



Hope Deepblue



## X Hot-water Type LiBr Absorption Chiller



Hope Deepblue

**Continental Hope Group**  
**Hope Deepblue Air-conditioner Manufacturer Corp., Ltd.**

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## Hot-water LiBr Absorption Chiller

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## Company Profile

Hope Deepblue Air-conditioner Manufacture Corp., Ltd.(Deepblue) was established in 1997. It is affiliated to Hope Group, which has been following its corporate philosophy of "Contributing to the Motherland and Striving for the Best" since its founding and has developed into an ultra-large conglomerate after over twenty years of hard work, with its annual sales revenue approaching RMB 100 billion and its business involving energy development, energy and chemicals, HVAC&R, power electronics, information network, drive control, building, real estate, hotel, food, feedstuff, finance and international trade industries.

Deepblue was founded with an investment of RMB 160 million. It is located in the Western High-tech Park in Chengdu, a national key high-tech development zone, and occupies an area of about 170 mu(1 hectare equals 15 mu). As a national key high-tech enterprise and the largest central air conditioner manufacturer in West China, Deepblue is engaged in R&D, production and sale of products in HVAC&R, and offer all kinds of air conditioners and systematic solutions according to users' different demands.

Deepblue has a strong technology R&D team consisting of renowned experts, scholars and engineers in air conditioner industry. So far it has obtained tens of patents and proprietary technologies and on this basis has developed the Deepblue Green Energy Center, the truly first heat-electricity-cooling tri-generation system with independent intellectual property rights in China, which has been operating successfully for more than six years. Besides, Deepblue developed various advanced air conditioning products including water(ground)-source central air conditioner, LiBr(lithium bromide) absorption chiller and vacuum boiler, bringing comfort and energy saving, and environmental protection benefits to its customers.

Thanks to the advanced technologies, state-of-the-art production and test equipment, and scientific management, Deepblue's products has passed ISO9001, ISO14001, CCC, CRAA, CSC and CE certifications, won the "Gold Medal of the Fourth Shanghai Science and Technology Exposition" and "Gold Medal of China Fair of Inventions and Technologies", and included in the National Torch Program and National Key & New Product list, and Deepblue has won a number of awards such as Key Recommended Unit for National Energy Saving Project Construction, Top Ten Most Influential HVAC&R Brand, Top Ten Most Designer-trusted HVAC&R Brand, Model Enterprise for Building's Energy Conservation and Emission Reduction, Special Contribution Prize in Building Environment and Facilities Industry, and Leading Enterprise in Waste Heat Recovery. Particularly, Deepblue's water(ground)-source central air conditioner has become the first choice in the industry due to its prominent energy efficiency and high quality.

After more than ten years of rapid development, Deepblue has formulated a nationwide marketing and service network and established powerful and professional marketing and installation teams, which provide pre-sale technical consultancy, production installation and consultancy, lifelong product maintenance, energy saving management consultancy, energy saving project retrofit, and air conditioner and energy operation management services, making customers enjoy satisfactory services during the whole process from R&D, manufacture, inspection to commissioning and after-sale maintenance.

"One Project, One Masterpiece". Deepblue has built an array of important and representative projects across China such as the Beijing Newton Office, Zhejiang World Trade Center, Hefei New City International, Lingbo Xinfeng Resort(five-star), Chengdu Homeland Hotel(five-star) and Hongjiaou Commercial Plaza. "Deepblue Fits Top Building" has been a fashion, trend and acknowledgement. Deepblue will continue to work hard and take public praise as its best encouragement and endeavour to grow into an industrial leading company.





## Certificates



CE Certificate



ISO14001 Certificate



ISO9001 Certificate



CRAA Certificate



Chiller(Heater) performance test-room certificate



National Torch Program Project Certificate



Chinese Energy Conservation Product Certificate



High-tech Enterprise Certificate



National Industrial Product Production License

## Manufacturing and Test Equipment



Helium Leak Detectors



X-Ray Detectors



Ultrasonic Weld Tester

Helium mass spectrometer leak detector  
(imported from Germany)



Machining Center



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Hot-water Type LiBr  
Absorption Chiller(Heatex)

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- ① Welding robot
- ② Submerged Arc welding machine
- ③ CNC cutting machine
- ④ CNC Drilling machine
- ⑤ Bundle automatic welding machine



## Hot Water-type LiBr Absorption Chiller Product Features

### Working principle

The hot water-type LiBr absorption chiller is a hot water-powered refrigeration unit. It adopts the aqueous solution of lithium bromide (LiBr) as a cycling working medium. The LiBr solution works as an absorbent and water as a refrigerant.

The chiller comprises primarily the generator, condenser, evaporator, absorber, heat exchanger, automatic air extractor, burner, vacuum pump and canned pump.

**Working Principle:** The refrigerant water in the evaporator evaporates away from the surface of the heat conducting tube. As heat in the cold water is taken away from the tube, the water temperature drops and quantities of cold are generated. The refrigerant steam evaporated from the evaporator is absorbed by the thick solution in the absorber and therefore the solution is diluted. The thin solution in the absorber is then delivered by the solution pump to the heat exchanger, where the solution is heated and the solution temperature rises. Then the thin solution is delivered to the generator, where it is heated by hot water to produce refrigerant steam. Then the solution becomes a thick solution. After releasing heat in the heat exchanger, the temperature of the thick solution drops. The thick solution then enters the absorber, where it absorbs the refrigerant steam from the evaporator, becomes a thin solution and enters the next cycle. The refrigerant steam generated by the generator is cooled in the condenser to form refrigerant water, which is further depressurized by a throttle valve and delivered to the evaporator. After the evaporation & refrigeration process, the refrigerant steam enters the next cycle.

The aforesaid cycle occurs repeatedly to form a continuous refrigeration process.





