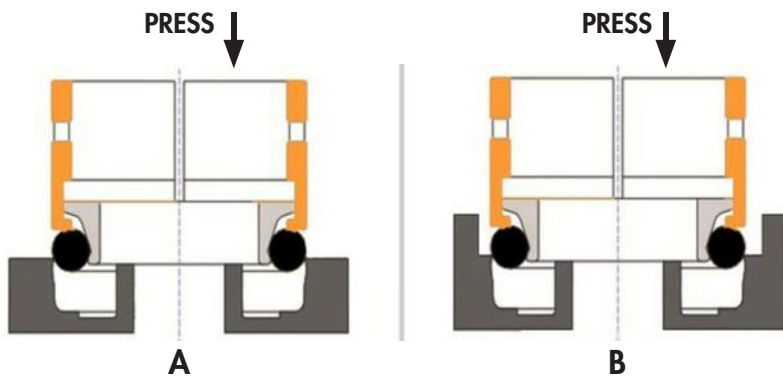
PART NUMBER STRUCTURE



The Dual-Face Seals and Heavy Duty Dual-Face Seals listed in this catalog are a small sample of available sizing. Refer to the part number formatting below and materials when ordering your Dual-Face Seals.

Call Black Hawk Seals at (260) 615-3951 for pricing and tooling options.





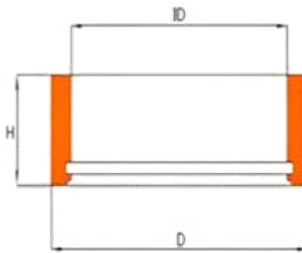
Black Hawk Seals offers two types of installing tools. Contact us for details.

- The O-ring must be seated in the outer radius (type DO) inside the retaining lip.
 - Only remove the seal from its packing immediately prior to installation.
 - Do not use sharp instruments during assembly which may damage the O-ring and cause eventual failure.
 - Do not lay the seal on the lapped surface.
 - Coat the seal face with a thin film of oil using a clean, lint-free cloth or similar.
 - Perform a visual check of the O-ring and seal's position, ensuring it is symmetrically seated and that the O-ring is not twisted.
 - Properly adjust the housing clearance gap.
 - Always use an installation tool (pictured below) for the best installation results.
- See next page for sizing.



Installation Tool	Drawing No.
FAT0010	CS9200
FAT0020	CS8250
FAT0030	CS7800
FAT0040	CS3250
FAT0050	CS2202
FAT0060	CS2050
FAT0070	CS1780
FAT0080	CS1630
FAT0090	CS10300
FAT0100	CS8950
FAT0110	CS3660
FAT0120	CS5590
FAT0130	CS6670
FAT0140	CS5050
FAT0150	CS10440
FAT0170	CS3180
FAT0180	CS1780
FAT0190	CS4290
FAT0200	CS1095
FAT0210	CS1501
FAT0230	CS1150
FAT0240	CS1240
FAT0250	CS1542
FAT0260	CS7800
FAT0270	CS2204
FAT0280	CS2980
FAT0290	CS3500
FAT0300	CS6600
FAT0310	CS8300
FAT0320	CS3002

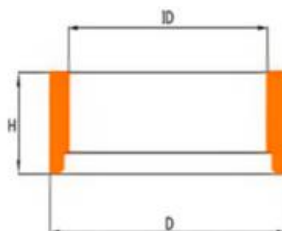
Type FAT



Installation Tool	Drawing No.
FAT0330	CS3870
FAT0340	CS3000
FAT0350	CS3400
FAT0360	CS3181
FAT0370	CS1300
FAT0380	CS3700
FAT0390	CS1540
FAT0400	CS4700
FAT0410	CS2520
FAT0420	CS1461
FAT0430	CS1820
FAT0440	CS2230
FAT0450	CS0905
FAT0460	CS1250
FAT0470	CS1770
FAT0480	CS2652
FAT0490	CS0380
FAT0500	CS0730
FAT0510	CS1541
FAT0520	CS1240
FAT0530	CS2250
FAT0540	CS1820
FAT0550	CS3805
FAT0560	CS2820
FAT0570	CS7380
FAT0580	CS5960
FAT0590	CS5910
FAT0600	CS4500
FAT0610	CS2235
FAT0620	CS2750
FAT0630	CS5800

Installation Tool	Drawing No.
FBT0080	CS1630
FBT0210	CS1501
FBT0230	CS1150
FBT0270	CS2204
FBT0390	CS1540
FBT0420	CS1461
FBT0430	CS1820
FBT0440	CS2230
FBT0450	CS0905

Type FBT

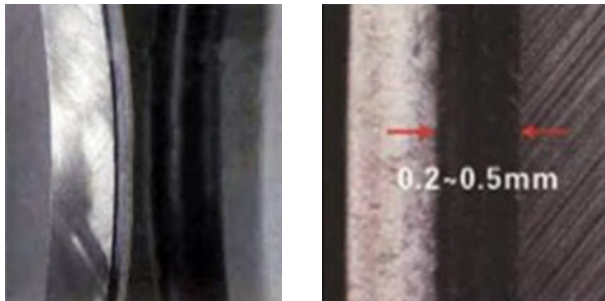


Installation Tool	Drawing No.
FBT0490	CS0380
FBT0500	CS0730
FBT0510	CS1541
FBT0240	CS1240
FBT0530	CS2250
FBT0550	CS3805
FBT0610	CS2235
FBT0630	CS5800

Lubricant Requirements

An oil based lubricant must always be used on the metal sealing surfaces. In some slow rotating or oscillating applications certain types of grease can be used but synthetic oils are always preferred. Oil provides both lubrication to the sealing faces and serves to cool the seal rings. Lubricant must fill a minimum of 33% of the sealing surface to properly lubricate and cool the rings. To allow adequate volume for thermal expansion, the oil must not exceed 70% volume at room temperature.

Oil and greases should be evaluated to ensure compatibility with O-ring prior to installation.



Seal face picture after 1,000 hours.
Contact band at 50x magnification.

Storage

The Dual-Face Seals are packed in order to prevent corrosion. We recommend storage in a clean, dry, and room temperature controlled environment. The seals should be stacked neatly and protected from any impacts which may cause dents or fractures. Any seals which have been opened but unused must be packed again before storage.



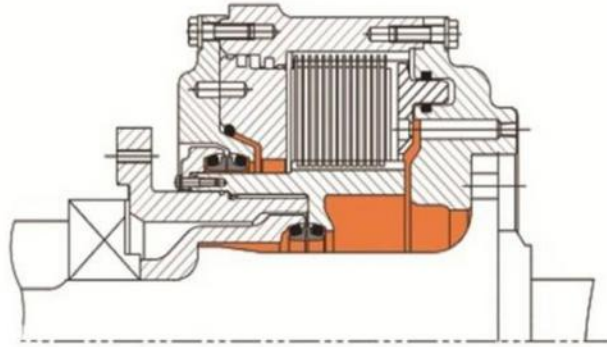
Seal Wear Measurements

The cast metal face of the Dual-Face Seals dynamically compensate for wear. The mating faces form a contact band approximately 0.2mm (0.008") to 0.5mm (0.02") wide which retains the oil lubricant and keeps out foreign material. As wear occurs, the contact band will migrate inwards. The seal face wear process is depicted in the figure below.

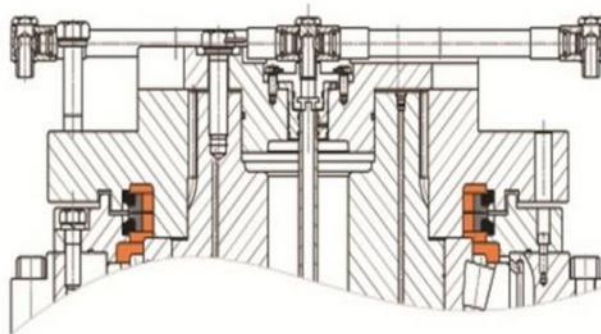
Remaining service life can easily be estimated without removing the assembly by visually inspecting the seal band location and matching this against the linear relationship between service hours and contact band position. Precise seal wear can be determined by removing the assembly and measuring the difference between the original and current seal band length.



