TAHVIEH
AIR CONDITIONING SYSTEMS

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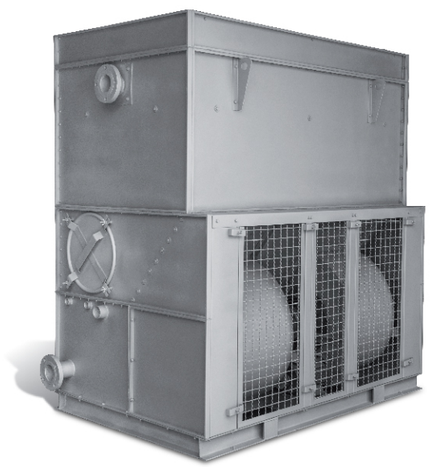
ISO 9001
Registered Firm
IMQ

No.1, Kooh_e_Noor St., Shahid Motahhari
Ave. Tehran, IRAN Zip Cod:1587633111
Tel:+9821 41827 Fax:+9821 88543584
export@tahvieh.com www.tahvieh.com

E09-01-19

ECO FRIENDLY

Cooling Tower



TAHVIEH
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www.tahvieh.com

Tahvieh History and activity

Tahvieh Company was established in 1964 and successfully paved its way in the air conditioning industry by utilizing technology of Air temp & Trane companies. This company later managed to receive manufacturing permit under the license of two U.S. companies of Chrysler and Air temp.

During 80's, Tahvieh started to design and manufacture a new generation of air conditioning system relying on its rich technical knowledge and great capability of its manpower. As one of the largest private companies in designing and manufacturing air conditioning equipment, it has managed to become a pioneer of this industry in Iran.

In 2013, we began the second half-century of our glorious presence in air conditioning industry and in addition to the previous products, Tahvieh initiated manufacturing of new products and by the end of the first half of 2016, we managed to manufacture and supply mini-chillers, various types of split air condition systems (floor standing, wall mounted and ducted), electrical enclosure air condition, precision air condition, ice cream makers and air conditioning systems for automotive and rail industry.

Leadership, the ability to meet all consumer demands in designing and manufacturing of superior quality products and extensive and fast aftersales services have enabled us to become a premium brand in Iran. Unique customer care has been assigned as the main strategy of Tahvieh and this company has always been loyal to its customers.

Tahvieh Co., In 2016 being a member of International Institute of Refrigeration (IIR). Today, Tahvieh, as one of the largest manufacturers of air conditioning systems and as a top brand in Iran, is one of the reliable sources of supplying the strategic and important industries of the country such as oil, gas, petrochemical, refining, power plants, telecommunications, steel making, train & automobiles, healthcare, Development and other industries of the country.

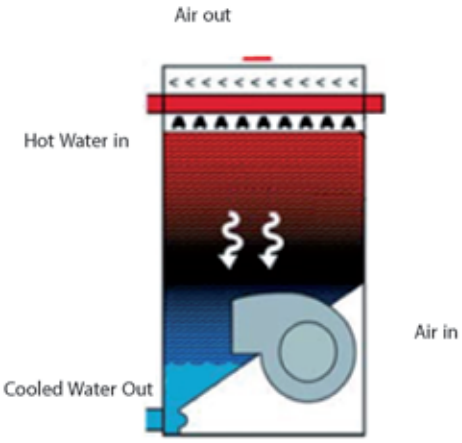
CONTENTS

Features

Water is one of our most precious resources and consumption has reached unprecedented levels. Cooling towers recycle cooling water, so it can be used over and over again .Recycling reduces water consumption by 95% when compared to out dated "once-through" systems, thus, reducing water and sewage costs.

Principle of Operation

The water from the heat source is distributed over the wet deck surface by spray nozzles .Air is simultaneously blown upward over the wet deck surface, causing a small portion of the water to evaporate .This evaporation removes heat from the remaining water .The cooled water is collected the tower sump and returned to the heat source.



Production range

VX Cooling Towers extend the proven advantages of V-Line with a broader choice of sizes to closely match the capacity, space, and application requirements of virtually any project.

All units are designed to ensure quiet operation, dependable Performance, long life, and ease of maintenance. The compactness of the V-pan and the static pressure capability of the centrifugal fans make VX Cooling Towers the logical choice for indoor installations of restricted outdoor enclosures. Single-fan-side design and a variety of width and length combinations provide alternative configurations to fit the required capacity in the available space.
Because the recessed centrifugal fans are inherently quiet, VX Cooling Towers are preferred whenever low sound levels are desired. Sound attenuation accessories manufactured by TAHVIEH are available for projects requiring very quiet operation.

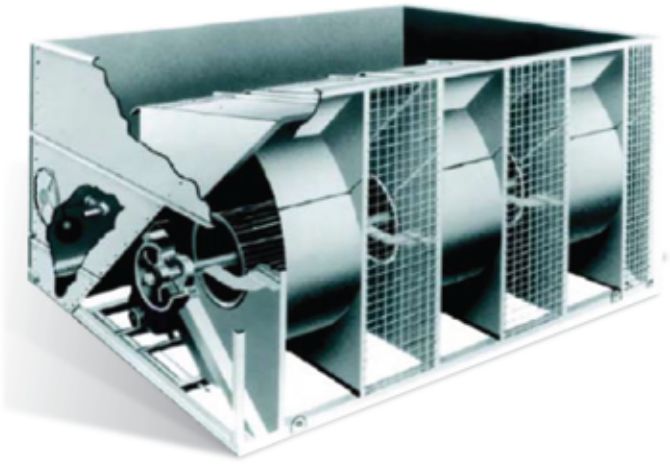
A choice of materials of construction including two wet deck surface options and TAHVIEH engineered accessories mean the VX Cooling Tower can meet virtually every application and installation need including complete fireproof construction for PVC wet deck surface and reliable year round operation.

Product life is extended and maintenance costs are minimized by the blow-through design which places all moving parts in the dry entering air stream. VX Cooling Towers are constructed of heavy gage, galvanized steel with a proven corrosion protection finish significantly better than galvanizing alone.

Ease of maintenance is provided by the self-cleaning V-pan and large orifice spray nozzles. All rotating parts are located at the base of the unit for easy access and maintenance. All units are factory-assembled for uniform quality of construction and performance with major components having been designed, tested, and manufactured by TAHVIEH.

Specification and function of equipment

Pan section



Water is one of our most precious resources and consumption has reached unprecedented levels. Cooling towers recycle cooling water, so it can be used over and over again .Recycling reduces water consumption by 95% when compared to out dated "once-through" systems, thus, reducing water and sewage costs.

Access

Leak proof, circular access doors are furnished to provide convenient access to the interior of the pan/fan sections for inspection and adjustment of the float valve, cleaning the lift out strainers, and flushing the sump.

Strainer

A strainer assembly of anti-vortexing design is standard on all VX -Cooling Towers. Large area lift-out strainer screens are provided to avoid the need for frequent servicing while the perforated
Strainer surface washes clean quickly, when service is required.
The anti-vortexing baffle is specially designed to preclude air entrainment.

Motors and Drives

Drip-proof fan motors are furnished as standard. In addition to being suitable for outdoor service, the motors are sheltered from the weather by their location under the sloping pan side. V-belt drives are designed for not less than 150°/o of motor nameplate power rating. The belts are easily adjusted by means of a threaded bolt and nut arrangement.

Fan Shaft & Bearings

All models have a solid steel fan shaft supported on each end by a ball bearing. Where intermediate bearings are required, self-¬ aligning, oil lubricated, sleeve type bearings with split, cast iron, pillow-block housings are furnished.

Fans

The forwardly curved centrifugal fans are statically and dynamically balanced. They are mounted in fan housings.

Heavy Duty Construction

The pan/fan section consists of heavy gage, hot-dipped galvanized panels. This heavy duty construction provides the strength and rigidity required for lasting trouble-free operation. All pan/fan section panels are formed for maximum strength.

Protection for Moving Parts

All moving parts are protected by inlet screens on the front of the fan housings and by solid panels on the ends of the unit fan section(s). Screens and panels are easily removable for access to fans, bearings, motor and drives. Bottom screens or a solid bottom panel are available as optional equipment if the unit installation requires this additional protection.

Fan Discharge Cowls

Fan discharge cowls, mounted inside the sloping pan sides, are designed to recover normal velocity pressure losses, providing increased fan efficiency and lower energy consumption.

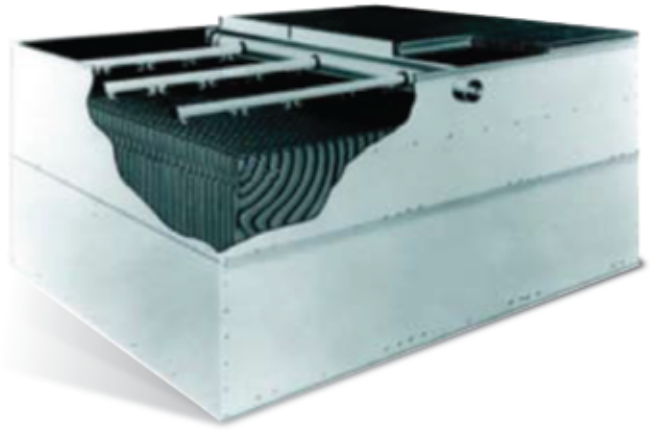
Water Make-Up Valve

The base float valve on the water make- up connection is actuated by a large diameter plastic float. Water level is easily adjusted by means of wing nuts on the float rod.

Casing section

Water Distribution System

Water is distributed over the wet deck surface by a header and spray branches. The branches are connected to the main header by means of a grommet assembly so they can be individually removed for flushing and cleaning .Large diameter, non-clog; plastic spray nozzles are oriented for optimum water distribution over the wet deck surface. The nozzles are held in place with snap-in rubber grommets which permit quick removal for cleaning. A 8 mm tapping in the header facilitates mounting of an external pressure gauge to check water spray press .res.



TAHVIEH Wet Deck Surface

An efficient polyvinyl chloride (PVC) wet deck surface manufactured by TAHVIB-i is furnished as standard in VX Cooing Towers.

The special configuration provides maximum contact between air and water with low air pressure drop to ensure efficient heat transfer while minimizing power requirements. Optional wet deck surface materials are discussed on page 27.

