



管状带式输送机

PIPE CONVEYOR

上海办事处
地址：上海市中山北1路1250号1号楼1502室
电话：021-65425835
传真：021-65425835
邮编：200437

SHANGHAI OFFICE
Address: H Room,7Th Floor,Yonghua Buiding,No. 138 Pudong Road,Pudong New District, Shanghai,China
Tel: 0086-21-65425835
Fax: 0086-21-65425835
P.C: 200120

北京办事处
地址：北京市朝阳区朝阳门外大街20号联合大厦0907
电话：010-65883109
传真：010-65883109
邮编：100050

BEIJING OFFICE
Address: Room 0907, Building 20 of Union Mansion , Chaoyang Men Wai Avenue, Chaoyang District Beijing,China
Tel: 0086-10-65883109
Fax: 0086-10-65883109
P.C 100055

郑州办事处：
地址：郑州市中原区万达广场
电话：0371-55613331
传真：0371-55613331
邮编：450000

ZHENGZHOU OFFICE
Address: Room 1745 , Building A of Wanda Plaza , Zhongyuan Road , Zhengzhou City , Henan, China
Tel: 0086-371-55613331
Fax: 0086-371-55613331
P.C: 450000

焦作科瑞森重装股份有限公司
Jiaozuo Creation Heavy Industry Co.,Ltd

地址：河南省焦作新区神州路2878号
电话：0391-3683666 3683678
传真：0391-3683672
邮编：454000
邮箱：jzcreation@126.com

Address: NO.2878 Shenzhou Road,Jiaozuo,Henan,China
Tel: 0086-391-3683666 3683678
Fax: 0086-391-3683672
P.C: 454000
Email: jzcreation@126.com



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www.jzcreation.com



企业简介 Introduction

焦作科瑞森重装股份有限公司是一家专业的散状物料输送系统的全球服务商。数十年市场搏击，科瑞森已发展成为散料输送行业的领先企业。公司拥有国际领先的全自动化滚筒及托辊生产线，先进的制造技术、优良的生产设备、精密的检测仪器。产品加工精度高，质量稳定，可实现连续、高效的专业生产。公司相继取得了ISO9001-2000、ISO14001、OHSAS18001 认证、通过了进入欧盟市场的 CE 、EN1090 认证、产品被广泛应用于矿山、港口、电力、冶金、煤炭、水利、建材等领域，产品远销海内外。

Jiaozuo Creation, a global EPC contractor for bulk handling system and service, a leader in bulk handling industry after decades development. We have idler and pulley auto manufacturing line, advanced manufacturing technology, updated fabrication equipment and precision testing instrument which ensure high-quality product, Stable quality, continuous high effect and quality manufacturing; Jiaozuo Creation has got certificates including ISO9001, ISO14001, OHSAS 18001, CE, EN 1090 etc. Our bulk handling system are used widely in mining, port, power plant, metallurgy, coal, Building and other fields in domestic and abroad.

