

# Spiral Nozzles

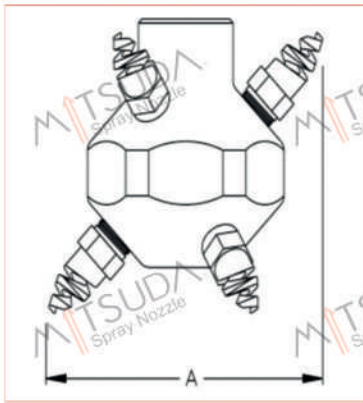


## DESIGN FEATURES

Nozzles placed on the cluster are Mitsuda MT series spiral nozzles designed with clog resistant features. They can be combined with all other Mitsuda nozzles according to required process through female connection.

## SPRAY CHARACTERISTICS

Multidirectional coverage through six nozzles placed on the cluster in perfect angles. Flow rates from 4.2 to 157 gmp (Other required flow rates can also be supplied if needed). Please check tables for approximate dimensions.



LEM Coverage Chart			
When Spraying at 40 - 50 PSI			
Female Pipe Size	Nozzle Number	Sucrubbing Diameter	Rinsing Diameter
3/4	MT.LEM 6	1.6	3.1
	MT.LEM 8	2.1	6.1
	MT.LEM 10	4.6	9.1
1	MT.LEM 12	6.6	13.1
	MT.LEM 14	6.9	13.6
	MT.LEM 16	7.3	14.6
	MT.LEM 18	8.1	16.1

Dimensions are apporoximate. Check with MITSUDA for critical dimension applications.

MT.LEM Coverage Chart												
Spherical, 360° Spray Angle, 3/4" and 1" Pipe Sizes												
Female Pipe Size	Nozzle Number	K Factor	GALLONS PER MINUTE @ PSI							Minimum Entrance Open (in.) A	Weight	
			10 PSI	20 PSI	30 PSI	40 PSI	60 PSI	80 PSI	100 PSI		Metal	Plas.
3/4	MT.LEM 6	1.34	4.21	5.95	7.28	8.41	10.3	12.0	13.4	4.51	2.26	6.01
	MT.LEM 8	2.54	8.01	11.4	14.0	16.1	19.6	22.7	25.4			
	MT.LEM 10	3.96	12.6	17.8	21.8	25.1	30.6	35.5	39.6			
1	MT.LEM 12	5.70	18.1	25.6	31.3	36.1	44.1	51.0	57.0	5.26	4.13	11.1
	MT.LEM 14	7.69	24.4	34.5	42.2	48.7	59.5	68.8	76.9			
	MT.LEM 16	9.97	31.6	44.6	54.7	63.1	77.2	89.2	99.7			
	MT.LEM 18	15.8	49.6	70.1	85.8	99.1	121	141	158			



# Spiral Nozzles

# MS.TW



### DESIGN FEATURES

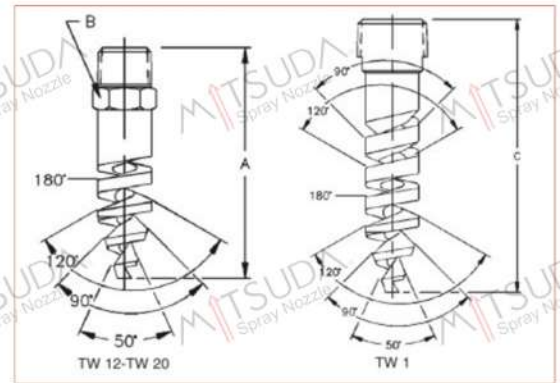
- | Tank Washing Nozzle
- | Spiral design
- | Clog resistant
- | Designed for more energy saving
- | Placing on small holes.

### SPRAY CHARACTERISTICS

- | Easy maintenance
- | Designed to spray in opposite directions
- | Flow rates from 11.4 to 260 l/min.

**Tank Washing TW Coverage Chart**  
When Spraying at 2 - 3 bar

Pipe Size	Nozzle Number	Sucrubbing Diameter(mm)	Rinsing Diameter(mm)
3/8	MS.TW12	381	761
	MS.TW14	481	1201
	MS.TW16	611	1501
	MS.TW20	911	2101
1	MS.TW1	2401	6101



**Tank Washing TW Flow Rates and Dimensons**

TW 180° and 270° Spray Angles 3/8 1" Sizes, BSP or NPT

Male Pipe Size	Nozzle Number	Available Spray Angles	K Factor	LITERS PER MINUTE						Approx(mm)		Metal Only Dim.(mm)			Weight (g) Metal
				0.7 bar	1 bar	2 bar	3 bar	4 bar	5 bar	Orifice Dia	Free Pass Dia.	A	B	C	
3/8	MS.TW12	180 270	13.8	11.5	13.8	19.4	23.8	27.4	30.7	4.84	3.31	73.1	17.6	49.7	
	MS.TW14	180 270	18.6	15.5	18.6	26.2	32.1	37.0	41.4	5.60	3.31				
	MS.TW16	180 270	24.3	20.3	24.3	34.3	41.9	48.4	54.1	6.36	3.31				
	MS.TW20	180 270	37.7	31.6	37.7	53.3	65.2	75.3	84.2	7.88	3.31				
1	MS.TW1	270	117	97.3	117	165	202	233	261	14.3	5.09			146.2	299