Casing

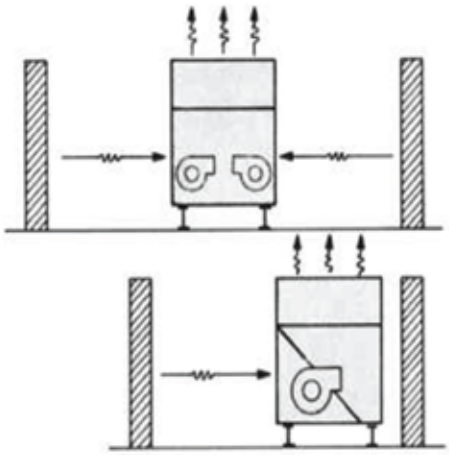
The casing of the heat transfer section is constructed of heavy gauge, galvanized steel. All casing panels are formed for maximum strength and die-punched to assure accurate mating of the casing section to the pan section.

Eliminator

The eliminator is constructed of PVC assembled in easy to handle sections the eliminators life aside for access to the spray tree and nozzles.

VX Advantages for the designers

Location Versatility



Compact Outdoor Installation

The ability to locate the compact VX Cooling Towers in tight locations allows cooling systems designers to better utilize available space. Smaller, less costly enclosures can be used and units can be placed in narrow setbacks or close to solid walls. Optional discharge hoods can be used to further reduce space requirements.

Compact Indoor Installation

VX Cooling Towers with centrifugal fans are ideally suited for indoor installation which is often desirable for freeze protection, noise abatement, space limitation, or allows inlet ducting and uses a minimum amount of valuable indoor space.

Quiet Operation

Concern about noise pollution has made it necessary to consider sound when selecting equipment. Many governmental bodies have enacted strict noise ordinances that affect the sound generated by mechanical equipment. TAHVIEH has the ability to solve sound problems

Quiet Design

VX Cooling Towers are particularly suited for noise sensitive installations. The use of centrifugal fans and the "V" design creating a recessed fan position enables the VX Cooling Towers to achieve superior acoustical performance.

Directional Advantage

In situation where one direction is particularly noise sensitive, the single-fan-side design of VX Cooling Towers allows the quieter back-panel side to be directed towards this noise sensitive direction. In many instances, this procedure eliminates the need for additional acoustical treatment.

Sound Attenuation Available

When even quieter operation is desired, the VX Cooling Towers can be supplied with packaged sound attenuators to reduce sound levels further. These attenuators are specifically designed and built by TAHVIEH for use on this equipment.

Broad Range of Sizes

The versatile VX Cooling Towers are produced in a broad range of capacities, with small capacity increments to permit close matching of unit size to design load.
A variety of width and length combinations provides alternative configurations to fit the available space.
Single fan design permits basic modules to be combined back-to-back and end-to-end for standard arrangements up to large 21100 kW; thus it makes the design of large capacity installations easier.
Broad range of sizes offers the widest selection of centrifugal fan cooling towers in the industry to meet virtually every installation and application need.

Year-Round Operation

Designed for Cold Weather

TAHVIEH VX Cooling Towers are ideally suited for year-round operation. Since the below-through design places the fans, motors and drives in the dry entering air stream, these moving parts are protected from moisture condensation and fan icing. The counter flow design provides more even cooling and has fewer potential icing problems than cross flow designs.

Accessories for Winter Operation

Standard accessories are available to provide protection against icing conditions. They include sump water heaters, dampers and electric water level control packages. Since none of these accessories are required for every cold weather application, TAHVIEH should be consulted for the year-round operating needs of a particular installation

Close Temperature Control (Optional)

Fan Cycling

Some installations do not require close control of the cooling water. VX Cooling Towers with fan cycling may be satisfactory for those systems. Additional steps of capacity control can be obtained by providing these units with two-speed motors.

Fan Speed Control

This method is used to control the cooling towers1 capacities in some places where the ambient temperature is low. For this purpose, the water temperature is measured and the control system modifies the fan RPM.

VX Advantages for the Owners

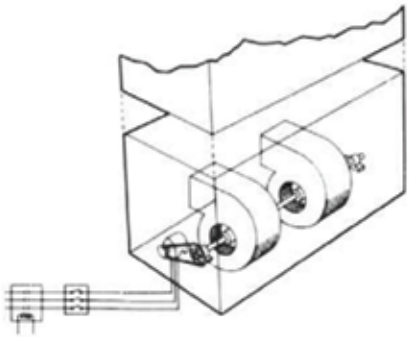
Low Installed Cost

Single Fan Side Saves Cost

Having a single fan side design means fewer motor starters to install and wire, fewer motors to maintain, and fewer accessories to purchase. This fan arrangement also saves cost by enabling the units to fit close to walls or in narrow set-backs to allow more profitable use of premium space.

Lower Rigging Cost

Rigging costs are greatly reduced with the modular design of the VX Cooling Towers. The fan sections are built into the pan with the motors and drives factory-installed and aligned eliminating the need for handling these items in the field. As a result, rigging consists only of placing the fan/pan section in place and mounting the heat transfer section on top of it.



Single fan side means lower installation cost.

Easy Maintenance

Few Moving Parts

Less maintenance is an inherent benefit of TAHVIEH's single fan side design because there are a minimum number of fans, bearings, motors, and drives.

Easy Access

All moving parts are located near the base of the unit within easy reach for cleaning, lubrication, or adjustment. Belt adjustment on VX units is accomplished by a single threaded bolt and nut assembly accessible from outside the fan assembly. The interior of the unit is easily accessible through leak proof. Man size access doors for adjusting the float valve, cleaning the strainer, or flushing the sump.

Trouble-Free Water Distribution

The water distribution system employs large orifice plastic nozzles which greatly reduce the potential for clogging, so thermal performance is more consistent between maintenance periods. When nozzles must be cleaned, the large orifices can be cleaned in place, but are grommeted to easy removal, if necessary.

Easy To Clean

Large pan space simplifies cleaning the unit interior another inherent benefit of single fan side design. The cylindrical pan strainer provides a large effective area in a single strong But light weight, piece which maintenance personnel can easily remove for cleaning.

large orifice nozzles

easy access

Selection Information

The selection of cooling tower is according to climate, water flow rate, inlet/outlet water temperature, ambient wet bulb temperature and using chart 1 and 2.

Selection Example:

GIVEN: To cool 95 l/s of water from 32°C to 27°C at 21°C wet bulb.

1-Determine Range

Range= Water on 32°C - Water off 27°C = 5°C

2-Determine Approach

Approach= Water off 27°C - Wet Bulb 21°C = 6°C

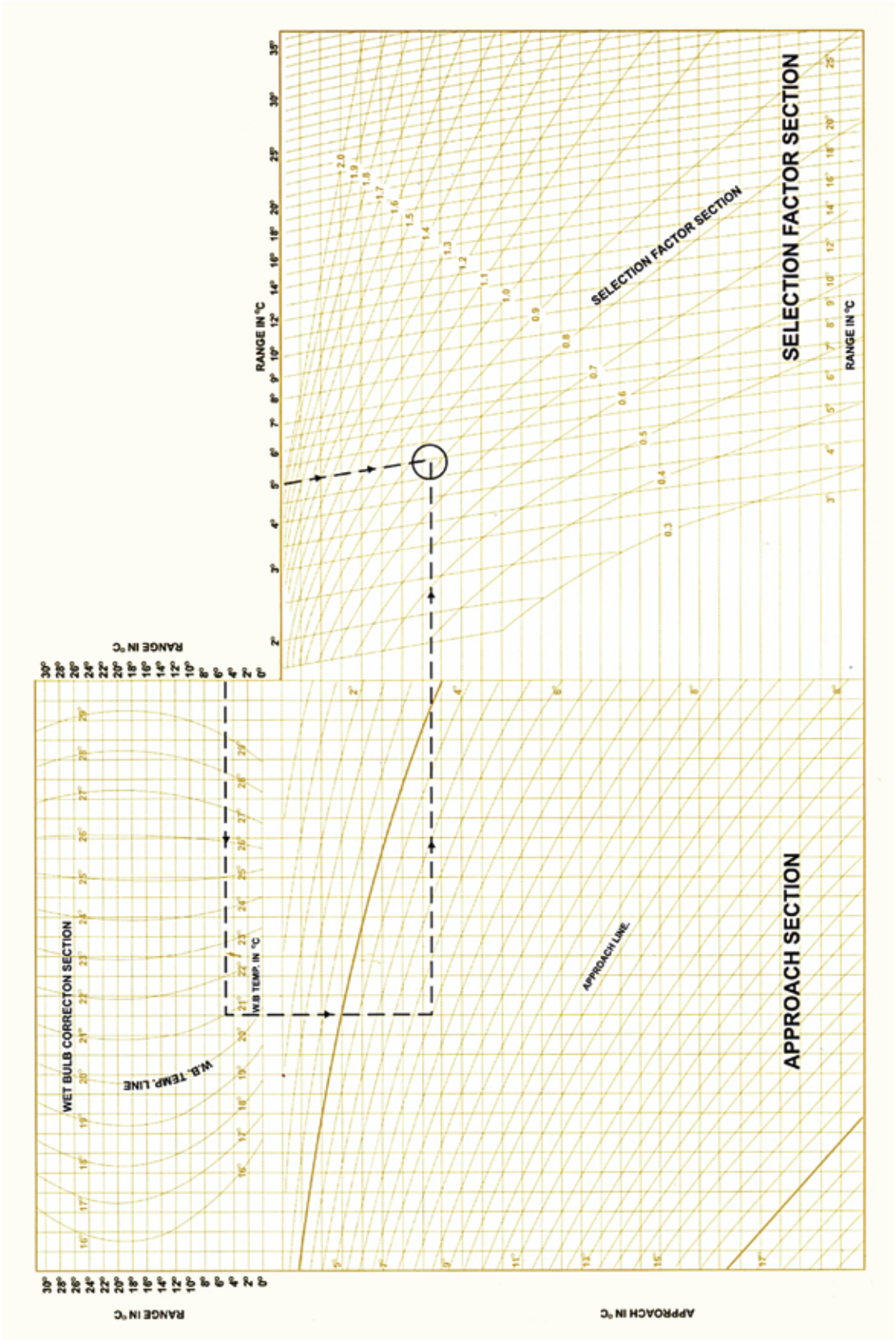
3-Determine Selection Factor

Enter the Wet Bulb Correction Section of Chart 1 on the 5° Range line as shown by the dotted line. From the intersection of the 5° Range line and the 21° Wet Bulb, curve project a straight line into the Approach Section to intersect the 6" Approach curve. From this point, extend a line horizontally into the Selection Factor Section interesting the 5° Range line to obtain the selection factor. The factor is 0.83

4-Unit Selection

Enter Chart 2 reading across the Selection Factor Columns to find a factor EQUAL to OR GREATER THAN the factor determined in Step 3. In this case enter the column headed by 0.85 read downward until reaching a l/s EQUAL TO OR GREATER THAN the quantity to be cooled (95 l/s). Read the recommended unit selection from the unit column on the left. For the given design conditions, it is a model VTX N430.

