Helical Static Mixer

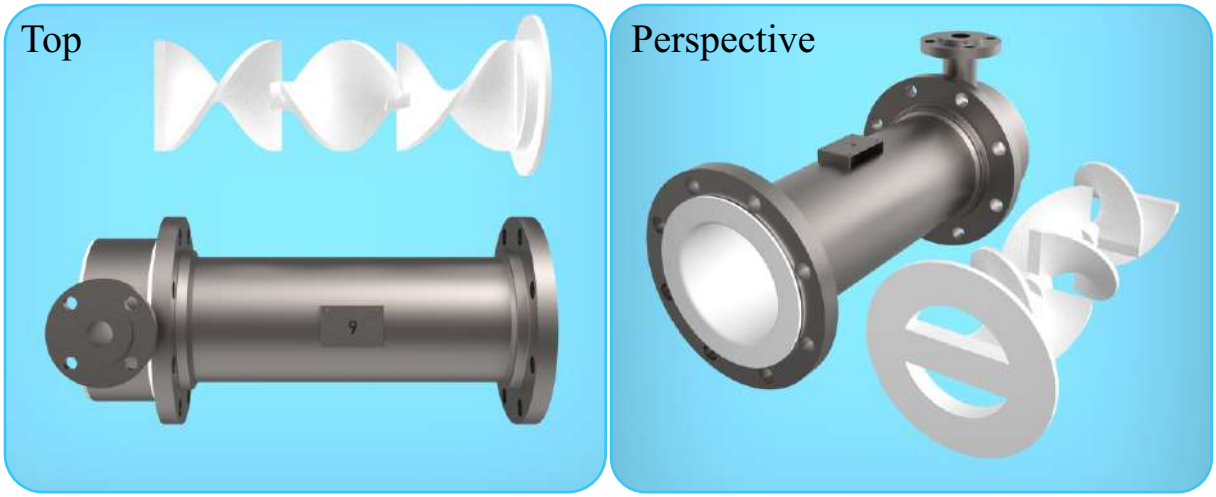


Power Transmission Solutions

PTS Process Engineering Co

Helical Static Mixers

Helical static mixers are widely used across various industries and are particularly suitable for fluids with medium viscosity and density. Their operation is primarily based on turbulent flow conditions (Reynolds number above 4000) and relies on three fundamental mechanisms: flow division, radial redistribution, and flow reorientation.



1- Flow Division: As the fluid passes through each element, it is split into two distinct layers. The total number of divisions after (n) elements is expressed as: **'x = 2^n'**.

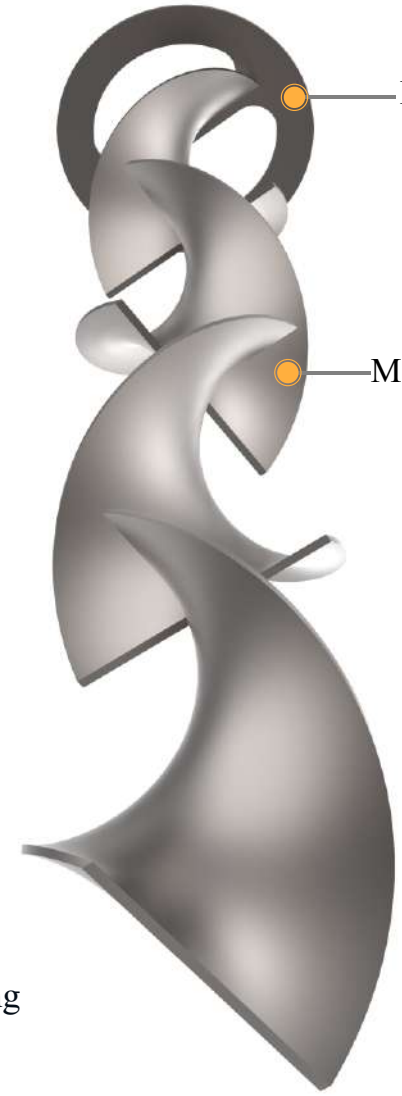
For example, in a mixer with 18 elements, the flow is divided into more than 262,144 streams, significantly increasing interfacial contact area and enhancing mixing efficiency.

2- Radial Flow Redistribution: Due to the helical geometry of the elements and the pressure drop along the mixer, the fluid is continuously transported from the center toward the wall and back to the center. This creates velocity gradients and enhances shear-driven mixing.

3- Flow Reorientation: The flow direction is rotated by approximately 90 degrees between successive elements. This continuous change in direction increases turbulence intensity and significantly improves mixing performance.