# Spiral Nozzles

# MS.TF

MITSUDA  
Spray Nozzle

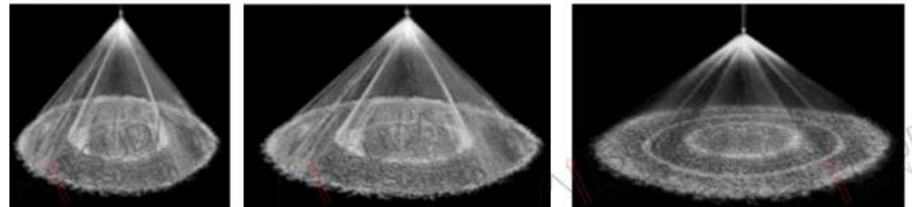
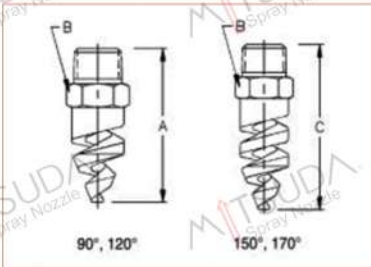
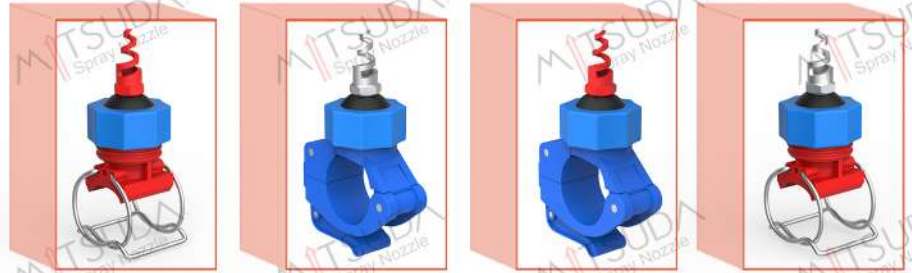


## DESIGN FEATURES

- ✓ Clog resistant
- ✓ More Energy saving
- ✓ Designed without any internal parts
- ✓ Designed to provide more fluid discharge velocity
- ✓ Male connection.

## SPRAY CHARACTERISTICS

- ✓ Full cone spraying
- ✓ Spray angles from 50° to 180°
- ✓ Flow rates from 0.5 to 3220 gmp (For higher flow rates please contact with our team).



Full Cone 60° (NN)

Full Cone 90° (FCN)

Full Cone 150°-170°

Male Pipe Size	Nozzle Number	Available Spray Angles	K Factor	GALLONS PER MINUTE @ PSI										Approx (in.)		Dim. (in.) for Metal Only"			Wt. (oz.)		
				5 PSI	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI	Free Orif. Dia.	Pass Dia.	A"	B	C	60°-120° Metal Plas.	90°-120° Metal Plas.
1/8	MS.TF6	60° 90° 120° 150° 170°	0.222	0.496	0.71	1.00	1.23	1.41	1.58	1.72	1.99	2.22	3.12	4.44	0.10	0.10	1.70	1.57	1.70	1.01	0.21
	MS.TF8	60° 90° 120° 150° 170°	0.412	0.920	1.31	1.85	2.27	2.61	2.92	3.19	3.69	4.12	5.82	8.23	0.14	0.14	1.70	1.57	2.20		
1/4	MS.TF6	60° 90° 120° 150° 170°	0.222	0.496	0.71	1.00	1.23	1.41	1.58	1.72	1.99	2.22	3.14	4.44	0.10	0.10	1.89	1.57	1.89		
	MS.TF8	60° 90° 120° 150° 170°	0.412	0.920	1.31	1.85	2.27	2.61	2.92	3.19	3.69	4.12	5.82	8.23	0.14	0.14	1.89	1.57	2.39	1.57	0.21
	MS.TF10	60° 90° 120° 150° 170°	0.533	1.42	2.01	2.84	3.48	4.01	4.48	4.91	5.67	6.33	8.95	12.7	0.17	0.14	1.89	1.57	2.39		
3/8	MS.TF6	60° 90° 120°	0.222	0.496	0.71	1.00	1.22	1.41	1.58	1.72	1.99	2.22	3.14	4.44	0.20	0.10					
	MS.TF8	60° 90° 120°	0.412	0.920	1.31	1.85	2.25	2.61	2.92	3.19	3.69	4.12	5.82	8.23	0.20	0.14					
	MS.TF10	60° 90° 120°	0.632	1.42	2.01	2.84	3.46	4.01	4.48	4.91	5.67	6.33	8.95	12.7	0.20	0.14					
	MS.TF12	60° 90° 120° 150° 170°	0.949	2.12	3.01	4.25	5.20	6.02	6.72	7.36	8.50	9.50	13.5	19.1	0.20	0.14	1.89	0.70	2.39	1.64	0.26
	MS.TF14	60° 90° 120° 150° 170°	1.29	2.87	4.06	5.74	7.01	8.11	9.07	9.93	11.6	12.9	18.2	25.7	0.23	0.14					
	MS.TF16	60° 90° 120° 150° 170°	1.69	3.76	5.31	7.51	9.18	10.7	12.0	13.1	15.1	16.9	21.8	33.6	0.26	0.14					
1/2	MS.TF20	60° 90° 120° 150° 170°	2.62	5.84	8.26	11.8	14.3	16.6	18.5	20.3	23.4	26.2	37.0	52.3	0.32	0.14					
	MS.TF24	60° 90° 120° 150° 170°	3.82	8.53	12.2	17.1	20.9	24.2	27.0	29.6	34.2	38.2	54.0	76.3	0.39	0.20	2.51	0.89	3.07	3.01	0.51
3/4	MS.TF28	60° 90° 120° 150° 170°	5.23	11.8	16.6	23.4	28.6	33.1	37.0	40.5	46.8	52.3	73.9	105	0.45	0.20					
	MS.TF32	60° 90° 120° 150° 170°	6.65	14.9	21.1	29.8	36.4	42.1	47.1	51.5	59.5	66.5	94.0	134	0.51	0.20	2.76	1.14	3.51	5.51	0.89
1	MS.TF40	60° 90° 120° 150° 170°	10.7	23.8	33.6	47.5	58.0	67.1	75.0	82.2	94.9	107	151	213	0.64	0.26	3.64	1.39	4.39	8.51	2.51
	MS.TF48	60° 90° 120° 150° 170°	15.1	33.7	47.6	67.3	82.3	95.1	107	117	135	151	213	301	0.76	0.26					
1 1/2	MS.TF56	60° 90° 120° 150° 170°	20.5	45.7	64.6	91.3	112	130	145	159	183	205	289	409	0.89	0.32			5.39		
	MS.TF64	60° 90° 120° 150° 170°	26.8	59.8	84.6	121	146	170	190	208	240	268	379	535	1.01	0.32	4.39	2.01	5.39	22.1	4.26
	MS.TF72	60° 90° 120° 150° 170°	30.5	68.0	96.1	137	166	192	216	236	273	305	430	608	1.14	0.32			5.64		
2	MS.TF88	60° 90° 120° 150° 170°	44.4	99.0	141	200	242	281	314	344	397	444	627	886	1.39	0.45	5.64	2.51	5.89	46.1	8.01
	MS.TF96	60° 90° 120° 150° 170°	56.0	125	178	252	306	355	396	434	501	560	792	1121	1.51	0.45	6.89	2.51	7.01	54.1	9.01
3	MS.TF112	60° 90° 120° 150° 170°	81.1	181	260	365	443	513	573	628	725	811	1151	1621	1.76	0.57					
	MS.TF128	60° 90° 120° 150° 170°	108	239	337	482	588	680	759	832	961	1071	1511	2151	2.01	0.57	8.64	3.51	9.26	115	20.1
4	MS.TF160	60° 90° 120°	167	372	526	744	909	1051	1171	1291	1481	1661	2351	3321	2.51	0.64	10.2	4.51		170	27.1



