Vessel and Agitator Mechanical Seals

CK728/738 Seal Family

smiths

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Vessel and Agitator Mechanical Seals

One mechanical seal family to suit all vessel and agitator applications in the following industries:

- **Chemical**
- **Pharmaceutical**
- **Oil and Gas**
- **Water and Wastewater**
- **Utilities**
- **Food and Beverage**
- **Power Generation**
- **Mining**

On-going development has resulted in a family of seals available in wet lubricated, gas lubricated, contacting or non-contacting models. Modulisation ensures maximum component flexibility from this versatile family, whilst the flange design ensures a standardised fit on all DIN flanged vessels and also allows for modification on non-standard equipment.

CK728/738W is a liquid lubricated design used in a traditional wet seal arrangement, with a process compatible liquid between the seals to lubricate and remove generated heat.

CK728/738D is a gas lubricated fully contacting design that uses a specially developed carbon allowing operation on a dry nitrogen sealant without a humidifier, which is often not process compatible.

CK728/738GD is a gas lubricated non-contacting inboard, contacting outboard design running on a dry nitrogen sealant. A non-contacting inboard seal ensures high levels of product purity, low heat generation and reduced power consumption. A dry contacting outboard seal as used in CK728/738D reduces sealant gas consumption by up to 50%.

Where an ultra clean process environment exists, non-contacting outboard seal faces are an option.

Typical top entry vessel and agitator applications include:

- Homogenisation
- Gas Introduction
- Gas Dispersion
- Dispersing
- Flue Gas Desulphurisation
- Suspending
- Heat Transfer

The Only Choice for Vessel and Agitator Mechanical Seals

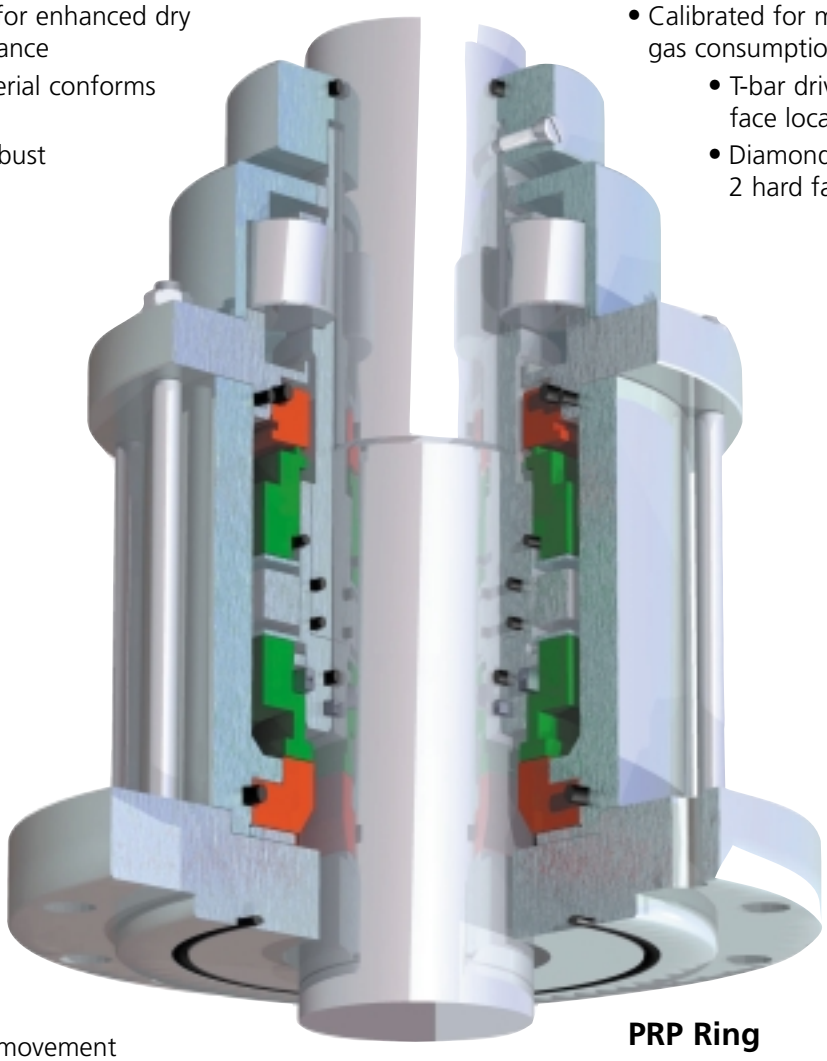
CK728 for Steel Vessels & CK738 for Glass Lined Vessels