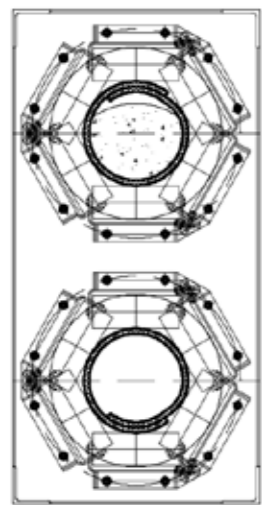
管状带式输送机简介

Pipe Conveyor Description

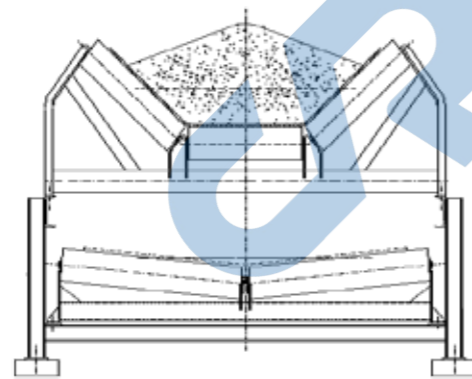
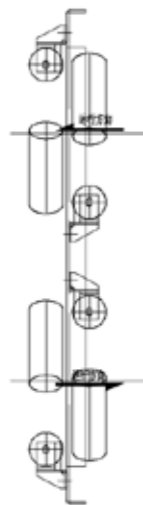
管状带式输送机是将散状物料包裹在强制形成管状胶带内进行输送的一类特殊的带式输送机，这种物料输送设备的设想最初是由德国科赫公司提出的全新物料搬运技术。其输送原理与普通带式输送机相同，即通过输送胶带作为传力和物料的输送载体，由转动灵活的托辊作为输送物料胶带的支撑，经滚筒的改向和传动，由驱动装置驱动滚筒，输送机胶带靠滚筒与胶带的摩擦力使送物料的胶带进行周圈转动，进而来输送物料。

所不同的是，普通带式输送机物料在形成平形或槽形截面的胶带上进行输送，而管状带式输送机使物料在形成管状截面的胶带内进行输送。（见下图）

Pipe conveyor is a special kind of belt conveyor that conveys bulk material in a tubular belt which was firstly proposed by KOCH GmbH. Materials are conveyed on the belt supported by rollers which is the same with ordinary belt conveyors. The friction between pulleys and belt makes the belt move in circle to convey materials. While the difference lies in the way they convey materials, the ordinary ones convey materials on a plane-section or a trough-section, while pipe conveyors convey materials on a tubular belt. (See figure below)



管状皮带机剖面图
Cross-section of Pipe Conveyor



普通皮带机剖面图
Cross-section of Ordinary Conveyor



目前我公司已经拥有了一大批专业从事管带机技术研发、设计、安装调试及售后服务的专业化技术队伍。通过引进技术消化吸收，在大量工程经验的基础上进行技术转化、创新。目前我公司管带机技术已达到国际同行业先进水平，先后出色的完成了如山西东山石灰石、洛阳铝业、姚孟水泥等世界级管带机项目。

Jiaozuo Creation has a professional engineering team engaged in the research & development, design, installation & commissioning and aftersale service. Based on plentiful experience, we transfer the introduced technology and bring forth new ideas. Currently, we have reached the advanced level of the world, finishing a lot of projects such as Shanxi Dongshan Limestone Mine, China Molybdenum Group, Yaomeng cement plant, etc.

管状带式输送机的基本结构与普通带式输送机基本相同，主要由头部滚筒、尾部滚筒、改向滚筒、驱动和张紧装置、托辊组、机架、桁架、走台、支架及胶带等部分组成。所不同的是管带形成段的胶带被六边形布置的托辊组约束形成圆管状。

The structure of pipe conveyor is as the same as ordinary conveyor, formed by head pulley, tail pulley, bend pulley, drive unit, take-up device, rollers, frame, and truss, walking way, trestle, belt etc. One is different: rollers which constitute a hexagon wrap the belt into a circular tube.

基本结构 Basic Structure

一条管状带式输送机一般由尾部过渡段、圆管成型段和头部过渡段三大部分组成。

Generally, a pipe conveyor is comprised of tail transition section, circular tube formation section and head transition section.

