

POONGCHEON



NEW

Hi-Per Series 직교류형 냉각탑

INDUCED DRAFT CROSS FLOW
OPEN CIRCUIT COOLING TOWER



[주] 풍천엔지니어링
POONGCHEON ENGINEERING CO.,LTD

NEW

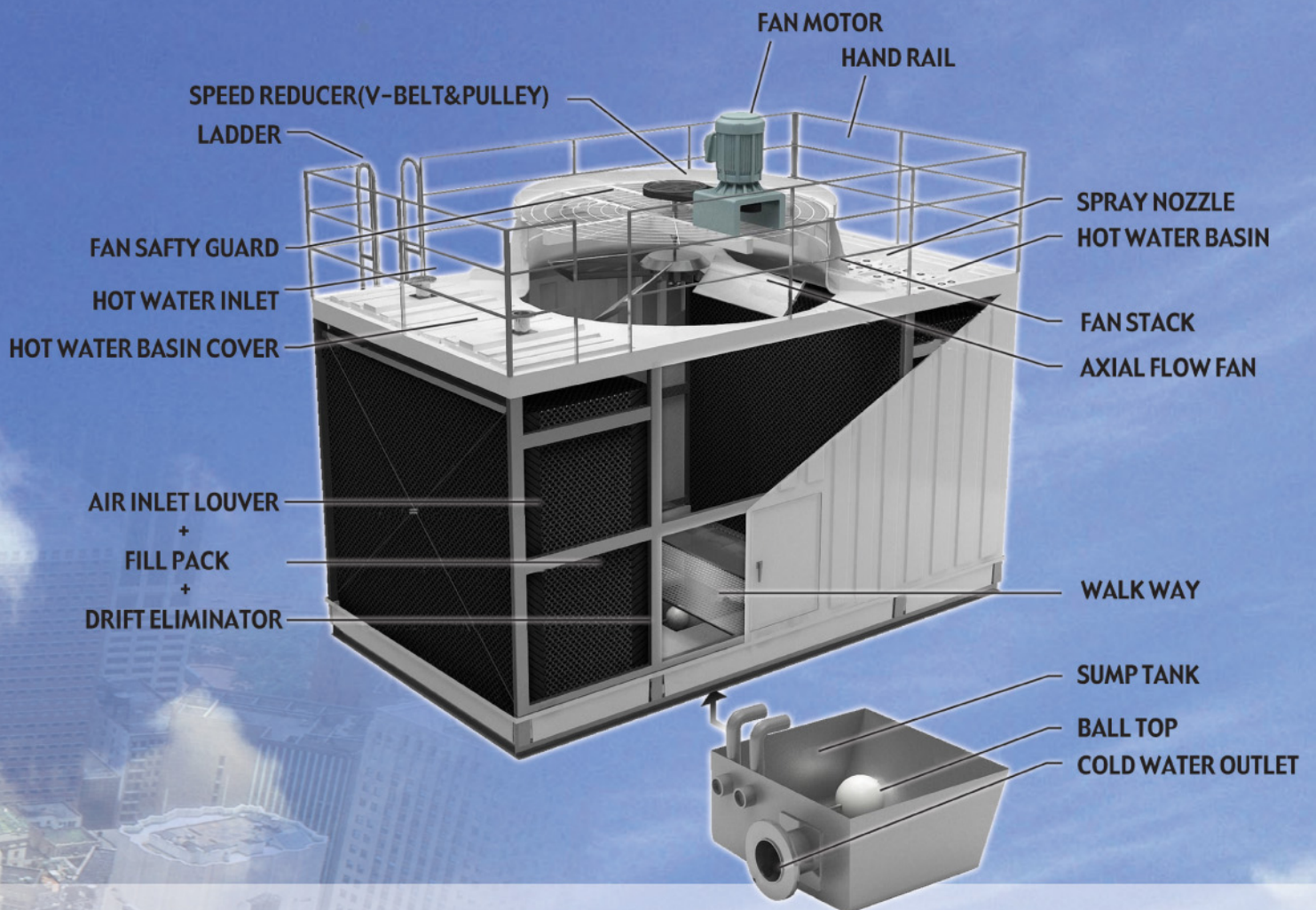
Hi-Per Series

직교류형 냉각탑

INDUCED DRAFT CROSS FLOW OPEN CIRCUIT COOLING TOWER



POONGCHEON ENGINEERING



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MODEL STANDARD SPECIFICATION

NEW HI-PER MODEL STANDARD SPECIFICATION

ITEM		MODEL	NHP-200F	NHP-250F	NHP-300F	NHP-350F	NHP-400F	NHP-450F		
Capacity	Cooling Cap.	RT	200	250	300	350	400	450		
	No. of Cell(s)	Cell(s)	200F-1	250F-1	300F-1	350F-1	400F-1	450F-1		
	Heat Load	kcal/hr	780,000	975,000	1,170,000	1,365,000	1,560,000	1,755,000		
	Water flow	LPM	2,600	3,250	3,900	4,550	5,200	5,850		
		m³/hr	156	195	234	273	312	351		
	Inlet Water Temp.	°C	37							
	Outlet Water Temp.	°C	32							
Wet Bulb Temp.	°C	27								
Fan Assembly	Fan	Type	Axial Flow							
		Diameter	mm	1,800	2,000	2,000	2,400	2,400	2,700	
		Air Volume	m³/min	1,470	1,734	2,058	2,400	2,700	3,054	
		No. of Blade	ea	6						
		Driver System		V-Belt Driver						
		Quantity	ea	1	1	1	1	1	1	
	Motor	Type	T.E.F.C, Class F, IP 54							
		Power Source	3Ph, 50/60Hz, 220V (380V/440V)							
		Nominal Motor	Kw	5.5	7.5	11	11	15	15	
		Quantity	ea	1	1	1	1	1	1	
Material	Fan Stack		F.R.P							
	Fan Drive Support		SS41 + H.D.G							
	Fan Blade / Hub		Al-alloy or F.R.P / H.D.G Steel or Al-alloy							
	Frame Members		SS41 + H.D.G							
	Casing / Partition		F.R.P							
	Fill / Louver		P.V.C							
	Eliminator		P.V.C							
	Hot Water Basin		F.R.P							
	Spray Nozzle		P.P							
	Cold water basin		F.R.P							
Pipe Connections	Hot Water Inlet	A	125×2	125×2	125×2	125×4	125×4	125×4		
	Cold Water Outlet	A	150	200	200	200	250	250		
	Drain	A	65	65	65	65	65	80		
	Overflow	A	65	80	80	80	80	100		
	Make-up (Auto)	A	32	32	32	40	40	40		
	Make-up (Manual)	A	32	32	32	40	40	40		
Water Distribution System			Open Gravity & Downspray							
Evaporation Loss		%	0.75							
Drift Loss		%	Drift Loss less than 0.02 to Total Water Flow							
C/T Size	Length	mm	2,230	2,530	2,530	2,830	2,830	3,330		
	Width	mm	4,100	4,700	4,700	5,100	5,100	5,400		
	Height	mm	3,473	3,688	3,770	4,040	4,114	4,114		
Weight	Net Weight	Kg	2,072	2,558	2,598	3,104	3,129	3,731		
	Operating Weight	Kg	4,016	4,958	4,998	6,604	6,629	7,931		
Water Storage Capacity		Litter	1,578	2,018	2,018	2,396	2,396	2,990		

