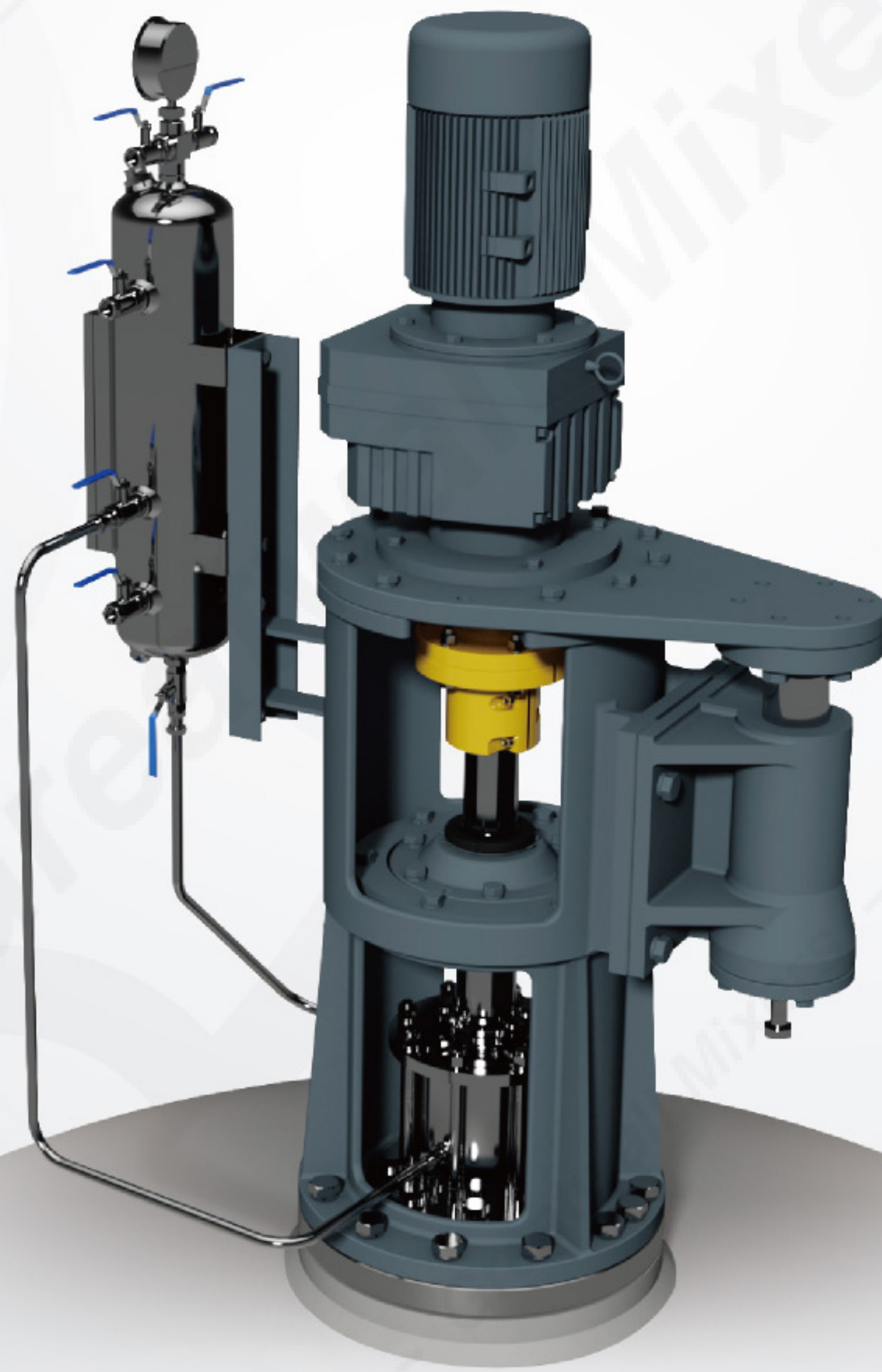


釜用机械密封

MECHANICAL SEALS FOR MIXERS AND AGITATORS



浙江长城搅拌设备股份有限公司
ZHEJIANG GREATWALL MIXERS CO., LTD.





浙江长城搅拌设备股份有限公司是国家高新技术企业，国家知识产权优势企业，浙江省创新型示范企业，浙江省专利示范企业。

企业技术力量雄厚，现拥有博士、教授级高工、高级工程师及各类专业技术人才近百人，并建立了国家级博士后科研工作站、长城搅拌技术与装备研究院、省级企业技术中心、省级院士专家工作站，与华东理工大学、浙江工业大学等高校合作建立了硕士研究生培养基地，共同进行技术人才的培养。



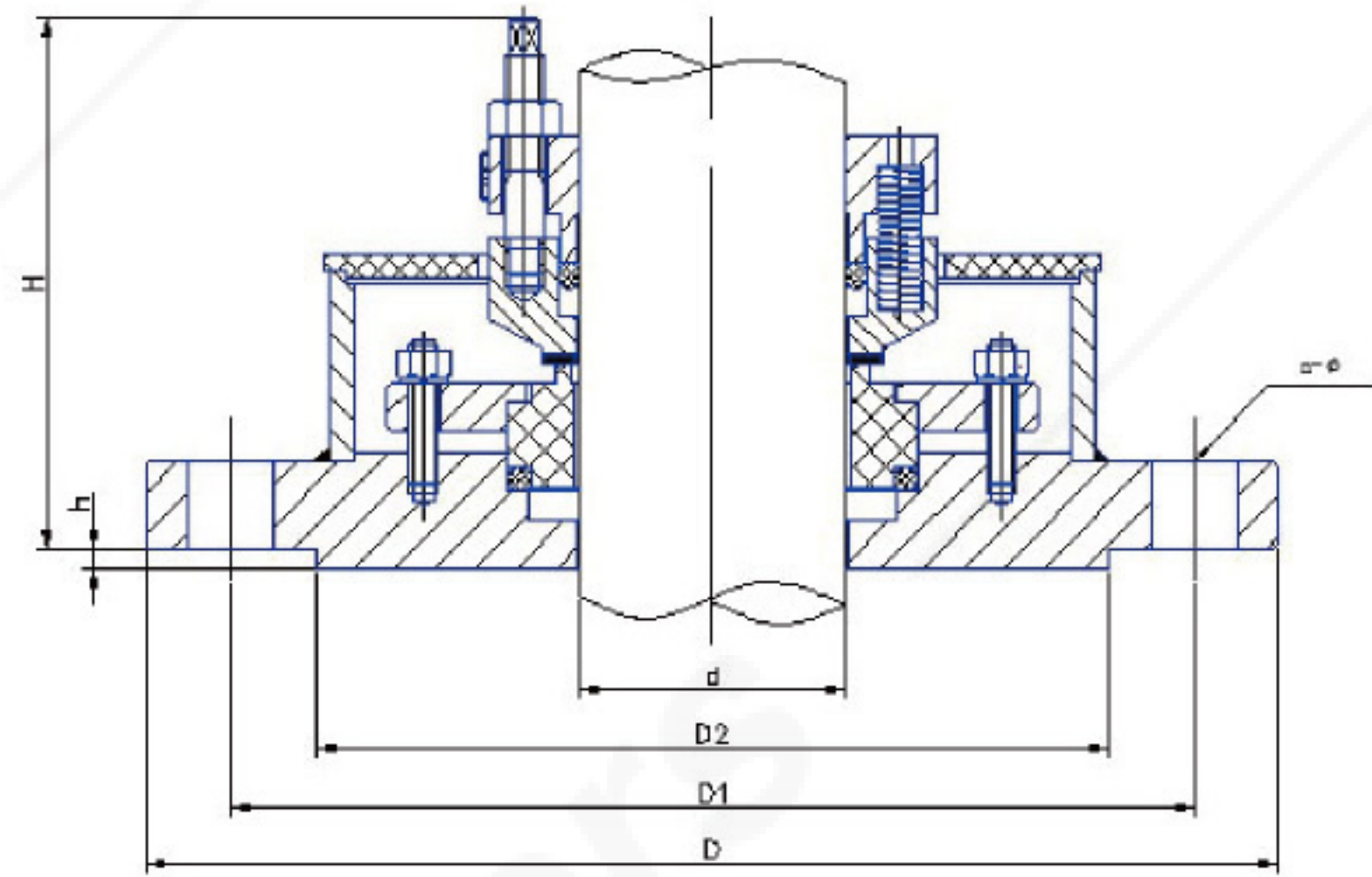
作为搅拌设备行业的创新型企业，不仅致力于搅拌技术与装备的发展，而且对搅拌设备相关的釜用机械密封做了大量的研究开发及标准化工作，拥有密封相关专利30余项，承担及参与密封行业标准及国际标准的制定共6项。近年来，公司不断加强在机械密封方面的研发和制造能力，并推出“长城西尔斯”机械密封品牌，力争进一步提升现有釜用机械密封的质量，并在高端釜用机械密封方面做出自己的特色。





一、釜用单端面机械密封 Single face mechanical seal

204系列机械密封 204 series single face mechanical seal



特点

Characteristics

204系列机械密封系单端面、多弹簧、传动螺钉传动平衡型釜用机械密封。一般适用于各种弱腐蚀性介质。204F、204FF通过选用合适的摩擦副材料可适用于各种无液体润滑工况下反应釜的密封，如发酵罐，种子罐等。204FF设计为静环对开式，可实现快速维修和更换。

204 series mechanical seal is single face balance type, which are widely used for common weak corrosion operations. By using proper seal rings, dry running designs (204F, 204FF) are widely used for fermentation processes.

