COMMUNITY PRESERVATION APPLICATION FOR FUNDING

City of Newburyport
Community Preservation Committee

Applications for funding are due by **Thursday, February 6, 2020 at 4:00 p.m.** with the Community Preservation Committee, c/o Office of Planning and Development, City Hall, 60 Pleasant St., Newburyport MA 01950.

Application Instructions:

- Applicants should file ten (10) paper copies and one electronic copy of the completed application and all accompanying documents.
- Applications should be stapled or clipped. Bound applications are not required.
- Please be mindful of extraneous paper – double sided copies are acceptable.

PROJECT NAME:	Newburyport Public Library Archival Center HVAC Replacement
PROJECT ADDRESS:	94 State Street Click here to enter text. Newburyport, MA 01950
MAP/LOT:	00169/0297
APPLICANT NAME:	Newburyport Public Library (Group or Committee Affiliation)
CONTACT PERSON:	Giselle Stevens
TELEPHONE/FAX NO.:	(978) 465-4428
ADDRESS:	94 State Street Click here to enter text. Newburyport, MA 01950
EMAIL:	gstevens@newburyportpl.org

AMOUNT OF COMMUNITY PRESERVATION FUNDING REQUESTED: $127,575.00

COMMUNITY PRESERVATION CATEGORY: *(Please check all that apply)*

☐ **Open Space** ☒ **Historic Resource †** ☐ **Affordable Housing *** ☐ **Recreation**

† Applicants seeking Historic Preservation funds for the preservation, restoration or renovation of historic structures must, as a condition of funding award, record a perpetual Preservation Restriction (PR) on the subject structure(s) prior to any distribution of funds. Applications should attend a meeting of the Newburyport Historical Commission (NHC) as early as possible to discuss and confirm the nature and scope of the required Preservation Restriction. The NHC's advisory opinion will be incorporated as appropriate into any Community Preservation Committee (CPC) recommendation, City Council appropriation, and/or grant award letters or agreements thereunder. *Please Note: The Newburyport Historical Commission (NHC) is an official City board and should not be confused with the local Newburyport Preservation Trust (NPT), a non-profit advocacy group.*

* Applicants seeking Affordable Housing funds must attend a Newburyport Affordable Housing Trust meeting to review and discuss their application. This review must occur prior to the Community Preservation Committee deliberations.

PROJECT SUMMARY: Provide a description of the Project, including the property involved and its proposed use.

The Newburyport Public Library's original HVAC system, including specialized equipment for the Archival Center, installed during the 1999-2001 building project is now almost 20 years old. This project proposes to replace the two HVAC units that control the temperature and humidity of the Archival Center of the Newburyport Public Library which are in poor condition and past their useful life. Stable climate control is vital to preserve and protect the historically important Archival Center Collection for many years into the future. According to the HVAC system assessment recently conducted, and given how critical the space temperature and humidity control of the Archives is to the library and history of Newburyport, it is recommended that the Library proactively replace the two HVAC Liebert units that serve them. Given their age, major repairs or overhauls are not recommended. Replacement now will mitigate against potential failure in the future that would necessitate emergency repairs or replacement. Emergency replacement would be more costly and require temporary HVAC units to be brought in until the units can be replaced. By budgeting to replace these units now, the Library will ensure that the Archival Center spaces are maintained at the proper relative humidity and temperature for the next 15-20 years. The recommended replacement units are air-cooled, which will eliminate the need for glycol in the existing system and its associated maintenance and costs. The new units are also smarter and more efficient, allowing for greater integration with the building management system for alarming as well as tighter control of set points. The cost to replace these units is estimated to be $127,575.00 including installation and humidity control.

PUBLIC BENEFIT*: Describe in detail the benefits Newburyport will receive from the Project and how the Project fulfills the Community Preservation Committee's Project Evaluation Criteria.

* **Deed Restrictions:** The City may require, as a condition for funding, that the applicant grant to the City or other authorized grantee certain restrictions, including: Preservation Restrictions on rehabilitated or acquired historic resources, Conservation Restrictions on preserved or acquired lands, and Affordability Restrictions on affordable housing projects. The restriction shall be recorded at the Southern Essex Registry of Deeds.

The Newburyport Public Library Archival Center (NPLAC), located on the lower level of the Library in the heart of downtown Newburyport, is a repository for local history and genealogy. Its holdings consist of approximately 1,200 linear feet of books and archival material relating to all aspects of Newburyport history, from its early settlement of "Ould Newbury" in 1635 to the modern city it is today. The materials range from early Newburyport imprints and manuscripts to rare monographs, genealogical material, family papers, scrapbooks, newspapers, maps, charts, plans, photographs and ephemera. Like many New England towns and cities, Newburyport played an important role in the early formation of our country. This rich history is documented in early town records, many from the Revolutionary War period, which make up the core collection of manuscripts at the NPLAC. Preserving and making available the City of Newburyport's historic collections will ensure their long-term use and enjoyment, directly benefiting all citizens of Newburyport, as well as Newburyport Public Library (NPL) patrons from near and far. In FY19 there were 183 phone and email inquiries, and 2,156 visitors from 33 states and 9 countries. This includes students, local historians, genealogists, researchers, authors, artists, architects, homeowners, the casual browser, local residents, and tourists.

CONTROL OF SITE: Indicate whether the applicant owns or has a purchase agreement for the Project site. If the property is under agreement, include a description of the agreement and the timing and conditions. If the applicant does not have site control, explain.

The Newburyport Public Library is owned by the City of Newburyport.

FEASIBILITY: List all steps that may be required for completion of the Project, such as environmental assessment, zoning or other approvals, agreement on terms of any required conservation, affordability or historic preservation restrictions, and any other known issues. For projects that may impact abutters or the neighborhood, describe support or objections from those affected.

