KING SUN
INDUSTRY

KST-N

COUNTERFLOW BOTTLE TYPE COOLING TOWER

MEMBER OF THE CTI

afaq ISO 9001 Quality AFNOR CERTIFICATION

TAF Environmental Management EC012

KST-N

MAIN BENEFITS

Bottle type configuration on counterflow design maximizes heat-exchanging efficiency, while minimizes acquisition cost as well as installation cost .

FEATURES

FRP Casing & Basin

Free from corrosion and rust; ensuring durable operation and long service life. High structural strengh can effectively withstand high wind velocity and vibration.

Round Design

The design permits maximum air intake at whatever wind direction.

Lightweight and portable components

All the tower components are carefully designed to be small enough to either fit into an elevator or maneuvered via stairways to rooftops or plant rooms. That enables easy transportation and eliminating rigging.

Inner, Centralized Piping System

The piping and pipe connections all are centralized in water basin.That ensures ease of installation and reduction of installation cost.

Meticulously Designed and Tested Fills

The honeycomb PVC fills are corrugated by air-vacuum forming method. The fill orifices are consistent and uniform. That enables maximum airflow volume, minimizes the pressure drop through the tower, and consquently contributes to a higher heat rejection with lower power consumption.
The corrugation of the PVC fills was meticulously designed to offer maximum water/air contact time, which results in superior heat exchanging efficiency.

Mesh Type Air Intake

The plastic mesh air-intake effectively prevents foreign objects from entering into water basin, and also provides easy access to water sump for cleaning.
Louver type air intake is available for areas that experience snow fall.

High Efficiency Drift Eliminator

Efficiently designced PVC drift eliminators can be provided upon request. The drift eliminators can limit drift loss to less than 0.005%.

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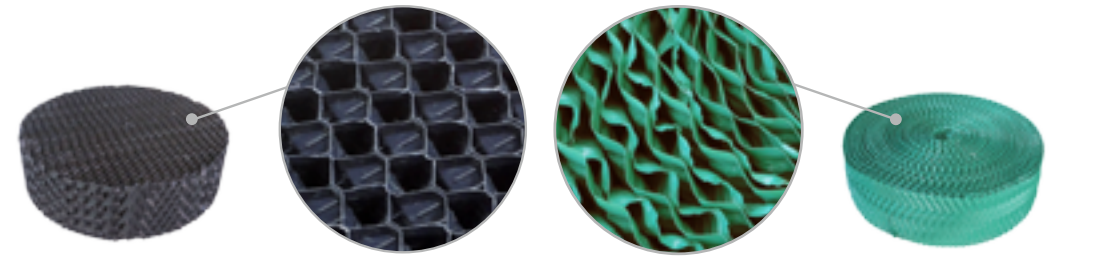
COMPARISION OF FILLS



Air Vacuum Formed Fills

Hot Press Winded Fills

Air Vacuum Formed Fills Vs. Hot Press Winded Fills

Item	Air Vacuum Formed Fills	Hot Press Winded Fills
Power Consumption	The fill orifices are uniform. That allows a well distributed air flow pattern and maximizes the internal airflow volume through the fill while minimizing the pressure drop. All that contribute to a lower overall power consumption of the tower.	The fill orifices are inconsistent, so more energy is required in order to achieve the design air flow volume through the tower.
Efficiency	The uniform orifices offer a larger heat transfer surface area, creating maximum water dispersion and leading to higher cooling efficiency. The heat exchanging efficiency is 20% higher than traditional hot press winded fills.	The inconsistency of the orifices largely reduces the heat transfer surface area of the fill. That consequently decreases the cooling efficiency of the tower.
Service Life	Air vacuum forming softens the PVC sheets thoroughly before shaping the individual profile sections. The process will not affect the inner stress integrity of thie PVC sheets or destroy their crystal structure. That ensures an extended service life of the fill.	Hot press forming only softens the PVC sheets slightly and shapes them by force. That will cause the inner stress congregation of the PVC sheets and destroy their crystal strcuture. As a result, the PVC sheets become brittle and the service life of the fill becomes shorter.