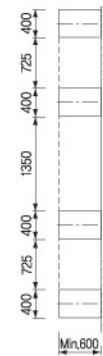
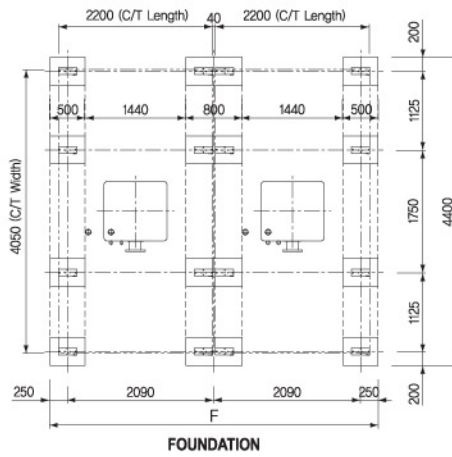
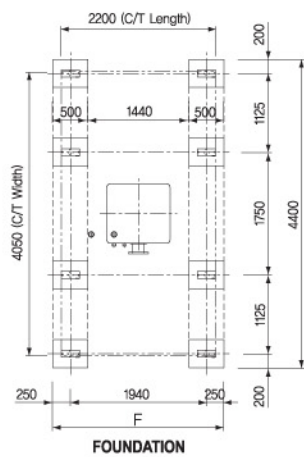
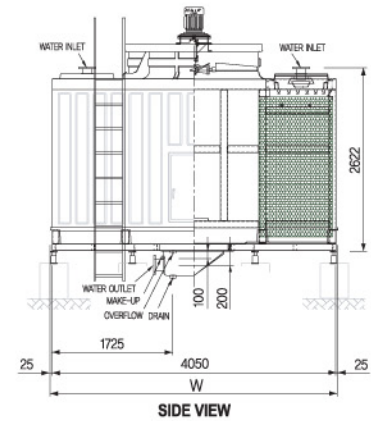
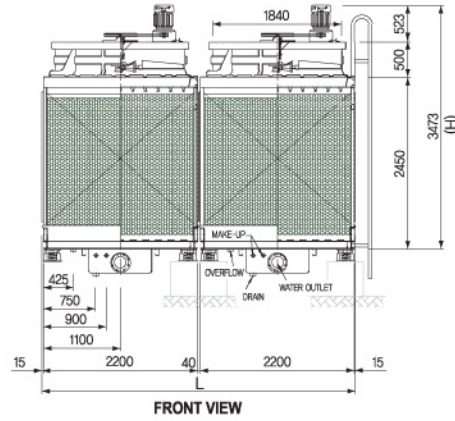
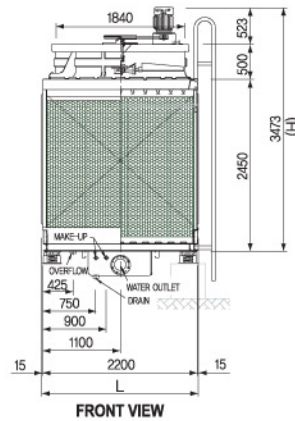
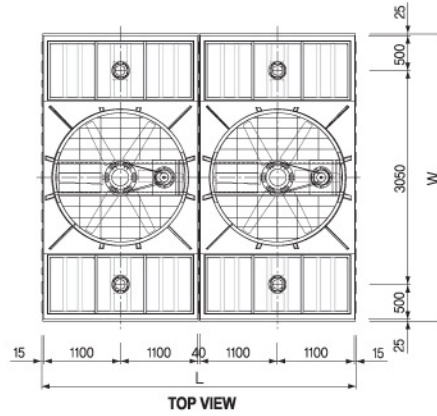
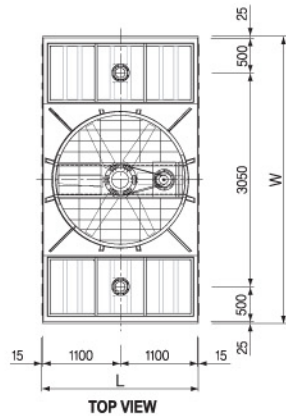


NEW HI-PER MODEL STANDARD SPECIFICATION

MODEL			NHP-500F	NHP-600F	NHP-700F	NHP-800F	NHP-900F	NHP-1000F	NHP-1200F		
ITEM											
Capacity	Cooling Cap.	RT	500	600	700	800	900	1000	1200		
	No. of Cell(s)	Cell(s)	500F-1	600F-1	350F-2	400F-2	450F-2	500F-2	600F-2		
	Heat Load	kcal/hr	1,950,000	2,340,000	2,730,000	3,120,000	3,510,000	3,900,000	4,680,000		
	Water flow	LPM	6,500	7,800	9,100	10,400	11,700	13,000	15,600		
		m³/hr	390	468	546	624	702	780	936		
	Inlet Water Temp.	°C	37								
	Outlet Water Temp.	°C	32								
Wet Bulb Temp.	°C	27									
Fan Assembly	Fan	Type	Axial Flow								
		Diameter	mm	2,700	3,500	2,400	2,400	2,700	2,700	3,500	
		Air Volume	m³/min	3,360	4,104	2,400	2,700	3,054	3,360	4,104	
		No. of Blade	ea	6							
		Driver System		V-Belt Driver							
		Quantity	ea	1	1	2	2	2	2	2	
	Motor	Type	T.E.F.C, Class F, IP 54								
		Power Source	3Ph, 50/60Hz, 220V (380V/440V)								
		Nominal Motor	Kw	22	22	11	15	15	22	22	
		Quantity	ea	1	1	2	2	2	2	2	
Material	Fan Stack		F.R.P								
	Fan Drive Support		SS41 + H.D.G								
	Fan Blade / Hub		Al-alloy or F.R.P / H.D.G Steel or Al-alloy								
	Frame Members		SS41 + H.D.G								
	Casing / Partition		F.R.P								
	Fill / Louver		P.V.C								
	Eliminator		P.V.C								
	Hot Water Basin		F.R.P								
	Spray Nozzle		P.P								
	Cold water basin		F.R.P								
Pipe Connections	Hot Water Inlet	A	125×4	125×4	125×8	125×8	125×8	125×8	125×8		
	Cold Water Outlet	A	250	250	200×2	250×2	250×2	250×2	250×2		
	Drain	A	80	80	65×2	65×2	80×2	80×2	80×2		
	Overflow	A	100	100	80×2	80×2	100×2	100×2	100×2		
	Make-up (Auto)	A	40	50	40×2	40×2	40×2	40×2	50×2		
	Make-up (Manual)	A	40	50	40×2	40×2	40×2	40×2	50×2		
Water Distribution System		Open Gravity & Downspray									
Evaporation Loss		%	0.75								
Drift Loss		%	Drift Loss less than 0.02 to Total Water Flow								
C/T Size	Length	Kg	3,330	4,230	5,670	5,670	6,670	6,670	8,470		
	Width	Kg	5,400	6,210	5,100	5,100	5,400	5,400	6,210		
	Height	Kg	4,165	4,165	4,040	4,114	4,114	4,165	4,165		
Weight	Net Weight	Kg	3,790	4,850	6,208	6,258	7,462	7,580	9,700		
	Operating Weight	Kg	7,990	10,710	13,208	13,258	15,862	15,980	21,420		
Water Storage Capacity		Litter	2,990	4,216	4,792	4,792	5,980	5,980	8,432		

DIMENSIONS AND CONNECTIONS

NHP-200 FRAME

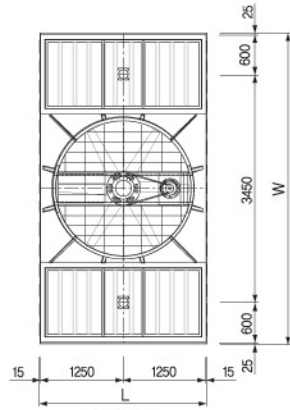


	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 200-1	2,072	4,016	2,230	4,100	3,473	2,440	65A×1	65A×1	32A×1	32A×1	125A×2	150A×1
NHP 200-2	4,144	8,032	4,470	4,100	3,473	4,680	65A×2	65A×2	32A×2	32A×2	125A×4	150A×2
NHP 200-3	6,216	12,048	6,710	4,100	3,473	6,920	65A×3	65A×3	32A×3	32A×3	125A×6	150A×3
NHP 200-4	8,288	16,064	8,950	4,100	3,473	9,160	65A×4	65A×4	32A×4	32A×4	125A×8	150A×4

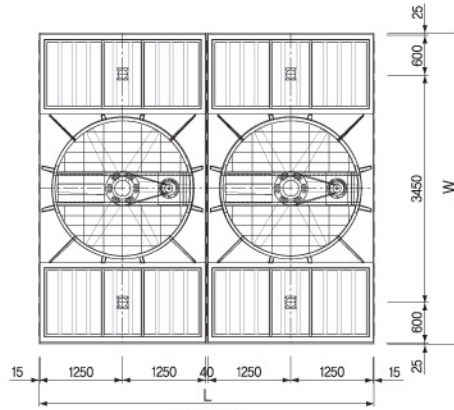
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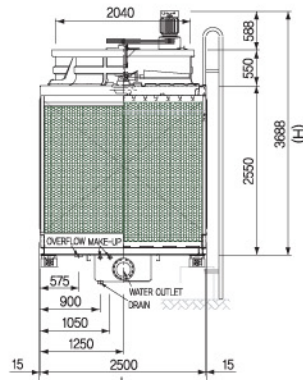
NHP-250 FRAME



