

# Floating Seal

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## Why choose FUYOTE floating seal

- Focus on floating seal 30 years since 1992
- Product size 35 to 1105mm
- Casting process in metal rings
- O-ring made in house
- Provide adapted installation tools



## FUYOTE MISSION

Delivery industry leading precision, durability, and customer service on large size floating seals.



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### Working Requirement

Floating seal cannot be used in inappropriate pressure & velocity environment

- 1.Recommend temperature: -40~150 degrees Celsius
- 2.Working liner speed:  $V \leq 10\text{m/s}$
- 3.Usually floating seals can accept at most 0.3MPa pressure
- 4.Use oil lubrication instead of grease, also oil level cannot excess 2/3 after filling

Focus on large size floating seal manufacture

Metal seal rings : high wearing resistance & non-slip characteristics

Avoid cold welding & oil spilling on sealing face

### Fuyote Product Advantages



O-ring made in house, achieve the best sealing effect by matching with metal rings

Decrease the assemble difficulty

Decrease the product consumption, easy to install with installation tools

## FUYOTE Product Characteristics



### Focus on large size floating seal manufacture

Established in 1992, has been 30 years in china. Fuyote focus on floating seals manufacture, rather than others sealing products. In the past two decades, large size floating seals are the main products in fuyote's production line. Diameter from 400mm to 1105mm are the best-selling products in fuyote.

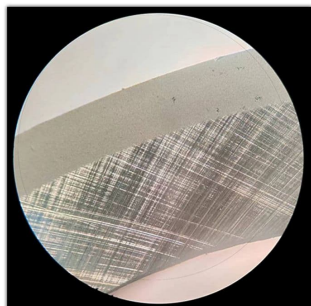
### Metal seal rings : high wearing resistance & non-slip characteristics

Compared to forging process, casting floating seal can be used under high temperature, high pressure, and high velocity circumstance. Casting product has better wearing resistance and longer useful life. Also fuyote use high chromium molybdenum in metal rings which could keep sealing ability stability.



### Avoid cold welding & oil spilling on sealing face

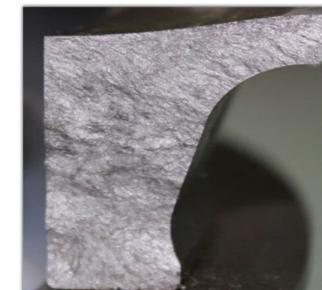
Fuyote's seal face at 200\* magnification, crossed gullies can be observed. Floating seal works depend on oil molecule between the seal face. The effect of gullies is to circulate oil, which can cause self-circulation of heat and cold. Increase the seals lifetime and adaptability of high temperature and velocity conditions.



## FUYOTE Product Characteristics

### Decrease the assemble difficulty

Aim to decrease the difficulties of customer assemble, Fuyote use curve design on sealing face. This design has self-centering to compensate for shaft eccentricity or misalignment under the o-ring pressure, which could increase the sealing stability.



### O-ring made in house, achieve the best sealing effect by matching with metal rings

In order to achieve the best sealing ability, elastomeric load rings need to be matched with metal rings. Although metal rings have good quality, without matched o-ring it will be useless. Fuyote made o-ring in house, design o-ring dimensions before production. And loading with metal rings to optimize the sealing ability.



### Decrease the product consumption, easy to install with installation tools

Do not use sharp instruments during assembly which may damage the o-ring and cause eventual failure. We recommend that the installation tool always be used to avoid o-ring twisted and others inappropriate loading. Fuyote design suitable installation tools to ensure the proper installation of o-rings.



## Floating seal design & principle

Fuyote's sealing system consists of two separate floating metallic seals and two elastomeric load rings. This system provides positive seal face contact, uniform loading, dynamic seal to shaft alignment, and transmits torque to the metallic seals. This design, in which only one metallic seal rotates, creates a leak proof seal, requires no maintenance, provides exceptional service life, and compensates for vibrations, misalignment, eccentricity, assembly wear, and other such conditions.

- Wear and corrosion resistant, long service life, maintenance free.
- Exceptional sealing capacity against exterior contaminants such as abrasive media, moisture, and chemicals, oil, and grease.
- Self-centering to compensate for shaft eccentricity or misalignment.
- Oil lubricates and cools the seal faces, allowing for higher rotating speeds.



## Duo-cone Seal



- Duo-cone seal consists of two separate metal seal rings and two o-rings that provide elastic compression within housing bores.
- Available metal seal ring sizes:
  - outer diameter 35~1105mm
  - Inner diameter 22~1044mm
  - Thickness 14~80mm
- Metal Seal Ring Material: Fuyote's metal seal rings are manufactured of high alloy cast iron. Fuyote offers two kinds of material for seal rings: Chromium Molybdenum Alloy 15CrMo and High Chromium Molybdenum Alloy 15Cr3Mo.
- O-Ring material defines its temperatures and pressure. Fuyote offers four kinds of materials for o-rings: Common NBR, High Rubber NBR, HNBR, and Silicone.
- Primary Applications: conveyors and construction equipment; agricultural machinery, off-road and tracked vehicles, mining equipment.
- Advantages of duo-cone seals: lower price point and a wide range of applications. About specific mechanical face seal and housing data, referring to DO catalog in page.

## Heavy Duty Seal



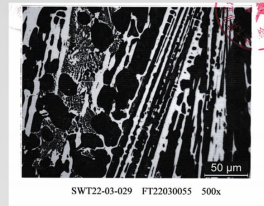
- Heavy Duty seal consists of two separate metal seal rings and two square o-rings that provide elastic compression within housing bores.
- Available metal seal ring sizes:
  - outer diameter 59~800mm
  - Inner diameter 42~750mm
  - Thickness 14~54mm
- Metal Seal Ring Material: Fuyote's metal seal rings are manufactured of high alloy cast iron. Fuyote offers two kinds of material for seal rings: Chromium Molybdenum Alloy 15CrMo and High Chromium Molybdenum Alloy 15Cr3Mo.
- O-Ring material defines its temperatures and pressure. Fuyote offers four kinds of materials for o-rings: Common NBR, High Rubber NBR, HNBR, and Silicone.
- Primary Applications: conveyors and construction equipment; agricultural machinery, off-road and tracked vehicles, mining equipment.
- Advantages of heavy duty seals: easy to process housing bores and highly sealing reliability.
- About specific mechanical face seal and housing data, referring to DF catalog in page.

# Metal Ring Seals & O-Ring Material

Floating seals consists of metal rings and o-rings, both material can do significant impact on sealing. Metal ring's material decided the Wear and corrosion resistant. And elastomeric o-rings generate a uniform axial face load which acts as static seal at both the inner and outer edges. Additionally, the o-rings transmit turning torque to the static face of the assembly. Therefore o-rings material also need to be careful.

## Seal Ring Material

Fuyote's metal seal rings are made of high alloy cast iron in a Rockwell hardness value of HRC 62~69. Recommended operating temperatures are between -50°C~150°C. As seal ring material has a direct effect on its sealing ability, we recommend that metal seal rings material should be selected according to different working conditions.



**Metallographic Diagram**

The following are three kinds of material that FUYOTE offers, For specific conditions please consult FUYOTE.

	Material	Process	Cost	Lifetime	Corrosion resistant	Scratch resistance
Chromium Molybdenum Alloy	15CrMo	Casting	Low	Low	Low	Low
General Chromium Molybdenum Alloy	15Cr3Mo	Casting	Medium	Medium	Medium	Medium
High Chromium Molybdenum Alloy	15Cr6Mo	Casting	high	high	high	high



# O-ring Material

After the test, at regular operating temperatures, Fuyote 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 for 24 hours, elasticity changes in the range of ±5° while compression is ≤ 12%. The o-ring material defines its operating temperatures and pressure. Over 50% of Mechanical face seals leak because o-ring material cannot withstand continuous pressure. O-ring should be chosen according to different working conditions.

The following are three kinds of material that FUYOTE offers, For specific conditions please consult FUYOTE.

	NBR	HNBR	Silicone
Temperature	-25°C----90°C	-40°C----150°C	-50°C----200°C
Pressure resistant	good	Excellent	Low
Tear resistant	good	Excellent	Medium
Manufacturing cost	Medium	High	Medium
Application	Secondary part	Key part	Extremely temperature part
Reaction with oil	Less than 1%	Less than 0.5%	Larger than 2%





**Material content analyzer**  
(The spectrometer for metal Mo Cr Fe analysis)



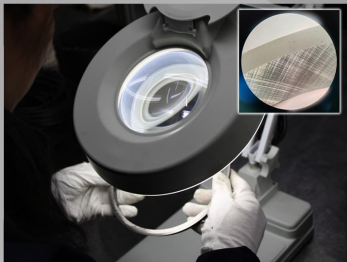
**Metal rings hardness test**  
(Rockwell hardness tester)



**Product Diameter Dominate**



**O-ring hardness test**  
(Shore hardness tester)



**Product Scratches Testing**

## Inspection & Testing

Our in-house manufacturing and stringent quality control processes ensure each seal face is continuous and uniform, being void of scores, burrs, scratches, shrinkage, pores, or any other imperfections.

Also provides data from a range of quality tests to assist customers in verifying quality standards and assessing the viability of our seals in their application.