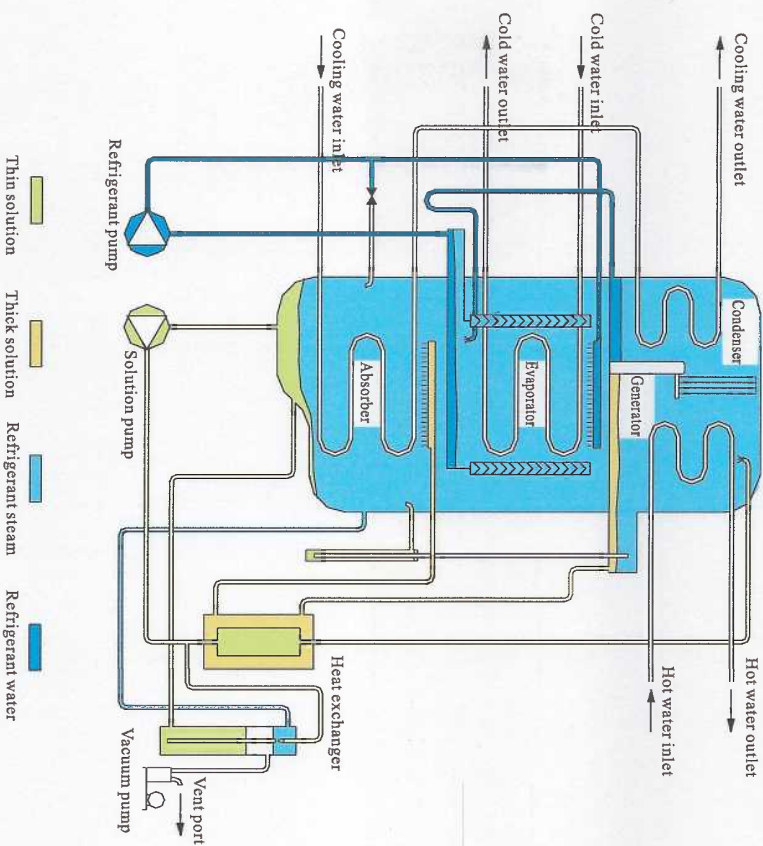


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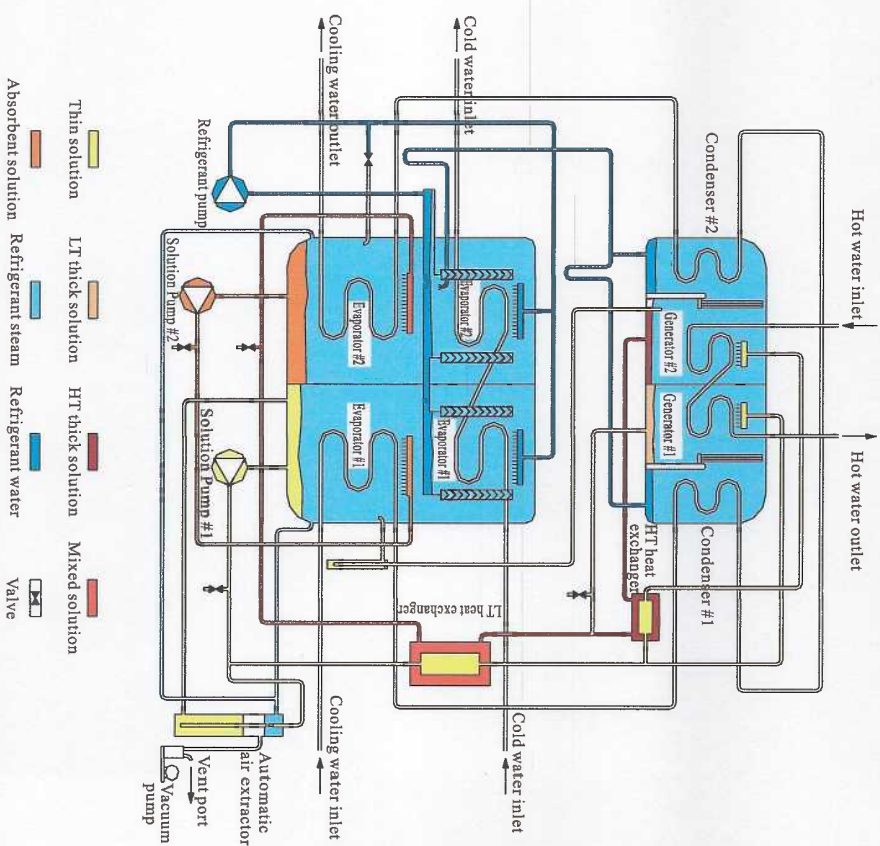
Hot water Type Lifer  
Absorption Chiller(Heater)

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## Refrigeration Flowsheet of a Standard Hot Water-T Type Chiller



## Refrigeration Flowsheet of a Hot Water-T Type Two-Pass Chiller





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Hot-water Type LiBr  
Absorption Chiller(Heater)

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## Chiller Features

### 1. Automatic air extraction system combining multi-ejector & water head technology: Speedy vacuum pumping and high vacuum degree maintenance

This is a new, high-efficiency automatic air extraction system. The ejector functions as a small air extraction pump. Meanwhile, automatic air extraction system adopts multiple ejectors to increase the air extraction & exhaust rate of the chiller. The water head design can help to elevate the vacuum limits and maintain a high vacuum degree. The design, which features "rapidity" and "highness", can provide a high vacuum degree for every part of the chiller at any time. Therefore, oxygen corrosion is precluded, service life is prolonged and an optimal operating status is maintained for the chiller.

### 2. Self-purging multiply-guided drip-spray device: Stemming blockage

This is a novel structure that precludes blockage effectively. Liquid comes out of the upper pores and branches into three directions. The barbed liquid distribution design can realize self-purging and sedimentation, therefore eradicating the likeliness of absorber sprayer blockage and minimizing refrigeration capacity deterioration.



### 3. Fine separation device: Stemming contamination

The concentration process for the LiBr solution in the generator is composed of two stages: flash evaporation and generation. Flash evaporation is the root cause for contamination. The fine separation unit conducts fine separation for the refrigerant water (containing parts of the solution) in the flash evaporation stage and purifies and delivers the refrigerant water to the next refrigeration cycle. By eliminating the source of contamination, the fine separation unit radically addresses refrigeration water contamination.

### 4. Automatic anti-crystallization system combining potential difference-based dilution and crystal dissolution: Stemming crystallization

A self-contained temperature & potential difference detection system enables the chiller to monitor excessively high concentration of the thick solution. On the one hand, upon detecting an overly high concentration, the chiller automatically feeds refrigerant water to the thick solution for dilution; on the other hand, the chiller utilizes the HT LiBr solution in the generator to heat the thick solution to a higher temperature. The two-pronged solution helps to prevent crystallization-induced failure by keeping the thick solution concentration well below the critical point of crystallization.