Optimised Outboard Seal Faces

- Balanced for optimum performance
- Unique material for enhanced dry running performance
- Dry running material conforms to FDA
- T-bar drive for robust face location

Gas Lubricated Inboard Seal Faces

- Uni-directional or bi-directional designs
- Calibrated for minimum buffer gas consumption
- T-bar drive for robust face location
- Diamond coating when 2 hard faces employed



Unique Shaft Sleeve

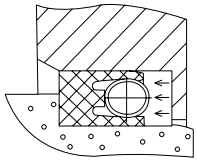
- Allows for shaft movement without upsetting the seal setting
- Secondary sealing device positioned for vacuum applications
- Divided sleeve can be made from exotic materials to ensure product compatibility (CK738)

PRP Ring

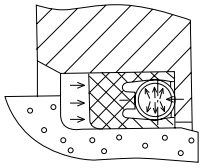
- Virgin PTFE is FDA compatible
- Unique reverse pressure design
- Wide chemical compatibility
- Interchangeable with O-ring if required

Thrust Bearing

- Ensures control of the seal



Pressurised
By Sealant



Reverse
Pressurised

Modular Seal Design Ensures Process Compatibility

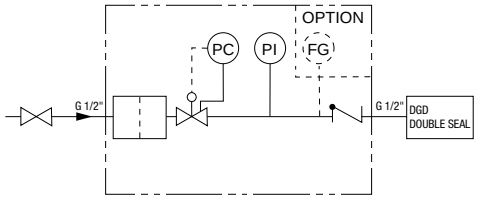
CK728/738W – liquid lubricated
CK728/738D – dry gas lubricated without humidification
CK728/738GD – unique gas/dry face combination

All CK728/738 vessel seals are cartridge design for trouble free operation

Sealant System Options to Suit All Seal Designs

Gas Sealant System

Piping and
Instrumentation

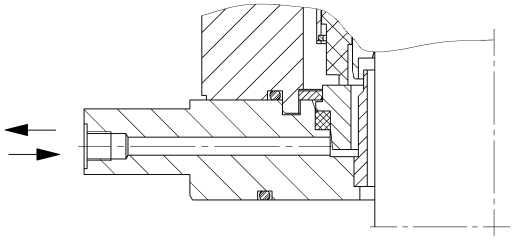


Wet Seal System

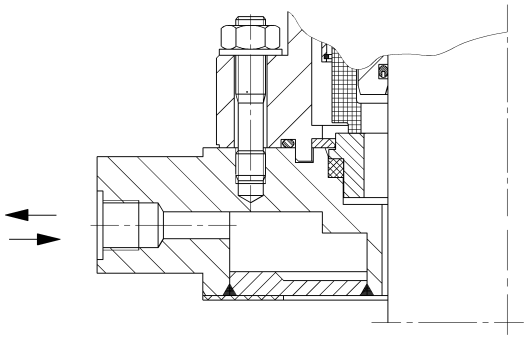
Ancillary Equipment

All seals shown in this leaflet can be offered with the following ancillaries, individually or in combination upon request.

- Leakage Control
- Flushing Connection
- Cooling Flange
- Heating Flange



For use on wet designs where leakage to product is intolerable.



For use when the seal chamber temperature needs to be isolated from that of the process.

Performance Capabilities

Speed	0 to 500 min^{-1}
Vessel Pressure	Vacuum to 16 bar
Seal Pressure	Max. 18 bar
Temperature	-40 °C to + 200 °C
	(-20 °C with special materials)

