



JIAWANYU

河北万字波纹管科技有限公司

Hebei Wanyu Bellows Technology Co., LTD.



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河北万字

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质量第一 · 诚信至上

河北万字波纹管科技有限公司

HeBei WanYu Bellows Technology Co., LTD

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河北万字波纹管科技有限公司

HEBEI WANYU BELLOWS TECHNOLOGY Co., LTD



公司简介 About us

河北万宇波纹管科技有限公司(原万宇金属软管厂，始建于1999年)，是国内较早从事不锈钢管坯、网套、金属软管、波纹膨胀节、补偿器等多种产品研发、设计、生产、销售服务于一体的专业金属制品综合性企业。万宇公司位于景县城东开发区，区位优势，通达八方。为万宇的腾飞奠定了基石。

公司主营高品质的不锈钢管坯、网套、欧标管、螺旋管、连续环形波纹管、环形波纹管、加厚波纹管、超柔加密波纹管、金属软管、消防洒水软管、七氟丙烷金属软管、法兰式金属软管、快接式金属软管、丝扣式的金属软管、卡盘式金属软管、食品级金属软管、内衬四氟金属软管、膨胀节补偿器，服务于（电力、建筑、钢铁、矿山、石油、化工、水泥、消防、食品、运输等行业多种管道和设备上，始终追求最优品质与服务发展的理念，以技术与诚信为原则率先通过的ISO9001国际质量体系认证，欧盟CE认证，已获得20多项国家专利，并多次荣获诚信企业称号。

本着“质量第一，用户至上”的宗旨，我公司愿为国内外用户提供全方位的优质服务，欢迎广大新老客户来我公司参观指导及商务洽谈。

万众一心 宇众不同

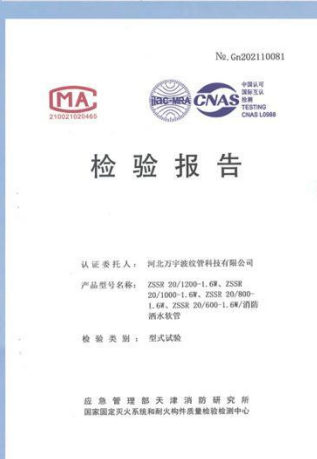
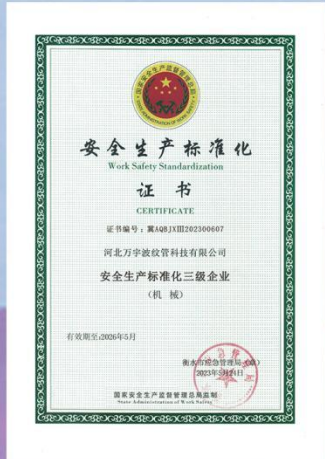
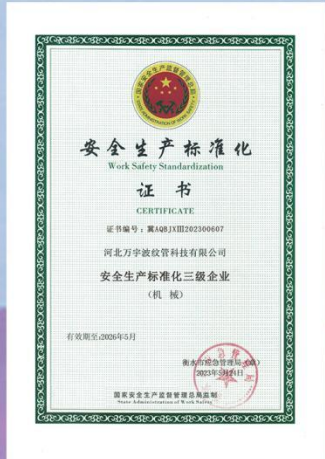
Hebei Wanyu Bellows Technology Co., Ltd. (formerly known as Wanyu Metal Hose Factory, founded in 1999) is a professional metal product comprehensive enterprise engaged in the research and development, design, production, sales and service of various products such as stainless steel pipe blanks, mesh sleeves, metal hoses, corrugated expansion joints, compensators, etc., which was one of the earliest in China. Wanyu Company is located in the East Development Zone of Jing County, with a superior location and access to all directions. It laid the foundation for the takeoff of Wanyu.

The company specializes in high-quality stainless steel pipe blanks, mesh sleeves, European standard pipes, spiral pipes, continuous ring corrugated pipes, ring corrugated pipes, thickened corrugated pipes, ultra flexible encrypted corrugated pipes, metal hoses, fire sprinkler hoses, heptafluoropropane metal hoses, flange type metal hoses, quick connect metal hoses, threaded metal hoses, chuck type metal hoses, food grade metal hoses, PTFE lined metal hoses, expansion joint compensators, serving various pipelines and equipment in industries such as power, construction, steel, mining, petroleum, chemical, cement, fire protection, food, transportation, etc. We always pursue the concept of optimal quality and service development, and have passed ISO9001 international quality system certification and EU CE certification based on technology and integrity. Obtained over 20 national patents and was awarded the title of Integrity Enterprise multiple times.

Adhering to the principle of "quality first, customer first", our company is willing to provide comprehensive and high-quality services for domestic and foreign users. We welcome new and old customers to visit our company for guidance and business negotiations.

C公司资质

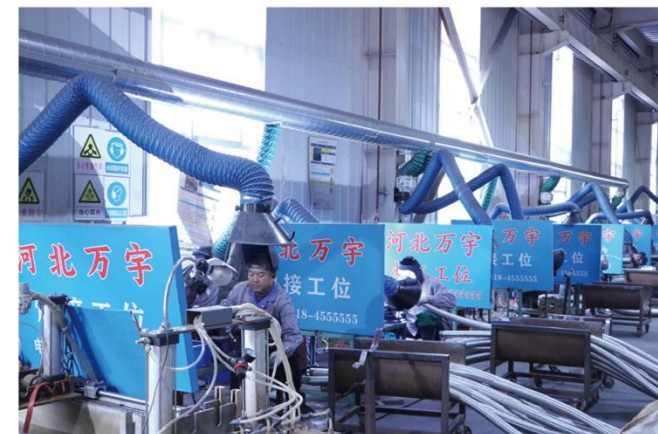
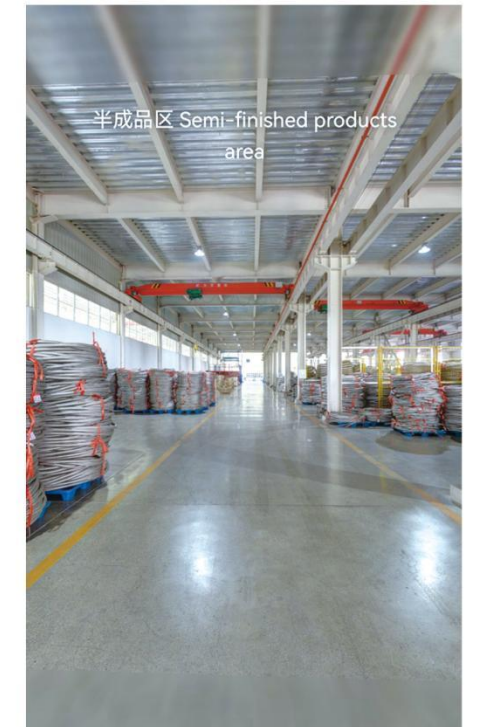
Company Qualification



P 生产设备

RODUCTION EQUIPMENT

磨励精湛的技术，实践科学的管理，应用先进的设备，创名牌产品！

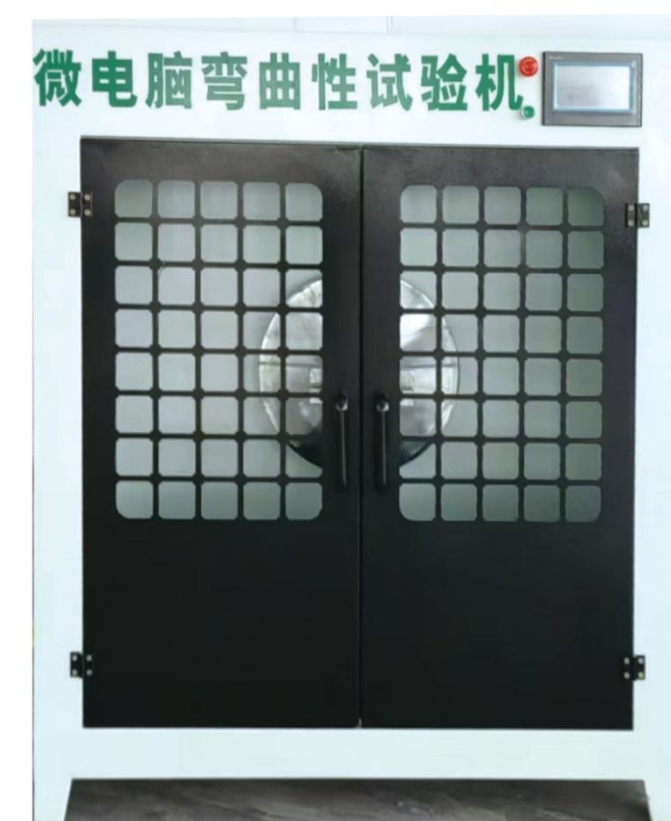


T 检测设备 TEST EQUIPMENT

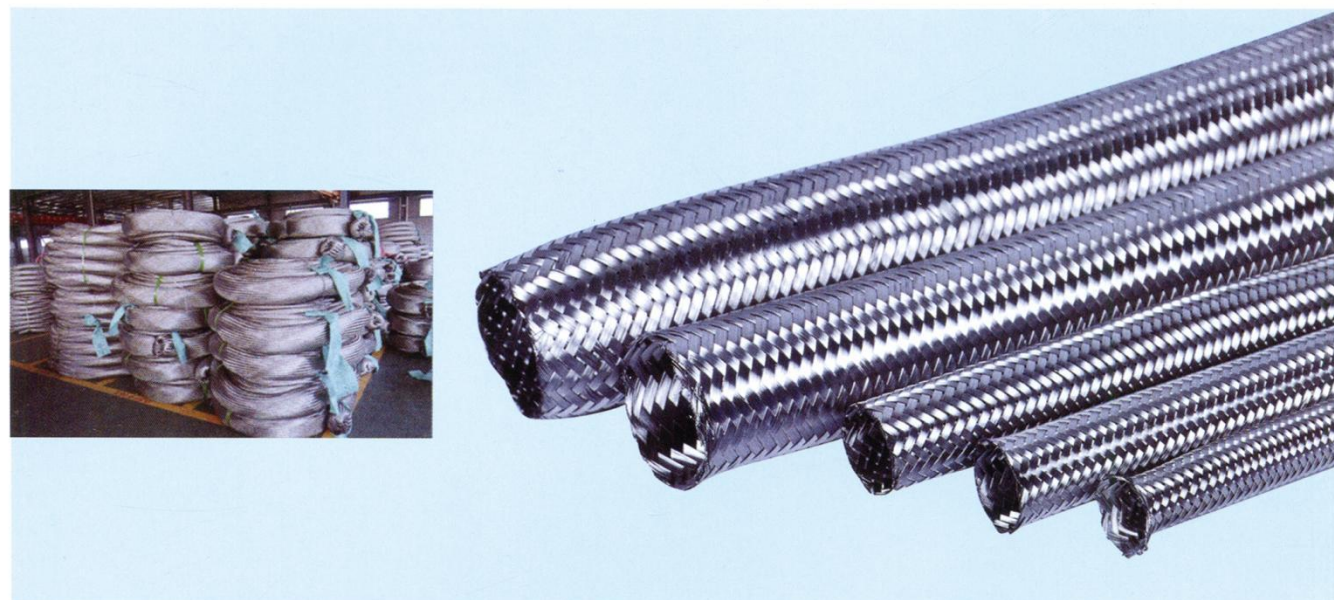


质量是企业的生命，完善的质量保证体系和先进的检测手段是产品质量不断提高的必要条件。公司在每一个重要的生产环节都设有质控点。完整健全的质量管理体系，多年的专业生产管理经验，高度的责任心和精湛的技艺，是我们对客户的最好承诺。

Quality is the life, improve the quality assurance system and advanced detection equipment means continuously improve the quality of products is a necessary condition. Companies in every important aspect of production are equipped with quality control points. Improved sound quality management system, year of professional production experience, a high degree of responsibility and superb artistry, is the best of our commitment to customers.



不锈钢网套 Stainless Steel Mesh Sleeve



不锈钢编织网套是对工业元件起到保护作用的一种物件，主要制作材质：包括不锈钢 304、不锈钢 316(L) 等，耐温范围：一般在 -50°C 至 300°C ，常用于精自动化仪表信号管，自动化仪表电线保护管；精密光学尺线路、工业传感器、电子设备线路保护管；电器线路的安全防护、热工仪表毛细管的防护，精密机械仪器线缆保护。柔软度好、防尘防锈、抗压抗拉抗磨损，并且提供优良的电磁屏蔽作用。

Stainless steel braided mesh sleeve is a kind of object which protects industrial components. It mainly produces materials: stainless steel 304, stainless steel 316(L), etc. Its temperature-resistant range is from -50°C to 300°C . It is commonly used in precision automatic instrument signal tube, automatic instrument wire protection tube, precision optical ruler circuit, industrial sensor and electronic installation. Prepare line protection tube; Safety protection of electrical circuit, capillary protection of thermal instrument, cable protection of precision mechanical instrument. Good softness, dustproof and rust-proof, compression, tension and wear resistance, and provide excellent electromagnetic shielding effect.



不锈钢波纹管 Stainless Steel Bellows



不锈钢波纹管作为一种柔性耐压管件安装于液体输送系统中，用以补偿管道或机器、设备连接端的相互位移，吸收振动能量，能够起到减振、消音等作用，具有柔性好、质量轻、耐腐蚀、抗疲劳、耐高低温等多项特点。

Stainless steel bellows, as a flexible pressure-resistant pipe fittings, are installed in the liquid transportation system to compensate for the mutual displacement of the connecting ends or pipes or machines and equipment, absorb vibration energy, and can play the role of vibration reduction and silencing. They have many characteristics, such as good flexibility, light weight, corrosion resistance, fatigue resistance, high and low temperature resistance.