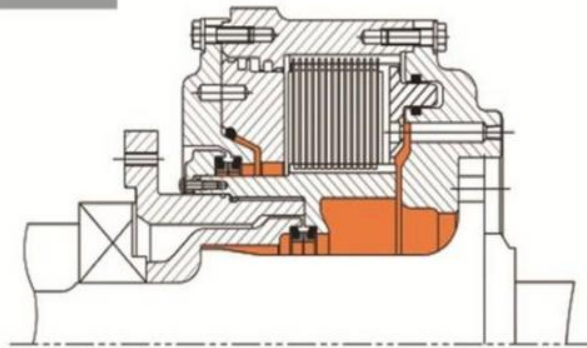
Handler



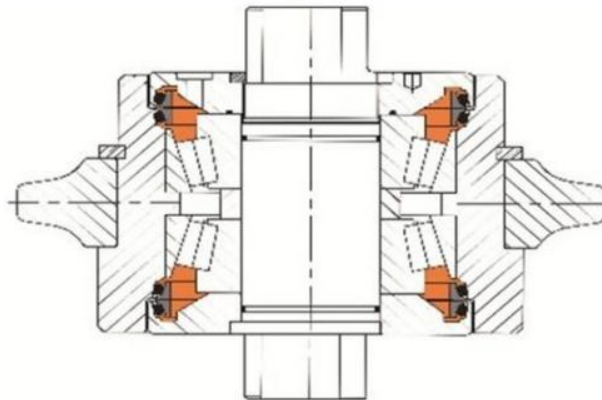
Coal Winning Machine



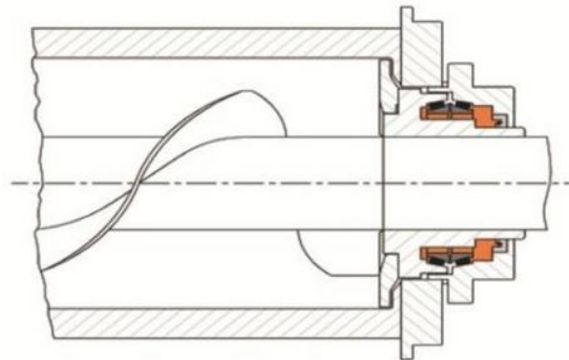
Mining Truck



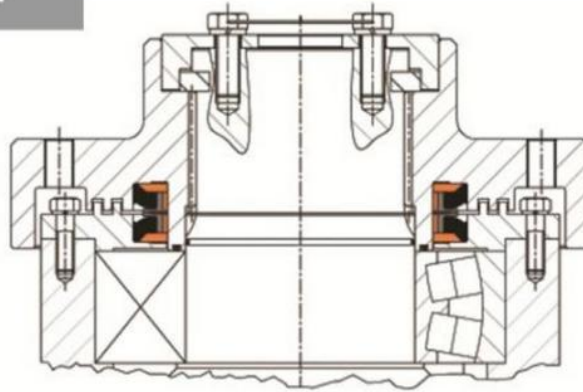
Shield Machine Hob



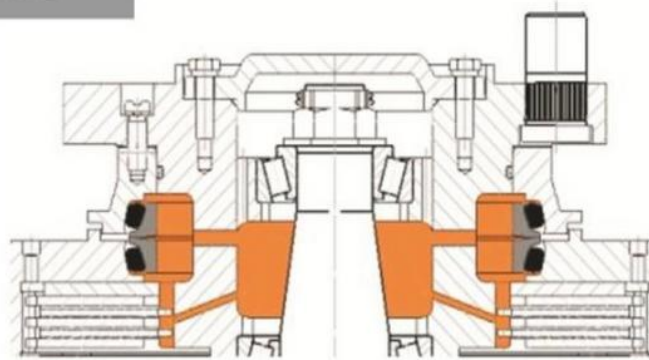
Mixing Machine



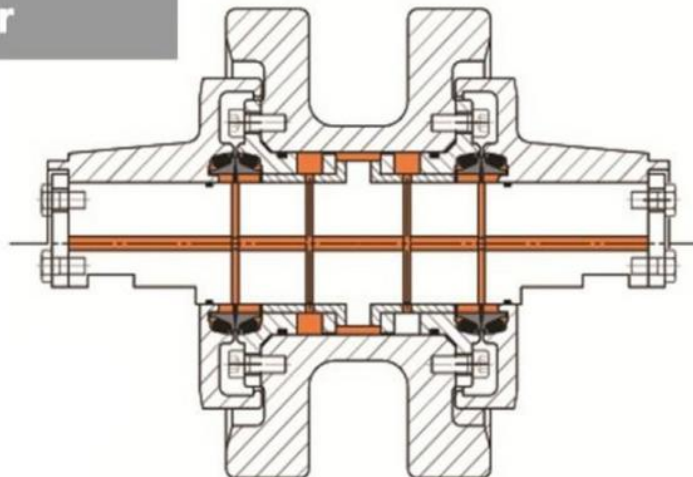
Scraper Conveyor



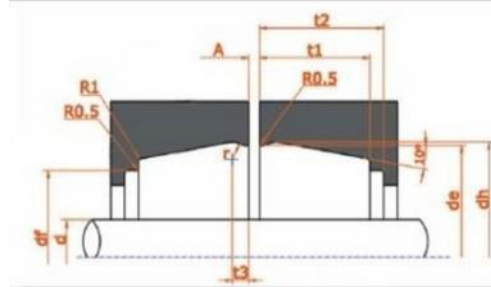
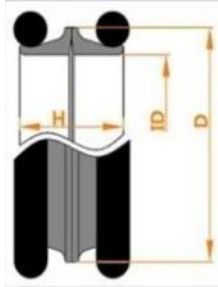
Heading Machine



Bulldozer



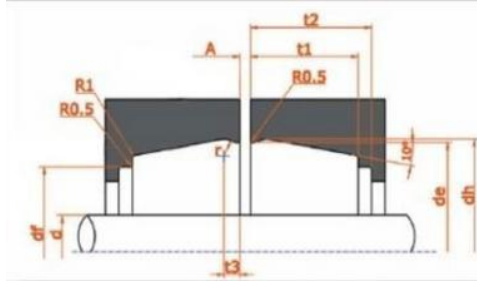
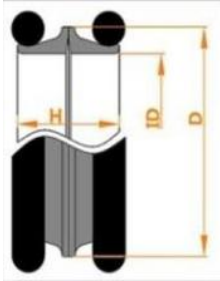
DUAL-FACE SEAL (DO)