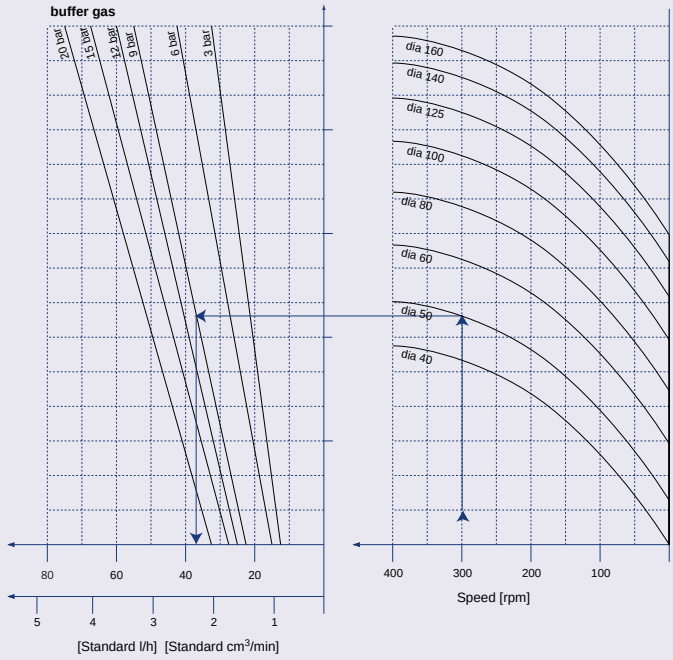
Type CK728/738 Performance Limits

Leakage Curves

A guide to maximum gas leakage rate for dry running contacting agitator seals.

** The leakage rate includes both seal interfaces and secondary seals. During the run-in period (up to 200 hours) the leakage rate can be higher. Under transient conditions leakage may rise for a short time until the interface has stabilised. Most of the time the leakage rate is only a fraction of the maximum value.*

Maximum temperature limit = 200˚C

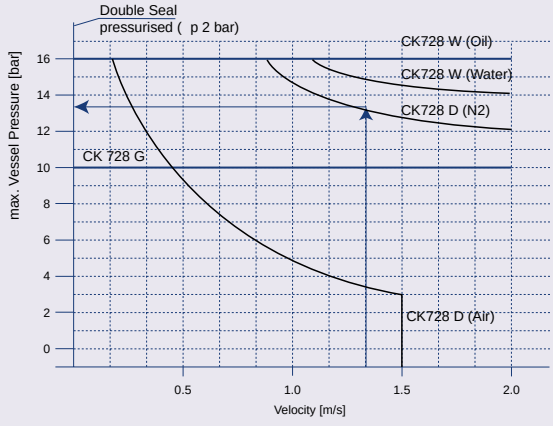


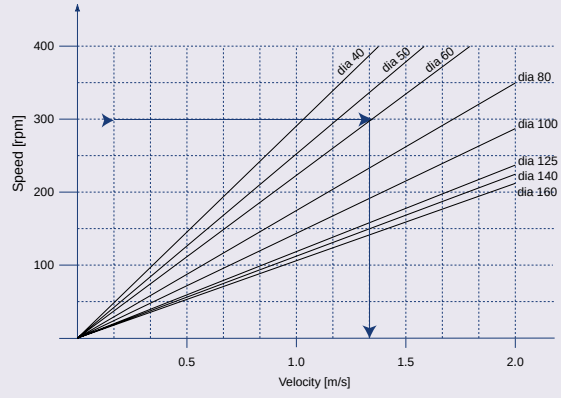
Material Chart

Item		Standard	EN code	Options	EN code
Face	(Wet)	Resin impregnated carbon (171)	B	SiC (277)	Q1
	(Dry & Gas)	Resin impregnated carbon (646)	B3		
Seat		SiC (277)	Q1	DIA-SiC (Gas Only) (648)	Q6
Secondary Seals					
Type CK728 medium side		Fluorocarbon (134)	V	PTFE (138)	T
Type CK738 medium side		PTFE (138)	T		
Type CK728/738 Atmospheric side		Fluorocarbon (134)	V	high-temperature perfluoro elastomer (230) perfluoro elastomer (394) EPT (FDA approved) (235) perfluoro elastomer (FDA approved) (199) (Chemraz SD-505)	K K1 E K4
Metal Parts Type CK728/738		Stainless steel (316SS) (001) DIN 1.4571	G		
In contact with the medium Type **CK728 only**				Any 'special' material which is required for service conditions involved (Hastelloy C4, C276, 2000, Monel, Titanium etc.)	
Springs		Stainless steel (316SS) (001)	G		