Key Applications

- Water and wastewater treatment
- Gas–liquid and liquid–liquid mixing
- Chemical reactions across low and high viscosity ranges
- Oil-in-water emulsion production
- Biodiesel production
- Antioxidant and chemical additive blending
- Inline coagulant dosing and mixing
- Viscosity adjustment processes
- pH control in process lines
- Stream homogenization for accurate sampling
- Liquid resin blending



Specifications & Features

Optional features

- Cartridge / sliding element design
- Elements manufactured from virgin PTFE
- Element coating in PE and FEP
- Provision for injection points upstream of the mixer

Available materials

- Body materials:
  - Non-metallic: GRP, GRE, HDPE, UPVC
  - Metal:CS,304 SS, 316 SS,Duplex SS, Super Duplex SS
- Flange Standards: ASME, DIN, JIS
- Flange Type: Welding Neck (WN), Slip-On (SO)



Standard Specifications of HSM Mixers

Mixer Selection

HSM Helical Static Mixers

Mixer Version Indicator

V2 Version 2

Wet Parts Material

S4	SS 304
S6	SS 316L
S4	TITANIUM
S10	HASTELLOY C-276

Mixer Size

A	1/2″	E	2″	I	6″
B	3/4″	F	3″		
C	1″	G	4″		
D	1 1/2″	H	5″		

Mixer Element Type

A	Fixed
B	Removable

Number Of Element