适用工况

Working conditions

温度 Temp.: $-10^{\circ}\text{C} \sim 250^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: ATM~0.6MPa

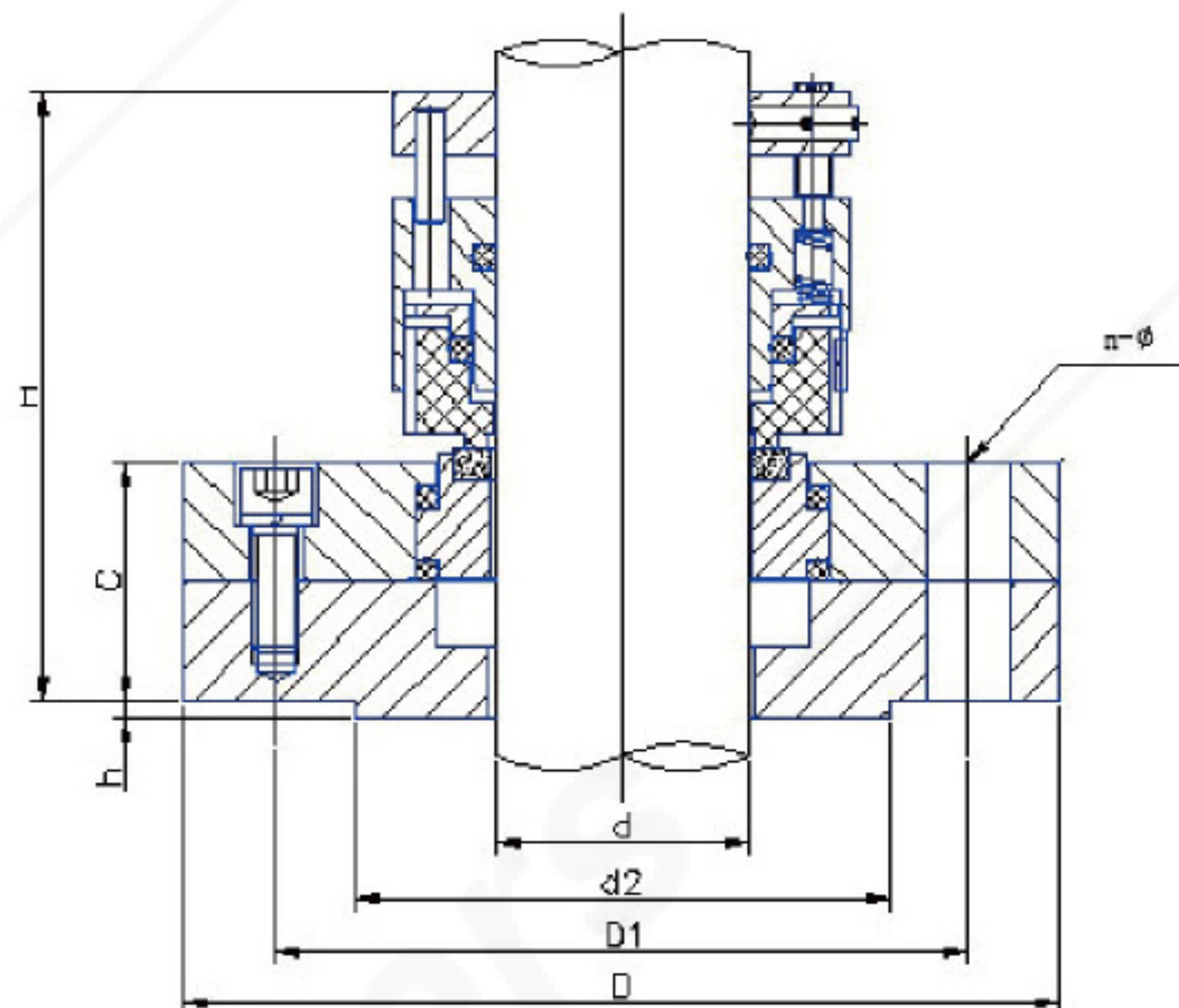
线速度 speed: 0~2m/s

介质 Material: 各类普通或具有弱腐蚀性的气-液, 气-液-固相介质。

For gas-liquid, gas-liquid-solid operations of common or weak corrosion materials.

d	D	D1	D2	n-φ	h	H
20	160	130	100	4-φ12	4	~130
25	170	140	110			
30	185	150	116			
35	195	160	125	4-φ18		
40	205	170	135			
45~65	235	200	164	8-φ18		
70~80	260	225	188			
85~95	290	255	220	12-φ18		
100~110	315	280	245			
120~130	340	300	260			
140~150	370	320	280	12-φ23		
160	390	350	300			
170~180	405	355	312			
190~220	435	395	353			

GW204系列机械密封 GW204 series single face mechanical seal



特点

Characteristics

GW204型机械密封是在原有204系列基础上开发的单端面、多弹簧、传动螺钉传动平衡型釜用机械密封。一般适用于各种普通或弱腐蚀性介质工况。通过选用合适的摩擦副材料可适用于各种无液体润滑工况下反应釜的密封，如发酵罐，种子罐等。GW204H型设计带有碎片井结构，可防止摩擦屑进入罐体，适用于卫生级结构设计。

GW204 is updated version of 204 seals. With the collection well design, it can prevent the friction dust coming into the tank and can meet sanitary design requirement.

适用工况

Working conditions

温度 Temp.: $-10^{\circ}\text{C}\sim 250^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: ATM~0.6MPa

线速度 speed: 0~2m/s

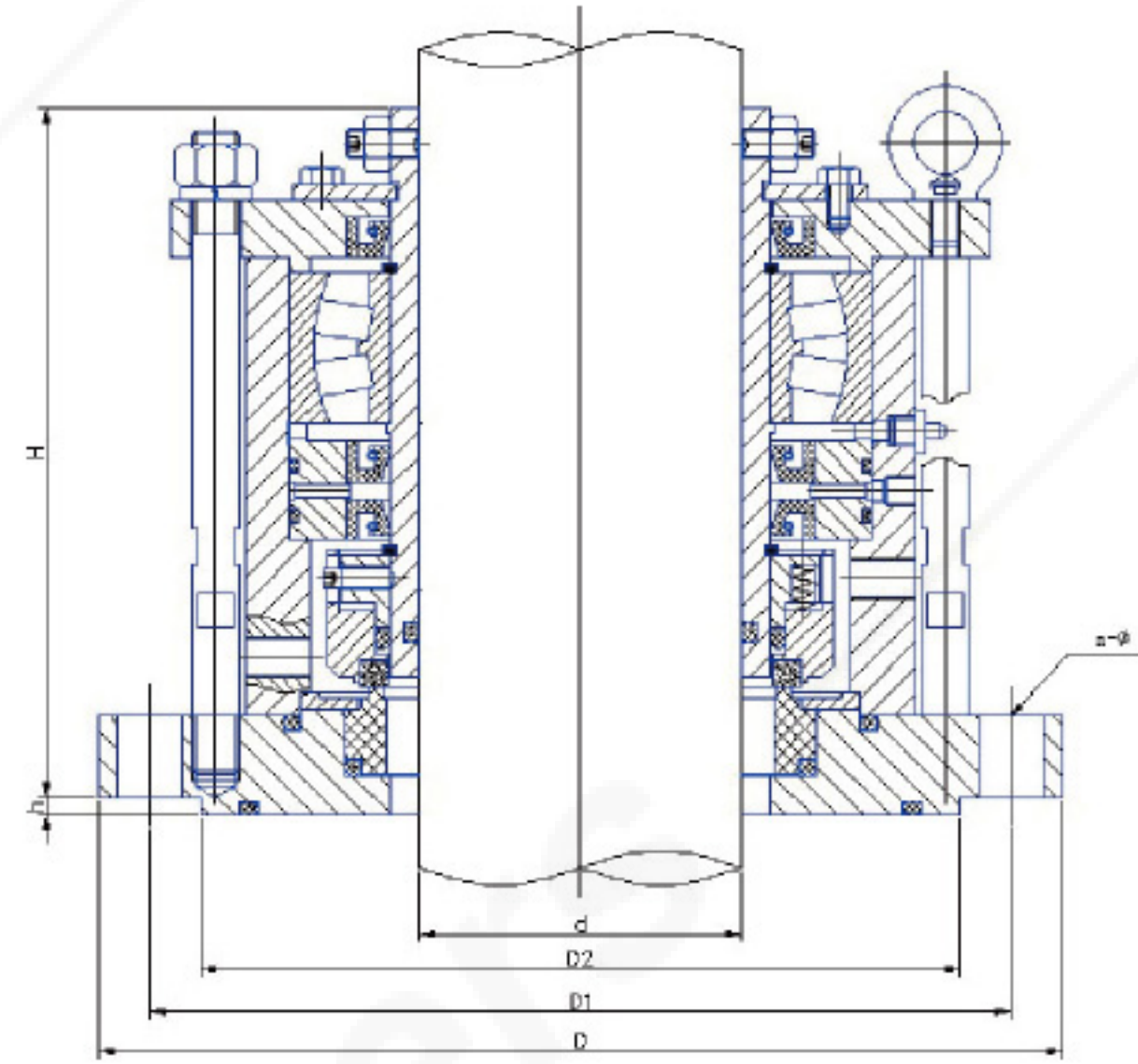
介质 Material: 各类普通或具有弱腐蚀性的气-液, 气-液-固相介质。

For gas-liquid, gas-liquid-solid operations of common or weak corrosion materials.

d	D	D2	D1	h	n-φ	H
20~25	130	100	70	4	4-φ14	~140
30~35	140	110	80			
40~50	160	130	100			
55~65	190	150	116		4-φ18	
70~85	210	170	135			
90~110	240	200	164		8-φ18	
120~130	265	225	188			
140~160	280	240	203			

一、釜用单端面机械密封 Single face mechanical seal

2002 系列机械密封 2002 series single face mechanical seal



特点

Characteristics

2002系列机械密封为集装式，轴向单端面多弹簧，内置轴承，非平衡型机械密封。一般用于普通及弱腐蚀性介质等工况。

2002 series are single cartridge, balance type seals, used for operations of common or weak corrosion materials.

适用工况

Working conditions

温度 Temp.: $-10^{\circ}\text{C}\sim 250^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: ATM~0.6MPa