This project may require a permit from the building department which will be obtained by the vendor/installer upon receipt of the contract.

PROJECT TIMELINE: Describe the anticipated steps or phases for completion of the Project. Demonstrate whether the Project will be ready to proceed in the coming fiscal year.

This project will be ready to proceed immediately upon receiving the grant award. The request for price quotes will be prepared in advance and be ready to solicit price quotes immediately. Within one month from soliciting price quotes, the vendor will be selected. Work will begin as soon as the vendor is able to fit it into their work schedule, but no longer than one month from vendor selection. The work of replacing the AC units is anticipated to take no longer than two weeks.

FUNDING:

A. **Project cost estimates:** Provide recent cost estimates for the proposed project, dated within the past six (6) months, detailing the scope of work and associated costs for each task.

B. **Amount of Newburyport Community Preservation Funding Requested:** $127,575.00

C. **Other Sources of Funding Available:** If funding from other sources may be available for the Project, please complete the following table:

SOURCE OF FUNDING	AMOUNT REQUESTED	STATUS (COMMITTED Y/N IF NOT-WHEN)	CONTINGENT ON CP FUNDS (Y/N)
Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.
Click here to enter text.	Click here to enter text.	Click here to enter text.	Click here to enter text.

ATTACHMENTS:

Include the following with ALL copies of the application:

- Assessor's map showing location of the Project
- Photographs

- Recent written estimates of cost with detailed scope of work
- Proposed oversight and management plan for the Project
- If the project involves public property, provide verification that the applicable public agency or department supports the project as presented and will oversee the project if funded.
- Historic resources include buildings, structures, vessel real properties, documents or artifacts that are listed or eligible for listing on the state register of historic place or determined to be significant in the history, archeology, architecture or culture of the city by the local historic preservation commission. If the project involves a historic resource, please provide evidence (date of listing on the state register or a letter from the Newburyport Historical Commission confirming its determination of significance) with the application that it meets these criteria

Include the following, if applicable and available:

- Architectural plans and specifications, for new construction or rehabilitation
- Maps, renderings, site plans
- Historic structures report, existing conditions report
- Names and addresses of project architects, contractors and consultants
- Budgets
- Letters of Support

Attach additional sheets as necessary to answer all questions.

YOU MAY BE REQUESTED TO PROVIDE ADDITIONAL INFORMATION.

For questions contact: Office of Planning and Development
Newburyport City Hall
cpc@cityofnewburyport.com
(978) 465-4400

City of Newburyport

02/06/2020

Data Sources: Produced by Merrimack Valley Planning Commission (MVPC) using data provided by the City of Newburyport & MassIT/MassGIS.

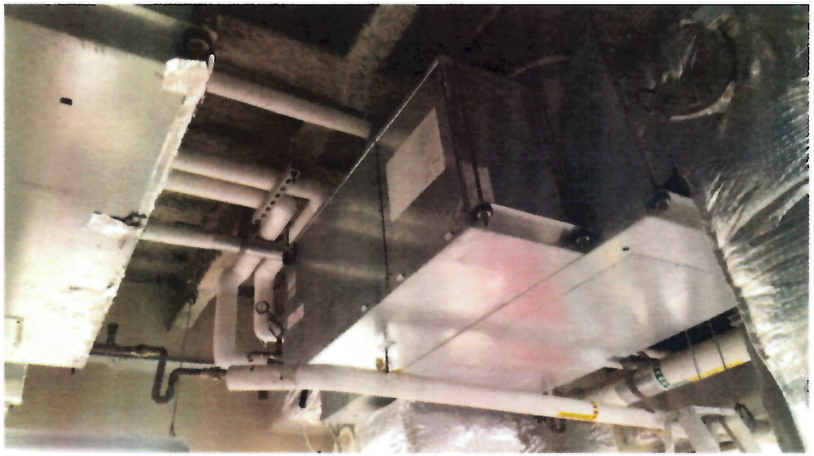
MVPC AND THE CITY OF NEWBURYPORT MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE ACCURACY, COMPLETENESS, RELIABILITY, OR SUITABILITY OF THESE DATA. THE CITY OF NEWBURYPORT AND MVPC DOES NOT ASSUME ANY LIABILITY ASSOCIATED WITH THE USE OR MISUSE OF THIS INFORMATION.

Legend

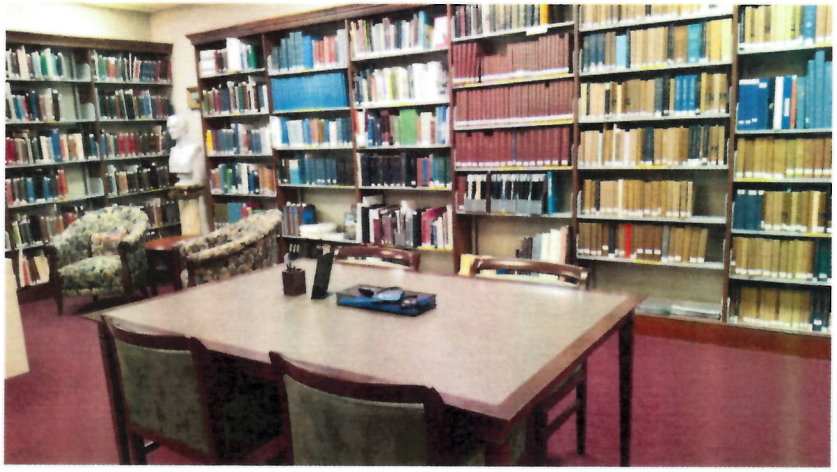
- Municipal Boundary
- Roads
  - Interstate
  - Major Road
  - Local Road
- Railroad

Projection: NAD_1983_StatePlane_Massachusetts_Mainland_FIPS_2001

Newburyport Public Library Archival Center HVAC Units



Newburyport Archival Center – Reading Room, Archival Storage and Workroom



AMBIENT TEMPERATURE CORPORATION

HVAC BUDGET PROPOSAL

Prepared For: City of Newburyport
Newburyport Library
94 State Street
Newburyport, MA 01950

Date: February 6, 2020

Re: Library Unit Replacements

Attn: Mr. Michael Bartlett

Quote: SCI.02062020.DW

Dear Mike,

Per our site visit and discussions here is your budget proposal for the replacement of the two (2) Liebert systems serving the Hamilton, archival storage and work room. Proposed scope of work as indicated below.