In the event of a sudden power failure or abnormal system shutdown, the potential difference-based dilution system will start rapidly to dilute the LiBr solution and to ensure rapid dilution after power supply is restored.

### 5. Mixed-process refrigeration cycling: An innovative refrigeration process

By combining the merits of the serial process and the parallel process, mixed-process refrigeration cycling can effectively reduce the circulated solution volume and heat loss. Meanwhile, the mixed solution helps to improve chiller operation, minimize crystallization and ensure more stable and energy-efficient chiller operation.

### 6. Economizer: Energy output boosting

Isosaccharol with a conventional chemical structure, as an energy-boosting agent added to the LiBr solution, is normally an insoluble chemical that has only a limited energy boosting effect. The economizer can prepare the mixture of isosaccharol and the LiBr solution in a special way to guide isosaccharol into the generation & absorption process, therefore enhancing the energy boosting effect of isosaccharol, effectively reducing energy consumption and realizing energy efficiency.

### 7. Interlocked mechanical & electrical anti-freezing system: Multiple anti-freezing protection

The coordinated anti-freezing system features the following merits: a lowered primary sprayer design for the evaporator; an interlock mechanism which links the secondary sprayer of the evaporator with the supply of refrigerant water/cold water; a pipe blockage prevention device; a two-hierarchy old water flow regulating valve; and an interlock mechanism designed for the cold water circulating pump and the cooling water circulating pump. A sextuple anti-freezing design ensures timely detection of cutoff, underflow and under-temperature of cold water supply. Meanwhile, automatic steps will be taken to prevent pipe freezing.

### 8. Fine flash drum: Recovery of residual heat in the refrigerant

The residual heat of the refrigerant water in the chiller is used to heat the thin LiBr solution. By reducing the thermal load of the absorber, the fine flash drum achieves the end of residual heat recovery and energy efficiency.

### 9. Self-adaptive refrigerant storage unit: Improving part of the load characteristics and shortening startup/shutdown time

The refrigerant water storage capacity can be automatically adjusted according to external load changes, particularly when the chiller works under only partial load. The refrigerant storage unit has an evident energy-saving effect in that it can automatically control the solution concentration and maintain optimal performance parameters. The adoption of the refrigerant storage unit can shorten the start/shutdown time substantially and reduce idle work.



tiger electric control valve



canned pump





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Absorption Chiller(Heatr)

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#### 10. Plate heat exchanger: Saving more than 10% of energy

A corrugated stainless steel plate heat exchanger is adopted. This type of plate heat exchanger has a very sound effect, a high residual heat recovery rate and a remarkable energy-saving performance. Meanwhile, the stainless steel plate has a service life of over 20 years.

#### 11. Special surface treatment for heat-conducting tubes: High performance in heat exchanging & less energy consumption

The evaporator and absorber have been hydrophilically treated to ensure even liquid film distribution on the tube surface. This design can improve the heat exchange effect and lower energy consumption.

#### 12. $\text{Li}_2\text{MoO}_4$ corrosion inhibitor: An environment-friendly corrosion inhibitor

Lithium molybdate ( $\text{Li}_2\text{MoO}_4$ ), an environment-friendly corrosion inhibitor, is used to replace  $\text{Li}_2\text{CrO}_4$  (containing heavy metals) during the preparation of the LiBr solution.

#### 13. Wholly welded structure: Secure sealing performance

All the sealed places are treated by submerged arc-welding.  $\text{CO}_2$  gas-shielded welding or argon arc-welding to prevent chiller leaks that are caused by bolt connection or flar sealing.

#### 14. Frequency-variable operation: An energy-saving technology

The chiller can adjust its operation condition automatically and maintain optimal working according to changes in refrigeration capacity. This technology ensures the least energy consumption for prolonged chiller operation.

## Artificial Intelligence (AI) Control System (V3.0)

### 1. Fully-Automatic Control Functions

The AI control system (V3.0) is featured by powerful and complete functions, such as one-key startup/shutdown, timed startup/shutdown, a mature safety protection system, multiple automatic adjustment options, system interlock, an expert system, human-machine dialogue, building automation interfaces, etc. These functions help to enable simple operation, stable performance and high working efficiency.

### 2. Unique Load Adjustment Function

The AI control system (V3.0) has a unique load adjustment function, which enables automatic adjustment of chiller output load according to the actual load of the user. The function not only helps to reduce startup/shutdown time and dilution time, but also contributes to less idle work and energy consumption.

### 3. Unique Circulated Solution Volume Control Technology

The AI control system (V3.0) employs an innovative tertiary control technology to adjust the circulated solution volume. Traditionally, only parameters of the generator liquid level are used for control of the

circulated solution volume. By contrast, the new technology combines the merits of the concentration & temperature of a thick solution and the liquid level in the generator. Meanwhile, an advanced frequency-variable control technology is applied to the solution pump to enable the chiller to achieve an optimal circulated solution volume. The technology improves operating efficiency and reduces startup time & energy consumption.

### 4. Cooling Water Temperature Limits Control Technology

The AI control system (V3.0) can control and adapt the hot water volume to the temperature changes of the inlet cooling water. By maintaining the cooling water inlet temperature within  $18\text{--}34^\circ\text{C}$ , the chiller can operate safely and efficiently.

### 5. Solution Concentration Limits Control Technology

The AI control system (V3.0) uses a unique concentration control technology to enable real-time monitoring/control of the concentration and circulated volume of a thick solution as well as the hot water volume. The system can maintain the chiller under safe and stable high-concentration condition, improve chiller operating efficiency and prevent crystallization.

### 6. Complete Chiller Abnormality Self-Diagnosis & Protection Function

The AI control system (V3.0) features 34 abnormality self-diagnosis & protection functions. Automatic steps will be taken by the system according to the level of an abnormality. This is intended to prevent accidents, minimize human labor and ensure a sustained, safe and stable operation of the chiller.

### 7. Intelligent Automatic Air Extraction Function

The AI control system (V3.0) can realize real-time monitoring of non-condensable gas volumes inside the chiller. The system can automatically start up or shut down the air extractor, or give prompts of manual operation.