Drawing No.	A	Seal Set			(Max)d	Housing Bore							
		OD	ID	H		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS0220		35	22	20	18	37.7	37	29	9	10.5	1.8	2	0.1
CS0250		38	25	20	1	40.7	40	34	9	10.5	1.8	2	0.1
CS0305		42.5	30.5	17.6	30	44.3	44	39.5	7.3	8.8	1.1	2	0.1
CS0340		45	34	14	35	47	46.5	42	6.5	8	1	1	0.1
CS0380		51	38	20	35	53.7	53	46	9	11	1.8	2	0.1
CS0381		51	38	20	39	53.7	53	46	10	11.5	1.8	2	0.1
CS0435		58	43.5	24	41	61.6	61	52	11	13.5	2.8	5	0.1
CS0450		58	45	21	41	61.6	60.8	53.4	10	12	1.8	2.5	0.1
CS0451		59	45	26.8	42	62.3	61.5	53	13.5	15.5	2.7	2.8	0.1
CS0460		60	46	24	42	64	63	54	11	13.5	2.8	5	0.1
CS0461		59	46	20	445	62.5	61.8	56	8.5	10.5	1.8	2	0.1
CS0480		62	48	25	45	68	67.2	58	12	14	2	3	0.1
CS0481		58	48	14.4	45	59.9	59.4	55	6.3	80	1.5	1.7	0.1
CS0485		62	48.5	18	45	64	63.5	59	7.3	8.8	1.1	2	0.1
CS0510		65.6	51	26.8	47	68	67.2	62	13.5	15.5	2.7	2.8	0.1
CS0540		68	54	24	51	72	71	60	11	13.5	2.8	5	0.1
CS0550		67	55	18	52	69.1	68.6	64	7.3	8.8	1.1	2	0.1
CS0551		66.5	55	20	52	72.8	73.1	60	8.5	10.5	1.8	2	0.1
CS0555		70	55.5	22	52	73.8	73.1	65.5	10	11.5	2.4	5	0.1
CS0556		70	55.5	22	52	74.8	74.1	66.5	10	11.5	2.4	5	0.1
CS0560		70	56	25	53	76	75.2	66	12.5	14.5	2	3	0.1
CS0575		74	57.5	26	54.5	78	77	66	13	15	2	3	0.1
CS0580		75	58	27	55	79.4	78.6	67	13.5	15.5	2	3	0.1
CS0581		77.5	58	36	55	82.2	81.2	70	18	20.5	3.1	6	0.1
CS0582		75.5	57.8	26	55	80	79.1	67	13	15	2	3	0.1
CS0600		74	60	20.6	57	78.4	77.4	70	9	11	1.9	2.5	0.1
CS0602		73	60.2	20	57	76.5	75.8	69	8.5	10.5	1.8	2	0.1
CS0610		83	61	30	58	85.2	84.2	75	14.5	17	2.8	5	0.15
CS0611		73	61	17.6	58	75.8	75.5	66.8	6.5	7.5	1	1.4	0.1
CS0620		73.2	62	17	58	76.7	76.1	70	8.2	9.2	2.3	1.5	0.1
CS0621		73.5	62	16	58	76.7	76.1	70	8.2	9.2	2.3	1.5	0.1
CS0630		80.5	63	26	60	84	83.2	72	11.5	13	2.5	5	0.1
CS0635		82.5	63.5	31.8	60.5	86.8	86	74.5	14.5	17.5	2.8	5	0.1
CS0640		78	64	25	61	84.6	84	74	12.5	14.5	2	3	0.1
CS0641		76	64	17.6	61	78.8	78.5	71.5	7.3	8.8	1.1	2	0.1
CS0660		86	66	28	63	90	89.2	78	13.5	15.5	2	3	0.1
CS0661		85	66	26	63	90.5	89.5	77	13	15	2	3	0.1
CS0670		80	67	20	64	83.4	82.7	76.8	805	10.5	1.8	2	0.1
CS0675		86.5	67.5	31.8	64.5	91	90	78	14.5	17	2.8	5	0.15
CS0685		89	68.5	24	65.5	92.5	91.5	83	11	13.5	2.8	5	0.1
CS0690		84	69	24	66	89.6	88.6	78	11	13.5	2.8	5	0.1
CS0700		90	70	28	66	95	94	84	13.5	15.5	2	3	0.1
CS0701		87	70	21	66	91.8	90.8	84	9.2	10	2.3	3	0.1
CS0702		84	70	20	66	86.5	85.7	55	90	11	1.8	2	0.1

Contact Black Hawk Seals at (260) 615-3951 for more sizes and pricing

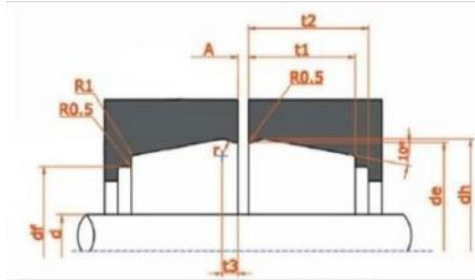
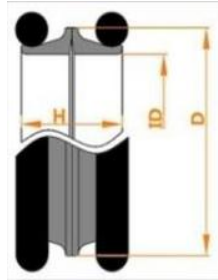
DUAL-FACE SEAL (DO)



Drawing No.	A	Seal Set			(Max)d	Housing Bore							
		OD	ID	H		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS0710		84	71	20	68	87.4	86.7	80.8	8.5	10.5	1.8	2	0.1
CS0705		92	72.5	36	69	96.5	95.5	85	18	20.5	3.1	6	0.1
CS0730		92	73	31.8	70	96.4	95.4	84	15	17	2.8	5	0.1
CS0738		88	73.8	22	70.5	89.8	89.6	81	10	11.5	2	4	0.1
CS0740		86.4	74	22	71	91.5	90.5	81	10	11.5	2	4	0.1
CS0741		87	74	21	71	95	94	83	10	11.5	2	4	0.1
CS0746		93	74.6	29	72	100.7	99.9	84	15	17	2.8	5	0.1
CS0750		94.5	75	32	71	98	97	86	14.5	17	2.8	5	0.15
CS0760		94	76	29	72	101.4	100.4	88	14.5	16.5	2	5	0.1
CS0775		87.5	77.5	14	75.9	90.7	90.2	85.5	7	8	1.5	1.5	0.1
CS0790		100	79	30	76	105.2	104.2	92	14.5	17	2.8	5	0.1
CS0795		92.5	79.5	20	76.5	96	95.3	88	8.5	10.5	1.8	2	0.1
CS0800		100	80	29	77	105	104	92	14.5	16.5	2	3	0.1
CS0801		100	80	29	77	104	103.2	92	14.5	16.5	2	3	0.1
CS0810		98	81	28	78	102.3	101.3	91	12.5	14.5	2.8	5	0.1
CS0825		102	82.5	36	80	106.3	105.3	95	18	20.5	3.1	6	0.1
CS0830		102	83	28	80	105.4	104.5	94	12.5	15	2.8	5	0.1
CS0845		104.5	84.5	32	81	109	108	99	14.5	17	2.8	5	0.1
CS0880		108	88	24	85	111.5	110.5	102	11	13.5	2.8	5	0.1
CS0890		108	89	29	86	112	111	100	14.5	16.5	2	5	0.1
CS0900		105	90	26	87	107.4	106.6	100.4	11.8	14.2	2.9	2.8	0.1
CS0901		102	90	20	88.4	107.4	106.6	100	9	11	1.8	2	0.1
CS0905		109	90.5	32	88.5	114	113	101.5	14.5	17.5	2.8	5	0.1
CS0910		110	91	32	89	114	113	101.5	14.5	17.5	2.8	5	0.1
CS0920		109	92	22	88	113.8	112.8	104	10	11.5	2	4	0.1
CS0940		107	94	22	91	112	111	102	10	11.5	2	4	0.1
CS0950		114	95	32	92	120	119	106	14.5	17	2.8	5	0.15
CS0951		111	95	24	92	115.6	114.9	108	11	13	1.8	2	0.1
CS0965		106.5	96.5	14	94.9	109.7	109.2	108.5	7	8	1.5	1.5	0.1
CS0970		116	97	32	94	120.5	119.5	108	14.5	17	2.8	5	0.15
CS0980		119	98	29.6	95	124.2	123.2	111	14.5	17	2.8	5	0.15
CS0985		115	98.5	21.2	95	117.3	116.5	110	9	11	1.8	2	0.1
CS0990		120	99	28	96	123.5	122.5	112	12.5	14.5	2.8	5	0.1
CS1000		119	100	32	97	123.5	122.5	111	14.5	17	2.8	5	0.15
CS1001		119	100	32	97	124	123	111	14.5	17	2.8	5	0.15
CS1010		120	101	30	98	125	124	111	14.5	17	2.8	5	0.15
CS1020		122	102	33	99	127.2	126.2	114	16.5	18.5	3.1	3	0.15
CS1021		118	102	27	99	124	123	112	12	14.5	2.8	5	0.1
CS1030		117	103	20	100	119.8	119	112.5	9	11	1.8	2	0.1
CS1039		117.1	103.9	20	100	121	120.2	114	9	10.5	2	3	0.1
CS1040		117	104	22	101	122	121	112.5	10	11.5	2	4	0.1
CS1041		122	104	22	101	125.8	124.8	117	10	11.5	2	4	0.1
CS1042		125	104	28	101	128.5	127.5	117	12.5	14	2.8	5	0.1
CS1070		125	107	24	103	130.4	129.4	119.5	11	13.5	2.8	5	0.1
CS1095		127	109.5	32	104	132.6	131.3	121	14.5	17	2.8	5	0.15
CS1100		128	110	32	106	133	132	121	14.5	17	2.8	5	0.15
CS1101		132	110	32	107	136.5	135.5	125	14.5	17	2.8	5	0.15
CS1110		133	111	32	108	137	136	124.5	14.5	18	2.8	5	0.1