环波及网套企业标准参数表

Standard parameter table for environmental and network equipment enterprises

DN	波纹管				弯曲半径		单根最大长度 M	网套结构	工作压力Npa				每米净重KG/m	
	mm	内径	外径	波距mm	壁厚	静态	动态	锭数×股数×直径	波纹管	波纹管+1层网套	波纹管+2层网套	波纹管+3层网套	波纹管	网套
6	6.1±0.2	9.6±0.2	2±0.2	0.18	50	110	100	20*5*0.3	0.8	≤6	≤12	≤18	0.065±0.01	0.12±0.01
8	8.1±0.2	12.1±0.2	2.2±0.2	0.18	65	145	100	20*6*0.3	0.8	≤6	≤12	≤18	0.1±0.01	0.12±0.02
10	10.1±0.25	14.2±0.25	2.6±0.25	0.18	80	180	100	24*8*0.3	0.6	≤6	≤12	≤18	0.11±0.01	0.16±0.02
12	12.2±0.25	16.7±0.25	3.0±0.25	0.18	95	215	100	24*9*0.3	0.6	≤6	≤12	≤18	0.15±0.03	0.18±0.02
16	16.3±0.25	21.6±0.25	3.5±0.25	0.20	120	270	100	36*8*0.3	0.6	≤6	≤12	≤18	0.19±0.03	0.21±0.02
20	20.3±0.3	26.8±0.3	3.8±0.3	0.20	160	360	100	36*9*0.3	0.6	≤6	≤12	≤18	0.27±0.03	0.26±0.03
25	25.5±0.3	32.3±0.3	3.8±0.3	0.20	175	400	100	36*11*0.3	0.6	≤6	≤12	≤18	0.36±0.03	0.3±0.04
32	33.8±0.3	41.2±0.3	3.8±0.3	0.22	225	510	100	48*10*0.3	0.6	≤5	≤10	≤15	0.52±0.05	0.4±0.06
40	40.3±0.3	49.5±0.3	5.1±0.3	0.25	280	640	100	48*12*0.3	0.6	≤5	≤10	≤15	0.67±0.05	0.5±0.08
50	50.2±0.3	60.3±0.3	5.1±0.3	0.25	350	800	100	48*14*0.3	0.6	≤4	≤8	≤12	0.86±0.1	0.65±0.1
65	65.2±0.3	75.2±0.3	5.1±0.3	0.25	390	845	100	48*14*0.35	0.6	≤2.5	≤4.0	≤6	1.1±0.2	1.1±0.2
80	79±1	97.0±2	10.5±0.5	0.4	480	1000	9	72*13*0.4		≤1.6	≤2.5	≤4.0	1.8±0.3	1.6±0.3
100	99±1	120.0±2	12.0±1	0.4	600	1200	9	72*15*0.4		≤1.6	≤2.5	≤4.0	2.2±0.3	2±0.3
125	123.5±1.25	149.0±2	14.0±1	0.5	750	1500	9	96*13*0.45		≤1.6	≤4.0	≤60	3.6±0.4	2.9±0.4
150	150±1.25	179.0±2.5	19.5±2	0.5	900	1800	9	96*15*0.45		≤1.6	≤2.5	≤4.0	4.4±0.5	3.3±0.5
175	175±1.25	208.0±2.5	20.0±2	0.50	1000	2000	9	128*13*0.5		≤1.0	≤2.5	≤4.0	5.8±0.5	4.0±0.5
200	200±1.45	238±3	21±2	0.6	1000	2000	9	128*15*0.5		≤1.0	≤2.5	≤4.0	7±0.5	4.7±0.5
250	250±1.5	296±3	22.5±2	0.8	1250	2500	8.5	128*15*0.5 ₅		≤1.0	≤1.6	≤2.5	11.8±1.5	6.5±1.5
300	300±1.5	348±3	27±2	0.8	1500	3000	8.5	156*16*0.6		≤1.0	≤1.6	≤2.5	14±1.5	8.5±1.5

螺旋波及网套企业标准参数表

Spiral wave and mesh cover enterprise standard parameter table

DN	波纹管				弯曲半径		单根最大长度 M	网套结构	工作压力Npa				每米净重KG/m	
	mm	内径	外径	波距mm	壁厚	静态	动态	锭数×股数×直径	波纹管	波纹管+1层网套	波纹管+2层网套	波纹管+3层网套	波纹管	网套
8	8.1±0.2	11±0.2	±0.2	0.18	65	145	100	20*6*0.3	0.8	≤6	≤12	≤18	0.06±0.01	0.12±0.02
10	10.1±0.25	14.5±0.25	±0.25	0.18	80	180	100	24*8*0.3	0.6	≤6	≤12	≤18	0.11±0.01	0.16±0.02
13	13.5±0.25	17.8±0.25	±0.25	0.18	95	215	100	24*9*0.3	0.6	≤6	≤12	≤18	0.14±0.03	0.18±0.02
15	15.5±0.25	21±0.25	±0.25	0.18	120	270	100	36*8*0.3	0.6	≤6	≤12	≤18	0.16±0.03	0.2±0.02
18	18.2±0.3	23.5±0.3	±0.3	0.18									0.18±0.03	0.23±0.02
20	20.3±0.3	25±0.3	±0.3	0.18	160	360	100	36*9*0.3	0.6	≤6	≤12	≤18	0.2±0.03	0.25±0.03
25	25.2±0.3	31±0.3	±0.3	0.20	175	400	100	36*11*0.3	0.6	≤6	≤12	≤18	0.3±0.03	0.3±0.04
32	32.1±0.3	39.2±0.3	±0.3	0.21	225	510	100	48*10*0.3	0.6	≤5	≤10	≤15	0.4±0.05	0.4±0.06
40	40.1±0.3	47.5±0.3	±0.3	0.22	280	640	100	48*12*0.3	0.6	≤5	≤10	≤15	0.5±0.05	0.5±0.08
50	50.2±0.3	59.3±0.3	±0.3	0.22	350	800	100	48*14*0.3	0.6	≤4	≤8	≤12	0.66±0.1	0.65±0.1



波纹管 and 网套企业参数

Enterprise Parameters of Bellows and Net Cover

环波及网套企业标准参数表

STANDARD PARAMETER TABLE OF RING-SWEPT NETTING BUSINESS

DN	波纹管				弯曲半径		单根最大长度 M	网套结构	工作压力 Mpa				每米净重 KG/m	
mm	内径	外径	波距 mm	壁厚	静态	动态		锭数 × 股数 × 直径	波纹管	波纹管 + 1 层网套	波纹管 + 2 层网套	波纹管 + 3 层网套	波纹管	网套
12	12±0.55	18.0±0.6	3.5±0.2	0.28	95	215	4.5M	24*8*0.3	0.6	≤ 6	≤ 12	≤ 18	0.17±0.03	0.24±0.02
15	15±0.55	22±0.6	4±0.3	0.28	120	270	4.5M	36*9*0.3	0.6	≤ 6	≤ 12	≤ 18	0.3±0.03	0.28±0.02
18	18±.055	25±0.6	3.5±0.3	0.28			4.5M	36*9*0.3	0.6	≤ 6	≤ 12	≤ 18	0.37±0.03	0.30±0.02
20	19.5±0.65	27.5±0.6	5.2±0.3	0.28	160	360	4.5M	36*9*0.3	0.6	≤ 6	≤ 12	≤ 18	0.38±0.03	0.33±0.03
25	25±0.65	32.5±1	5.2±0.5	0.28	175	400	5M	36*10*0.3	0.6	≤ 6	≤ 12	≤ 18	0.46±0.03	0.36±0.04
32	30±0.8	41+1	6±0.5	0.28	225	510	6M	36*13*0.3	0.6	≤ 5	≤ 10	≤ 15	0.65±0.05	0.6±0.06
40	39±0.8	51.5±1	6.2±0.5	0.28	280	640	6M	48*13*0.3	0.6	≤ 5	≤ 10	≤ 15	0.78±0.05	0.74±0.08
50	48.5±0.8	62.5±1.3	7.5±0.5	0.28	350	800	6M	48*13*0.35	0.6	≤ 4	≤ 8	≤ 12	1±0.1	1.00±0.1
65	64.5±1.1	79.0±2	8.5±0.5	0.28	390	845	5.5M	64*12*0.4		≤ 2.5	≤ 4.0	≤ 6	1.4±0.2	1.4±0.2
80	79±1	97.0±2	10.5±0.5	0.4	480	1000	6M	64*15*0.4		≤ 1.6	≤ 2.5	≤ 4.0	2.2±0.3	1.7±0.3
100	99±1	120.0±2	12.0±1	0.4	600	1200	6M	96*12*0.4		≤ 1.6	≤ 2.5	≤ 4.0	2.8±0.3	1.9±0.3
125	123.5±1.25	149.0±2	14.0±1	0.5	750	1500	8.5M	96*13*0.45		≤ 1.6	≤ 4.0	≤ 6.0	3.6±0.4	2.9±0.4
150	150±1.25	179.0±2.5	19.5±2	0.5	900	1800	8.5M	96*14*0.5		≤ 1.6	≤ 2.5	≤ 4.0	4.4±0.5	3.3±0.5
175	175±1.25	208.0±2.5	20.0±2	0.55				128*13*0.5					5.8±0.5	4.0±0.5
200	200±1.45	238±3	21±2	0.6	1000	2000	8.5M	128*15*0.5		≤ 1.0	≤ 2.5	≤ 4.0	7.5±0.5	4.7±0.5
250	250±1.5	296±3	22.5±2	0.8	1250	2500	8.5M	128*15*0.53		≤ 1.0	≤ 1.6	≤ 2.5	11.8±1.5	5.9±1.5
300	300±1.5	348±3	27±2	0.8	1500	3000	8.5M	156*16*0.6		≤ 1.0	≤ 1.6	≤ 2.5	13.4±1.5	8.5±1.5

波纹管 and 网套企业参数

Enterprise Parameters of Bellows and Net Cover

接管通径和钢管外径参照表

REFERENCE TABL FOR NOZZLE DIAMETER AND STEEL TUBE OUTER DIAMETER

A/B 两个系列，A 系列为国际通用系列（俗称英制管）， B 管系列为国内沿用系列（俗称公制管）， 通径 DN 和钢管外径按下表规定										
公称通径 DN	10	15	20	25	32	40	50	65	80	100
英制度	1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2 "	2"	2 1/2"	3"	4"
钢管外径	A	17.2	21.3	26.9	33.7	42.2	48.3	60.3	76.1	88.9
	B	14	18	25	32	38	45	57	76	89
壁厚（小）		2.8	2.8	3.2	3.5	3.5	3.8	4	4	4
0.16m/kg		0.17024	0.24864	0.36864	0.483	0.581	0.80864	1.152	1.36	1.664

公称通径 DN	125	150	200	250	300	350	400	450	500	600
英制度	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
钢管外径	A	139.7	168.3	219.1	273	323.9	355.4	406.4	457	608
	B	133	159	219	273	325	377	426	480	530
壁厚（小）	4.5	4.5	6							
0.16m/kg	2.313	2.781	5.112							

公称通径 DN	700	800	900	1000	1200	1400	1600	1800	2000
英制度	28"	32"	36"	40"	48"	56"	64"	72"	80"
钢管外径	A	711	813	914	1016	1219	1422	1626	1829
	B	720	820	920	1020	1220	1420	1620	1820
壁厚（小）									
0.16m/kg									

金属软管系列
 Flexible Metal Hose Series



金属软管系列
 Flexible Metal Hose Series



金属软管系列

Flexible Metal Hose Series

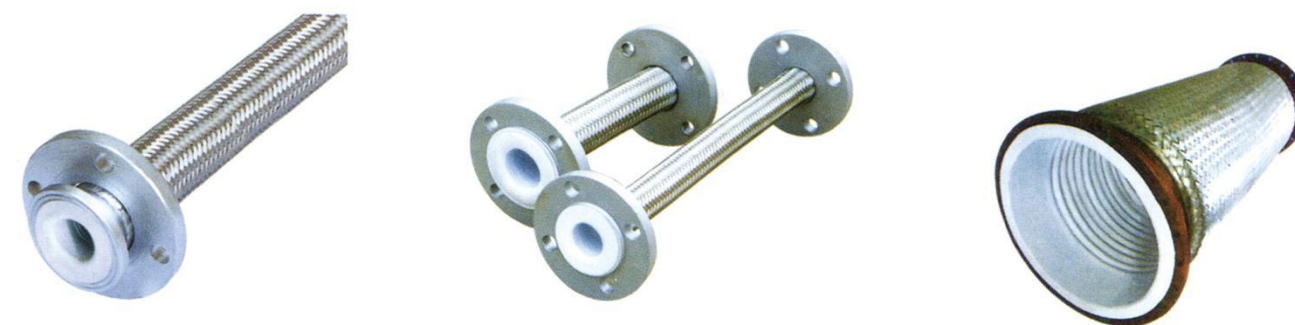


四氟波纹管系列

Teflon Bellows Series

该管通过特殊的加工方法,改变了以往管道不能挠曲的特性,它可用来连接机械较低的石墨、陶瓷或玻璃管道,可作槽车、贮罐、容器或反应釜的给、排料管,可进行管道错位连接或用来平衡因气候或其它原因引起的管道位移尺寸变化或用来消除高频机械的振动。在特殊场合还可作管式反应器或热交换器等作用。

This pipe has changed the characteristic that traditional pipes cannot bend through special processing methods. It can be used to connect graphite, ceramic, or glass pipes with lower mechanical strength, and can be used as a feeding and discharging pipe for tank trucks, storage tanks, containers, or reaction vessels. It can be used for pipe misalignment connection or to balance pipe displacement size changes caused by climate or other reasons, or to eliminate high-frequency mechanical vibrations. In special occasions, it can also serve as a tubular reactor or heat exchanger.



铁氟龙波纹编织管

Wire Braided Corrugated Teflon Hose

特征: 本产品由聚四氟乙烯波纹管用钢丝编织增强, 两端装上金属接头构成软管组件有耐折、弯曲半径小、耐高、低温、耐压、耐腐蚀、不粘和使用寿命长等特点。

内层: 由 PTFE 制成波纹管, 其特性为耐高温、耐腐蚀、不粘、耐折、弯曲半径小等特性

外层: 由不锈钢 SUS304 编织网制成, 强化 hose 管硬度, 提高耐压, 外接各种快速接头。

工作温度特性: 连续耐温 -50°C~+210°C, 短暂性耐温 -70°C~+260°C。

用途: 适用于橡胶、塑料、服装、汽车、机床、造船、电机、柴油机、造纸等行业做液压气压、蒸汽输送等的软管附件。对输送冷热交替的液体、气体和强腐蚀介质比其他输送软管有更好的使用性能和寿命。

Features: This product is reinforced with PTFE corrugated hose woven with steel wire, and the hose assembly is composed of metal joints at both ends. It has the characteristics of being resistant to bending, small bending radius, non stick, and long service life.

Inner layer: Made of PTFE corrugated hose, characterized by high temperature resistance, corrosion resistance, non stick, folding resistance, and small bending radius

Outer layer: Made of stainless steel SUS304 woven mesh, it strengthens the hardness of the hose tube, improves pressure resistance, and connects various quick connectors externally.

Working temperature characteristics: continuous temperature resistance -50 °C~+210 °C, transient temperature resistance -70 °C~+260 °C.

Usage: Suitable for software connectors in industries such as rubber, plastics, clothing, automobiles, machine tools, shipbuilding, motors, diesel engines, and papermaking for hydraulic, pneumatic, and steam conveying. Compared to other conveying hoses, it has better performance and lifespan in transporting liquids, gases, and strongly corrosive media that alternate between cold and hot.



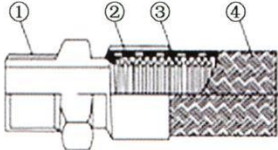
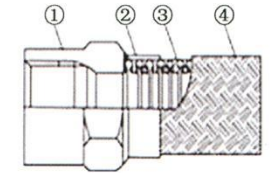
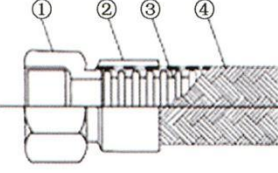
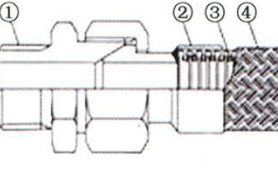
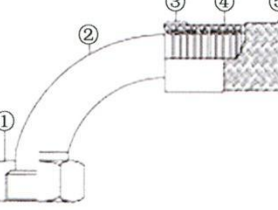
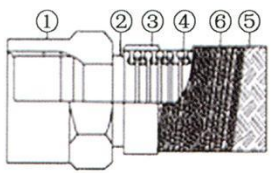
编码 Item	尺寸 Inch	内径 (mm) ID	外径 (mm) OD	壁厚 (mm) Thickness	常用工作压力 (kg/cm ²) Working Pressure	最小破坏压力 (kg/cm ²) Min.Burst Pressure	最小弯曲半径 mm/±3mm Min.Bend Semidiameter
FW-B20	1/4	5.75-6.55	9.85-10.55	1	151	450	32
FW-B25	5/16	7.75-8.55	12.25-13.15	1	126	370	36
FW-B30	3/8	9.14-10.25	15.85-16.55	1	105	324	59
FW-B40	1/2	12.45-13.25	18.45-19.35	1	90	270	82
FW-B50	5/8	15.35-16.25	24.85-25.55	1.5	72	255	95
FW-B60	3/4	18.6-19.85	28.25-29.55	1.5	60	231	113
FW-B70	7/8	21.84-22.86	32.25-33.55	2	52	189	145
FW-B100	1	24.89-26.16	35.55-36.85	2	47	144	189

备注: 单根长度在 10 米到 20 米

1psi (1 磅 / 英寸²) = 0.0703kg/cm² 1bar (巴) = 1.0197kg/cm²

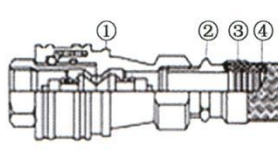
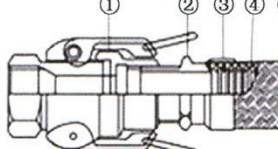
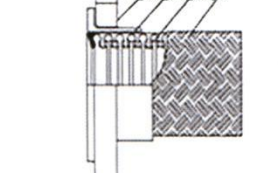
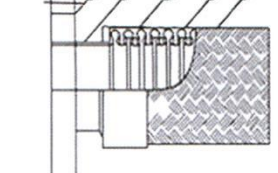
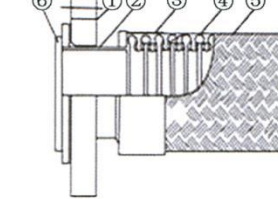
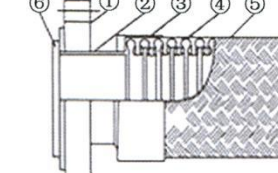
金属软管接头示意图