### 8. Unique Shutdown Dilution Control Technology

The AI control system (V3.0) can control the operation time of different pumps requiring dilution, according to the thick solution concentration, ambient temperature and remaining refrigerant water volume (in the case of refrigeration). Therefore, an optimal concentration can be maintained for the chiller after shutdown. Crystallization is precluded and chiller re-start time is shortened.

### 9. Unit Working Parameter Management System

Through the interface of the AI control system (V3.0), the operator can perform any of the following operations for 12 critical parameters relating to chiller performance: real-time display, correction and configuration. Also, records can be kept of historical operation events.

### 10. Chiller Fault Management System

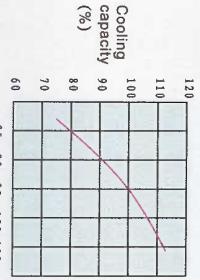
If any accurate prompt of any occasional fault is displayed on the operation interface, the AI control system (V3.0) can locate and detail the fault, and propose a solution or cautionary tips. Classification and statistical analysis of historical faults can be conducted to facilitate maintenance service provided by operators.



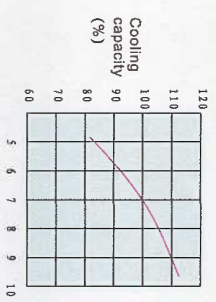
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## Performance curve

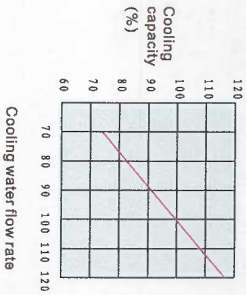
Relationship of cooling capacity and hot water inlet temperature



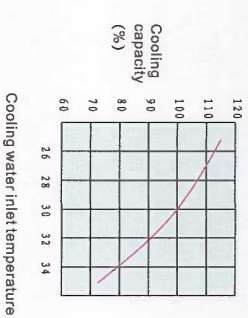
Relationship of cooling capacity and chilled water outlet temperature



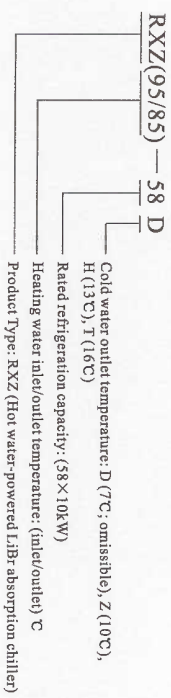
Relationship of cooling capacity and cooling water flow rate



Relationship of cooling capacity and cooling water inlet temperature



## Product Model No. Format



## Nominal Parameters

Model	RXZ(95/85)-	23	35	47	58	70	81	93	105	116	145	174	204	233	262	291	349	407	465	523	582	698
Refrigeration capacity	KW	233	350	470	580	700	810	930	1050	1163	1450	1740	2040	2330	2620	2910	3490	4070	4650	5230	5820	6980
	×10 <sup>3</sup> Kcal/h	20	30	40	50	60	70	80	90	100	125	150	175	200	225	250	300	350	400	450	500	600
	USRt	66	99	132	165	198	231	265	299	331	413	496	579	661	744	827	992	1157	1323	1488	1653	1984
Cold water	Inlet/Outlet temperature °C	Cold water 12~7																				
	Flow rate m <sup>3</sup> /h	40	60	80	100	120	140	160	180	200	250	300	350	400	450	500	600	700	800	900	1000	1200
	Pressure drop mmHg	7.93	7.93	7.93	6.24	6.26	9.10	9.09	9.08	9.11	9.10	5.35	5.36	7.22	7.23	7.22	12.20	12.20	12.20	6.90	6.90	6.90
	Pipe diameter DN(mm)	80	100	100	125	125	150	150	150	150	200	200	200	250	250	250	250	300	300	350	350	400
Cooling water	Inlet/Outlet temperature °C	Cooling water 30~36																				
	Flowrate m <sup>3</sup> /h	75	112.5	150	187.5	225	262.5	300	337.5	375	468.8	562.5	656.3	750	843.8	937.5	1125	1313	1500	1688	1875	2250
	Pressure drop mmHg	7.0	7.0	7.0	5.5	5.5	8.0	8.0	8.0	8.0	8.0	11.1	11.2	6.3	6.3	6.4	10.7	10.7	10.7	6.0	6.0	6.0
	Pipe diameter DN(mm)	100	125	150	150	200	200	200	200	250	250	300	300	350	350	350	350	400	400	450	450	500
Hot water	Inlet/Outlet temperature °C	hot water 95~85																				
	Flow rate m <sup>3</sup> /h	25	37.5	50	62.5	75	87.5	100	112.5	125	156.3	187.5	218.8	250	281.3	312.5	375	437.5	500	562.5	625	750
	Pressure drop mmHg	8.5	8.5	8.5	8.2	8.2	12.0	12.0	12.0	12.0	12.0	9.7	9.7	13.1	13.1	13.1	11.3	11.3	11.3	9.1	9.1	9.1
	Pipe diameter DN(mm)	65	80	80	100	100	100	125	125	125	150	150	200	200	200	200	200	250	250	250	300	300
Electrical properties	Total power KW	2.8	2.8	2.8	2.8	3.2	3.2	3.2	3.5	3.5	3.8	4.2	4.6	5.2	6.2	7.1	7.6	7.9	8.4	9.4	14.9	16.9
	Power supply	3-phase/380V/50Hz																				
Dimension	Length (L) mm	3420	3460	3480	4000	4030	4737	4800	4850	4880	4920	5440	5460	6020	6060	6060	7100	7120	7150	8830	8830	8830
	Width (W) mm	1360	1480	1655	1685	1780	1620	1790	1980	2105	2210	2210	2420	2430	2630	3300	2720	2970	3120	3230	3300	3450
	Height (H) mm	2210	2290	2380	2540	2620	2700	2790	2865	2910	3050	3180	3320	3420	3540	3600	3790	3905	4010	4065	4100	4180
Transportation		Whole-unit transportation																				
Total shipment weight t		3.5	4.1	4.9	5.8	6.5	7.5	8.4	9.2	10.1	12.4	14.6	16.8	19	21.3	23.6	28	32.2	36.4	41	45.5	54.6
Operating weight t		4.2	4.9	5.9	6.8	8.1	9.3	10.5	11.2	12.3	15	17.7	20.4	23.1	26.2	29.2	35	40	45.1	50.6	56	67





