



唯万密封  
VONESEALS

# 多级缸 密封方案

*Sealing Solution for Telescopic Cylinder*



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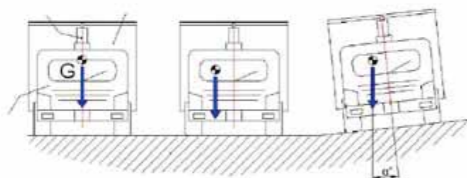
## 多级缸特点和要求

### Telescopic Cylinder Feature & Design

多级缸特点是结构紧凑行程长，叠合长度仅为伸出总长的 20-40%，因此广泛应用于自卸车、矿用支架等需要长行程但安装空间有所限制的场所。

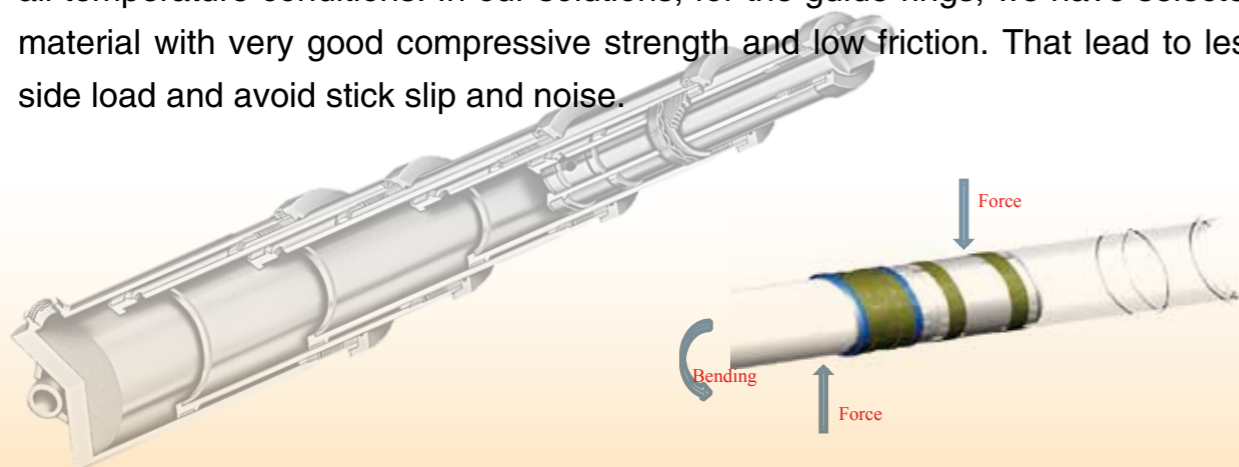
Typical feature of telescopic cylinder is compact structure with long stroke. Major use:

- Dumper
- Roof support in coal mining



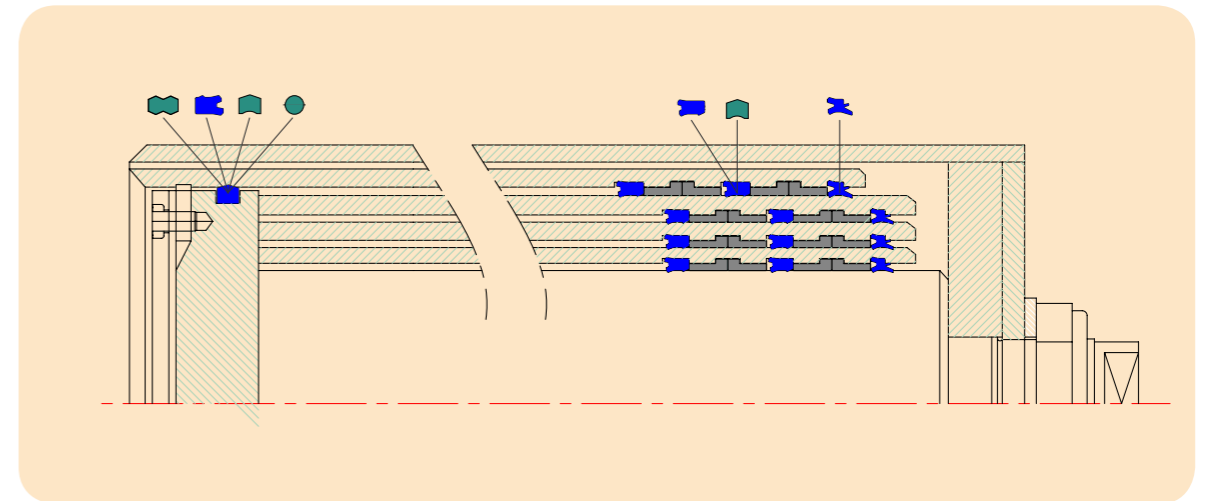
多级缸设计 requirements 是稳定无泄漏。其使用过程中可能会有沙尘、污水等造成污染；侧向载荷和压力冲击导致弯折；低温环境造成密封材料的变形失效等。我们的解决方案就会考虑这些因素，如导向环材料就选用具有极高的强度和较低的摩擦系数，这样就能减少侧向载荷并避免爬行和噪音。