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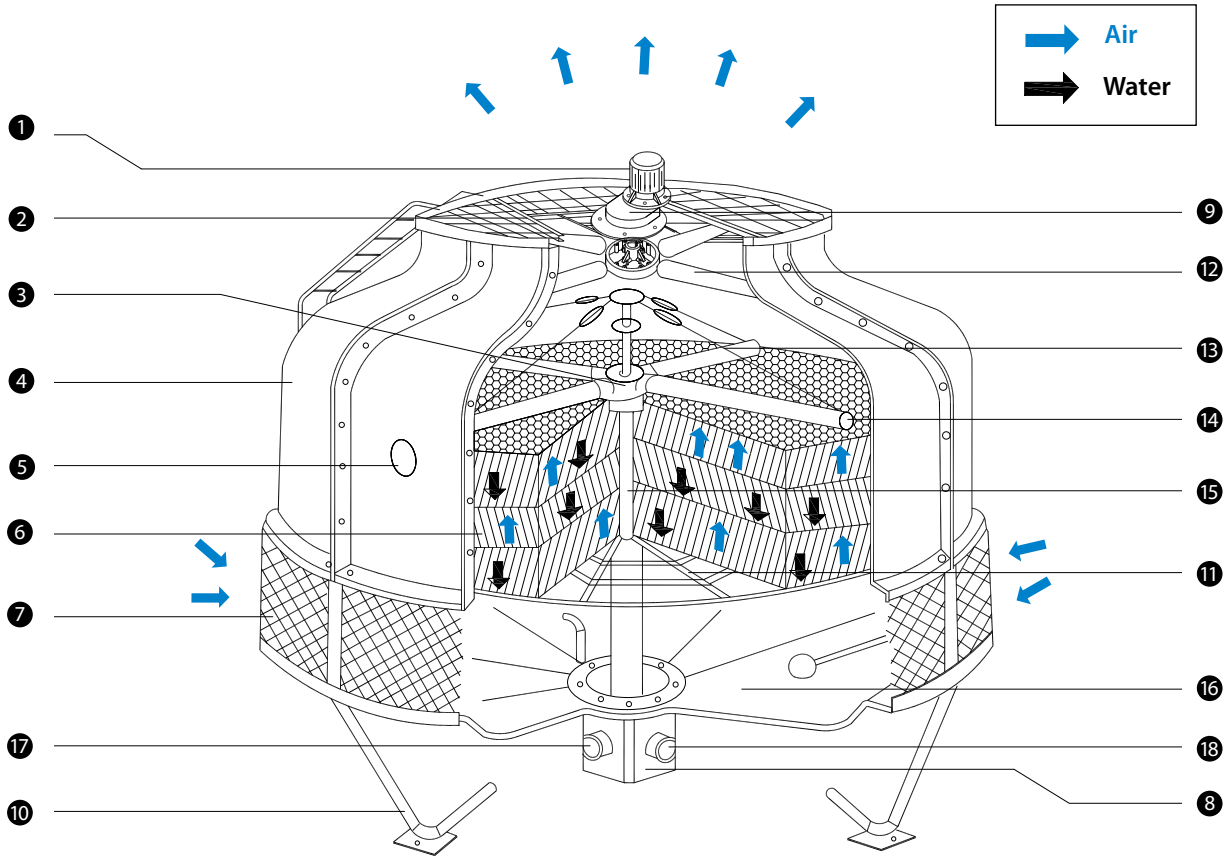
STUCTURAL DRAWING



Parts & Standard Materials

No.	Parts	Material
1	Motor	50Hz / 60Hz
2	Motor support	H.D.G. steel
3	Sprinkler head	A.B.S. / Aluminium Alloy
4	Casing	F.R.P.
5	Inspection hole	P.V.C.
6	Fill	P.V.C.
7	Air intake- mesh type	P.V.C.
8	Water Sump from 350RT ~ 1500RT	F.R.P.
9	Direct driving system from 3RT ~ 200RT	
	Gear reducer from 225RT ~ 1500RT	50Hz / 60Hz