圆管成形段 Circular tube Formation Section

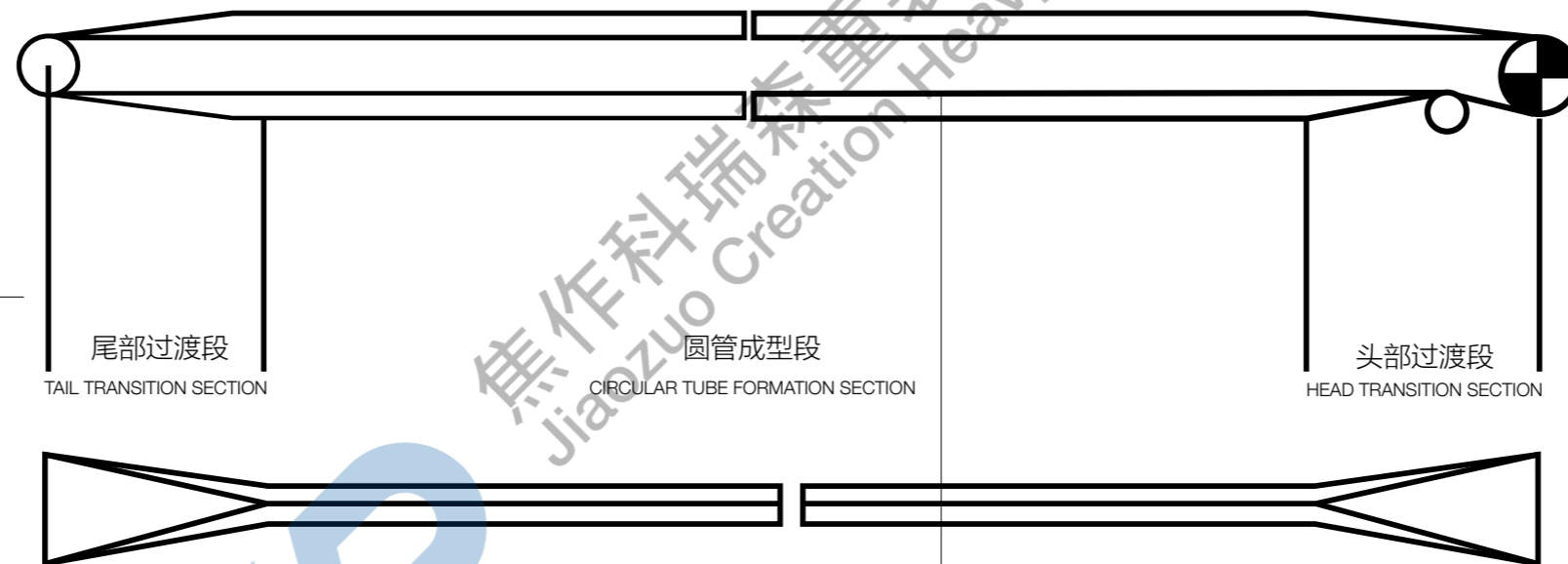
在圆管成形段，胶带被呈六边形布置的托辊组约束形成圆管状，输送的物料在圆管内随胶带稳定运行。

In the circular tube formation section, belt is wrapped into a circular tube by rollers which constitute a hexagon.

头部过渡段 Head Transition Section

在头部过渡段，胶带由圆管形逐步过渡为槽形并在头部滚筒处自然形成平形。

In the head transition section, tubular belt starts getting trough form and then gets flat naturally at head-end pulley.



尾部过渡段 Tail Transition Section

从尾部滚筒至胶带形成圆管状的区段称为尾部过渡段。受料口一般设在这段范围内。在该过渡段内，胶带由平形逐步形成槽形，最后卷成圆管状。

Sector from tail pulley to the section of belt is wrapped into circular tube is called tail transition section. Usually, feeding position is at this section. And the belt gets trough gradually and then gets tubular.



在返回侧也是如此 The Same In Return Section

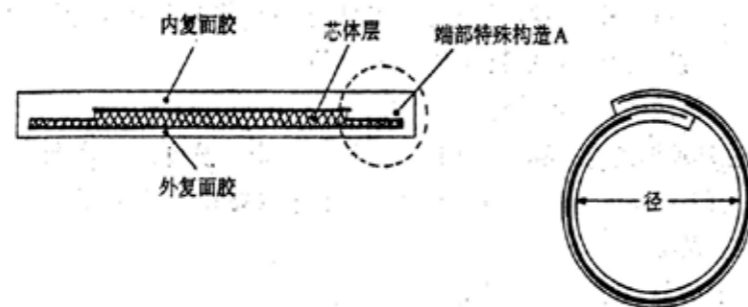
胶带是以展开受料、封闭输送、再展开卸料。依次循环而平稳地运行。

The belt gets fed horizontally, conveys materials enclosed, and unloads them horizontally.

