



UHMWPE pipe

UHMWPE (Ultra-High Molecular Weight Polyethylene) pipe is a type of plastic pipe with excellent abrasion resistance, high impact resistance, low friction coefficient, and good chemical resistance. It is commonly used in industries such as mining, water treatment, and dredging due to its durability and long service life. UHMWPE pipe is also lightweight and easy to install, making it an ideal choice for applications where traditional metal pipes are too heavy or difficult to maneuver.

Additionally, UHMWPE pipe is resistant to UV radiation and does not corrode, making it suitable for outdoor applications. Ultra-high molecular weight polyethylene (UHMWPE) is a new kind of engineering thermoplastics with more than 3 million viscosity-average molecular weight. Ultra-high molecular weight polyethylene pipe has superior performance over conventional HDPE pipe such as very high wear

resistance, impact resistance, excellent resistance to internal pressure strength, resistance to environmental stress cracking, intrinsically self-lubricating, anti-adhesion, low temperature resistance and excellent chemical resistance.

What is UHMWPE?



Ultra-high molecular weight polyethylene pipe has superior performance over conventional HDPE pipe such as very high wear resistance, impact resistance, excellent resistance to internal pressure strength, resistance to environmental stress cracking, intrinsically self-lubricating, anti-adhesion, low temperature resistance and excellent chemical resistance.

Ultra-high molecular weight polyethylene (UHMW full name is ultra-high molecular weight polyethylene pipe) is a thermoplastic engineering plastics



with an average molecular weight greater than 1.5 million, which is polymerized by ethylene and butadiene monomer under the action of a catalyst. Ultrahigh-molecular-weight polyethylene (UHMWPE) has been the material of choice for the polymeric component in total joint replacements primarily because of its excellent combination of wear resistance, structural strength and biocompatibility and remains the gold standard thus far. Nevertheless, wear of UHMWPE prostheses produces billions of submicron particles annually,¹ which may cause a foreign-body response, leading to extensive bone resorption and gross loosening of the implants.^{2–5} UHMWPE wear is of particular concern for young or active patients who may face one or more revisions with accumulative bone loss in their lifetime. Thus, improving the wear resistance of UHMWPE and, thereby, reducing the volume of wear particles released to the periarticular tissues should reduce the adverse biological responses and substantially extend the clinical lifespan of total joint replacements. Ultra-high molecular weight polyethylene is a polymer compound, which is difficult to process, and has excellent wear resistance, self-lubricating properties, high strength, stable chemical properties, and strong anti-aging properties. When it comes to ethylene, be sure to pay attention to these characteristics. The specific methods are as follows:

1. Weighing rule: The product made of pure ultra-high molecular weight polyethylene has a specific gravity of 0.93-0.95, and the density is small,



and it can float on the water surface.

2. Temperature measurement: Pure ultra-high molecular weight polyethylene products will not melt at 200 ° C, will not deform, but will become soft. If it is not pure ultra-high molecular weight polyethylene material, it will be deformed at 200 degrees Celsius.
3. Visual method: The true ultra-high molecular weight polyethylene surface is flat, uniform, smooth and the density of the cut surface is very uniform. If it is not pure polyethylene material, the color is dim and the density is uneven.
4. Edge test method: The pure UHMWPE flanging end face is round, uniform and smooth. If it is not a pure polyethylene material, there will be cracks on the flanged end face, and the slag phenomenon will occur when the flanging is heated.
5. Due to its many excellent properties, UHMWPE has shown great advantages in the high performance fiber market, from mooring ropes in offshore oil fields to high performance lightweight composites, in modern warfare and aviation, Aerospace, marine defense equipment and other fields play a pivotal role.



Specifications of UHMWPE pipe

DN mm	Wall thickness (mm)					
	0.6Mpa	0.8Mpa	1.0Mpa	1.25Mpa	1.6Mpa	2.0Mpa
65					8	9
96					9	10
110					8	10
130				8	10	12
159				10	12	15
168			8	10	13	16
205		8	10	12	15	18
219		9	11	13	16	20
236		10	12	14	18	22
250		10	12	15	19	23
273	9	11	13	16	21	25
280	9	11	14	17	21	26
300	10	12	15	18	23	27
315	10	12	15	19	24	29
325	10	13	16	19	24	30
350	11	14	17	21	26	32
377	12	15	18	22	28	35
400	12	16	19	24	30	36
415	13	16	20	25	31	
426	13	17	20	25	32	
536	16	21	26	23		
560	16	22	27	33		
630	19	25	30	37		
652	20	26	32	38		
710	21	27	34			
800	23	31	38			

Custom sizes available, where molds already exist from 20-1400mm OD, up to 65 WT. Product can be manufactured in any color, and to all conformance requirements.