The main tests include the static sealing test, dynamic sealing test, and gear oil/O-ring compatibility test.

### Static Sealing Test

**Aim:**

Test and ensure a static sealing ability before installation.

**Approch:**

Place two seal rings face to face and secure the bottom seal to a flat surface with grease. Press and rotate it 180°, so as to prevent oil leak between flat surface and seal ring. After adjusting metal seal rings, apply a weight on top of the assembly. Fill two thirds of the interior volume with kerosene. The seal is effective if no kerosene leaks between the seal faces in 10 minutes. Do not use the seal if there is any leak.



### Dynamic Sealing Test

**Aim:**

Test the sealing ability with simulate the working environment.

**Approch:**

Install both sides of the mechanical face seal into their housing, fill with oil and install the assembly on a dynamic operation test platform. Modify the A value according to the drawing. Operate the assembly for 1,000 continuous hours and ensure there is no oil leak from the assembly. Remaining service life and precise seal wearing level can be determined by removing the assembly and measuring the difference between the original and current seal band length.



### Gear Oil / O-ring Compatibility

**Aim:**

Test o-ring compatibility and volatile substances.

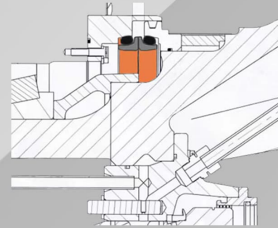
**Approch:**

Choose a random sample from each manufacturing batch and follow the procedure:  
Install the o-ring into an assembly, applying a consistent pressure and temperature. Measure the o-ring parameters.  
Install the o-ring into an oil bath assembly at 100°C. After 48 hours, test the material's condition and volatile substances emissions of the o-ring to assess compatibility with the oil.

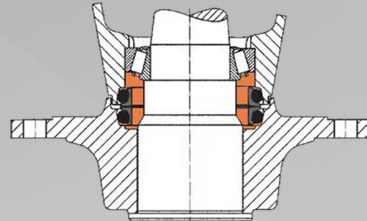


# Applications

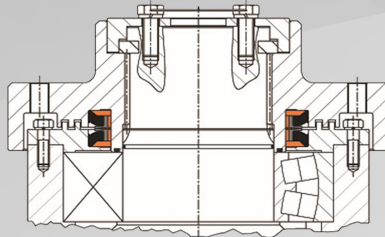
Mining truck



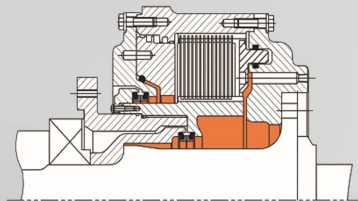
Steering drive axle



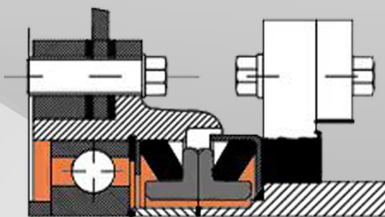
Mining scraper chain conveyor



Underground mining trucks

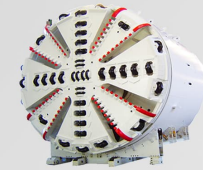
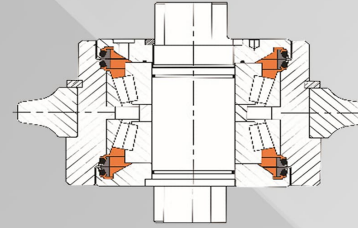


Combine harvester

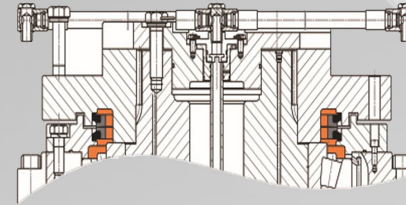


# Applications

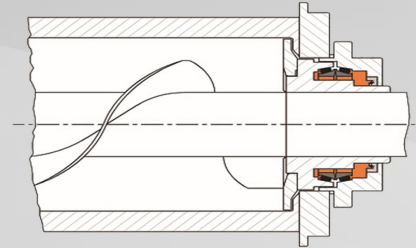
Tunnel boring machine



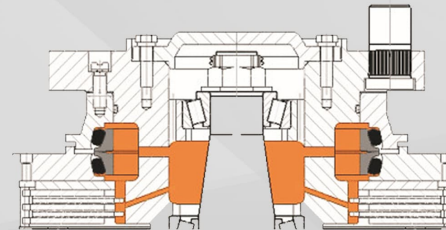
Coal winning machine



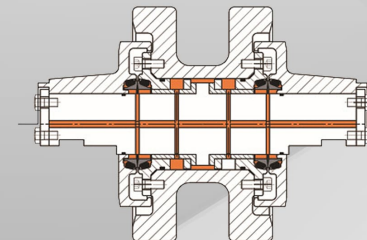
Twin shaft concrete mixer



Boom-type road header



Bulldozer

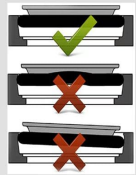




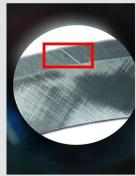
# How to Installation floating seals

**\*Do not use installation tools during assembly may cause eventual failure.**

We recommend the use of installation tools to ensure a proper installation of o-rings. If improperly installed, twist on o-rings might lead to uneven stress and creep down from the metal ring. Eventually cause early failure.



Do not use sharp instruments in floating seal installation. As shown in the following picture, inappropriate tool cause irreversible damage of metal ring's sealing face. Because mechanical face seals are high precision product, especially the contact band, installation tools must be used in fixing.

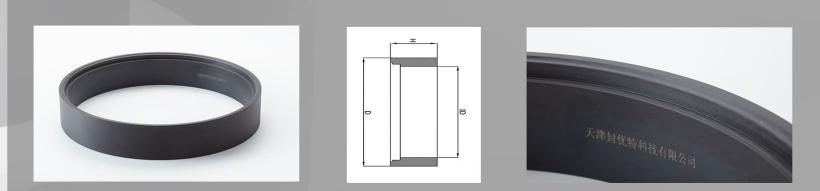


## How to install floating seals with installation tools:

# Installation Tool Catalog

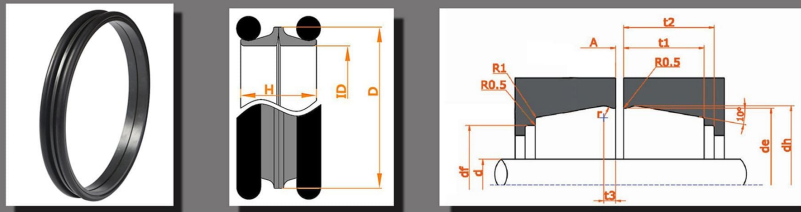


Installation Tool (TYPE FAT)					
FUYOTE Installation Tools code	Acc. To Floating seals code	FUYOTE Installation Tools code	Acc. To Floating seals code	FUYOTE Installation Tools code	Acc. To Floating seals code
FAT0010	CS9200	FAT0240	CS1240	FAT0450	CS0905
FAT0020	CS8250	FAT0250	CS1542	FAT0460	CS1250
FAT0030	CS7800	FAT0260	CS7800	FAT0470	CS1770
FAT0040	CS3250	FAT0270	CS2204	FAT0480	CS2652
FAT0050	CS2202	FAT0280	CS2980	FAT0490	CS0380
FAT0060	CS2050	FAT0290	CS3500	FAT0500	CS0730
FAT0070	CS1780	FAT0300	CS6600	FAT0510	CS1541
FAT0080	CS1630	FAT0310	CS8300	FAT0520	CS1240
FAT0090	CS10300	FAT0320	CS3002	FAT0530	CS2250
FAT0100	CS8950	FAT0330	CS3870	FAT0540	CS1820
FAT0110	CS3660	FAT0340	CS3000	FAT0550	CS3805
FAT0120	CS5590	FAT0350	CS3400	FAT0560	CS2820
FAT0130	CS6670	FAT0360	CS3181	FAT0570	CS7380
FAT0140	CS5050	FAT0370	CS1300	FAT0580	CS5960
FAT0150	CS10440	FAT0380	CS3700	FAT0590	CS5910
FAT0170	CS3180	FAT0390	CS1540	FAT0600	CS4500
FAT0180	CS1780	FAT0400	CS4700	FAT0610	CS2235
FAT0190	CS4290	FAT0410	CS2520	FAT0620	CS2750
FAT0200	CS1095	FAT0420	CS1461	FAT0630	CS5800
FAT0210	CS1501	FAT0430	CS1820		
FAT0230	CS1150	FAT0440	CS2230		