Main request for the telescopic cylinder is stability and zero leakage under all temperature conditions. In our solutions, for the guide rings, we have selected material with very good compressive strength and low friction. That lead to less side load and avoid stick slip and noise.



## 密封方案

### Sealing Solution







#### 方案优点:

1. 摩擦小，导向好，举升更平顺
2. 防水、防尘好，污染小
3. 性价比高
4. 内部支撑作用，减小间隙，强度更高
5. 使用寿命更长

#### Advantages:

1. Low friction, good guiding cause more smooth operation
2. Good water and dust proof lead
3. Higher cost efficiency
4. Inner support cause higher strength
5. Extend service life

产品编号 Product Code	HRD	HWX	HGR	SP	YR
结构 Profile					
标准材料 Standard Material	P2006	P2006	S009	P2001	P2001
材料种类 Material Type	耐低温聚氨酯 LT Resistant PUR	耐低温聚氨酯 LT Resistant PUR	改性尼龙 Modified PA	标准聚氨酯 Standard PUR	标准聚氨酯 Standard PUR
工作温度 Temperature (°C)	-46 ~ +110	-46 ~ +110	-50 ~ +120	-35 ~ +110	-35 ~ +110
工作压力 Pressure(MPa)	≤ 50	-	-	≤ 50	≤ 50
速度 Velocity(m/s)	≤ 1.0	≤ 1.0	≤ 0.5	≤ 1.0	≤ 1.0
工作介质 Media	液压油 Hydraulic oil	液压油 Hydraulic oil	液压油 Hydraulic oil	液压油 Hydraulic oil	液压油 Hydraulic oil

## 标准材料

### Standard Materials

Material Code 材料编号			P2001	P2005	P2006
Description 描述			TPU 热塑性聚氨酯		
硬度 /Hardness	ShA	DIN 53 505	92 ± 2	95 ± 2	95 ± 2
密度 /Density	g/cm <sup>3</sup>	DIN 53 479	1.19 ± 0.02	1.20 ± 0.02	1.17 ± 0.02
拉伸强度 Tensile strength	N/mm <sup>2</sup>	DIN 53 504	min. 48	min. 48	min. 40
断裂伸长 /Elongation	%	DIN 53 504	min. 400	min. 400	min. 400
永久压变 Compression set	%	24h @ 70°C 70h @ 70°C	max. 24 max. 26	max. 23 max. 25	max. 20 max. 23
回弹性 /Rebound	%	DIN 53 512	min. 40	min. 38	min. 50
磨损量 /Abrasion	mm <sup>3</sup>	DIN 53 516	max. 45	max. 45	max. 40

材料 Material	材料描述 Description	密度 Density	拉伸强度 Tensile	断裂伸长率 Elongation	弯曲强度 Flexural Strength	弯曲模量 Flexural Modulus
S009	增强尼龙	1.36 g/cm <sup>3</sup>	135 MPa	4.3%	208MPa	8.6GPa