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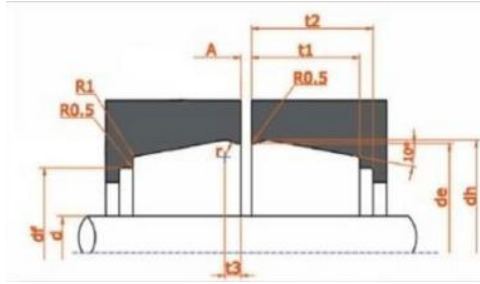
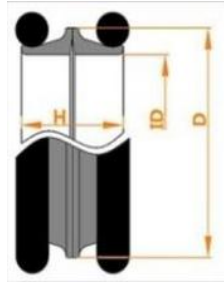
DUAL-FACE SEAL (DO)



Drawing No.	A	Seal Set				Housing Bore							
		OD	ID	H	(Max)d	Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS1120		132	112	31.8	110	136.3	135.3	124	15	17	2.8	5	0.15
CS1145		129	114.5	21	111	134.1	133.1	126	9.2	10	2.3	3	0.1
CS1150		137	115	31	112	141.8	140.8	130	14.5	16.5	2.8	3	0.1
CS1170		140	117	29	114	142.5	141.5	132	13	14	2.8	5	0.15
CS1171		138	117	32	115	142.5	141.5	132	14.5	17	2.8	5	0.1
CS1180		138	118	32	115	143	142	132	14.5	17	2.8	5	0.1
CS1200		142	120	38	116	149	148	133	17	19	3.1	6.5	0.15
CS1201		139	120	32	116	143.8	142.8	132	14.5	17	2.8	5	0.15
CS1202		138	120	32	117	143	142	132	14.5	17	2.8	5	0.1
CS1235		143.5	13.5	29.4	120	148	147	137	12.5	13.5	2.8	5	0.1
CS1240		141	124	22	120	146.4	145.3	136	10	11.5	2	4	0.1
CS1250		144	125	31.8	121	148.5	147.5	136	14.5	17	2.8	5	0.15
CS1270		140.7	127	25	124	144	143.2	135	12	14.5	2	3	0.1
CS1271		146	127	32	124	150.5	149.5	138	14.5	17.5	2.8	5	0.15
CS1272		141.1	127	29	124	148.2	147.2	135	13.2	15.5	2.8	5	0.15
CS1273		141	127	29	124	144	143	136	12	14.5	2.3	3	0.1
CS1300		150	130	32	125	156	155	144.6	14.5	17	2.8	5	0.15
CS1301		151	130	32	125	156	155	144.6	14.5	17.5	2.8	5	0.15
CS1302		152	130	38.4	125	159	158	142	18	20.5	3.1	6.5	0.2
CS1303		150.1	130	32	125	156	155	144.6	14.5	17.5	2.8	5	0.15
CS1320		152	132	30	129	156.2	155	144.6	12.5	14.5	2.5	3	0.1
CS1355		154.5	135.5	28	132	158.3	157.3	146.5	12.5	14	2.8	5	0.15
CS1360		155	136	30	132	159.7	158.7	145	14.5	17	2.8	5	0.15
CS1370		153	137	30	132	161.7	160.7	143	14.5	17	2.8	5	0.15
CS1400		155	140	26	137	158.6	157.6	147	13	15	2	3	0.1
CS1420		160	142	33	139	166	165	152	16.5	18.5	3.1	3	0.2
CS1430		157.01	143	25	139	160	159	152	12	14.5	2.3	3	0.1
CS1431		160	143	27	138	164	163	154	12	14.5	2.8	5	0.1
CS1432		157	143	27	138	160	159	152	12	14.5	2.3	3	0.1
CS1440		157.05	144	26	138	160	159	152	12	14.5	2.3	3	0.1
CS1460		168.1	146	38	143	177	176	159	18	20.5	3.1	6.5	0.15
CS1461		172	146	38	143	177	176	159	18	20.5	3.1	6.5	0.15
CS1462		175	146	38	143	180.5	179.5	168	17.5	20.5	3.1	6.5	0.2
CS1470		167	147	28	143	171	170	160	13	15.5	2.8	5	0.15
CS1500		172	150	40	146	176.3	175.5	165	18	20	2.5	3	0.15
CS1501		171	150	32	146	175.6	174.6	164	14.5	17	2.8	5	0.15
CS1502		172	150	40	146	179	178	165	18	20	2.5	3	0.15
CS1503		167	150	28	146	171	170	160	12.5	14.5	2.8	5	0.1
CS1504		172	150	39	146	176.5	175.5	165	18	20	2.5	3	0.15
CS1530		171.5	153	28	150	176.3	175.3	164.5	12.5	14.5	2.8	5	0.1
CS1535		172.5	153.5	32	150.5	178	177	166	14.5	17	2.8	5	0.15
CS1539		168	153.9	26	151	171	170.2	163	12	14.5	2.3	3	0.1
CS1540		168	154	27	151	171	170	163	12	14.5	2.3	3	0.1
CS1541		169	154	22	151	174.5	173.5	166	10	11.5	2	4	0.1
CS1542		170	154	21	151	175.1	174.1	167	9.2	11	2.3	3	0.1
CS1543		173.5	154	32	151	178	177	166	14.5	17	2.8	5	0.15
CS1544		173.5	154	32	151	179	187	167	14.5	17	2.8	5	0.15
CS1545		178	154	34	151	181	180	171	18	20.5	3.1	6	0.2

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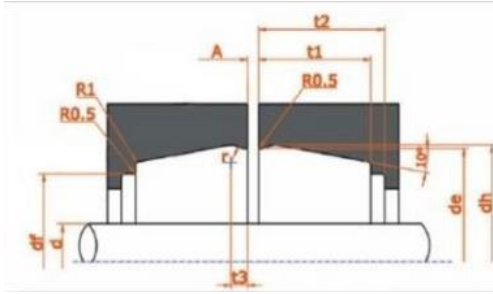
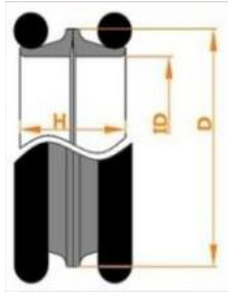
DUAL-FACE SEAL (DO)