Ultra-high molecular weight polyethylene can be used as a lining for trailers, silos, and chutes for loading coal, lime, cement, mineral powder, salt, grain, etc., because it has excellent self-lubricating properties and non-stickiness. The above-mentioned powder file can prevent the adhesion scene from being stored and transported, and the guarantee is guaranteed.

1. Ultra-high molecular weight polyethylene is used for liquid-supporting pipelines such as sand flow. Compared with other pipelines, the outstanding performance is as follows: the life expectancy is increased by 18 times compared with the bamboo tube, and the interest rate is reduced to 1/25, compared with the nylon tube. The number is increased by 3 times and the interest is reduced to 1/8. At the time of sponsorship, the inner barrier is 25% smaller than the non-metallic tube, which greatly increases the frequency of sponsorship.
2. In the range of linings of chutes, buckets and ore compartments, when using traditional non-metallic documents, in cold and humid weather, the items will be thawed on non-metal, and the adoption of high-molecular polyethylene sheets will never , which greatly reduces the cost of unloading. After lining a layer of high-molecular-weight polyethylene sheet on the self-unloading leaker of the bulk carrier, the uniform unloading time was reduced from the original 16~20h to 8h.
3. In the defense military equipment, due to its good impact resistance and



greater energy absorption, it can be made into protective clothing, helmets and bulletproof materials in the military, such as helicopters, tanks and ships. Protective cover, missile cover, body armor, stab-resistant clothing, shield, parachute, etc.

4. In aerospace engineering, due to its light weight, high strength and good impact resistance, it is suitable for wingtip structures, spacecraft structures and buoy aircraft of various aircraft. At the same time, it can also be used as a speed-reducing parachute for space shuttle landings and as a rope for hanging heavy objects on the aircraft, replacing traditional steel cables and synthetic fiber ropes, and its development speed is extremely rapid.
5. In the civil field, ropes, cables, sails and fishing gears are suitable for marine engineering. The length of the break under self-weight is 8 times that of steel rope and twice that of aramid. The rope is used for fixed anchor ropes of supertankers, marine operating platforms, lighthouses, etc., which solves the corrosion and the corrosion and hydrolyzed degradation of the nylon and polyester cables caused by the corrosion of the steel cables used in the past. , the problem of frequent replacement.
6. In industrial applications, it can be used as pressure-resistant containers, conveyor belts, filter materials, automobile buffer boards, etc.; construction can be used as wall, partition structure, etc., it can be used to strengthen cement composite materials to improve the toughness of cement. Improve



its impact resistance. Due to its excellent wear resistance and impact resistance, it is widely used in the mechanical manufacturing industry to produce a variety of gears, cams, impellers, rollers, pulleys, bearings, bushings, bushings, shafts, gaskets, Mechanical parts such as gaskets, elastic couplings, and screws.

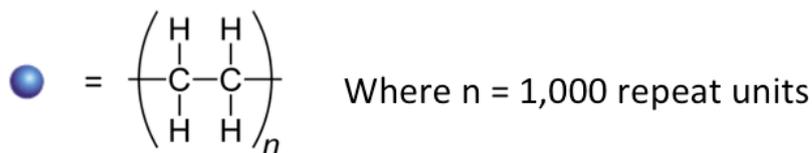
7. In sports goods, helmets, snowboards, sail boards, fishing rods, rackets and bicycles, glides, ultra-lightweight aircraft parts, etc. have been made, which are superior to traditional materials.
8. In medicine, it is used in the fields of tray materials, medical implants and plastic sutures. It has good biocompatibility and durability, high stability, no allergies, and has been used clinically.

Role of Molecular Weight

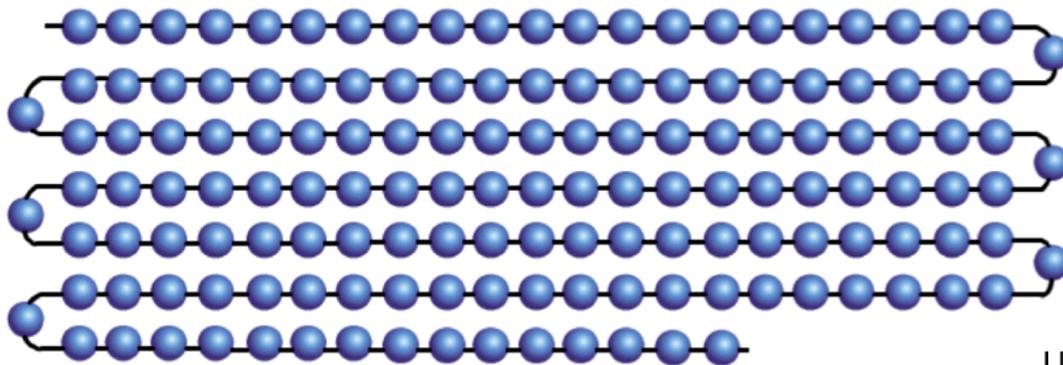
Ultra high molecular weight polyethylene is superior in comprehensive performance, abrasion resistance, low temperature, corrosion resistance, self lubrication, impact resistance in all plastic for the highest value, wear-resistant properties than PTFE, nylon, carbon steel and other materials, can be long-term in-169 to +80°C conditions, known as "amazing" engineering plastics, Ultra-high molecular weight polyethylene Engineering Plastics (UHMW---PE) pipeline technology is becoming more and more mature in China, more and