Scope of Work:

- Recover glycol from 2 systems and store for re use
- Disconnect and remove existing Liebert FCU's, dry-coolers and pump sets
- Install new Liebert systems connect to existing piping
- Pressure test and refill system with recovered glycol
- Insulate new piping to point of connection to existing
- Reconnect power and controls
- Install 2 external humidifiers
- Install up to 4 destratification fans to promote even distribution of air – most important for storage room
- Remove hydronic unit heater and demo piping out of storage room.
- Acquire the services of a licensed PE to review and modify design to ensure all expectations are met.
- Start up and test of new equipment
- Prevailing wage rates
- One-year Warranty on equipment and labor supplied under this proposal
- Cost for Bond
- Close out documents/ As built drawings / System training

HVAC Budget $127,575.00

Exclusions:

- Overtime
- Roofing
- Structural steel or supports
- Cutting patching or painting unless noted above

Respectfully,
Ambient Temperature Corporation

Dave Wilcox

Dave Wilcox
Sr. Project Manager

Customer Acceptance:

Signature:_____

Acceptance Date:_____

Purchase Order #:_____

This proposal will expire in 30 days

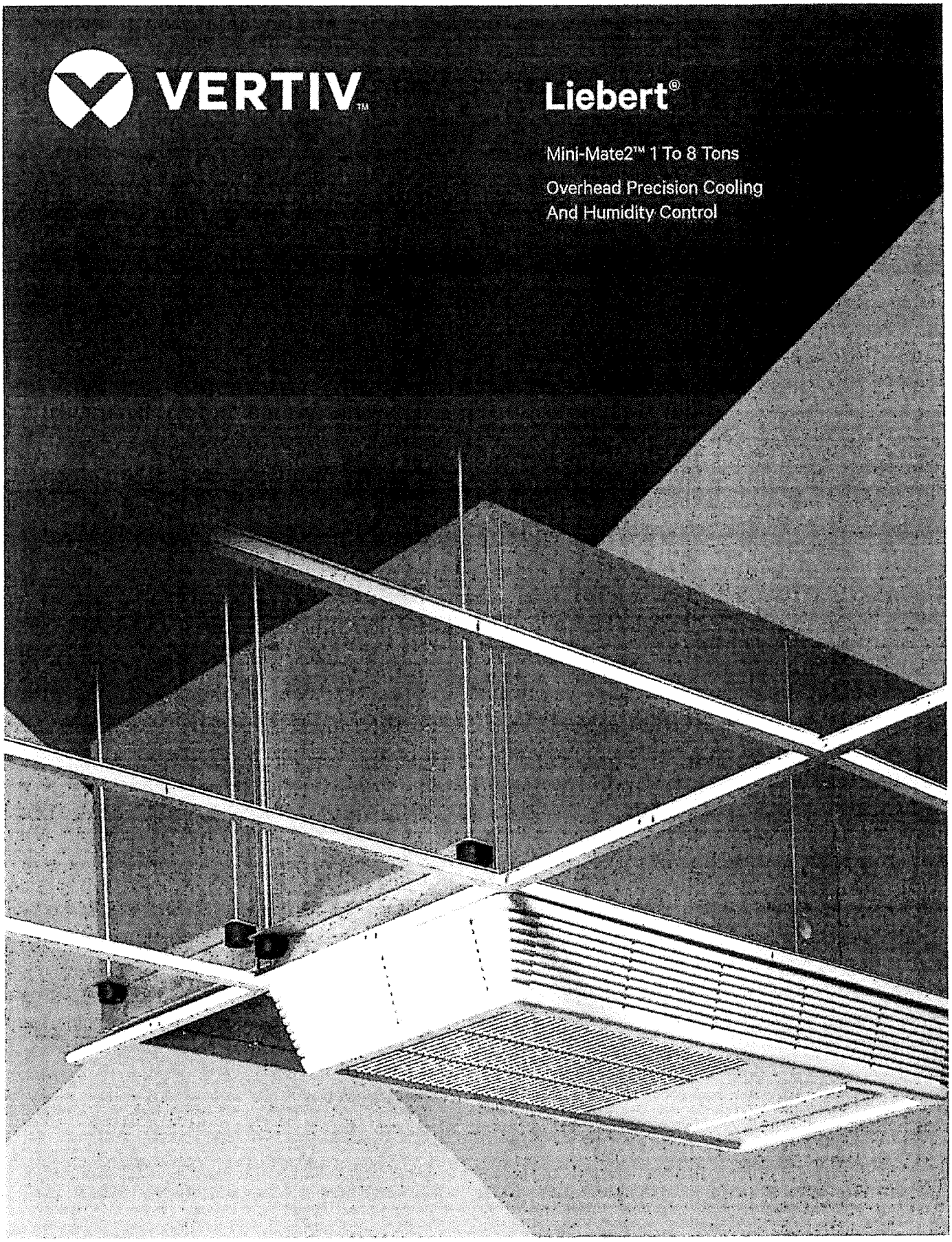
14 Graf Road - Newburyport, MA 01950 - Phone: 978-646-0660 - Fax: 978-646-0661