Drawing No.	A	Seal Set			(Max)d	Housing Bore							
		OD	ID	H		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS1550		177	155	39	152	180	179	168	18	20	2.5	3	0.2
CS1600		180	160	32	156	186.5	185.5	174	14.5	17	2.8	5	0.15
CS1630		191	163	38	159	196.5	195.5	178.5	18	20.5	3.1	6.5	0.2
CS1631		191	163	46	159	196.8	195.8	178.4	21	23.5	3.1	6.5	0.2
CS1633		191.5	163	38	159	196.5	195.5	178.5	18	20.5	3.1	6.5	0.2
CS1640		189	164	30	159	193.5	192.5	179	14.5	17	2.8	5	0.15
CS1650		181	165	27	161	185	184	176.5	12	14.5	2.3	3	0.15
CS1651		183	165	28	161	188	187	176	12.5	14.5	2.8	5	0.1
CS1665		191.5	166.5	38	163	196.5	195.5	178.5	18	20.5	3.1	6.5	0.2
CS1670		194	167	38	163	199	198	187	18	20.5	3.1	6.5	0.2
CS1690		188.5	169	32	165	193.5	192.5	179	14.5	17	2.8	5	0.15
CS1713		185.3	171.3	20	167	188	187.3	180	9	11	1.8	2	0.1
CS1720		194.4	172	31.8	168	198.9	197.9	186	14.5	17	2.8	5	0.15
CS1725		190	172.5	25.4	169	192.7	191.8	188	12.7	14.3	2.3	2.8	0.1
CS1730		200	173	36	169	205.5	204.5	190.5	18	20.5	3.1	6	0.2
CS1731		200	173	40	170	204.5	203.5	191	18	20.5	3.1	6.5	0.2
CS1740		190	174	25.4	170	192.7	191.8	188	12.7	14.3	2.3	2.8	0.1
CS1760		195	176	28	171	199.8	198.8	188	12.5	14.5	2.8	5	0.1
CS1770		200	177	30	173	204.5	203.5	191	14.5	17	2.8	5	0.15
CS1780		200	178	38	174	210.6	209.6	191	18	20.5	3.1	6.5	0.2
CS1781		200	178	38	174	212	211	191	18	20.5	3.1	6.5	0.2
CS1782		199	178	32	174	203.6	202	190	14.5	17	2.8	5	0.2
CS1783		198.3	178	21.4	174	202.2	201.9	196	9.4	10.6	1.2	3	0.1
CS1800		198.4	180	21.4	173	202.2	201.9	196	9.4	10.6	1.2	3	0.1
CS1820		210.5	182	38	179	215.5	215.5	197.5	18	20.5	3.1	6.5	0.1
CS1825		210.3	182.5	46	179	215.4	215.5	197.5	21	23.5	3.1	6.5	0.1
CS1830		202	183	28	179	206	205	195	12.5	14.5	2.8	5	0.1
CS1860		203	186	25.4	182	205.7	204.8	192	12.7	14.3	2.3	2.8	0.1
CS1865		202.2	186.5	21.4	182	207	206	202	9.4	10.6	1.2	3	0.1
CS1866		202.8	186.5	21.7	182	208	207	202	9.4	10.6	1.2	3	0.1
CS1900		216	190	44	186	224	223	206.5	21	22.5	3.1	3	0.2
CS1901		216.1	190	36	186	221	220	206	18	20.5	3.1	6	0.2
CS1910		210	191	28	188	214	213	203	12.5	14.5	2.8	5	0.1
CS1920		215	192	33	189	220.8	219.8	207	16.5	18.5	3.1	6	0.15
CS1921		209	192	30	189	213.5	212.5	200	14.5	17	2.8	5	0.15
CS1930		218	193	38	190	225	224	208	18	20.5	3.1	6.5	0.2
CS1950		216.5	195	31.8	191	221	220	207	14.5	17	2.8	5	0.15
CS2000		228.5	200	38	196	233.5	232.5	215.5	18	20.5	3.1	6.5	0.2
CS2010		222.3	201	26.5	197	226.9	226.1	218	11.8	14.2	2.2	2.5	0.1
CS2020		222.3	202	26.5	197	224.9	224.1	217.9	11.8	14.2	2.2	2.5	0.1
CS2040		222.5	204	26	206	225.4	224.4	217	11.5	13.5	2.2	2.5	0.1
CS2050		227	205	30	201	231.5	230.5	219	14.5	17	2.8	5	0.1
CS2070		227.5	207	32	203	231.3	230.3	219	14.5	17.5	2.8	5	0.1
CS2085		222.8	208.5	26	206	225.4	224.4	217	11.5	13.5	2.2	2.5	0.1
CS2090		234	209	42	206	242.6	241.6	224	19.5	21.5	3	4	0.15
CS2100		240	210	40	207	246.4	245.4	228	18	20.5	3.1	6.5	0.2
CS2160		237	216	30	212	241.5	240.5	229	14.5	17	2.8	5	0.15
CS2170		240	217	36	213	244	243	228	18	20.5	3.1	6	0.2

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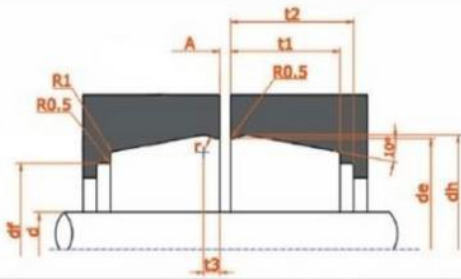
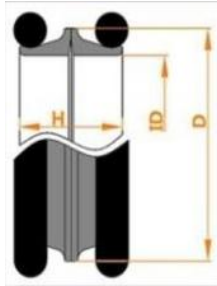
DUAL-FACE SEAL (DO)



Drawing No.	A	Seal Set			(Max)d	Housing Bore							
		OD	ID	H		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS2180		246	218	38	214	251	250	239	17.5	20.5	3.1	6.5	0.2
CS2190		245	219	32	215	250	249.9	238.4	14.5	18	2.8	5	0.1
CS2201		246	220	41	216	254.6	253.6	236	20.5	22.5	3	4	0.2
CS2203		241.2	220	25	216	244.7	244	233.9	11	13.5	2.2	4	0.1
CS2204		239.5	220	31.8	216	244	243	232	14.5	17	2.8	5	0.15
CS2220		246	222	36	218	251.6	250.6	236.5	18	20.5	3.1	6	0.2
CS2230		251.4	223	38	219	256.5	255.5	238.5	18	20.5	3.1	6.5	0.2
CS2235		252	223.5	46	220	257	255.9	238.9	21	23.5	3.1	6.5	0.2
CS2260		253	226	38	223	258	257	241	18	20.5	3.1	6.5	0.2
CS2265		251.6	226.5	38	222	256.5	255.5	238.5	18	20.5	3.1	6.5	0.2
CS2320		260	232	36	228	265	264	250	18	20.5	3.1	6	0.2
CS2321		259.5	232	38	228	264.7	263.7	247	18	20.5	3.1	6	0.2
CS2340		260	234	36	230	265	264	250	18	20.5	3.1	6	0.2
CS2350		259.5	235	38	231	264.7	263.7	247	18	20.5	3.1	6	0.2
CS2360		266	236	42	233	275	274	256	19.5	21.5	3	4	0.15
CS2380		261	238	32	234	265.5	264.5	254	14.5	17	2.8	5	0.15
CS2390		268	239	40	235	274.2	273.2	257	18	20.5	3.1	6.5	0.15
CS2400		262.8	240	38	236	273.5	272.5	255.5	18	20.5	3.1	6.5	0.2
CS2401		268.5	240	38	236	273.5	272.5	255.5	18	20.5	3.1	6.5	0.2
CS2402		268.5	240	38	236	282	270	255.5	19	21.5	3.1	6.5	0.2
CS2410		273	241	40	237	278	277	266	19	21.5	3.1	6.5	0.2
CS2420		262.5	252	40	239	273.5	272.5	255.5	18	20.5	3.1	6.5	0.2
CS2450		264.5	245	32	241	269	268	257	14.5	17	2.8	5	0.15
CS2500		276	250	44	246	284.06	283.6	266	20.5	22.5	3.1	6.5	0.2
CS2501		270	250	30	246	274.7	273.7	262	14.5	17	2.8	5	0.2
CS2520		280	252	38	249	285.5	284.5	267.5	18.5	20.5	3.1	6.5	0.2
CS2600		288	260	40	254	294	293	276	18.5	20.5	3.1	6.5	0.2
CS2620		290	262	38	260	298	297	280	18	20.5	3.1	6.5	0.2
CS2650		292.8	265	46	261	298	297	280	21	23.5	3.1	6.5	0.2
CS2652		293	265	38	261	298	297	280	18	20.5	3.1	6.5	0.2
CS2653		294	265	38	261	299	298	280	18	20.5	3.1	6.5	0.2
CS2680		293	268	38	265	298	297	280	18	20.5	3.1	6.5	0.2
CS2720		300	272	40	268	304	303	286	18	20.5	3.1	6.5	0.2
CS2740		300	274	40	268	305	304	286	18	20.5	3.1	6.5	0.2
CS2741		300	274	40	268	306	305	286	18	20.5	3.1	6.5	0.2
CS2750		303	275	38	271	308	307	290	18	20.5	3.1	6.5	0.2
CS2770		310	277	38	273	315.5	314.5	303	17.5	20.5	3.1	6.5	0.2
CS2825		310.8	282.5	38	279	316.3	315.4	298	18	20.5	3.1	6.5	0.2
CS2900		314	290	40	287	325	324	305	18	20.5	3.1	6.5	0.2
CS2940		327	294	42	290	333.2	332.2	315	19	21.5	3.1	6.5	0.2
CS2980		328	298	40	295	332.5	331.5	315	19	21.5	3.1	6.5	0.2
CS3000		328	300	40	295	333	332	315	19	21.5	3.1	6.5	0.2
CS3001		330	300	41	295	338	337	318	19.5	22	3.1	6.5	0.2
CS3002		325	300	38	295	335.5	334.5	318	17.5	20.5	3.1	6.5	0.2
CS3090		337	309	40	304	341	340	325	19	21.5	3.1	6.5	0.2
CS3180		341	318	38	315.5	351.5	350.5	334	18	20.5	3.1	6.5	0.2
CS3181		346	318	38	315.5	351.5	350.5	334	18	20.5	3.1	6.5	0.2
CS3185		346	318.5	46	315.5	351.5	350.5	334	21.5	23.5	3.1	6.5	0.2