# Spiral Nozzles

# MS.ST

**MITSUDA**  
Spray Nozzle

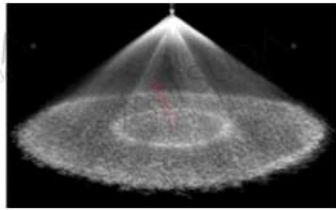
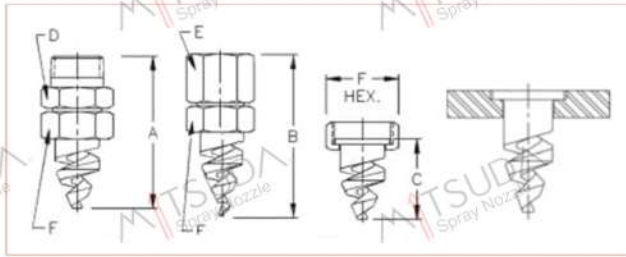


## DESIGN FEATURES

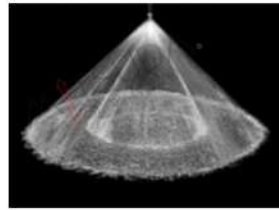
- Designed with Cobalt Alloy 6 or RBSC ceramic parts against wearing
- Clog resistant
- More energy saving
- Designed without any internal parts
- Both male and female connections.

## SPRAY CHARACTERISTICS

- Full cone spraying (Hollow Cone available upon request)
- Perfect atomization
- Spray angles from 50° to 180°
- Flow rates from 0.5 to 3220 gmp (For higher flow rates please contact with our team).



Full Cone 120° (FFN)



Full Cone 90° (FCN)