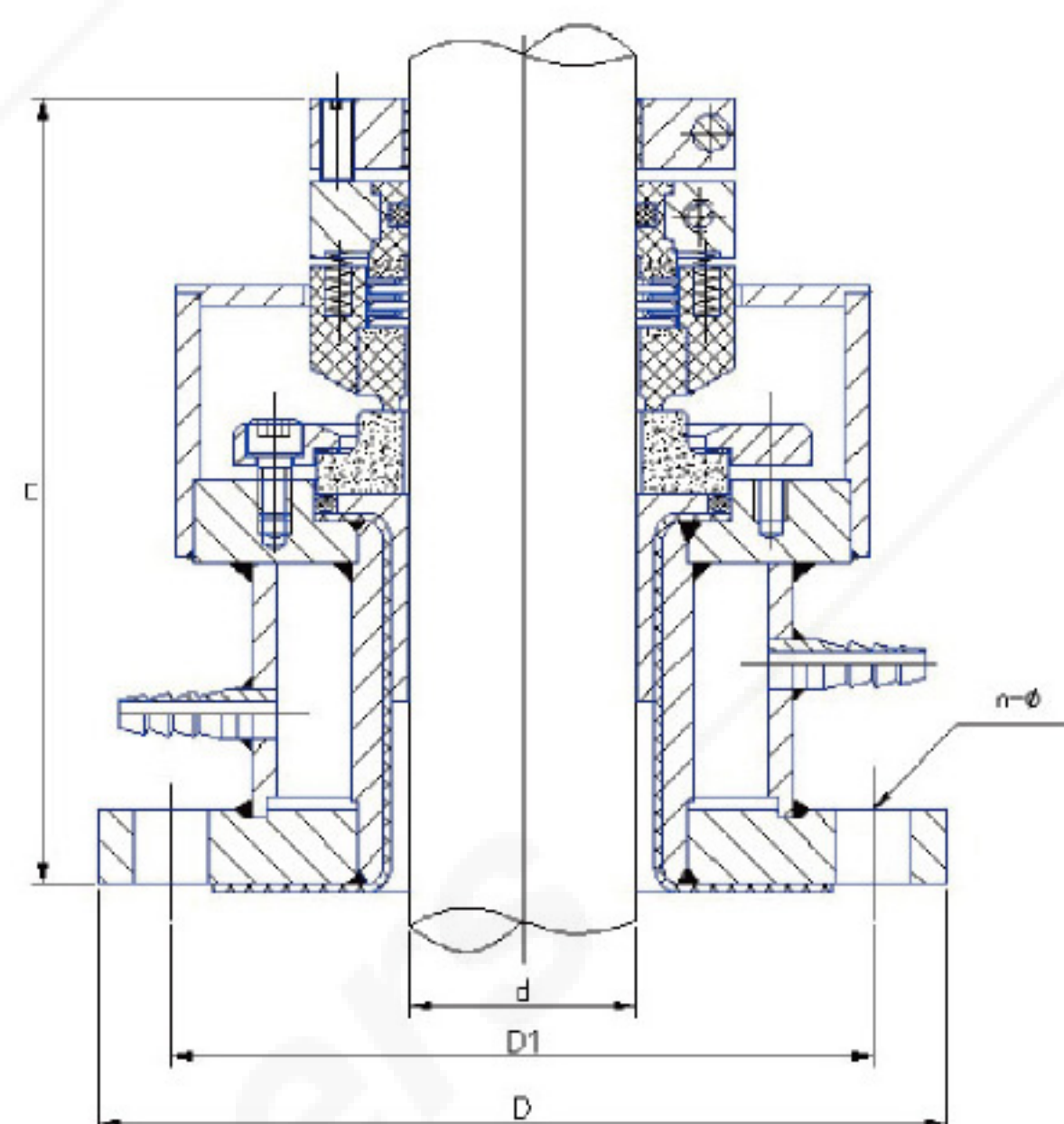
线速度 speed: 0~3m/s

介质 Material: 各类普通或具有弱腐蚀性的气-液，气-液-固相介质。

For gas-liquid, gas-liquid-solid operations of common or weak corrosion materials.

d	D	D1	D2	n-φ	H	h
30~40	175	145	110	4-φ18	209	6
45~55	240	210	176	8-φ18	225	
60~70	240	210	176	8-φ18	255	
75~85	275	240	204	8-φ22	275	
90~100	305	270	234	8-φ22	275	
110~130	330	295	260	8-φ22	300	
140~160	395	350	313	12-φ22	305	

212 系列单端面机械密封 212 series single face mechanical seal



特点

Characteristics

212型机械密封为单端面、多弹簧、部分平衡型四氟波纹管机械密封。一般用于腐蚀性较强，无悬浮颗粒的操作工况，尤其适用于搪玻璃反应釜，钛合金釜等有一定真空要求及径向摆动稍大的场合。

212 series seals use corrugated PTFE pipe and ceramics as friction rings. By PTFE lining for inner surfaces, the seals can be used for high corrosion operations, especially for glass lining reactors, high alloy tanks, etc. This design is also suitable for vacuum operations and allowable for high radial shaft run-out.

适用工况

Working conditions

温度 Temp.: $-10^{\circ}\text{C}\sim 120^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1\sim 0.5\text{MPa}$

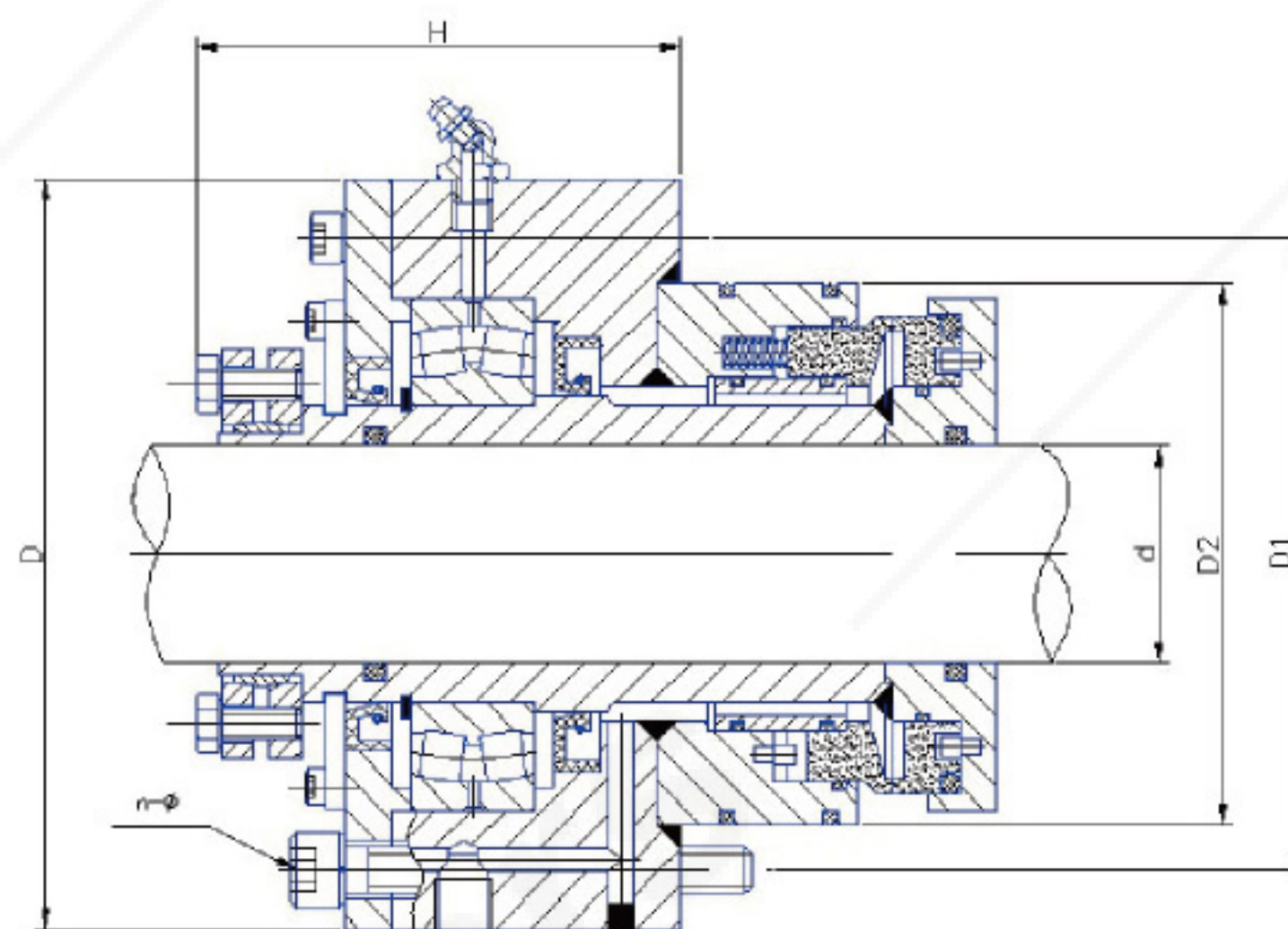
线速度 speed: $0\sim 3\text{m/s}$

介质 Material: 适用于普通及各种强腐蚀性工况。
For common and high corrosion operations.

d	D	D1	n-φ	H
30	160	130	4-φ14	192
40				
50	185	150	4-φ18	192
60				
65	205	170	4-φ18	192
70				
80				
90	235	200	4-φ18	193
95				
100	290	255	8-φ18	197
110				
120	320	280	8-φ18	204
130				
140	360	320	12-φ18	204
150				
160				202

一、釜用单端面机械密封 Single face mechanical seal

261系列侧入式搅拌机机械密封 261 series single face mechanical seal



特点

Characteristics

261系列机械密封为集装式，轴向单端面多弹簧，内置轴承，平衡型机械密封。是针对侧入式搅拌机专门开发的一种机械密封，采用硬对硬的摩擦副设计，适用于含固体颗粒的介质。经常应用于烟气脱硫吸收塔、沼气发酵罐、储罐等大型常压容器的侧入式搅拌机。

261 series seals are specially designed for side entry mixers. By using hard-hard friction rings, it is suitable for operations with solids, such as FGD absorption tower, biogas digester, oil storage tanks, etc.

d	D	D1	D2	n-φ	H
40	165	140	117	6-Φ14	117
45~50	175	150	127	6-Φ14	123
55~60	190	160	137	6-Φ14	123
65~70	215	180	147	6-Φ18	128
75~80	235	200	157	6-Φ18	135
85~90	275	240	177	6-Φ22	154
95~100	275	240	187	6-Φ22	163

适用工况

Working conditions

温度 Temp.: $-10^{\circ}\text{C}\sim 130^{\circ}\text{C}$

压力 press.: $0\sim 0.6\text{MPa}$

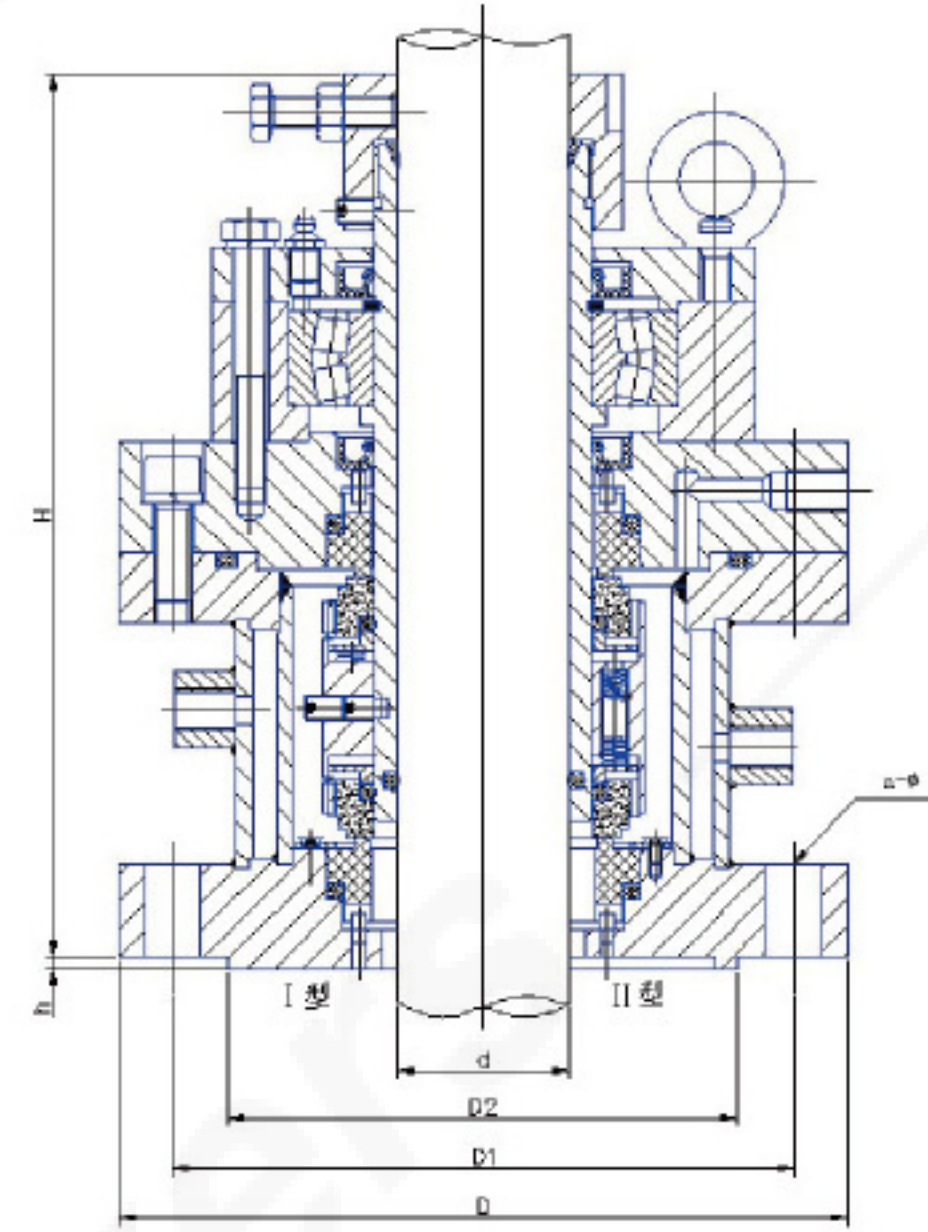
线速度 speed: $0\sim 3\text{m/s}$

介质 Material: 适用于各种含有固体颗粒的固-液或气-液-固过程，如烟气脱硫吸收塔、沼气发酵罐、储罐等。

For operations with solids, such as FGD absorption tower, biogas digester, oil storage tanks, etc.