No.	Parts	Material
10	Tower support from 3RT ~ 300RT	F.R.P.
	Tower support from 350RT ~ 1500RT	H.D.G. Steel
11	Fill support	H.D.G. Steel
12	Fan assembly	A.B.S. /F.R.P. Aluminium Alloy
13	Tension device set	H.D.G. Steel
14	Sprinkler pipes	P.V.C.
15	Standpipe	P.V.C.
16	Water basin	F.R.P.
17	Water inlet	F.R.P. / Aluminium Alloy
18	Water outlet	F.R.P. / Aluminium Alloy

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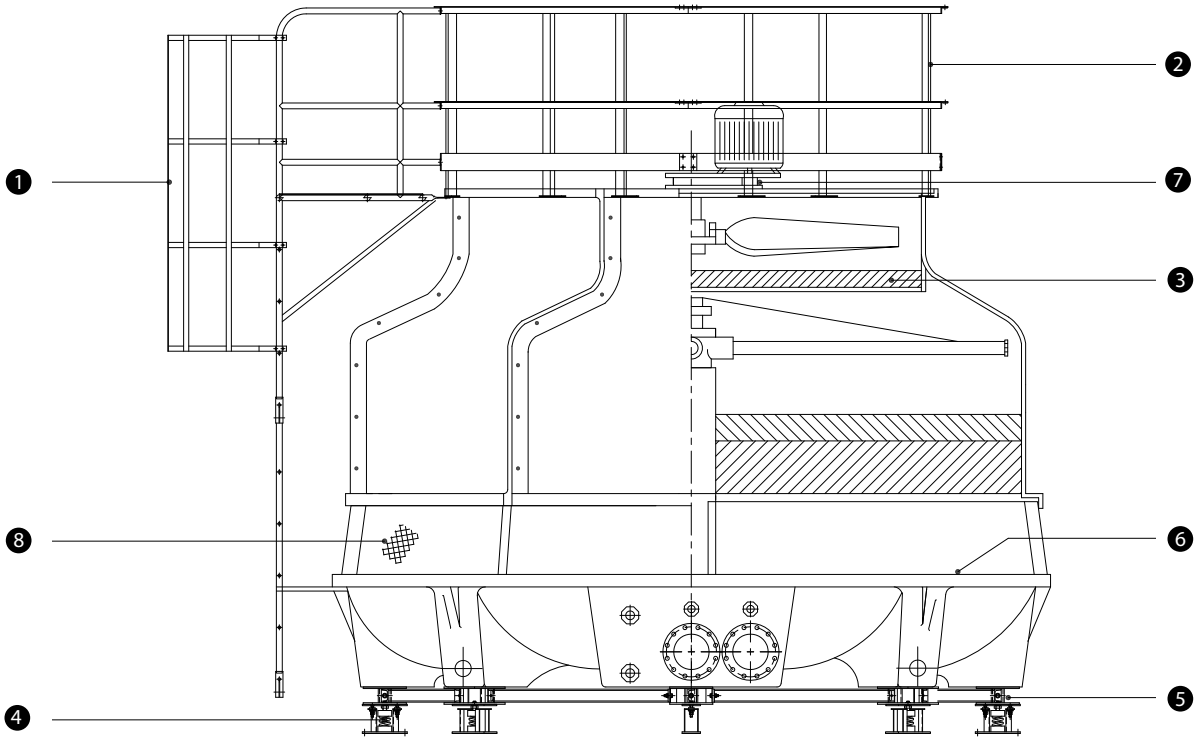
OPTIONAL PARTS AND MATERIALS



No.	Part Name	Standard material	Other material
1	Ladder cage	H.D.G. Steel	SUS304, SUS316
2	Safety handrail	H.D.G. Steel	SUS304, SUS316
3	Drift eliminator	P.V.C.	C.P.V.C
4	Spring isolator	H.D.G. Steel	SUS304
5	Spring isolator support	H.D.G. Steel	SUS304
6	Silent mat	NYLON	
7	Belt reducer (225RT ~ 1500RT)	50Hz / 60Hz	
8	Air intake- louver type	FRP	

H.D.G.Steel Hot Dip Galvanized Steel
SUS304 Stainless steel Grade 304
SUS316 Stainless steel Grade 316