Chart 1. Counter Flow Cooling Tower Selection and Performance Chart



Enter chart reading across the selection factor columns to find a factor EQUAL TO OR GREATER THAN the design selection factor. Read downward until reaching the flow in l/s EQUAL TO OR GREATER THAN design. Read the recommended unit selection from the unit column on the left. Interpolation is permitted between selection factors only.

Chart 2.1 Recommended Selections in l/s / Selection Factors 0.40 to 0.85

UNIT	SELECTION FACTOR									
	0,40	0,45	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85
VXT-10	6,62	5,87	5,30	4,73	4,23	3,85	3,47	3,22	2,84	2,59
VXT-15	8,20	7,26	6,62	5,93	5,43	4,92	4,54	4,23	3,85	3,60
VXT-20	8,52	8,52	8,08	7,32	6,69	6,12	5,68	5,30	4,92	4,61
VXT-25	8,52	8,52	8,52	8,52	8,01	7,32	6,81	6,37	5,93	5,62
VXT-30	16,40	14,83	13,31	12,11	10,98	9,97	9,27	8,58	7,82	7,32
VXT-40	17,67	17,67	16,09	14,70	13,50	12,37	11,55	10,73	9,91	9,34
VXT-45	17,67	17,67	17,67	16,02	14,70	13,56	12,74	11,80	10,98	10,35
VXT-55	17,67	17,67	17,67	17,67	17,54	16,09	15,02	14,07	13,12	12,43
VXT-65	27,13	27,13	25,87	23,53	21,64	19,87	18,42	17,16	15,84	14,89
VXT-70	27,13	27,13	27,13	24,98	23,15	21,26	19,81	18,36	16,97	15,90
VXT-75	27,13	27,13	27,13	26,50	24,42	22,46	20,95	19,56	18,11	17,03
VXT-85	27,13	27,13	27,13	27,13	27,13	24,98	23,34	21,77	20,31	19,18
VXT-95	36,28	36,28	36,28	34,07	31,23	28,71	26,81	24,92	23,34	21,83
VXT-105	36,28	36,28	36,28	36,28	34,07	31,23	29,34	27,19	25,49	23.97
VXT-120	36,28	36,28	36,28	36,28	36,28	35,33	32,81	30,60	28 77	07 27
VXT-135	36,28	36,28	36,28	36,28	36,28	36,28	36,28	34,07	31,86	30,22
VXT-150	51'10	51'10	51'10	51'10	48,26	44,79	41,64	38,80	36,28	34,07
VXT-165	51'10	51'10	51'10	51'10	51'10	48,58	45,42	41,95	39,43	37,22
VXT-185	51'10	51'10	51'10	51'10	51'10	51'10	50,16	46,69	85 43	41 32
VXT-N215	71,92	71,91	71,92	71,92	68,45	63,41	58,67	54,89	51,42	48,26
VXT-N240	71,92	71,92	71,92	71,92	71,92	70,35	64,98	60,88	57,10	53,63
VXT N265	71,92	71,92	71,92	71,92	71,92	71,92	71,61	66,88	62,46	58,99
VXT-N310	109,8	109,8	109,8	109,1	100,3	92,11	85,17	79,49	74,76	70,03
VXT N345	109,8	109,8	109,8	109,8	109,8	101,6	94,00	87,70	82,33	77,29
VXT N370	109,8	109,8	109,8	109,8	109,8	108,5	100,3	94,00	88,01	82,65
VXT N395	109,8	109,8	109,8	109,8	109,8	109,8	106,6	99,68	93,37	88,01
VXT N430	143,8	143,8	143,8	143,2	136,9	126,8	117,3	109,8	102,8	96,53
VXT N480	143,8	143,8	143,8	143,8	143,8	140,7	130,0	121,8	114,2	107,3
VXT N510	143,8	143,8	143,8	143,8	143,8	143,8	137,5	128,1	120,5	113,6
VXT N535	143,8	143,8	143,8	143,8	143,8	143,8	143,8	135,0	126,2	118,6

Models VXT-N215 to VXT-N535 are furnished with max 25 m wide pan sections.

Models VXT-N315 to VXT-4800 are furnished with 3.0 m wide pan sections.

Refer to pages 11 to 13 for detailed dimensional information.

Continue...Chart 2.1 Recommended Selections in l/s / Selection Factors 0.40 to 0.85

UNIT	SELECTION FACTOR									
	0,40	0,45	0,50	0,55	0,60	0,65	0,70	0,75	0,80	0,85
VXT-315	110,4	110,4	110,4	110,4	100,9	94,64	87,06	82,02	76,02	71,29
VXT-350	110,4	110,4	110,4	110,4	110,4	102,8	95,58	89,27	83,91	78,86
VXT-375	110,4	110,4	110,4	110,4	110,4	110,4	101,8	94,64	89,27	83,91
VXT-400	110,4	110,4	110,4	110,4	110,4	110,4	108,2	100,9	94,64	88,96
VXT-470	164,0	164,0	164,0	164,0	151,4	138,8	130,6	1'121	113,6	106,0
VXT-525	164,0	164,0	164,0	164,0	164,0	154,6	143,8	134,4	126,2	118,0
VXT-560	164,0	164,0	164,0	164,0	164,0	164,0	152,0	142,0	133,1	126,2
VXT-600	164,0	164,0	164,0	164,0	164,0	164,0	162,1	152,0	142,6	133,8
VXT-630	220,8	220,8	220,8	220,8	201,9	189,3	174,1	164,0	152,0	142,6
VXT-700	220,8	220,8	220,8	220,8	220,8	205,0	191,2	178,5	167,8	157,7
VXT-750	220,8	220,8	220,8	220,8	220,8	220,8	203,8	189,3	178,5	167,8
VXT-800	220,8	220,8	220,8	220,8	220,8	220,8	216,4	201,9	189,3	177,9
VXT-870	331,2	331,2	331,2	312,3	283,9	265,0	244,8	229,0	212,6	198,7
VXT-945	331,2	331,2	331,2	331,2	302,8	283,9	261,8	246,0	228,4	213,9
VXT-1050	331,2	331,2	331,2	331,2	331,2	309,1	287,1	268,1	251,7	236,6
VXT-1125	331,2	331,2	331,2	331,2	331,2	331,2	306,0	283,9	268,1	252,4
VXT-1200	331,2	331,2	331,2	331,2	331,2	331,2	324,9	302,8	283,9	267,5
VXT-1260	441,6	441,6	441,6	441,6	403,8	378.5	348,3	328,1	304,1	285,2
VXT-1400	441,6	441,6	441,6	441,6	441,6	410,1	382,3	357,1	335,6	315,5
VXT-1500	441,6	441,6	441,6	441,6	441,6	441,6	407,6	378,6	357,1	335,6
VXT-1600	441,6	441,6	441,6	441,6	441,6	441,6	432,8	403,8	378,5	355,8
VXT-1740	662,4	662,4	662,4	624,6	567,8	0 530	489,6	458,0	425,2	397 5
VXT-1890	662,4	662,4	662,4	662,4	605,7	567,8	523.6	492,1	456,8	427,8
VXT-2100	662,4	662,4	662,4	662,4	662,4	618,3	574,1	536,3	503,5	473,2
VXT-2250	662,4	662,4	662,4	662,4	662,4	662,4	612,0	567,8	536,3	504,7
VXT-2400	662,4	662,4	662,4	662,4	662,4	662,4	649,8	605,7	567,8	535,0
VXT-2520	883,3	883,3	883,3	883,3	807,6	757,1	694,0	656,1	608,2	570,3
VXT-2800	883,3	883,3	883,3	883,3	883,3	820,2	763,4	712,9	668,8	630,9
VXT-3000	883,3	883,3	883.3	883,3	883,3	883,3	813,9	757,1	712,9	668,8
VXT-3200	883,3	883.3	883,3	883,3	883,3	883,3	864,3	807,6	757,1	712,9
VXT-3480	1325	1325	1325	1249	1136	1060	977,9	914,8	851,7	794,9
VXT-3780	1325	1325	1325	1325	1211	1136	1047	984,2	914,8	858,0
VXT-4200	1325	1325	1325	1325	1325	1237	1148	1073	1009	946,4
VXT-4500	1325	1325	1325	1325	1325	1325	1224	1136	1073	1009
VXT-4800	1325	1325	1325	1325	1325	1325	1300	1211	1136	1072

Enter chart reading across the selection factor columns to find a factor EQUAL TO OR GREATER THAN the design selection factor. Read downward until reaching the flow in l/s EQUAL TO OR GREATER THAN design. Read the recommended unit selection from the unit column on the left. Interpolation is permitted between selection factors only.