Schematic Diagram of Metal Hose Connector

金属软管接头形式 Metal hose joint form	金属软管接头结构图 Structural diagram of metal hose joint	结构说明 Structure Description
		结构：外螺纹接头不锈钢波纹管 特点：结构简单，通用性好 材料：(1) 外螺纹接头：不锈钢； (2) 网套紧环：不锈钢； (3) 金属波纹管： SUS301/304； (4) 网套： SUS301/304 Structure: External thread joint stainless steel corrugated pipe Features: Simple structure, good universality Material: (1) External thread joint: stainless steel; (2) Mesh sleeve tightening ring: stainless steel; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304
		结构：活动内螺纹接头扩中/球头波纹管 特点：结构简单 通径:DN10~DN100 材料：(1)活动内螺纹接头： 不锈钢； (2)网套压紧圈： 不锈钢； (3)金属波纹管： SUS301/304； (4)网套： SUS301/304 Structure: Active internal thread joint expansion/ball head corrugated pipe Features: Simple structure Diameter: DN10~DN100 Material: (1) Active internal threaded joint: stainless steel; (2) Mesh sleeve compression ring: stainless steel; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304
		结构：活动内螺纹平接头波纹管 特点：结构简单 通径:DN10~DN100 材料：(1) 活动内螺纹接头： 不锈钢； (2) 网套压紧圈： 不锈钢； (3) 金属波纹管： SUS301/304； (4) 网套： SUS301/304; Structure: Active internal thread flat joint corrugated pipe Features: Simple structure Diameter: DN10~DN100 Material: (1) Active internal threaded joint: stainless steel; (2) Mesh sleeve compression ring: stainless steel; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304;
		结构：球形接头+内螺纹接头波纹管 特点：无压需焊接，可按需要长度自行装配 通径： DN10~DN100 材料：(1) 内螺纹接头： 不锈钢； (2) 网套压紧环： 不锈钢； (3) 金属波纹管： SUS301/304； (4) 网套： SUS301/304； Structure: Spherical joint+internal thread joint corrugated pipe Features: No pressure and welding required, can be assembled according to the required length by oneself Diameter: DN10~DN100 Material: (1) Internal thread joint: stainless steel; (2) Mesh sleeve compression ring: stainless steel; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304;
		结构：焊接活接头不锈钢波纹管 特点：通用性好 通径:DN10~DN800 材料：(1) 活动内螺纹接头:碳钢/不锈钢； (2) 接管:碳钢/ 不锈钢； (3) 网套压紧圈:不锈钢； (4) 金属波纹管:SUS301/304； (5) 网套:SUS301/304； Structure: Welded flexible joint stainless steel corrugated pipe Features: Good universality, diameter: DN10~DN800 Material: (1) Active internal thread joint: carbon steel/stainless steel; (2) Takeover: Carbon steel/stainless steel; (3) Mesh sleeve compression ring: stainless steel; (4) Metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304;
		结构：焊接活接头+防震环波纹管 特点：通用性好、防震性好 通径： DN10~DN800 材料：(1)活动内螺纹接头： 碳钢/不锈钢； (2)接管： 碳钢/不锈钢； (3)网套压紧圈： 不锈钢； (4)金属波纹管： SUS301/304； (5)网套： SUS301/304； (6)防震环： 碳钢/不锈钢 Structure: Welded flexible joint+shock-absorbing ring corrugated pipe Features: Good universality and shock resistance. Diameter: DN10~DN800 Material: (1) Active internal thread joint: carbon steel/stainless steel; (2) Takeover: Carbon steel/stainless steel; (3) Mesh sleeve compression ring: stainless steel; (4) Metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304; (6) Anti vibration ring: carbon steel/stainless steel

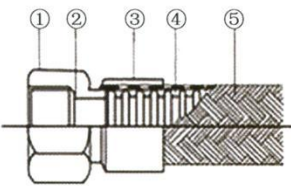
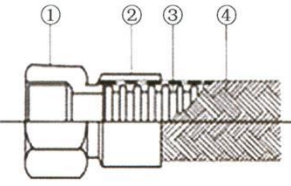
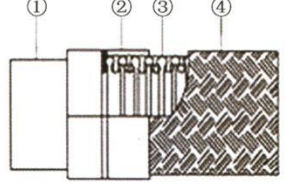
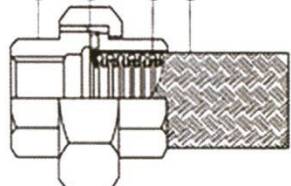
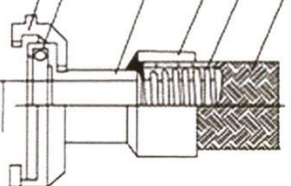
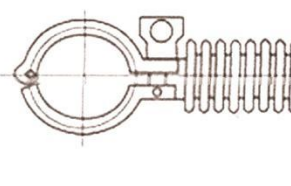
金属软管接头示意图

Schematic Diagram of Metal Hose Connector

金属软管接头形式 Metal hose joint form	金属软管接头结构图 Structural diagram of metal hose joint	结构说明 Structure Description
		结构：外螺纹接头+快速管接头波纹管 特点：安装方便 通径： DN10~ DN50 材料：(1) 快速接头： 不锈钢 (2) 外螺纹接头： 不锈钢； (3) 网套压紧圈： 不锈钢 (4) 金属波纹管： SUS301/304； (5)网套： SUS301/304 Structure: External thread joint+quick coupling corrugated pipe Features: Easy to install Diameter: DN10~DN50 Material: (1) Quick connector: stainless steel (2) External thread connector: stainless steel; (3) Mesh sleeve compression ring: stainless steel (4) metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304
		结构：外螺纹接头+开启式快速管接头波纹管 特点：安装方便 通径： DN10~ DN150 材料：(1)开启式快速接头,不锈钢； (2)外螺纹接头： 不锈钢； (3)网套压紧圈： 不锈钢 (4) 金属波纹管： SUS301/304； (5)网套： SUS301/304； Structure: External thread joint+open quick coupling corrugated pipe Features: Easy to install Diameter: DN10~DN150 Material: (1) Open quick connector: stainless steel (2) External thread connector: stainless steel; (3) Mesh sleeve compression ring: stainless steel (4) metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304
		结构：松套法兰密封座与网套波纹管一起三位一体焊波纹管 特点：安装方便、密封性能好 通径:DN10~ DN2000 材料：(1) 松套法兰： 碳钢/不锈钢 (2) 接管： 碳钢/不锈钢； (3) 金属波纹管： SUS301/304； (4) 网套： SUS301/304； Structure: Three in one welded corrugated pipe with loose flange sealing seat and mesh corrugated pipe Features: Easy installation, good sealing performance Diameter: DN10~DN2000 Materials: (1) Loose flange: carbon steel/stainless steel (2) Connecting pipe: carbon steel/stainless steel; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304;
		结构：固定法兰式金属软管波纹管 特点：通用性能好 通径:DN10~ DN2000 材料：(1) 法兰： 碳钢/不锈钢 (2) 接管： 碳钢/不锈钢 (3) 网套扣压圈： 不锈钢 (4) 金属波纹管： SUS301/304； (5) 网套： SUS301/304； Structure: Fixed flange metal hose corrugated pipe Features: Good universal performance Diameter: DN10~DN2000 Material: (1) Flange: Carbon Steel/Stainless Steel (2) Connection: Carbon Steel/Stainless Steel (3) Mesh sleeve buckle ring: stainless steel (4) metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304;
		结构：衬四氟松套法兰软管波纹管 特点：通用性能好、耐腐蚀性强 通径： DN15~DN500 材料：(1) 法兰： 碳钢/不锈钢； (2) 接管： 碳钢/不锈钢； (3) 网套扣压圈： 不锈钢； (4) 金属波纹管： SUS301/304； (5) 网套： SUS301/304； Structure: PTFE lined loose flange hose corrugated pipe Features: Good universal performance, strong corrosion resistance Diameter: DN15~DN500 Material: (1) Flange: Carbon steel/stainless steel; (2) Takeover: Carbon steel/stainless steel; (3) Mesh sleeve buckle ring: stainless steel; (4) Metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304;
		结构：衬四氟固定式法兰软管波纹管 特点：通用性能好、耐腐蚀性强 通径： DN15~ DN500 材料：(1) 法兰： 碳钢/不锈钢； (2) 接管： 碳钢/不锈钢； (3) 网套扣压圈： 不锈钢 (4)金属波纹管： SUS301/304； (5) 网套： SUS301/304； Structure: PTFE lined fixed flange hose corrugated pipe Features: Good universal performance, strong corrosion resistance Diameter: DN15~DN500 Material: (1) Flange: Carbon steel/stainless steel; (2) Takeover: Carbon steel/stainless steel; (3) Mesh sleeve buckle ring: stainless steel; (4) metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304;

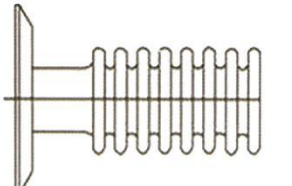
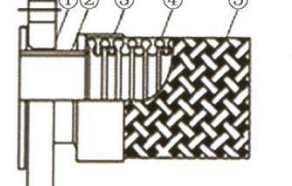
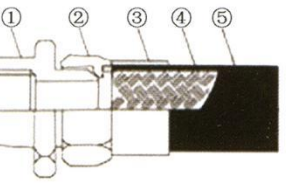
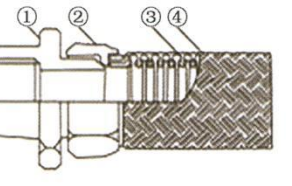
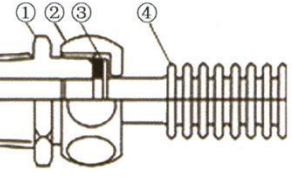
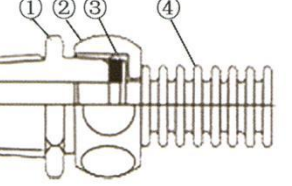
金属软管接头示意图

Schematic Diagram of Metal Hose Connector

金属软管接头形式 Metal hose joint form	金属软管接头结构图 Structural diagram of metal hose joint	结构说明 Structure Description
		结构：衬四氟活动内螺纹平接头波纹管 特点：结构简单、耐腐蚀性强 口径：DN10~ DN100 材料：(1) 活动内螺纹：不锈钢； (2) 四氟； (3) 网套压紧圈：不锈钢； (4) 金属波纹管： SUS301/304； (5) 网套： SUS301/304 Structure: PTFE lined movable internal thread flat joint corrugated pipe Features: Simple structure, strong corrosion resistance Diameter: DN10~DN100 Material: (1) Active internal thread: stainless steel; (2) Tetrafluoride; (3) Mesh sleeve compression ring: stainless steel; (4) Metal wave tube: SUS301/304; (5) Mesh cover: SUS301/304
		结构：活动内螺纹平接头波纹管 特点：特柔性、弯曲性好 口径：DN10~ DN1005 材料：(1) 活动螺纹：不锈钢； (2) 网套压紧圈：不锈钢； (3) 硅橡胶； (4) 网套： SUS301/3044 Structure: Active internal thread flat joint corrugated pipe Features: Extremely flexible, good flexibility Diameter: DN10~DN1005 Material: (1) Active thread: stainless steel; (2) Mesh sleeve compression ring: stainless steel; (3) Silicone rubber; (4) Mesh cover: SUS301/3044
		结构：焊接式软管波纹管 特点：结构简单，通用性好 口径：DN10~DN800 材料：(1) 管子接头：碳钢/不锈钢； (2) 网套压紧环：碳钢/不锈钢； (3) 金属波纹管： SUS301/304； (4) 网套： SUS301/304； Structure: Welded hose corrugated pipe Features: Simple structure, good universality Diameter: DN10~DN800 Material: (1) Pipe joint: Carbon steel/stainless steel; (2) Mesh sleeve compression ring: carbon steel/stainless steel; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304;
		结构：由壬接头不锈钢波纹管 特点：结构简单、安装方便 口径：DN10~DN100 材料：(1) 由壬接头：不锈钢； (2) 密封垫圈：石棉/四氟； (3) 金属波纹管： SUS301/304； (4) 网套： SUS301/304； Structure: Stainless steel corrugated pipe with union joint Features: Simple structure, easy installation Diameter: DN10~DN100 Material: (1) Union joint: stainless steel; (2) Sealing gasket: asbestos/PTFE; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304;
		结构：卡箍式金属软管波纹管 特点：快速扣接、密封可靠 口径：DN10~DN800 材料：(1) 卡箍：不锈钢 (2) 密封：橡胶； (3) 连接接管：不锈钢 (4) 网套压紧环：不锈钢； (5) 金属软管： SUS301/304 (6) 网套： SUS301/304 Structure: Stainless steel corrugated pipe with union joint Features: Simple structure, easy installation Diameter: DN10~DN100 Material: (1) Union joint: stainless steel; (2) Sealing gasket: asbestos/PTFE; (3) Metal wave tube: SUS301/304; (4) Mesh cover: SUS301/304;
		结构：药用金属软管波纹管 快装接头 特点：安装方便 口径：DN50.5~DN159 材料：SUS301/304 Structure: Pharmaceutical metal hose corrugated tube quick connector Features: Easy installation Diameter: DN50.5~DN159 Material: SUS301/304

金属软管接头示意图

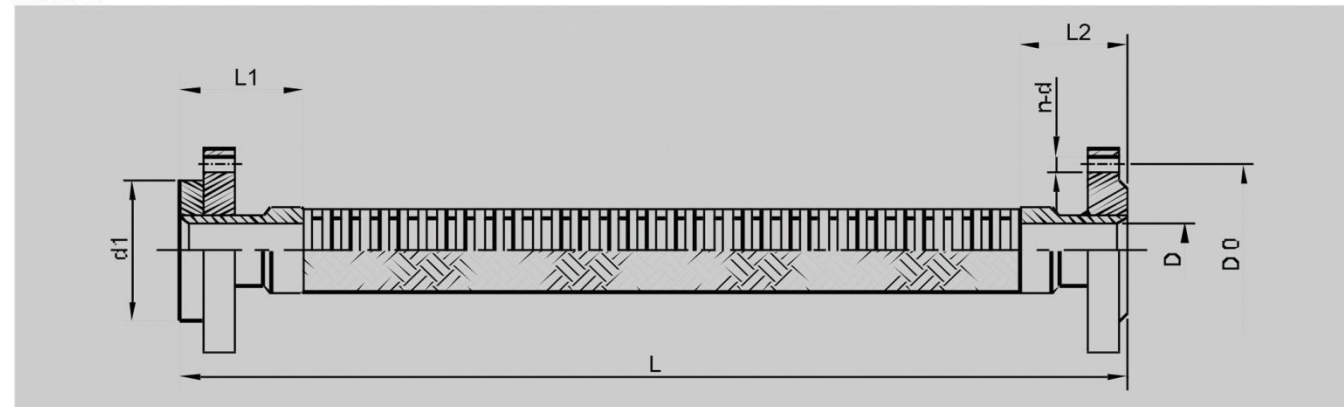
Schematic Diagram of Metal Hose Connector