胶带 Belt

与普通带式输送机相同，管状带式输送机使用的胶带主要也分为两类：聚脂棉帆布（EP）胶带和钢绳芯（ST）胶带。但两类带式输送机胶带的芯层结构及胶料配方等存在着很大的差别。

The same with ordinary belt conveyor, the belt of a pipe conveyor can be divided into two kinds: EP and ST belt. However, the core structure and rubber formulations of the two kinds of belt are greatly differently.

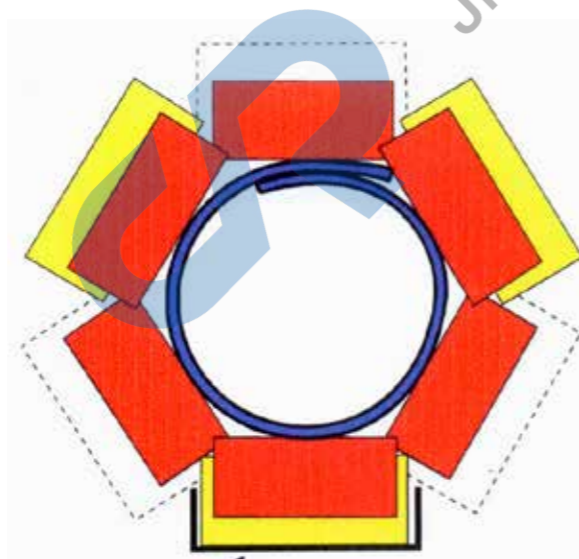


搭接处应考虑适当的重合面，根据设计标准推荐：搭接的累计宽度宜为管径的 1/3-1/2。管状带式输送机胶带应采用硫化接头，接头质量要求较高。

Lapjoint should allow for the coincidence face. According to the design standard, we have the following suggestion: It would be better if the accumulated width of lapping is 1/3-1/2 of the pipe diameter. The belt should adopt high quality vulcanized joint.

管带机能否长期稳定运行，在胶带胶料配方和芯层结构设计上除了考虑其柔性、横向刚性、抗疲劳、耐磨损、抗臭氧及耐寒耐热等指标外，更为重要的指标是在疲劳及温度变化时横向刚性的稳定保持性。即在上述条件下，不能出现如爆管和严重塌陷等现象。这正是管带机胶带区别与普通带式输送机胶带的重要指标。

In order to ensure the steady operation of pipe conveyor, the design of rubber formulations and core layer structure should be considered such as flexibility, lateral stiffness, anti-fatigue, wear resistance, ozone resistance, cold resistance and heat resistance etc. And the most important is the stability of lateral stiffness at fatigue state or temperature variation, namely, no pipe explosion and sever collapse etc. should ever happen. And this is an important index that makes the belt of pipe conveyors different from trough conveyor.



托辊 Roller



管状带式输送机托辊组由两大类组成：槽形过渡托辊组和六边形托辊组。槽形过渡托辊组用于头尾部过渡段，结构和布置间距与普通带式输送机相同。

六边形托辊组的布置间距随圆管直径的增大而增加（见表）在确定间距时，还应考虑到输送物料的松散密度、转弯半径和弧段类型等因素。

辊子的结构与普通带式输送机托辊大体相同，但防水性能和转动阻力系数要求更高。辊子直径和长度根据管径和带速确定槽形过渡托辊组的槽角主要有：10°、20°、30°、45°和60°等。

Rollers of pipe conveyor are composed of trough transition rollers and hexagon rollers. Trough transition rollers are used at the transition section of tail and head. And the structure and interval is the same with that of trough belt conveyor.