Chart 2.2 Recommended Selections in l/s / Selection Factors 0.90 to 1.35

UNIT	SELECTION FACTOR									
	0,90	0,95	1,00	1,05	1,10	1,15	1,20	1,25	1,30	1,35
VXT-10	2.27	2.08	1.89	1.64	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-15	3,28	3,09	2,84	2,59	2,33	2,15	2,02	1,83	1,70	N.A.
VXT-20	4,23	4,04	3,79	3,53	3,28	3,09	2,90	2,71	2,52	2,33
VXT-25	5,24	5,05	4,73	4,48	4,23	4,04	3,79	3,60	3,41	3,22
VXT-30	6,62	6,18	5,68	5,24	4,73	4,35	3,97	3,66	N.A.	N.A.
VXT-40	8,58	8,08	7,57	7,07	6,62	6,25	5,80	5,43	5,05	4,73
VXT-45	9,65	9,08	8,52	8,01	7,57	7,07	6,69	6,31	5,93	5,62
VXT-55	11,67	11,10	10,41	9,91	9,40	8,90	8,39	8,01	7,57	7,19
VXT-65	13,94	13,12	12,30	11,55	10,85	10,16	9,53	8,96	8,01	7,82
VXT-70	14,89	14,07	13,25	12,49	11,80	11,04	10,41	9,78	9,15	8,64
VXT-75	15,90	15,08	14,20	13,44	12,74	11,99	11,36	10,66	10,03	9,59
VXT-85	17,92	16,91	16,09	15,08	14,38	13,69	13,06	12,37	11,67	11,04
VXT-95	20 44	19 31	17 98	16,91	15,90	15,02	14,26	13,44	12,68	11,92
VXT-105	22 59	21 32	87 19	18 93	17 92	16 85	15 90	15 02	14 26	13,50
VXT-120	25.55	23 24	22 71	21 64	20 57	19 56	18 55	17 54	16 59	15 77
VXT-135	28,64	27,25	25,55	24,48	23,34	22,33	21,26	20,25	19,24	15,36
VXT-150	32 11	30 41	28,39	27,13	25,68	24,35	23,15	21,83	20,57	19,56
VXT-165	35 20	33 25	23 31	29 72	26 28	26,88	25,55	24,29	22,96	21,89
VXT-185	18 39	29 37	01 35	44 33	99 31	41 30	02 29	51 27	18 26	92 24
VXT-N215	45,74	43,22	40,69	38,48	36,59	34,38	32,81	30,91	29,34	27,76
VXT-N240	50,47	47,95	45,42	43,22	41,01	38,80	36,91	35,01	33,44	31,86
VXT N265	55,52	52,68	50,16	47,63	44,79	43,22	41,32	39,12	37,22	35,65
VXT-N310	65,61	62,14	58,67	55,20	52,36	49,53	46,69	44,48	41,95	39,75
VXT N345	72,87	68,77	65,30	61,51	58,36	55,52	52,36	49,84	47,32	44,79
VXT N370	77,92	73,82	70,03	66,24	63,09	59,94	56,78	53,94	51,10	48,58
VXT N395	82,96	78,55	74,76	70,66	67,51	64,35	61,20	58,36	55,52	52,68
VXT N430	91,54	86,43	81,39	76,97	73,18	68,77	65,61	61,83	58,67	55,52
VXT N480	100,9	95,90	90,85	86,43	82,02	77,60	73,82	70,03	66,88	63,72
VXT N510	107,3	101,9	96,53	91,80	87,70	83,28	79,18	75,71	71,61	68,14
VXT N535	112,3	106,6	101,3	96,53	91,80	87,70	83,28	79,49	76,02	72,24

Models VXT-N215 to VXT-N535 is furnished with max 25 m wide pan sections.

Models VXT-N315 to VXT-4800 is furnished with 3.0 m wide pan sections.

Refer to pages 11 to 13 for detailed dimensional information.

Continue...Chart 2.2 Recommended Selections in l/s / Selection Factors 0.90 to 1.35

UNIT	SELECTION FACTOR									
	0,90	0,95	1,00	1,05	1,10	1,15	1,20	1,25	1,30	1,35
VXT-315	67,19	63,09	59,62	56,78	53,63	50,47	48,26	45,74	43,22	40,69
VXT-350	74,76	70,35	66,24	62,14	58,99	56,78	53,63	50,47	48,26	45,11
VXT-375	79,81	75,71	70,98	67,19	64,04	60,88	57,73	54,57	52,68	49,53
VXT-400	85,17	79,81	75,71	71,61	68,45	65,30	62,14	58,99	56,78	53,63
VXT-470	99,68	94,00	88,96	83,59	78,86	75,08	70,98	67,51	64,04	59,94
VXT-525	111,0	104,7	99,37	93,69	88,96	84,54	80,12	76,34	72,24	68,14
VXT-560	118,6	112,3	106,0	100,6	95,27	91,48	86,43	82,33	78,23	74,13
VXT-600	126,8	119,9	113,6	107,9	102,2	97,79	93,37	88,96	84,86	80,76
VXT-630	134,4	126,2	119,2	113,6	107,3	100,9	96,53	91,48	86,43	81,39
VXT-700	149,5	140,7	132,5	124,3	118,0	113,6	107,3	100,9	96,53	90,22
VXT-750	159,6	151,4	142,0	134,4	128,1	121,8	115,5	109,1	105,4	99,05
VXT-800	170,3	159,6	151,4	143,2	136,9	130,6	124,3	118,0	113,6	107,3
VXT-870	186,1	176,7	164,7	154,6	145,1	138,8	130,6	123,7	116,4	109,5
VXT-945	201,9	189,3	178,9	170,3	160,9	151,4	145,1	136,9	129,3	122,4
VXT-1050	224,0	211,4	198,7	186,1	176,7	170,3	160,9	151,4	145,1	135,6
VXT-1125	7 239	1 227	9 212	9 201	4 192	183,0	173,5	164,0	157,7	148,3
VXT-1200	255,5	239,7	227,1	214,5	205,0	195,6	186,1	176,7	170,3	160,9
VXT-1260	268,8	252,4	238,5	227,1	214,5	201,9	193,1	183,0	172,9	162,8
VXT-1400	299,0	281,4	265,0	248,6	236,0	227,1	214,5	201,9	193,1	180,4
VXT-1500	319,2	302,8	283,9	268,8	256,1	243,5	230,9	218,3	210,7	198,1
VXT-1600	340,7	319,2	302,8	286,4	273,8	261,2	248,6	236,0	227,1	214,5
VXT-1740	372,2	353,3	329,3	309,1	290,2	277,6	261,2	247,3	232,8	218,9
VXT-1890	403,8	378,5	357,7	340,7	321,8	302,8	290,2	273,8	258,7	244,8
VXT-2100	447,9	422,7	397,5	372,2	353,3	340,7	321,8	302,8	290,2	271,3
VXT-2250	479,5	454,2	425,9	403,8	384,8	365,9	347,0	328,1	315,5	296,5
VXT-2400	511,0	479,5	454,2	429,0	410,1	391,2	372,2	353,3	340,7	321,8
VXT-2520	537,5	504,7	477,0	454,2	429,0	403,8	386,1	365,9	345,7	325,5
VXT-2800	598,1	562,8	530,0	497,1	471,9	454,2	429,0	403,8	386,1	360,9
VXT-3000	637,2	605,7	567,8	537,5	512,3	487,1	461,8	436,6	421,4	396,2
VXT-3200	681,4	637,2	605,7	572,9	547,6	522,4	497,1	471,9	454,2	429,0
VXT-3480	744,5	706,6	658,7	618,3	580,4	555,2	522,4	494,6	465,6	437,8
VXT-3780	807,6	757,1	715,4	681,4	643,5	605,7	580,4	547,6	517,3	489,6
VXT-4200	895,9	845,4	794,9	744,5	706,6	681,4	643,5	605,7	580,4	542,6
VXT-4500	959,0	908,5	851,7	807,6	769,7	731,8	694,0	656,1	630,9	593.0
VXT-4800	1022,1	959,0	908,5	858,0	820,2	782,3	744,5	706,6	681,4	643,5

Enter chart reading across the selection factor columns to find a factor EQUAL TO OR GREATER THAN the design selection factor. Read downward until reaching the flow in l/s EQUAL TO OR GREATER THAN design. Read the recommended unit selection from the unit column on the left. Interpolation is permitted between selection factors only.

Chart 2.3 Recommended Selections in l/s / Selection Factors 1.40 to 2.00

	SELECTION FACTOR									
UNIT	1,40	1,45	1,50	1,55	1,60	1,65	1,70	1,80	1,90	2,00
VXT-10	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-15	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A	N.A.	N.A.	N.A.
VXT-20	2,21	2,02	1,89	1,77	1,64	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-25	3,03	2,84	2,71	2,52	2,40	2,27	2,15	1,89	1,64	N.A.
VXT-30	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-40	4,42	4,04	3,85	3,60	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-45	5,24	4,86	4,61	4,29	4,04	3,72	3,47	N.A.	N.A.	N.A.
VXT-55	6,81	6,44	6,18	5,80	5,49	5,17	4,92	4,35	3,85	3,41
VXT-65	7,13	6,81	6,44	5,99	5,62	5,24	N.A.	N.A.	N.A.	N.A.
VXT-70	8,08	7,63	7,19	6,75	6,39	5,93	5,62	N.A.	N.A.	N.A.
VXT-75	8,96	8,39	7,95	7,44	6,94	6,50	6,12	5,36	N.A.	N.A.
VXT-85	10,79	10,28	9,46	8,96	8,45	8,01	7,57	6,75	6,06	5,36
VXT-95	17'11	10,79	9,91	9,27	8,64	8,14	7,63	N.A.	N.A.	N.A.
VXT-105	12,74	11,99	11,36	10,66	10,28	9,46	8,83	7,76	6,88	N.A.
VXT-120	02 15	38 14	69 13	06 13	43 12	73 11	17 11	09 10	08 9	08 8
VXT-135	17,35	16,53	15,65	14,95	14,32	13,56	12,93	11,55	10,35	9,27
VXT-150	18,36	17,41	16,34	15,46	14,64	13,88	13,19	11,73	10,41	N.A.
VXT-165	20,69	19,68	18,61	17,67	16,53	15,77	14,95	13,44	11,99	10,60
VXT-185	23,60	22,59	21,45	20,25	19,24	18,11	17,03	15,14	13,63	12,18
VXT-N215	26,31	24,92	23,66	22,40	21,14	20,00	18,93	16,91	15,14	N.A.
VXT-N240	29,97	28,39	27,13	25,87	24,29	22,71	21,77	19,24	17,03	15,27
VXT N265	33,75	32,18	30,66	29,15	27,76	26,69	24,92	22,40	19,94	17,79
VXT-N310	37.29	35.20	33.63	31.36	29.65	28.01	26.37	23,34	20.82	N.A.
VXI N345	'42,21	39,87	37,85	35,52	33,44	31,55	29,78	26,31	23,34	20,69
VXT N370	46,06	43,53	41,01	38,80	36,59	34,38	32,49	28,83	25,55	22,59
VXT N395	50,16	47,63	45,42	43,22	41,01	38,80	36,72	32,81	29,27	25,87
VXT N430	52,68	49,84	47,32	44,79	42,27	40,06	37,85	33,82	30,28	N.A.
VXT N480	59,94	56,78	54,26	51,73	48,58	45,74	43,53	38,48	34,07	30,54
VXT N510	64,35	61,20	58,04	55,20	52,05	49,21	46,69	41,64	36,91	32,81
VXT N535	68,77	65,30	62,46	59,30	56,47	53,63	50,79	45,42	40,50	35,96

Models VXT-N215 to VXT-N535 are furnished with max 25 m wide pan sections.

Models VXT-N315 to VXT-4800 are furnished with 3.0 m wide pan sections.

Refer to pages 11 to 13 for detailed dimensional information.