VERTIV.™

Liebert®

Mini-Mate2™ 1 To 8 Tons

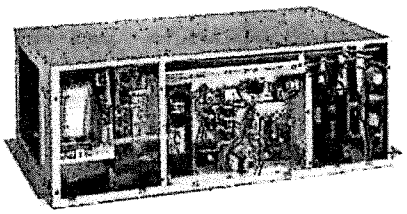
Overhead Precision Cooling
And Humidity Control



Precision Cooling In A Space-Saving, Ceiling-Installed System

When IT equipment needs precision cooling and humidity control, but floor space is limited, the Liebert® Mini-Mate2™ can provide the overhead answer. This flexible, space-saving system is the ideal solution for small areas where space is at a premium:

- Network Closets
- VoIP
- IDF
- Telecommunications Equipment
- Data Processing
- Control Rooms
- Desktop Publishing
- Network Facilities
- Laboratories
- Other Critical Electronic Systems



The components in units are located for easy service (1 ton, self-contained unit shown)

Liebert Mini-Mate2 Offers:

Higher Reliability:

High Sensible Cooling Capacity. Unlike "comfort" air conditioners, Liebert systems are designed for the cooling requirements of electronic equipment – 80% of the capacity dedicated to the removal of dry "sensible" heat, and 20% for the control of humidity.

Reliable. Based on a field-proven system, the Liebert Mini-Mate2 is manufactured with rugged, efficient components. To ensure 365 days x 24 hours operation at your site, each system is factory tested.

Warranty Protection. In addition to the standard one-year warranty, your Liebert Representative can offer extended warranties on the unit, compressor, parts and labor.

Preventive Maintenance Programs. Liebert factory-certified personnel provide regular inspections and service to extend the life of the system.

Liebert Spare Parts. Highest-quality parts, designed for your system, are easily available through your Liebert service representative.

Flexibility:

Uses Zero Floor Space. The evaporator and indoor condensing units are mounted above the dropped ceiling, requiring minimal site disturbance.

Simple Control. Split systems require simple thermostat-type wiring to controls and condensing units.

Designed For Easy Component Access. Most units can be serviced from the front.

Option Kits. Single-point power kits, sweat adapters, condensate pumps, duct adapters and other options are ordered as kits, ensuring availability of required parts and complete compatibility with your system.

Agency Listed. Standard 60Hz units are CSA certified to the harmonized U.S. and Canadian product safety standard, CSA C22.2 No 236/UL1995 for "Heating and Cooling Equipment" and are marked with the CSA c-us logo.

C US

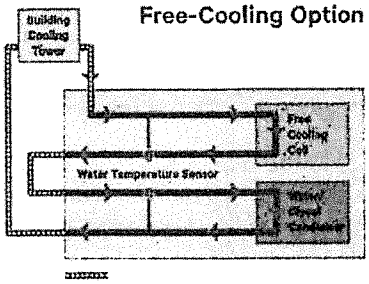
Liebert™ Monitoring Solutions: When You Need To Know

LOW TOTAL COST OF OWNERSHIP

High-Efficiency Compressor. The rotary or scroll compressors are both energy-efficient and rugged, to ensure continuous operation.

Free-Cooling Option. A second cooling coil allows the system to take advantage of colder outdoor temperatures and bypass compressor operation.

Free-Cooling Option



Field-supplied piping

When water temperature goes below 45°F, cooling switches over to Free-Cooling operation. A separate chilled water source can also be used with Air-Cooled system. Note: Special cupro-nickel free-cooling coil must be specified when applied to open cooling tower.

You will find a full-range of monitoring and control systems, communications modules designed to interface Liebert equipment with a variety of building management systems, plus stand-alone monitoring, control and leak detection devices.

Local And Remote Monitoring Panels

These units provide basic monitoring and control for a single unit or small groups of equipment either at the equipment location or to a remote site.

Products include:

- Liebert Universal Monitor
- Liebert Controllers

Leak Detection

Liebert Liqui-tect® leak detection systems alert facility personnel to the presence of leaking fluids before serious damage results. They provide quick sensing and accurate reporting of leaks below the floor, above the ceiling or at the perimeter of a room.

Products include:

- Liebert Liqui-tect Panel Two Channel Direct Read Leak Detection
- Liebert Zone Leak Detection Kits
- Liebert Point Leak Detection Sensor

Fundamental Monitoring

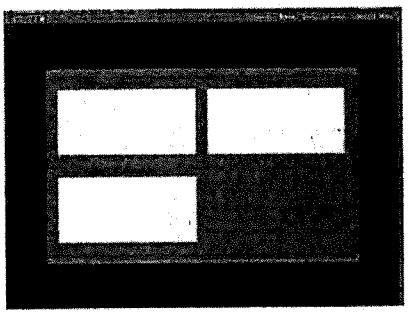
Liebert Nform™ is a centralized monitoring and communications software package that combines full-scale monitoring with cost-effective deployment through the use of the existing network infrastructure.

Products include:

- Liebert Nform Software
- Liebert IntelliSlot Web/485 Card ADPT

Advanced Monitoring

Liebert SiteScan® Web offers comprehensive, centralized monitoring, control, data analysis and reporting for a full-range of computer support systems. It provides web-based site monitoring, alarm management and trending/analysis for critical sites.



For further information, please refer to www.liebert.com

Third Party Monitoring System Connectivity

The use of open protocols allows you to interface Liebert units and monitoring systems with other types and brands of control equipment including BMS, NMS, SCADA and fire alarm systems.