2	4		
6	8		
10	12		

Housing Schedule

TI	Schedule 10
TH	Schedule 40
TV	Schedule 80

Connection Type

0	NPT
1	ANSI 150 LBS FLANGES
2	ANSI 300 LBS FLANGES
3	Pn16, Flange (DIN2501)
4	Pn40, Flange (DIN2501)

Element Coat

A	N/A
B	PE Coating
C	ETFE Coating
D	FEP Coating

Housing Lining

1	W/O
2	Hard Rubber
3	PTFE

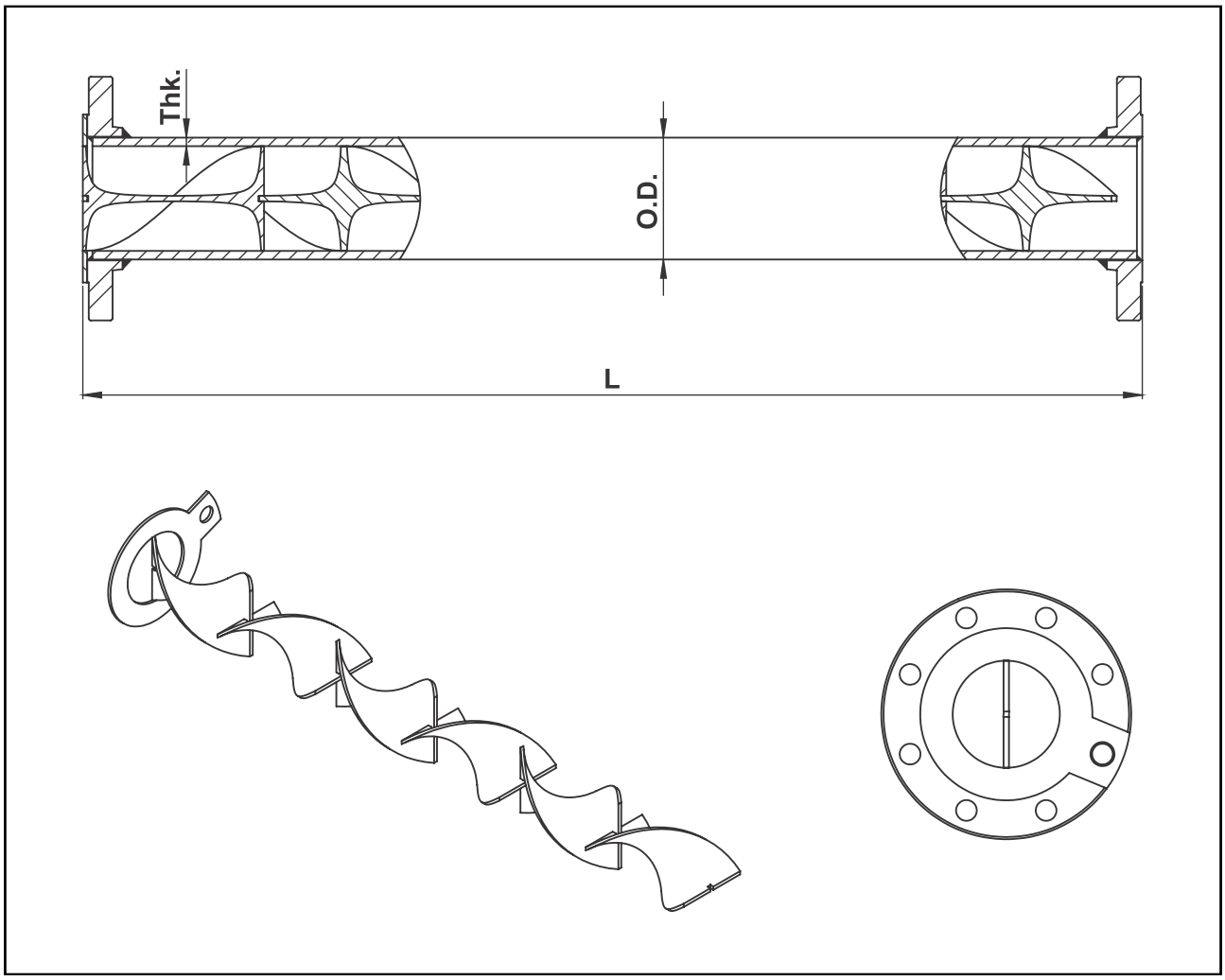
Number Of Injection Points

CO	W/O		
C1	1		
C2	2		
C3	3		

Additional Test

T1	W/O
T2	Mat. Certificate
T3	Welding TEST
T4	Pressure TEST
T5	All TEST

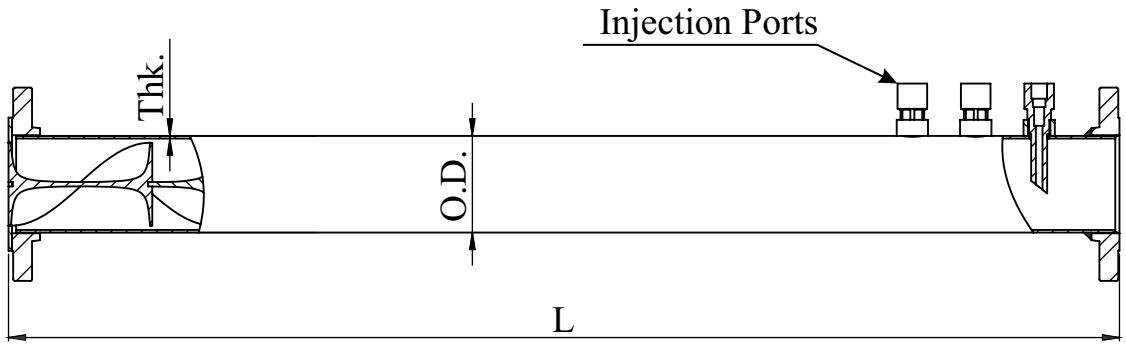
Dimensional Drawing of Helical Static With Slip On Flange



Normal Size (inch)			1/2	3/4	1	1 1/2	2	3	4	5	6
OD(mm)			21.3	26.7	33.4	48.3	60.3	88.9	114.3	141.3	168.3
HOUSING THICKNESS Thk (mm)	SCH 10		2.11	2.11	2.77	2.77	2.77	3.05	3.05	3.4	3.4
	SCH 40		2.77	2.87	3.38	3.68	3.91	5.49	6.02	6.55	7.11
	SCH 80		3.73	3.91	4.55	5.08	5.54	7.62	8.56	9.53	10.97
TOTAL LENGTH L (mm)	Element Number	2	65	85	115	155	205	295	400	430	525
		4	115	150	195	280	365	525	675	820	990
		6	160	210	275	400	520	760	980	1200	1450
		8	210	275	355	525	680	995	1290	1585	-
		10	255	335	435	645	835	1230	1595	-	-
		12	305	400	515	770	995	1460	-	-	-