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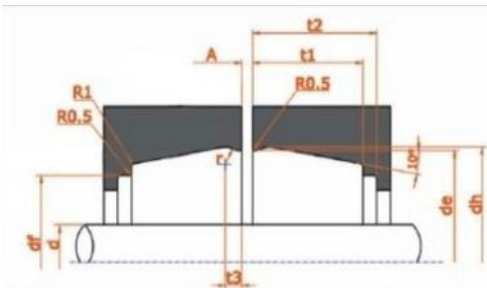
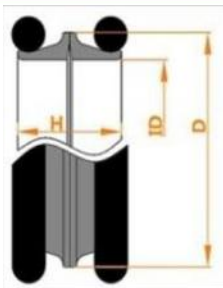
DUAL-FACE SEAL (DO)



Drawing No.	A	Seal Set			(Max)d	Housing Bore							
		OD	ID	H		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS3200		348	320	40	316	354	535	338	19	21.5	3.1	6.5	0.2
CS3220		346	322	46	320	351.5	350.5	334	21.5	23.5	3.1	6.5	0.2
CS3250		353.8	325	30	320	358.8	357.8	346	14.5	17	2.8	5	0.2
CS3360		368	336	40	330	374.8	373.8	358	19	21.5	3.1	6.5	0.2
CS3395		368	339.5	40	335	374.8	373.8	358	19	21.5	3.1	6.5	0.2
CS3400		370	340	40.4	335	375.7	374.7	358	19	21.5	3.1	6.5	0.2
CS3500		376	350	44	345	386	385	368	20.5	22.5	3.1	6.5	0.2
CS3501		375	350	38	345	385.5	384.5	36	17.5	20.5	3.1	6.5	0.2
CS3550		375	355	38	350	385.5	384.5	368	17.5	20.5	3.1	6.5	0.2
CS3560		375	356	38	351	388.5	387.5	370	17.5	20.5	3.1	6.5	0.2
CS3650		381	365	38	361	400	399	381	17.5	20.5	3	6.5	0.2
CS3660		394	366	38	361	399.5	398.6	381	17.5	20.5	3	6.5	0.2
CS3690		394.4	369	38	365	399.5	398.6	381	17.5	20.5	3	6.5	0.2
CS3700		394	370	38	365	403.5	402.6	385	17.5	20.5	3	6.5	0.2
CS3805		398	380.5	40	375	412.2	410.5	395	19	21.5	3.1	6.5	0.25
CS3810		405	381	40.8	376	415	414	393	19	21.5	3.1	6.5	0.2
CS3820		405	382	42	378	415.4	414.4	400	19.5	21.5	3	4	0.15
CS3870		410	387	38	382	419.5	418.6	402	17.5	20.5	3	6.5	0.25
CS3871		415	387	38	382	420.3	419.4	402	17.5	20.5	3	6.5	0.25
CS3880		415	388	38	383	423.5	422.5	402	17.5	20.5	3	6.5	0.25
CS3980		417	398	38	393	431.6	430.6	412	17.5	20.5	3	6.5	0.25
CS4070		426	407	38	404	442.5	441.5	424	17.5	20.5	3	6.5	0.25
CS4240		436	424	42	420	461	460	444	19.5	21.5	3	4	0.15
CS4285		454	428.5	37	425	462.3	461.3	444	18	21	3	6.5	0.25
CS4290		457	429	38	426	462.3	461.3	444	17.5	20.5	3	6.5	0.25
CS4300		457	429	38	426	463.5	462.5	444	17.5	20.5	3	6.5	0.25
CS4450		473	445	38	440	478.3	477.3	460	17.5	20.5	3	6.5	0.25
CS4480		482.5	448	40	443	486.3	484.3	470	19	21.5	3	6.5	0.25
CS4500		480	450	50	445	492.2	490.2	470	23.5	25.5	4	6	0.25
CS4600		494	460	60	455	504.2	503.2	484	23.8	25.2	4.7	8	0.4
CS4650		495	465	44	460	500.7	498.5	482.9	21.2	22.9	4.7	7	0.25
CS4651		497	465	44	460	503.1	500.9	482.9	21.2	23	4.7	7	0.25
CS4700		500	470	50	465	512.2	510.2	490	23.5	25.5	4	6	0.25
CS5050		533.4	505	44	502	538.4	537.4	521	19.7	21.7	4	6.5	0.25
CS5051		535	505	44	503	541.8	539.7	521	19.7	21.7	4.2	6.5	0.25
CS5080		548	508	60	501	553	551.5	528	22	26	5	9	0.25
CS5300		560	530	50	524	572.2	570.2	545	23.5	25.5	4	6	0.25
CS5380		567	538	44	532	573.1	572.1	555	19.7	21.7	4	6.5	0.25
CS5590		590	559	50	554	602.2	600.2	575	23.5	25.5	4	6	0.25
CS5591		590	559	48	554	602.2	600.2	575	20	23	4	6	0.4
CS5800		608	581	44	576	613	612	596	19.7	21.7	4	6.5	0.25
CS5910		623	594	50	586	635.2	633.2	613	23.5	25.5	4	6	0.4
CS5960		628	596	50	591	640.2	638.2	618	23.5	25.5	4	6	0.4
CS6200		650	650	50	615	662.2	660.2	635	23.5	25.5	4	6	0.4
CS6600		690	660	50	650	705.3	703.3	680	20	22.5	4	6	0.4
CS6670		700	667	44	660	705.6	704.3	687	21.3	24	3.7	6.3	0.25
CS7180		750	718	50	710	762.2	760.2	740	23.5	25	4	6	0.4
CS7370		768	737	50	730	784	782	750	24	26	4	6	0.4

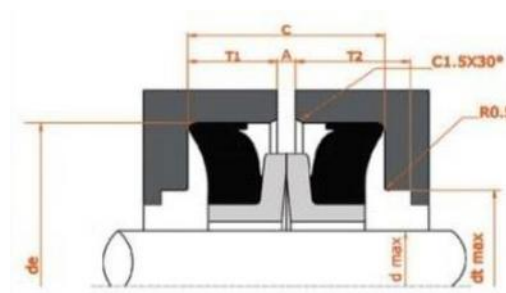
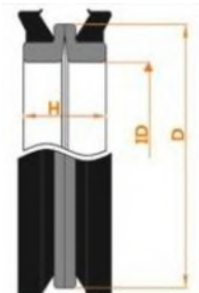
Contact Black Hawk Seals at (260) 615-3951 for more sizes and pricing