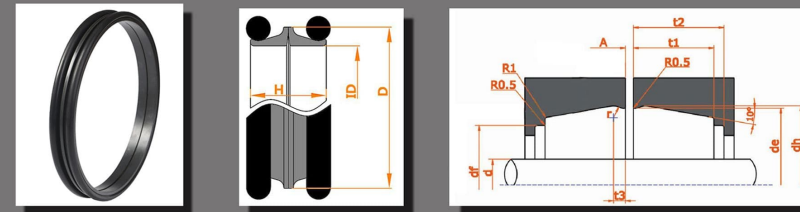
Installation Tool (TYPE FBT)					
FUYOTE Installation Tools code	Acc. To Floating seals code	FUYOTE Installation Tools code	Acc. To Floating seals code	FUYOTE Installation Tools code	Acc. To Floating seals code
FBT0080	CS1630	FBT0430	CS1820	FBT0240	CS1240
FBT0210	CS1501	FBT0440	CS2230	FBT0530	CS2250
FBT0230	CS1150	FBT0450	CS0905	FBT0550	CS3805
FBT0270	CS2204	FBT0490	CS0380	FBT0610	CS2235
FBT0390	CS1540	FBT0500	CS0730	FBT0630	CS5800
FBT0420	CS1461	FBT0510	CS1541		

## Duo-cone Seal



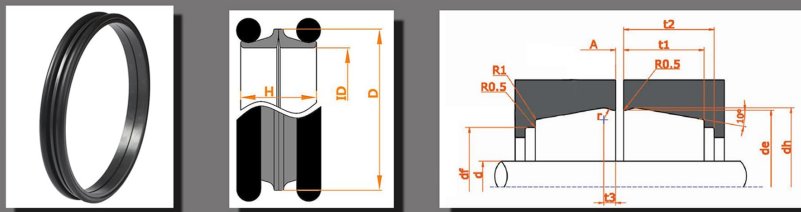
Drawing No.	Seal Set			(Max) d	Housing Bore								(+/-) Tol. for
	PN#	Outside Diameter D	Inside Diameter ID		Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r	
CS0220	35.0	22.0	20.0	18.0	37.7	37.0	29.0	9.0	10.5	1.8	2.0	0.10	
CS0340	45	34	14	30	47	46.5	42	6.5	8	1	1	0.1	
CS0380	51.0	38.0	20.0	35.0	53.7	53.0	46.0	9.0	11.0	1.8	2.0	0.10	
CS0390	50	39	14	35	52	51.5	46	6.5	8	1	1	0.1	
CS0450	58.0	45.0	21.0	41.0	61.6	60.8	53.4	10.0	12.0	1.8	2.5	0.10	
CS0451	59	45	26.8	41	62.3	61.5	53	13.5	15.5	2.7	2.8	0.1	
CS0460	59.0	46.0	20.0	43.0	61.6	61.0	53.0	9.0	11.0	2.0	2.5	0.10	
CS0461	59	46	20	42	62.5	61.8	56	8.5	10.5	1.8	2	0.1	
CS0480	62.0	48.0	25.0	45.0	68.0	67.2	58.0	12.0	14.0	2.0	3.0	0.10	
CS0540	68	54	24	51	73	72	62	11	13.5	2.8	5	0.1	
CS0555	70.0	55.5	22.0	52.0	73.8	73.1	65.5	10.0	11.5	2.4	5.0	0.10	
CS0556	70	55.5	22	52	74.8	74.1	66.5	10	11.5	2.4	5	0.1	
CS0560	70.0	56.0	25.0	53.0	76.0	75.2	66.0	12.5	14.5	2.0	3.0	0.10	
CS0575	74	57.5	26	54.5	78	77	66	13	15	2	3	0.1	
CS0580	75.0	58.0	27.0	55.0	79.4	78.6	67.0	13.5	15.5	2.0	3.0	0.10	
CS0581	77.5	58	36	55	81.5	80.5	68.5	15.2	20.5	3.5	4.8	0.1	
CS0582	75.5	57.8	26.0	55.0	80.0	79.1	67.0	13.0	15.0	2.0	3.0	0.10	
CS0600	74	60	20.6	57	78.4	77.4	70	9	11	1.9	2.5	0.1	
CS0602	73.0	60.2	20.0	57.0	76.5	75.8	69.0	8.5	10.5	1.8	2.0	0.10	
CS0610	83	61	30	58	85.2	84.2	75	14.5	17	2.8	5	0.1	
CS0611	73.0	61.0	17.6	58.0	75.8	75.5	66.8	6.5	7.5	1.0	1.4	0.10	
CS0621	73.5	62	16	58	76.7	76.1	70	8.2	9.2	2.3	1.5	0.1	
CS0630	80.5	63.0	26.0	60.0	84.0	83.2	72.0	11.5	13.0	2.5	5.0	0.10	
CS0635	82.5	63.5	31.8	60.5	86.8	86	74.5	14.5	17.5	2.8	5	0.1	
CS0640	78.0	64.0	25.0	61.0	84.6	83.8	74.0	12.5	14.5	2.0	3.0	0.10	
CS0660	86	66	28	63	90	89.2	78	13.5	15.5	2	3	0.1	
CS0670	80.0	67.0	20.0	64.0	83.4	82.7	76.8	8.5	10.5	1.8	2.0	0.10	
CS0675	86.5	67.5	31.8	64.5	91	90	78	14.5	17	2.8	5	0.1	
CS0685	89.0	68.5	24.0	65.5	92.5	91.5	83.0	11.0	13.5	2.8	5.0	0.10	
CS0690	84	69	24	66	89.6	88.6	78	11	13.5	2.8	5	0.1	
CS0700	90.0	70.0	28.0	66.0	95.0	94.0	84.0	13.5	15.5	2.0	3.0	0.10	
CS0710	84	71	20	68	87.4	86.7	80.8	8.5	10.5	1.8	2	0.1	
CS0730	92.0	73.0	31.8	70.0	96.5	95.5	84.0	15.0	17.0	2.8	5.0	0.10	
CS0731	92.1	73	32	70	96	95.2	83	15.2	17	2.8	5	0.1	
CS0738	88.0	73.8	22.0	70.5	89.8	89.6	81.0	9.5	11.0	2.3	3.0	0.10	
CS0740	86.4	74	22	71	91.5	90.5	81	9.5	11	2.3	3	0.1	
CS0741	87.0	74.0	21.0	71.0	95.0	94.0	83.0	10.0	11.5	2.0	4.0	0.10	

## Duo-cone Seal



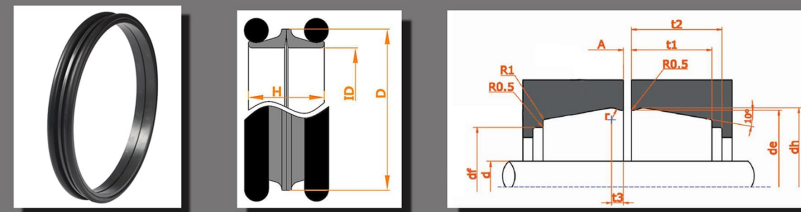
Drawing No.	Seal Set			(Max) d	Housing Bore								(+/-) Tol. for
	PN#	Outside Diameter D	Inside Diameter ID		Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r	
CS0746	93.0	74.6	29.0	72.0	100.7	99.9	84.0	15.0	17.0	2.8	5.0	0.10	
CS0760	94	76	29	72	101.4	100.4	88	14.5	16.5	2	5	0.1	
CS0775	87.5	77.5	14.0	74.5	90.7	90.2	85.5	7.0	8.0	1.5	1.5	0.10	
CS0795	92.5	79.5	20	76.5	96	95.3	88	8.5	10.5	1.8	2	0.1	
CS0800	100.0	80.0	29.0	77.0	105.0	104.0	92.0	14.5	16.5	2.0	3.0	0.10	
CS0801	100	80	29	77	104	103.2	92	14.5	16.5	2	3	0.1	
CS0810	98.0	81.0	28.0	78.0	102.3	101.3	91.0	12.5	14.5	2.8	5.0	0.10	
CS0820	98	82	22	79	102.3	101.3	91	9	11	2.3	3	0.1	
CS0830	102.0	83.0	28.0	80.0	105.4	104.5	94.0	12.5	15.0	2.8	5.0	0.10	
CS0845	104.5	84.5	32	81	109	108	99	14.5	17	2.8	5	0.1	
CS0880	108.0	88.0	24.0	85.0	111.5	110.5	102.0	11.0	13.5	2.8	5.0	0.10	
CS0890	108	89	29	86	112	111	100	14.5	16.5	2	5	0.1	
CS0900	105.0	90.0	26.0	87.0	107.4	106.6	100.0	11.8	14.2	2.9	2.8	0.10	
CS0901	102	90	20	87	107.4	106.6	100	9	11	1.8	2	0.1	
CS0903	109.0	90.4	32.0	87.0	113.4	112.7	100.4	14.5	17.0	3.2	3.0	0.10	
CS0904	109	90.4	32	87	112.5	111.7	100.4	14.5	17	3.2	3	0.1	
CS0905	109.0	90.5	32.0	87.0	114.0	113.0	100.4	14.5	17.5	2.8	5.0	0.10	
CS0920	109	92	22	88	113.8	112.8	104	9.5	11	2.3	3	0.1	
CS0940	107.0	94.0	22.0	91.0	112.0	111.0	102.0	9.5	11.0	2.3	3.0	0.10	
CS0950	114	95	32	92	120	119	106	14.5	17	2.8	5	0.1	
CS0951	111.0	95.0	24.0	92.0	115.6	114.8	108.0	11.0	13.0	1.8	2.0	0.10	
CS0965	106.5	96.5	14	93.5	109.7	109.2	104.5	7	8	1.5	1.5	0.1	
CS0970	116.0	97.0	32.0	94.0	120.5	119.5	108.0	14.5	17.0	2.8	5.0	0.10	
CS0980	119	98	29.6	95	124.2	123.2	111	14.5	17	2.8	5	0.1	
CS0985	115.0	98.5	21.2	95.0	117.3	116.5	110.0	9.0	11.0	1.8	2.0	0.10	
CS0990	120	99	28	96	123.5	122.5	112	12.5	14.5	2.8	5	0.1	
CS1000	119.0	100.0	32.0	97.0	123.5	122.5	111.0	14.5	17.0	2.8	5.0	0.10	
CS1001	119	100	32	97	124	123	111	14.5	17	2.8	5	0.1	
CS1010	120.0	101.0	30.0	98.0	125.0	124.0	111.0	14.5	17.0	2.8	5.0	0.15	
CS1020	122	102	33	99	127.2	126.2	114	16.5	18.5	3.1	3	0.15	
CS1039	117.1	103.9	22.0	100.0	121.0	120.2	112.0	9.0	10.5	2.0	3.0	0.15	
CS1040	117	104	22	101	122	121	112	9.5	11	2.3	3	0.15	
CS1041	122.5	104.0	22.5	101.0	125.5	125.1	117.0	10.0	11.5	2.0	4.0	0.15	
CS1042	125	104	28	101	128.5	127.5	117	12.5	14	2.8	5	0.15	
CS1070	125.0	107.0	24.0	103.0	130.4	129.4	119.5	11.0	13.5	2.8	5.0	0.15	
CS1075	122.5	107.5	22.5	101	125.5	125.1	117	10	11.5	2	4	0.15	
CS1095	127.0	109.5	32.0	104.0	132.6	131.5	121.0	14.5	17.0	2.8	5.0	0.15	