Protocols supported:

- Modbus
- BACnet
- SNMP

The Right Size To Fit Your Space And Application

With more than 10,000 possible configurations, there is a Liebert Mini-Mate2™ system available to fit the needs of many room cooling or spot cooling requirements.

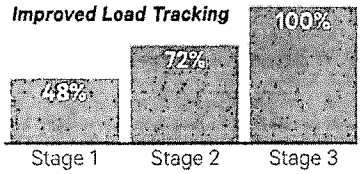
Liebert Mini-Mate2 Product Features Include:

- Available in 1, 1.5, 2, 3, 5 & 8 ton capacities (3-stage cooling on 8-ton)
- Self-contained or split systems allow for fitting systems with a variety of architectures
- Reliable refrigeration components featuring rotary or scroll compressors with copper tube aluminum fin coils provide high-efficiency
- Units are fully charged with refrigerant and come standard with quick-connect fittings to reduce installation time
- Available in air-cooled, water-cooled, glycol-cooled or chilled-water configurations
- Easy-to-use menu-driven microprocessor control
- Optional room sensors available
- Hot gas bypass for low load applications

Microprocessor Control Features:

- User-friendly wall-mount display
- Provides precise control of all unit functions
- Temperature Control
- Humidity Control
- Alarm Indication
- Programming
- Auto Restart

3-Stage Cooling (8 ton system only)

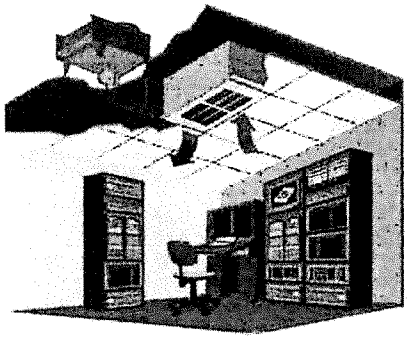


A unique compressor staging system utilizes independent 3-ton and 5-ton circuits to provide better control of room conditions The unit microprocessor continuously monitors recent cooling operation and selects the most economical cooling stage to satisfy demand

A Variety Of Options Help You Meet Numerous Applications:

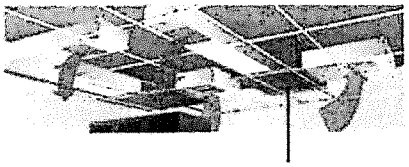
- Grille (1-1.5 tons) or Plenum (2-3 tons) that fits 2'x4' ceiling grid for direct supply & return air distribution
- Fan speed and/or blower options to handle supply air ductwork with higher external static pressures
- Filter box or duct kits to connect to ducted sites
- Hot water reheat to utilize building hot water for energy savings
- Stainless steel electric reheat and/or canister humidifier for humidity control
- High-pressure chilled water systems
- Single-point power connection kit to facilitate close coupled evaporator & condensing unit wiring
- Multiple air-cooled heat rejection solutions: indoor ducted and outdoor (standard ambient, high ambient and Quiet-Line)
- 2-way or 3-way water regulating valves rated for standard or high-pressure applications
- Unit disconnect, smoke sensor, and/or high-temp sensor options
- Site monitoring and communication devices to meet monitoring needs
- R407C refrigerant

1-1.5 Ton with grille



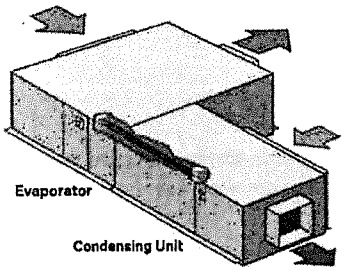
Product Option Availability

		CAPACITY (TONS)					
		1	1.5	2	3	5	8
System Types	Chilled Water (rated @ 300 psi static pressure)		•		•	•	
	Chilled Water (rated @ 400 psi static pressure)					•	•
	Self-Contained Air-Cooled	•	•				
	Self-Contained Water/Glycol-Cooled	•	•				
	Split System Air-Cooled w/Centrifugal Indoor Condensing Unit			•	•	•	•
	Split System Air-Cooled w/Outdoor High Ambient Prop Fan Condensing Unit			•	•	•	
	Split System Air-Cooled w/Outdoor Prop Fan Condensing Unit	•	•	•	•	•	•
	Split System Air-Cooled w/Outdoor Quiet-Line Prop Fan Condensing Unit			•	•	•	
	Split System Water/Glycol-Cooled (2- or 3-way Valve, 150 or 350 psi)			•	•	•	•
	50 & 60 Hz voltages	•	•	•	•	•	•
	Canister Humidifier	•	•	•	•	•	•
	Chilled Water w/High Close-Off Pressure Valve		•		•	•	•
Factory Installed Options[1]	Direct-Drive Motor/Two-Speed	•	•	•	•		
	Filter Clog Alarm	•	•	•	•	•	•
	High Temp Sensor (Firestat)	•	•	•	•	•	•
	Free-Cooling Coil	•	•	•	•	•	•
	Hot Gas Reheat (self-contained systems only)	•	•				
	Hot Water Reheat (chilled water systems only)		•		•	•	•
	Internal Disconnect Switch	•	•	•	•	•	•
	SCR Reheat	•	•	•	•	•	•
	Smoke Sensor	•	•	•	•	•	•
	Stainless Steel Electric Reheat	•	•	•	•	•	•
	R407C	•	•	•	•	•	•
	High External Static Option			•	•	•	•
Ship Loose Accessories[1]	15' or 30' Refrigerant Line Sets (R-407C)	•	•	•	•		
	Condensate Pump Kit	•	•	•	•	•	•
	Duct Kit	•	•	•	•	•	•
	Filter Box	•	•	•	•	•	•
	Remote Sensors	•	•	•	•	•	•
	Single Point Power Kit			•	•	•	•
	Supply & Return Grille/Plenum	•	•	•	•		
Monitoring[2]	Liebert Liqui-tect 410 Point Detection Leak Detection Sensor	•	•	•	•	•	•
	Liebert LT460-K Zone Leak Detection Kits	•	•	•	•	•	•
	Liebert IntelliSlot Web/485 Card ADPT	•	•	•	•	•	•
	Liebert ENV-DO Environmental Interface Card	•	•	•	•	•	•
	Liebert AC8 Controller	•	•	•	•	•	•
	Liebert RCM4 Four-Point Dry Contact Monitor	•	•	•	•	•	•
	Liebert Universal Monitor Remote Dry Contact Monitor	•	•	•	•	•	•
	Liebert Site Scan Monitoring	•	•	•	•	•	•
	Liebert AC4 Autochangeover Controller	•	•	•	•	•	•