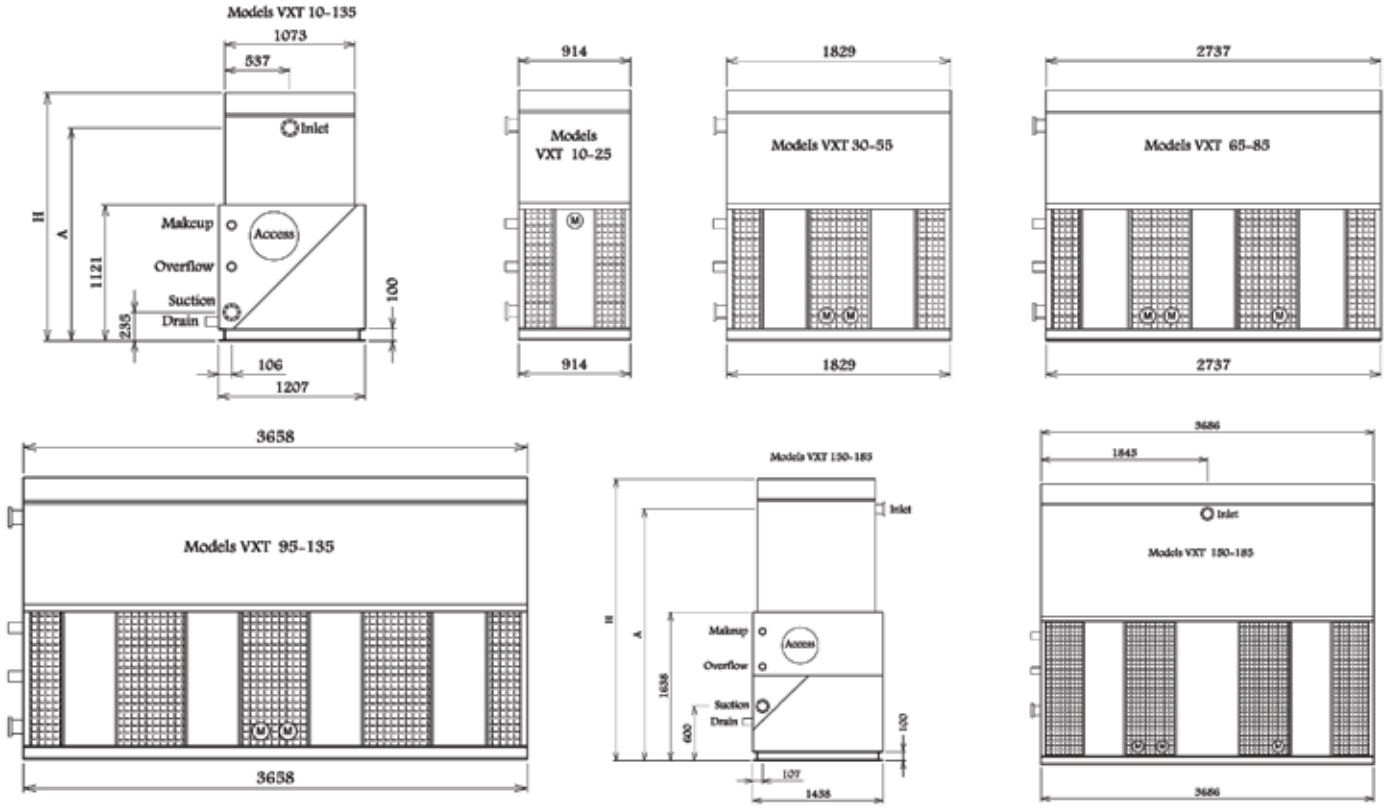
Continue...Chart 2.3 Recommended Selections in l/s / Selection Factors 1.40 to 2.00

UNIT	SELECTION FACTOR									
	1,40	1,45	1,50	1,55	1,60	1,65	1,70	1,80	1,90	2,00
VXT-315	38,17	35,96	34,07	32,18	30,28	28,39	26,81	23,97	21,14	N.A.
VXT-350	42,59	40,38	38,17	35,96	33,75	31,55	29,65	26,50	23,66	20,82
VXT-375	46,69	44,16	41,95	39,43	36,91	34,38	32,49	28,71	25,55	22,71
VXT-400	51'10	48,58	46,06	44,16	41,64	38,80	36,91	32,81	29,02	25,87
VXT-470	57,41	54,26	51,73	48,58	45,42	42,27	40,06	35,65	31,55	N.A.
VXT-525	64,98	61,20	58,04	54,89	51,42	47,63	45,11	40,75	35,01	31,55
VXT-560	70,66	66,24	63,09	59,30	55,52	51,73	48,89	42,90	37,85	33,75
VXT-600	76,97	73,18	70,03	66,56	63,09	58,99	56,78	50,16	44,16	39,43
VXT-630	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-700	85,17	80,76	76,34	71,92	67,51	63,09	59,30	53,00	47,32	41,64
VXT-750	93,37	88,33	83,91	78,86	73,82	68,77	64,98	57,41	51,10	45,42
VXT-800	102,2	97,76	92,11	88,33	83,28	77,60	73,82	65,61	58,04	51,73
VXT-870	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-945	114,5	107,9	102,2	96,53	90,85	85,17	80,44	71,92	63,41	N.A.
VXT-1050	127 8	121 1	114 5	107,9	101,3	9· .64	88,96	79,49	70,98	62,46
VXT-1125	140 1	132 5	125 9	118,3	110 7	103 2	97,47	86,12	76,65	68,14
VXT-1200	153,3	145,7	138,2	132,5	124,9	116,4	110,7	98,42	87.06	77.60
VXT-1260	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-1400	170,3	161,5	152,7	143,8	135,0	126,2	118.6	106.0	96.64	83.28
VXT-1500	186,7	176,7	167,8	157,7	147,6	137.5	130.0	114.8	102.2	90.85
VXT-1600	204,4	194,3	184,2	176,7	166,6	155.2	147.6	131.2	116.1	103.5
VXT-1740	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-1890	229,0	215,8	204,4	193,1	181.7	170,3	160.9	143.8	126.8	N.A.
VXT-2100	255,5	242,3	229,0	215,8	202.5	189.3	177.9	159.0	142.0	124.9
VXT-2250	280,1	265,0	251,7	236,6	221,4	206.3	194.9	172.2	153.3	136.3
VXT-2400	306,6	291,5	276,3	265,0	249,8	232,8	221,4	196.8	174,1	155,2
VXT-2520	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-2800	340,7	323,0	305,4	287,7	270,0	252,4	237,2	212,0	189,3	166,6
VXT-3000	373,5	353,3	335,6	315,5	295,3	275,1	259,9	229,6	204,4	181,7
VXT-3200	408,8	388,6	368,4	353,3	333,1	310,4	295,3	262,5	232,2	206,9
VXT-3480	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
VXT-3780	458,0	431,5	408,8	386,1	363,4	340,7	321,8	287,7	253,6	N.A.
VXT-4200	511,0	484.5	458,0	431,5	405,0	378,5	355,8	318,0	283,9	249,8
VXT-4500	560,2	530,0	503,5	473,2	442,9	412,6	389,9	344,5	306,6	272,5
VXT-4800	613,2	583,0	552,7	530,0	499,7	465,6	442,9	393,7	348,3	310,4