金属软管接头形式 Metal hose joint form	金属软管接头结构图 Structural diagram of metal hose joint	结构说明 Structure Description
		结构：快装金属软管波纹管 特点：安装方便 口径：DN50.5~DN159 材料：SUS301/304 Structure: Quick installation metal hose corrugated pipe Features: Easy installation Diameter: DN50.5~DN159 Material: SUS301/304
		结构：松套法兰，带直管焊接式钢带网套波纹管 特点：抗震性能好，网套防护性强 口径：DN150~DN200 材料：(1) 松套法兰：碳钢/不锈钢； (2) 接管：碳钢/不锈钢； (3) 压紧环： SUS301/304； (4) 金属波纹管： SUS301/304； (5) 钢带网套： 不锈钢 Structure: Loose flange, welded steel strip mesh corrugated pipe with straight pipe Features: Good seismic performance, strong mesh protection, diameter: DN150~DN200 Material: (1) Loose flange: Carbon steel/stainless steel; (2) Takeover: Carbon steel/stainless steel; (3) Compression ring: SUS301/304; (4) Metal wave tube: SUS301/304; (5) Steel belt mesh cover: stainless steel
		结构：扣压式胶管波纹管 特点：结构简单、耐压性能好 口径：DN10~DN150 材料：(1) 外丝：碳钢/不锈钢； (2) 活动内螺纹：碳钢/不锈钢； (3) 扣压圈：碳钢/不锈钢； (4) 编织网：碳钢； (5) 胶管： 碳钢 Structure: Buckle type rubber hose corrugated pipe Features: Simple structure, good pressure resistance Diameter: DN10~DN150 Material: (1) Outer wire: carbon steel/stainless steel; (2) Activity internal thread: carbon steel/stainless steel; (3) Buckle ring: carbon steel/stainless steel; (4) Woven mesh: carbon steel; (5) Rubber hose: carbon steel
		结构：风机盘管不锈钢接头软管波纹管 特点：结构简单、耐压性能好 口径：DN10~DN150 材料：(1) 外丝：碳钢/不锈钢； (2) 活动内螺纹：碳钢/不锈钢； (3) 扣压圈：碳钢/不锈钢； (4) 编织网：碳钢； (5) 胶管： 碳钢 Structure: Fan coil unit, stainless steel joint, flexible hose, corrugated pipe Features: Simple structure, good pressure resistance Diameter: DN10~DN150 Material: (1) Outer wire: carbon steel/stainless steel; (2) Activity internal thread: carbon steel/stainless steel; (3) Buckle ring: carbon steel/stainless steel; (4) Woven mesh: carbon steel; (5) Rubber hose: carbon steel
		空调软管波纹管结构：风螺纹接头+外丝 特点：无需焊接，可按需要长度自行装配 口径：DN10~ DN50 材料：(1) 六角接头：铜/不锈钢； (2) 六角螺母：铜/不锈钢； (3) 密封垫圈：四氟/优质橡胶； (4) 波纹波纹管： SUS301/304； Air conditioning hose corrugated pipe structure: wind threaded joint+external wire Features: No welding required, can be assembled according to the required length Diameter: DN10~DN50 Material: (1) Hexagonal joint: copper/stainless steel; (2) Hexagonal nut: copper/stainless steel; (3) Sealing gasket: PTFE/high-quality rubber; (4) Ripple tube: SUS301/304;
		结构：空调软管波纹管制作 口径：DN10~DN1000 制作长度：100mm~1000mm 特点：无需焊接、可按需要长度自行装配 材料：(1) 六角接头：铜/不锈钢； (2) 六角螺母：铜/不锈钢； (3) 密封垫圈：四氟/优质橡胶； (4) 波纹波纹管： SUS301/304； Structure: Manufacturing of corrugated air conditioning hoses Diameter: DN10~DN1000 Production length: 100mm~1000mm Features: No need for welding, can be assembled according to the required length by oneself Material: (1) Hexagonal joint: copper/stainless steel; (2) Hexagonal nut: copper/stainless steel; (3) Sealing gasket: PTFE/high-quality rubber; (4) Ripple tube: SUS301/304;

转炉氧枪用金属软管 Metal Hose for Oxygen Converter Lance

在炼钢行业中，转炉氧枪与供氧管道之间原为橡胶软管连接，但容易爆炸，危及人身设备安全。且使用寿命短，更换频繁，影响生产，因而近年来多改为金属软管。我公司引进国外先进技术研制的转炉氧枪用金属软管，经几年多的使用证明，在高温、高流速、高粉尘的恶劣环境下完全满足工艺要求及使用条件。该金属软管也可用于转炉氧枪冷却水管及平炉吹氧软管。

In steelmaking fields, the rubber hoses were applied between converter oxygen lance and oxygen supply pipes. It is easy to get exploded. Which endangers the people and the equipment, also short service life. Exchange frequently, affecting production. So, in recent years, metal hoses are used in this field. This specific metal hose used for converter, which is studied and produced by our company with foreign advanced technology. It has been proved that it meets the requirements of the steel making process and the using condition. It can work properly against high temperature, high flow speed, high metal dust and other curviness environment. The hose can also be applied to the water-cooling system of oxygen converter and open-hearth furnace.



订货标记
Ordering Example

1.6	RYR	150	A	—	15000
					长度 Length
					法兰连接 Flange connection
					公称通径 Nom. Diameter
					代号 Code
					公称压力 (MPa) Nom. pressure

说明:

1. 平焊法兰标准为JB81-59, 松套法兰标准为JB83-59, 也可根据用户要求设计制造。
The standard for flat welding flange is JB81-59, for loose flange is JB83-59, it can be supplied as user's needed.

2. 材质为碳钢时, 连接法兰代号为A, 材质为不锈钢时, 代号为F。

Material: A-carbon steel, F-stainless steel.

3. 工作温度: -196℃ ~ +450℃。

Working temperature: -196℃ ~ +450℃.

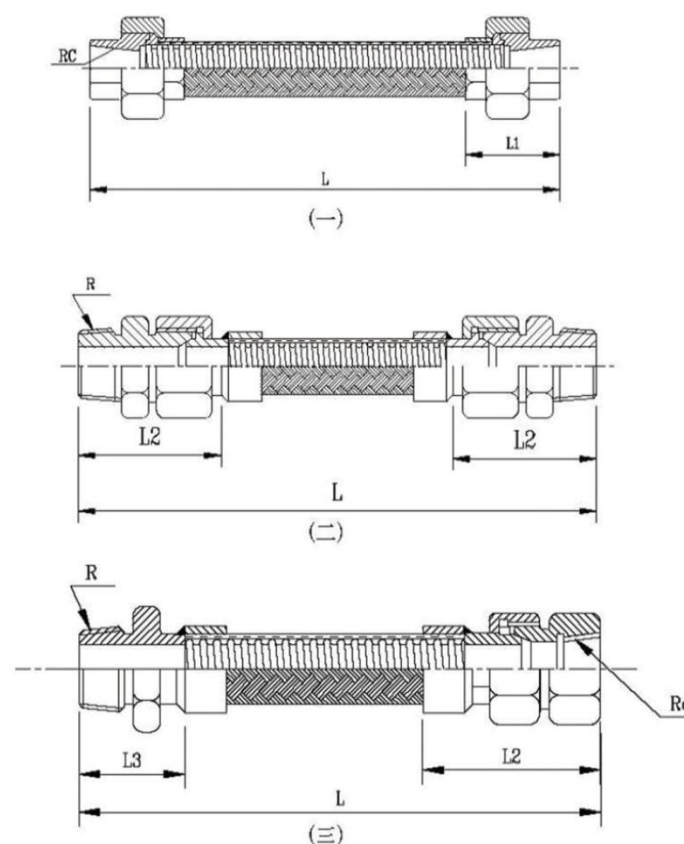
4. 软管动态弯曲半径取R=20DN。

Dynamic bending radius R=20DN.

风机及中央空调安装用软管 Metal Hose for Blower and Central Air-Conditioner

在民用建筑行业中为调节偏心，减振、方便安装，越来越广泛的使用了不锈钢软管。

It has been widely used in civil building to adjust eccentricity and absorb vibration for its easy assembling.



通 径 Nor. diameter DN IN	承压能力 Working Pressure (Mpa)	接头尺寸 Joint Size			弯曲半径 Bend radius	长度 L Length
		L ₁	L ₂	L ₃		
15	1/2	3.2	42	70	36	60
20	3/4	3.0	46	80	45	80
25	1"	2.5	52	88	50	100
32	1 1/4"	1.6	57	95	55	120

按需
As required

双层保温金属软管

1、功能、作用、使用场合及特点说明

双层保温金属软管是指除了正常输送介质外，还附加了一种对所输送介质进行加热、冷却或保温的软管。

双层保温金属软管一般输送粘度较大、常温下不易流动而需加热输送的介质;或在零下为液态而在常温时易汽化、需要保温的介质。如原油、沥青、硫磺、液氢、液等。内外管可流通两种不同的介质。

2、结构说明

(1) 双层保温金属软管的设计、制造、验收均符合GB/T 14525-93《波纹金属软管通用技术条件》的规定。

(2)平焊法兰标准为JB/T81-94,松套法兰标准为JB/T83-94,也可根据客户要求设计制造

(3)材质为碳钢(Q235-A),连接形式代号为C;不锈钢时为F。

(4)工作温度-196~+450℃。

(5)工作压力等级0.6Mpa、1.0Mpa、1.6Mpa、0.5Mpa、4.0Mpa。

(6)两个小法兰的相对位置为 180° ，小法兰的高度和距大法兰的距离，由甲方订货时提出。

Remark:

1、Function, role, application & feature

Double thermal insulating metal hose is a type of hose which not only transports the medium, but also heat or cool the medium, or keep it warm. Generally, the medium has large viscosity; It does not flow easily at ambient temperatures, but can flow when heated; or when the temperature is below zero, the medium is in liquid form; at ambient temperature, the medium is easy for vaporization and needs heat preservation. Such as crude oil, asphalt, sulfur, liquid hydrogen, liquid oxygen etc, The inner hose and the outer hose could convey two different mediums.

2、Structure

(1)The design, manufacture and acceptance of metal hose should be in accordance with 《General Technical conditions of Flexible Metal Hose》 of GB/T 14525-93.

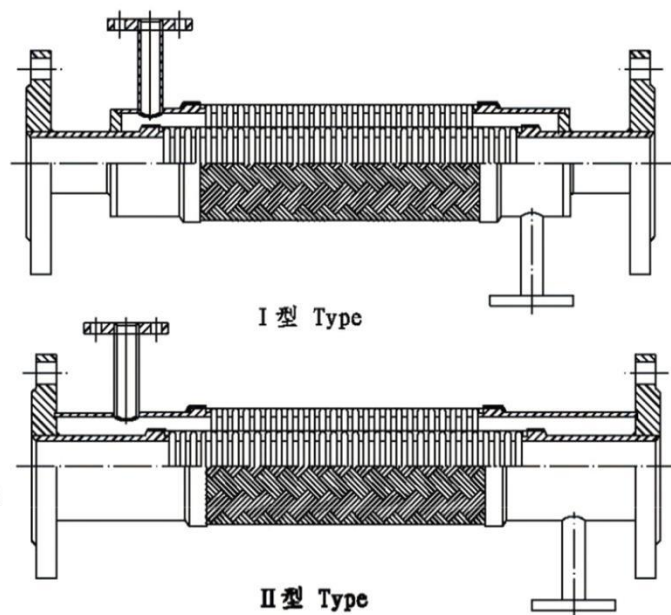
(2) Standard for flat welding flange: JB/T81-94; for loose flange: JB/T83-94; can also make according to requirement of client.

(3) Material is carbon steel (Q235A), code of joint: C (F with stainless)

(4) Working temperature: -196~+450°C

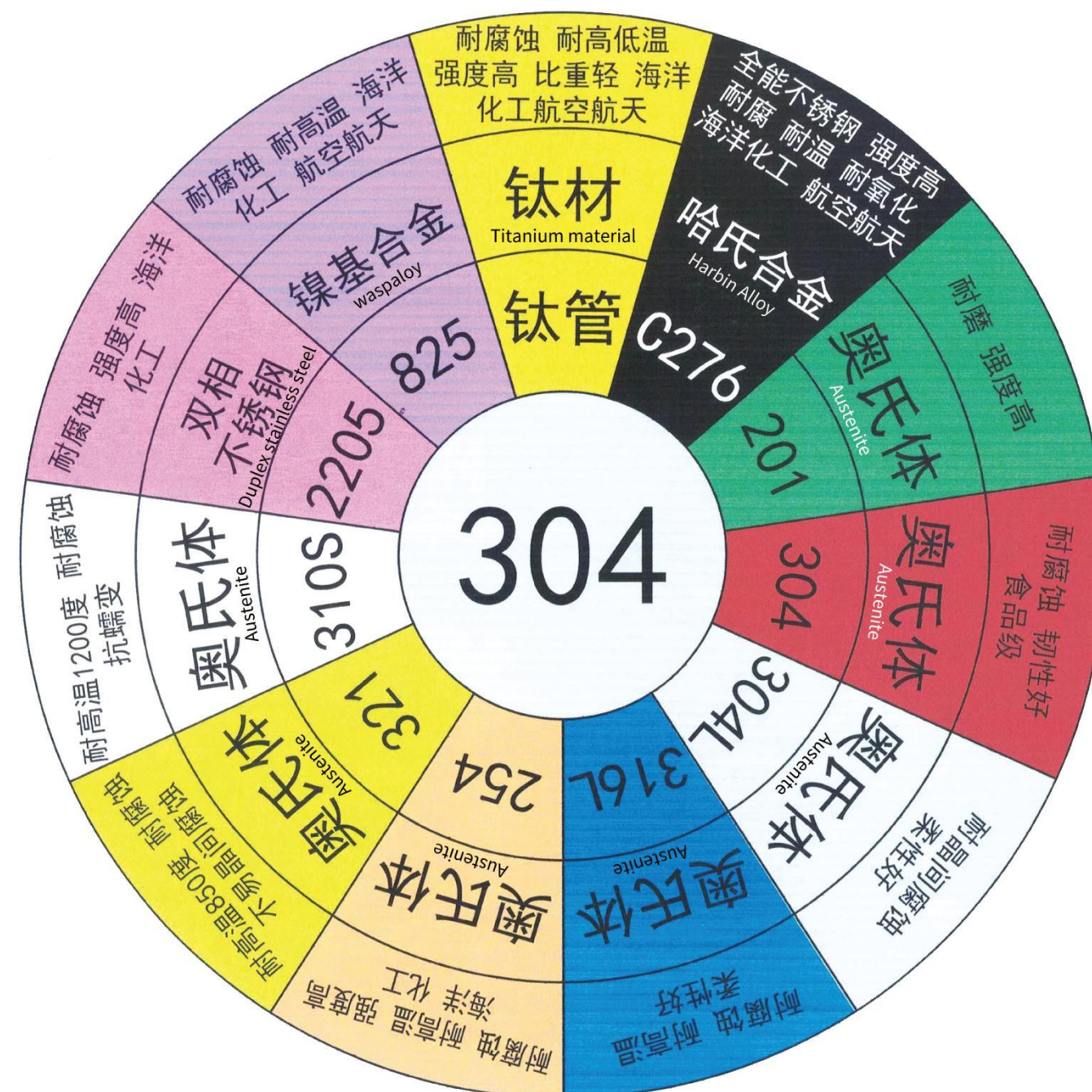
(5) Working pressure classes: 0.6MPa, 1.0 MPa, 1.6 MPa, 0.5 MPa, 4.0 MPa

(6) The relative angle between two small flanges is 180°; the height of small flange and the distance between small flange and big flange will be supplied by customer when ordering.