5-Ton Ducted Liebert Mini-Mate2

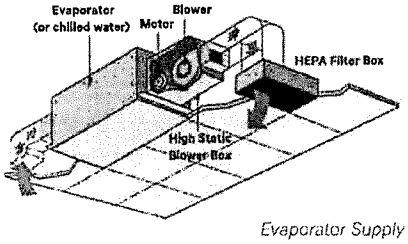
Single-Point Power Kit



Field installed single-point power kit simplifies connection and installation

High Static Pressure Option

2-3 Ton Shown



Evaporator Supply

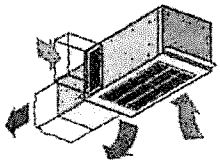
Evaporator Return

Condenser Return

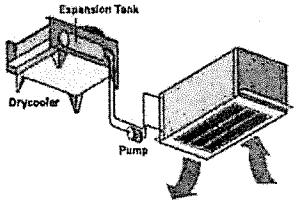
Condenser Supply

1 And 1-1/2 Ton Systems

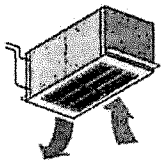
AIR-COOLED	WATER/GLYCOL	CHILLED-WATER



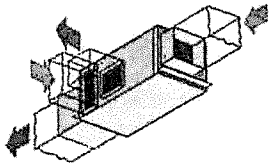
Self-Contained Air-Cooled with Grille



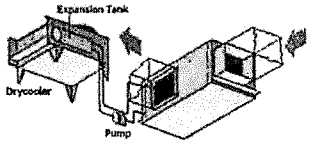
Self-Contained Glycol System
with Grille



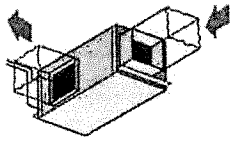
Chilled-Water with Grille



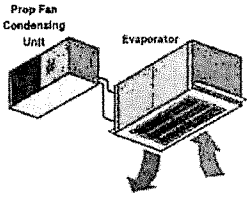
Self-Contained Air-Cooled Ducted
Optional Filter Box,
Duct Connection Available



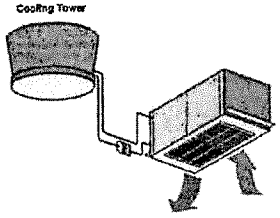
Self-Contained Glycol System Ducted
Optional Filter Box,
Duct Connection Available



Chilled-Water Ducted
Optional Filter Box,
Duct Connection Available



Split System with Grille



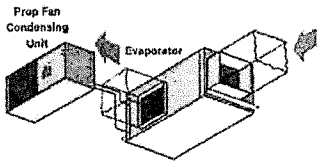
Self-Contained Water-Cooled
with Grille

Evaporator Supply

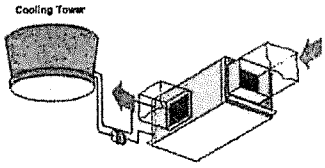
Evaporator Return

Condenser Return

Condenser Supply



Split System Ducted
Optional Filter Box,
Duct Connection Available



Self-Contained Water-Cooled Ducted
Optional Filter Box,
Duct Connection Available

Specifications

1 And 1-1/2 Ton Systems

		60HZ ONLY			
		AIR COOLED SYSTEM			
		Split System with Outdoor Condensing Unit		Self-Contained	
		1 Ton	1.5 Tons	1 Ton	1.5 Tons
Evaporator		MMD12E	MMD18E	MMD12A	MMD18A
Condensing Unit or Fan		PFH014A	PFH020A	MM2CF	MM2CF
Net Capacity Data* - kW (Btuh) @ High Fan Speed CFM					
80°F DB, 62.8°F WB (26.7°C	Total	4.45 (15,200)	5.65 (19,300)	3.70 (12,600)	5.55 (18,900)
DB,17.1°C WB) 38% RH	Sensible	4.10 (14,000)	5.35 (18,300)	3.60 (12,300)	5.30 (18,100)
75°F DB, 61°F WB (23.9°C	Total	4.25 (14,500)	5.35 (18,300)	3.50 (12,000)	5.30 (18,100)
DB,16.1°C WB) 45% RH	Sensible	3.65 (12,500)	4.85 (16,500)	3.20 (11,000)	4.75 (16,200)
72°F DB, 60°F WB (22.2°C	Total	4.15 (14,100)	5.25 (18,000)	3.45 (11,700)	5.15 (17,600)
DB,15.5°C WB) 50% RH	Sensible	3.35 (11,500)	4.45 (15,200)	3.00 (10,200)	4.40 (15,000)