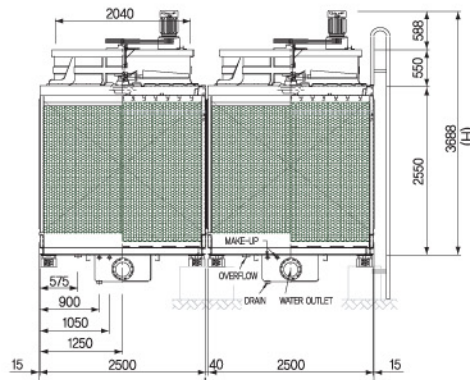
TOP VIEW



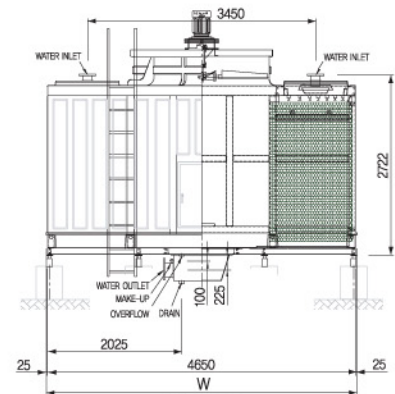
TOP VIEW



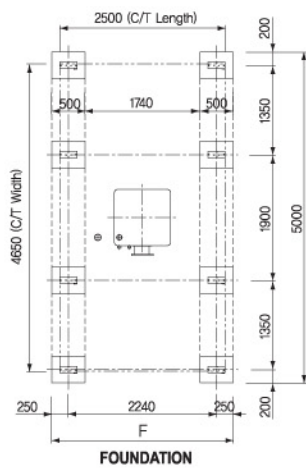
FRONT VIEW



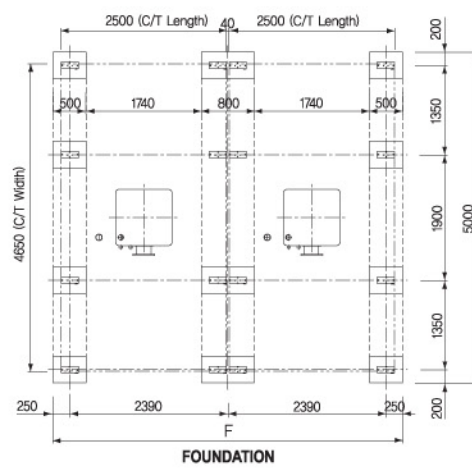
FRONT VIEW



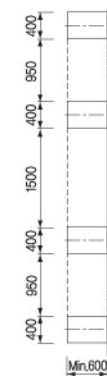
SIDE VIEW



FOUNDATION



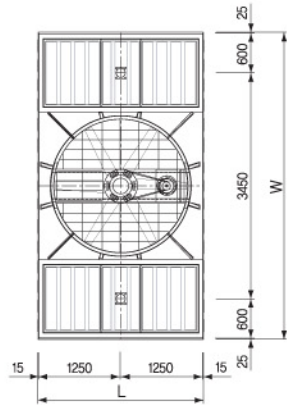
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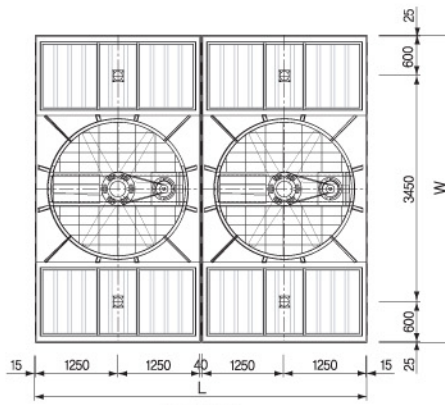
	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 250-1	2,558	4,958	2,530	4,700	3,688	2,740	80A×1	65A×1	32A×1	32A×1	125A×2	200A×1
NHP 250-2	5,116	9,916	5,070	4,700	3,688	5,280	80A×2	65A×2	32A×2	32A×2	125A×4	200A×2
NHP 250-3	7,674	14,874	7,610	4,700	3,688	7,820	80A×3	65A×3	32A×3	32A×3	125A×6	200A×3
NHP 250-4	10,232	19,832	10,150	4,700	3,688	10,360	80A×4	65A×4	32A×4	32A×4	125A×8	200A×4

DIMENSIONS AND CONNECTIONS

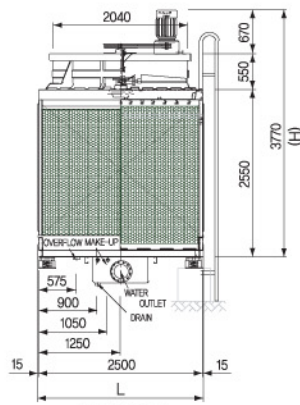
NHP-300 FRAME



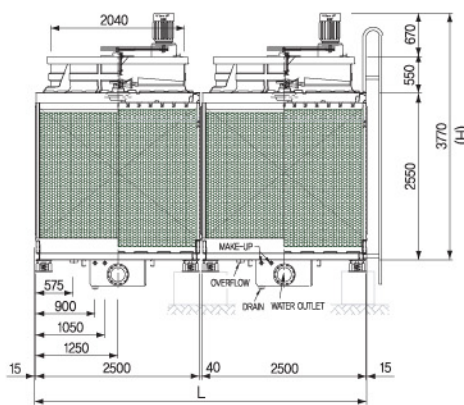
TOP VIEW



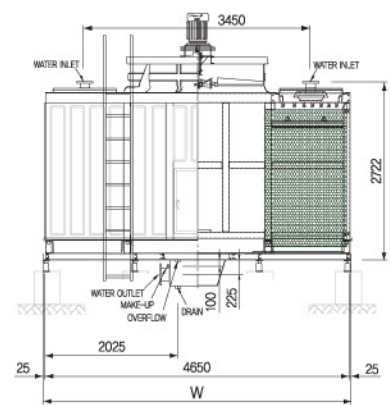
TOP VIEW



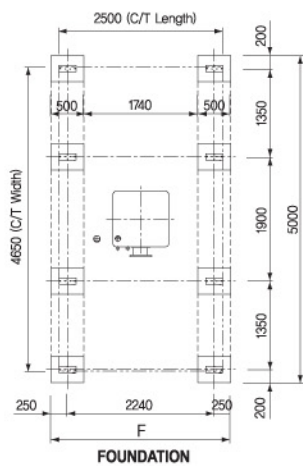
FRONT VIEW



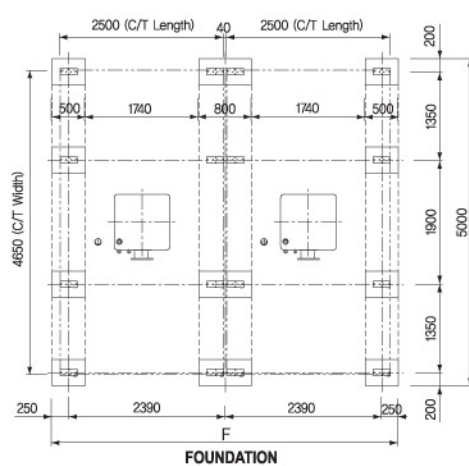
FRONT VIEW



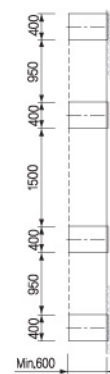
SIDE VIEW



FOUNDATION



FOUNDATION

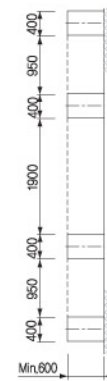
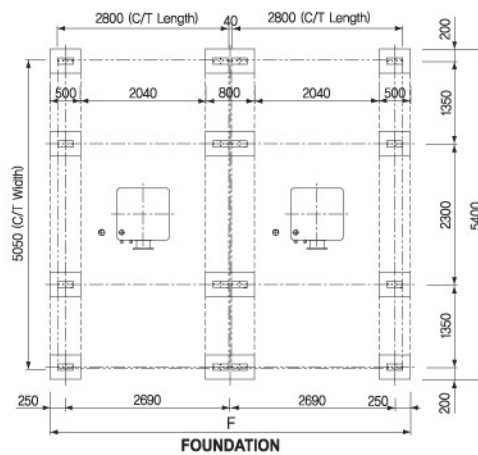
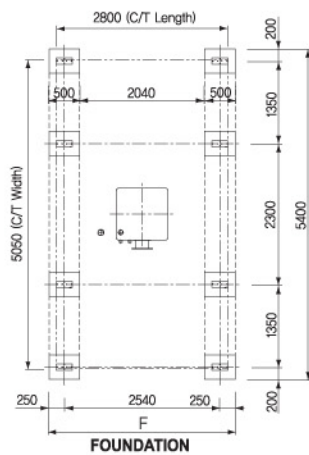
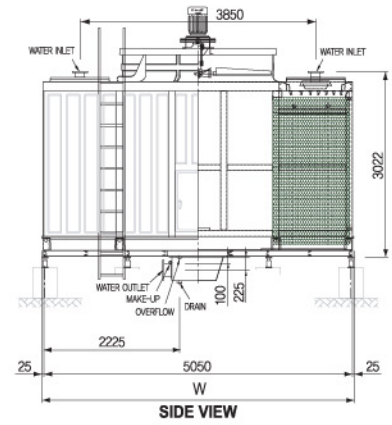
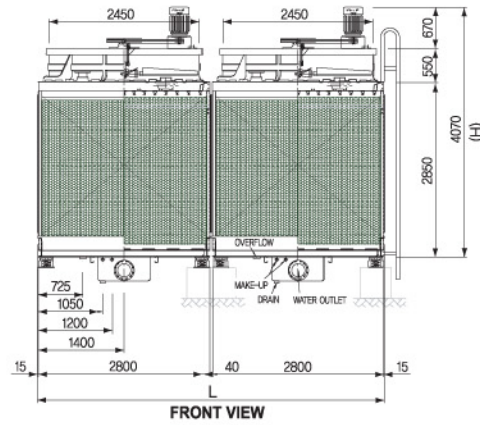
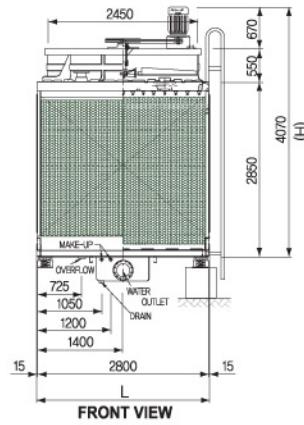
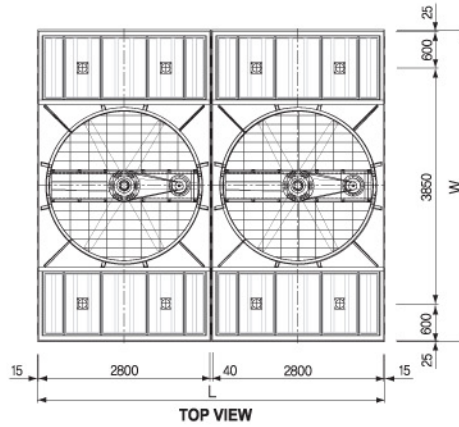
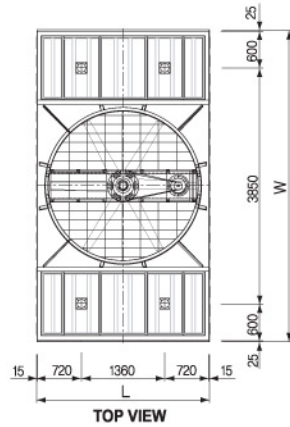