## Duo-cone Seal



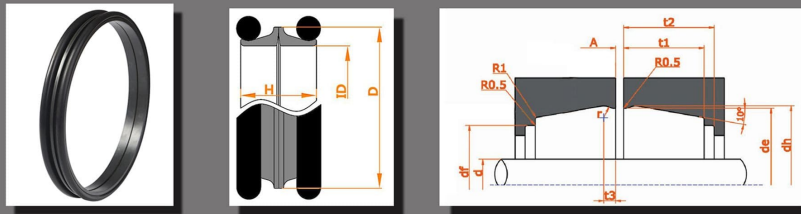
Drawing No.	Seal Set				(Max) d	Housing Bore								(+/-) Tol. for
	PN#	Outside Diameter D	Inside Diameter ID	Seal Ring Height H		Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r		
CS1100	128.0	110.0	32.0	106.0	133.0	132.0	121.0	14.5	17.0	2.8	5.0	0.15		
CS1110	133	111	32	108	137	136	124.5	14.5	18	2.8	5	0.15		
CS1111	128.0	111.0	22.0	108.0	132.5	132.0	123.0	9.5	11.0	2.3	3.0	0.15		
CS1120	132	112	31.8	109	136.3	135.3	124	15	17	2.8	5	0.15		
CS1145	129.0	114.5	21.0	111.0	134.1	133.1	126.0	9.2	10.0	2.3	3.0	0.15		
CS1150	137	115	31	112	141.8	140.8	130	14.5	16.5	2.8	3	0.15		
CS1170	140.0	117.0	29.0	114.0	142.5	141.5	132.0	13.0	14.0	2.8	5.0	0.15		
CS1171	138	117	32	114	142.5	141.5	132	14.5	17	2.8	5	0.15		
CS1180	138.0	118.0	32.0	115.0	143.0	142.0	132.0	14.5	17.0	2.8	5.0	0.15		
CS1200	142	120	38	116	149	148	133	17	19	3.1	6.5	0.15		
CS1201	139.0	120.0	32.0	116.0	144.3	143.3	132.0	14.5	17.0	2.8	5.0	0.15		
CS1202	138	120	32	117	143	142	132	14.5	17	2.8	5	0.15		
CS1203	139.0	120.0	32.0	116.0	144.0	143.0	132.0	14.5	17.0	2.8	5.0	0.15		
CS1210	139	121	32	116	143.8	142.8	132	14.5	17	2.8	5	0.15		
CS1240	140.9	124.0	22.0	121.0	146.4	145.4	136.0	9.5	11.0	2.3	3.0	0.15		
CS1250	144	125	31.8	121	148.5	147.5	136	14.5	17	2.8	5	0.15		
CS1270	140.7	127.0	25.0	124.0	144.0	143.2	135.0	12.0	14.5	2.0	3.0	0.15		
CS1271	146	127	32	124	150.5	149.5	138	14.5	17.5	2.8	5	0.15		
CS1272	141.1	127.0	29.0	124.0	148.2	147.2	135.0	13.2	15.5	2.8	5.0	0.15		
CS1273	141	127	29	124	144	143	136	12	14.5	2.3	3	0.15		
CS1290	145.0	129.0	20.0	125.0	150.0	149.0	141.0	10.6	12.3	2.8	3.0	0.15		
CS1300	150	130	32	125	156	155	144.6	14.5	17	2.8	5	0.15		
CS1302	152.0	130.0	38.4	125.0	159.0	158.0	142.0	18.0	20.5	3.1	6.5	0.15		
CS1320	152	132	30	129	156.2	155	144.6	12.5	14.5	2.5	3	0.15		
CS1355	154.5	135.5	28.0	132.0	158.3	157.3	146.5	12.5	14.0	2.8	5.0	0.15		
CS1360	155	136	30	132	159.7	158.7	145	14.5	17	2.8	5	0.15		
CS1370	153.0	137.0	30.0	132.0	161.7	160.7	147.0	14.5	17.0	2.8	5.0	0.15		
CS1420	160	142	33	139	166	165	152	16.5	18.5	3.1	3	0.15		
CS1430	157.1	143.0	25.0	139.0	160.0	159.0	152.0	12.0	14.5	2.3	3.0	0.15		
CS1431	160	143	27	138	164	163	154	12	14.5	2.8	5	0.15		
CS1432	157.0	143.0	27.0	138.0	160.0	159.0	152.0	12.0	14.5	2.3	3.0	0.15		
CS1460	168.1	146	38	143	177	176	159	18	20.5	3.1	6.5	0.15		
CS1461	172.0	146.0	38.0	143.0	177.0	176.0	159.0	18.0	20.5	3.1	6.5	0.15		
CS1462	175	146	38	143	180.5	179.5	162.0	17.5	20.5	3.1	6.5	0.15		
CS1500	172.2	150.0	40.0	146.0	176.3	175.5	165.0	18.0	20.0	2.5	3.0	0.15		
CS1501	171	150	32	146	175.6	174.6	164	14.5	17	2.8	5	0.15		
CS1502	172.1	150.0	40.0	146.0	179.0	178.0	165.0	18.0	20.0	2.5	3.0	0.15		