Dimensional and Weight Data

This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

Models VXT 10 to VXT 185

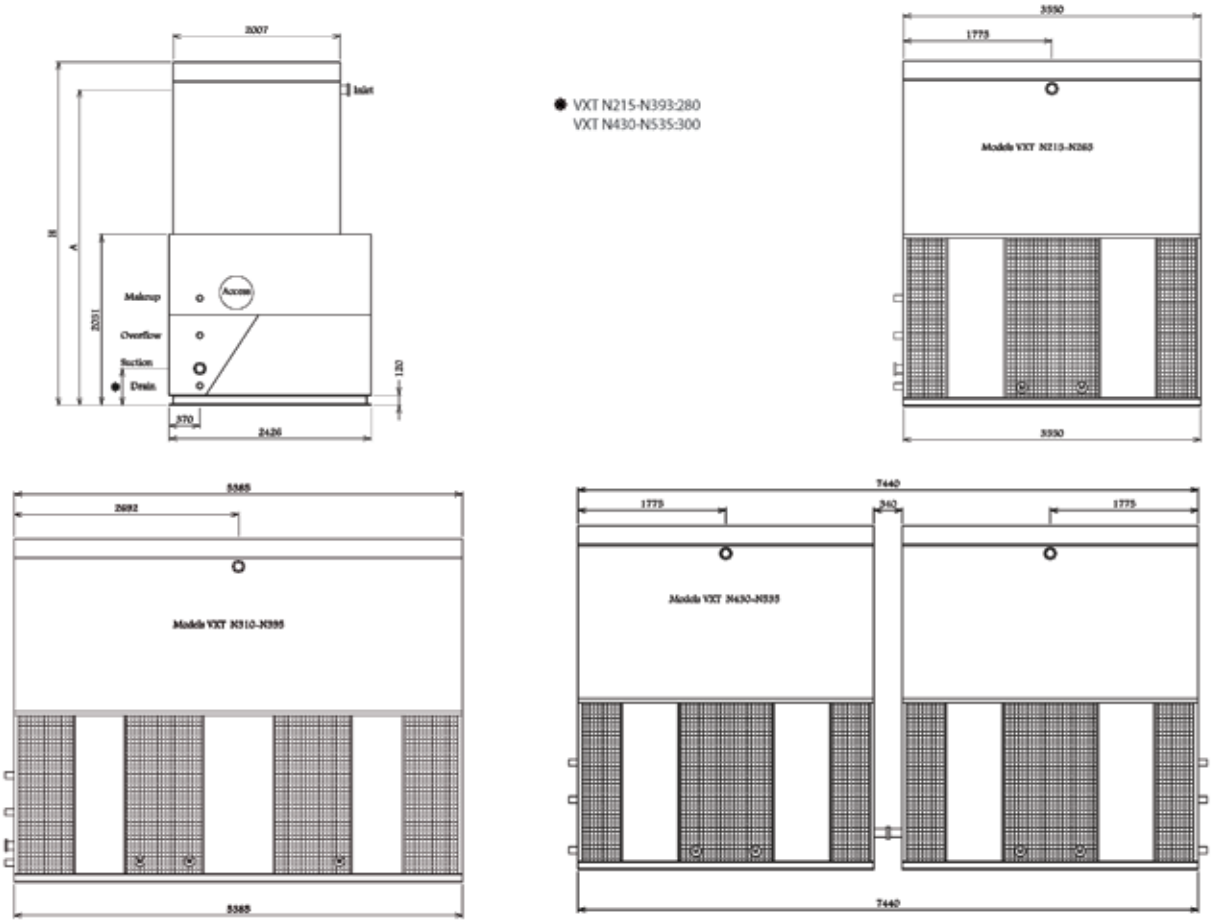


Model No.	Mass (Kg)		Air Flow (m/s)	Motor		Dimension (mm)		Water Inlet Connection	Water Outlet Connection	Make Up Connection
	Approx. Oper.	Approx. Shipg.		Qty.	Power (Hp)	A	H			
VXT 10	540	440	1.79	1	1	1755	2045	80	80	25
VXT 15	550	440	1.94	1	1.5	1755	2045	80	80	25
VXT 20	564	463	2.19	1	2	1755	2045	80	80	25
VXT 25	580	480	2.50	1	3	1755	2045	80	80	25
VXT 30	870	650	3.74	2	1	1755	2045	80	80	25
VXT 40	910	695	4.48	2	1.5	1755	2045	80	80	25
VXT 45	915	705	4.97	2	3	1755	2045	80	80	25
VXT 55	1035	820	5.16	2	4	2225	2515	80	80	25
VXT 65	1395	955	7.22	3	3	1727	2045	100	100	25
VXT 70	1430	985	8.12	3	3	1911	2229	100	100	25
VXT 75	1510	1065	8.02	3	3	2197	2515	100	100	25
VXT 85	1515	1075	8.83	3	4	2197	2515	100	100	25
VXT 95	1670	1180	11.04	2	5	1727	2045	100	100	25
VXT 105	1920	1440	10.90	2	5	2368	2686	100	100	25
VXT 120	1955	1470	12.58	2	7.5	2368	2686	100	100	25
VXT 135	5510	1730	12.46	2	7.5	3041	3359	100	100	25
VXT 150	2940	2120	15.79	3	7.5	2780	3112	150	150	25
VXT 165	3135	2310	15.53	3	7.5	3236	3569	150	150	25
VXT 185	3405	2580	16.94	3	10	3693	4026	150	150	25

All 80 mm and smaller connections are MPT. Connections larger than 100 mm are beveled for welding.
Fan kW is at 0 Pa ESP. To operate against external static pressure up to 125 Pa, increase each fan motor one size.
1. Units VXT-10 to VXT-95 ship in one piece.
2. Casing is the heaviest section.
Make-up,suction, and drain connections can be provided on end opposite to that shown.

This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

Models VXT N215 to VXT N535

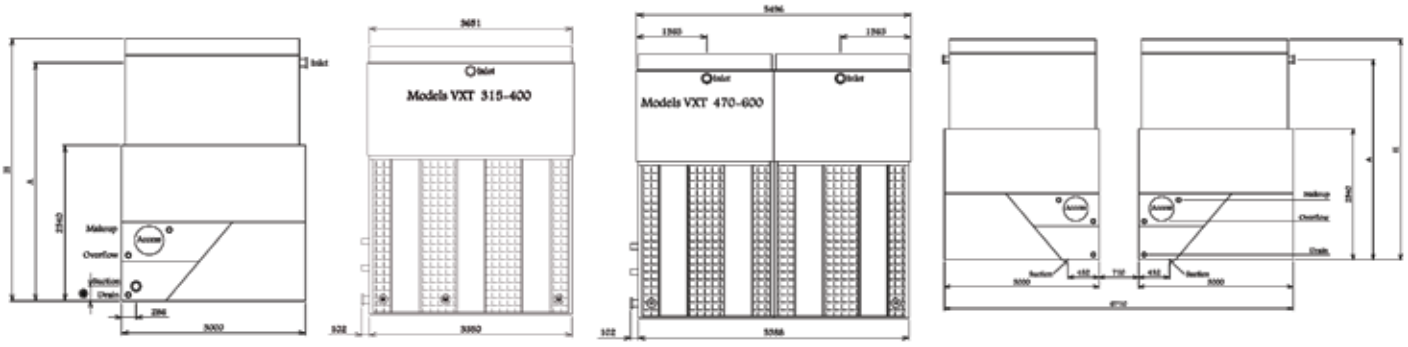


Model No.	Mass (Kg)		Air Flow (m/s)	Motor		Dimension (mm)		Water Inlet Connection	Water Outlet Connection	Make Up Connection
	Approx. Oper.	Approx. Shipg.		Qty.	Power (Hp)	A	H			
VXT N215	4580	2800	23.49	2	15	2873	3206	150	200	50
VXT N240	5105	3100	23.33	2	15	3330	3663	150	200	50
VXT N265	5415	3400	24.26	2	20	3787	4120	150	200	50
VXT N310	7040	4100	34.12	3	15	2833	3206	200	200	50
VXT N345	7415	4450	33.82	3	15	3290	3663	200	200	50
VXT N370	7785	4850	33.60	3	15	3747	4120	200	200	50
VXT N395	7815	4900	36.15	3	20	3747	4120	200	200	50
VXT N430	9730	5600	46.98	4	15	2873	3206	2 x 150	250	50
VXT N480	10300	6100	46.65	4	15	3330	3663	2 x 150	250	50
VXT N510	10800	6650	46.44	4	15	3787	4120	2 x 150	250	50
VXT N535	10900	6750	48.94	4	20	3787	4120	2 x 150	250	50

All 80 mm and smaller connections are MPT. Connections larger than 100 mm are beveled for welding.
Fan kW is at 0 Pa ESP. To operate against external static pressure up to 125 Pa, increase each fan motor one size.
Make-up, suction, and drain connection can be provided on end opposite to that shown.

This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase

Models VXT 315 to VXT 4800



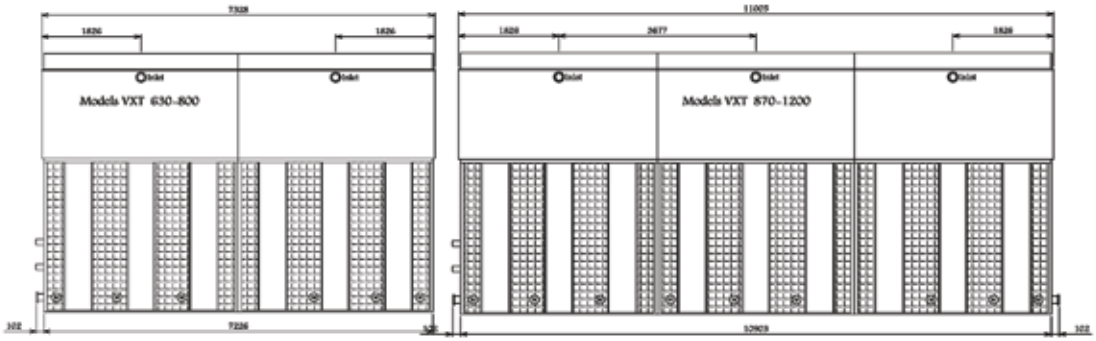
● VXT 315 - 400 : 279
VXT 470 - 600 : 305
VXT 630 - 800 : 330
VXT 870 - 1200 : 305

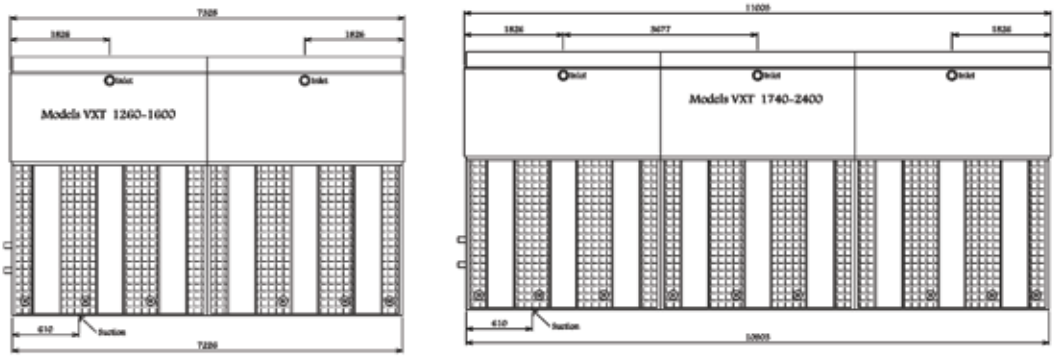
Model No.	Mass (Kg)		Air Flow (m/s)	Motor		Dimension (mm)		Water Inlet Connection	Water Outlet Connection	Make Up Connection
	Approx. Oper.	Approx. Shipg.		Qty.	Power (Hp)	A	H			
VXT 315	6510	3950	34.55	3	15	3743	4123	200	200	50
VXT 350	6900	4350	34.31	3	15	4201	4581	200	200	50
VXT 375	7310	4750	34.10	3	15	4658	5038	200	200	50
VXT 400	7350	4800	36.62	3	20	4658	5038	200	200	50
VXT 470	9700	5800	51.82	2	30	3743	4123	2 x 200	250	50
VXT 525	10300	6400	51.44	2	30	4201	4581	2 x 200	250	50
VXT 560	11000	7050	50.92	2	30	4658	5038	2 x 200	250	50
VXT 600	11050	7200	54.93	2	40	4658	5038	2 x 200	250	50
VXT 630	13050	7900	69.09	6	15	3743	4123	2 x 200	300	50
VXT 700	14550	8650	68.62	6	15	4201	4581	2 x 200	300	50
VXT 750	14650	9450	68.20	6	15	4658	5038	2 x 200	300	50
VXT 800	14700	9550	73.25	6	20	4658	5038	2 x 200	300	50
VXT 870	19350	11600	94.37	9	10	3743	4123	3 x 200	2 x 250	80
VXT 945	19500	11800	103.64	9	15	3743	4123	3 x 200	2 x 250	80
VXT 1050	20700	12800	102.93	9	15	4201	4581	3 x 200	2 x 250	80
VXT 1125	21900	14200	102.30	9	15	4658	5038	3 x 200	2 x 250	80
VXT 1200	22000	14300	109.87	9	20	4658	5038	3 x 200	2 x 250	80
VXT 1260	26050	15700	138.19	12	15	4201	4123	4 x 200	2 x 300	80
VXT 1400	29050	17300	137.24	12	15	4658	4581	4 x 200	2 x 300	80
VXT 1500	29250	18900	136.39	12	15	4658	5038	4 x 200	2 x 300	80
VXT 1600	29350	19100	146.49	12	20	4201	5038	4 x 200	2 x 300	80
VXT 1740	38700	23250	188.73	18	10	3743	4123	6 x 200	2 x 300	80
VXT 1890	39000	23600	207.28	18	15	3743	4123	6 x 200	2 x 300	80
VXT 2100	41350	25900	205.86	18	15	4201	4581	6 x 200	2 x 300	80
VXT 2250	43900	28400	204.59	18	15	4658	5038	6 x 200	2 x 300	80
VXT 2400	44050	28650	219.74	18	20	4658	5038	6 x 200	2 x 300	80
VXT 2520	52150	31500	276.37	24	15	4201	4123	8 x 200	4 x 300	2 x 80
VXT 2800	58150	34600	274.49	24	15	4658	4581	8 x 200	4 x 300	2 x 80
VXT 3000	58550	37900	272.79	24	15	4658	5038	8 x 200	4 x 300	2 x 80
VXT 3200	58750	38150	292.99	24	20	4201	5038	8 x 200	4 x 300	2 x 80
VXT 3480	77400	46400	377.47	36	10	3743	4123	12 x 200	4 x 350	2 x 80
VXT 3780	78050	47000	414.56	36	15	3743	4123	12 x 200	4 x 350	2 x 80
VXT 4200	82700	51700	411.73	36	15	4201	4581	12 x 200	4 x 350	2 x 80
VXT 4500	87650	56700	409.18	36	15	4658	5038	12 x 200	4 x 350	2 x 80
VXT 4800	88000	57000	439.48	36	20	4658	5038	12 x 200	4 x 350	2 x 80