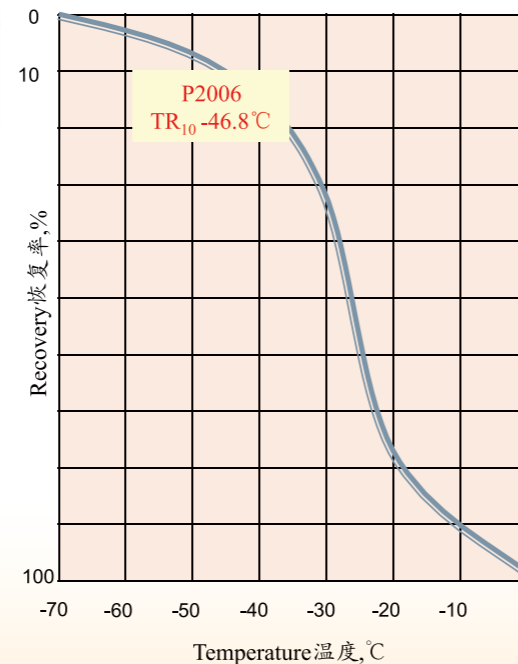


#### 低温测试 TR<sub>10</sub>

测试标准是 ASTM D1329, 指材料在低温领域内变形的恢复性。TR<sub>10</sub> 值为给定变形恢复 10% 时的温度。唇形密封材料的 TR<sub>10</sub> 值作为许可最低适用温度的参考基准。

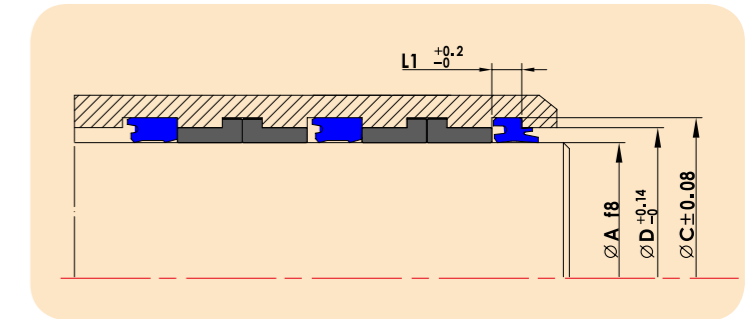
#### Temperature Retraction Testing

TR<sub>10</sub> is a low temperature test according ASTM D 1329. It is an important reference of materials for lip seals applied in low temperature environment.



## 唯万产品

### VONE Parts



#### 主要特点和优点:

特殊设计有效的防止沙尘、水、泥浆等进入体系, 保护导向环。外部防尘唇设计亦可有效防潮, 聚氨酯材料耐磨性、抗挤出、抗臭氧性能等突出, 有利于延长使用寿命。

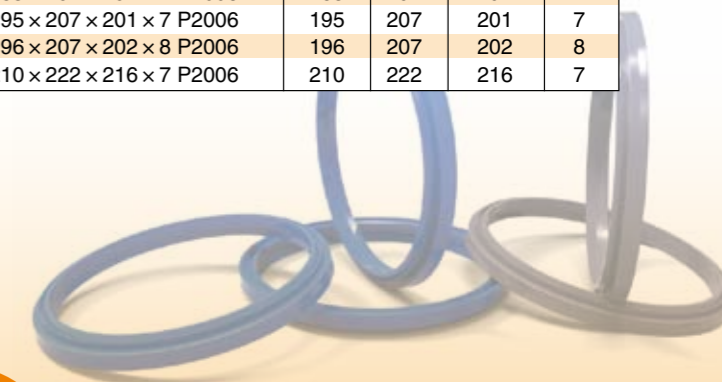
- ✓ 沟槽和密封件有良好保护
- ✓ 延长使用寿命
- ✓ 良好耐磨性
- ✓ 良好抗挤出能力
- ✓ 装配简便, 无需工具
- ✓ 有效防止水分、泥浆等渗入系统
- ✓ 适用于全天候的野外工作环境

#### Main features & Advantages

Special design largely prevents dust, mud, water, sands, protects the guiding parts. An external sealing lip on the outside diameter contacts the housing in order to prevent moisture entering the groove. The polyurethane compound ensures excellent properties in case of dry run, increased wear-resistance and extended service life due to good resistance against ozone and radiation caused by weather conditions.