	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 300-1	2,598	4,998	2,530	4,700	3,770	2,740	80A×1	65A×1	32A×1	32A×1	125A×2	200A×1
NHP 300-2	5,196	9,996	5,070	4,700	3,770	5,280	80A×2	65A×2	32A×2	32A×2	125A×4	200A×2
NHP 300-3	7,794	14,994	7,610	4,700	3,770	7,820	80A×3	65A×3	32A×3	32A×3	125A×6	200A×3
NHP 300-4	10,392	19,992	10,150	4,700	3,770	10,360	80A×4	65A×4	32A×4	32A×4	125A×8	200A×4

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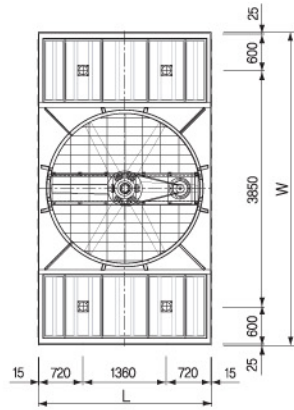
NHP-350 FRAME



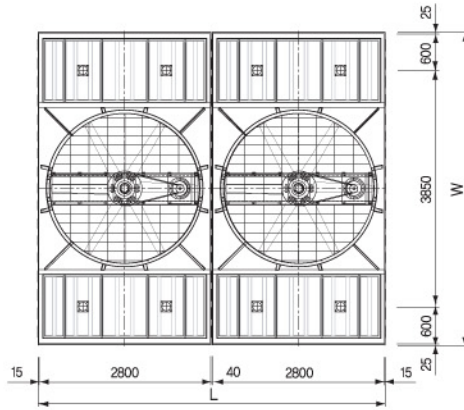
	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 350-1	3,104	6,604	2,830	5,100	4,040	3,040	80A×1	65A×1	40A×1	40A×1	125A×4	200A×1
NHP 350-2	6,208	13,208	5,670	5,100	4,040	5,880	80A×2	65A×2	40A×2	40A×2	125A×8	200A×2
NHP 350-3	9,312	19,812	8,510	5,100	4,040	8,720	80A×3	65A×3	40A×3	40A×3	125A×12	200A×3
NHP 350-4	12,416	26,416	11,350	5,100	4,040	11,560	80A×4	65A×4	40A×4	40A×4	125A×16	200A×4

DIMENSIONS AND CONNECTIONS

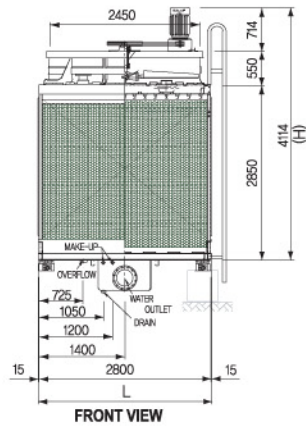
NHP-400 FRAME



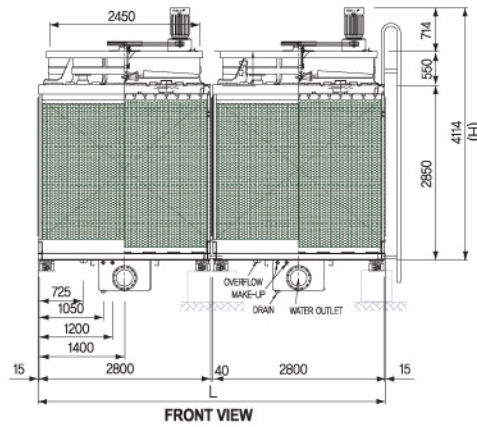
TOP VIEW



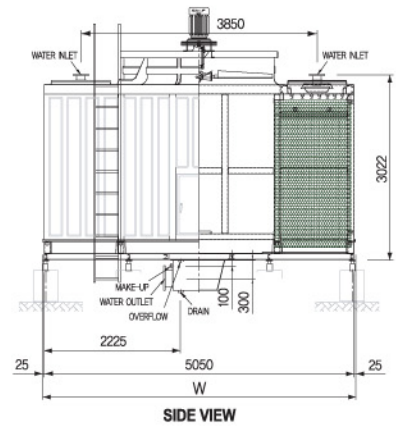
TOP VIEW



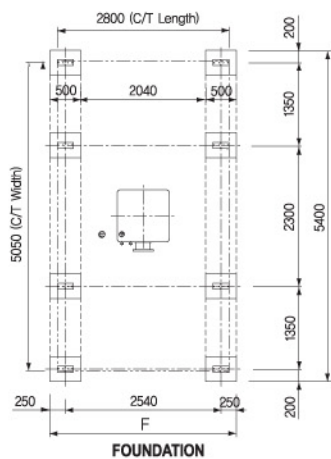
FRONT VIEW



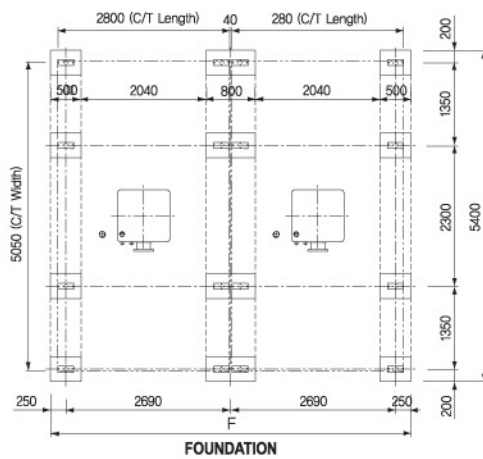
FRONT VIEW



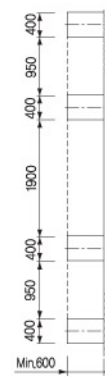
SIDE VIEW



FOUNDATION



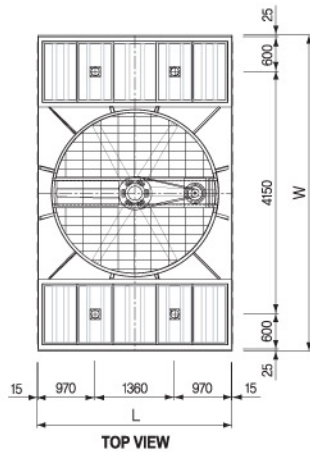
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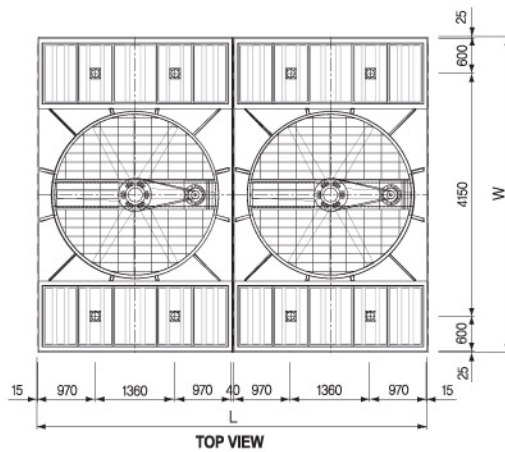
	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 400-1	3,129	6,629	2,830	5,100	4,114	3,040	80A×1	65A×1	40A×1	40A×1	125A×4	250A×1
NHP 400-2	6,258	13,258	5,670	5,100	4,114	5,880	80A×2	65A×2	40A×2	40A×2	125A×8	250A×2
NHP 400-3	9,387	19,887	8,510	5,100	4,114	8,720	80A×3	65A×3	40A×3	40A×3	125A×12	250A×3
NHP 400-4	12,516	26,516	11,350	5,100	4,114	11,560	80A×4	65A×4	40A×4	40A×4	125A×16	250A×4