## Duo-cone Seal



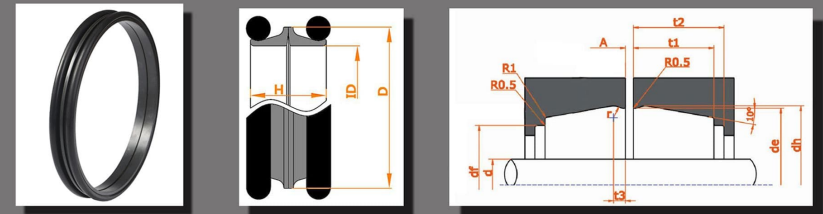
Drawing No.	Seal Set				(Max) d	Housing Bore								(+/-) Tol. for
	PN#	Outside Diameter D	Inside Diameter ID	Seal Ring Height H		Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r		
CS1503	167.0	150.0	28.0	146.0	171.0	170.0	160.0	12.5	14.5	2.8	5.0	0.15		
CS1504	172	150	39	146	176.5	175.5	165	18	20	2.5	3	0.15		
CS1530	171.5	153.0	28.0	150.0	176.3	175.3	164.5	12.5	14.5	2.8	5.0	0.15		
CS1535	171.6	153.5	32	150.5	178	177	166	14.5	17	2.8	5	0.15		
CS1538	180.0	153.8	38.0	150.0	185.0	184.0	167.0	18.0	20.5	3.1	6.5	0.15		
CS1539	168	153.9	25.4	151	171	170.2	163	12	14.5	2.3	3	0.15		
CS1540	168.0	154.0	27.0	151.0	171.0	170.0	163.0	12.0	14.5	2.3	3.0	0.15		
CS1541	169	154	22	151	174.5	173.5	166	9.5	11	2.3	3	0.15		
CS1542	170.0	154.0	21.0	151.0	175.1	174.1	167.0	9.2	11.0	2.3	3.0	0.15		
CS1543	173.5	154	32	151	178	177	166	14.5	17	2.8	5	0.15		
CS1545	178.0	154.0	34.0	151.0	181.0	180.0	171.0	18.0	20.5	2.8	5.0	0.15		
CS1550	177	155	39	152	180	179	168	18	20	2.5	3	0.15		
CS1600	180.0	160.0	32.0	156.0	186.3	185.5	174.0	13.5	15.5	2.8	5.0	0.15		
CS1630	191.3	163	38	159	196.5	195.5	178.5	18	20.5	3.1	6.5	0.15		
CS1631	191.0	163.0	46.0	159.0	196.8	195.8	178.4	21.0	23.5	3.1	6.5	0.15		
CS1632	191.5	163	38	159	197.7	197	178.4	18	20.5	3.1	6.5	0.15		
CS1640	189.0	164.0	30.0	159.0	193.5	192.5	179.0	14.5	17.0	2.8	5.0	0.15		
CS1650	181	165	27	161	185	184	176.5	12	14.5	2.3	3	0.15		
CS1651	183.0	165.0	28.0	161.0	188.0	187.0	176.0	12.5	14.5	2.8	5.0	0.15		
CS1665	191.5	166	38	163	196.5	195.5	178.5	18	20.5	3.1	6.5	0.15		
CS1670	194.0	167.0	38.0	163.0	198.0	197.0	187.0	18.0	20.5	3.1	6.5	0.15		
CS1690	188.5	169	32	165	193.5	192.5	179	15	17	2.8	5	0.15		
CS1713	185.3	171.3	20.0	167.0	188.0	187.3	180.0	9.0	11.0	1.8	2.0	0.15		
CS1720	194.4	172	31.8	168	198.9	197.9	186	14.5	17	2.8	5	0.15		
CS1725	190.0	172.5	25.4	169.0	192.7	191.8	188.0	12.7	14.3	2.3	2.8	0.15		
CS1730	200	173	36	169	205.5	204.5	190.5	18	20.5	3.1	6	0.15		
CS1731	200.0	173.0	40.0	170.0	204.0	203.0	191.0	18.0	20.5	3.1	6.5	0.15		
CS1740	190	174	25.4	170	192.7	191.8	188	12.7	14.3	2.3	2.8	0.15		
CS1760	195.0	176.0	28.0	171.0	199.8	198.8	188.0	12.5	14.5	2.8	5.0	0.15		
CS1770	200	177	30	173	204.5	203.5	191	14.5	17	2.8	5	0.15		
CS1780	200.0	178.0	38.0	174.0	210.6	209.6	191.0	18.0	20.5	3.1	6.5	0.15		
CS1781	200	178	38	174	212	211	191	18	20.5	3.1	6.5	0.15		
CS1782	199.0	178.0	32.0	174.0	203.6	202.6	190.0	14.5	17.0	2.8	5.0	0.15		
CS1800	197.4	180	21.4	173	202.2	201.9	196	9.4	10.6	1.2	3	0.15		
CS1820	210.5	182.0	38.0	179.0	215.5	214.5	197.5	18.0	20.5	3.1	6.5	0.15		
CS1825	210.3	182.5	46	179	215.5	214.5	197.5	21	23.5	3.1	6.5	0.15		
CS1830	202.0	183.0	28.0	179.0	206.0	205.0	195.0	12.5	14.5	2.8	5.0	0.15		

# Duo-cone Seal



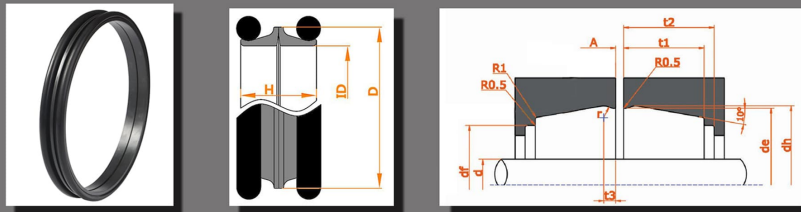
Drawing No.	Seal Set			(Max) d	Housing Bore								(+/-)Tol.
	PN#	Outside Diameter D	Inside Diameter ID		Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r	
CS1860	203.0	186.0	25.4	182.0	205.7	204.8	192.0	12.7	14.3	2.3	2.8	0.15	
CS1865	202.5	186.5	21.4	182	207	206	202	9.4	10.6	1.2	3	0.15	
CS1866	202.8	186.6	21.7	182.0	208.0	207.0	202.0	9.4	10.6	1.2	3.0	0.15	
CS1900	216	190	44	186	224	223	206.5	21	22.5	3.1	6.5	0.15	
CS1910	210.0	191.0	28.0	188.0	214.0	213.0	203.0	12.5	14.5	2.8	5.0	0.15	
CS1920	215	192	33	189	220.8	219.8	207	16.5	18.5	3.1	6	0.15	
CS1921	209.0	192.0	30.0	189.0	213.5	212.5	200.0	14.5	17.0	2.8	5.0	0.15	
CS1930	218	193	38	190	225	224	208	18	20.5	3.1	6.5	0.15	
CS1950	216.5	195.0	31.8	191.0	221.0	220.0	207.0	14.5	17.0	2.8	5.0	0.15	
CS2000	228.5	200	38	197	233.5	232.5	215.5	18	20.5	3.1	6.5	0.15	
CS2020	222.3	202.0	26.5	197.0	224.9	224.1	217.9	11.8	14.2	2.2	2.5	0.15	
CS2050	227	205	30	201	231.5	230.5	219	14.5	17	2.8	5	0.15	
CS2051	227.1	205.0	30.4	201.0	232.0	231.0	219.0	14.5	17.0	2.8	5.0	0.15	
CS2085	222.8	208	26	204	225.4	224.4	217	11.5	13.5	2.2	2.5	0.15	
CS2090	234.0	209.0	42.0	206.0	242.6	241.6	224.0	19.5	21.5	3.0	4.0	0.15	
CS2100	240	210	40	207	246.4	245.4	228	18	20.5	3.1	6.5	0.15	
CS2160	237.0	216.0	30.0	212.0	241.5	240.5	229.0	14.5	17.0	2.8	5.0	0.15	
CS2170	240	217	36	213	244	243	228	18	20.5	3.1	6	0.15	
CS2180	246.0	218.0	38.0	214.0	251.0	250.0	239.0	17.5	20.5	3.1	6.5	0.15	
CS2190	245	219	32	215	250.9	249.9	238.4	14.5	18	2.8	5	0.15	
CS2201	246.0	220.0	41.0	216.0	254.6	253.6	236.0	20.5	22.5	3.0	4.0	0.15	
CS2202	241	220	26	216	245.3	244.3	234	11	13.5	2.2	4	0.15	
CS2203	241.4	220.0	25.0	216.0	244.7	244.0	233.9	11.0	13.5	2.2	4.0	0.15	
CS2204	239.5	220	31.8	216	244	243	232	14.5	17	2.8	5	0.15	
CS2220	246.0	222.0	36.0	218.0	251.6	250.6	236.5	18.0	20.5	3.1	5.0	0.15	
CS2230	251.4	223	38	219	256.5	255.5	238.5	18	20.5	3.1	6.5	0.15	
CS2231	251.5	223.0	38.0	219.0	258.0	257.0	241.0	18.0	20.5	3.1	6.5	0.15	
CS2250	253	225	38	221	258	257	241	18	20.5	3.1	6.5	0.15	
CS2254	252.0	225.4	46.0	222.0	257.0	255.9	238.9	21.0	23.5	3.1	6.5	0.15	
CS2255	251.6	225.5	38	222	256.5	255.5	238.5	18	20.5	3.1	6.5	0.15	
CS2320	260.0	232.0	36.0	228.0	265.0	264.0	250.0	18.0	20.5	3.1	6.0	0.15	
CS2321	259.5	232	38	228	264.7	263.7	247	18	20.5	3.1	6	0.15	
CS2340	260.0	234.0	36.0	230.0	266.0	265.0	250.0	18.0	20.5	3.1	6.0	0.15	
CS2348	255	235	28	231	260	259	249	12.5	14.5	2.8	5	0.15	
CS2350	259.5	235.0	38.0	231.0	264.7	263.7	247.0	18.0	20.5	3.1	6.0	0.15	
CS2360	266	236	42	233	275	274	256	19.5	21.5	3	4	0.15	
CS2380	261.0	238.0	32.0	234.0	265.5	264.5	254.0	14.5	17.0	2.8	5.0	0.15	