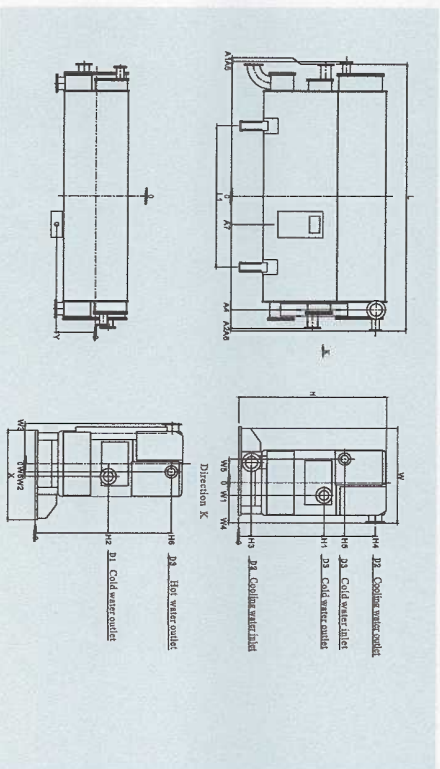
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Hot-water Type Libr  
Absorption Chiller(Heater)

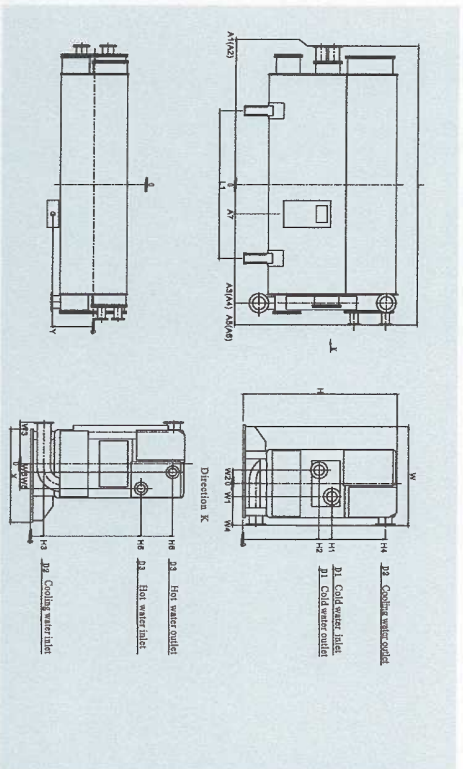
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## External Tubing Diagram