二、釜用双端面机械密封 Double faces mechanical seal

GW205 系列双端面机械密封 GW205 series double faces mechanical seal



特点

Characteristics

GW205系列机械密封为集装式，轴向双端面多弹簧、内置轴承、非平衡型机械密封。一般用于弱腐蚀性介质且对密封泄露量要求严格的场合，如易燃、易爆、有危害性及高真空工况等。摩擦副采用硬对硬配对时可用于带固体颗粒的工况，如结晶过程等。

GW205 series seals are designed for low pressure, common or weak corrosion materials, but sealing requirement is high. The inner bearing will limit the shaft vibration. Proper sealing rings selection, such as hard-hard, will allow for operations with solids, such as crystallization.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C} \sim 350^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1 \sim 0.6\text{MPa}$

线速度 speed: $0 \sim 3\text{m/s}$

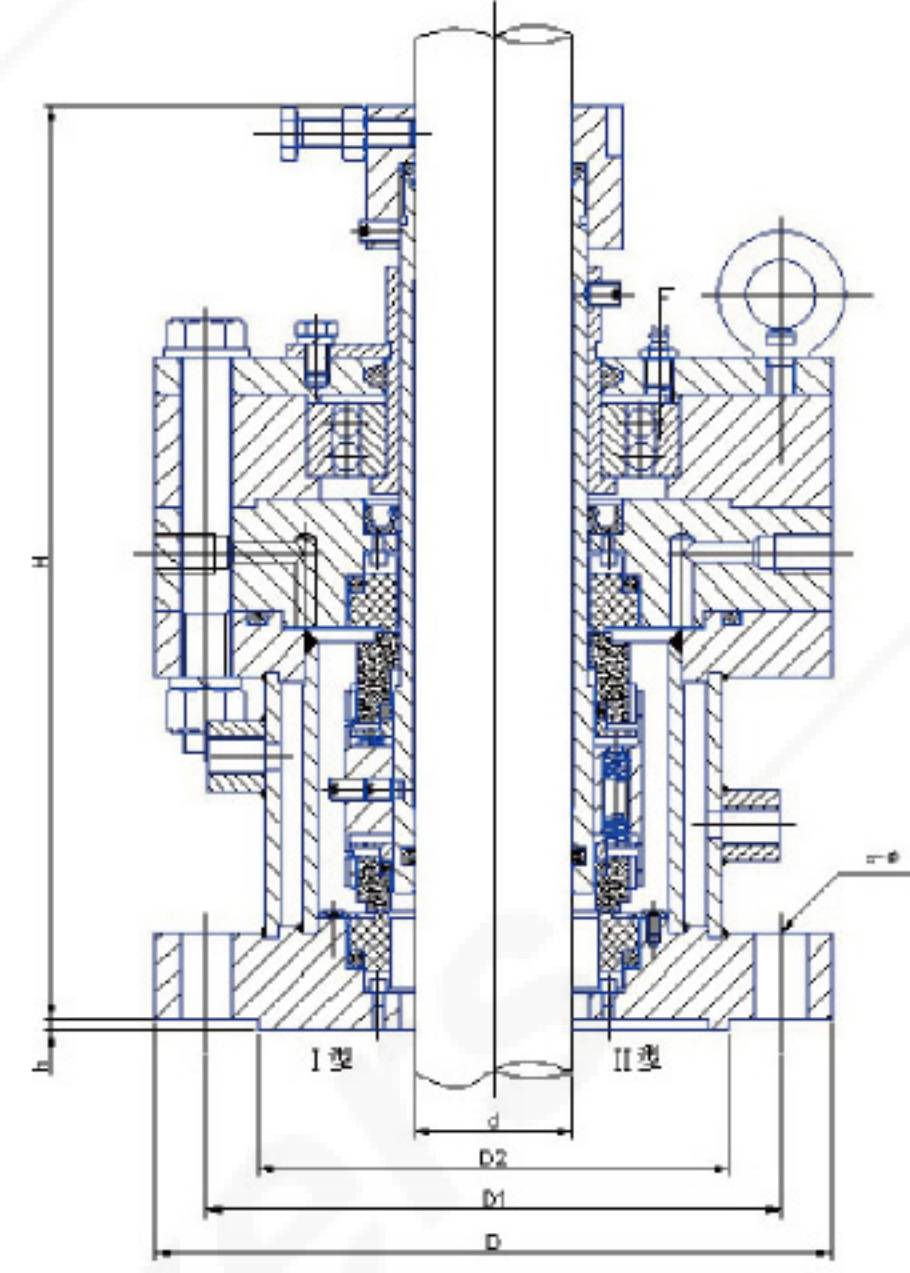
介质 Material: 适用于普通及各种弱腐蚀性且对密封要求严格的工况。

For operations of common or weak corrosion materials, but sealing requirement is high.

d	D	D1	D2	n-φ	H
30	185	160	116	6-φ14	~270
35~40	205	170	135	4-φ18	~290
45~65	235	200	164	8-φ18	~290
70~80	260	225	188		~320
85~95	290	255	220	12-φ18	~324
100~110	315	280	245		~340
115~125	370	320	270		~345
130~150	405	355	312	12-φ23	~370
160~170	435	395	353		~370
180~200	485	445	403	12-φ26	~390

二、釜用双端面机械密封 Double faces mechanical seal

206 系列双端面机械密封 206 series double faces mechanical seal



特点

Characteristics

206型机械密封为集装式，轴向双端面多弹簧、内置轴承、大气端平衡型机械密封。一般用于弱腐蚀性介质且对密封泄露量要求严格的场合，如易燃、易爆、有危害性及高真空工况等。摩擦副采用硬对硬配对时可用于带固体颗粒的工况，如结晶过程等。

206 series seals are designed for medium pressure, common or weak corrosion materials, but sealing requirement is high. The inner bearing will limit the shaft vibration. Proper sealing rings selection, such as hard-hard, will allow for operations with solids, such as crystallization.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C} \sim 350^{\circ}\text{C}$ (不同温度匹配相应的冷却措施)

压力 press.: $-0.1 \sim 1.6\text{MPa}$

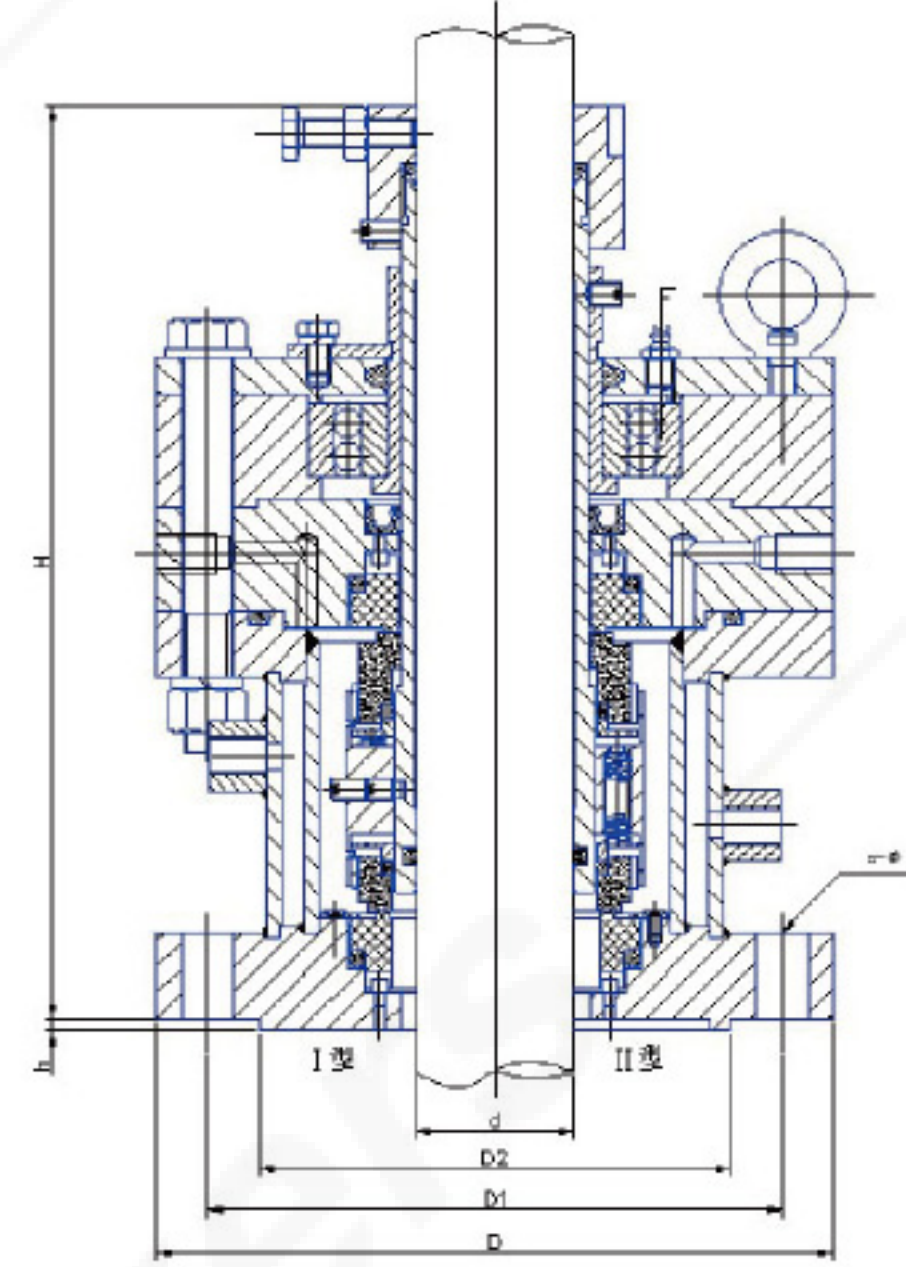
线速度 speed: $0 \sim 3\text{m/s}$

介质 Material: 适用于普通及各种弱腐蚀性且对密封要求严格的工况。

For operations of common or weak corrosion materials, but sealing requirement is high.