The arrangement interval of hexagon rollers increases with the increasing of pipe diameter(see detail in table). When decides the interval, factors such as the density of materials, turning radius, and type of special section etc which should be taken into account.

The structure of roller is almost the same with that of ordinary conveyor, but it requires the waterproof and rotational resistance coefficient to be better. Trough angles of trough transition rollers are mainly as follows: 10, 20°, 30°, 45°and 60°etc.

管径 Dia (mm)	内径 Inner Dia (mm)	标准间距 Spacing (m)	辊子直径 Roller Dia (mm)
100	100. 2	1. 0	48. 6
150	150. 7	1. 5	60. 5
200	199. 1	1. 6	60. 5
250	263. 5	1. 7	89. 1
300	285. 2	1. 8	89. 1
350	334. 3	1. 9	89. 1
400	426. 5	2. 0	114. 3
500	509. 5	2. 2	114. 3
600	603. 5	2. 4	139. 8
700	690. 6	2. 5	139. 8
850	-	2. 7	164. 2

张紧装置和清扫装置

Take-up Device and Cleaning Device

管状带式输送机的张紧装置和清扫装置与普通带式输送机相同，可以选用 DTII 型固定带式输送机标准部件。

The take-up device and cleaning device are the same with ordinary conveyor, and standardized components of DTII belt conveyor.

张紧装置的形式根据布置需要也同样分为垂直重锤张紧、螺旋张紧和车式张紧等三种。由于管状胶带牵引和张紧比较困难，因此管状带式输送机的张紧装置行程比普通带式输送机大一些。

According to the arranging requirements, the take-up device can be divided into vertical counter tensioning device, screw tensioning device and trolley tensioning device. Since the haulage and tensioning of pipe conveyor belt is harder than ordinary one, the route of tensioning device is farther than ordinary conveyor.

驱动装置 Driving Device



管状带式输送机的驱动装置与普通带式输送机的相同，可以选用 DTII 型固定带式输送机标准部件。通常采用单滚筒驱动，当输送距离很长时，可采用多滚筒驱动方式。

The driving device is the same with ordinary conveyor, and standardized components of DTII belt conveyor. Usually a single pulley is on pipe conveyor. When the conveying distance is long, multiple driving pulleys can be used. Usually the conveyor is drove by a single pulley. When the conveying distance is long, multiple driving pulleys can be adopted.

过渡段 Transition Section



过渡段的长度主要是由胶带的伸长率和横向刚性决定的。在过渡段上胶带由平形变成圆形。此时胶带的边缘将被拉伸，并由此产生附加拉应力。如果过渡段的长度太短，则其边缘将产生很大的附加应力，使胶带边缘过早地出现疲劳现象。严重者则使胶带边缘拉裂；局部托辊损坏严重。过渡段很长，又将缩短整个线路的圆管形成段的长度，同时也增加了钢结构工程量。一般过渡段长度主要由胶带类型、强度、刚度、受料点数量及外界自然条件等因素确定。

The length of transition section is determined by the elongation and lateral stiffness of belt. In this section, belt changes from flat to circular tube. And the belt's edges will be stretched and the subsidiary stress coming. If the transition section is too short, larger subsidiary stress makes the belt fatigued early, even be ripped, and damages rollers. If the transition section is too long, it will shorten the length of circular section and increase the work amount of steel structure. Generally, the length of transition section is determined by the type of belt, intensity, stiffness, the number of feeding entry, natural conditions etc.

支撑形式 Supporting Structure

钢结构桁架的形式根据需要也可分为矩形框架、三角形管结构框架及异形框架等多种形式。

The type of truss includes rectangle frames, triangle frames, tubular structure frames and special-shaped frames etc.