# Duo-cone Seal



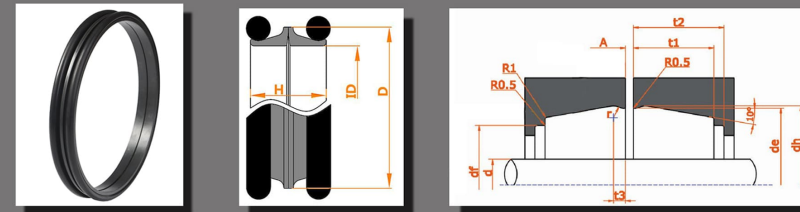
Drawing No.	Seal Set			(Max) d	Housing Bore								(+/-)Tol.
	PN#	Outside Diameter D	Inside Diameter ID		Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r	
CS2390	268.0	239.0	40.0	235.0	274.2	273.2	257.0	18.0	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	0.15	
CS2401	268.5	240.0	38.0	236.0	273.5	272.5	255.5	18.0	20.5	3.1	6.5	0.15	
CS2410	273	241	40	237	278	277	266	19	21.5	3.1	6.5	0.15	
CS2450	264.5	245.0	32.0	241.0	269.0	268.0	257.0	14.5	17.0	2.8	5.0	0.15	
CS2500	276	250	44	246	284.6	283.6	266	20.5	22.5	3.1	6.5	0.15	
CS2501	270.0	250.0	30.0	246.0	274.7	273.7	262.0	14.5	17.0	2.8	5.0	0.15	
CS2520	280	252	38	249	285.5	284.5	267.5	18.5	20.5	3.1	6.5	0.15	
CS2540	280.1	254.0	38.0	251.0	286.2	285.2	269.0	18.5	20.5	3.1	6.5	0.15	
CS2600	288	260	40	256	295	294	276	18.5	20.5	3.1	6.5	0.15	
CS2620	290.0	262.0	38.0	259.0	298.0	297.0	280.0	18.0	20.5	3.1	6.5	0.15	
CS2650	293	265	38	261	298	297	280	18	20.5	3.1	6.5	0.15	
CS2651	292.8	265.0	46.0	262.0	298.0	297.0	280.0	21.0	23.5	3.1	6.5	0.15	
CS2652	294	265	38	261	299	298	280	18	20.5	3.1	6.5	0.15	
CS2680	293.0	268.0	38.0	265.0	298.0	297.0	280.0	18.0	20.5	3.1	6.5	0.15	
CS2720	300	272	40	268	305	304	286	18	20.5	3.1	6.5	0.2	
CS2740	300.0	274.0	40.0	270.0	306.0	305.0	286.0	18.0	20.5	3.1	6.5	0.20	
CS2750	303	275	38	271	308	307	290	18	20.5	3.1	6.5	0.2	
CS2770	310.0	277.0	38.0	273.0	315.5	314.5	303.0	17.5	20.5	3.1	6.5	0.20	
CS2820	314	282	40	280	320	319	300	18.5	21	3.1	6.5	0.2	
CS2825	310.8	282.5	38.0	279.0	316.4	315.4	298.0	18.0	20.5	3.1	6.5	0.20	
CS2940	327	298	42	294	333.2	332.2	315	19	21.5	3.1	6.5	0.2	
CS2980	328.0	298.0	40.0	295.0	332.5	331.5	315.0	19.0	21.5	3.1	6.5	0.20	
CS3000	328	300	40	295	333	332	315	19	21.5	3.1	6.5	0.2	
CS3001	324.6	300.0	38.0	295.0	335.5	334.5	318.0	17.5	20.5	3.1	6.5	0.20	
CS3002	325	300	38	295	336.5	335.5	318	17.5	20.5	3.1	6.5	0.2	
CS3010	328.0	301.0	38.0	296.0	333.0	332.0	315.0	18.4	20.4	0.7	6.3	0.20	
CS3090	337	309	40	304	341	340	325	19	21.5	3.1	6.5	0.2	
CS3180	341.0	318.0	38.0	315.0	351.5	350.5	334.0	18.0	20.5	3.1	6.5	0.20	
CS3181	346	318	38	315	351.5	350.5	334	18	20.5	3.1	6.5	0.2	
CS3185	346.0	318.5	46.0	315.0	351.5	350.5	334.0	21.0	23.5	3.1	6.5	0.20	
CS3200	346	320	38	317	351.5	350.5	334	18	20.5	3.1	6.5	0.2	
CS3201	346.5	320.1	46.0	317.0	351.5	350.5	334.0	21.0	23.5	3.1	6.5	0.20	
CS3202	348	320.2	40	317	354.5	353.5	338	19	21.5	3.1	6.5	0.2	
CS3260	354.0	326.0	38.0	323.0	360.0	359.0	346.0	17.5	20.5	3.1	6.5	0.20	
CS3360	368	336	40	333	374.8	373.8	358	19	21.5	3.1	6.5	0.2	
CS3395	368.0	339.5	40.0	335.0	374.8	373.8	358.0	19.0	21.5	3.1	6.5	0.20	

# Duo-cone Seal



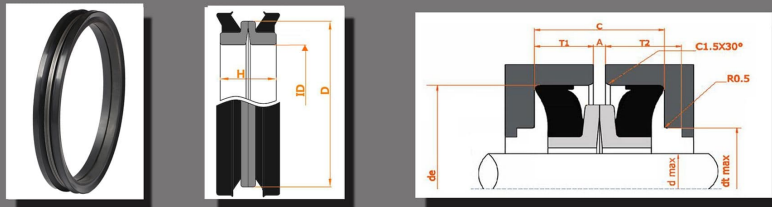
Drawing No.	Seal Set			(Max) d	Housing Bore								(+/-)Tol. for
	PN#	Outside Diameter D	Inside Diameter ID		Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r	
CS3396	368.5	339.6	38.0	335.0	374.8	373.8	358.0	19.0	21.5	3.1	6.5	0.20	
CS3400	370	340	40.4	335	375.7	374.7	358	19	21.5	3.1	6.5	0.2	
CS3500	376.0	350.0	44.0	345.0	386.0	385.0	368.0	20.5	22.5	3.1	6.5	0.20	
CS3501	375	350	38	345	385.5	384.5	368	17.5	20.5	3.1	6.5	0.2	
CS3550	375.0	355.0	38.0	350.0	385.5	384.5	368.0	17.5	20.5	3.1	6.5	0.20	
CS3560	381	356	38	351	389.5	388.5	370	17.5	20.5	3.1	6.5	0.2	
CS3650	394.2	365.0	38.0	361.0	400.0	399.0	381.0	18.0	20.5	3.0	6.5	0.20	
CS3660	394.4	366	38	361	399.5	398.5	381	17.5	20.5	3	6.5	0.2	
CS3661	394.0	366.0	46.0	361.0	399.5	398.5	381.0	21.0	23.5	3.1	6.5	0.20	
CS3662	394.3	366	40	361	399.5	398.5	381	17.5	20.5	3	6.5	0.2	
CS3690	394.4	369.0	38.0	365.0	399.5	398.5	381.0	17.5	20.5	3.0	6.5	0.20	
CS3691	394	369	46	365	399.5	398.5	381	21	23.5	3.1	6.5	0.2	
CS3700	397.8	370.0	38.0	365.0	403.5	402.5	385.0	17.5	20.5	3.0	6.5	0.20	
CS3805	405	380.5	40	375	412	411	395	18	21.5	3.7	6	0.2	
CS3810	405.0	381.0	40.6	376.0	415.0	414.0	397.0	19.0	21.5	3.1	6.5	0.20	
CS3820	410	382	42	378	415.4	414.4	400	19.5	21.5	3	4	0.2	
CS3850	413.0	387.0	46.0	382.0	419.5	418.5	400.0	21.0	23.5	3.1	6.5	0.20	
CS3870	415	387	38	382	419.5	418.5	402	17.5	20.5	3	6.5	0.2	
CS3871	415.1	387.0	38.0	382.0	420.3	419.3	402.0	17.5	20.5	3.0	6.5	0.20	
CS3878	410.1	387.8	38	382	419.5	418.5	402	18	20.5	3	6.5	0.2	
CS3880	417.0	388.0	38.0	383.0	423.5	422.5	405.0	17.5	20.5	3.0	6.5	0.20	
CS3881	416.2	388	38	383	421.6	420.6	402	17.5	20.5	3	6.5	0.2	
CS4000	427.0	400.0	38.0	395.0	432.4	431.4	414.0	17.5	20.5	3.0	6.5	0.20	
CS4070	436	407	38	404	442.5	441.5	424	17.5	20.5	3	6.5	0.2	
CS4240	454.0	424.0	42.0	420.0	461.0	460.0	444.0	19.5	21.5	3.0	4.0	0.20	
CS4285	454.1	428.5	37	425	462.3	461.3	444	18	21	3	6.5	0.2	
CS4290	457.0	429.0	38.0	426.0	463.5	462.5	444.0	17.5	20.5	3.0	6.5	0.20	
CS4291	457.2	429	46	426	462.3	461.3	444	21	23.5	3.1	6.5	0.2	
CS4300	457.0	430.0	38.0	426.0	462.3	461.3	444.0	17.5	20.5	3.0	6.5	0.20	
CS4450	473	445	38	440	478.3	477.3	460	17.5	20.5	3	6.5	0.2	
CS4480	482.5	448.0	40.0	443.0	486.3	485.3	470.0	19.0	21.5	3.1	6.5	0.20	
CS4500	480	450	50	445	492.2	490.2	470	23.5	25.5	4	6	0.2	
CS4540	482.6	454.0	39.0	450.0	487.7	486.7	470.0	22.0	24.0	3.7	6.3	0.20	
CS4600	494	460	60	455	504.8	503.2	484	23.8	25.8	4.7	8	0.2	
CS4650	495.0	465.0	44.0	460.0	500.7	498.5	482.9	21.2	23.2	4.7	7.0	0.20	
CS4651	497	465	44	460	503.1	500.9	482.9	21.2	23.2	4.7	7	0.2	
CS4700	500.0	470.0	50.0	465.0	512.2	510.2	490.0	23.5	25.5	4.0	6.0	0.25	