more projects adopt this kind of pipeline, become a kind of new thermoplastic engineering plastics with good price, it almost concentrates the advantages of various plastics, wear-resisting impact, self-lubricating, corrosion resistance, low temperature, hygienic non-toxic, Non-adhesion, water and other comprehensive properties, is an ideal pipe, can be widely used in mining (ore powder, pulp, tailings discharge pipelines) metallurgy, electricity, petroleum, textile, papermaking, food, chemical, mechanical, electrical and other industries.



Conventional HDPE



UHMWPE



Role of Molecular Weight

UHMWPE denotes Ultra High Molecular Weight Polyethylene which is a polyethylene polymer with an average molecular weight is greater than 3,100,000 as defined by ASTM D4020 – Standard specification for UHMWPE polymers. This molecular weight is well above the molecular weight of most typical polymers which are between 1,000,000 and 400,000 thus earning the title Ultra-High Molecular Weight Polyethylene. Polyethylenes with molecular weight in the 3.1 -4.5 Million range have been found to exhibit the best combination of impact strength and abrasion resistance.

For Polyethylene molecular weight classification the following guidelines can be used:

- HDPE (High Density Polyethylene): 100,000 – 400,000 MW
- HMWHDPE (High Molecular Weight High Density Polyethylene) 500,000 – 1,999,999
- VHMWHDPE (Very High Molecular Weight High Density Polyethylene) 2,000,000 – 3,100,000
- UHMWPE (Ultra High Molecular Weight Polyethylene) > 3,100,000 + MW



Attributes of UHMWPE Pipe

UHMWPE by virtue of its extremely high molecular weight yields several unique properties, including the highest abrasion resistance and highest impact strength of any plastic.

- Abrasion resistance – UHMWPE pipes have excellent abrasion resistance providing long life in abrasive slurry applications.
- Chemical resistance – outstanding resistance to a wide range of chemical reagents allows the use of UHMWPE systems in tailings pipelines and chemical treatment applications used in mining operations.
- Flexibility – UHMWPE pipes can be bent to a minimum of 30 times the pipe's outside diameter for HDPE. This flexibility and resiliency allows the pipe to absorb surge pressures, vibration and stresses caused by soil movement. This makes the pipes particularly useful in submarine pipe lines, mine subsidence and earthquake prone areas.
- High flow capacity – low friction compared with materials such as fibre reinforced cement and resistance to material deposit buildup give UHMWPE pipes long lived high flow capacity.
- Lower pumping cost due to greater hydraulic capacity as compared with steel and HDPE pipes.
- Ease of installation – UHMWPE is easy to install with light weights and flanged couplings.



Excellent characteristics of piping

Ultra-high molecular weight polyethylene pipe (UHMWPE) wear-resistant plastic crown, is carbon steel, stainless steel 3-7 times.

Low friction coefficient, self-lubricating, anti-adhesion, no scaling, reduce the energy transmission of materials. Top of the plastic in the impact strength column. The impact energy absorption value is highest in all plastics and has a silencing nature. Good chemical stability. Excellent low-temperature resistance. Sanitation is non-toxic to food and drugs.

1. very high wear resistance, UHMW products unique molecular structure, so that it has a very high ability to resist sliding. Wear resistance is higher than the general alloy steel 6.6 times times, stainless steel 27.3 times times. is phenolic resin 17.9 times times, nylon six 6 times times, polyethylene 4 times times the annual wear rate of 0. 58 mm, the service life of pipeline is greatly improved.
2. extremely high impact resistance, in the existing engineering plastics, the impact toughness of this product is the highest, many materials in severe or repeated explosions of the impact of cracks, breakage, crushing or surface stress fatigue. This product according to the GB1843 standard, carries on the cantilever beam impact experiment to achieve no breakage.