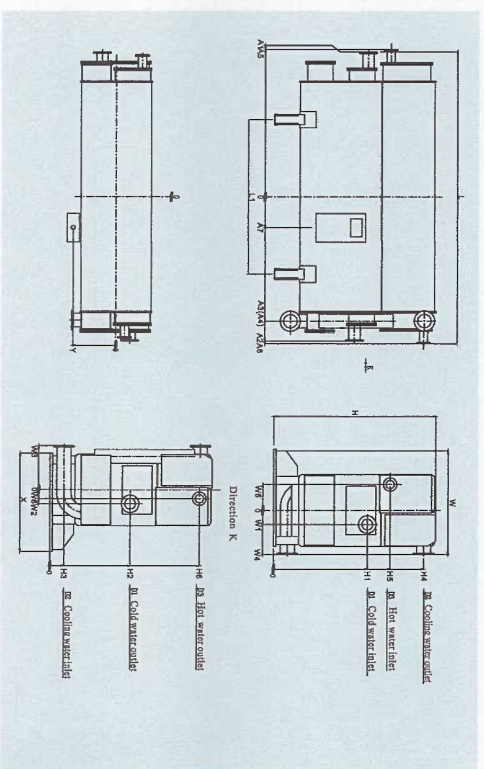
Model :RXZ(95/85)23~RXZ(95/85)47



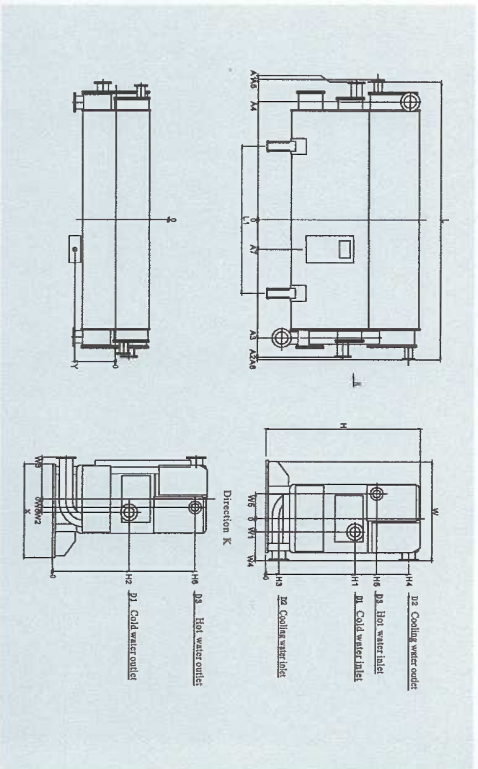
Model :RXZ(95/85)58~RXZ(95/85)145



Model :RXZ(95/85)174~RXZ(95/85)204



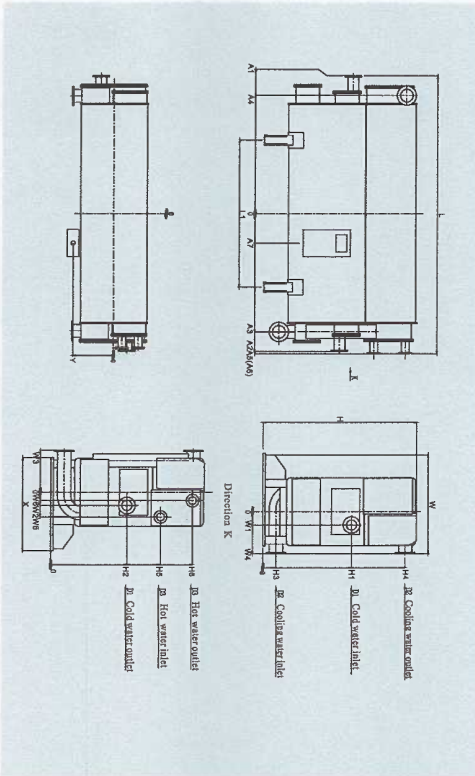
Model :RXZ(95/85)233~RXZ(95/85)291



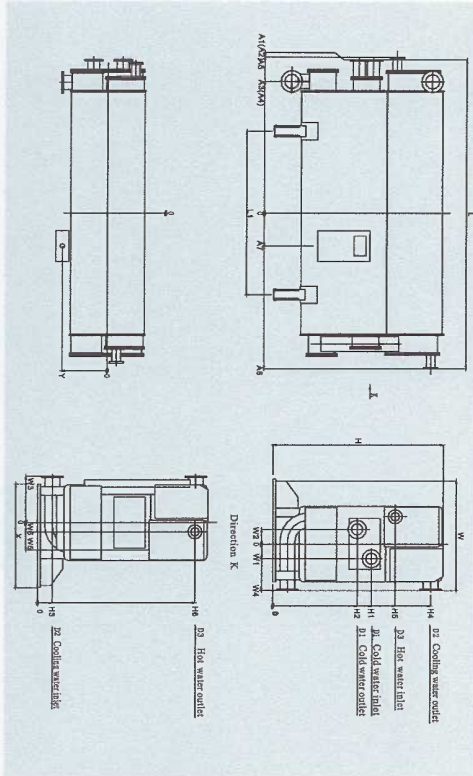


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Model : RXZ(95/85)349~RXZ(95/85)465



Model : RXZ(95/85)523~RXZ(95/85)698



## External Tubing Dimension Table

Model: RXZ(95/85)-	23	35	47	58	70	81	93	105	116	145	174	204	233	262	291	349	407	465	523	582	698
Unit	L	3420	3460	3480	4000	4030	4737	4800	4850	4880	4920	5440	5460	6020	6020	6060	7100	7120	7150	8830	8830
	W	1360	1480	1655	1685	1780	1620	1790	1980	2105	2210	2210	2420	2430	2510	2630	2720	2970	3120	3230	3300
	H	1920	2030	2100	2100	2160	2460	2580	2720	2800	2930	3100	3220	3350	3410	3560	3690	3720	3810	3740	3880
	L1	2450	2450	2450	2750	2800	3000	3000	2900	3100	3100	3500	3500	4000	3500	4000	4300	4300	4300	4600	4600
	X	1200	1250	1300	1300	1360	1300	1360	1400	1450	1450	1565	1740	1740	1740	2100	3100	2300	2500	2500	2600
Cold water	A1	1710	1730	1740	2000	2015	2368	2400	2425	2440	2460	2700	2710	2990	2990	3010	3530	3540	3550	4395	4395
	A2	1710	1730	1740	2000	2015	2368	2400	2425	2440	2460	2700	2710	2990	2990	3010	3530	3540	3550	4395	4395
	W1	50	55	75	80	85	100	140	200	215	245	255	265	280	285	405	415	445	450	495	500
	W2	50	55	75	80	85	100	140	200	215	245	255	265	280	285	405	415	445	450	495	500
	H1	1530	1590	1605	1605	1620	1765	1790	1850	1940	1970	2110	2160	2170	2275	2290	2350	2390	2350	2410	2420
	H2	1470	1475	1475	1475	1480	1520	1540	1570	1575	1575	1650	1660	1660	1660	1770	1770	1810	1825	1810	1825
	D1	80	100	100	125	125	150	150	150	150	200	200	200	250	250	250	300	300	350	350	350
	A3	1575	1600	1600	1835	1835	2137	2150	2150	2140	2140	2400	2410	2690	2690	2710	3200	3200	3200	4035	4035
	A4	1575	1600	1600	1835	1835	2137	2150	2150	2140	2140	2400	2410	2690	2690	2710	3200	3200	3200	4035	4035
	W3	580	640	725	740	790	710	795	890	950	1005	1005	1120	1115	1125	1215	1210	1385	1460	1615	1650
Cooling water	W4	580	640	725	740	790	710	795	890	950	1005	1005	1120	1115	1125	1215	1210	1385	1460	1615	1650
	H3	150	185	190	190	250	260	270	280	330	340	350	380	390	440	450	460	500	510	550	560
	H4	1820	1905	1950	1950	1960	2260	2380	2520	2550	2680	2850	2930	3050	3060	3210	3340	3320	3410	3290	3430
	D2	100	125	150	150	200	200	200	200	250	250	250	300	300	350	350	350	400	400	450	450
	A5	1710	1730	1740	2000	2015	2368	2400	2425	2440	2460	2720	2730	3010	3010	3030	3550	3560	3575	4415	4415
	A6	1710	1730	1740	2000	2015	2368	2400	2425	2440	2460	2720	2730	3010	3010	3030	3550	3560	3575	4415	4415
Hot water	W5	260	320	330	390	400	410	500	510	520	600	610	750	760	765	770	790	930	940	950	1110
	W6	50	60	65	70	75	80	85	90	95	100	105	120	125	125	130	130	150	155	160	185
	H5	1650	1750	1750	1750	1800	1950	2000	2050	2150	2200	2350	2450	2450	2480	2600	2600	2700	2750	2820	2850
	H6	1800	1880	1920	1920	1930	2220	2340	2470	2500	2630	2800	2880	2990	3000	3150	3280	3260	3350	3230	3370
	D3	65	80	80	100	100	100	125	125	125	150	150	200	200	200	200	250	250	250	300	300
	A7	370	370	370	500	500	500	500	500	500	500	600	600	600	600	600	600	600	600	700	700
Electrical control system	Y	530	590	675	690	740	660	735	830	890	935	935	1050	1045	1055	1135	1130	1295	1360	1405	1505