P.V.C. Polyvinyl Chloride
F.R.P Fiberglass Reinforced Plastics

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SELECTION TABLE

Type	Normal Temperature Type								Medium Temperature Type		High Temperature Type	
Wet Bulb Temperature	27(°C)		28(°C)		29(°C)		30(°C)		27(°C)	28(°C)	27(°C)	28(°C)
°C / l/min / Model	37°C | 32°C	37.5°C | 32°C	37°C | 32°C	37.5°C | 32°C	37°C | 32°C	37.5°C | 32°C	38°C | 33°C	38.5°C | 33°C	42°C | 32°C	42°C | 32°C	60°C | 35°C	60°C | 35°C
3	39	36	33	30	26	24	28	26	23	20	23	20
5	65	60	55	50	43	41	46	43	39	32	39	36
8	104	95	88	80	70	66	76	70	63	55	63	60
10	130	120	100	95	88	82	95	88	78	68	78	75
15	195	180	152	148	133	123	142	133	118	100	118	110
20	260	240	220	200	177	165	190	177	157	135	157	145
25	325	300	275	255	220	210	240	220	196	170	196	185
30	390	360	330	305	270	250	290	266	240	205	240	230
40	520	480	440	415	375	355	395	375	340	300	340	330
50	650	600	550	530	470	440	500	470	400	370	400	390
60	780	720	660	615	560	520	590	560	480	450	520	490
70	910	840	770	740	660	620	700	660	580	530	600	570
80	1040	962	892	826	733	700	788	743	655	570	660	610
100	1300	1210	1120	1025	925	829	937	877	830	729	870	750
125	1625	1513	1398	1304	1152	1104	1237	1166	1034	940	1070	1000
150	1950	1814	1680	1563	1391	1330	1495	1415	1251	1093	1260	1190
175	2275	2108	1963	1837	1624	1541	1728	1634	1460	1310	1510	1430
200	2600	2419	2241	2114	1849	1786	1990	1895	1659	1456	1760	1660
225	2925	2736	2514	2380	2100	1990	2220	2090	1890	1680	1950	1830
250	3250	2995	2791	2610	2330	2180	2480	2310	2090	1860	2140	2040
300	3900	3634	3355	3135	2810	2605	2910	2760	2488	2220	2520	2395
350	4550	4223	3932	3696	3330	3130	3486	3293	2952	2615	3050	2890
400	5200	4832	4490	4250	3800	3518	3960	3748	3350	2992	3450	3220
500	6500	6100	5660	5330	4788	4520	5023	4780	4356	3880	4440	4230
600	7800	7280	6749	6340	5613	5330	5960	5650	5100	4550	5250	4950
700	9100	8470	7965	7350	6725	6300	7000	6660	6127	5482	6220	5930
800	10400	9710	8984	8520	7650	7270	8090	7680	7000	6280	7270	6930
1000	13000	12180	11430	10710	9756	9200	10100	9700	8965	8050	9250	8840
1250	16250	15350	14300	13550	12250	11700	12900	12250	11300	10300	12000	11400
1500	19500	18420	17160	16260	14700	14050	15480	14700	13600	12200	14200	13200

1 Please verify the wet bulb temperature at the geographical location where the tower is to be installed before consulting the Selection Table.

2 Should the design temperature condition not be within the selection temperature range of the table, please contact your King Sun representative.

3 In order to select the cooling tower model no., the data below are necessary:

- Water flow rate… LPM, GPM, m^3/hr
- Entering temperature… water temperature into the tower
- Leaving temperature… water temperature required out of the tower
- WBT… wet bulb temperature

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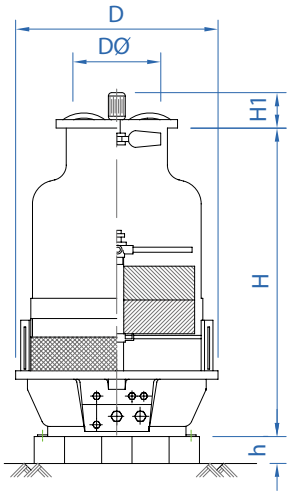
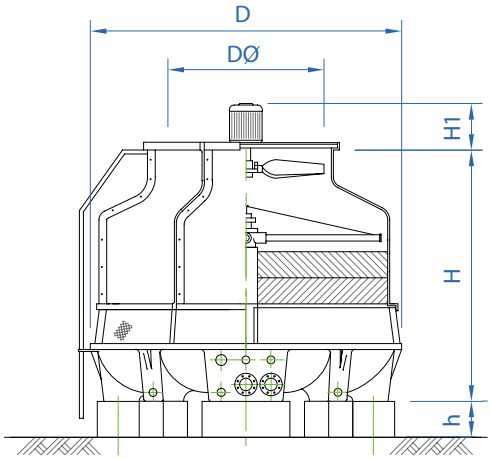
SPECIFICATIONS