3. excellent chemical stability, this product can withstand strong chemical erosion, in addition to certain acids at elevated temperatures there is a slight corrosion, in other lye, acid solution is not corrosion. Can be used in concentrated hydrochloric acid with a concentration of less than 80%, the performance is fairly stable in nitric acid with a concentration of less than 75% and a concentration of less than 20%.
4. good self-lubricating, because this product contains wax-like material, and its own lubrication is good. The coefficient of friction (196n,2 hours) is only 0.219mn/m (GB3960). Self-sliding performance is superior to oil-lubricated steel or brass. Especially in the environment, dust, sand and many places, the product of its own dry lubrication performance more fully displayed. Not only can exercise freely, and protect the related workpiece does not wear or pull injury.
5. non-toxic to the biological, ultrahigh molecular weight Polyethylene Engineering Plastics (UHMW----PE) pipeline to adapt to water quality fluids, solid particles, powders, slurry, etc., the traditional metal pipe difficult to meet the requirements of ultra-high molecular weight polyethylene (UHMW----PE) pipeline can be replaced by extremely high corrosion resistance, high wear resistance, Self-lubricating absorption shock and other comprehensive properties, in various industries have a wide range of applications in solid particles, powder, slurry, gas transport, has a unique advantage.



6. the unique low-temperature resistance, this product is excellent low-temperature resistance, its impact resistance, wear resistance in Minus 269 degrees Celsius basic unchanged. It is the only kind of engineering plastics which can work at a temperature close to absolute 0 degrees at present. At the same time, the temperature of the product is wide, can be long-term in the 269 °C to 80 °C of work.
7. the surface is not adhered to, this product because of the small friction coefficient and the infinite, it has a good surface adhesion. The existing materials generally in the ph value of more than 9 of the medium are scaling, this product is not scaling, the characteristics of fire power plant for the discharge of fly ash system has great significance. In crude oil, mud and other transportation pipelines are also very suitable.
8. the best resistance to environmental stress cracking, resistance to environmental stress cracking >4000h, elastic modulus is 1.5 times times more than PE100, anti-fatigue strength of 500,000 times.
9. other characteristics, the product also has absorption, noise absorption, anti-static, the neutron has shielding capacity, do not absorb water, light weight. Easy machining, coloring and other outstanding characteristics.



Benefits of Ultra High MW

- UHMWPE by virtue of its extremely high molecular weight yields several unique properties, including the highest abrasion resistance and highest impact strength of any plastic.
- Beware of competitive products claiming to be UHMWPE as some techniques for processability of UHMWPE are not without an attendant disadvantage since effective amounts of intermediate molecular weight polyethylene causes a marked decrease in some of the most desirable properties of the UHMWPE, such as impact strength and abrasion resistance.
- The high molecular weight is what gives UHMW-PE a unique combination of high impact strength, low coefficient of friction and abrasion resistance that outwears carbon steel 10 to 1 making it more suitable for many applications where lower molecular weight grades fail.
- UHMWPE pipes can be used in a broad range of mining and industrial slurry applications due to its three main characteristics: high impact strength, outstanding abrasion resistance and extremely low coefficient of friction.
- Ultra-high molecular weight polyethylene (UHMW) is a tough, abrasion-resistant thermoplastic with a molecular weight of greater than 3 million. UHMWPE pipes have reduced coefficient of friction, improved abrasion



resistance, lower wear rates over conventional HDPE pipes such as PE100.

Exceptionally High Wear

Ultrahigh molecular weight polyethylene (UHMWPE) shows unusually high wear resistance compared to most materials. This is due to a combination of very high molecular weight and the resulting entanglements and relative surface softness with a slippery waxy surface.

Application of UHMWPE pipe

Compare with existing plastic pipes, Wear resistant UNMWPE pipe has the most excellent wear resistance which is 4 to 7 times that of Q235 steel pipe and 2.7 times that of wear-resistant steel 16Mn. Therefore it increases pipe flow rate and improves the transmission efficiency of more than 20%. The working life of UHMWPE pipes is more than 3 times that of wear-resistant steel pipe.

UHMWPE Pipe for Dredging Applications

UHMWPE pipes are widely used in the industries of dredging, mining, metallurgy, electric power, oil, textile, paper, food, chemical, mechanics, gas, tunneling etc.





UHMWPE mining pipe

Mining tailings pipe is the tailings slurry discharged from non-ferrous metal ore beneficiation and ferrous metal ore beneficiation, which needs to be transported to the tailings inventory.

- Sand pumping pipe
- Dredger pipeline
- Dredging and reclamation projects
- Deepening and cleaning up job for river, lake
- Silt, Mud, Slag, slurry discharging pipe

UHMWPE Slurry Pipe

UHMWPE has the following impressive statistics: up to 15 times the abrasion resistance of steel while being 8 times lighter than steel and having 5 times lower coefficient of friction than steel and offering as low as 1/10 the pressure loss of steel pipes.

- UHMWPE PIPE for mine tailings and slurry in the mining industry
- UHMWPE PIPE for dredging mud and sand
- UHMWPE PIPE for thermal power system coal ash transport
- UHMWPE PIPE corrosive particles and liquids
- UHMWPE PIPE transport pulverized coal and coal-water slurry
- UHMWPE PIPE for food transport



List of Core values

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