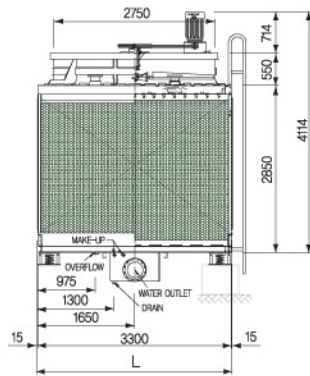
NHP-450 FRAME



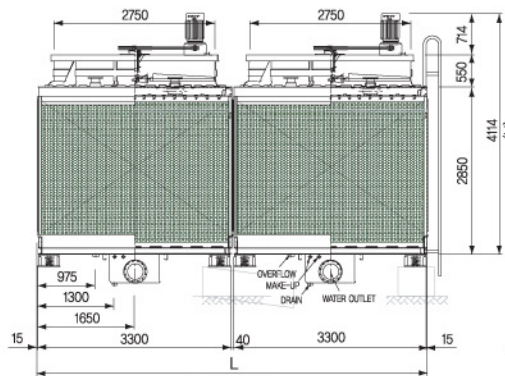
TOP VIEW



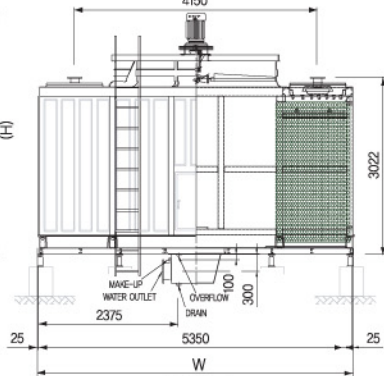
TOP VIEW



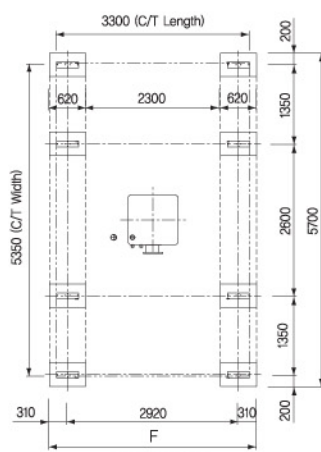
FRONT VIEW



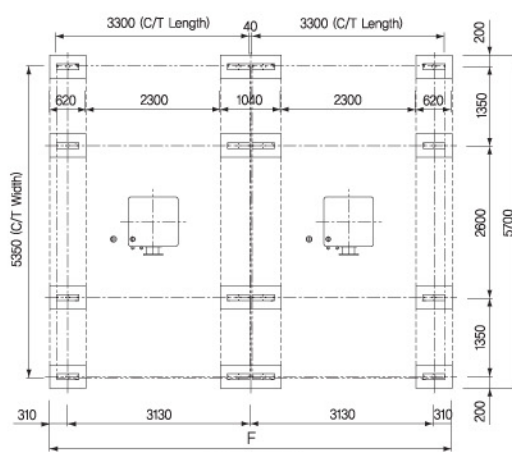
FRONT VIEW



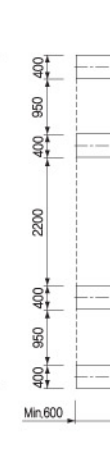
SIDE VIEW



FOUNDATION



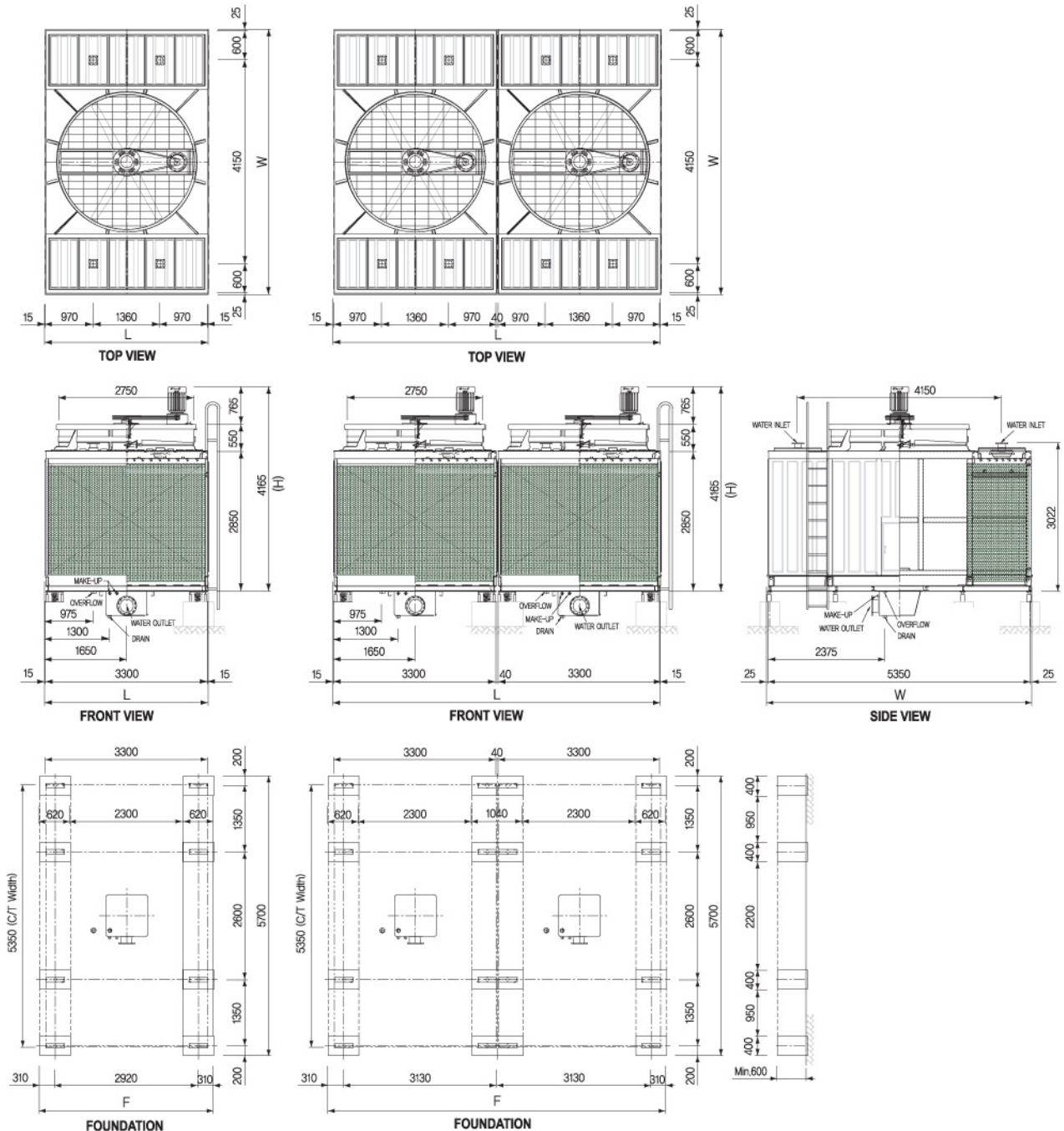
FOUNDATION



	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 450-1	3,731	7,931	3,330	5,400	4,114	3,540	100A×1	80A×1	40A×1	40A×1	125A×4	250A×1
NHP 450-2	7,462	15,862	6,670	5,400	4,114	6,880	100A×2	80A×2	40A×2	40A×2	125A×8	250A×2
NHP 450-3	11,193	23,793	10,010	5,400	4,114	10,220	100A×3	80A×3	40A×3	40A×3	125A×12	250A×3
NHP 450-4	14,924	31,724	13,350	5,400	4,114	13,560	100A×4	80A×4	40A×4	40A×4	125A×16	250A×4