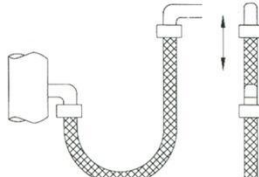
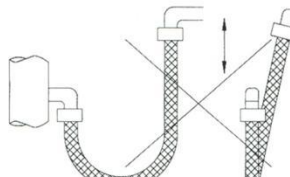
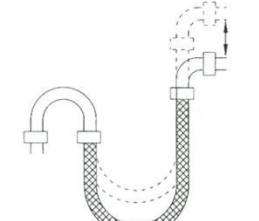
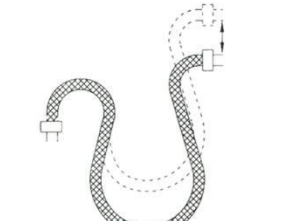
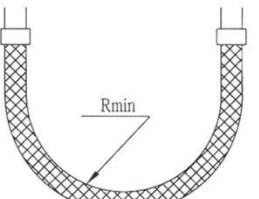
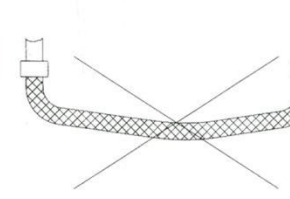
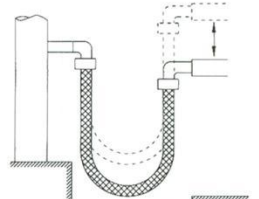
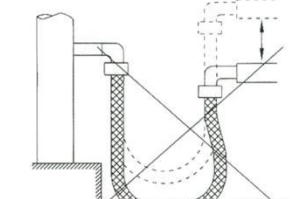
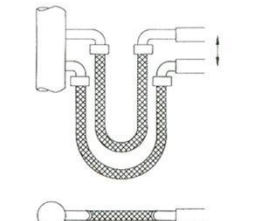
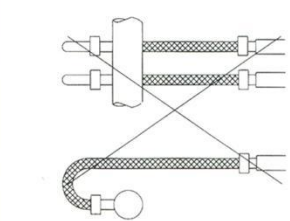
金属软管材质性能对照表

Comparison Table of Material Properties of Metal Hoses



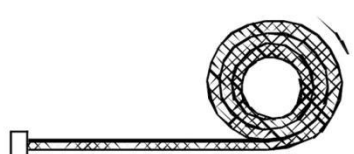
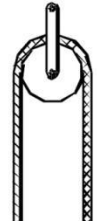
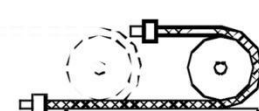
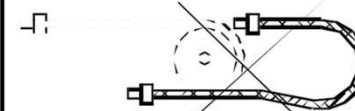
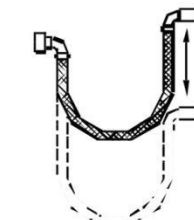
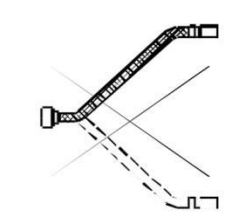
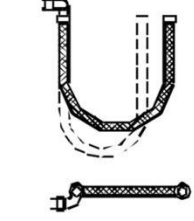
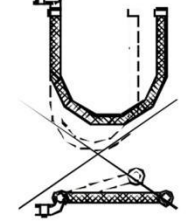
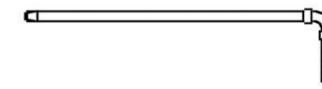
金属软管安装指南

Metal Hose Installation Guide

正确 Correct	错误 Incorrect
软管的运动方向与软管的安装应保持在一个平面。 Hose should move with one plane. 	在扭曲下运动，会降低软管的使用寿命。 It will shorten life of hose moving under twist. 
采用刚性弯头连接，以保证软管运动时的弯曲半径。 Rigid angle fitting is used to keep suitable bending radius. 	过小的弯曲，会使软管受到损伤。 Too small bending will damage hose. 
软管安装，应保证允许的最小弯曲半径。 When assembling hose, Min. bending radius should be guaranteed. 	软管的长度选择过短，会产生软管过小的弯曲，这是不允许的。 Too short hose will damage hose. 
运动时，软管应避免与其它物体发生摩擦。 Avoiding rubbing with other objects when moving. 	运动时，软管受到其它物体的阻碍，会产生破坏。 Rubbing will damage hose when moving. 
软管的运动方向与软管的安装应保持在一个平面。 Use fixed angle fitting keeping two end of hose moving on one line. 	不在一个平面内运动的软管，会降低使用寿命。 It will shorten life of hose moving under twist. 

安装指南

Guide for Assembling

正确 Correct	错误 Incorrect
为保持允许的弯曲半径，应将盘卷在一起的软管立起，引拉展开使用。 In order to keep the allowed bending radius, coiling hoses should be put vertically, then expansion to use. 	被盘卷在一起的软管，请不要直接引拉其中的一端使用。 Don't use coiling hose directly. 
使用半圆形滑轮，以保持其允许的弯曲半径。 Use semi-circular pulley to keep suitable bending radius. 	极度的弯曲，将使软管损坏。 Extreme bending can damage the hose. 
采用和软管运动同步的旋转滚轮，以避免不适当的弯曲。 Use rotary roller with same speed of hose. 	软管长度选择过长，会产生不规则的弯曲，是必须注意的。 Select suitable length of hose avoiding irregular bending. 
在小的弯曲部分，采用刚性弯头，以保证软管的弯曲半径。 Use fixed angle fitting at small bending part to keep suitable bending radius. 	不适当的弯曲，会降低软管的使用寿命。 Unappropriate bending will shorten life of hose. 
使用刚性弯头连接，使软管两端点的运动在一条直线上。 Use fixed angle fitting keeping two end of hose moving on one line. 	在扭曲下运动，会降低软管的使用寿命。 It will shorten life of hose moving under twist. 
在弯曲部分采用刚性弯头，使软管成直线配管状。 Keep the hose in a line by using fixed angle fitting at bending part. 	过度的弯曲，会使软管受到损伤。 Extreme bending will damage hose. 

金属软管执行标准GB/T 14525-2010

Metal hose execution standard GB/T 14525-2010

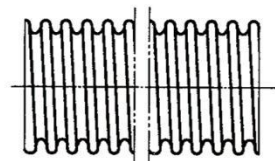


图 1 虫螺旋波纹管示意图
Figure 1 Schematic diagram of insect spiral corrugated tube

3.4 环形波纹管 annular corrugated tube

波纹呈闭合圆环状的波纹管(见图2)。A corrugated pipe with a closed circular shape (see Figure 2).

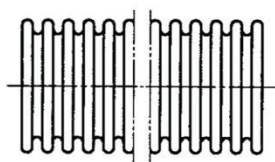


图 2 环形波纹管示意图
Figure 2 Schematic diagram of circular corrugated pipe

3.5 加强型波纹管 strengthened corrugated tube

在波谷根部有与波纹贴合的加强件的波纹管(见图3)

A corrugated pipe with reinforcing elements attached to the corrugation at the root of the valley (see Figure 3)

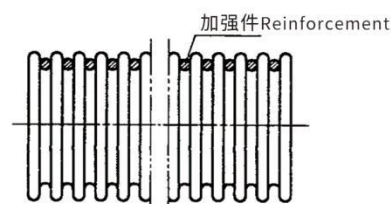


图 3 加强型波纹管示意图
Figure 3 Schematic diagram of reinforced corrugated pipe

3.6 网套 braid

波纹管外表面的金属编织物, 分为钢丝网套、钢带网套和丝带网套(见图4)。

The metal woven fabric on the outer surface of the corrugated pipe is divided into steel wire mesh sleeve, steel belt mesh sleeve, and ribbon mesh sleeve (see Figure 4).

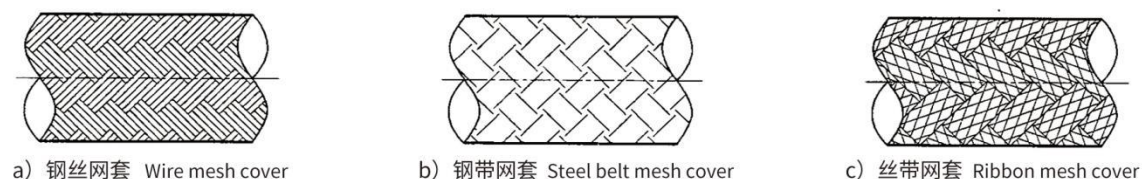


图 4 网套示意图
Figure 4 Schematic diagram of mesh cover

3.7 接头 joint

用于与管道连接的结构件。结构件一般为球面型、锥面型、平面活接头型、快速接头型、管螺纹型、法兰型和接管型。

Structural components used for connecting with pipelines. Structural components are generally spherical, conical, flat joint type, quick connector type, pipe thread type, flange type, and connecting pipe type.

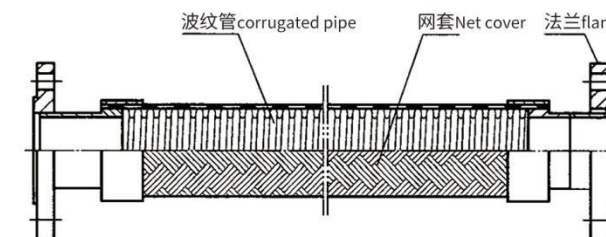
金属软管执行标准GB/T 14525-2010

Metal hose execution standard GB/T 14525-2010

3.8 波纹金属软管 corrugated metal hose assembly

波纹管、网套和接头的组合(见图5)或波纹管和接头的组合。

Combination of corrugated pipe, mesh sleeve, and joint (see Figure 5) or combination of corrugated pipe and joint.



注: 图示为法兰接头的软管 Note: The illustration shows a hose with a flange joint

图 5 波纹金属软管示意图
Figure 5 Schematic diagram of corrugated metal hose

3.9 弯曲半径 bend radius

按软管轴线测量的弯曲圆弧半径 Bend radius measured along the axis of the hose

3.10 静态弯曲半径 static bend radius

软管在一次性弯曲下工作所允许的弯曲半径 The allowable bending radius for hoses to work under one-time bending

3.11 动态弯曲半径 dynamic bend radius

软管在反复弯曲下工作所允许的弯曲半径 The allowable bending radius for hoses to work under repeated bending

3.12 柔性段长度 flexible part length

软管中去除两端所有刚性连接段后的长度。

The length of the hose after removing all rigid connecting sections at both ends.

4 分类 Classification

4.1 基本参数 Basic parameters

软管的公称尺寸范围为 DN 4~DN 800, 室温下的设计压力 P_s (以下简称设计压力 P_s) 范围为 $P_s \leq 35.0$ MPa, 常用规格见表 1。在不同工作温度下, 软管允许的最大工作压力计算参见附录 A。

The nominal size range of the hose is DN 4~DN 800, and the design pressure P_s (hereinafter referred to as the design pressure P_s) at room temperature ranges from $P_s \leq 35.0$ MPa. Common specifications are shown in Table 1. The maximum allowable working pressure of the hose at different operating temperatures is calculated in Appendix A.

表 1 常用规格 Table 1 Common Specifications

公称尺寸 DN	设计压力 P_s /MPa													
	0.6	1.0	1.6	2.0	2.5	4.0	5.0	6.3	10.0	15.0	20.0	25.0	32.0	35.0
4	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○	○		
8	○	○	○	○	○	○	○	○	○	○	○	○		
10	○	○	○	○	○	○	○	○	○	○	○	○		
(12)	○	○	○	○	○	○	○	○	○	○	○	○		

金属软管执行标准GB/T 14525-2010

Metal hose execution standard GB/T 14525-2010

表 1（续） Table 1 (Continued)

公称尺寸 DN	设计压力 P _s /MPa Design pressure P _s / MPa													
	0.6	1.0	1.6	2.0	2.5	4.0	5.0	6.3	10.0	15.0	20.0	25.0	32.0	35.0
15	○	○	○	○	○	○	○	○	○	○	○	○		
(18)	○	○	○	○	○	○	○	○	○	○	○			
20	○	○	○	○	○	○	○	○	○	○	○			
25	○	○	○	○	○	○	○	○	○	○	○			
32	○	○	○	○	○	○	○	○	○					
40	○	○	○	○	○	○	○	○	○					
50	○	○	○	○	○	○	○	○						
65	○	○	○	○	○	○	○	○						
80	○	○	○	○	○	○	○							
100	○	○	○	○	○	○								
125	○	○	○	○	○	○								
150	○	○	○	○	○	○								
(175)	○	○	○	○	○	○								
200	○	○	○	○	○	○								
250	○	○	○	○	○	○								
300	○	○	○	○	○	○								
350	○	○	○	○	○									
400	○	○	○	○	○									
450	○	○	○	○	○									
500	○	○	○	○	○									
600	○	○	○	○										
700	○	○	○											
800	○	○	○											
注 1: “○” 表示软管的常用规格。 Note 1: “○” indicates the common specifications of the hose.														
注 2: 括号内公称尺寸不推荐采用。 Note 2: The nominal size in parentheses is not recommended.														

- 4.2 软管分类 Classification of hoses
- 根据使用工况，软管分 A、B 两类。
- A 类软管：设计压力 P_s≥0.1 MPa(表压)，工作介质为气体、液化气体、蒸汽或者可燃、易爆、有毒有腐蚀性、最高工作温度高于或者等于标准沸点的液体，且公称尺寸 DN>25 的软管；
- B 类软管：非 A 类软管。
- According to the operating conditions, hoses are divided into two categories: A and B.
- A-class hose: designed pressure P_s ≥ 0.1 MPa (gauge pressure), working medium is gas, liquefied gas, steam or flammable, explosive, toxic and corrosive liquid, with a maximum working temperature higher than or equal to the standard boiling point, and nominal size DN>25 hose;
- B-class hose: Non A-class hose.

5 要求 Require

5.1 材料 Material

软管用材料应适合制造(如成形、焊接)及使用的要求，常用材料见表 2。

The materials used for hoses should be suitable for manufacturing (such as forming, welding) and usage requirements. Common materials are shown in Table 2.

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表 2 常用材料 Common materials

零件名称 Part name	材料牌号 Material grade		材料标准 Material standards	推荐工作温度 Recommended working temperature
	新牌号 New brand	旧牌号 Old brand		
波纹管 Corrugated tube	06Cr19Ni10	0Cr18Ni9	GB/T 3089 GB/T 3280	-196℃~450℃
	022Cr19Ni10	00Cr19Ni10		
	06Cr17Ni12Mo2	0Cr17Ni12Mo2		
	022Cr17Ni12Mo2	00Cr17Ni14Mo2		
	06Cr18Ni11Ti	0Cr18Ni10Ti		
网套 Mesh sleeve	06Cr19Ni10	0Cr18Ni9	GB/T 4240 GB/T 3280	-196℃~450℃
	022Cr19Ni10	00Cr19Ni10		
	06Cr17Ni12Mo2	0Cr17Ni12Mo2		
	022Cr17Ni12Mo2	00Cr17Ni14Mo2		
	06Cr18Ni11Ti	0Cr18Ni10Ti		
接头 Joint	06Cr19Ni10	0Cr18Ni9	GB/T 1220 GB/T 4226	-196℃~450℃
	022Cr19Ni10	00Cr19Ni10		
	06Cr17Ni12Mo2	0Cr17Ni12Mo2		
	022Cr17Ni12Mo2	00Cr17Ni14Mo2		
	06Cr18Ni11Ti	0Cr18Ni10Ti		
	ZG08Cr18Ni9	ZG0Cr18Ni9	GB/T 12230	-20℃~450℃
	ZG08Cr18Ni12Mo2Ti	ZG0Cr18Ni12Mo2Ti		
	20Cr13	2Cr13	GB/T 4226	-20℃~450℃
	Q235B	Q235B	GB/T 700	-20℃~300℃
	20	20	GB/T 699	

5.2 制造 Manufacture

5.2.1 管坯不允许有环焊缝,允许有纵焊缝,纵焊缝条数应符合表 3 的规定,且相邻纵焊缝的间距应大于200 mm。

The pipe blank is not allowed to have circumferential welds, and longitudinal welds are allowed. The number of longitudinal welds should comply with the provisions of Table 3, and the spacing between adjacent longitudinal welds should be greater than 200 mm.

表 3 管坯纵焊缝条数 Number of longitudinal welds on the pipe blank

公称尺寸 DN Nominal size DN	纵焊缝条数 Number of longitudinal welds
≤250	≤1
>250~600	≤2
>600~800	≤3

5.2.2 管坯纵焊缝的焊接方法，可采用自动氩弧焊、等离子焊、激光焊或电子束焊；其焊缝表面一般应呈银白色、金黄色，也可呈浅蓝色；管坯纵焊缝的凹陷及余高不应超过壁厚的 10%。

The welding method for the longitudinal weld seam of the billet can be automatic argon arc welding, plasma welding, laser welding, or electronic welding; The surface of the weld seam should generally be silver white, golden yellow, or light blue; The indentation and excess height of the longitudinal weld seam of the pipe blank should not exceed 10% of the wall thickness

5.2.3 波纹管的成形方法,可采用液压成形、聚氨酯成形、旋压成形或机械胀形。

The forming methods for corrugated pipes include hydraulic forming, polyurethane forming, spinning forming, or mechanical bulging.