## LEM Coverage Chart

Spherical, 360 Spray Angle, 3/4" and 1" Pipe Sizes

3-piece Male or Female Pipe Size	** 2-piece Female Pipe Size	Nozzle Number	K Factor	GALLONS PER MINUTE @ PSI												Approx. (in.) Orifice Pass Dia. Dia.		Approximate Dimensions (in.)						Wt. (lbs.) Male	
				5 PSI	10 PSI	15 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI	A	B	C	D	E	F				
1/4		MS.ST6	0.222	0.496	0.701	0.858	0.991	1.22	1.41	1.58	1.72	1.99	2.22	3.14	4.44	0.10	0.10	2.57	2.57		0.70	0.70	0.82	0.20	
		MS.ST9	0.412	0.920	1.31	1.60	1.85	2.26	2.61	2.92	3.19	3.69	4.12	5.82	8.23	0.14	0.14	2.57	2.57		0.70	0.70	0.82		
		MS.ST10	0.633	1.42	2.01	2.46	2.84	3.47	4.01	4.48	4.91	5.67	6.33	8.95	12.7	0.17	0.14	2.57	2.57		0.70	0.70	0.82		
3/8		MS.ST12	0.950	2.13	3.01	3.68	4.25	5.21	6.01	6.72	7.36	8.50	9.50	13.5	19.1	0.20	0.14	2.95	2.95		0.95	0.95	1.14	1.14	
		MS.ST14	1.29	2.87	4.06	4.97	5.74	7.02	8.11	9.07	9.93	11.6	12.9	18.2	25.7	0.23	0.14	2.89	2.89		0.95	0.95	1.14		
		MS.ST16	1.69	3.76	5.31	6.50	7.51	9.19	10.7	12.0	13.1	15.1	16.9	23.8	33.6	0.26	0.14	3.00	3.00		0.95	0.95	1.14		
		MS.ST20	2.62	5.84	8.26	10.2	11.8	14.3	16.6	18.5	20.3	23.4	26.2	37.0	52.3	0.32	0.14	2.89	2.89		0.95	0.95	1.14		
3/4		MS.ST24	3.82	8.53	12.2	14.9	17.1	21.0	24.2	27.0	30.0	34.2	38.2	54.0	76.3	0.39	0.20	3.57	3.57		1.39	1.39	1.51	0.63	
		MS.ST28	5.23	11.8	16.6	20.3	23.4	28.7	33.1	37.0	40.5	46.8	52.3	73.9	105	0.45	0.20	3.54	3.54		1.39	1.39	1.51		
		MS.ST32	6.65	14.9	21.1	25.8	29.8	36.5	42.1	47.1	51.5	59.5	66.5	94.0	134	0.51	0.20	3.51	3.51		1.39	1.39	1.51		
1		MS.ST40	10.7	23.8	33.6	41.2	47.5	58.1	67.1	78.0	82.2	94.9	107	151	213	0.64	0.26	4.51	4.51		1.89	1.76	2.01	1.26	
		MS.ST48	15.1	33.7	47.6	58.3	67.3	82.3	95.1	107	117	135	151	213	301	0.76	0.26	4.51	4.51		1.89	1.76	2.01		
1 1/2		MS.ST56	20.5	45.7	64.6	79.1	91.3	113	130	145	159	183	205	268	409	0.89	0.32	5.76	5.76		1.95	2.14	2.20	1.76	
		MS.ST64	26.8	59.9	84.6	104	121	147	170	190	208	240	268	378	535	1.01	0.32	5.76	5.76		1.95	2.14	2.20		
		MS.ST72	30.5	68.0	96.1	119	137	167	193	216	236	273	305	429	608	1.13	0.32	5.76	5.76		1.95	2.14	2.20		
2	2 1/2 3	MS.ST88	44.4	100	141	172	199	243	261	314	344	397	443	627	886	1.38	0.45	7.64	6.32	4.57	3.01	3.51	3.51	5.01	
		MS.ST96	56.0	125	178	217	251	307	355	396	434	501	560	792	1121	1.51	0.45	9.01	7.39	5.64	3.64	4.01	4.01	7.01	
3	3	MS.ST112	81.1	182	257	315	363	444	513	573	628	725	811	1151	1621	1.76	0.57	10.4			3.64	4.01	4.01	9.01	
		MS.ST128	108	240	340	415	481	589	680	780	832	961	1071	1511	2151	2.01	0.57	10.8			7.29	3.64	4.01		4.01
4	4	MS.ST160	167	372	525	644	743	910	1051	1171	1291	1481	1661	2350	3321	2.51	0.64	12.0			8.26	4.57	5.01	5.01	14.1

# Spiral Nozzles

# MS.N

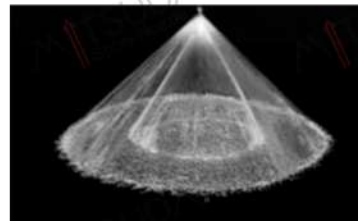
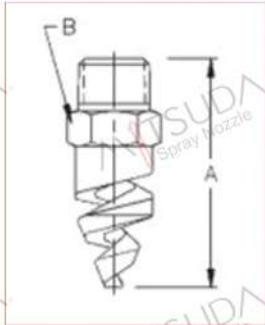


## DESIGN FEATURES

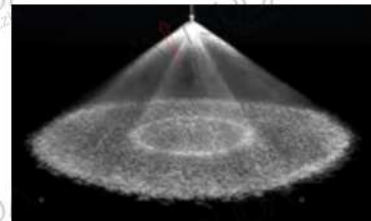
- Clog resistant
- Designed without any internal parts
- Fits pipe sizes 1/2", 1" and 1-1/2" Male connection

## SPRAY CHARACTERISTICS

- Two spraying cones with wide and narrower angles
- Full cone spraying
- Spray angles from 90° to 120°
- Flow rates from 3.0 to 534 gmp



Full Cone 90°



Full Cone 120° (W)