KST-N-3~20RT



KST-N-25~300RT



Model KST-N	Heat duty	Water flow	Dimension m/m			Motor		Fan	Head	Dry weight	Operating weight
	kcal/h	l/min	H	H1	D	HP	kW	Dφm/m	m	kg	kg
3	11700	39	1318	175	750	1/6	0.12	500	1.3	30	75
5	19500	65	1318	175	750	1/6	0.12	500	1.5	35	85
8	32100	104	1563	175	860	1/6	0.12	500	1.5	41	120
10	39000	130	1563	178	860	1/4	0.18	500	1.7	45	130
15	58500	195	1773	178	1165	1/4	0.18	600	1.7	66	210
20	78000	260	1773	193	1165	1/2	0.37	600	1.8	90	260
25	97500	325	1795	231	1440	1	0.75	700	1.8	137	505
30	117000	390	1795	231	1440	1	0.75	700	2.0	144	522
40	156000	520	1775	231	1560	1	0.75	700	2.0	185	577
50	195000	650	1845	263	1800	2	1.5	900	2.0	228	650
60	234000	780	1845	263	1800	2	1.5	900	2.0	277	719
70	273000	910	2140	320	1900	2	1.5	1200	2.0	337	798
80	312000	1040	1980	320	2140	2	1.5	1200	2.0	352	982
100	390000	1300	2365	320	2410	3	2.2	1500	2.5	474	1205
125	487500	1625	2330	320	2730	3	2.2	1500	3.0	524	1336

1 The normal cooling capacity of KST-N towers was based on 37°C HWT, 32°C CWT, 27°C WBT and 13LPM per ton.

2 The water flow rate (LPM) on the table was based on temperature condition: 37°C-32°C-27°C.

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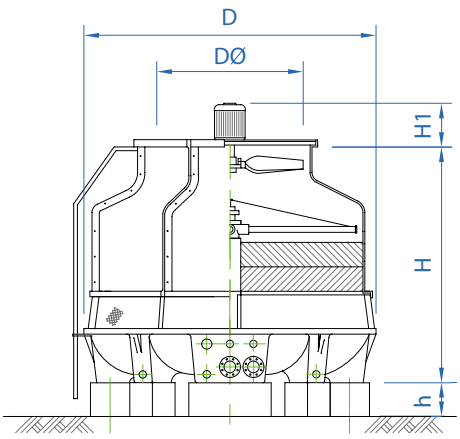
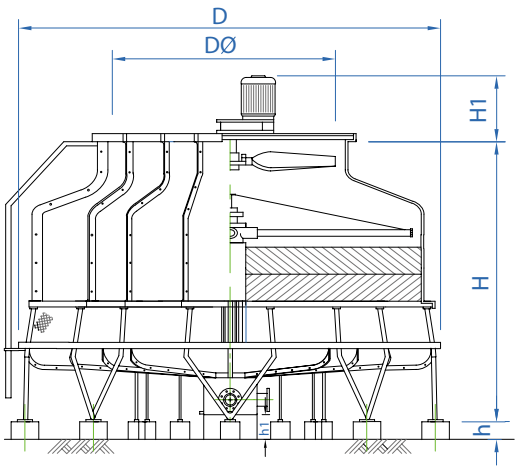
SPECIFICATIONS