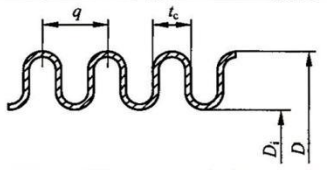
5.2.4 波纹管的极限偏差应符合表4的规定。

The maximum deviation of the corrugated pipe should comply with the provisions of Table 4.

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表 4 波纹管的极限偏差 Table 4 Limit Deviation of Bellows

旋压成形机械胀形 Spinning forming mechanical bulging		液压成形聚氨酯成形 Hydraulic forming of polyurethane		波厚 Wave thickness t_c	波距 Wave distance q	简图 Diagram 
外径 External diameter D	内径 Internal diameter D_i	外径 External diameter D	内径 Internal diameter D_i			
JS16	JS18	JS18	JS16	JS18		

5.2.5 波纹管表面不应有裂纹、尖角折叠、剥层、夹杂、焊渣、氧化皮、锈斑、凹坑缺陷,也不应有深度大于壁厚
的压痕或深度大于壁厚下偏差的划痕。对于不大于壁厚下偏差的划痕,应予修磨。

There should be no cracks, sharp folds, peeling, inclusions, welding slag, oxide scale, rust spots, pits or defects on the surface of the corrugated pipe. There should also be no indentations deeper than the wall thickness or scratches deeper than the deviation below the wall thickness. For scratches that do not exceed the deviation below the wall thickness, they should be ground.

5.2.6 软管采用的波纹管允许由多段波纹管串接而成,此时波纹管之间允许有环焊缝。

The corrugated pipe used in the hose allows for multiple sections of corrugated pipe to be connected in series, with circumferential welds allowed between the corrugated pipes.

5.2.7 网套编织通常采用在波纹管外机器编织,也可采用手工编织或套网。

Mesh weaving is usually done by machine weaving outside the corrugated pipe, or by hand weaving or netting.

5.2.8 波纹管与波纹管、波纹管与接管、波纹管与网套、接管与网套连接环焊缝的焊接方法,可采用氩弧焊、等
离子焊或硬钎焊。

The welding methods for circumferential welds between corrugated pipes, corrugated pipes and connecting pipes, corrugated pipes and mesh sleeves, and connecting pipes and mesh sleeves can be argon arc welding, etc Ion welding or brazing.

5.2.9 焊缝同一部位的补焊次数不应超过 2 次。The number of repair welding for the same part of the weld should not exceed 2 times.

5.3 外观 Appearance

5.3.1 软管焊缝表面应成形均匀,不应有裂纹、气孔、弧坑、咬边和焊接飞溅。

The surface of the hose weld should be uniformly formed, without cracks, pores, arc pits, undercutting, and welding spatter.

5.3.2 软管接头的密封表面不应有裂纹、擦伤、毛刺和砂眼

The sealing surface of the hose joint should not have cracks, scratches, burrs, or sand holes

5.3.3 软管内外表面应清洁干燥,不应有锈蚀和多余物。

The inner and outer surfaces of the hose should be clean and dry, without rust or excess material.

5.3.4 钢丝网套或丝带网套的断(缺)丝总根数应符合表5的规定,且每股断(缺)丝数不应超过 1 根

The total number of broken (missing) wires in steel wire mesh or silk wire mesh should comply with the provisions of Table 5, and the number of broken (missing) wires per strand should not exceed one

表 5 钢丝或丝带网套的断(缺)丝总根数 The total number of broken (missing) wires in steel wire or ribbon mesh covers

单位为根数 The unit is the number of roots

公称尺寸 DN	网套长度<500 mm	网套长度≥500 mm
4~32	≤3	≤4
40~100	≤6	≤8
125~800	≤9	≤12

5.3.5 软管网套应与波纹管贴合,网套的表面应平整光滑且网花均匀,不允许折叠和扭曲。

The hose mesh cover should be attached to the corrugated pipe, and the surface of the mesh cover should be flat, smooth, and evenly patterned, without folding or twisting.

5.4 尺寸 Size

5.4.1 软管长度极限偏差应符合表 6 的规定。The maximum deviation of hose length shall comply with the provisions of Table 6.

表 6 长度极限偏差 Table 6 Length Limit Deviation

单位为毫米 Unit in millimeters

软管长度 L Hose length	长度极限偏差 ΔL Length limit deviation	软管长度 L Hose length	长度极限偏差 ΔL Length limit deviation
100~400	+20 0	>2 000~3 000	+70 0
>400~800	+30 0	>3 000~4 000	+80 0
>800~1 200	+45 0	>4 000~6 000	+90 0
>1 200~2 000	+60 0	>6 000	+1.5% L 0

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5.4.2 软管接口尺寸应符合图样及相关标准规定。The size of the hose interface should comply with the drawings and relevant standards.

5.5 焊缝无损检测 Non destructive testing of welds

5.5.1 B类软管的焊缝,一般不进行无损检测。The welds of Class B hoses are generally not subjected to non-destructive testing.

5.5.2 A类软管的管坯纵焊缝、接管纵焊缝以及波纹管与波纹管、波纹管与接管、波纹管与网套、接管与网套
连接环焊缝应按合同中规定的数量(或比例)进行无损检测,而对于连续自动焊管生产线的管坯纵焊缝,可在合同
中规定对焊接见证件(截取长度不短于 250 mm 的管坯)进行无损检测,其质量要求见表7。

The longitudinal welds of the pipe blank, the longitudinal welds of the connecting pipe, and the circumferential welds connecting the corrugated pipe and corrugated pipe, corrugated pipe and connecting pipe, corrugated pipe and mesh sleeve, and connecting pipe and mesh sleeve of Class A hoses shall be subjected to non-destructive testing in accordance with the quantity (or proportion) specified in the contract. For the longitudinal welds of the pipe blank in the continuous automatic welding pipe production line, non-destructive testing of the welding certificate (cutting pipe blanks with a length of not less than 250 mm) can be specified in the contract, and their quality requirements are shown in Table 7

5.5.3 A类软管除表7中序号3外的可检测环焊缝,应按合同中规定的数量(或比例)进行无损检测,型式试验的
试件应进行100%的无损检测,其质量要求见表7中序号4和序号5。

The detectable circumferential welds of Class A hoses, except for No. 3 in Table 7, shall be subjected to non-destructive testing in accordance with the quantity (or proportion) specified in the contract. The type test specimens shall undergo 100% non-destructive testing, and their quality requirements are shown in No. 4 and No. 5 in Table 7.

表 7 焊缝无损检测质量要求 Table 7 Quality Requirements for Non destructive Testing of Weld Seams

序号 Serial Number	分 类 Classification	质 量 要 求 Quality requirement
1	管坯纵焊缝 Longitudinal weld seam of pipe blank	射线检测质量应不低于 GB/T 3323 的Ⅱ级规定 The quality of radiographic testing should not be lower than the Level II requirements of GB/T 3323
2	接管纵焊缝 Take over the longitudinal weld seam	射线检测质量应不低于 JB/T 4730. 2 的Ⅱ级规定 The quality of radiographic testing should not be lower than the Level II requirements of JB/T 4730.2
3	波纹管与波纹管、波纹管与接管、波纹管与网套、接管与网套连接的环焊缝 Circular welds connecting corrugated pipes to corrugated pipes, corrugated pipes to connecting pipes, corrugated pipes to mesh sleeves, and connecting pipes to mesh sleeves	渗透检测质量应不低于 JB/T 4730. 5 的Ⅱ级规定 The quality of penetration testing should not be lower than the Level II requirements of JB/T 4730.5
4	除序号 3 外的对接环焊缝 Butt ring welds except for serial number 3	射线检测质量应不低于 JB/T 4730. 2 的Ⅲ级规定 The quality of radiographic testing should not be lower than the Level II requirements of JB/T 4730.2
5	除序号 3 外的非对接环焊缝 Non butt circumferential welds except for No. 3	渗透检测质量应不低于 JB/T 4730. 5 的Ⅱ级规定 The quality of penetration testing should not be lower than the Level II requirements of JB/T 4730.5

5.6 性能 Performance

5.6.1 耐压 Pressure resistance

软管耐压试验宜采用水压试验。对于符合表8规定的软管,在防护措施足以保障人身安全的条件下,允许
采用气压代替水压进行耐压试验,但不推荐使用气压试验。除用户合同规定外,型式试验软管的耐压试验不允
许使用气压试验。

The pressure test for hoses should be conducted using hydraulic pressure test. For hoses that meet the requirements of Table 8, under the condition that protective measures are sufficient to ensure personal safety, it is allowed to use air pressure instead of water pressure for pressure testing, but it is not recommended to use air pressure testing. Unless otherwise specified in the user contract, air pressure testing is not allowed for the pressure test of type test hoses.

表 8 允许以气压代替水压试验的软管 Table 8: Flexible hoses that allow air pressure to replace water pressure testing

公称尺寸 DN Nominal size	设计压力 P_s /MPa Design pressure
≤80	≤2.5
100~150	≤1.6
175~200	≤1.0
250~350	≤0.6

5.6.1.1 软管在1.5倍的设计压力 P_s 下进行水压试验,应无渗漏、无损伤、无异常变形。

The hose should undergo a hydrostatic test at 1.5 times the design pressure P_s , and there should be no leakage, damage, or abnormal deformation.

5.6.1.2 软管在1.15倍的设计压力 P_s 下进行水压试验,应无渗漏、无损伤、无异常变形。

The hose should undergo a hydrostatic test at 1.15 times the design pressure P_s , and there should be no leakage, damage, or abnormal deformation.

5.6.2 气密 Airtight

软管在设计压力 P_s 下进行气密试验,应无漏气。

The hose should undergo an air tightness test at the design pressure P_s and there should be no air leakage.

5.6.3 静态弯曲 Static bending

软管以静态弯曲半径 R_f 反复弯曲 10 次后,在设计压力 P_s 下进行气密试验,应无漏气、无损伤、无异常变形。

After repeatedly bending the hose with a static bending radius R_f for 10 times, an air tightness test should be conducted at the design pressure P_s , and there should be no air leakage, damage, or abnormal deformation.

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5.6.4 动态弯曲 Dynamic bending

软管最少动态弯曲次数见表9。软管在设计压力 P_s 下,以动态弯曲半径 R_d 弯曲表9规定的最少动态弯曲次数后,软管应无渗漏、无异常变形。

The minimum dynamic bending times of the hose are shown in Table 9. The hose is bent at the minimum dynamic bending radius R_d specified in Table 9 under the design pressure P_s . After multiple times, the hose should have no leakage or abnormal deformation.

表 9 软管最少弯曲次数和最小弯曲半径 Table 9 Minimum number of bends and minimum bending radius for hoses

公称 尺寸 Nominal size DN	最少弯曲次数/次 Minimum number of bends/time														最小弯曲半径/mm Minimum bend radius						
	设计压力 P_d /MPa Design pressure														静态 Static R_i	动态 Dynamic R_d					
	0.6	1.0	1.6	2.0	2.5	4.0	5.0	6.3	10.0	15.0	20.0	25.0	32.0	35.0							
4	50 000					15 000					8 000				35	80					
6															50	110					
8															65	145					
10															80	180					
(12)															95	215					
15						50 000					15 000					8 000				120	270
(18)																				145	325
20																				160	360
25																				175	400
32																				225	510
40	4 000																			280	640
50																				350	800
65																				390	845
80																				480	1 000
100																				600	1 200
125						4 000														750	1 500
150																				900	1 800
(175)																				1 000	2 000
200																				1 250	2 500
250																				1 500	3 000
300	2 000																			1 500	3 000
350																				1 750	3 500
400																				2 000	4 000
450																				2 250	4 500
500																				2 500	5 000
600						2 000														3 000	6 000
700																				3 500	7 000
800																				4 000	8 000

注：括号内的公称尺寸不推荐采用。 Note: The nominal size in parentheses is not recommended.

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5.6.5 爆破 Blast

软管最小爆破压力 P_b 应符合表 10 的规定。网套的爆破压力应按附录 B 进行校核。

The minimum burst pressure P_b of the hose shall comply with the provisions of Table 10. The blasting pressure of the mesh should be verified according to Appendix B.

表 10 软管最小爆破压力 Table 10 Minimum burst pressure of flexible hoses

公称 尺寸 Nominal size DN	最小爆破压力 P_b Minimum burst pressure													
	设计压力 P_s /MPa Design pressure													
	0.6	1.0	1.6	2.0	2.5	4.0	5.0	6.3	10.0	15.0	20.0	25.0	32.0	35.0
4														
6														
8														
10														
(12)	$P_b=4P_s$													
15														
(18)														
20														
25														
32														
40														
50														
65	$P_b=3P_s$													
80														
100														
125														
150														
(175)														
200														
250														
300														
350														
400														
450														
500														
600														
700														
800														

注：括号内的公称尺寸不推荐采用。 Note: The nominal size in parentheses is not recommended.

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6 检验方法 Testing method

6.1 外观 Appearance

用目视法和手感进行检查,结果应符合5.3的要求。
The inspection should be conducted using visual inspection and tactile sensation, and the results should meet the requirements of 5.3.

6.2 尺寸 Size

用精度符合尺寸偏差要求的量具进行检查,结果应符合5.4的要求。
Check with measuring tools that meet the accuracy requirements for dimensional deviation, and the results should meet the requirements of 5.4.

6.3 焊缝无损检测 Non destructive testing of welds

管坯纵焊缝的射线检测方法按GB/T 3323的规定,接管纵焊缝和软管对接环焊缝的射线检测方法按 JB/T 4730.2的规定,其他焊缝的渗透检测方法按JB/T 4730.5的规定,结果应符合 5.5的要求。

The radiographic testing method for longitudinal welds of pipe blanks shall comply with the provisions of GB/T 3323, the radiographic testing method for longitudinal welds of connecting pipes and circumferential welds of flexible hoses shall comply with the provisions of JB/T 4730.2, and the penetrant testing method for other welds shall comply with the provisions of JB/T 4730.5. The results shall meet the requirements of 5.5.

6.4 性能 Performance

6.4.1 耐压试验 Voltage withstand test

6.4.1.1 水压试验 Hydrostatic test

试验介质为氯离子含量不超过 25 mg/L的水。试验装置为加压泵、压力监测仪表。将试件平直放置,一端安装带有排气阀的堵头,另一端和泵出口连接。将水注入软管内,排尽空气,关闭排气阀,密封试件,然后缓慢加压至试验压力,至少保压5 min,试验压力下检查试件,结果应符合 5.6.1.1的要求。

The test medium is water with a chloride ion content not exceeding 25 mg/L. The experimental device consists of a pressure pump and a pressure monitoring instrument. Place the test piece flat, install a plug with an exhaust valve on one end, and connect the other end to the pump outlet. Inject water into the hose, exhaust the air, close the exhaust valve, seal the specimen, and then slowly pressurize to the test pressure for at least 5 minutes. Check the specimen under the test pressure, and the results should meet the requirements of 5.6.1.1.

6.4.1.2 气压试验 Pneumatic Test

试验介质为无毒、无腐蚀性、非可燃的干燥、洁净气体。试验水槽用水的氯离子含量不超过25 mg/L。试验装置为气泵(或气瓶组)、压力监测仪表、水槽。试件一端安装堵头,另一端与进气口相接,将试件浸没于水槽中,通入气体缓慢加压至试验压力,至少保压 10 min,试验压力下检查试件,结果应符合5.6.1.2的要求。

The test medium is a non-toxic, non corrosive, non flammable, dry, clean gas. The chloride ion content of the water used in the experimental water tank shall not exceed 25 mg/L. The experimental device consists of an air pump (or gas cylinder group), pressure monitoring instrument, and water tank. One end of the test piece is equipped with a plug, and the other end is connected to the air inlet. The test piece is immersed in a water tank, and gas is slowly pressurized to the test pressure for at least 10 minutes. The test piece is inspected under the test pressure, and the results should meet the requirements of 5.6.1.2.