### N Flow Rates and Dimensions

Full Cone, Medium 90° and Wide 120° (W) 1/2" to 1 1/2" Pipe Sizes

Male Pipe Size	Nozzle Number	K Factor	GALLONS PER MINUTE @ PSI									Approx.(mm)		Approximate Dimensions (inches)		Weight (g) Metal
			10 PSI	20 PSI	30 PSI	40 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI	Orifice Dia.	Free Pass Dia.			
1/2	MS.N1	0.950	3.01	4.25	5.21	6.01	7.36	8.50	9.50	13.5	19.1	0.20	0.14	2.51	2.51	3.01
	MS.N2	0.69	5.31	7.51	9.19	10.7	13.1	15.1	16.8	23.8	33.6	0.26	0.14			
	MS.N3	2.62	8.26	11.8	14.4	16.6	20.3	23.4	26.2	37.0	52.3	0.32	0.14			
	MS.N4	3.82	12.2	17.1	21.0	24.2	29.6	34.2	38.2	54.0	76.3	0.39	0.20			
	MS.N5	5.23	16.6	23.4	28.9	33.1	40.5	46.8	52.3	73.9	105	0.44	0.20			
	MS.N6	6.65	21.1	29.8	36.5	42.1	51.5	59.4	66.5	94.0	134	0.51	0.20			
1	MS.N6	6.65	21.1	29.8	36.5	42.1	51.5	59.5	66.5	94.0	134	0.51	0.20	3.64	3.64	8.51
	MS.N7	10.7	33.6	47.5	58.1	67.1	82.2	94.9	107	151	213	0.63	0.26			
	MS.N8	15.1	47.6	67.3	82.4	95.1	117	135	151	213	301	0.76	0.26			
1 1/2	MS.N9	20.5	64.5	91.3	113	130	159	183	205	289	409	0.89	0.32	4.39	4.39	27.1
	MS.N10	26.8	84.5	121	147	170	208	240	267	379	535	1.01	0.32			



# Spiral Nozzles

# MS.TFXPW

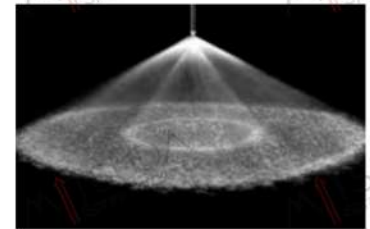
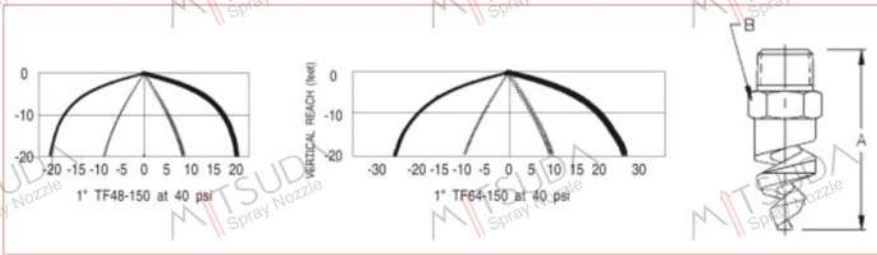


## DESIGN FEATURES

Designed with two-sided spiral nozzle to obtain wide coverage  
 One piece without any internal parts also provides wide free passage.

## SPRAY CHARACTERISTICS

Full cone spraying  
 Spray angle of 150°  
 Flow rates from 33.6 to 534 gmp.



Full Cone 150°

### MS.TFXPW Flow Rates and Dimensions

Full Cone, 150 Wide Spray Angle, 1" & 1-1/2" Pipe Size

Female Pipe Size	Nozzle Number	K Factor	Flow Rate (gmp)												Approx Free Pass Dia. (in.)	Approx Orifice Dia. (in.)		Wt. (lbs.)
			5 PSI	10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI	A		B		
1"	MS.TF48XPW	15.1	33.7	47.6	67.3	82.4	95.1	107	117	135	151	213	301	0.51	0.76	6.51	2.26	2.07
1 1/2"	MS.TF64XPW	26.8	59.8	84.6	121	147	170	190	208	240	268	379	535	0.51	1.01	6.76	2.51	2.45

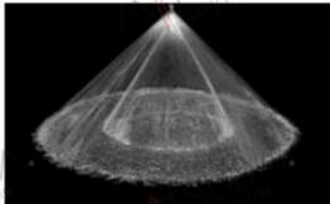


## DESIGN FEATURES

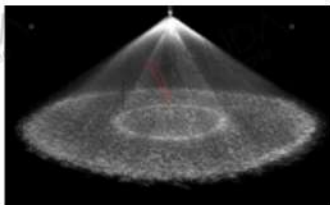
- Clog resistant
- Designed without any internal parts
- Fits pipe sizes 1/2", 1" and 1-1/2" Male connection.

## SPRAY CHARACTERISTICS

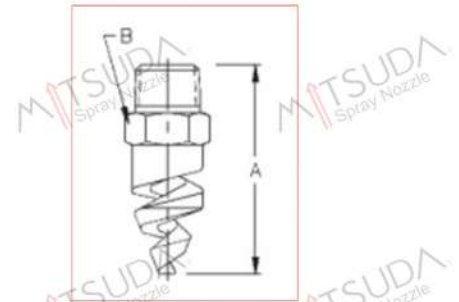
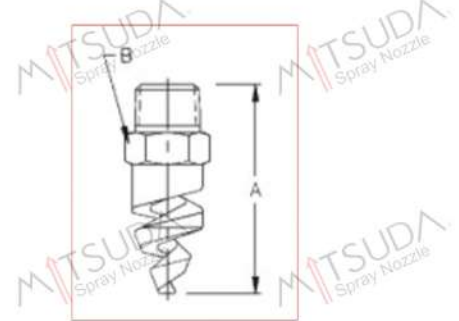
- Full cone spraying
- Spray angles of 90° & 120°
- Flow rates from 96.7 to 1720 l/min
- Two cones with wide and narrower angles to achieve full cone spraying.