# Duo-cone Seal



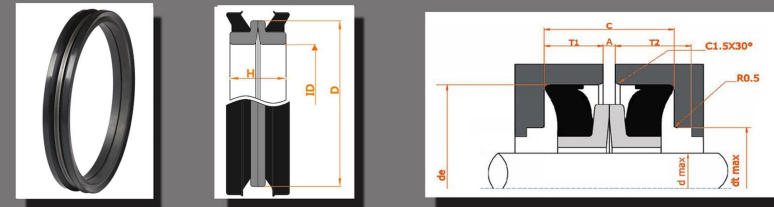
Drawing No.	Seal Set			(Max) d	Housing Bore								(+/-)Tol. for
	PN#	Outside Diameter D	Inside Diameter ID		Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia. de	Shoulder Diameter df	Housing Depth t1	Depth Of Shoulder(Min) t2min	Taper Intersection t3	Transitional Radius r	
CS5050	533.4	505.0	44.0	500.0	538.4	537.4	521.0	19.7	21.7	4.0	6.5	0.25	
CS5051	535	505	44	500	541.7	539.7	521	19.7	21.7	4.2	6.5	0.25	
CS5080	548.0	508.0	60.0	503.0	553.0	551.5	524.0	23.0	26.0	5.0	9.0	0.25	
CS5300	560	530	50	524	572.2	570.2	545	23.5	25.5	4	6	0.25	
CS5380	568.0	538.0	44.0	532.0	573.1	572.1	555.0	19.7	21.7	4.0	6.5	0.25	
CS5381	567	538	44	532	572.2	571.2	554	19.7	21.7	4	6.5	0.25	
CS5382	580.0	538.0	62.0	532.0	585.0	583.5	556.0	23.0	26.0	5.0	9.0	0.25	
CS5590	590	559	50	554	602.2	600.2	575	23.5	25.5	4	6	0.25	
CS5760	608.0	576.0	44.0	572.0	613.0	612.0	596.0	19.7	21.7	4.0	6.5	0.25	
CS5800	608	580	44	575	613	612	596	19.7	21.7	4	6.5	0.25	
CS5910	623.0	591.0	50.0	586.0	635.2	633.2	613.0	23.5	25.5	4.0	6.0	0.25	
CS5960	628	596	50	591	640.2	638.2	618	23.5	25.5	4	6	0.25	
CS6200	650.0	620.0	50.0	615.0	662.2	660.2	635.0	23.5	25.5	4.0	6.0	0.25	
CS6600	695	660	53	653	705.3	703.3	680	20	22.5	4	6	0.25	
CS6670	700.0	667.0	44.0	660.0	705.6	704.3	687.0	21.3	24.0	3.7	6.3	0.25	
CS6671	700	667	50	660	705.6	704.3	687	21.5	26	3.7	6.3	0.25	
CS7180	750.0	718.0	50.0	710.0	762.2	760.2	740.0	23.5	25.5	4.0	6.0	0.25	
CS7370	768	737	50	730	784	782	760	24	26	4	6	0.25	
CS7380	770.0	738.0	50.0	730.0	782.0	780.0	760.0	24.0	26.0	4.0	6.0	0.25	
CS7450	800	745	80	730	806.9	805.9	775	34.5	38.9	4.4	10	0.3	
CS7740	807.0	773.0	44.0	763.0	812.4	811.4	794.0	22.0	24.0	3.7	6.3	0.30	
CS7700	825	770	80	755	831.9	830.9	800	34.5	38.9	4.4	10	0.3	
CS7750	821.0	775.0	60.0	750.0	828.0	826.5	798.0	23.0	26.0	5.0	9.0	0.25	
CS7800	835	780	80	765	841.9	840.9	810	34.5	38.9	4.4	10	0.3	
CS8250	865.0	825.0	46.6	815.0	870.6	869.6	852.7	19.0	23.0	3.7	6.3	0.30	
CS8251	865.1	825	48	815	870.6	869.6	853	18.5	23.5	3.7	6.3	0.3	
CS8252	872.0	825.0	60.0	815.0	876.0	874.5	846.0	23.0	26.0	5.0	9.0	0.30	
CS8320	865	832	44	820	870.6	869.6	852.7	18.5	23.5	3.7	6.3	0.3	
CS8300	886.0	830.0	80.0	815.0	891.9	890.9	860.0	34.5	38.9	4.4	10.0	0.30	
CS8350	886	835	80	820	891.9	890.9	860	34.5	38.9	4.4	10	0.3	
CS8950	951.0	895.0	80.0	885.0	956.9	955.9	924.0	34.5	38.9	4.4	10.0	0.30	
CS9000	941	900	60	885	946.3	945.2	922.4	23.8	25.2	4.7	8	0.3	
CS9200	976.0	920.0	80.0	900.0	981.9	980.9	950.0	34.5	38.9	4.4	10.0	0.30	
CS10300	1085	1030	80	1010	1090.9	1089.9	1058	34.5	38.9	4.4	10	0.3	
CS10440	1105.0	1044.0	80.0	1024.0	1110.9	1109.9	1078.0	34.5	38.9	4.4	10.0	0.30	

# Heavy Duty Seal



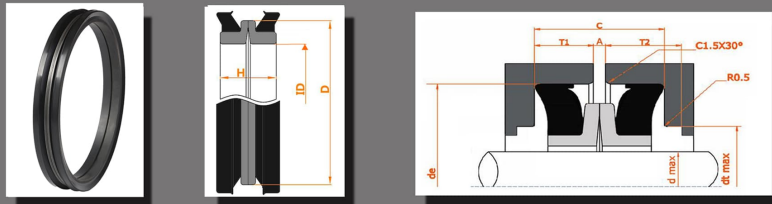
Drawing No. PN#	Seal Set				(Max) d	Housing Bore				
	A	Outside Diameter D	Inside Diameter ID	Seal Ring Height H		Bore depth de	Recommended shoulder dia dt	Bore depth T1	Depth Of Shoulder(Min) t2min	C
CS0420DF		59.0	42.0	20.0	39.0	65.0	53.0	10.0	10.5	23.0
CS0470DF		62	47	20	44	70	58	11.5	11.5	23
CS0450DF		65.0	45.0	22.0	42.0	70.1	58.0	11.5	12.1	24.7
CS0505DF		65	50.5	19	46.5	76.2	63	10.5	11	23
CS0540DF		73.0	54.0	22.0	50.0	80.0	67.0	11.5	12.0	26.0
CS0585DF		73	58.5	19	54	82.6	65	10	11	23
CS0586DF		80.0	58.6	19.6	54.0	84.0	71.0	9.0	9.5	21.0
CS0600DF		80	60	24	56	85	70	10.5	10.5	28
CS0635DF		81.0	63.5	19.0	59.5	87.8	71.0	9.0	9.5	21.0
CS0670DF		86.2	67	20	64	95.5	82	10	11	23
CS0671DF		91.7	67.0	20.0	64.0	95.5	82.0	10.0	11.0	23.0
CS0740DF		92.8	73.8	20	70	102.2	88	10	11	23
CS0741DF		99.0	74.0	20.0	70.0	102.2	88.0	10.0	11.0	23.0
CS0760DF		90	76	17	73	95	83	8	9.5	18
CS0770DF		97.0	77.0	25.0	74.0	105.0	87.0	12.5	13.5	29.0
CS0820DF		101.5	82	20	78	110.2	96	10	11	23
CS0825DF		100.0	82.5	22.0	78.0	114.3	97.0	11.0	12.0	25.5
CS0875DF		111.5	87.5	19	85	115.8	102	10	11	23
CS0880DF		104.0	88.0	19.0	85.5	113.0	98.0	8.0	9.5	20.0
CS0920DF		113	92	24	88	125.8	109	12.5	13	28
CS0940DF		115.0	94.0	24.0	90.0	125.8	109.0	12.5	13.0	28.0
CS0941DF		120	94	24	90	125.8	109	12.5	13	28
CS0990DF		123.0	99.0	19.0	95.0	127.3	113.0	10.0	11.0	23.0
CS0991DF		120	99	17.5	95	124	110	8.5	9.5	20
CS1040DF		132.0	104.0	27.0	100.0	141.2	121.0	15.0	16.0	32.2
CS1050DF		124	105	24	100	135	114	12	13	28
CS1140DF		133.2	114.0	26.0	110.0	148.0	130.0	12.0	13.0	28.0
CS1141DF		138	114	26	110	148	126	12	13	28
CS1150DF		141.0	115.0	28.0	112.0	152.4	131.4	15.3	15.3	33.6
CS1240DF		144	124	32	120	162.5	142	18.3	20	39.6
CS1330DF		156.0	133.0	28.0	128.0	171.5	151.0	15.3	15.3	32.6
CS1340DF		155.6	134	22	130	162.6	152	10.7	13.1	22.81
CS1425DF		161.0	142.5	24.0	138.0	173.0	139.7	11.1	11.1	27.7