6.4.2 气密试验 Air tightness test

气密试验应在耐压试验合格后进行,当耐压试验采用气压试验时,可不进行气密试验。试验介质为无毒、无腐蚀性、非可燃的干燥、洁净气体;试验水槽用水的氯离子含量不超过 25 mg/L。试验装置为气泵(或气瓶组)、压力监测仪表、水槽。试件一端安装堵头,另一端与进气口相接,将试件浸没于水槽中,通入气体缓慢加压至试验压力,至少保压 10 min,试验压力下检查试件,结果应符合5.6.2的要求。

The air tightness test should be conducted after the pressure resistance test is qualified. When the pressure resistance test adopts the air pressure test, the air tightness test may not be conducted. The test medium is a non-toxic, non corrosive, non flammable, dry, clean gas; The chloride ion content of the water used in the experimental water tank shall not exceed 25 mg/L. The experimental device consists of an air pump (or gas cylinder group), pressure monitoring instrument, and water tank. One end of the test piece is equipped with a plug, and the other end is connected to the air inlet. The test piece is immersed in a water tank and slowly pressurized with gas to the test pressure for at least 10 minutes. The test piece is inspected under the test pressure, and the results should meet the requirements of 5.6.2.

6.4.3 静态弯曲试验 Static bending test

气在软管不充压的情况下进行试验,试验装置为静态弯曲试验台。按图6安装试件,将试件一端刚性固定,另一端以5次/min~25 次/min 的频率,围绕并贴合定形圆柱体进行弯曲,软管由直线状态至弯曲状态,再恢复至直线状态为1次弯曲循环,弯曲角为90°,反复弯曲10次后,对试件按6.4.2的方法进行气密试验,结果应符合5.6.3的要求。

The test is conducted without pressurization of the hose, and the testing device is a static bending test bench. Install the test piece according to Figure 6, fix one end of the test piece rigidly, and bend the other end at a frequency of 5 times/min~25 times/min around and in contact with the shaped cylinder. The hose is bent from a straight state to a bent state, and then restored to a straight state as one bending cycle with a bending angle of 90°. After repeated bending for 10 times, the test piece is subjected to an airtight test according to the method in 6.4.2, and the results should meet the requirements of 5.6.3.

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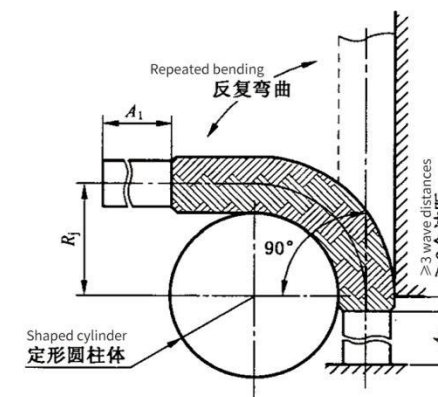


图 6 软管静态弯曲试验原理图 Figure 6 Schematic diagram of static bending test for hose

进行单项的静态弯曲试验时,试件最小长度 L_1 应按公式 (1) 进行计算,当软管的波纹管之间有环焊缝时,试件中应至少包含一个焊接段。

When conducting a single static bending test, the minimum length L of the specimen should be calculated according to formula (1). When there is a circumferential weld between the corrugated pipes of the hose, at least one welding section should be included in the specimen.

$$L_1 = 1.7R_j + A_1 + A_2 \dots\dots\dots(1)$$

式中 Where

L_1 ——静态弯曲试件最小长度,单位为毫米(mm);Minimum length of static bending specimen, in millimeters (mm);

R_j ——软管静态弯曲半径(见表9),单位为毫米(mm); Static bending radius of hose (see Table 9), in millimeters (mm);

A_1 、 A_2 ——试件的刚性段长度,单位为毫米(mm)The length of the rigid section of the specimen, measured in millimeters (mm)

6.4.4 动态弯曲试验 Dynamic bending test

公称尺寸 $DN < 100$ 的试件进行 U型弯曲试验,公称尺寸 $DN > 100$ 的试件进行摆动弯曲试验,结果应符合 5.6.4的要求。

The specimens with nominal size $DN < 100$ shall undergo U-shaped bending test, and the specimens with nominal size $DN > 100$ shall undergo swing bending test, and the results shall meet the requirements of 5.6.4.

6.4.4.1 U型弯曲试验 U-shaped bending test

试验介质为水或液压油。试验装置为U型弯曲试验台、加压泵、压力监测仪表。按图 7a)或图 7b)安装试件,启动加压泵,将水或液压油注入管内,排尽空气,关闭排气阀,密封试件,然后缓慢加压至设计压力 P_s ,启动弯曲试验台,以5次/min~30次/min 的频率往复运动,在试验过程中检查试件有无渗漏和异常变形;当达到表9规定的最少弯曲次数后,在设计压力 P ,下检查软管,结果应符合5.6.4的要求。

The test medium is water or hydraulic oil. The experimental device consists of a U-shaped bending test bench, a pressure pump, and a pressure monitoring instrument. Install the test piece according to Figure 7a) or Figure 7b), start the pressure pump, inject water or hydraulic oil into the pipe, exhaust the air, close the exhaust valve, seal the test piece, and then slowly increase the pressure to the design pressure P_s . Start the bending test bench and move back and forth at a frequency of 5 times/min~30 times/min to check for leakage and abnormal deformation of the test piece during the test process; After reaching the minimum number of bends specified in Table 9, the hose should be inspected at the design pressure P and the results should meet the requirements of 5.6.4.

U型弯曲试件长度 L_2 按公式(2)进行计算:

$$L_2 = 4R_d + A_1 + A_2 + S/2 \dots\dots\dots(2)$$

式中 Where

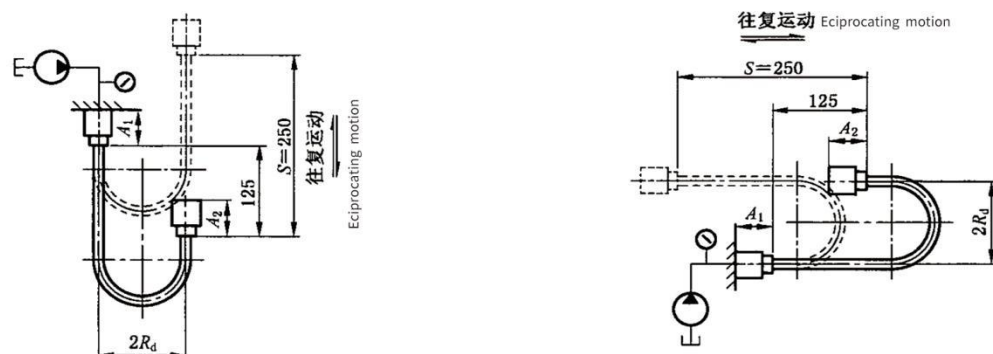
L_2 ——U型弯曲试件长度,单位为毫米(mm);The length of the U-shaped bending specimen is measured in millimeters (mm);

R_d ——软管动态弯曲半径(见表9),单位为毫米(mm); Dynamic bending radius of hose (see Table 9), in millimeters (mm);

S ——试验行程: 250 mm。Test stroke: 250 mm.

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a) 垂直位移安装方式 Vertical displacement installation method b) 水平位移安装方式 Horizontal displacement installation method

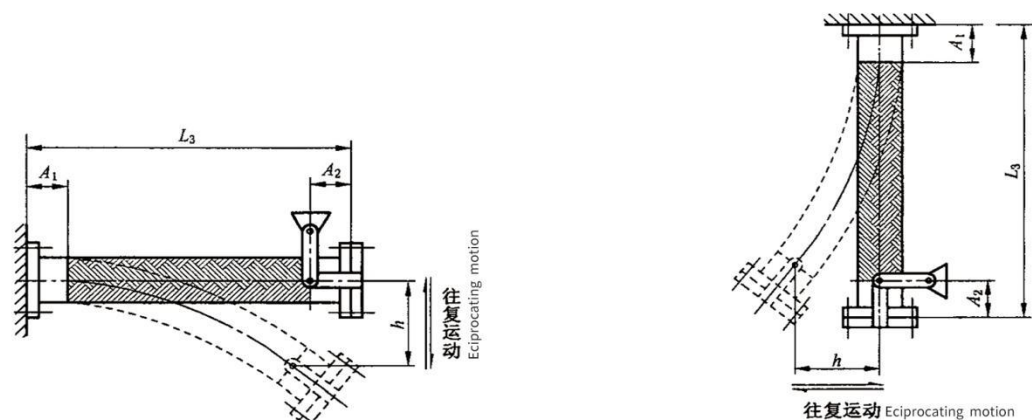
注：图 7b) 水平位移安装方式仅适用于 DN≤32 软管。 Note: Figure 7b) Horizontal displacement installation method is only applicable to hoses with DN ≤ 32.

图 7 软管U型弯曲试验原理图 Figure 7 Schematic diagram of U-shaped bending test for hose

6.4.4.2 摆动弯曲试验 Swing bending test

试验介质为水或液压油。试验装置为摆动弯曲试验台、加压泵、压力监测仪表。按图 8a)或图 8b)安装试件，启动加压泵，将水或液压油注入管内，排尽空气，关闭排气阀，密封试件，然后缓慢加压至设计压力 P_s ，启动摆动弯曲试验台，按表 11 规定的行程 h ，以 3 次/min~15 次/min 的频率往复运动，在试验过程中检查试件有无渗漏和异常变形；当达到表 9 规定的最少弯曲次数后，在设计压力 P_s 下检查软管，结果应符合 5.6.4 的要求。

The test medium is water or hydraulic oil. The experimental device consists of a swing bending test bench, a pressure pump, and a pressure monitoring instrument. Install the test piece according to Figure 8a) or Figure 8b), start the pressure pump, inject water or hydraulic oil into the pipe, exhaust the air, close the exhaust valve, seal the test piece, and then slowly increase the pressure to the design pressure P_s . Start the swing bending test bench and move it back and forth at a frequency of 3 times/min to 15 times/min according to the stroke h specified in Table 11. During the test process, check for leakage and abnormal deformation of the test piece; After reaching the minimum number of bends specified in Table 9, the hose should be inspected at the design pressure P_s and the results should meet the requirements of 5.6.4.



a) 垂直位移安装方式 Vertical displacement installation method b) 水平位移安装方式 Horizontal displacement installation method

图 8 软管摆动弯曲试验原理图 Schematic diagram of hose swing bending test

表 11 摆动弯曲试验行程 Table 11 Swing bending test stroke

单位为毫米 Unit in millimeters

公称尺寸 DN Nominal size DN	100	125	150	(175)	200	250	300	350	400	450	500	600	700	800
长度系数 k_1 Length coefficient k_1	6							3						
行程 h Journey h	45	50	55	65	65	70	80	45	50	55	60	65	70	75

摆动弯曲试件长度 L_3 按公式(3)进行计算:

Calculate the length L_3 of the swinging bending specimen according to formula (3):

$$L_3 = k_1 \times DN + A_1 + A_2 \quad \dots\dots\dots(3)$$

式中: In the formula:

L_3 ——摆动弯曲试件长度, 单位为毫米(mm); The length of the swinging bending specimen is measured in millimeters (mm);

k_1 ——长度系数 Length factor

6.4.5 爆破试验 Bursting test

试验介质为水或液压油。试验装置为加压泵、压力监测仪表。将试件平直放置,一端安装带有排气阀的堵头,另一端和泵出口连接。启动加压泵,将水或液压油注入试件内,排尽空气,关闭排气阀,密封试件,然后缓慢加压,直至试件渗漏或破坏并记录试件的损坏情况,结果应符合 5.6.5 的要求。若压力超过表 10 规定的最小爆破压力 P_b 时试件仍未爆破,允许不将试验持续至渗漏或破坏。

进行单件的爆破试验时,试件柔性段最小长度 L_4 应符合表 12 的规定,当软管的波纹管之间有环焊缝时,应至少包含一个焊接段。

The test medium is water or hydraulic oil. The experimental device consists of a pressure pump and a pressure monitoring instrument. Place the test piece flat, install a plug with an exhaust valve on one end, and connect the other end to the pump outlet. Start the pressure pump, inject water or hydraulic oil into the test piece, exhaust the air, close the exhaust valve, seal the test piece, and then slowly Apply pressure until the specimen leaks or is damaged, and record the damage condition of the specimen. The result should meet the requirements of 5.6.5. If the pressure exceeds the maximum explosive limit specified in Table 10.

When the pressure P_b is broken, the specimen has not yet exploded, and it is allowed not to continue the test until leakage or damage occurs. When conducting a single blasting test, the minimum length L_4 of the flexible section of the specimen should comply with the provisions of Table 12. When there is a circumferential weld between the corrugated pipes of the hose, it should be At least one welding section should be included.

表 12 爆破试件柔性段最小长度 Table 12 Minimum length of flexible section of blasting specimens

单位为毫米 Unit in millimeters

公称尺寸 DN Nominal size DN	4~32	40~100	125~200	250~350	400~600	600~800
爆破试件柔性段最小长度 L_4 Minimum length of flexible section of blasting specimen L_4	70	150	250	350	400	450

爆破试件最小长度 L_5 按公式(4)进行计算:

Calculate the minimum length L_5 of the blasting specimen according to formula (4):

$$L_5 = L_4 + A_1 + A_2 \quad \dots\dots\dots(4)$$

式中: In the formula:

L_4 ——试件柔性段最小长度,单位为毫米(mm); The minimum length of the flexible section of the specimen, measured in millimeters (mm);

k_1 ——爆破试件最小长度,单位为毫米(mm)。 Minimum length of blasting specimen, in millimeters (mm)

7 检验规则 Inspection rules

7.1 检验分类 Inspection classification

产品的检验分为出厂检验和型式试验,其检验项目按表 13 的规定。

The inspection of products is divided into factory inspection and type testing, and the inspection items are in accordance with the provisions of Table 13

表 13 检验项目 Table 13 Inspection Items

序号 Serial Number	检验项目 Inspection items	要求 Require	检验方法 Testing method	出厂检验 Delivery inspection	型式试验 Type test
1	外观 Appearance	5.3	6.1	○	○
2	尺寸 Size	5.4	6.2	○	○
3	焊缝无损检测 Non destructive testing of welds	5.5.3	6.3	○*	○
4	耐压试验 Voltage withstand test	5.6.1	6.4.1	○	○
5	气密试验 Air tightness test	5.6.2	6.4.2	○	○
6	静态弯曲试验 Static bending test	5.6.3	6.4.3	—	○
7	动态弯曲试验 Dynamic bending test	5.6.4	6.4.4	—	○
8	爆破试验 Blasting test	5.6.5	6.4.5	—	○

注:“○”表示进行该项检验。 Note: “○” indicates that the inspection will be conducted.

由合同确定是否进行该项检验。 The contract shall determine whether to conduct this inspection.