Full Cone 120°



Full Cone 90°



### MS.TFXPW Flow Rates and Dimensions

Full Cone, 150 Wide Spray Angle, 1" & 1-1/2" Pipe Size

Female Pipe Size	Nozzle Number	K Factor	LITERS PER MINUTE @ BAR								Approx (mm)		Approximate Dimensions (mm)		W (g) Metal
			0.5 bar	0.7 bar	1 bar	2 bar	3 bar	5 bar	10 bar	20 bar	Orifice Dia.	Free Pass Dia.			
1/2	MS.N1	13.8	9.68	11.5	13.8	19.4	23.8	30.7	43.3	61.2	4.77	3.19	63.6	22.5	86
	MS.N2	24.3	17.2	20.3	24.3	34.3	41.7	54.0	76.5	109	6.39	3.19			
	MS.N3	37.7	26.7	31.6	37.7	53.3	65.2	84.2	120	169	7.95	3.19			
	MS.N4	55.0	38.9	46.1	55.0	77.8	95.2	124	175	247	9.54	4.77			
	MS.N5	75.2	53.3	63.0	75.3	107	131	169	239	337	11.2	4.77			
	MS.N6	95.8	67.8	90.2	95.8	136	167	215	304	429	12.8	4.77			
1	MS.N6	95.8	67.8	80.2	95.8	136	167	215	304	429	12.8	4.77	92.3	35.2	242
	MS.N7	154	109	129	154	217	265	342	484	684	16.0	6.36			
1 1/2	MS.N8	217	154	182	217	307	376	485	686	969	19.2	6.36	112	50.9	766
	MS.N9	295	209	247	295	417	510	658	931	1321	22.3	7.95			
	MS.N10	386	273	323	386	546	668	862	1221	1721	25.5	7.95			



# Spiral Nozzles

# MS.TF29-180

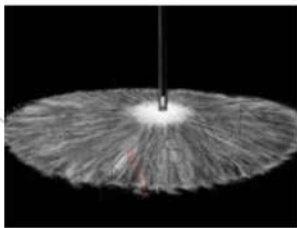
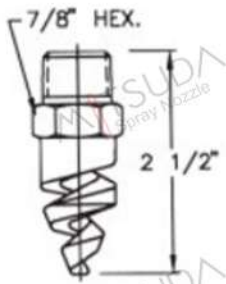


## DESIGN FEATURES

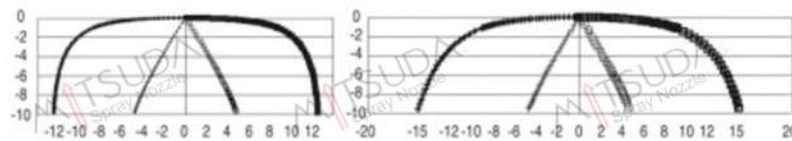
- Designed with two-turn spiral nozzle to obtain very wide coverage
- Designed without any internal parts
- Recommended as an appropriate nozzle type if there is a narrow distance between nozzle and material.

## SPRAY CHARACTERISTICS

- Ultrawide coverage
- Perfect atomization
- Spray angles of 180°
- Flow rates from 3.80 to 110 gmp.



Full Cone 180°



### MS.TF29-180 Flow Rates and Dimensions Extra-wide Spray Angle, 1/2" Pipe Size

Male Pipe Size	Nozzle Number	K Factor	GALLONS PER MINUTE @ PSI											Approx Free Pass. & Orifice Dia. (in.)	Wt. (lbs)
			10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI			
1/2	MS.TF29-180-16	1.21	3.81	5.38	6.59	7.61	8.51	9.32	10.8	12.1	17.1	24.1	0.204	0.15	
	MS.TF29-180-18	1.91	6.01	8.50	10.5	12.1	13.5	14.8	17.1	19.1	26.9	38.0	0.251	0.15	
	MS.TF29-180-21	2.30	7.26	10.4	12.7	14.6	16.3	17.9	20.6	23.0	32.5	46.0	0.282	0.23	
	MS.TF29-180-24	3.01	9.51	13.5	16.6	19.1	21.3	23.4	27.0	30.1	42.6	60.2	0.329	0.19	
	MS.TF29-180-28	3.92	12.5	17.6	21.5	24.8	27.7	30.4	35.0	39.2	55.3	78.2	0.376	0.17	
	MS.TF29-180-32	5.51	17.5	24.7	30.2	34.9	39.0	42.7	49.3	55.1	77.9	111	0.439	0.15	



# Spiral Nozzles

# MS.ST

**MITSUDA**  
Spray Nozzle

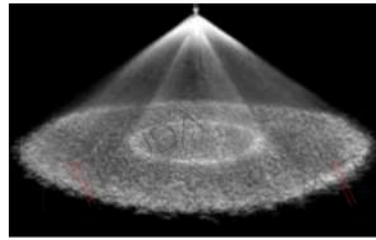
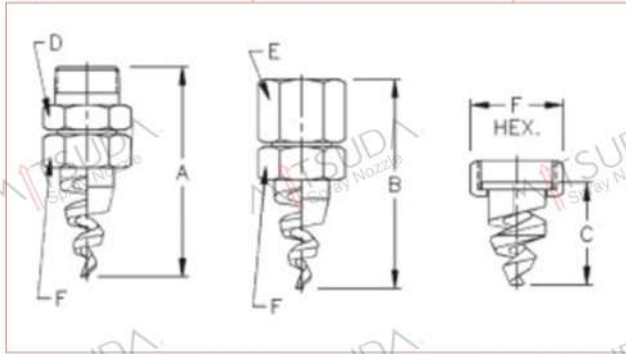


## DESIGN FEATURES

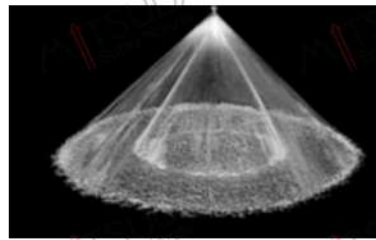
- Tank Washing Nozzle
- Designed for more energy saving
- Designed with Cobalt Alloy 6 or RBSC ceramic parts against wearing
- Both male and female connections
- Wide free passage design