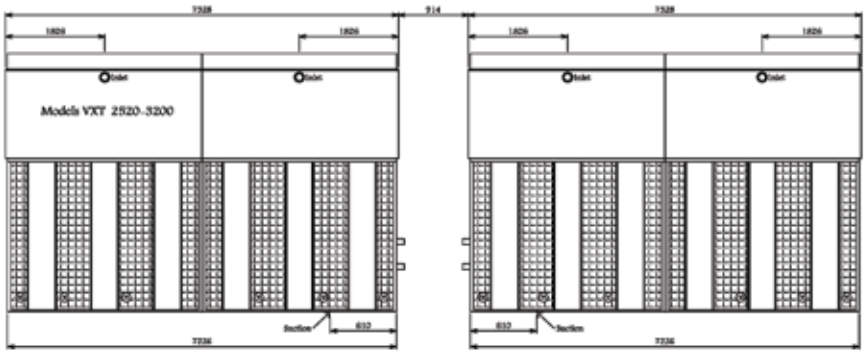
All 80 mm and smaller connections are MPT. Connections larger than 100 mm are beveled for welding.
Unit sizes VXT-1260 through VXT-4800 have water inlet connections on both sides.
All water inlet connections must be used.
Unit sizes VXT-1260 through VXT-4800 require equalizers. If equalizer piping is valved or inlet header piping is located in the access lane, increase width as required.
Fan kW is at 0 Pa ESP. To operate against external static pressure up to 125 Pa, increase each fan motor one size.
Make-up over flow suction and drain connections can be provided on end opposite to that shown.

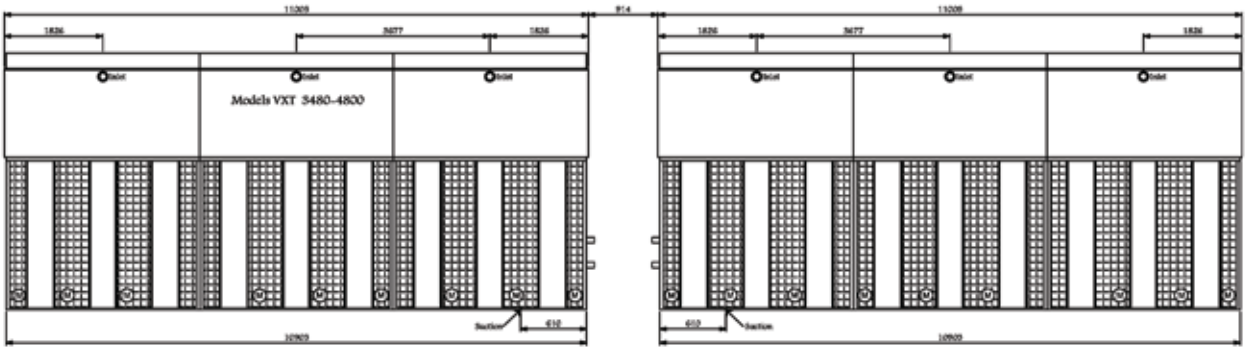
This brochure includes data current at the time of publication which should be reconfirmed at the time of purchase.

Models VXT 315 to VXT 4800









Application

Satisfactory VX Cooling Tower performance depends on correct selection and proper attention to overall system design and installation. Some of the major design considerations are discussed below. For more detailed recommendations, consult TAHVIEH.

Location

VX Cooling Towers must be located so there is an unimpeded supply of air to all fans. When units are located in enclosures or close to building walls, the top of the unit must be level with the top of adjacent walls. This will, reduce the possibility of capacity reduction due to recirculation of the warm saturated discharge air back into the fan intakes. On installations where the unit cannot be elevated to premit discharge above adjacent wall a discharge hood (see "Optional Accessory Equipment) or duct should be provided to raise the discharge opening even with the top of the enclosure or adjacent wall. Additionally, each Cooling Tower should be located and positioned to prevent the introduction of its discharge air into the ventilation systems of the building on which the tower is located and of adjacent buildings.

Indoor Installations

Many indoor installations require the use of inlet and/or discharge ductwork. Towers installed with inlet ductwork must be ordered with solid bottom panels. Generally, intake ducts are used only on the smaller units while the equipment room is used as a plenum for the larger units.
Discharge ductwork will normally be required to carry the saturated discharge air from the building.
Both intake and discharge ductwork must have access doors to allow servicing of the fan assembly, eliminators, and water distribution system. All ductwork should be symmetrical and designed to provide even air distribution across the face of intakes and discharge openings.
Ducts must be designed for static pressure loss of 125 Pa or less and fan motor sizes must be increased one size.

Wet Deck Surface Compatibility

The maximum allowable entering water temperature for VX Tower with PVC wet deck surface is 55 °C.
The PVC wet deck surface is compatible with the water found in most cooling tower applications. However, for applications which may require an alternative type of wet deck surface material refer to the "Optional Materials" where wet deck surface options are discussed. For the proper choice of wet deck surface contact TAHVIEH.

Piping

Piping should be sized and installed in accordance with good piping practice. In order to prevent overflowing of the tower basin and ensure satisfactory pump operation at start-up, all heat exchangers and as much tower piping as possible should be installed below the operating level of the tower. In addition, all piping should be supported separately from the unit through the use of pipe hangers or supports.
If more than one inlet connection is required, balancing valves should be installed to properly balance flow to each cooling tower cell. Shut-off valves are optional and their use is dictated by the necessity to isolate units for servicing. Maximum required spray pressure at the inlet header is 35 kPa.
When multiple towers (such as Models VXT-1260 through VXT-4800) are used on a common system, equalizing lines should be installed between the sumps of the separate units to ensure a balanced water level in all units.

Capacity Control

Most cooling tower systems are subject to substantial changes in load and/or ambient temperature conditions during the normal operating season. The capacity of VX Cooling Towers varies greatly as the wet bulb temperature changes. When a reasonably constant leaving water temperature is desired, some forms of capacity control is required during periods of reduced load or low ambient temperature conditions.

Fan cycling is the simplest method of capacity control on VX Cooling Towers and is often used on multiple unit installations. At above freezing ambient temperatures where close control of the water temperature leaving the tower is not essential, fan cycling affords an adequate and inexpensive method of temperature control.

The number of steps of capacity control can be doubled by using two speed fan motors in conjunction with fan cycling. This is particularly useful on single fan motor units. Two speed fan motors also provide additional energy savings when compared to simple fan cycling.

Where close control of the leaving water temperature is required or the unit is to operate at subfreezing ambient temperatures, the recommended method of capacity control is modulating capacity control dampers (See "Optional Accessory Equipment"). Fan discharge dampers provide modulation of capacity by varying the airflow to match the tower capacity to the system heat load.

End switches on the damper motors shut off the fan motors when the dampers reach the minimum position. Damper control also provides operating savings since the fan power rating is reduced with reduced airflow.

Protection against Pan Water Freezing

As long as the VX Cooling Tower is in operation under load with capacity control dampers, the recirculating cooling water will not freeze. However, when the tower is shut down, the pan water must be protected. An indoor auxiliary sump is the best means of avoiding pan water freezing in an idle tower. With this remote sump system, the pan water is always drained to the indoor sump whenever the recirculating water pump is stopped.

Where a remote sump is impractical because of tower location or space limitations, supplementary heat must be supplied to the pan water through the use of electric immersion heaters, steam coils, or hot water coils (see "Optional Accessory Equipment").

In addition, all exposed water piping and makeup lines that do not drain at shutdown should be traced with electric heater tape and insulated.

Water Treatment

As water evaporates in a cooling tower, the dissolved solids originally present in the water remain in the system. The concentration of dissolved solids increases rapidly and can reach unacceptable levels. In addition, airborne impurities and biological contaminants are often introduced into the recirculating water. If impurities and contaminants are not effectively controlled, they can cause scaling, corrosion, sludge or biological fouling.

Accordingly, a water treatment program should be employed to control all potential contaminants. While in many cases simple bleed-off may be adequate for control of scale or corrosion, it is insufficient to control biological contamination and this subject must be addressed in any treatment program. The treatment program must be compatible with galvanized steel and the pH of the pan water must be maintained between 6.5 and 8.5.

Batch chemical feeding for scale and corrosion control is not recommended since effective mixing may not be achieved in the cooling tower sump.

For specific recommendations on water treatment contact a competent water treatment supplier.

Sound

As society becomes more concerned about the quality of its environment, sound is becoming an important consideration in the selection and location of mechanical equipment there are basically three steps involved in evaluating the sound from a cooling tower to determine if it will be acceptable for the installation. These three steps are: establishing the sound criteria, estimating the sound levels generated by the cooling tower, and comparing the sound criteria to the generated sound levels.

Establishing the Sound Criteria

The system designer usually establishes the acceptable sound level for the project based on his judgment, local code requirements, and the needs of the owner.

Sound Levels Generated By the Cooing Tower

TAHVIEH has certified sound rating data available for all of its products. These data is required to calculate sound levels generated by the cooling tower. In addition, the designer must take into account the effects of the geometry of the tower to noise sensitive areas.

Comparing Sound Levels

The last step is comparing the established noise criteria with the expected sound levels to determine if the tower sound will be acceptable.

In the event that the cooling tower sound may be excessive for the particular site conditions; packaged sound attenuation, barrier walls, or relocation of towers may be used to reduce or control the sound levels.