Pressure and Velocity Limits

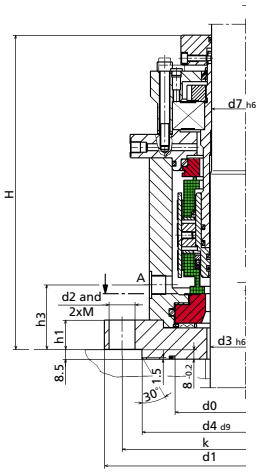
CK738 = CK728



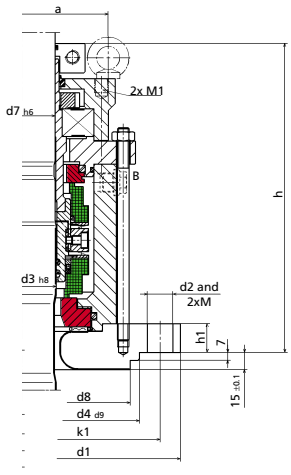


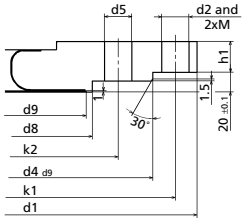
Type CK728/738 – Technical Data

CK728 G



CK738 D





Type CK728 Dimensional Data (mm)

Shaft size				Bolting								Connections			
d3	d0	d1	k	No.	Size	d2	d4	d7	H	h1	h3	a	BSP	C	M	M1
40	91	175	145	4	M16	18	110	38	232	48	34	106	G 3/8	G 1/8	M16	M12
50	107	240	210	8	M16	18	176	48	260	25	51	136	G 3/8	G 1/8	M16	M12
60	120	240	210	8	M16	18	176	58	270	25	55	152	G 3/8	G 1/8	M16	M12
80	149	275	240	8	M20	22	204	78	292	30	61	175	G 1/2	G 1/8	M20	M16
100	174	305	270	8	M20	22	234	98	300	30	60	208	G 1/2	G 1/8	M20	M16
125	199	330	295	8	M20	22	260	120	330	68	53	245	G 1/2	G 1/8	M20	M20
140	218	395	350	12	M20	22	313	135	350	30	60	270	G 1/2	G 1/8	M20	M20
160	237	395	350	12	M20	22	313	150	370	30	60	295	G 1/2	G 1/8	M20	M20
180	263	445	400	12	M20	22	364	170	390	32	60	310	G 1/2	G 1/8	M20	M24
200	288	445	400	12	M20	22	364	190	410	32	60	345	G 1/2	G 1/8	M20	M24
220	326	505	460	16	M20	22	422	210	430	32	60	372	G 1/2	G 1/8	M20	M24

Connections to DIN 28 138 Parts 1&3

Type CK738 Dimensional Data (mm)

Shaft size		Bolting																Connections			
d3	d1	k1	No.	Size	d2	k2	No.	Size	d5	d4	d7	d8	d9	h	h1	h3	a	BSP	C	M	M1
40	175	145	4	M16	18	-	-	-	-	110	38	102	-	243	60	47	105	G 3/8	G 1/8	M16	M12
50	240	210	8	M16	18	-	-	-	-	176	48	138	-	253	25	51	120	G 3/8	G 1/8	M16	M12
60	275	240	8	M20	22	-	-	-	-	204	58	188	-	263	25	55	130	G 3/8	G 1/8	M20	M12
80	305	270	8	M20	22	-	-	-	-	234	78	212	-	285	30	61	170	G 1/2	G 1/8	M20	M16
100	395	350	12	M20	22	-	-	-	-	313	98	268	-	299	30	60	190	G 1/2	G 1/8	M20	M16
125	505	460	4	M20	22	350	12	M20	22	422	120	320	306	330	30	56	215	G 1/2	G 1/8	M20	M20
140	505	460	4	M20	22	350	12	M20	22	422	135	320	306	350	30	60	240	G 1/2	G 1/8	M20	M20
160	505	460	4	M20	22	350	12	M20	22	422	150	320	306	370	30	60	270	G 1/2	G 1/8	M20	M20
161*	565	515	4	M24	26	400	12	M20	22	474	150	370	356	370	30	60	270	G 1/2	G 1/8	M20	M20

** Shaft & size to DIN 28 138 Part 2&3*

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North America
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Houston
Tel: 1-713-944-6690
Fax: 1-713-946-8252

Latin America
São Paulo, Brazil
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Middle East & Africa
Dubai, United Arab Emirates
Tel: 971-4-3438940
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Singapore
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If the products featured will be used in a potentially dangerous and/or hazardous process, your John Crane representative should be consulted prior to their selection and use.
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