## SPRAY CHARACTERISTICS

- Full cone spraying
- Spray angles of 90° & 120°
- Flow rates from 2.12 to 3220 gmp



Full Cone 120° (XP)



Full Cone 90° (XPN)



## MS.STXP Flow Rates & Dimensions

Flow Cone, 90° (XPN) and 120° (XP) Spray Angles, 3/8" to 4" Pipe Sizes

3-piece Male or Female Pipe Size	2-piece Female Pipe Sizes	Nozzle Number	K Factor	GALLONS PER MINUTE @ PSI												Approx. (in.) Orifice & Free Pass. Dia.	Approximate Dimensions (in.)						Wt. (lbs.) Metal Male Fem.	
				5 PSI	10 PSI	15 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI		A	B	C	D	E	F		
3/8		MS.ST12	0.950	2.13	3.01	3.68	4.25	5.21	6.01	6.72	7.36	8.50	9.50	13.5	19.1	0.20	3.95	3.40	2.14	1.39	1.39	1.51	0.6	0.6
		MS.ST14	1.21	2.87	4.06	4.97	5.74	7.02	8.11	9.07	9.93	11.6	12.9	18.2	25.7	0.23	3.95	3.40	2.12	1.39	1.39	1.51		
		MS.ST16	1.69	3.76	5.31	6.50	7.51	9.19	10.7	12.0	13.1	15.1	16.9	23.8	33.6	0.26	3.95	3.40	2.13	1.39	1.39	1.51		
		MS.ST20	2.62	5.84	8.26	10.2	11.8	14.4	16.6	18.5	20.3	23.4	26.2	37.0	52.3	0.32	3.95	3.40	2.13	1.39	1.39	1.51		
3/4		MS.ST24	3.82	8.53	12.2	14.9	17.1	21.0	24.2	27.0	30.0	34.2	38.2	54.0	76.3	0.39	4.57	3.82	2.69	1.20	1.20	1.75	1.2	1.2
		MS.ST28	5.23	11.8	16.6	20.3	23.4	28.7	33.1	37.0	40.5	46.8	52.3	73.9	105	0.45	4.57	3.82	2.69	1.20	1.20	1.75	1.2	1.2
		MS.ST32	6.64	14.9	21.1	25.8	29.8	36.5	42.1	47.1	51.5	59.5	66.5	94.0	134	0.51	5.15	5.13	4.23	1.51	1.51	2.20	2.1	2.1
1		MS.ST40	10.7	23.8	33.6	41.1	47.5	58.1	67.1	75.0	82.2	94.9	107	151	213	0.64	6.32	5.31	4.06	1.89	1.89	2.76	3.1	2.7
		MS.ST48	15.1	33.7	47.6	58.3	67.3	82.4	95.1	107	117	136	151	213	301	0.76	7.45	6.45	5.57	1.89	1.89	2.76		
1 1/2	1 1/2	MS.ST56	20.5	46.7	64.6	79.1	91.3	113	130	145	159	183	205	288	409	0.89	8.57	7.26	5.51	3.01	3.01	3.51	6.1	3.5
		MS.ST64	26.8	59.9	84.6	104	121	147	170	190	208	240	268	379	535	1.01	8.57	7.26	5.72	3.01	3.01	3.51		
		MS.ST72	30.5	68.0	96.1	119	137	167	193	216	236	273	305	430	608	1.14	8.89	7.64	5.74	3.01	3.01	3.51		
2	2	MS.ST88	44.4	99.1	141	172	199	243	281	314	344	397	444	627	886	1.39	11.9	8.01	8.39	3.64	3.64	4.01	8.1	4.1
		MS.ST96	56.0	126	178	217	251	307	355	396	434	501	561	792	1121	1.51	11.5	10.3	8.61	3.64	3.64	4.01		
3	3	MS.ST112	81.1	182	257	315	363	444	513	573	628	725	811	1151	1621	1.76	12.0	11.9	8.57	3.64	4.01	4.01	11	6.0
		MS.ST128	108	240	340	415	481	589	680	760	830	961	1071	1510	2151	2.01	12.7	11.9	8.57	3.64	4.01	4.01		
4	4	MS.ST160	167	372	526	644	743	910	1051	1171	1291	1481	1661	2351	3321	2.51	13.1	13.1	10.1	5.01	5.01	5.01	12	11



# Spiral Nozzles

# MS.TFXP



## DESIGN FEATURES

- More energy saving
- Male connection
- Extra wide free passage design
- Clog resistant

## SPRAY CHARACTERISTICS

- Full cone spraying
- Spray angles of 90° & 120°
- Flow rates from 3 to 3220 gmp



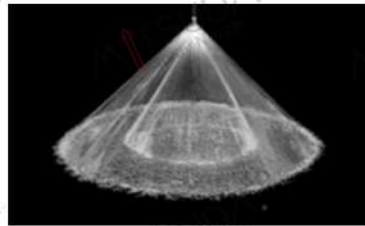
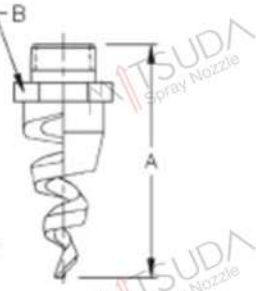
PTFE