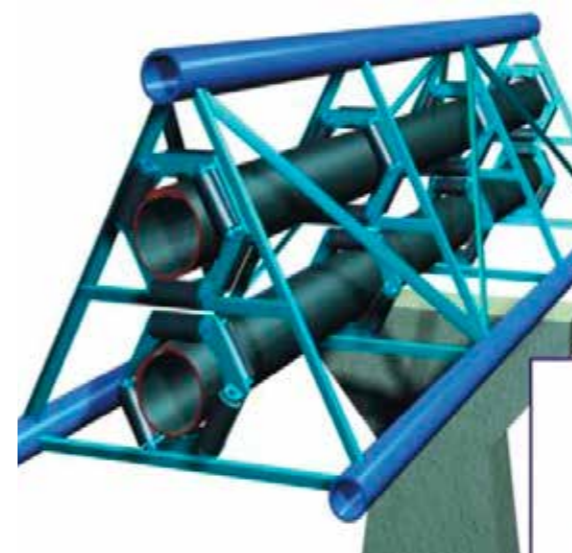
柱形框架 Cylindrical Frame



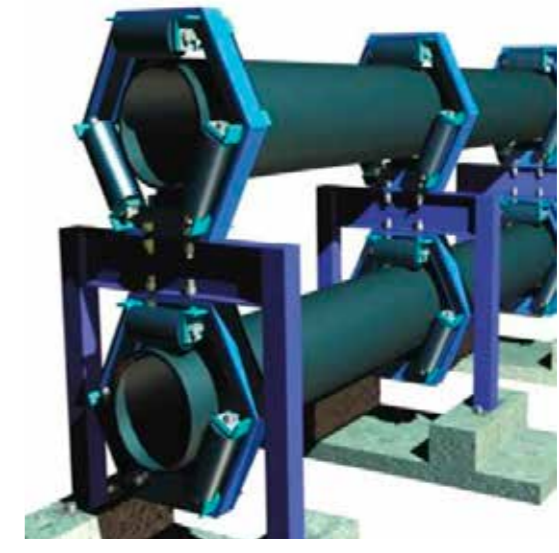
矩形框架 Rectangle Frame

管状带输机的桁架结构全部根据现场情况设计，与普通带式输送机的标准中间架和支腿的支承结构形式不同。由于管状带式输送机较普通式输送机更能适应地形，因此可采用沿地平线和架空等多种布置形式。

Truss structure of pipe conveyor is designed according to site conditions, different from the supporting structure of standardized frame and trestle of belt conveyor. Compared with belt conveyors, pipe conveyors suits the various terrain better, the pipe conveyor can be arranged both horizontally and in the space.



三角形框架 Triangle Frame



矩形框异形 Special-Shaped Frame

性能特点 Features

管状带式输送机除有普通带式输送机的性能特点外，还有自己更为突出的特点。

In addition to the features of belt conveyor, pipe conveyor also has its own characteristic.



1、密闭输送物料

由于物料被围包在管状胶带内运行，因此，物料不会散落及飞扬，也不会因刮风、下雨等受外界自然环境的影响。可减少物料在运输途中的损耗；尤其在输送灰渣、矿石等物料时，可明显减少物料对环境的污染。

2、输送线可沿空间曲线布置

由于胶带形成管状，当它运行时，每处胶带都是可绕曲的。对于聚脂棉帆布胶带，其水平面和垂直面内的最小曲率半径可达到管径的300倍。

3、输送线可沿地形曲线布置。特别是山区和地形条件比较复杂的地区

1. Enclosed conveying materials

Since materials are conveyed in tubular belt, it stops materials from spillage and keeps them from the exterior environment (wind, rain, snow, ice, etc.) which reduces loss of materials during conveying. When materials (such as lime-ash, minerals) are conveyed, the contamination to environment will be decreased greatly.

2. Conveying route can be arranged with curves in space since the belt is tubular. In terms of EP belt, the minimum radius of curvature of its horizontal and vertical plane can be 300 times of the pipe diameter .

3. Pipeline can be arranged according to terrain curves, especially suitable for areas with complicated topographic conditions.