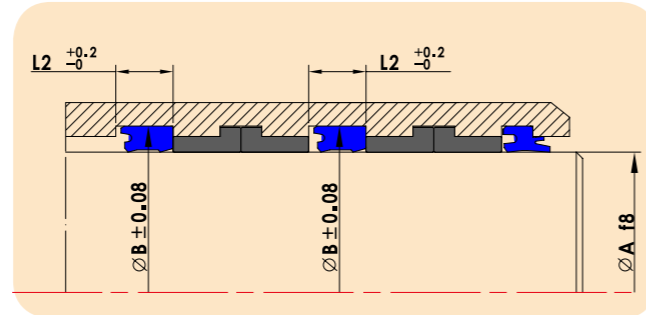
- ✓ External sealing lip for a real housing protection
- ✓ Extended service life
- ✓ Excellent wear-resistance
- ✓ High resistance against extrusion
- ✓ Easy installation without expensive tools
- ✓ Prevent moisture, water, mud penetrate to the system
- ✓ Suitable for all-weather field operation

产品编号	尺寸			
	A	C	D	L1
HWX 80 × 92 × 86 × 7 P2006	80	92	86	7
HWX 85 × 97 × 91 × 7 P2006	85	97	91	7
HWX 90 × 102 × 96 × 7 P2006	90	102	96	7
HWX 95 × 107 × 101 × 7 P2006	95	107	101	7
HWX 100 × 112 × 106 × 7 P2006	100	112	106	7
HWX 100 × 115 × 106 × 7 P2006	100	115	106	7
HWX 105 × 117 × 111 × 7 P2006	105	117	111	7
HWX 110 × 120 × 116 × 7 P2006	110	120	116	7
HWX 110 × 122 × 116 × 7 P2006	110	122	116	7
HWX 115 × 127 × 121 × 7 P2006	115	127	121	7
HWX 120 × 132 × 126 × 7 P2006	120	132	126	7
HWX 125 × 137 × 131 × 7 P2006	125	137	131	7
HWX 125 × 140 × 131 × 7 P2006	125	140	131	7
HWX 129 × 139 × 135 × 7 P2006	129	139	135	7
HWX 130 × 142 × 136 × 7 P2006	130	142	136	7
HWX 135 × 147 × 141 × 7 P2006	135	147	141	7
HWX 140 × 152 × 146 × 7 P2006	140	152	146	7
HWX 145 × 157 × 151 × 7 P2006	145	157	151	7
HWX 150 × 160 × 156 × 7 P2006	150	160	156	7
HWX 150 × 162 × 156 × 7 P2006	150	162	156	7
HWX 150 × 165 × 156 × 7 P2006	150	165	156	7
HWX 152 × 164 × 158 × 7 P2006	152	164	158	7
HWX 155 × 167 × 161 × 7 P2006	155	167	161	7
HWX 160 × 172 × 166 × 7 P2006	160	172	166	7
HWX 165 × 177 × 171 × 7 P2006	165	177	171	7
HWX 170 × 182 × 176 × 7 P2006	170	182	176	7
HWX 172 × 183 × 178 × 8 P2006	172	183	178	8
HWX 175 × 187 × 181 × 7 P2006	175	187	181	7
HWX 180 × 192 × 186 × 7 P2006	180	192	186	7
HWX 180 × 195 × 186 × 7 P2006	180	195	186	7
HWX 182 × 194 × 188 × 7 P2006	182	194	188	7
HWX 185 × 197 × 191 × 7 P2006	185	197	191	7
HWX 195 × 207 × 201 × 7 P2006	195	207	201	7
HWX 196 × 207 × 202 × 8 P2006	196	207	202	8
HWX 210 × 222 × 216 × 7 P2006	210	222	216	7



## 唯万产品

### VONE Parts



#### 主要特点和优点:

特别设计用于对压力波动敏感的 U 型密封件。聚氨酯材料加工。

- ✓ 用于径向结构尺寸狭窄的单向轴用密封的需要
- ✓ 低的背压回流和储油能力设计
- ✓ 副唇口防止污染物的侵入，同时起到一定的支撑作用
- ✓ 良好的密封性，低压下也能保持良好性能
- ✓ 延长使用寿命
- ✓ 良好耐磨性
- ✓ 良好抗挤出能力
- ✓ 耐温范围广
- ✓ 对压力波动敏感
- ✓ 装配简便，无需工具