KST-N-25~300RT



KST-N-350~1500RT



Model KST-N	Heat duty	Water flow	Dimension m/m			Motor		Fan	Head	Dry weight	Operating weight
	kcal/h	l/min	H	H1	D	HP	kW	Dφm/m	m	kg	kg
150	585000	1950	2465	499	3050	5	3.7	1800	3.0	702	3212
175	682500	2275	2465	499	3050	5	3.7	1800	3.1	855	3415
200	780000	2600	2450	499	3280	5	3.7	1800	3.3	937	3570
225	877500	2925	2405	513	3280	7 1/2	5.5	2400	3.3	1022	3661
250	975000	3250	2740	513	3760	7 1/2	5.5	2400	3.6	1172	3885
300	1170000	3900	2835	551	4160	10	7.5	2400	3.6	1331	4125
350	1365000	4550	3370	551	4600	10	7.5	2400	4.1	1560	5690
400	1560000	5200	3375	668	4600	15	11	3000	4.3	1902	6145
500	1950000	6500	4264	668	4870	15	11	3000	4.4	2165	6837
600	2340000	7800	3990	712	5580	20	15	3400	5.1	2909	8052
700	2730000	9100	4200	712	6550	20	15	3400	5.1	3411	11734
800	3120000	10400	4200	767	6550	30	22	3400	5.8	3963	12690
1000	3900000	13000	4935	767	6550	30	22	3600	6.1	4512	13465
1250	4875000	16250	5315	767	7600	40	30	4200	6.3	4650	14500
1500	5850000	19500	5605	994	8430	50	37	4200	6.5	5500	21500

1 The normal cooling capacity of KST-N towers was based on 37°C HWT, 32°C CWT, 27°C WBT and 13LPM per ton.
2 The water flow rate (LPM) on the table was based on temperature condition: 37°C-32°C-27°C.

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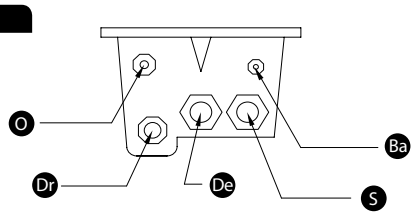
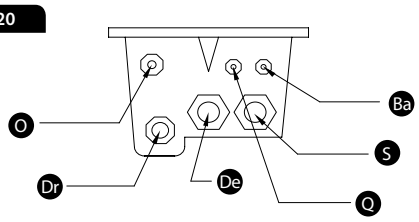
PIPE CONNECTION DETAILS

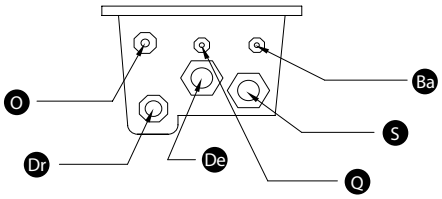
KST-N-3~5



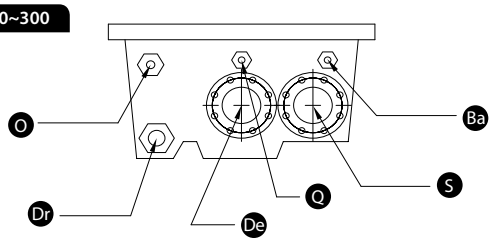
KST-N-8~20



KST-N-25~70



KST-N-80~300



RT	Inlet De	Outlet S	Automatic Ba	Quick Q	Over flow O	Drain Dr
3	1 1/2"(40A)	1 1/2"(40A)	1/4"(15A)	-----	1"(25A)	1"(25A)
5	1 1/2"(40A)	1 1/2"(40A)	1/4"(15A)	-----	1"(25A)	1"(25A)
8	1 1/2"(40A)	1 1/2"(40A)	1/4"(15A)	1/4"(15A)	1"(25A)	1"(25A)
10	1 1/2"(40A)	1 1/2"(40A)	1/4"(15A)	1/4"(15A)	1"(25A)	1"(25A)
15	2"(50A)	2"(50A)	1/4"(15A)	1/4"(15A)	1"(25A)	1"(25A)
20	2"(50A)	2"(50A)	1/4"(15A)	1/4"(15A)	1"(25A)	1"(25A)
25	2 1/2"(65A)	2 1/2"(65A)	1/4"(15A)	1/4"(15A)	1"(25A)	2"(50A)
30	2 1/2"(65A)	2 1/2"(65A)	1/4"(15A)	1/4"(15A)	1"(25A)	2"(50A)
40	2 1/2"(65A)	2 1/2"(65A)	1/4"(15A)	1/4"(15A)	1"(25A)	2"(50A)
50	3"(80A)	3"(80A)	3/4"(20A)	3/4"(20A)	1"(25A)	2"(50A)
60	3"(80A)	3"(80A)	3/4"(20A)	3/4"(20A)	1"(25A)	2"(50A)
70	4"(100A)	4"(100A)	3/4"(20A)	3/4"(20A)	1"(25A)	2"(50A)
80	4"(100A)	4"(100A)	3/4"(20A)	3/4"(20A)	1"(25A)	2"(50A)
100	5"(125A)	5"(125A)	1"(25A)	1"(25A)	1"(25A)	2"(50A)
125	5"(125A)	5"(125A)	1"(25A)	1"(25A)	1"(25A)	2"(50A)