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- 7.2 出厂检验 Delivery inspection
- 7.2.1 每根软管均应进行出厂检验，合格后方可出厂。
Each hose should undergo factory inspection and can only be shipped after passing the inspection
- 7.2.2 出厂检验时，若发现不合格项目，允许进行返修，次数不超过两次。
During the factory inspection, if any non-conforming items are found, they are allowed to be repaired no more than twice.
- 7.3 型式试验 Type test
- 7.3.1 检验时机 Testing timing
- 在下列情况之一时，应进行型式试验:
- a) 新产品定型鉴定时;

b) 正式生产后，如结构、材料、工艺有较大改变，可能影响产品性能时;

c) 正常生产每满4年时;

d) 产品停产超过1年，再恢复生产时;

e) 国家质量监督机构提出进行型式试验的要求时。
- Type tests should be conducted in any of the following situations:
- a) During the formal identification of new products;

b) After formal production, if there are significant changes in structure, materials, or processes that may affect product performance;

c) Every 4 years of normal production;

d) When the product has been discontinued for more than one year and production is resumed;

e) When the national quality supervision agency requests type testing.
- 7.3.2 抽样与判定 Sampling and Judgment
- 7.3.2.1 进行型式试验的试件，应从出厂检验合格的软管中任选一种规格随机抽取，其数量为3根。
根据合同规定，也可增加试件数量，
The test specimens for type testing should be randomly selected from three hoses of any specification that have passed the factory inspection. According to the contract, the number of specimens can also be increased,
- 7.3.2.2 型式试验的顺序按表14的规定。 The sequence of type tests shall be in accordance with the provisions of Table 14

表 14 型式试验顺序表 Table 14 Type Test Sequence Table

试件编号 Test piece number	出厂检验 Delivery inspection	静态弯曲试验 Static bending test	动态弯曲试验 Dynamic bending test	爆破试验 bursting test
1	○	○	—	○
2	○	—	○	—
3	○	—	○	—
注 1: “○”表示进行该项试验。 Note 1: "○" indicates conducting the experiment 注 2: 公称尺寸DN>100的软管，允许将试件2和3按试件1进行静态弯曲和爆破试验 Note 2: For hoses with nominal size DN>100, it is allowed to conduct static bending and bursting tests on specimens 2 and 3 according to specimen 1				

- 7.3.2.3 型式试验中若有任一项不合格时，可判该次型式试验不合格，亦可加倍抽样，对不合格项进行复检，若复检结果仍有任一项不合格时，则判该次型式试验不合格。
If any item in the type test fails, the type test can be judged as unqualified, and double sampling can be carried out to retest the unqualified item. If any item still fails in the retest result, the type test is judged as unqualified.
- 7.3.2.4 经过型式试验的软管不得再作为合格产品出厂。
Hoses that have undergone type testing shall no longer be shipped as qualified products.
- 8 标志、包装、运输和贮存 Marking, packaging, transportation, and storage
- 8.1 标志 Sign
- 8.1.1 每根软管均应标明产品型号、商标、制造厂名和制造日期(或批号)。
Each hose should be labeled with the product model, trademark, manufacturer name, and manufacturing date (or batch number).
- 8.1.2 软管若采用包装箱包装时，产品的包装、贮存标志应符合GB/T191的规定，且至少应包括下列各项:
If the hose is packaged in a box, the packaging and storage markings of the product should comply with the provisions of GB/T191 and should include at least the following items:
- a) 制造厂名; Manufacturer name;

b) 产品名称; Product name;

c) 商标; Trademark;

d) 产品型号; Product model;

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- e) 制造日期; Manufacturing date;
- f) 产品执行的标准号。 The standard number for product execution.
- 8.2 包装 Package
- 8.2.1 软管两端应有防尘包装，产品可裸装或木箱包装，但应满足软管最小静态弯曲半径要求。
Both ends of the hose should have dust-proof packaging. The product can be packed naked or in wooden boxes, but it should meet the minimum static bending radius requirement of the hose.
- 8.2.2 包装箱内应有装箱单和备件清单(若需提供备件时)。
There should be a packing list and spare parts list inside the packaging box (if spare parts are required).
- 8.3 运输 Transport
- 软管在运输过程中应避免碰撞并防止雨雪直接侵袭。
During transportation, hoses should avoid collisions and prevent direct invasion by rain and snow.
- 8.4 贮存 Keep in storage
- 软管宜贮存在洁净、干燥和无腐蚀性气体的库房内。
Hoses should be stored in a clean, dry, and non corrosive gas warehouse

金属软管腐蚀表
MetalHoseAnti-corrosionList

Mediu 介质	SUS304 材料 Material	SUS316L 材料 Material	Mediu 介质	SUS304 材料 Material	SUS316L 材料 Material
丙酮Acetone	●	●	氢氧化钾 {10%-70%} Potassiumhydroxide	▲	▲
乙炔Acetylene	●	●	氢氧化钾 {50%} {沸} Potassiumhydroxide	▲	▲
二氧化碳 {湿} Carbondioxide(wet)	×	▲	氢氧化钡 {10%-70%} Bariumhydroxide	▲	●
二氧化硫 {干} Sulphurdioxide(dry)	×	×	氢氧化钡 {≤10%} Bariumhydroxide	▲	●
酒精Alcohol	●	●	溴Bromine	×	×
甲醇Methanol	●	●	焦油Tar	●	●
氨水Liquidammonia(cold)	●	●	氯化钡Bariumchloride	×	×
氨气Liquidammonia(hot)	●	●	碳酸Carbonicacid	●	●
硫磺 {干} Sulphur(dry)	●	●	碳酸钠SodiumCarbonate	●	●
硫磺 {湿} Sulphur(wet)	×	●	氮气Notrogen	●	●
硫磺 {溶液} Sulphur(solution)	×	×	三氯乙烯 {干} Trichloroethylene	●	●
硫磺 {喷雾} Sulphur(spray)	×	×	三氯乙烯 {干} Trichloroethylene	×	×
甘醇Ethyleneglycol	●	●	石脑油Solventnaphtha	●	●
乙醚Ether	●	●	苯Benzene	●	●
氯化铝Aluminumchloride	×	×	硫化氢 {干} Hydrogensulfide	●	●
氯化亚铁Iron(II)chloride	×	×	硫化氢 {湿} Hydrogensulfide	▲	▲
氯化镁Magnesiumchloride	×	×	硫酸铵 {1%} Ammoniumsulfate	×	▲
氯气 {干} Chlorine(dry)	×	▲	硫酸铵 {5%} Ammoniumsulfate	×	▲
氯气 {湿} Chlorine(wet)	×	×	硫酸钙Calciumsulfate	●	●
过氧化氢 {常温} Hydrogenperoxide	●	●	硫酸铜Coppersulfate	▲	▲
过氧化氢 {沸} Hydrogenperoxide	▲	●	硫酸钠 {5%} Sodiumsulfate	▲	▲
海水Seawater	×	×	浓硫酸钠Sodiumsulfate	●	●
汽油Gasoline	●	●	硫酸钡Bariumsulfate	▲	▲
丙三醇Glycerin	●	●	磷酸 {≤5%} Phosphoricacid	●	●
原油Crudeoil	●	●	磷酸 {5%-25%} Phosphoricacid	×	▲
醋酸乙烯Vinylacetate	●	●	磷酸 {25%-50%} Phosphoricacid	×	×
氧气Oxygen	●	●	盐酸 {<5%} Hydrochloricacid	×	×
四氯化碳Carbontetrachloride	●	●	盐酸 {>5%} Hydrochloricacid	×	×
四氯化碳+水Carbontetrachloride+water	×	×	硝酸 {<50%} Nitricacid	●	●
蒸汽Steam	●	●	硝酸 {65%} {常温} Nitricacid	●	●
甲酸Formicacid	▲	●	硝酸 {≥50%} {沸} Nitricacid	▲	▲
燃烧油Firedoil	●	●	浓硝酸 {常温} Nitricacid	▲	▲
乳酸Lacticacid	●	●	浓硝酸 {沸} Nitricacid	×	×
水银Mercury	●	●	硫酸 {95%-100%} Sulfuric acid	●	●

●好good ▲一般average ×差poor

金属软管腐蚀表
MetalHoseAnti-corrosionList

Mediu 介质	SUS304 材料 Material	SUS316L 材料 Material	Mediu 介质	SUS304 材料 Material	SUS316L 材料 Material
氢氧化钾 {≤10%} Potassiumhydroxide	●	●	硫酸 {75%-95%} Sulfuricacid	▲	▲
硫酸 {<75%} Sulfuricacid	×	×	丙烷Propane	●	●
无水硫酸 {常温} Absolutesulfuricacid	●	●	树脂Resin	●	●
无水硫酸 {高温} Absolutesulfuricacid	●	●	硝酸银Silvernitrate	●	●
甲烷 {冷冻液} Methane	●	●	氯化钠Sodiumchloride	●	●
醋酸 {常温} Aceticacid	●	●	氢氧化钠Sodiumhydroxide	●	●
醋酸 {高温} Aceticacid	×	×	淀粉水溶液Starchaqueoussolution	●	●
碱性苏打 {<10%} Basicsoda	●	●	清漆Varnish	●	●
碱性苏打 {10%-50%} Basicsoda	●	●	蔬菜汁Vegetablejuice	●	●
碱性苏打 {沸} Basicsoda	×	×	葡萄酒Wine	●	●
沥青Asphalt	●	●	酵母Yeast	●	●
丁烷Butane	●	●	饮用水Drinkingwater	●	●
丁酸Butaneacid	●	●	醋Vinegar	●	●
二氧化碳 {干} Carbondioxide	●	●	氯化锌Zincsulfate	●	●
二氧化碳 {湿} Carbondioxide	●	●	硝酸锌Zincsulfate	●	●
二硫化碳Carbondisulphide	●	●	硫酸锌Zincsulfate	●	●
硫化钾Potassiumsulfide	●	●	酸盐混合物Mixtureofacidandsalt	●	●
氯化钾Potassiumchloride	×	×	氢氧化铝Aluminumhydroxide	●	●
氯仿Chloroform	●	●	硫酸铝 {常温} Aluminumsulfate	●	●
柠檬酸Lemonacid	●	●	硫酸铝 {沸} Aluminumsulfate	▲	●
氯乙烯Vinylchloride	●	●	硫酸铝钾 {常温} Aluminumsulfate	●	●
氟Fluorine	×	×	硫酸铝钾 {沸} Aluminumsulfate	▲	●
硅酸Silicaacid	×	×	溴化铵Aluminumbromide	▲	●
甲醛Formaldehyde	●	●	碳酸铵Aluminumcarbonate	●	●
芥子油Mustardoil	●	●	碳酸氢铵Aluminumbcarbonate	▲	●
植物油Vegetableoil	●	●	氯化铵Aluminumchloride	●	●
草酸 {常温} Oxalicacid	●	●	草酸铵Aluminumoxalate	●	●
草酸 {沸} Oxalicacid	×	×	苯胺Aniline	●	●
热石蜡Hotparaffin	●	●	苯甲酸Benzophenoneacid	●	●
苯酚Carbolicacid	●	●	碳酸钙Calciumcarbonate	●	●

●好good ▲一般average ×差poor

补偿器系列

Compensator Series



轴向型补偿器

Axial type compensator



圆截面非金属补偿器

Round section nonmetal compensator



旁通式补偿器

Other general formula compensators



铰链式补偿器

Hinge type compensator



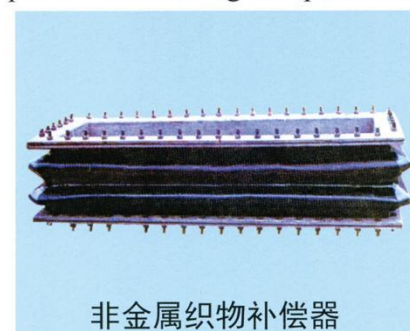
复式拉杆型补偿器

Multiple drag compensator



曲管压力平衡式补偿器

The song is in charge of the pressure balancing compensator



非金属织物补偿器

Nonmetal fabric compensator



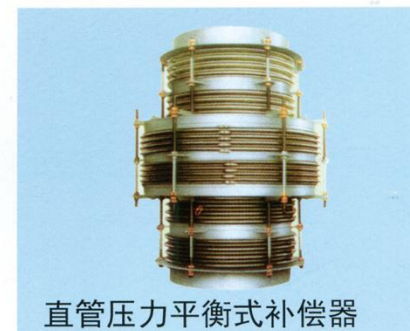
弯管压力平衡式补偿器

Pressure balancing type compensator of return bend



单式铰链型补偿器

Single hinge compensator



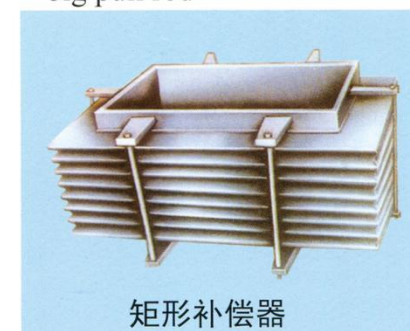
直管压力平衡式补偿器

In charge of the pressure balancing compensator directly



大拉杆横向型补偿器

Horizontal compensator of big pull rod



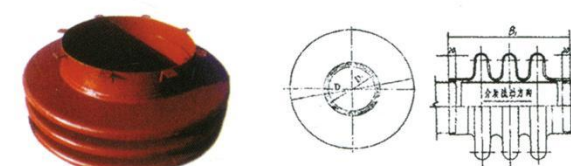
矩形补偿器

Rectangle compensator

补偿器系列

Compensator Series

烟风煤粉管道圆形波纹补偿器

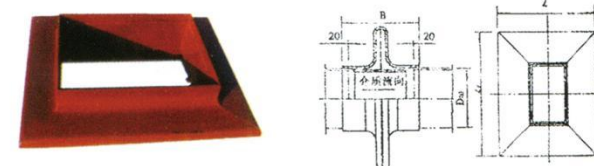


位移方向：轴向（少量横向、角向）

工作压力：真空 $\sim$ 0.25MPa

规格有：DN200 $\sim$ DN3600 圆形单波、双波和三波补偿器 23 种；DN400 $\sim$ DN1400 圆形单波密封式补偿器 12 种。该补偿器具有补偿量大、刚度小、便于安装使用和寿命长等特点，可根据用户要求选用不锈钢或碳钢制造 U 型或 V 型波接管，内衬筒，法兰一般选用碳钢。

烟风煤粉管道矩形波纹补偿器



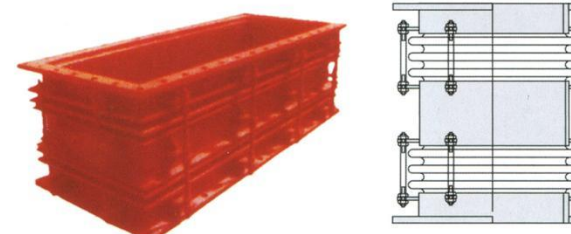
位移方向：轴向（少量横向、角向）

工作压力：真空 $\sim$ 0.25MPa

规格有：300 $\times$ 400 $\sim$ 6000 $\times$ 5000 矩形单波、双波和三波补偿器 98 种。

该补偿器具有补偿量大、刚度小、便于安装使用和寿命长等特点，可根据用户要求选用不锈钢或碳钢制造 U 型或 V 型波接管，内衬筒，法兰一般选用碳钢。

复式矩形波纹补偿器 (型号：JXB)



位移方向：横向、轴向

工作压力：真空 $\sim$ 0.1MPa

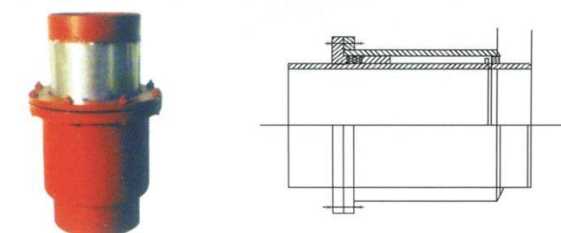
公称通径：任意尺寸

波形：CE 波、V 形波、UV 形波

材料：考顿钢（CE 波）、不锈钢、碳钢等

角部：圆角、斜角、像机角

套筒补偿器 (带止退环) (型号：HTTB)



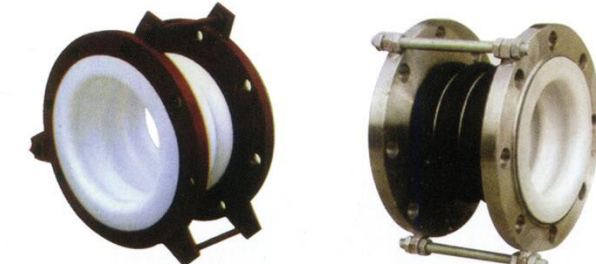
位移方向：轴向及轴向旋转

工作压力：0.25 $\sim$ 2.5 (MPa)

公称通径：DN100 $\sim$ 1000

该补偿器适用输送无腐蚀的流体，用于管道的轴向补偿和任意角度的轴向旋转。并装有止退环，可保证拉至极限时不被拉开，适用温度 -40°C $\sim$ 150°C 。

衬四氟补偿器



纯四氟补偿器

橡胶套四氟补偿器



外编网四氟补偿器



波纹管衬四氟补偿器

橡胶软接头衬四氟补偿器