d	D	D1	D2	n-φ	H	h
30	185	160	116	6-φ14	~306	4
35~40	205	170	135	4-φ18	~320	
45~65	235	200	164	8-φ18	~342	
70~80	260	225	188		~355	
85~95	290	255	220	12-φ18	~370	
100~110	315	280	245		~385	
115	370	320	270		~410	
120~125					~420	
130				12-φ23	~430	
140~150	405	355	312			
160~170	435	395	353			
180~190	485	445	403	12-φ26		
200						

207 系列双端面机械密封 207 series double faces mechanical seal



特点

Characteristics

207型机械密封为集装式，轴向双端面多弹簧、内置轴承、两端平衡型机械密封。一般用于弱腐蚀性介质且对密封泄露量要求严格的场合，如易燃、易爆、有危害性及高真空工况等。摩擦副采用硬对硬配对时可用于带固体颗粒的工况，如结晶过程等。

207 series seals are designed for high pressure, common or weak corrosion materials, but sealing requirement is high. The inner bearing will limit the shaft vibration. Proper sealing rings selection, such as hard-hard, will allow for operations with solids, such as crystallization.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C}\sim 350^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1\sim 2.5\text{MPa}$

线速度 speed: $0\sim 3\text{m/s}$

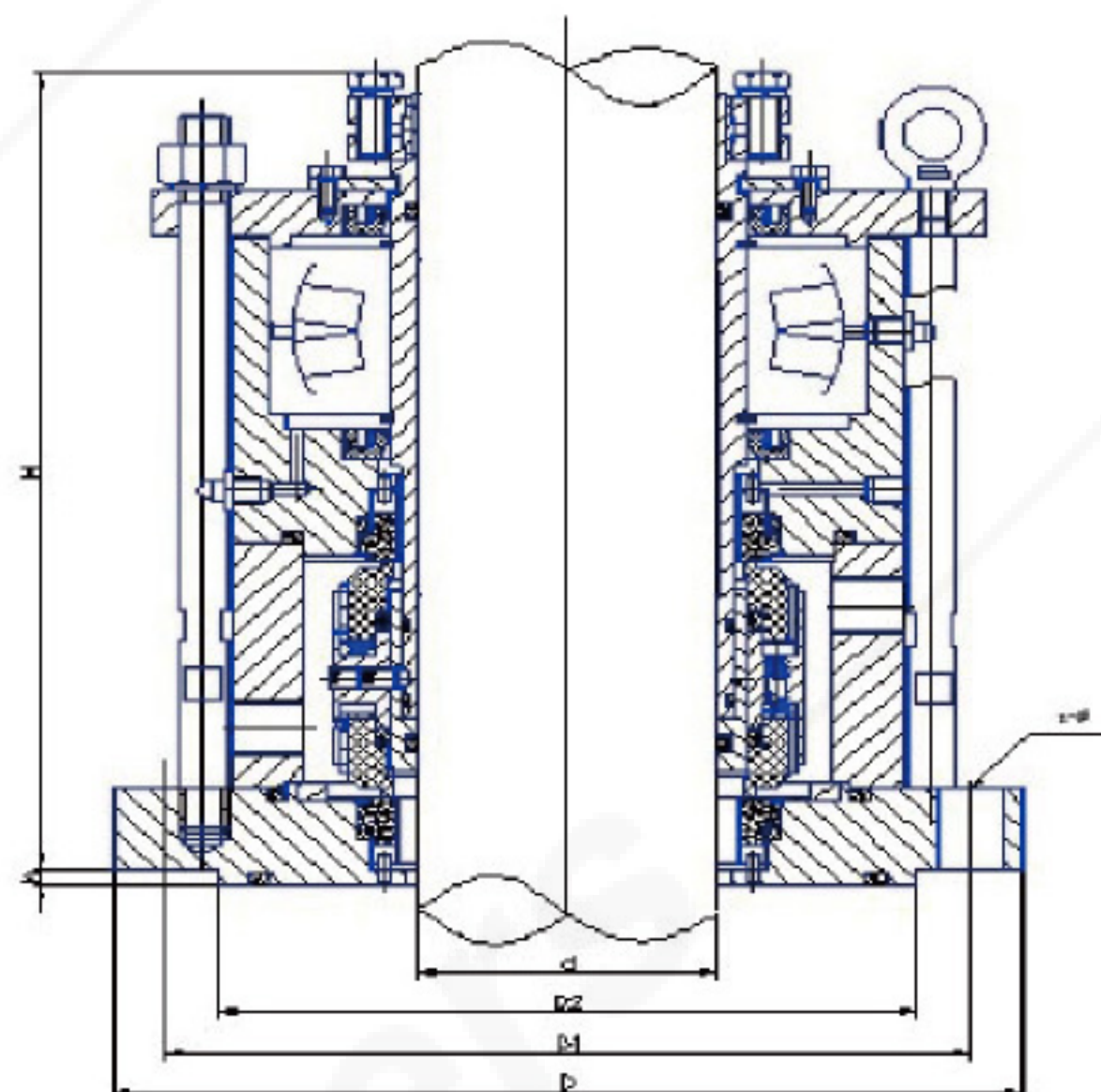
介质 Material: 适用于普通及各种弱腐蚀性且对密封要求严格的工况。

For operations of common or weak corrosion materials, but sealing requirement is high.

d	D	D 1	D 2	n - φ	H	h
30	185	160	116	6-φ14	~318	4
35	205	170	135	4-φ18		
40						
45~55	235	200	164	8-φ18	~330	
60~65					~340	
70	260	225	188	12-φ18	~365	
75~80						
85~95	290	255	220		~375	
100~110	315	280	245	12-φ23	~390	
115	370	320	270			
120~125						
130	405	355	312	12-φ26	~415	
140~150						
160	435	395	353	12-φ26	~430	
170						
180~190	485	445	403	12-φ26	~440	
200						

二、釜用双端面机械密封 Double faces mechanical seal

GW2007 系列双端面机械密封 GW2007 series double faces mechanical seal



特点

Characteristics

GW2007系列机械密封是在原2000系列双端面密封的基础上改进而成，为集装式、轴向双端面、多弹簧、内置轴承平衡型机械密封。其结构紧凑，适用压力范围广，性能稳定。一般用于弱腐蚀性介质以及对密封泄露量要求严格的场合。可用于大部分需要配置双端面机械密封的工况。

GW2007 series seals, updated from original 2000 series, are designed for high pressure, common or weak corrosion materials, but sealing requirement is high. It has compact structure, and can be used for most of conditions which need double faces seal.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C}\sim 300^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1\sim 2.5\text{MPa}$

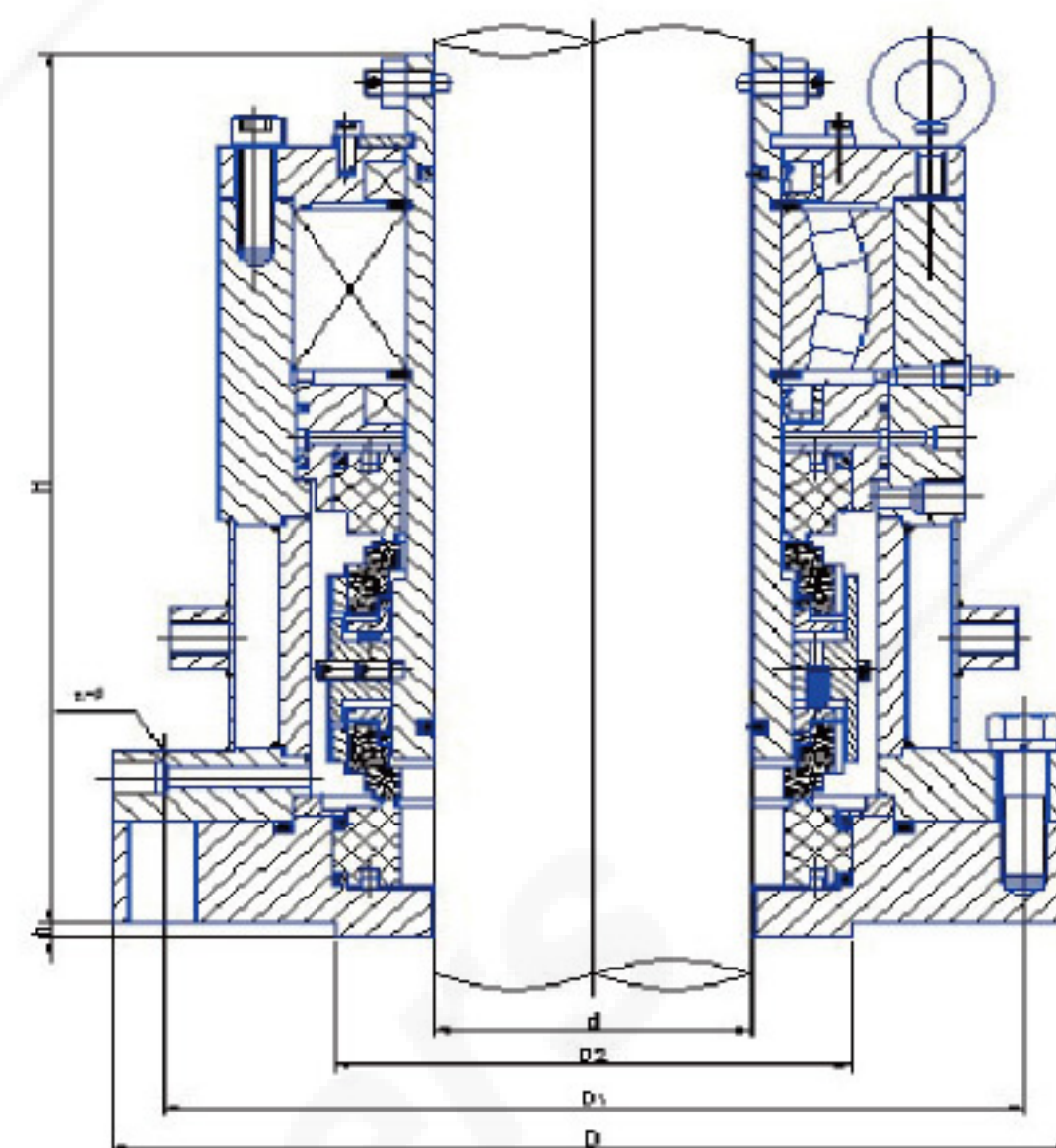
线速度 speed: $0\sim 3\text{m/s}$

介质 Material: 适用于普通及各种弱腐蚀性且对密封要求严格的工况。

For operations of common or weak corrosion materials, but sealing requirement is high.