DIMENSIONS AND CONNECTIONS

NHP-500 FRAME

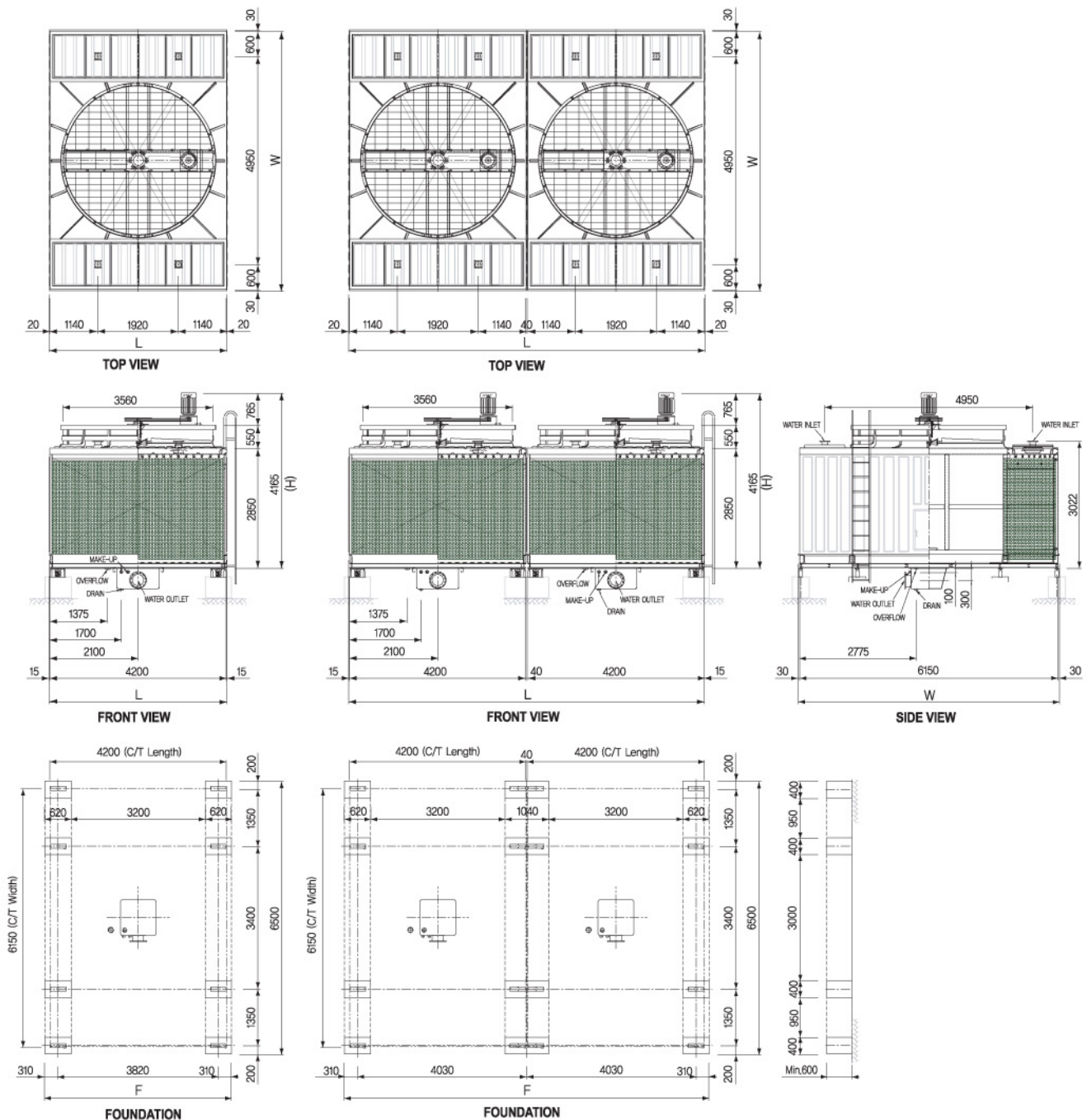


	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 500-1	3,790	7,990	3,330	5,400	4,165	3,540	100A×1	80A×1	40A×1	40A×1	125A×4	250A×1
NHP 500-2	7,580	15,980	6,670	5,400	4,165	6,880	100A×2	80A×2	40A×2	40A×2	125A×8	250A×2
NHP 500-3	11,370	23,970	10,010	5,400	4,165	10,220	100A×3	80A×3	40A×3	40A×3	125A×12	250A×3
NHP 500-4	15,160	31,960	13,350	5,400	4,165	13,560	100A×4	80A×4	40A×4	40A×4	125A×16	250A×4

NEW

Hi-Per Series
직교류형 냉각탑

NHP-600 FRAME



	NET WEIGHT	OPER. WEIGHT	L	W	H	F	Over flow	Drain	Make - Up		INLET A	OUTLET A
									Man.	Auto		
NHP 600-1	4,850	10,710	4,230	6,210	4,165	4,440	100A×1	80A×1	50A×1	50A×1	125A×4	250A×1
NHP 600-2	9,700	21,420	8,470	6,210	4,165	8,680	100A×2	80A×2	50A×2	50A×2	125A×8	250A×2
NHP 600-3	14,550	32,130	12,710	6,210	4,165	12,920	100A×3	80A×3	50A×3	50A×3	125A×12	250A×3
NHP 600-4	19,400	42,840	16,950	6,210	4,165	17,160	100A×4	80A×4	50A×4	50A×4	125A×16	250A×4

PERFORMANCE CHART

APPROACH 3°C GROUP

Range (°C)	W.B.T (°C)	Cold Water Volume Classified by Frame Size(M³/h)												
		1200F	1000F	900F	800F	700F	600F	500F	450F	400F	350F	300F	250F	200F
3.0	26.0	850	708	638	566	496	425	354	319	283	248	211	176	141
	27.0	884	736	662	588	516	442	368	331	294	258	220	184	147
	28.0	920	766	690	612	536	460	383	345	306	268	230	192	153
	29.0	956	796	718	638	558	478	398	359	319	279	239	200	160
4.0	26.0	714	592	534	474	414	357	296	267	237	207	176	147	116
	27.0	744	618	556	494	432	372	309	278	247	216	184	153	121
	28.0	774	644	578	514	450	387	322	289	257	225	191	160	127
	29.0	806	670	604	530	468	403	335	302	265	234	200	166	132
5.0	26.0	626	520	468	414	362	313	260	234	207	181	153	128	101
	27.0	654	542	488	432	378	327	271	244	216	189	160	134	105
	28.0	682	564	508	452	394	341	282	254	226	197	167	139	110
	29.0	710	588	530	470	412	355	294	265	235	206	174	146	115
5.5	26.0	594	492	442	392	344	297	246	221	196	172	145	121	95
	27.0	620	514	462	410	358	310	257	231	205	179	151	126	99
	28.0	646	536	482	428	374	323	268	241	214	187	158	132	104
	29.0	672	558	502	446	390	336	279	251	223	195	165	138	108
6.0	26.0	566	468	422	374	326	283	234	211	187	163	138	115	90
	27.0	590	488	440	390	342	295	244	220	195	171	144	120	94
	28.0	616	510	460	406	356	308	255	230	203	178	150	125	98
	29.0	642	532	480	424	372	321	266	240	212	186	157	131	103
7.0	26.0	520	430	388	344	300	260	215	194	172	150	126	105	82
	27.0	544	450	404	358	314	272	225	202	179	157	132	110	86
	28.0	568	470	422	374	328	284	235	211	187	164	138	115	90
	29.0	592	490	442	390	342	296	245	221	195	171	144	120	94
8.0	26.0	486	400	362	320	280	243	200	181	160	140	117	98	76
	27.0	506	418	378	334	292	253	209	189	167	146	123	102	80
	28.0	530	438	394	348	306	265	219	197	174	153	128	107	83
	29.0	552	458	412	364	320	276	229	206	182	160	134	120	87
9.0	26.0	456	378	340	300	264	228	189	170	150	132	110	92	71
	27.0	478	394	356	314	276	239	197	178	157	138	115	96	75
	28.0	498	412	372	328	288	249	206	186	164	144	120	101	78
	29.0	522	430	388	344	300	261	215	194	172	150	126	105	82
10.0	26.0	434	358	322	284	250	217	179	161	142	125	104	87	67
	27.0	454	374	336	298	260	227	187	168	149	130	109	91	70
	28.0	474	392	352	312	272	237	196	176	156	136	114	95	74
	29.0	496	408	368	326	286	248	204	184	163	143	119	100	77



APPROACH 4°C GROUP

Range (°C)	W.B.T (°C)	Cold Water Volume Classified by Frame Size(M ³ /h)												
		1200F	1000F	900F	800F	700F	600F	500F	450F	400F	350F	300F	250F	200F
3.0	26.0	1048	874	786	700	612	524	437	393	350	306	264	220	177
	27.0	1088	908	818	728	636	544	454	409	364	318	274	229	184
	28.0	1128	942	848	756	662	564	471	424	378	331	285	238	192
	29.0	1172	980	882	786	686	586	490	441	393	343	297	247	200
4.0	26.0	876	728	656	582	510	438	364	328	291	255	218	182	145
	27.0	910	758	682	606	530	455	379	341	303	265	227	189	151
	28.0	946	788	710	630	552	473	394	355	315	276	237	197	158
	29.0	984	820	738	656	574	492	410	369	328	287	247	206	165
5.0	26.0	766	636	572	508	444	383	318	286	254	222	189	158	125
	27.0	796	662	596	530	464	398	331	298	265	232	197	165	131
	28.0	830	690	620	552	482	415	345	310	276	241	206	172	137
	29.0	864	718	646	574	502	432	359	323	287	251	215	179	143
5.5	26.0	724	602	542	480	420	362	301	271	240	210	178	149	118
	27.0	754	626	564	500	438	377	313	282	250	219	186	155	123
	28.0	786	652	588	522	456	393	326	294	261	228	194	162	128
	29.0	818	680	612	544	476	409	340	306	272	238	203	169	134
6.0	26.0	688	572	514	456	400	344	286	257	228	200	169	141	111
	27.0	718	596	536	476	416	359	298	268	238	208	177	147	116
	28.0	748	620	558	496	434	374	310	279	248	217	184	154	122
	29.0	778	646	582	516	452	389	323	291	258	226	192	161	127
7.0	26.0	632	524	472	418	366	316	262	236	209	183	155	129	101
	27.0	658	546	492	436	382	329	273	246	218	191	161	135	106
	28.0	686	570	512	454	398	343	285	256	227	199	169	141	111
	29.0	716	594	534	474	416	358	297	267	237	208	176	147	116
8.0	26.0	588	486	438	388	340	294	243	219	194	170	143	119	94
	27.0	614	508	458	406	354	307	254	229	203	177	150	125	98
	28.0	640	530	478	422	370	320	265	239	211	185	102	131	102
	29.0	666	552	498	442	386	333	276	249	221	193	163	136	107
9.0	26.0	552	456	412	364	318	276	228	206	182	159	134	112	87
	27.0	576	478	430	380	334	288	239	215	190	167	140	117	91
	28.0	602	498	448	398	348	301	249	224	199	174	147	122	96
	29.0	628	520	468	414	364	314	260	234	207	182	153	128	100
10.0	26.0	524	432	390	346	302	262	216	195	173	151	127	106	82
	27.0	546	452	408	360	316	273	226	204	180	158	133	111	86
	28.0	570	472	426	376	330	285	236	213	188	165	139	116	90
	29.0	596	492	444	394	344	298	246	222	197	172	145	121	95