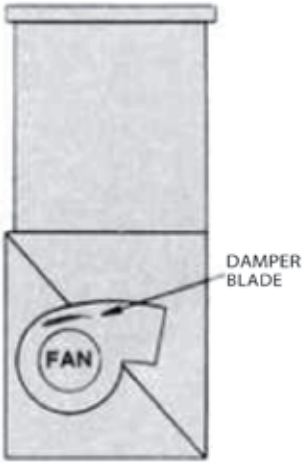
Application Checklist

Shown below are items that should be checked before the design of a VX Cooling Tower installation is completed.

1- Correct Selection
2- Location
   a.Outdoor
   b.b. Indoor
3- Wet Deck Compatibility
4- Piping
   a.Inlet
   b.b. Outlet
   c.Drain
   d.Make-up
   e.Overflow
   f.Support
   g.g. Equalizer
5- Capacity Control
6- Pan Water Freeze Protection
7- Water Treatment
8- Sound

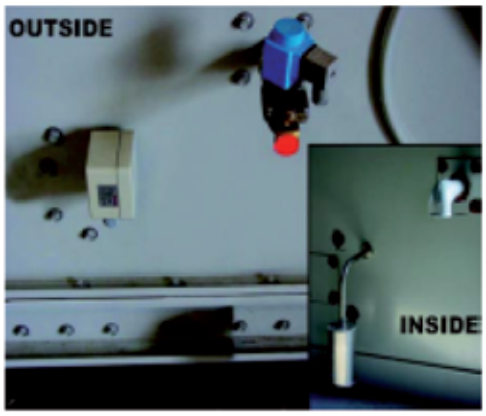
Optional Accessory Equipment

Control capacity dampers



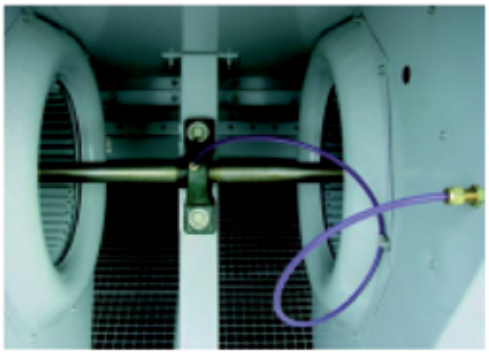
Where close control of the leaving water temperature is required or the unit is to operate at subfreezing ambient temperatures, the recommended method of capacity control is modulating capacity control dampers (See "Optional Accessory Equipment"). Fan discharge dampers provide modulation of capacity by varying the airflow to match the tower capacity to the system heat load.
End switches on the damper motors shut off the fan motors when the dampers reach the minimum position. Damper control also provides operating savings since the fan power rating is reduced with reduced airflow.

Electric Water level Control



A factory-set electric water level control system can be substituted for the standard mechanical makeup valve to provide exceptionally accurate water level control. No field adjustment is necessary regardless of variations in thermal loads on the cooling tower or variations in makeup water supply pressure. This system consists of a weather protected electric float switch with stilling chamber mounted on the pan/fan section and a solenoid valve factory installed at the makeup water connection on the unit. All wiring must be provided by others.
Because this accessory assures a constant water level without adjustment, it is recommended for use on units that will require year-round operation in a freezing climate.

Solid Bottom panels



Factory-installed bottom panels are available. Their use is required when the intake air is ducted to the unit.
When a tower is specified for use with inlet ductwork, the solid bottom panel package includes lubrication fittings extended outside the fan section and the unit is furnished without air inlet screens.

Bottom Screens

Air inlet screens can be factory installed on the bottom of the cooling tower when location makes this additional protection desirable or necessary for safety or other reasons.

Pan Water Heaters

Cooling Towers that will be exposed to below-freezing ambient temperatures require protection to prevent freezing of the pan water when the cooling tower is idle. Heaters selected to maintain +4°C pan water temperature afford a simple and inexpensive way of providing such protection. Factory-installed pan heaters of two types are available.
Electric Heaters ... Electric immersion heaters are normally factory-installed in the cooling tower basin. The heaters are controlled by a thermostat with the sensing bulb located in the pan water. A low water level control, also heater elements are fully submerged.
Immersion heaters should be interlocked with water circulating pump to de-energize heaters whenever the circulating pump is running.

MODEL	HEATER kW		
	-18 (1)	-2)14)	-3)7)
VXT 10-25	1,5	1,0	1,0
VXT 30-55	1,5	1,0	1,0
VXT 65-85	2.5	2,0	1,0
VXT 95-135	3,0	2.5	1,5
VXT 150-185	4,0	3,0	2,0
VXT N215-N265	6,0	5,0	3,0
VXT N310-N395	8,0	6,0	4,0
VXT N430-N535	12.0	10,0	6,0
VXT 315-400	6,0	5,0	3,0
VXT 470-600	10,0	8,0	5.0
VXT 630-800	12,0	10,0	6,0
VXT 870-1200	20,0	16.0	10,0
VXT 1260-1600	24.0	20.0	12.0
VXT 1740-2400	36,0	32.0	18.0
VXT 2520-3200	48,0	40,0	24,0
VXT 3480-4800	72,0	64,0	36.0

(1) Heater selection for maintaining pan water at +4°C at -18°C ambient air temperature.
(2) Heater selection for maintaining pan water at + 4°C at -14°C ambient air temperature.
(3) Heater selection for maintaining pan water at +4•c at -7°C ambient air temperature.

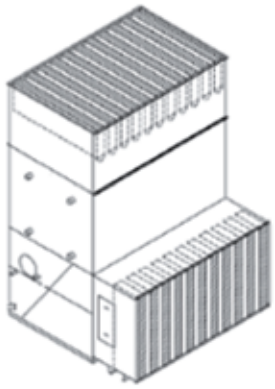
Pan Coil ... A steam coil or a hot water coil can be factory installed in the cooling tower basin. The coil is constructed from galvanized steel pipe ready for piping to an external steam or hot water source.

Discharge Hoods

TAHVIEH offers a full line of standard discharge hoods for all VX Cooling Towers. These hoods are designed to increase the discharge air velocity to avoid recirculation in extremely tight enclosures. They can be used to elevate the tower discharge above must be used when hoods are provided.

Engineered Sound Attenuation Systems

VX Cooling Tower installations will meet most sound level criteria without attenuation. For extremely noise sensitive installations, factory-built sound attenuation systems are available for field mounting .The full line of sound attenuation systems consists of two types of barrier attenuation to meet horizontal noise criteria and three types of air intake and air discharge sound attenuators to meet both horizontal and vertical noise criteria. All engineered sound attenuation systems are designed to allow easy access to all moving parts of the unit.



Vibration Isolators

TAHVIEH VX Cooling Towers operate with virtually no vibration and generally do not require vibration isolation.

Connections

The design of the VX tower allows for additional connections to be installed in the pan for equalizing, bypass, or optional suction location.
When the tower is specified for remote sump operation, the float valve and strainer are omitted and an oversized outlet is provided.
Connections can be provided as flanged, beveled-for welding, or threaded depending on size and location.

Export Shipment

VX Cooling Towers can be prepared for export shipment in either of two ways: minimum export crating acceptable to the carrier, or completely closed export boxing.

Optional Materials

Wet Deck Surface

High Temperature TAHVIEH Wet Deck Surface

In application where temperatures may exceed 55 °C, high temperature TAHVIEH wet deck surface can be provided.

Stainless Steel Cooling Towers

For those installations where severe corrosion conditions exist and exceptionally long life is desired, TAHVIEH offers the VX Cooling Towers in stainless steel construction. VX Stainless Steel Cooling Towers can be built of stainless in water-touched areas only, or of complete stainless steel construction.

Water Contact

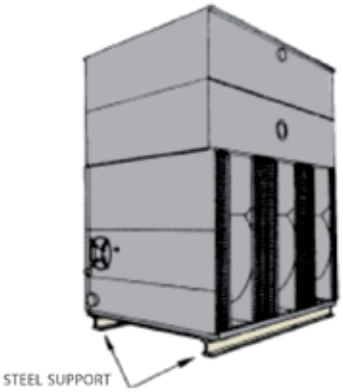
Water contact stainless steel VX towers utilize 304 stainless steel in all areas of the tower which come in contact with water, while the remainder of the unit is built of hot-dip galvanized steel. This construction provides the corrosion resistance of stainless steel where it is needed most at a lower cost than all stainless construction.
The components made of stainless steel are: casing panels, discharge eliminators, "V" pans section panels, strainer assembly, fan discharge snout, and internal baffles. Pan section components which are located in the dry entering air are made of standard hot-dip galvanized steel protected.

All Stainless

In situations where the air moving equipment along with the water contact components must be stainless steel, all 304 stainless VX constructions can be supplied.
All components except the heat transfer section, fan motors, belts and sheaves are made of stainless steel when this type of construction is chosen.

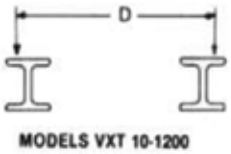
Support and Installation

The recommended support arrangement for TAHVIEH VX Cooling Towers is two I beams running the full length of the unit. Besides providing support, the steel also serves to raise the unit above any solid foundation which might restrict air movement or prevent access to the bottom of the unit. The steel support beam must be located directly beneath the unit and extend the full length of the pan section. Support beams and anchor bolts are to be furnished and installed by others

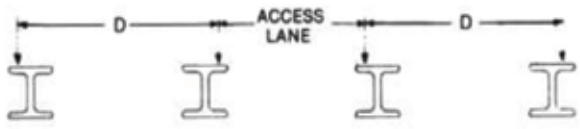


Beam Size and Length

Beams size should be calculated in accordance with accepted structural practice. Use 65 percent of the operating weight as a uniform load on each beam. The length of the beam must be at least equal to the length of the pan. Refer to Engineering Data section pages 10 to 13 for pan dimensions. Maximum permissible beam deflection and center line distances between bolt holes are tabulated below.



MODELS VXT 10-1200



MODELS VXT 1260-4800

Model Nos.	D (mm)	Maximum Deflection (mm)
VXT 10-25	1153	2.4
VXT 30-55	1153	4.8
VXT 65-85	1153	7.9
VXT 95-135	1153	9.5
VXT 150-185	1378	9.5
VXT N215-N265	2356	9.5
VXT N310-N535	2356	12.5
VXT 315-400	2934	9.5
VXT 470-800	2934	12.5

Vibration Isolators

If vibration isolators are used, a rail or channel must be provided between the unit and the isolators to provide continuous unit support. Refer to vibration isolator drawings for the length of the rails and mounting hole locations which may differ from the length and the hole locations of the unit itself.