d	D	D1	D2	n-φ	H	h
30~40	175	145	110	4-φ18	~240	6
45~55	240	210	176	8-φ18	~250	
60~70	240	210	176	8-φ18	~260	
75~85	275	240	204	8-φ22	~270	
90~100	305	270	234	8-φ22	~300	
110~130	330	295	260	8-φ22	~320	
140~160	395	350	313	12-φ22	~340	

2010 系列双端面机械密封 2010 series double faces mechanical seal



特点

Characteristics

2010系列机械密封是针对高压工况而设计的双端面机械密封，为集装式、轴向双端面、多弹簧、内置轴承平衡型机械密封。一般用于弱腐蚀性介质以及对密封泄露量要求严格的场合，尤其是针对高压而需要配置双端面机械密封的工况。

2010 series seals are designed for super high pressure operations. With inner bearing, balance type design, it is suitable for high pressure tanks with common or weak corrosion materials, but sealing requirement is high.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C} \sim 350^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1 \sim 4\text{MPa}$

线速度 speed: $0 \sim 3\text{m/s}$

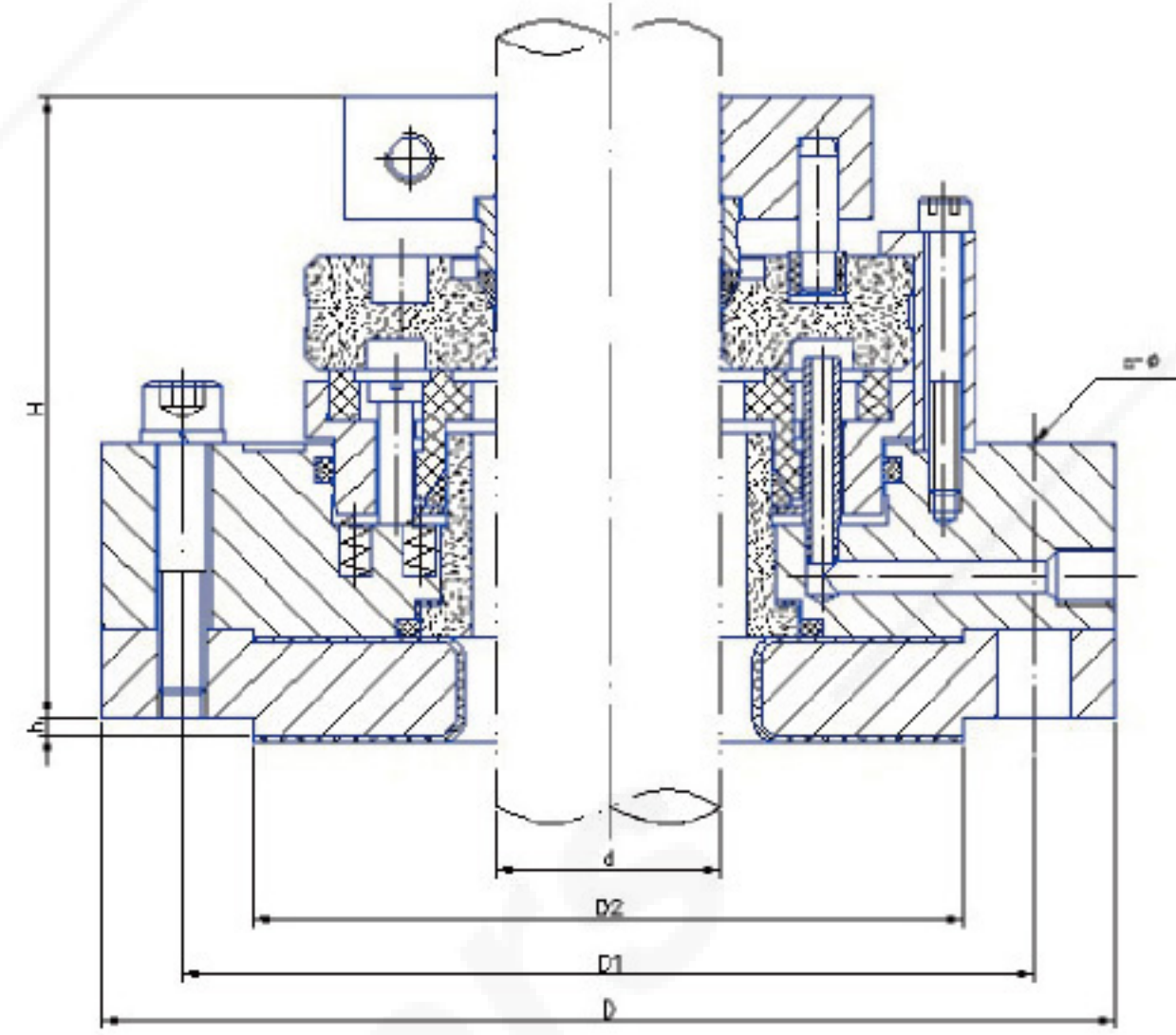
介质 Material: 适用于普通及各种弱腐蚀性且对密封要求严格的工况。

For operations of common or weak corrosion materials, but sealing requirement is high.

d	D	D 1	D 2	n - φ	H
30	170	145	70	6-φ14	~295
40	200	170	80	6-φ18	~299
50	230	200	100	8-φ18	~304
60	255	225	120	8-φ18	~316
70	275	245	130	8-φ18	~325
80	295	260	145	8-φ23	~329
90	310	275	155	8-φ23	~337
100	315	280	170	8-φ23	~343
110	335	300	180	8-φ23	~347
120	345	310	190	8-φ23	~351

二、釜用双端面机械密封 Double faces mechanical seal

221 系列径向双端面机械密封 221 series radial double faces mechanical seal



特点

Characteristics

221系列机械密封是一种径向双端面机械密封，集装式结构，特别适合于轴向尺寸受限的工作场合。可设计应用于强腐蚀介质，用于搪玻璃反应釜等；也可设计为常用不锈钢材料，用于弱腐蚀性介质的场合。

221 series are radial double faces mechanical seals, especially for conditions of limitation in axial spacing. It can be designed for glass lining tanks (high corrosion) or common stainless steel tanks (weak corrosion).

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C}\sim 250^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1\sim 1.6\text{MPa}$

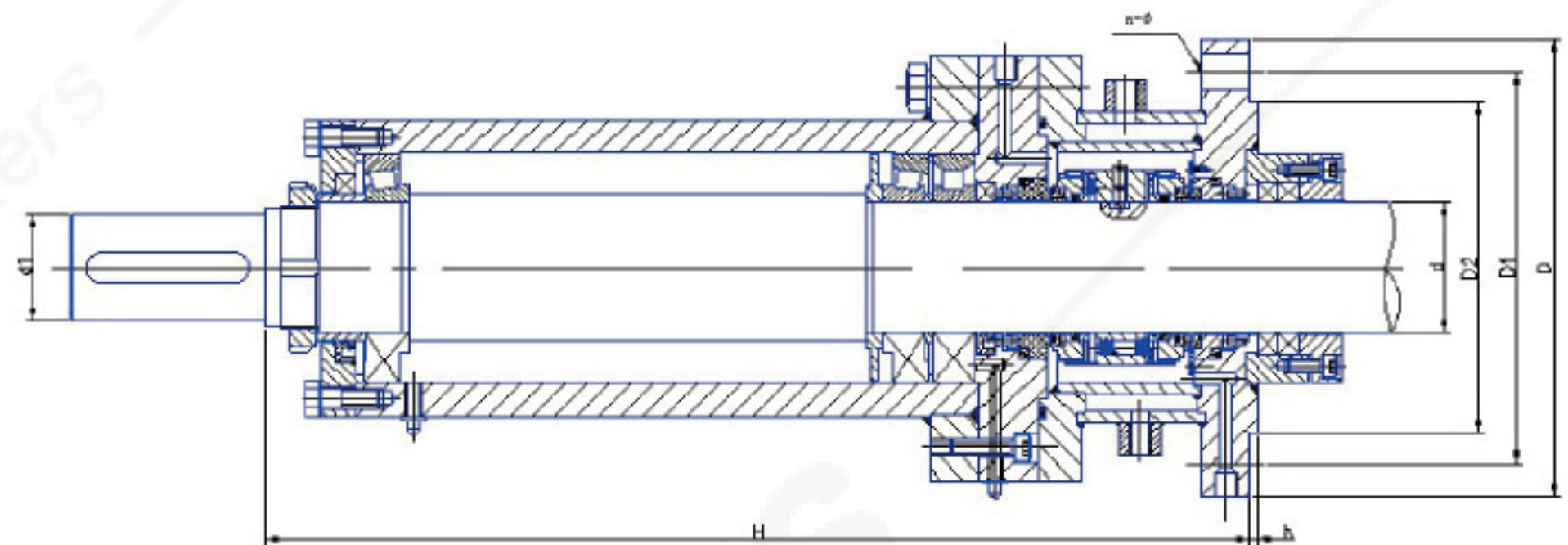
线速度 speed: $0\sim 2\text{m/s}$

介质 Material: 采用不同的设计可适用从弱腐蚀性介质到强腐蚀性介质的工况。

By using different design, it can be used from weak corrosion to high corrosion operations.

d	D	D1	D2	H	n-φ	h
30	185	145	109	153	4-φ18	4
40						
50	220	180	149	157	8-φ18	
60						
65						
70	250	210	175	168	8-φ18	
80						
90						
95						
100	285	240	203	168	8-φ23	
110						
120	340	295	259	168	8-φ23	
125						
130						
140	395	350	300	168	12-φ23	
140						

285系列底搅拌用双端面机械密封 285 series double faces mechanical seal



特点

Characteristics

285系列机械密封为集装式，带转轴支撑，前置填料密封，轴向双端面，非平衡型机械密封。根据介质性质确定材料及适用工况，常用于弱腐蚀介质的底入式及侧入式搅拌，密封要求严格的场合。将前置的填料密封改为单端面机封，可用于带颗粒、微粉の場合。

285 series are double cartridge mechanical seals. With specially designed shaft support and pre-stuffing, they are suitable for processes using bottom entry mixers with common or weak corrosion material. The pre-single face seal instead of pre-stuffing allows fluid with solids or powder.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C}\sim 200^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1\sim 0.6\text{MPa}$