		60HZ ONLY			
		WATER-COOLED		GLYCOL-COOLED	
		Self-contained		Self-Contained	
		1 Ton	1.5 Tons	1 Ton	1.5 Tons
Unit		MMD14W	MMD20W	MMD14W	MMD20W
Net Capacity Data* - kW (Btuh) @ High Fan Speed CFM					
80°F DB, 62.8°F WB (26.7°C	Total	4.05 (13,800)	6.40 (21,800)	3.50 (11,900)	5.20 (17,800)
DB,17.1°C WB) 38% RH	Sensible	3.85 (13,100)	5.80 (19,800)	3.45 (11,800)	5.10 (17,400)
75°F DB, 61°F WB (23.9°C	Total	3.85 (13,100)	6.15 (21,000)	3.30 (11,300)	5.00 (17,000)
DB,16.1°C WB) 45% RH	Sensible	3.45 (11,800)	5.20 (17,700)	3.10 (10,600)	4.55 (15,600)
72°F DB, 60°F WB (22.2°C	Total	3.80 (12,900)	6.00 (20,500)	3.20 (11,000)	4.85 (16,600)
DB,15.5°C WB) 50% RH	Sensible	3.15 (10,800)	4.80 (16,400)	2.90 (9,800)	4.10 (14,000)

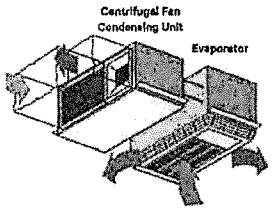
		60HZ	50HZ
		CHILLED WATER	
		Self-contained	Self-Contained
		1.5 Tons	1.5 Tons
Chilled Water Unit		MMD23C	MMD22C
Net Capacity Data* - kW (Btuh) 45°F (7.2°C) EWT & 10°F (5.5°C) temp. rise - High Fan Speed CFM			
80°F DB, 62.8°F WB (26.7°C	Total	4.85 (16,500)	4.85 (16,500)
DB,17.1°C WB) 38% RH	Sensible	4.80 (16,300)	4.80 (16,300)
75°F DB, 61°F WB (23.9°C	Total	3.80 (13,000)	3.80 (13,000)
DB,16.1°C WB) 45% RH	Sensible	3.80 (13,000)	3.80 (13,000)
72°F DB, 60°F WB (22.2°C	Total	3.20 (11,000)	3.20 (11,000)
DB,15.5°C WB) 50% RH	Sensible	3.20 (10,900)	3.20 (10,900)

*The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45% RH, is the standard rating condition for ASHRAE 127-2007.
All capacities are nominal values; actual performance will be ±5%

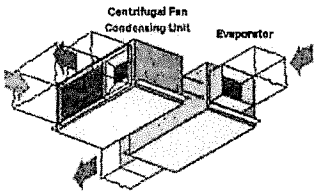
2 and 3 Ton Systems

AIR-COOLED

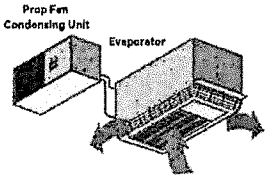
Utilizes Split System Evaporator



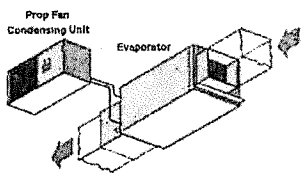
Remote Air-Cooled Condensing Unit
Supply & Return Air Plenum



Remote Air-Cooled Condensing Unit
Supply & Return Air Ducted
Optional Filter Box,
Duct Connection Available



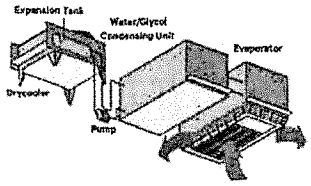
Outdoor Prop Fan Condensing Unit
Supply & Return Air Plenum



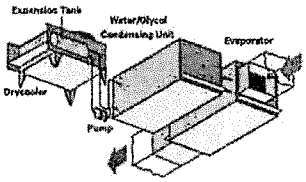
Outdoor Prop Fan Condensing Unit
Supply & Return Air Ducted
Optional Filter Box,
Duct Connection Available

WATER/GLYCOL

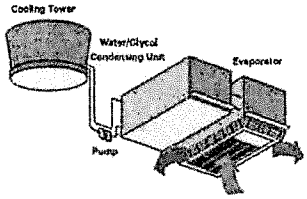
Utilizes Split System Evaporator



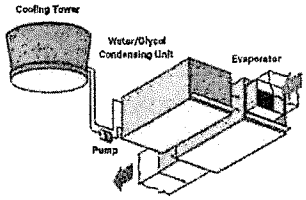
Remote Water/Glycol-Condensing Unit
Supply & Return Air Plenum



Remote Water/Glycol-Condensing Unit
Supply & Return Air Ducted
Optional Filter Box,
Duct Connection Available

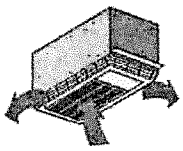


Remote Water/Glycol-Condensing Unit
Supply & Return Air Plenum

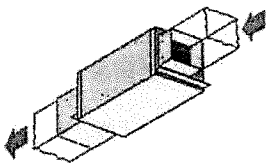


Remote Water/Glycol-Condensing Unit
Supply & Return Air Ducted
Optional Filter Box,
Duct Connection Available

CHILLED-WATER



Chilled-Water
Supply & Return Plenum



Chilled-WaterSupply & Return Air Ducted
Optional Filter Box,
Duct Connection Available

Note: All split systems may be close-coupled or configured with condensing unit located remotely from the evaporator.