- The Tolerance Of Overall Length is ± 5mm

Helical Static Mixer With Slip On Flange & Injection Quills

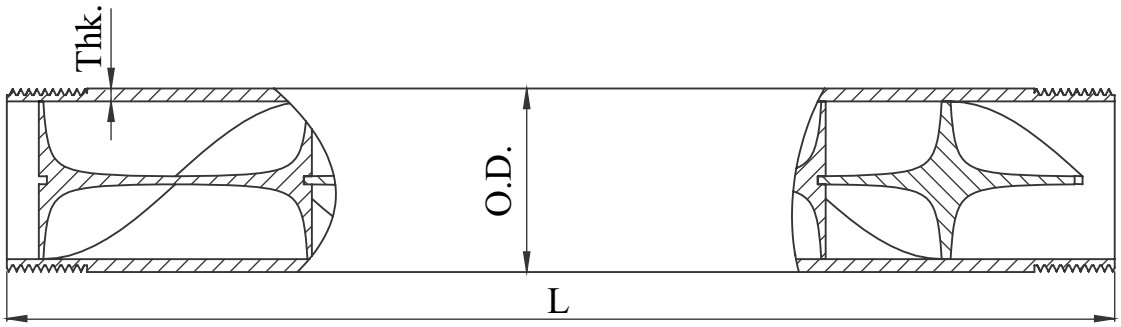


Normal Size (inch)				1/2	3/4	1	1 1/2	2	3	4	5	6
OD(mm)				21.3	26.7	33.4	48.3	60.3	88.9	114.3	141.3	168.3
Coupling Size (inch)				1.2	1.2	1.2	1.2	1.2	3.4	3.4	3.4	3.4
TOTAL LENGTH L (mm)	Element Number	2	1	165	185	215	255	305	395	500	530	625
			2	265	285	315	355	405	495	600	630	725
			3	365	385	415	455	505	595	700	730	825
		4	1	215	250	295	380	465	625	775	920	1090
			2	315	350	395	480	565	725	875	1020	1190
			3	415	450	495	580	665	825	975	1120	1290
		6	1	260	310	375	500	620	860	1080	1300	1550
			2	360	410	475	600	720	960	1180	1400	1650
			3	460	510	575	700	820	1060	1280	1500	1750
		8	1	310	375	455	625	780	1095	1390	1685	-
			2	410	475	655	725	880	1195	1490	1785	-
			3	510	575	755	825	980	1295	1590	1885	-

Injection Ports Numbers

- The Tolerance Of Overall Length is ± 5mm

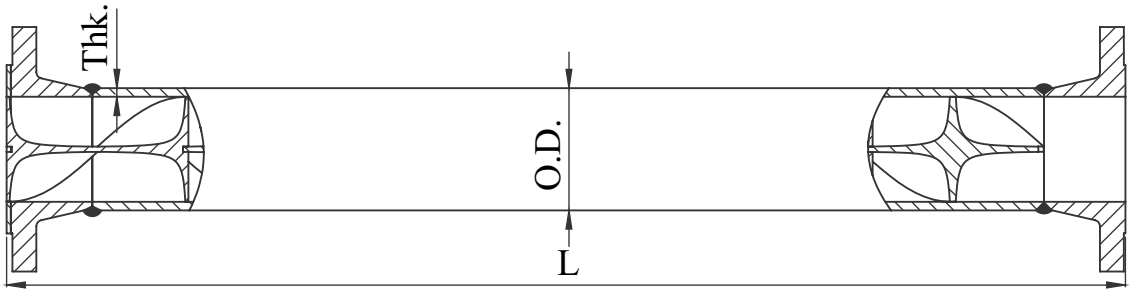
Helical Static Mixer With NPT Thread



Normal Size (inch)			1/2	3/4	1	1 1/2	2	3	4
OD(mm)			21.3	26.7	33.4	48.3	60.3	88.9	114.3
HOUSING THICKNESS Thk (mm)	SCH 10		2.11	2.11	2.77	2.77	2.77	3.05	3.05
	SCH 40		2.77	2.87	3.38	3.68	3.91	5.49	6.02
	SCH 80		3.73	3.91	4.55	5.08	5.54	7.62	8.56
TOTAL LENGTH L (mm)	Element Number	2	52	70	85	135	170	242	315
		4	100	130	165	252	325	475	622
		6	145	195	245	375	480	710	930
		8	192	258	325	498	638	945	1235
		10	240	320	405	620	795	1175	1542
		12	285	380	485	745	952	1410	1850

- The Tolerance Of Overall Length is ± 5mm

Helical Static Mixer With Welding Neck Flange



Normal Size (inch)			1/2	3/4	1	1 1/2	2	3	4	5	6
OD(mm)			21.3	26.7	33.4	48.3	60.3	88.9	114.3	141.3	168.3
HOUSING THICKNESS Thk (mm)	SCH 10		2.11	2.11	2.77	2.77	2.77	3.05	3.05	3.4	3.4
	SCH 40		2.77	2.87	3.38	3.68	3.91	5.49	6.02	6.55	7.11
	SCH 80		3.73	3.91	4.55	5.08	5.54	7.62	8.56	9.53	10.97
TOTAL LENGTH L (mm)	Element Number	2	130	160	190	235	280	375	285	535	625
		4	180	225	270	360	440	605	760	925	1100
		6	225	285	350	480	595	840	1070	1305	1550
		8	275	350	430	605	755	1075	1375	1690	-
		10	320	410	510	725	910	1310	1680	-	-
		12	370	475	590	850	1070	1540	-	-	-

- The Tolerance Of Overall Length is ± 5mm