#### Main features & Advantages

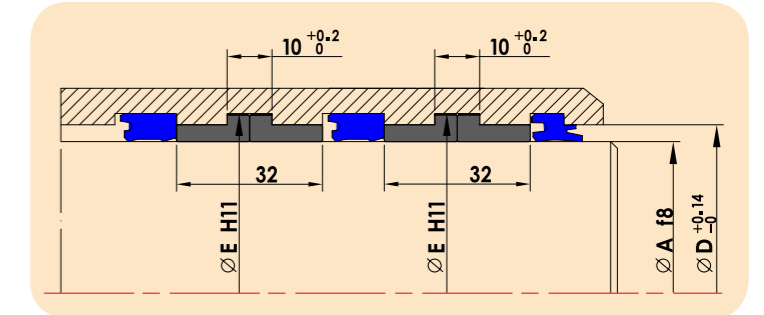
“U” type seals. The materials is a polyurethane compound.

- ✓ Thinner radical size to meet constrict groove
- ✓ Low backflow and oil storage design
- ✓ Secondary lip can prevent contamination, also support to cylinder
- ✓ Good sealing performance as well as low pressure
- ✓ Extended service life
- ✓ Excellent wear-resistance
- ✓ High resistance against extrusion
- ✓ Good temperature resistance
- ✓ Insensitive to pressure fluctuation
- ✓ Easy installation without expensive tools

产品编号	尺寸		
	A	B	L2
HRD 80 × 90 × 11.0 P2006	80	90	11.0
HRD 85 × 95 × 12.5 P2006	85	95	12.5
HRD 90 × 100 × 12.5 P2006	90	100	12.5
HRD 95 × 105 × 12.5 P2006	95	105	12.5
HRD 100 × 110 × 11.0 P2006	100	110	11.0
HRD 100 × 110 × 13.5 P2006	100	110	13.5
HRD 100 × 110 × 12.5 P2006	100	110	12.5
HRD 100 × 112 × 12.0 P2006	100	112	12.0
HRD 105 × 115 × 12.5 P2006	105	115	12.5
HRD 110 × 120 × 11.0 P2006	110	120	11.0
HRD 110 × 120 × 12.5 P2006	110	120	12.5
HRD 115 × 125 × 12.5 P2006	115	125	12.5
HRD 120 × 130 × 12.5 P2006	120	130	12.5
HRD 125 × 135 × 11.0 P2006	125	135	11.0
HRD 125 × 135 × 13.5 P2006	125	135	13.5
HRD 125 × 137 × 12.0 P2006	125	137	12.0
HRD 129 × 139 × 11.0 P2006	129	139	11.0
HRD 130 × 140 × 12.5 P2006	130	140	12.5
HRD 135 × 145 × 12.5 P2006	135	145	12.5
HRD 140 × 150 × 12.5 P2006	140	150	12.5
HRD 145 × 155 × 12.5 P2006	145	155	12.5
HRD 150 × 160 × 13.5 P2006	150	160	13.5
HRD 150 × 162 × 12.0 P2006	150	162	12.0
HRD 152 × 162 × 12.5 P2006	152	162	12.5
HRD 155 × 165 × 12.5 P2006	155	165	12.5
HRD 160 × 170 × 12.5 P2006	160	170	12.5
HRD 165 × 175 × 12.5 P2006	165	175	12.5
HRD 170 × 180 × 12.5 P2006	170	180	12.5
HRD 172 × 183 × 13.5 P2006	172	183	13.5
HRD 175 × 185 × 12.5 P2006	175	185	12.5
HRD 180 × 190 × 13.5 P2006	180	190	13.5
HRD 180 × 192 × 12.0 P2006	180	192	12.0
HRD 182 × 192 × 12.5 P2006	182	192	12.5
HRD 185 × 195 × 12.5 P2006	185	195	12.5
HRD 195 × 205 × 12.5 P2006	195	205	12.5
HRD 196 × 207 × 13.5 P2006	196	207	13.5
HRD 210 × 222 × 13.5 P2006	210	222	13.5