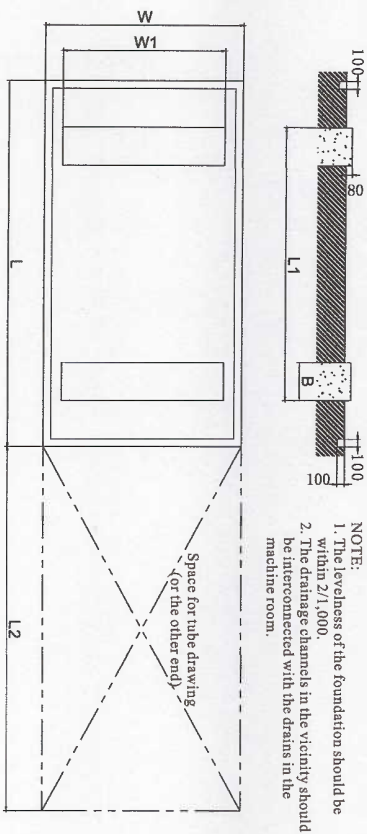


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Hot-water Type Libr  
Absorption Chiller(Heater)

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## Foundation Dimension Sketch



Model No.		23	35	47	58	70	81	93	105	116	145	174	204	233	262	291	349	407	465	523	582	698
L		3400	3400	3500	4000	4300	4550	4750	4250	4900	4950	5450	5500	6000	5600	6050	7100	7100	7150	8700	8750	8800
L1		2450	2450	2450	2750	2800	3000	3000	2900	3100	3100	3500	3500	4000	3500	4000	4300	4300	4600	4600	4600	4700
L2		3400	3400	3400	4000	4000	4500	4500	4000	4500	4500	5000	5000	5500	5500	5500	6500	6500	6500	8000	8000	8000
W		1600	1700	1850	1900	1950	1800	1950	2100	2200	2300	2300	2500	2500	2550	2650	2950	3100	3200	3250	3350	3450
W1		1200	1300	1450	1500	1550	1400	1550	1700	1800	1900	1900	2100	2100	2150	2250	2450	2550	2700	2800	2850	2950
B		250	250	250	250	300	300	300	400	400	400	500	500	500	500	500	600	600	600	600	600	700

## Model Selection Guide

### Model No. Selection

#### Cold Water Outlet Temperature

Besides the specified cold water outlet temperature of a standard chiller, other outlet temperature values (min: 6°C) may also be selected.

#### Pressure Bearing Requirements

The design pressure bearing standard capacity of the cold water/cooling water system of the chiller is 0.8MPa. If the actual pressure of the water system exceeds this standard value, a HP-type chiller should be used.

### Chiller Qty

The selection of the right type of chiller is based on the calculations of the cooling load of the processes or of the air-conditioner in the building. If more than one chiller is used, the determination of the single unit refrigeration capacity and of the number of chillers should take into account maximum load operation and partial load operation.

### Control Mode

The hot water-powered Libr absorption chiller is supported by an AI (artificial intelligence) control system that enables automatic operation. Meanwhile, there are a number of options available for the customers, such as control interfaces for the cold water pump, cooling water pump, cooling tower fan & buildings, centralized control system and dial-up internet access.

### NOTE

You are requested to refer to the List of Models and fill in the Model Selection Questionnaire in detail. Shenlan Company will assist the customers to make a rational choice.



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Hot-water Type (H&T  
Absorption Chiller(Heater))

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## Scope of Supply

Hot Water-Type Chiller: Scope of Supply

Item	Qty	Remarks
Principal part	1 set	Evaporator, condenser, evaporator, solution heat exchanger, and automatic air extractor
Hot water regulating valve	1 set	Patented technology, very high thermal efficiency
Canned pump	2/3	Including a complete set of safety devices and filters
Vacuum pump	1 set	
LIBr solution	An adequate amount	
Control system	1 kit	Including sensor & control elements (liquid level, pressure, flow rate and temperature), PCU and touchscreen
Frequency converter	1 set	
Debugging kit	1 kit	Thermometer and common tools
Accompanying accessories	1 set	See the packing list (the accessories can address the need of 5 years' maintenance)
Accompanying documents	1 set	Including ex-factory quality compliance certificate, warranty, packing list, user's manual, accessory parts/units instruction and quality inspection document.

## List of Models

Hot Water-Type Chiller: List of Models for Hot Water-Type Chiller

Heating source	Hot water	When placing an order, please specify requirements for the temperature /flow rate of hot water. If you desire a big hot water temperature difference, please specify in detail the expected temperature of the return hot water prior to placing an order.	
	HP type	When the cold water/cooling water system pressure is more than or equal to 0.8MPa, a HP water chamber may be adopted. The pressure bearing capacity may be 0.8-1.6MPa or 1.6-2.0MPa.	
	Big temperature difference type	The cold water inlet/outlet temperature is 7-10℃	When signing the contract, please specify the following details in the contract or annexes: number, parameters and any other requirement of a special order
Special order	LT type	The cold water outlet temperature is as low as 5℃ to meet the requirements of special processes.	
	Vessel-applied type	This type applies to occasions with slight wobbling. Seawater can be used as cooling water.	
	Separately-handled type	Considering the dimension limitations of passages in the user's machine room, the principal part and the HP generator may be separately transported	

ISO14001 ISO9001

CQC CRAA CE

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## Machine Room Design and Constructin

### Scope of Delivery and Construction

Item	Description	Scope of Delivery and Construction		Remarks
		Shanghai Company	User	
Unit	Chiller and accessories	<input type="checkbox"/>	<input type="checkbox"/>	Please refer to Scope of Supply.
Debugging test	Ex -factory debugging test Site debugging test	<input type="checkbox"/>	<input type="checkbox"/>	One (1) debugging test for refrigeration
Transportation to the site	From the factory to the worksite	<input type="checkbox"/>	<input type="checkbox"/>	
	From the worksite to the mounting base	<input type="checkbox"/>	<input type="checkbox"/>	
	Installation in place	<input type="checkbox"/>	<input type="checkbox"/>	
	Chiller assembly (separate delivery)	<input type="checkbox"/>	<input type="checkbox"/>	The user must provide welding equipment, nitrogen and other necessary tools
Electrical engineering	Sensors and meters	<input type="checkbox"/>	<input type="checkbox"/>	The user must be responsible for laying remote control cables
	External electrical wiring engineering	<input type="checkbox"/>	<input type="checkbox"/>	The wires extend till the outlet of the wiring terminal of the control cabinet.
	Mounting base construction	<input type="checkbox"/>	<input type="checkbox"/>	
	External tubing engineering	<input type="checkbox"/>	<input type="checkbox"/>	
Other engineering	Air extraction system	<input type="checkbox"/>	<input type="checkbox"/>	
	Tubing system anti-freezing measures	<input type="checkbox"/>	<input type="checkbox"/>	During winter shutdowns, please adopt anti-freezing measures for the water tubing.
	Cooling water quality management	<input type="checkbox"/>	<input type="checkbox"/>	Please set the cooling water discharge valve or other unit to enable proper water quality management
	Thermal insulation engineering	<input type="checkbox"/>	<input type="checkbox"/>	
Other	LiBr solution	<input type="checkbox"/>	<input type="checkbox"/>	
	Operation training & instructions	<input type="checkbox"/>	<input type="checkbox"/>	