4、大倾角输送

由于胶带为圆管状而增大了物料与胶带之间的摩擦系数。故线路的最大倾角可达30度。对于流动性差的物料其倾角还可以增大。这一特点对需高倾斜角度输送物料的场所是很重要的。可有效减小输送长度，节省空间位置，降低设备成本。

5、分别利用胶带的上、下分支往返封闭输送物料

由于有载（上）分支和无载（下）分支的胶带均是圆形，所以可用下（无载）分支向反方向输送物料。但要设置特殊的加料及翻带等装置。

6、占用空间高度，水平占地面积小。

4. Large inclination

The tubular belt increases the friction coefficient between materials and belt. As a result, the maximum inclination can be 30° and even larger for materials with low liquidity, which is especially important for occasions that require large inclination. It can shorten the conveying length effectively, save space and lower cost.

5. Materials are conveyed on carrying and returning sections. Because of two sections are both tubular, the returning section can convey materials in negative direction, if special feeder apparatus and belt turnover device are available.

6. Small space and less land

作为物料输送领域的专业化公司，我公司致力于积极开展管状带式输送机技术的引进吸收、开发及研制等工作。通过近五年来的市场推广及应用。设备含盖了电力、冶金矿山、港口、钢铁、煤炭等行业。输送物料的种类包括煤炭、焦炭、铁矿石、灰、石灰石、散化肥等。

As a professional bulk material handling system contractor, Jiaozuo Creation have been dedicating to the technology import, technology transfer, and research & development of pipe conveyors. Our products are widely used in the fields of electricity, metallurgy, mines, ports, steel, coal and etc, conveying material includes coal, coke, iron, limestone, ash, fertilizer and so on.



山西太钢集团石灰石运输管状带式输送机 Pipe conveyor for TISCO



安稳管带机 Pipe conveyor for Anwen Power Plant



开封电厂管带机 Pipe conveyor for Kaifeng Power Plant



平顶山姚电水泥公司管带机 Pipe conveyor for Yaomen Cement Co. Ltd



产品规格及参数 Specification and Data

常用规格与对应参数 Relation of pipe diameter, speed and conveying capacity

管径 Pipe dia. (mm)	150	200	250	300	350	400	500	600	700	850
带宽 Belt width (mm)	600	750	1000	1100	1300	1600	1800	2200	2550	3100
断面积 Sectional area 100% (m ²)	0.018	0.031	0.053	0.064	0.09	0.147	0.21	0.291	0.3789	0.5442
断面积 Sectional area 75% (m ²)	0.013	0.023	0.04	0.048	0.068	0.11	0.157	0.218	0.2842	0.4018
最大块度 (mm)	30-50	50-70	70-90	90-100	100-120	120-150	150-200	200-250	250-300	300-400
对应普通输送机带宽 Correspond belt conveyor width (mm)	300- 400	500- 600	600- 750	750- 900	900- 1050	1050- 1200	1200- 1500	1500- 1800	1800- 2000	2000- 2400

九江管带机 Pipe conveyor for Jiujiang Power Plant



管径、带速与输送能力间匹配关系 Specification and parameter

管径 Pipe dia. (mm)	100	150	200	250	300	350	400	500	600	700	850
出力 Capacity (m ³ /h)											
带速 Speed (m/s)											
0.8	17	37	66	118	138						
1.0	21	47	83	148	173	238					
1.25	26	59	104	185	216	297	482	688			
1.6	33	75	132	232	276	380	616	881	1238	1616	2327
2.0	42	94	166	296	346	472	770	1100	1548	2022	2909
2.5			208	370	432	594	964	1376	1935	2528	3636
3.15				460	543	748	1213	1734	2438	3185	4581
4						950	1540	2200	3096	4044	5818
5							1928	2750	3870	5056	7212

力量煤业管带机 Pipe conveyor for Jiujiang Liliang Coal Mine