PERFORMANCE CHART

APPROACH 5 °C GROUP

Range (°C)	W.B.T (°C)	Cold Water Volume Classified by Frame Size(M³/h)												
		1200F	1000F	900F	800F	700F	600F	500F	450F	400F	350F	300F	250F	200F
3.0	26.0	1238	1034	932	830	726	619	517	466	415	363	315	262	213
	27.0	1282	1074	966	862	754	641	537	483	431	377	327	272	221
	28.0	1330	1114	1002	894	782	665	557	501	447	391	340	283	230
	29.0	1380	1156	1040	928	812	690	578	520	464	406	353	294	239
4.0	26.0	1032	860	776	690	604	516	430	388	345	302	260	216	174
	27.0	1072	894	806	718	626	536	447	403	359	313	270	225	181
	28.0	1114	930	836	746	652	557	465	418	373	326	281	234	189
	29.0	1156	966	870	774	678	578	483	435	387	339	293	244	197
5.0	26.0	902	750	676	600	526	451	375	338	300	263	225	187	150
	27.0	936	780	702	624	546	468	390	351	312	273	234	195	156
	28.0	974	812	730	650	568	487	406	365	325	284	244	203	163
	29.0	1012	844	760	676	592	506	422	380	338	296	254	212	170
5.5	26.0	852	708	638	566	496	426	354	319	283	248	212	176	141
	27.0	886	736	664	590	516	443	368	332	295	258	221	184	147
	28.0	920	766	690	614	536	460	383	345	307	268	230	192	153
	29.0	958	798	718	638	558	479	399	359	319	279	240	200	160
6.0	26.0	810	672	606	538	470	405	336	303	269	235	201	167	133
	27.0	842	700	630	560	490	421	350	315	280	245	209	174	139
	28.0	876	730	656	584	510	438	365	328	292	255	218	182	145
	29.0	912	758	684	608	532	456	379	342	304	266	227	190	151
7.0	26.0	740	614	554	492	430	370	307	277	246	215	183	152	120
	27.0	772	640	576	512	448	386	320	288	256	224	191	159	126
	28.0	804	668	600	534	466	402	334	300	267	233	199	166	132
	29.0	836	696	626	556	486	418	348	313	278	243	207	173	137
8.0	26.0	688	570	514	456	398	344	285	257	228	199	169	141	111
	27.0	716	594	536	476	416	358	297	268	238	208	176	147	116
	28.0	746	620	558	496	434	373	310	279	248	217	184	154	121
	29.0	778	646	582	516	452	389	323	291	258	226	192	160	127
9.0	26.0	646	536	482	428	374	323	268	241	214	187	158	132	103
	27.0	674	558	502	446	390	337	279	251	223	195	165	138	108
	28.0	702	582	524	464	406	351	291	262	232	203	172	144	113
	29.0	732	606	546	484	424	366	303	273	242	212	180	150	118
10.0	26.0	612	506	456	404	354	306	253	228	202	177	149	124	97
	27.0	638	528	476	422	368	319	264	238	211	184	156	130	102
	28.0	664	550	496	440	384	332	275	248	220	192	163	136	107
	29.0	694	574	518	458	402	347	287	259	229	201	170	142	111



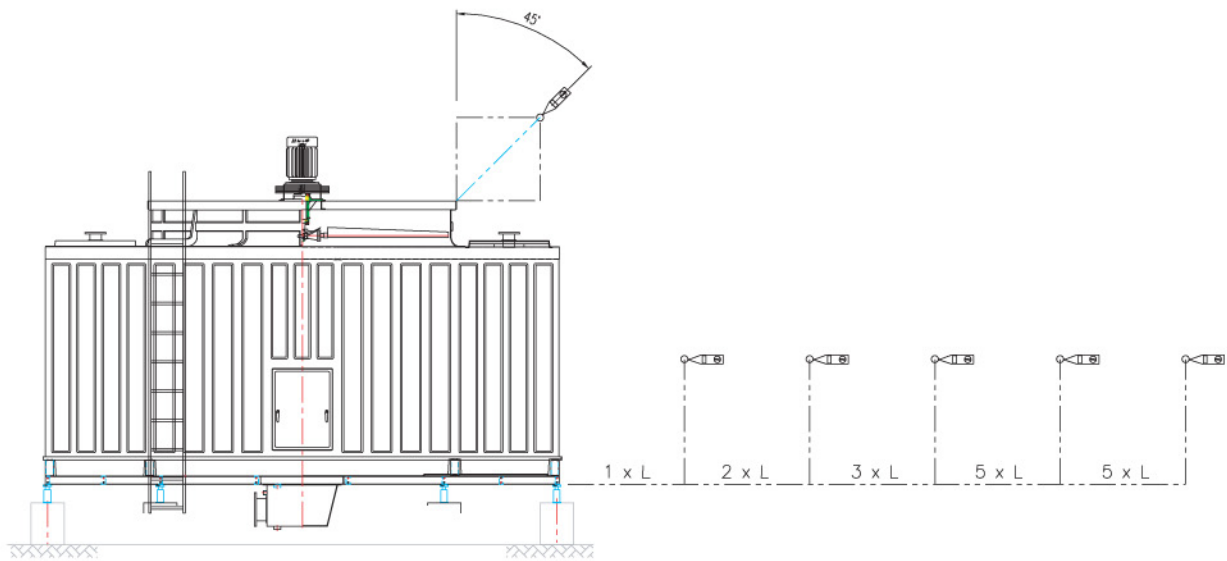
APPROACH 6°C GROUP

Range (°C)	W.B.T (°C)	Cold Water Volume Classified by Frame Size(M³/h)												
		1200F	1000F	900F	800F	700F	600F	500F	450F	400F	350F	300F	250F	200F
3.0	26.0	1424	1192	1072	958	838	712	596	536	479	419	365	304	248
	27.0	1474	1236	1112	992	868	737	618	556	496	434	379	315	259
	28.0	1528	1282	1152	1030	900	764	641	576	515	450	393	327	268
	29.0	1584	1328	1196	1068	934	792	664	598	534	467	408	340	278
4.0	26.0	1186	992	892	796	696	593	496	446	398	348	301	251	203
	27.0	1230	1030	926	826	722	615	515	463	413	361	313	261	211
	28.0	1278	1068	962	858	750	639	534	481	429	375	325	271	220
	29.0	1324	1110	998	890	778	662	555	499	445	389	338	282	229
5.0	26.0	1034	862	776	690	604	517	431	388	345	302	260	217	174
	27.0	1074	896	806	718	628	537	448	403	359	314	271	226	182
	28.0	1116	932	838	746	652	558	466	419	373	326	282	235	189
	29.0	1158	968	870	776	678	579	484	435	388	339	293	244	197
5.5	26.0	976	814	732	652	570	488	407	366	326	285	245	204	163
	27.0	1014	846	762	678	592	507	423	381	339	296	255	212	171
	28.0	1054	878	792	704	616	527	439	396	352	308	265	221	178
	29.0	1096	914	824	732	640	548	457	412	366	320	276	230	185
6.0	26.0	928	772	696	618	540	464	386	348	309	270	232	193	154
	27.0	964	804	724	644	562	482	402	362	322	281	241	201	161
	28.0	1002	836	752	670	586	501	418	376	335	293	251	210	168
	29.0	1042	868	782	696	608	521	434	391	348	304	262	218	175
7.0	26.0	848	706	636	564	494	424	353	318	282	247	211	176	140
	27.0	882	734	662	588	514	441	367	331	294	257	220	183	146
	28.0	918	764	688	612	536	459	382	344	306	268	229	191	152
	29.0	956	796	716	636	558	478	398	358	318	279	239	199	159
8.0	26.0	786	658	588	522	458	393	329	294	261	229	195	162	129
	27.0	820	680	614	544	476	410	340	307	272	238	203	169	134
	28.0	854	710	638	566	496	427	355	319	283	248	212	177	140
	29.0	888	738	666	590	518	444	369	333	295	259	221	184	146
9.0	26.0	738	612	552	490	428	369	306	276	245	214	182	152	120
	27.0	768	638	574	510	446	384	319	287	255	223	190	158	125
	28.0	800	664	598	532	466	400	332	299	266	233	198	165	131
	29.0	834	692	624	554	484	417	346	312	277	242	206	172	137
10.0	26.0	698	578	520	462	404	349	289	260	231	202	171	143	113
	27.0	726	604	544	482	422	363	302	272	241	211	179	149	118
	28.0	758	628	566	502	440	379	314	283	251	220	187	156	123
	29.0	788	656	590	524	458	394	328	295	262	229	195	163	129