## Civil Works for the Machine Room

### Site Selection of the Machine Room:

The hot water-powered LiBr absorption chiller can operate stably, safely and reliably with very little noise, so it may be installed in the basement or on the first floor, middle floors or rooftop or in independent machine rooms.

### Ambient Temperature in the Machine Room:

The temperature should be controlled within the range of 5-40℃.

### Drainage:

The machine room should be equipped with good drainage facilities: ① drains covered by cast iron grates should be available around the chiller. Water in the drains can flow out of the machine room without difficulty; ② all the discharge pipes and signal pipes in the machine room should be installed at a visible place above the drains. They should not be installed in the drains; ③ Sump pits and submerged pumps should be available in a machine room located in the basement. Automatic control devices should be provided to enable automatic drainage.

### Machine Room Arrangement:

The installation location of the machine room should ensure handy operation and adequate maintenance space. A 1-meter-wide operation space (minimum) should be left at the front of the electrical control cabinet; a 0.3m distance (minimum) should be reserved between the top of the chiller and the bottom of the beam of the machine room; a 1.2-meter-wide space (minimum) should be left for the other sides of the chiller. A space for drawing heat conducting tubes (length: no less than the tube length) should be reserved at any end of the lengthwise direction of the chiller. If this space can not be reserved, a window or door may be designed for tube drawing.

### Chiller Mounting Base:

The mounting base may be designed on the basis of the dead load of the chiller. The design should ensure a stable, firm and unsinkable base; otherwise the chiller may suffer damage or a shortened service life.



## Tubing System

The tubing system should be designed and planned as a whole in compliance with the requirements of the applicable standards and regulations. The tubes should be arranged in an orderly and neat way. Try to adopt overhead installation. The tubes should be firmly supported. The gravity of external tubing must not be applied to the chiller.

## Water Supply System

Flexible joints must be fitted for cold water/cooling water supply to the chiller. A filter must be fitted for the inlet end at a place easy for uninstallation. If the hydrostatic pressure of the water supply system is more than 30mH<sub>2</sub>O, it is recommended that the water pump be installed on the outlet side so as to relieve unnecessary pressure load. Tubes at both inlet and outlet ends should be easy to uninstall. This is intended to facilitate the cleaning of heat conducting tubes by opening the watertight cover.

## The control system of Shenlan hot water-powered LIBr absorption chiller supports multiple communication protocols.

Point-to-point interface: PPI protocol  
Multi-point interface: MPI protocol  
Process field bus (PROFIBUS): PROFIBUS protocol  
Freepoint communication: User-defined protocol



## Handling and Installation in Place

### Delivery Status:

Delivery usually takes the form of whole-unit delivery. If handling is restricted by the user's access way, the chiller may be delivered in two parts: the principal part and the HP generator. After the chiller is installed in place, Shenlan Company will be responsible for internal tubing connection and the user will be responsible for providing welding equipment and assistance. Recommendations on Transportation: The chiller should be hoisted in place and transported as per Corporate Specification for Chiller Hoisting & Transportation provided by Shenlan Company. The slings and fasteners must be fixed to the indicated positions of the chiller. Shenlan is ready to seek transportation service & insurance for the user.

### Installation in Place:

A steel plate and a rubber plate should be laid on the surface of the mounting base. After the chiller is installed in place, the small holes (φ4) on the two sides should be used as reference points for horizontal adjustment in the length and width direction. The levelness of the chiller should be controlled within 1/1000. To achieve an even pressure load, there should be no gaps between the bracket and the mounting base.

Protective measures must be taken for the chiller during the hoisting, transportation, installation and project construction stage. To prevent a chiller breakdown, never impact the chiller with heavy objects or twist the valves at will.

### Water Quality Management Tips

As cooling water in the cooling tower evaporates continuously, its salinity will increase and its quality will deteriorate, thus causing corrosion and scaling in the heat conducting tubes. Also, the summer heat will conduce to algae propagation, impurities accumulation and scaling, therefore raising the thermal resistance of copper tubes and compromising the refrigeration capacity substantially.





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Hot-water Type 118r  
Absorption Chiller(Heater)

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See the following table for the water quality requirements on cooling water as a make-up:

Item	Unit	Makeup Water Requirements	Cooling Water Requirements	Scaling	
				Corrosion	Tendency
pH value (25° C)		6.5-8.0	6.5-8.0	Δ	Δ
Conductivity (25° C)	US/cm	<200	<200	Δ	Δ
Chloride ion Cl <sup>-</sup>	mgCl <sup>-</sup> /L	<50	<200	Δ	
Sulfate ion SO <sub>4</sub> <sup>2-</sup>	mgSO <sub>4</sub> <sup>2-</sup> /L	<50	<200	Δ	
Acid consumption (pH: 4.8)	mgCaCO <sub>3</sub> /L	<50	<100		Δ
Total hardness	mgCaCO <sub>3</sub> /L	<50	<200		Δ
Ferric ion (Fe)	mgFe/L	<0.3	<1.0	Δ	Δ
Sulfide ion S <sup>2-</sup>	mgS <sup>2-</sup> /L	Undetectable	Undetectable	Δ	
Ammonium ion NH <sub>4</sub> <sup>+</sup>	mgNH <sub>4</sub> <sup>+</sup> /L	<0.2	<1.0	Δ	
Silicon dioxide SiO <sub>2</sub>	mgSiO <sub>2</sub> /L	<30	<50		Δ

## System Diagram