线速度 speed: $0\sim 3\text{m/s}$

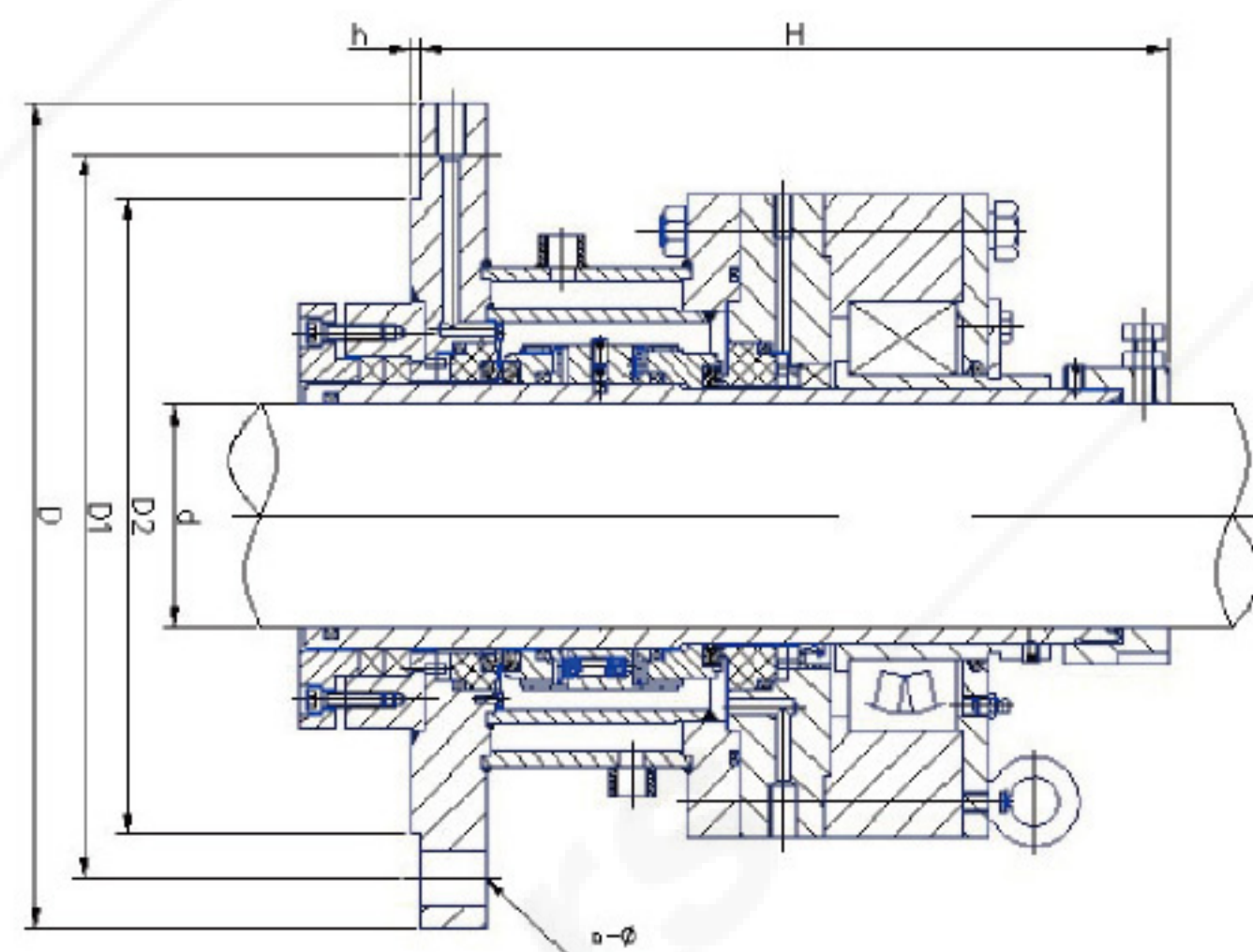
工艺过程 Processes: 常用于弱腐蚀介质的底入式及侧入式搅拌，密封要求严格的场合。

For bottom entry mixers with common or weak corrosion material, but sealing requirement is high.

d	D	D1	D2	h	n-φ	H
30	215	180	149	4	8-φ18	450
40						
50	245	210	175			550
60						
65	280	240	203	8-φ23	600	
70						
80					335	295
90						
95	405	355	312	12-φ25	700	
100						
110						
120						
125						
130						

二、釜用双端面机械密封 Double faces mechanical seal

286系列双端面机械密封 286 series double faces mechanical seal



特点

Characteristics

286型机械密封为集装式，轴向双端面，多弹簧，带转轴支撑，前置填料密封，大气端平衡型机械密封。根据介质性质确定材料及适用工况，常用于弱腐蚀介质的底入式及侧入式搅拌，对密封要求严格的场合。将前置的填料密封改为单端面机封可用于带颗粒、微粉の場合。

286 series are double cartridge mechanical seals. With specially designed shaft support and pre-stuffing, they are suitable for processes using bottom entry mixers with common or weak corrosion material. The pre-single face seal instead of pre-stuffing allows fluid with solids or powder.

适用工况

Working conditions

温度 Temp.: $-40^{\circ}\text{C}\sim 200^{\circ}\text{C}$ (不同温度匹配相应的冷却措施 With proper cooling method)

压力 press.: $-0.1\sim 1.6\text{MPa}$

线速度 speed: $0\sim 3\text{m/s}$

工艺过程 Processes: 常用于弱腐蚀介质的底入式及侧入式搅拌，密封要求严格的场合。

For bottom entry mixers with common or weak corrosion material, but sealing requirement is high.

d	D	D 1	D 2	L	h	n - φ	H
30	215	180	149	450	4	8-φ18	~316
40							~327
50	245	210	175	550	4	8-φ23	~342
60							~379
65	280	240	203	600	4	12-φ23	~382
70							~382
80	335	295	259	700	4	12-φ25	~382
90							~382
95	405	355	312	700	4	12-φ25	~382
100							~382
110	405	355	312	700	4	12-φ25	~382
120							~382
125	405	355	312	700	4	12-φ25	~382
130							~382

三、釜用机械密封辅助系统 Auxiliary systems for seal

机械密封辅助系统对于机封的安全稳定运行至关重要，根据不同的操作温度或压力需要配套相应的辅助系统。对于密封辅助系统的选用，一般遵循的原则如下：

对于单端面机械密封：当釜口的工作温度 $t \leq 100^{\circ}\text{C}$ 时，可直接在润滑盒内加注油或水（去离子水）或其他干净液体进行润滑和冷却；在 $100^{\circ}\text{C} < t < 250^{\circ}\text{C}$ 时，可选择XL, LT型调温器（约加高100mm）以降低密封腔温度，或者采用密封辅助系统；在 $t > 250^{\circ}\text{C}$ 时必须选择增高调温器（也可再配以相应的密封辅助系统）。

对于双端面机械密封：所有双端面机械密封原则上都应配有密封辅助系统，以保证密封液的压力始终至少高于釜内的最高工作压力约0.05~0.2MPa。根据API682标准，一般选择PLAN52/PLAN53/PLAN54等辅助系统。

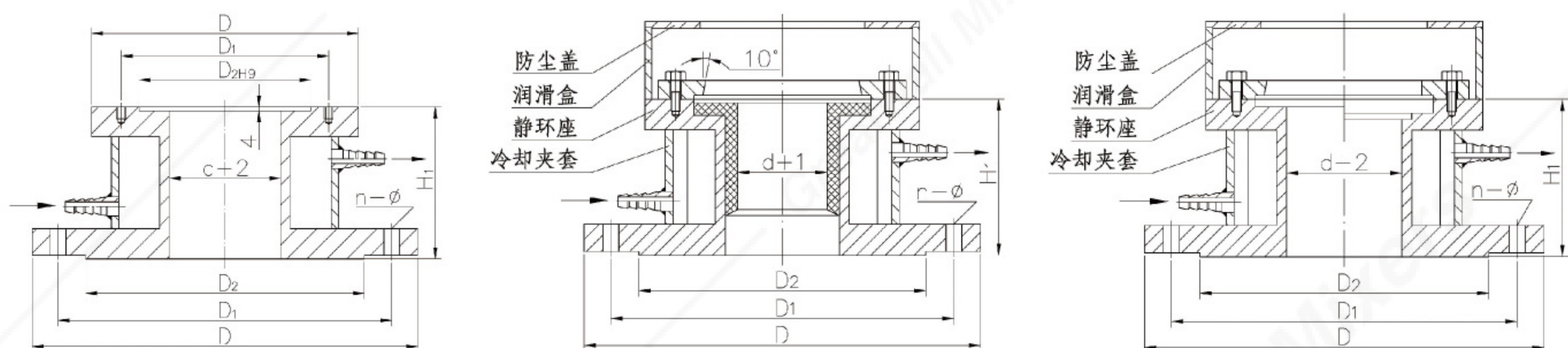
Auxiliary systems are critically important for the safe running of seals. Different cooling method (or system) should be used according to the temperature and pressure. For single face seals, when operating temperature is higher than 100°C , different types of cooler will be used. For double faces mechanical seals, different types of auxiliary systems (usually equal to API PLAN52, PLAN 53, PLAN54) must be used. The auxiliary system should keep pressure 0.1~0.2 Mpa higher than tank operating pressure.