# Heavy Duty Seal



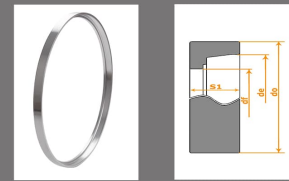
Drawing No. PN#	Seal Set				(Max) d	Housing Bore				
	A	Outside Diameter D	Inside Diameter ID	Seal Ring Height H		Bore depth de	Recommended shoulder dia dt	Bore depth T1	Depth Of Shoulder(Min) t2min	C
CS1430DF		165	143	28	139	177.5	168	15.8	16.8	33.6
CS1431DF		166.0	143.0	28.0	139.7	174.0	158.8	15.5	15.5	33.0
CS1480DF		172	148	29	144	184.5	164.7	16.5	16.5	35
CS1485DF		167.9	148.5	28.0	143.0	184.1	164.0	16.5	18.0	35.0
CS1481DF		168	148.5	32.4	143	188.9	172	16.5	16.5	36
CS1500DF		175.0	150.0	30.0	145.0	190.0	170.0	16.5	18.0	35.0
CS1501DF		177	150	32	145	184.1	164	16.5	18	35
CS1520DF		178.0	152.0	32.0	149.0	192.0	172.0	14.0	16.5	31.0
CS1540DF		180	154	36	149	194	174	18.4	18.4	38.5
CS1541DF		180.4	154.0	30.0	149.0	190.0	170.0	16.0	18.0	35.0
CS1580DF		180	158	18	153	190	174	8	10	22
CS1600DF		180.0	160.0	36.0	155.0	194.0	174.0	18.4	18.4	38.5
CS1630DF		184	163	30	158	190.5	175	15	15	31.75
CS1690DF		195.0	169.0	33.0	164.0	206.2	191.5	15.1	18.4	32.2
CS1740DF		194	174	23	170	204.65	190.5	10.7	13.1	22.81
CS1780DF		207.0	178.0	29.0	174.0	218.9	197.0	16.5	16.5	35.0
CS1920DF		218	192	32	187	231	206	15.2	17	32.4
CS1930DF		214.3	193.0	32.0	188.0	238.7	215.0	20.1	20.1	42.2
CS1931DF		223	193	32	188	238.7	215	20.1	20.1	42.2
CS1980DF		224.0	198.0	35.0	195.0	245.0	223.0	17.0	17.0	40.0
CS1981DF		220	198	18	195	228.6	212	10.5	12	23
CS2030DF		229.5	203.0	38.0	198.0	254.0	235.0	21.2	23.0	44.5
CS2060DF		237.5	206	38	202	254	235	21.2	23	44.5
CS2135DF		238.0	213.5	28.0	209.0	254.0	240.0	13.7	15.2	32.0
CS2140DF		242	215	38	210	255.5	235	18.9	21.2	39.6
CS2150DF		249.0	215.0	38.0	210.0	255.5	235.0	18.9	21.2	39.6
CS2220DF		244.6	222	22	217	254	240	10.5	10.5	23
CS2250DF		246.0	225.0	40.0	221.0	277.1	247.0	23.7	23.7	49.0
CS2251DF		246	225	36	221	266.8	247	18.15	18.15	38.1
CS2260DF		256.0	226.0	40.0	220.0	277.1	247.0	23.7	23.7	49.0
CS2280DF		260.5	228	40	221	277.1	247.5	23.7	23.7	49
CS2330DF		259.0	233.0	35.0	225.0	280.0	250.0	17.0	18.0	40.0
CS2360DF		265	236	30	231	273.1	230	15.6	17	34.2

## Heavy Duty Seal



Drawing No.	Seal Set				Housing Bore						
	PN#	A	Outside Diameter D	Inside Diameter ID	Seal Ring Height H	(Max) d	Bore depth de	Recommended shoulder dia dt	Bore depth T1	Depth Of Shoulder(Min) t2min	C
CS2380DF			261.9	238.0	22.0	233.0	269.9	255.0	10.7	10.7	22.9
CS2390DF			264	239	36	234	279.4	261.9	17.5	20	36.5
CS2410DF			261.3	241.0	22.0	236.0	269.9	255.0	10.6	10.6	22.2
CS2415DF			273.5	241.5	36	236	279.4	260.6	17.5	20	36.5
CS2416DF			273.5	241.6	36.0	236.0	295.3	273.0	21.3	21.3	44.6
CS2470DF			270.5	247	41	243	301.2	272	23.5	23.5	49.5
CS2485DF			269.1	248.5	28.0	243.0	279.4	260.0	12.7	12.7	28.9
CS2520DF			282	252	38	248	295.2	272	20.7	23	44.5
CS2580DF			286.0	258.0	28.0	253.0	292.1	276.0	15.6	17.0	33.2
CS2750DF			303	275	36	270	309.4	290	17.5	20	37
CS2830DF			305.0	283.0	42.0	278.0	329.4	307.0	18.5	22.1	39.2
CS2831DF			319	283	34	278	329.4	307	18.5	18.5	39.2
CS2835DF			322.5	283.5	42.0	278.0	329.4	307.0	18.5	22.1	39.2
CS3020DF			326	302	28	295	336.6	317	15.6	17	33.2
CS3200DF			352.5	320.0	40.0	312.0	365.1	343.0	20.0	21.0	42.0
CS3550DF			392	355	40	347	401.7	380	23	23	47.6
CS3790DF			414.0	379.0	40.0	371.0	424.1	403.0	23.0	23.0	47.6
CS4290DF			458	429	42	421	477	447	18.4	22	38.9
CS4420DF			478.0	442.0	42.0	434.0	488.7	467.4	18.4	22.0	38.9
CS4421DF			470	442	42	434	488.7	467.4	18.4	22	38.9
CS4800DF			515.0	480.0	44.0	475.0	530.0	502.0	22.0	24.8	48.0
CS4920DF			530	492	42	485	546	532	19.9	22	41.7
CS5000DF			534.0	500.0	42.0	490.0	546.0	532.0	19.9	22.0	41.7
CS5350DF			580	535	45	525	600	581	24.5	28.3	53
CS5400DF			570.0	540.0	42.0	530.0	582.8	552.7	21.4	21.4	46.6
CS5700DF			600	570	45	560	615	585	23.5	27.3	51
CS5780DF			616.0	578.0	40.0	568.0	624.0	600.0	21.5	21.5	45.0
CS6180DF			670	618	50	608	682.5	649	26	30	54
CS6200DF			664.0	620.0	50.0	610.0	682.5	649.0	26.0	30.0	54.0
CS6600DF			692	660	46	650	705	682	24.5	26.5	52
CS7490DF			782.0	749.0	47.0	737.0	812.8	779.0	26.1	30.0	54.0
CS7500DF			800	750	54	737	812.8	779	26.1	27.1	58

## Adapter Catalog



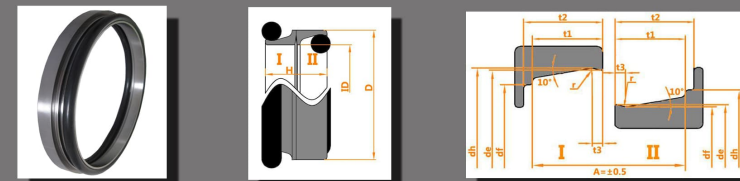
PN#	Seal Set			
	Outside Diameter do	Installing Dia df	Installing Dia. de	Thickness S1
CS3501H	392.0	368.0	384.5	24.0
CS3660	420	381	398.5	20.5
CS3870	430.0	402.0	418.5	24.0
CS4290	478	444	462.5	20.5
CS4300	457.0	444.0	461.3	38.0
CS5050	533.4	521	537.4	44
CS5800	608.0	596.0	612.0	44.0

## Specially design floating seals Catalog (G)



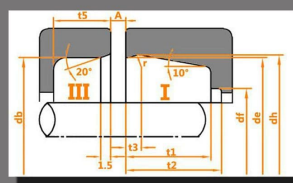
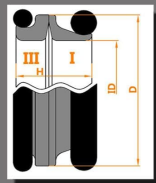
Drawing No.	Seal Set				
	PN#	A	Outside Diameter D	Inside Diameter ID	Seal Ring Height H
CS0545G			71.3	54.5	32.5
CS0660G			83.2	66	32.5
CS0820G			93.2	76.0	32.5
CS0820G			98.5	82	32.5
CS1080G			125.0	108.0	32.5

## Specially design floating seals Catalog (GH1)



Drawing No.	Seal Set			Housing Bore-I				Housing Bore-II					
	PN#	A	Outside Diameter D	Inside Diameter ID	Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia de	Housing Depth t1	Depth Of Shoulder (Min) t2min	Retaining Lip Dia. dh	Installing Dia de	Housing Depth t1	Depth Of Shoulder (Min) t2min
CS1720GH1			207.0	172.0	31.8	198.9	186.0	14.5	16.5	180.0	213.0	14.5	16.5
CS1920GH1			220	192	30.5	213.8	198	14.5	17	196.9	213	12.8	14
CS2420GH1			262.7	242.0	39.5	273.5	255.5	18.0	20.5	228.2	248.0	18	20.5
CS2920GH1			322.5	292	38	327.5	310	18	20.5	283	300	18	20.5

## Specially design floating seals Catalog (GH2)



Drawing No.		Seal Set			Housing Bore-I				Housing Bore-III	
PN#	A	Outside Diameter D	Inside Diameter ID	Seal Ring Height H	Retaining Lip Dia. dh	Installing Dia de	Housing Depth t1	Depth Of Shoulder(Min) t2min	Bore diameter db	Housing Depth t5
CS2910GH2		318.5	291.0	33.5	324.8	305.0	19.5	22.0	323.0	13.0
CS3260GH2		354	326	33.5	360	342	19.5	22	358	13

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