DUAL-FACE SEAL



Type DO

Drawing No.	A	Seal Set			(Max)d	Housing Bore							
		OD	ID	H		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS7380		770	738	50	730	782	780	760	24	26	4	6	0.4
CS7700		825	770	80	760	831.9	830.9	800	34.5	39.5	4.4	10	0.4
CS7800		835	780	80	770	841.9	840.9	810	34.5	39.5	4.4	10	0.4
CS8300		885	830	80	820	891.9	890.9	860	34.5	39.5	4.5	10	0.4
CS8310		865	831	44	830	870.6	869.7	852.7	21.3	26.2	3.8	6.3	0.15
CS9020		940	902	60	892	946.3	945.2	922.4	23.8	25.5	4.7	8	0.4
CS9200		975	920	80	910	981.9	980.9	950	34.5	39.5	4.4	10	0.4
CS10300		1082	1030	80	1010	1090.9	1089.9	1058	34.5	39.5	4.4	10	0.4
CS10460		1102	1043	80	1028	1110.9	1109	1078	34.5	39.5	4.4	10	0.4
CS11750		1233	1175	80	1155	1241.9	1240.4	1209	32.5	37.5	4.4	10	0.4
CS13720		1422	1372	80	1352	1430.9	1429.9	1398	32.5	37.5	4.4	10	0.4

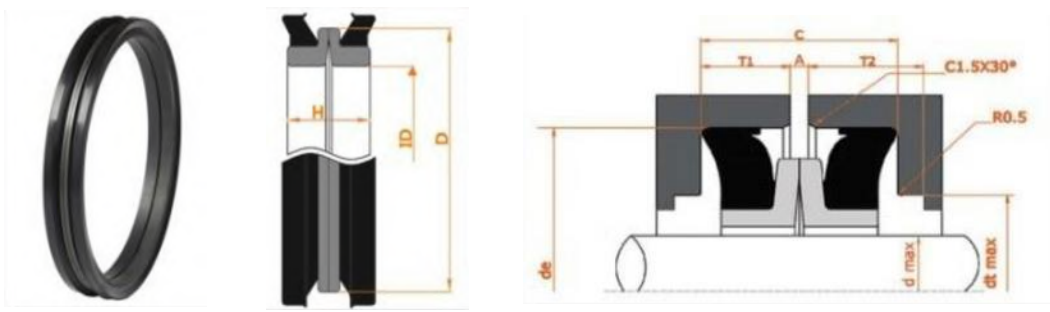


Type DF

Drawing No.	A	Seal Set			(Max)d	Housing Bore				
		OD	ID	H		Bore Dia	Shoulder Dia	Bore Depth	Total Depth	C
CS0420DF		59	42	20	38	65	53	10	10.5	23
CS0460DF		59	46	18	44	66	56	9	10.5	20
CS0470DF		62	47	20	44	70	58	10	11	23
CS0505DF		65	50.5	19	46	76.2	63	10	11	23
CS0530DF		67	53	17.2	50.5	76	62	6	7.5	15
CS0540DF		73	54	22	50	80	67	11.5	12	26
CS0580DF		78	58	20	54	82.6	65	10	11	23
CS0585DF		73	58.5	19	54	82.6	65	10	11	23
CS0586DF		80	58.6	19.6	56	84	71	9	9.5	21
CS0595DF		76	60	21	57	86	73	8.5	10	20
CS0635DF		81	63.5	19	59.5	87.8	71	9	9.5	21
CS0670DF		86.2	67	20	64	95.5	82	10	11	23
CS0671DF		87	67	25	64	95	81	12.5	13	29
CS0672DF		91.7	67	20	64	95.5	82	10	11	23

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HEAVY DUTY DUAL-FACE SEAL (DF)



Drawing No.	A	Seal Set			(Max)d	Housing Bore				
		OD	ID	H		Bore Dia	Shoulder Dia	Bore Depth	Total Depth	C
CS0730DF		90	73	20	70	101	87	9.5	11	22
CS0740DF		92.8	73.8	20	70	102.2	88	10	11	23
CS0741DF		99	74	20	70	102.2	88	10	11	23
CS0760DF		90	76	17	71	95	83	8	9.5	18
CS0770DF		97	77	25	74	105	87	12.5	13.5	29
CS0820DF		101.5	82	20	70	110.2	96	10	11	23
CS0825DF		100	82.5	22	78	114.3	97	11	12	25.5
CS0875DF		109	87.5	17.5	84	113	100	8.5	9.5	11
CS0876DF		111.5	87.5	19	85	115.8	102	10	11	23
CS0880DF		104	88	18	85.5	113	98	8.5	9.5	20
CS0900DF		106.5	90	14	96	117.5	108	13	14	30
CS0920DF		113	92	24	88	125.8	109	12	13	28
CS0940DF		112.5	94	24	90	125.8	109	12	13	28
CS0941DF		120	94	25	90	125.8	109	12	13	28
CS0990DF		123	99	19	95	127.3	113	10	11	23
CS0991DF		120	99	17.5	95	124	110	8.5	9.5	20
CS1040DF		132	104	27	100	141.2	121	15	16	33
CS1050DF		124	105	24	100	135	114	12	13	28
CS1075DF		123	107.5	15	105	127.5	105	7.5	8.5	18
CS1115DF		136	111.5	27	109	152.4	118	15	15	33.5
CS1140DF		133.2	114	26	110	148	130	12	13	28
CS1141DF		138	114	26	110	148	126	12	13	28
CS1150DF		141	115	28	112	152.4	131.4	15.3	15.3	33.5
CS1240DF		144	124	32	120	162.5	142	18.5	20.5	40
CS1320DF		158	132	31	129	171.5	151.8	15.4	17	34
CS1330DF		156	133	28	128	171.5	151	13	14	32.5
CS1425DF		161	142.5	24	138	173	139.7	11.1	12.5	27.7
CS1430DF		165	143	28	139	177.5	168	15.8	16.8	33.6
CS1431DF		168	143	28	139.7	174	158.8	15.5	15.5	32.6
CS1480DF		172	148	29	144	184.5	164.7	16.5	18	35
CS1485DF		168	148.5	32.4	143	184.1	164	16.5	18	35
CS1481DF		168	148.5	32.4	143	188.9	182.5	16.5	18	36
CS1500DF		175	150	30	145	190	170	16.5	18	35
CS1501DF		178	150	32	145	184.1	164	16.5	18	35
CS1520DF		178	152	32	149	192	172	14	16.5	31
CS1540DF		180	154	36	149	194	174	17	18.4	38.5
CS1541DF		175	154	30	145	190	170	16.5	18	35
CS1580DF		180	158	18	153	190	174	8	10	22
CS1630DF		184	163	28	159	190.5	175	15	15	31.8
CS1690DF		195	169	33	164	206.2	191.5	15.1	18.4	35
CS1691DF		189	169	22	166	199	185	11	12	24
CS1780DF		207	178	29	174	218.9	197	15	16.5	32

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HEAVY DUTY DUAL-FACE SEAL (DF)