1 If there's a need for equalization connection, please contact your King Sun representative.

2 For high temperature applications, there may possibly exist a need to modify the pipe diameters on the water inlet and water outlet. For this type of application, please contact your King Sun representative for advice.

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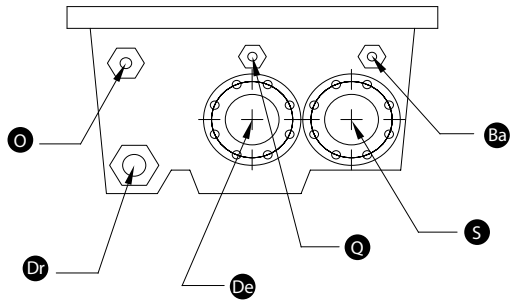
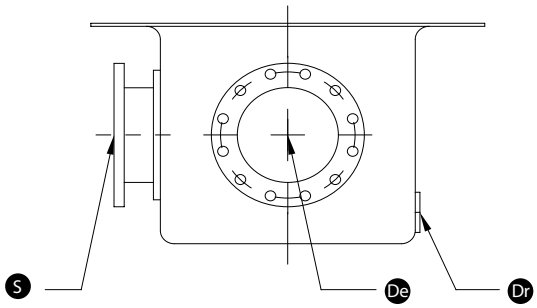
PIPE CONNECTION DETAILS

KST-N-80~300



KST-N-350~1500



RT	Inlet De	Outlet S	Automatic Ba	Quick Q	Over flow O	Drain Dr
150	5"(125A)	5"(125A)	1"(25A)	1"(25A)	2"(50A)	2"(50A)
175	5"(125A)	5"(125A)	1"(25A)	1"(25A)	2"(50A)	2"(50A)
200	6"(150A)	6"(150A)	1 1/4"(32A)	1 1/4"(32A)	2"(50A)	2"(50A)
225	6"(150A)	6"(150A)	1 1/4"(32A)	1 1/4"(32A)	2"(50A)	2"(50A)
250	8"(200A)	8"(200A)	1 1/4"(32A)	1 1/4"(32A)	2"(50A)	2"(50A)
300	8"(200A)	8"(200A)	1 1/4"(32A)	1 1/4"(32A)	2"(50A)	2"(50A)
350	8"(200A)	8"(200A)	1 1/4"(32A)	1 1/4"(32A)	3"(80A)	2"(50A)
400	8"(200A)	8"(200A)	1 1/4"(32A)	1 1/4"(32A)	3"(80A)	2"(50A)
500	10"(250A)	10"(250A)	1 1/2"(40A)	1 1/2"(40A)	3"(80A)	2"(50A)
600	10"(250A)	10"(250A)	1 1/2"(40A)	1 1/2"(40A)	3"(80A)	2"(50A)
700	10"(250A)	10"(250A)	2"(50A)	2"(50A)	4"(100A)	2"(50A)
800	12"(300A)	12"(300A)	2"(50A)	2"(50A)	4"(100A)	2"(50A)
1000	12"(300A)	12"(300A)	2"(50A)	2"(50A)	4"(100A)	2"(50A)
1250	12"(300A)	12"(300A)	2 1/2"(65A)	2 1/2"(65A)	4"(100A)	2 1/2"(65A)
1500	12"(300A)	12"(300A)	2 1/2"(65A)	2 1/2"(65A)	4"(100A)	2 1/2"(65A)

1 If there's a need for equalization connection, please contact your King Sun representative.

2 For high temperature applications, there may possibly exist a need to modify the pipe diameters on the water inlet and water outlet. For this type of application, please contact your King Sun representative for advice.