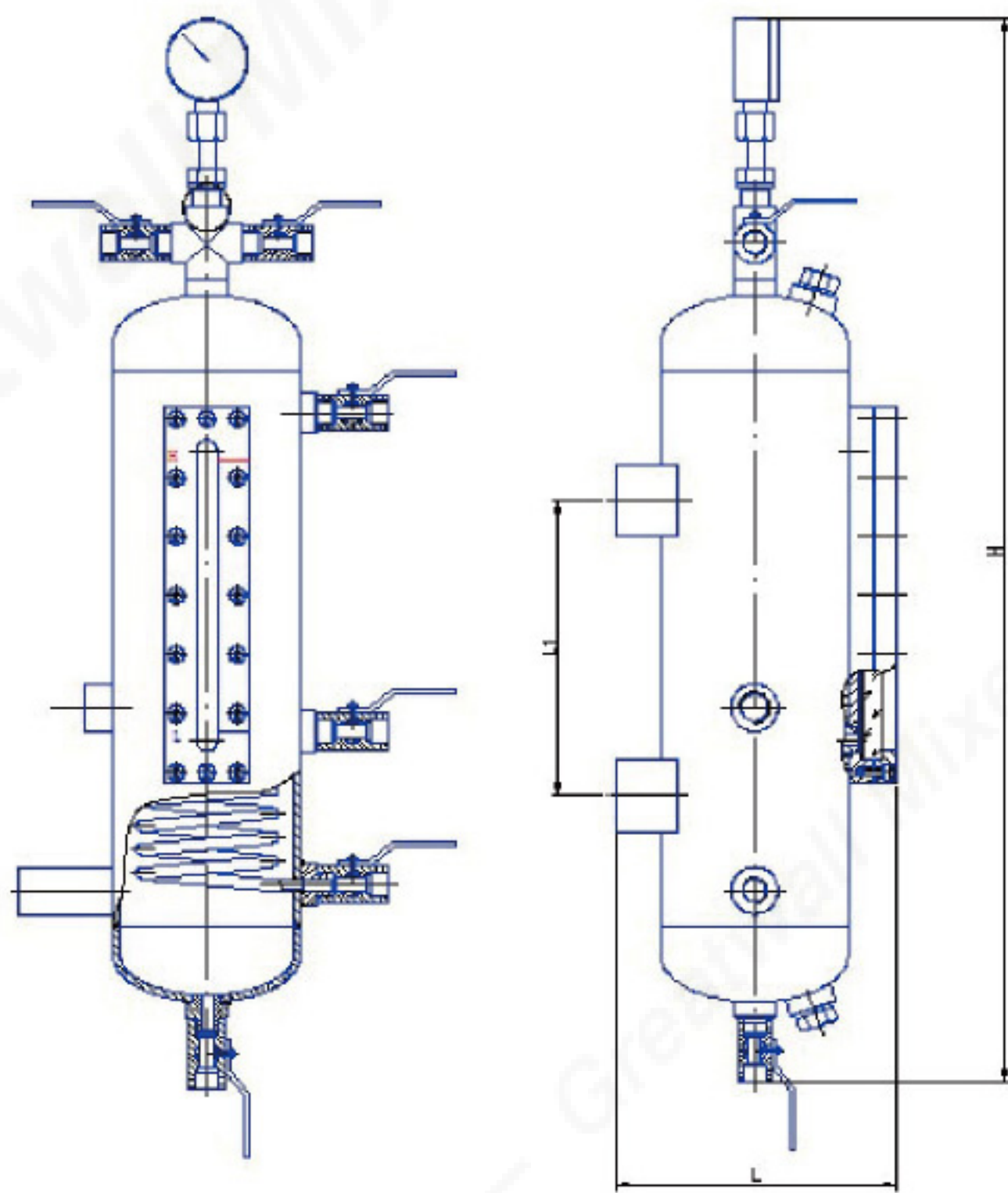
调温器

Cooler

在机械密封用于温度较高的场合时，需要考虑降低密封腔的温度。在密封的下部增加冷却水是一种常用的方法。这样的装置称为调温器。对用于单端面机械密封的调温器可以和下静环座集成在一起，常用的形式如图所示，用XT或LT表示。对用于双端面机械密封的调温器也可以与密封做成一体，常用的形式如图 所示，用CT表示。调温器的安装尺寸与对应机封的安装尺寸一致。

Cooler is cooling jacket designed at seal bottom to cool the seal. They can be integrated in the seal seat. XT or LT for single face seal and CT for double faces seal.

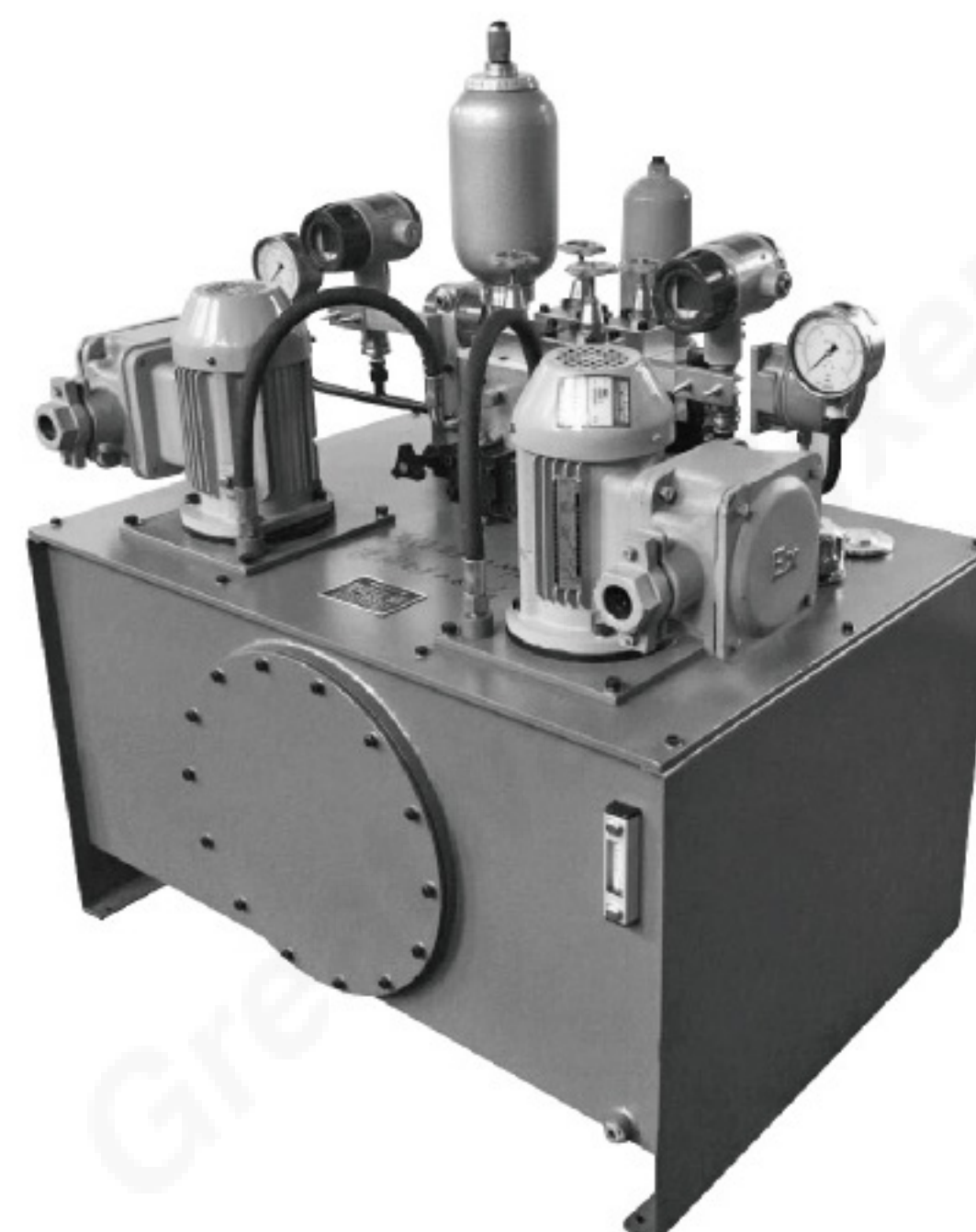
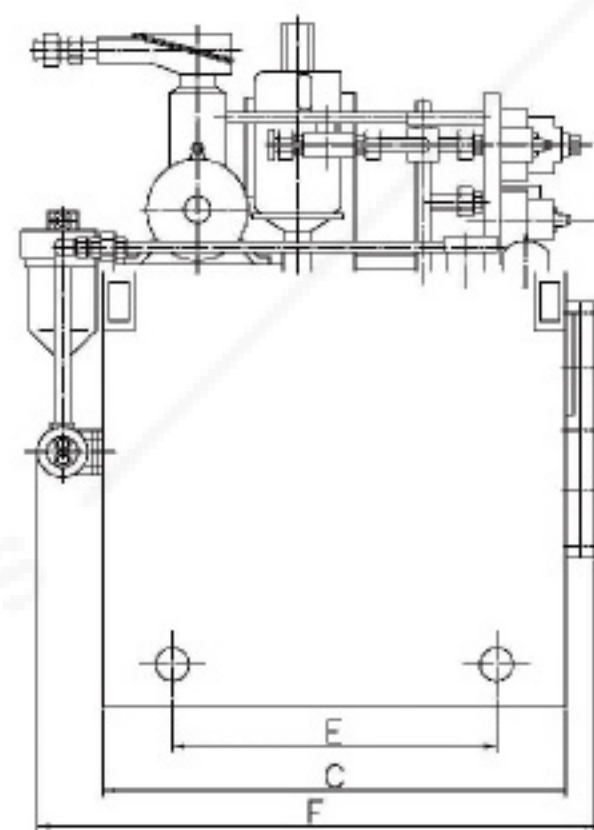
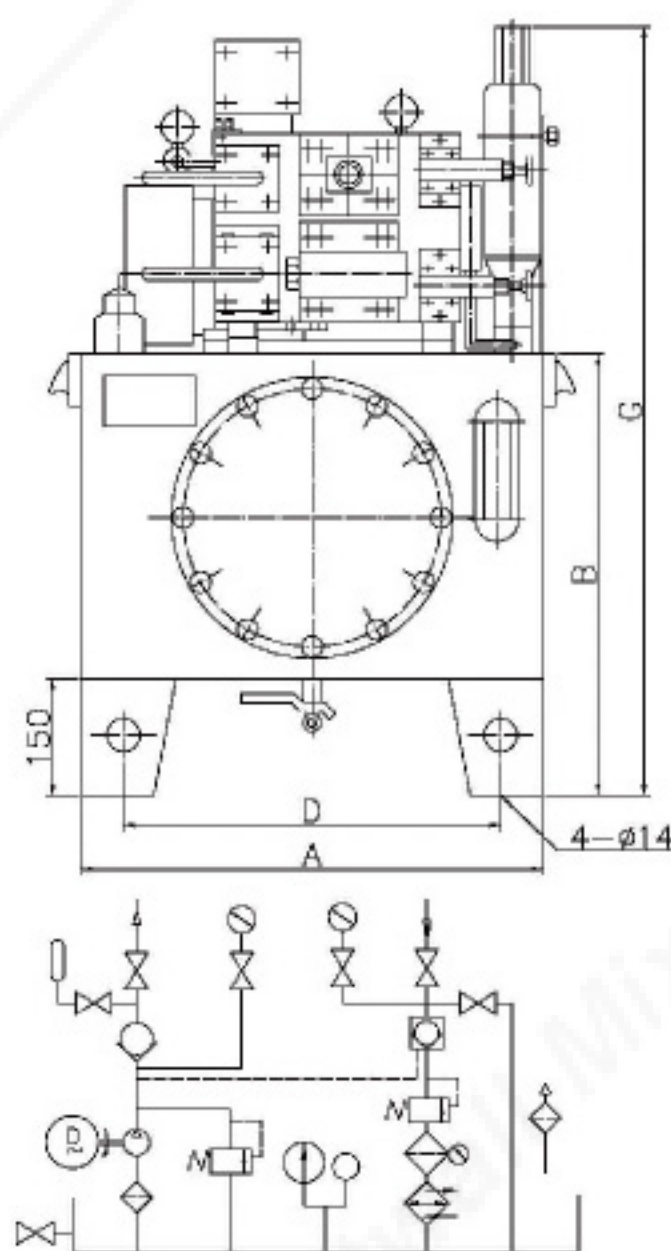




型号 Type	压力 Pressure (MPa)	有效容积 (升) Actual Volume	L	L1	H	接口 Port
GDL2-2.5B	2.5	2	240	160	750	G1/2"
GCL2-2.5B						
GCL4-2.5B	2.5	4	240	250	950	
GDL4-2.5B						
GCL10-2.5B	2.5	10	300	250	1020	
GDL10-2.5B						

对于工作压力大于2.5MPa的工况，一般选择PLAN54辅助系统。D型釜用机械密封液压泵站强制循环系统可以满足要求，具有润滑、调温、调压、监视、冷却等功能，可确保中高压、中高温机械密封稳定可靠地运行。

For operating pressure higher than 2.5Mpa, D series hydraulic power unit (equal to PLAN54) is used for the lubrication, cooling of the high pressure mechanical seals.





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