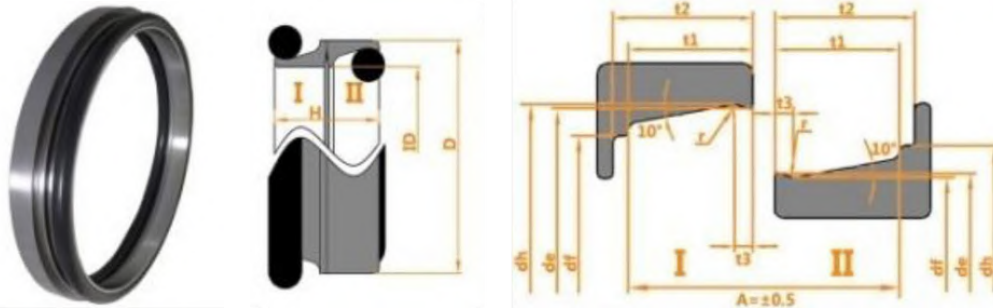
Drawing No.	A	Seal Set			(Max)d	Housing Bore				
		OD	ID	H		Bore Dia	Shoulder Dia	Bore Depth	Total Depth	C
CS1920DF		220	192	36	187	238.7	215	19.4	20.4	41.8
CS1930DF		214.3	193	32	187	238.7	215	19.4	20.4	41.8
CS1931DF		223	193	34	187	238.7	215	19.4	20.4	41.8
CS1940DF		222	194	32	187	238.7	214.5	19.4	20.4	41.8
CS1980DF		224	198	35	195	245	223	17	17.5	40
CS1981DF		220	198	18	195	228.6	212	10.5	12	23
CS2060DF		237.5	206	38	202	254	226.3	21.2	23	44.5
CS2135DF		238	213.5	28	209	254	203.2	13.7	15	32
CS2140DF		244	214	38	210	255.5	235	18.4	21.2	39.6
CS2150DF		249	215	38	210	255.5	235.7	18.5	21.2	39.6
CS2260DF		256	226	40	220	277.1	247	23	24.8	49
CS2261DF		246	225	40	221	277.1	247	23	24.8	49
CS2280DF		260.5	228	41	221	277.1	247.5	23.5	24.5	51
CS2330DF		259	233	35	225	280	250	17	18	40
CS2360DF		265	234	30	231	273.1	230	15.6	17	34.2
CS2390DF		264	239	34	233	279.4	261.9	17.5	20	36.5
CS2415DF		273.5	241.5	36	235	295.3	273	17.5	20	37
CS2420DF		273.5	241.5	36	235	279.4	260.6	17.5	20	37
CS2470DF		270.5	247	41	243	301.2	272	23.5	23.5	49.5
CS2580DF		286	258	28	250.5	292.1	276	15.6	17	33.2
CS2750DF		303	275	36	270	309.4	290	17.5	20	37
CS2830DF		305	283	42	278	329.4	307	18.5	22.1	40
CS2831DF		319	283	34	278	329.4	307	18.5	22.1	39.1
CS3020DF		330	302	28	295	336.6	317	15.6	17	33.2
CS3200DF		352.5	320	40	312	365.1	343	20	21	42
CS3550DF		392	355	40	345	401.7	380	22	24	46
CS3790DF		414	379	40	374.5	424.1	403	22.4	25	47.8
CS4288DF		458	428.8	42	424	477	447	18.4	22	39.3
CS4421DF		470	442	42	435	488.7	467.4	18.4	22	39.3
CS4800DF		515	480	44	475	530	502	22	24.8	48
CS4920DF		530	492	44	485	546	532	19.9	24.4	41.7
CS5350DF		580	535	45	525	600	581	24.5	28.3	53
CS5700DF		600	570	45	560	615	585	23.5	27.3	51
CS6200DF		664	620	46	610	682.5	649	26	28	54
CS6600DF		692	660	46	650	705	682	24.5	26.5	52
CS7500DF		796	750	54	737	812.8	779	26	28	56

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DUAL-FACE SEAL (GH1 & GH2)



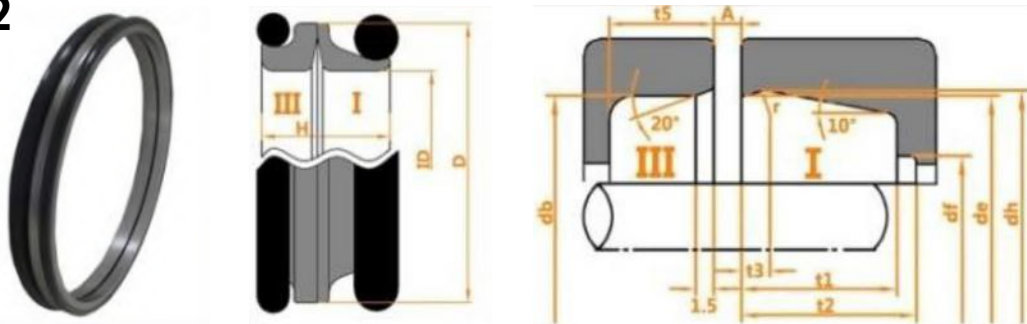
GH1



Drawing No.	A	Seal Set			Housing Bore I							
		OD	ID	H	Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS1720GH1		207	172	31.8	198.9	197.9	186	14.5	16.5	2.8	5	0.15
CS1920GH1		220	192	30.5	213.8	212.6	198	14.5	17	2.8	5	0.1
CS2420GH1		262.8	242	39.5	273.5	272.5	255.5	18	20.5	3.1	6.5	0.15
CS2920GH1		322.5	292	38	327.5	326.5	310	18	20.5	3.1	6.5	0.15

Drawing No.	A	Housing Bore II							(+/-) Tol. For
		Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	
CS1720GH1		180	181	213	14.5	16.5	2.8	5	0.1
CS1920GH1		196.9	198.2	213	12.8	14	2.8	5	0.1
CS2420GH1		228.2	229.2	248	18	20.5	3.1	6.5	0.15
CS2920GH1		283	284	300	18	20.5	3.1	6.5	0.15

GH2

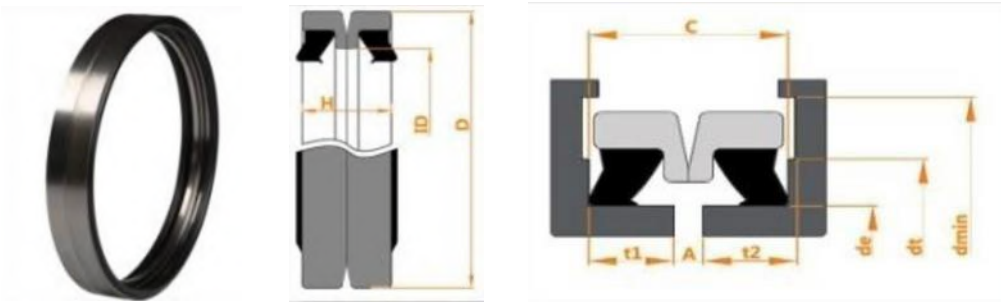


Drawing No.	A	Seal Set			Housing Bore I							
		OD	ID	H	Retaining Lip Dia	Installing Dia	Shoulder Dia	Housing Depth	Depth of Shoulder (min)	Taper Intersection	Transitional Radius	(+/-) Tol. For
CS2910GH1		318.5	291	33.5	324.8	323.8	305	19.5	22	3.1	6.5	0.15
CS3260GH2		354	326	33.5	360	359	342	19.5	22	3.1	6.5	0.15

Drawing No.	Housing Bore III		
	Bore Dia	Depth	(+/-) Tol. For
CS2910GH2	323	13	0.15
CS3260GH2	358	13	0.15

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MEDIA CONVERSION FACE SEAL



Drawing No.	A	Seal Set			(Max)d	Housing Bore				
		OD	ID	H		Bore Dia	Shoulder Dia	Bore Depth	Total Depth	C
CS3680R		392	368	43	400	342	380	21.5	23	46
CS4800R		520	480	44	528	476	483	22	24.8	48
CS6600R		690	660	46	700	640	670	24.5	26.5	52
CS8550R		900	855	54	910	834	860	28.5	30.5	60
CS10800R		1126	1080	52	1138	1062.6	1086	28.5	30	59

G



Drawing No.	A	Seal Set		
		OD	ID	H
CS0545G		71.3	54.5	32.5
CS0660G		83.2	66	32.5
CS0820G		93.2	76	32.5
CS0820G		98.5	82	32.5
CS1080G		125	108	32.5

ADAPTER



Drawing No.	Adapter No.
CS1540	CS1540H
CS1630	CS1630H
CS2090	CS2090H
CS2160	CS2160H
CS2220	CS2220H
CS3400	CS3400H
CS3871	CS3871H
CS4700	CS4700H
CS5050	CS5050H
CS5300	CS5300H
CS5590	CS5590H
CS5810	CS5810H

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