NOISE LEVEL DATA

NEW

Hi-Per Series
직교류형 냉각탑



FRAME SIZE	NUMBER OF CELL	SOUND PRESSURE LEVEL, dB(A)					
		FAN RING	1×LENGTH	2×LENGTH	3×LENGTH	4×LENGTH	5×LENGTH
200F	1	76.0	66.5	60.4	56.9	54.4	52.5
250F	1	76.3	65.6	59.6	56.1	53.6	51.7
300F	1	79.2	68.5	62.5	59.0	56.5	54.6
350F	1	78.9	67.4	61.3	57.8	55.3	53.4
400F	1	81.2	69.7	63.6	60.1	57.6	55.7
450F	1	80.9	68.0	62.0	58.5	56.0	54.1
500F	1	82.8	69.9	63.9	60.4	57.9	56.0
600F	1	84.2	69.7	63.7	60.2	57.7	55.8
700F	2	78.9	64.3	58.3	54.8	52.3	50.4
800F	2	81.2	66.6	60.6	57.1	54.6	52.7
900F	2	80.9	65.0	59.0	55.5	53.0	51.0
1000F	2	82.8	66.9	60.9	57.4	54.9	52.9
1200F	2	84.2	66.7	60.7	57.2	54.7	52.7

MODEL SELECTION PROCEDURE

냉각탑에 유입되는 외기 습구온도가 27℃이고, 냉각수가 37℃에서 32℃로 냉각될 때의 일(1)공칭 톤 (NOMINAL TON)이 0.78m³/hr인 경우의 조건을 설계 표준조건의 냉각탑이라 하며, 이들 조건 중 어느 하나라도 설계 표준 조건과 상이하게 되면, 다음의 절차에 따라 냉각탑의 용량을 선정하여야 한다.

1. 먼저 접근 온도(APPROACH)를 계산한다. (접근 온도 = 냉각수 출구 온도 - 냉각탑 입구 공기의 습구 온도)
2. 그 다음은 냉각 범위(RANGE)를 계산한다. (냉각 범위 = 냉각수 입구온도 - 냉각수 출구 온도)
3. 냉각탑 성능 차트에서 접근온도에 해당하는 그룹을 먼저 찾은 다음, 냉각범위에 해당하는 테이블로 가서 습구 온도와 일치하는 열을 찾는다.
4. 그 다음 순환 수량과 가장 근접한 프레임 사이즈를 찾으면 냉각탑 선정이 완료된다. 만약 해당 열에서 찾고자 하는 순환수량이 없을 경우에는 냉각탑 셀 수를 늘려야 하며, 이때 희망하는 순환수량을 각각의 프레임에 명시된 순환 수량으로 나누면 셀 수를 얻을 수 있다. 여기서, 고려해야 될 셀 수는 경제적 가격과 효율적인 냉각탑 운영이 이루어지도록 하여야 하며, 지나치게 많은 수의 셀이 되지 않도록 한다.
5. 냉각탑 성능 차트에 없는 냉각 범위, 접근 온도 그리고 습구 온도를 요구하는 설계 조건의 냉각탑인 경우는 당사의 기술부로 문의하시기 바랍니다.

The Standard Design Conditions of cooling towers are the condition that 1 nominal ton is equal to 0.78m³/hr when water is cooled from 37℃ to 32℃ in 27℃ wet bulb temperature. Even if one of these conditions differs from the Standard Design Conditions, it is necessary to select the capacity of cooling towers according to the following procedure.

1. Determine Approach. (Approach = Leaving water temperature - Wet bulb temperature)
2. Determine Range. (Range = Entering water temperature - Leaving water temperature)
3. After searching for the appropriate Approach in the Performance Chart for the column to fit with the Range in the Wet Bulb Temperature.
4. Selection is finished when you could search the most similar frame size from the Circulating Water Flow. If there is not C.W.F. in the corresponding column, you should increase the number of cells. If you divide the C.W.F. needed by the C.W.F. specified from the each frame, you can get the number of cells. In consideration of economical efficiency, you should avoid too much cells as possible.
5. If you can't find the design conditions to be required Range, Approach and W.B.T. in the Performance Chart, please contact with our technical division.

다음은 냉각탑 설계 습구온도가 28℃이고, 950m³/hr의 냉각수를 39℃에서 33℃로 냉각을 요구하는 경우의 냉각탑 선정을 예를 통하여 알아 본다. 앞서 설명한 절차에 따라 냉각 범위와 접근 온도를 먼저 구하면,

◆ APPROACH (접근온도) = 33 - 28 = 5℃ ◆ RANGE (냉각범위) = 39 - 33 = 6℃

냉각탑 성능 차트에서 접근 온도가 5℃ ①인 그룹을 찾은 다음, 아래 테이블에서 냉각범위가 6℃ ②이고, 외기 습구온도가 28℃ ③인 열을 찾는다. 이 열에 순환수량이 950m³/hr ④과 동일한 프레임이 없으므로, 순환수량 950m³/hr을 각 프레임에 명시된 순환수량으로 나누면 셀의 수를 구할 수 있다.

Case Study : To cool 950m³/hr of water from 39℃ to 33℃ at 28℃ W.B.T., according to the above procedure, determine the Range and Approach. Approach = 33 - 28 = 5℃. Range = 39 - 33 = 6℃. Select the group of 5℃ ① Approach, and find out the column of 28℃ ③ W.B.T. in the below table of Range 6℃ ②. There is not the same frame as 950m³/hr ④ C.W.F. in this column, if you divide 950m³/hr C.W.F. by the C.W.F. as mentioned in each frame, you can get the numbers of cells.

< APPROACH 5℃ GROUP > ①

Range (℃)	W.B.T. (℃)	Cold Water Volume classified by Frame Size(m³/hr)							
		600F	500F	450F	400F	350F	300F	250F	200F
5.5	26.0	426	354	319	283	248	212	176	141
	27.0	443	368	332	295	258	221	184	147
	28.0	460	383	345	307	268	230	192	153
	29.0	479	399	359	319	279	240	200	160
6.0 ②	26.0	405	336	303	269	235	201	167	133
	27.0	421	350	315	280	245	209	174	139
	28.0 ③	438	365	328 ④	292	255	218	182	145
	29.0	456	379	342	304	266	227	190	151

먼저 각 프레임에 해당되는 순환 수량으로 설계 순환 수량을 나눈 다음, 가장 근사치의 프레임을 선정한다.

350프레임의 경우 $950/255 = 3.72$ 으로 4셀이 요구된다. 하지만 필요한 순환수량은 950m³/h인데 비해, 1,020m³/h(255m³/h×4셀)이므로 7.36%를 초과한다. 다시 450프레임을 가지고 다시 계산하여 보면, $950/328 = 2.89$ 으로 3셀로 설계 순환수량 대비 3.57% $[(984/950 - 1) \times 100]$ 를 초과한다. 500프레임의 경우 $950/365 = 2.60$ 으로 3셀로 설계 순환수량 대비 15.26% $[(1,095/950 - 1) \times 100]$ 를 초과한다. 따라서 설계 순환수량 대비 가장 적게 초과한 값과 설치 댓수, 면적 및 유지관리 등을 고려 할 때 제일 경제적인 450프레임을 선정한다.

After dividing the designed C.W.F. by the C.W.F. as mentioned each frame, you should select the most similar frame. In case of 350 frame, you need 4 cells($950/255 = 3.72$). But 4 cells are unthrifty as compared with the C.W.F. required. $[255\text{m}^3/\text{h} \times 4\text{cells} = 1,020\text{m}^3/\text{h}, (1,020\text{m}^3/\text{h} \div 950\text{m}^3/\text{h}) \times 100 - 1 = 7.36\%]$ When you recalculate by 450 frame, 3cells ($950/328 = 2.89 = 3\text{cells}$) exceeds 3.57%. $[328\text{m}^3/\text{h} \times 3\text{cells} = 984\text{m}^3/\text{h}, (984\text{m}^3/\text{h} \div 950\text{m}^3/\text{h}) \times 100 - 1 = 3.57\%]$ In case of 500 frame, you need 3cells($950/365 = 2.60$). But 3cells are unthrifty as compared with the C.W.F. required. $[365\text{m}^3/\text{h} \times 3\text{cells} = 1,095\text{m}^3/\text{h}, (1,095\text{m}^3/\text{h} \div 950\text{m}^3/\text{h}) \times 100 - 1 = 15.26\%]$ So 3 cells in the 450 frame are the most efficient choice considering the numbers of cells, area and maintenance

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(#1110 2-dong, Ace High-tech City, 55-20, Munraedong 3ga, Yeongdeungpo-gu, Seoul, KOREA)

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공장(Factory) : 충남 서천군 종천면 석촌리 416-80

(#416-80, Seokchon-ri, Jongcheon-myeon, Seocheon-gun, Chungcheongnam-do, KOREA)

Tel : 82-41-953-2688 Fax : 82-41-953-2689