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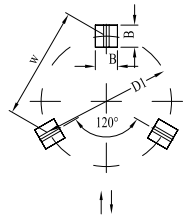
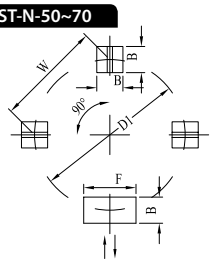
FOUNDATION DETAILS

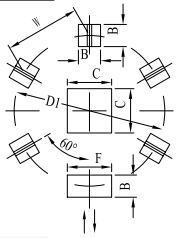
KST-N-3~40



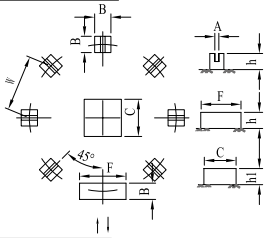
KST-N-50~70



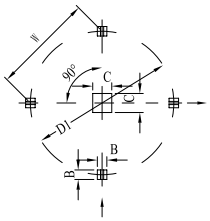
KST-N-80~175



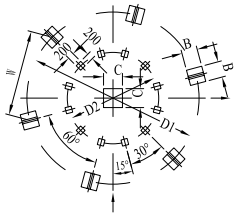
KST-N-200~300



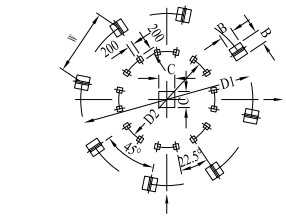
KST-N-350~500



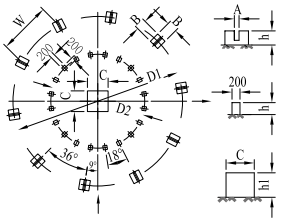
KST-N-600



KST-N-700~1250



KST-N-1500



Model KST-N	D1	W	D2	A	B	C	h	h1	F	Anchor Bolt		
										Size	Length	Quantity
3	560	485		50	200		150			M12	120	3
5	560	485		50	200		150			M12	120	3
8	660	572		50	200		150			M12	120	3
10	660	572		50	200		150			M12	120	3
15	956	828		50	200		150			M12	120	3
20	956	828		50	200		150			M12	120	3
25	1116	966		50	200		150			M12	120	3
30	1116	966		50	200		150			M12	120	3
40	1180	1022		50	200		150			M12	120	3
50	1418	1003		50	250		200		500	M12	120	3
60	1418	1003		50	250		200		500	M12	120	3
70	1440	1018		50	250		200		500	M12	120	3
80	1700	850		50	250	500	200		500	M12	120	5
100	2100	1050		50	300	500	300		1000	M16	200	5
125	2120	1060		50	300	500	300		1000	M16	200	5
150	2464	1232		50	300	600	300		900	M16	200	5
175	2464	1232		50	300	600	300		900	M16	200	7
200	2690	1029		50	300	600	300	300	900	M16	200	7
225	2690	1029		50	300	600	300	300	900	M16	200	7
250	3160	1209		100	350	800	400	400	1000	M16	200	7
300	3550	1358		100	350	800	400	400	1000	M16	200	7
350	4520	3196		100	300	600	300	380		M16	200	8
400	4520	3196		100	300	600	300	380		M16	200	8
500	4740	3352		100	300	600	300	380		M16	200	8
600	5460	2730	2900	100	500	600	300	520		M20	200	12
700	6450	2468	3600	100	500	600	300	380		M20	200	16
800	6450	2468	3600	100	500	600	300	380		M20	200	16
1000	6450	2468	3600	100	500	600	300	380		M20	200	16
1250	7630	2920	4155	100	500	900	300	380		M20	200	16
1500	8200	2534	4540	100	500	1000	300	580		M20	200	20

In the event that spring mount vibration isolators are to be used, the foundation detail would need to be modified.
For this type of application, please contact your King Sun representative for advice.

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