## 唯万产品

### VONE Parts



#### 主要特点和优点:

本产品用改性工程塑料加工，次啊了具有高强度、刚性、硬度、抗冲击、回弹性和高温稳定性。

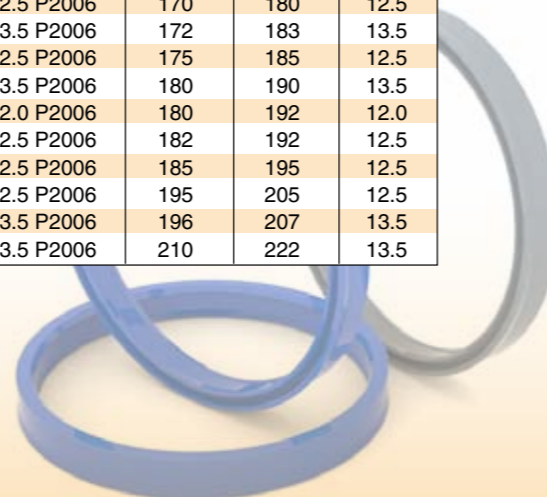
- ✓ 延长使用寿命
- ✓ 良好耐磨性
- ✓ 良好抗挤出能力
- ✓ 沟槽设计简单，摩擦系数低
- ✓ 装配简便，无需工具
- ✓ 抗磨性能优良
- ✓ 高侧向载荷承载能力
- ✓ 减少振动，避免爬行

#### Main features & Advantages

The compound modified engineering plastic characterized by high strength, rigidity, hardness, impact resistance, resilience and excellent stability to high and low temperature.

- ✓ Extended service life
- ✓ Excellent wear-resistance
- ✓ High resistance against extrusion
- ✓ Simple design of groove and assembly low friction
- ✓ Easy installation without expensive tools
- ✓ High anti-abrasion ability
- ✓ High side-load carrying capacity
- ✓ Reduce vibration, and avoid stick slide

产品编号	尺寸			
	A	D	E	L3
HGR 80 × 86 × 90.5 × 16 S009	80	86	90.5	16
HGR 85 × 91 × 95.5 × 16 S009	85	91	95.5	16
HGR 90 × 96 × 100.5 × 16 S009	90	96	100.5	16
HGR 95 × 101 × 105.5 × 16 S009	95	101	105.5	16
HGR 100 × 106 × 110.5 × 16 S009	100	106	110.5	16
HGR 105 × 111 × 115.5 × 16 S009	105	111	115.5	16
HGR 110 × 116 × 120.5 × 16 S009	110	116	120.5	16
HGR 115 × 121 × 125.5 × 16 S009	115	121	125.5	16
HGR 120 × 126 × 130.5 × 16 S009	120	126	130.5	16
HGR 125 × 131 × 135.5 × 16 S009	125	131	135.5	16
HGR 129 × 135 × 139.5 × 16 S009	129	135	139.5	16
HGR 130 × 136 × 140.5 × 16 S009	130	136	140.5	16
HGR 135 × 141 × 145.5 × 16 S009	135	141	145.5	16
HGR 140 × 146 × 150.5 × 16 S009	140	146	150.5	16
HGR 145 × 151 × 155.5 × 16 S009	145	151	155.5	16
HGR 150 × 156 × 160.5 × 16 S009	150	156	160.5	16
HGR 152 × 158 × 162.5 × 16 S009	152	158	162.5	16
HGR 155 × 161 × 165.5 × 16 S009	155	161	165.5	16
HGR 160 × 166 × 170.5 × 16 S009	160	166	170.5	16
HGR 165 × 171 × 175.5 × 16 S009	165	171	175.5	16
HGR 170 × 176 × 180.5 × 16 S009	170	176	180.5	16
HGR 172 × 178 × 182.5 × 16 S009	172	178	182.5	16
HGR 175 × 181 × 185.5 × 16 S009	175	181	185.5	16
HGR 180 × 186 × 190.5 × 16 S009	180	186	190.5	16
HGR 182 × 188 × 192.5 × 16 S009	182	188	192.5	16
HGR 185 × 191 × 195.5 × 16 S009	185	191	195.5	16
HGR 195 × 201 × 205.5 × 16 S009	195	201	205.5	16
HGR 196 × 202 × 206.5 × 16 S009	196	202	206.5	16
HGR 210 × 216 × 220.5 × 16 S009	210	216	220.5	16





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