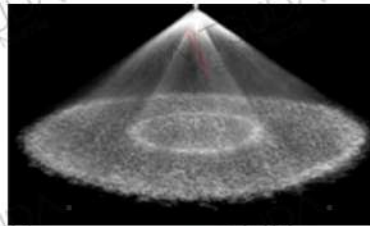
Plastic



Metal



Full Cone 90° (XPN)



Full Cone 120° (XP)

### MS.TFXP Flow Rates and Dimensions

Full Cone, 90° (XPN) and 120° (XP) Spray Angles, 3/8" to 4" Pipe Sizes

Male Pipe Size	Nozzle Number	K Factor	GALLONS PER MINUTE @ PSI										Approx. Free Pass. & Orifice Dia. (in.)	Approximate Dimensions (in.) for Metal Only		Wt. (lbs.)	
			10 PSI	20 PSI	30 PSI	40 PSI	50 PSI	60 PSI	80 PSI	100 PSI	200 PSI	400 PSI		A	B	Metal	Plas.
3/8	MS.TF12	0.950	3.01	4.25	5.21	6.01	6.72	7.36	8.50	9.50	13.5	19.1	0.20	2.89	2.89	0.21	0.05
	MS.TF14	1.29	4.06	5.74	7.02	8.11	9.07	9.93	11.6	12.9	18.2	25.7	0.23	2.89	2.89		
	MS.TF18	1.69	5.31	7.51	9.3	10.7	12.0	13.1	15.1	16.9	23.8	33.6	0.26	2.76	2.76		
	MS.TF20	2.62	8.26	11.8	14.4	16.6	18.5	20.3	23.4	26.2	37.0	52.3	0.32	3.13	3.13		
1/2	MS.TF24	3.82	12.2	17.1	21.0	24.2	27.0	29.6	34.2	38.2	54.0	76.3	0.39	3.48	3.48	0.41	0.07
	MS.TF28	5.23	16.6	23.4	28.7	33.1	37.0	40.5	46.8	52.3	73.9	105	0.45	3.51	3.51		
3/4	MS.TF32	6.65	21.1	29.8	36.5	42.1	47.1	51.5	59.5	66.5	94.0	134	0.51	5.39	5.39	1.57	0.23
1	MS.TF40	10.7	33.6	47.5	58.1	67.1	75.0	82.2	34.9	107	151	213	0.64	5.26	5.26	1.57	0.26
	MS.TF48	15.1	47.6	67.3	82.4	95.1	107	117	135	151	213	301	0.76	6.64	6.64	2.07	0.48
1 1/2	MS.TF56	20.5	64.6	91.2	113	130	145	159	183	205	269	409	0.89	6.98	6.98	4.01	0.60
	MS.TF64	26.8	84.6	121	147	169	190	208	240	268	379	535	1.01	6.95	6.95	2.45	0.54
	MS.TF72	30.5	96.1	137	167	193	216	236	273	305	430	608	1.14	7.42	7.42	2.82	0.54
2	MS.TF88	44.4	141	199	243	281	314	344	397	444	527	886	1.39	10.6	10.6	5.13	1.26
	MS.TF96	56.0	178	251	307	355	396	434	501	560	792	1121	1.51	11.1	11.1	6.32	1.26
3	MS.TF112	81.1	257	363	444	513	573	628	725	811	1152	1621	1.76**	12.0	12.0	8.38	1.38
	MS.TF128	108	340	481	589	680	760	830	961	1071	1511	2151	2.04**	11.8	11.8	9.76	1.51
4	MS.TF160	167	526	743	910	1051	1171	1291	1481	1661	2351	3321	2.50**	12.1	12.1	15.7	1.88



# Spiral Nozzles

# MS.TF

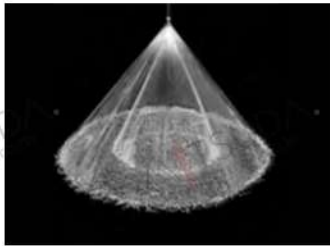


## Common Applications

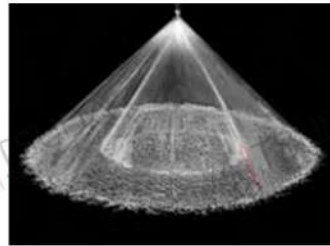
Exhaust gas filtration  
 Gas cooling  
 Clog resistant  
 More Energy saving  
 Male connection

Washing and rinsing  
 Fireproofing and fire extinguishment  
 Designed without any internal parts  
 Designed to provide more fluid discharge velocity

## Spray Angle Visual:



Full Cone 60° (NN)



Full Cone 90° (FCN)



Full Cone 150°/ 170°



pipe connection BSPT (out)	Spray angle (0.7 bar)					Capacity Size	orifice size (mm)	Diameter of nozzle without black (mm)	Capacity (L/min)				
	60°	90°	120°	150°	170°				0.7 bar	1.5 bar	3 bar	7 bar	25 bar **
1/4		○	○			13	3.2	3.2	4.9	7.3	10.3	15.7	30
3/8	○	○	○		○	30	4.8	3.2	11.4	16.7	24	36	68
1/2		○	○			82	7.9	3.2	31	46	65	99	187
			○	○		120	9.5	4.8	45	67	95	145	270
3/4		○	○			164	11.1	4.8	62	92	129	198	370
1		○	○			210	12.7	4.8	80	117	166	255	480
1-1/2			○	○		340	15.9	6.4	130	190	270	410	775
				○		640	22.2	7.9	245	355	505	770	1460