Evaporator Supply

Evaporator Return

Condenser Return

Condenser Supply

Specifications

2 And 3 Ton Systems

		60HZ				50HZ	
		AIR COOLED SYSTEM					
		with Outdoor Condensing Unit		with Centrifugal Condensing Unit		with Outdoor Condensing Unit	with Centrifugal Condensing Unit
		2 Tons	3 Tons	2 Tons	3 Tons	3 Tons	3 Tons
Evaporator		MMD24E	MMD36E	MMD24E	MMD36E	MMD35E	MMD35E
Condensing Unit		PFH - Outdoor	PFH - Outdoor	MCD - Indoor	MCD - Indoor	PFH - Outdoor	MCD - Indoor
Net Capacity Data* - kW (Btuh) @ High Fan Speed CFM							
80°F DB, 62.8°F WB (26.7°C	Total	6.70 (22,900)	9.90 (33,800)	6.50 (22,200)	9.35 (31,900)	9.95 (34,000)	9.50 (32,400)
DB,17.1°C WB) 38% RH	Sensible	6.50 (22,200)	9.40 (32,100)	6.35 (21,700)	9.10 (31,000)	9.40 (32,100)	9.15 (31,300)
75°F DB, 61°F WB (23.9°C	Total	6.40 (21,800)	9.55 (32,500)	6.15 (20,900)	8.95 (30,600)	9.60 (32,700)	9.10 (31,100)
DB,16.1°C WB) 45% RH	Sensible	5.70 (19,500)	8.30 (28,400)	5.60 (19,100)	8.05 (27,500)	8.35 (28,500)	8.15 (27,800)
72°F DB, 60°F WB (22.2°C	Total	6.20 (21,200)	9.30 (31,800)	5.95 (20,300)	8.75 (29,900)	9.35 (31,900)	8.90 (30,400)
DB,15.5°C WB) 50% RH	Sensible	6.20 (21,200)	7.70 (26,200)	5.10 (17,400)	7.40 (25,300)	7.70 (26,200)	7.45 (25,500)

		60HZ				50HZ	
		WATER-COOLED		GLYCOL-COOLED		WATER-COOLED	GLYCOL-COOLED
		2 Tons	3 Tons	2 Tons	3 Tons	3 Tons	3 Tons
Evaporator		MMD24E	MMD36E	MMD24E	MMD36E	MMD35E	MMD35E
Condensing Unit		MCD26W	MCD38W	MCD26W	MCD38W	MCD37W	MCD37W
Net Capacity Data* - kW (Btuh) @ High Fan Speed CFM							
80°F DB, 62.8°F WB (26.7°C	Total	7.60 (26,000)	11.0 (37,600)	6.25 (21,300)	9.05 (30,900)	11.3 (38,700)	9.20 (31,400)
DB,17.1°C WB) 38% RH	Sensible	6.95 (23,700)	9.95 (33,900)	6.20 (21,200)	8.95 (30,500)	10.1 (34,400)	9.00 (30,700)
75°F DB, 61°F WB (23.9°C	Total	7.30 (24,900)	10.6 (36,300)	5.90 (20,200)	8.70 (29,600)	11.0 (37,400)	8.80 (30,100)
DB,16.1°C WB) 45% RH	Sensible	6.15 (20,900)	8.85 (30,200)	5.50 (18,800)	7.95 (27,100)	9.00 (30,700)	8.00 (27,300)
72°F DB, 60°F WB (22.2°C	Total	7.10 (24,300)	10.4 (35,500)	5.75 (19,700)	8.45 (28,900)	10.7 (36,600)	8.60 (29,400)
DB,15.5°C WB) 50% RH	Sensible	5.65 (19,300)	8.20 (27,900)	5.00 (17,100)	7.30 (24,900)	8.30 (28,400)	7.35 (25,100)

		60HZ	50HZ
		CHILLED WATER	
		3 Tons	3 Tons
Unit		MMD40C	MMD39C
Net Capacity Data* - kW (Btuh) 45°F (7.2°C) EWT & 10°F (5.6°C) temp. rise - High Fan Speed CFM			
80°F DB, 62.8°F WB (26.7°C	Total	10.1 (34,600)	10.1 (34,600)
DB,17.1°C WB) 38% RH	Sensible	9.40 (32,100)	9.40 (32,100)
75°F DB, 61°F WB (23.9°C	Total	8.25 (28,200)	8.25 (28,200)
DB,16.1°C WB) 45% RH	Sensible	7.60 (26,000)	7.60 (26,000)
72°F DB, 60°F WB (22.2°C	Total	7.10 (24,200)	7.10 (24,200)
DB,15.5°C WB) 50% RH	Sensible	6.50 (22,200)	6.50 (22,200)

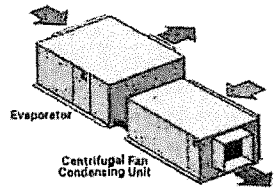
*The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45% RH, is the standard rating condition for ASHRAE 127-2007.
All capacities are nominal values; actual performance will be ±5%

5 and 8 Ton Systems

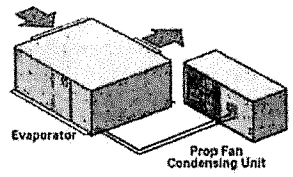
5 Ton System

8 Ton System

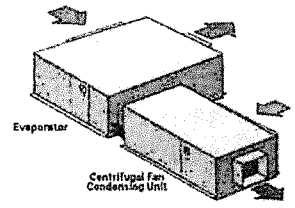
AIR-COOLED



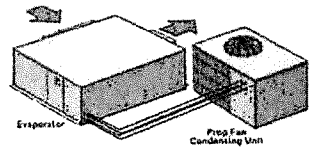
Indoor Air-Cooled Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available



Outdoor Prop Fan Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

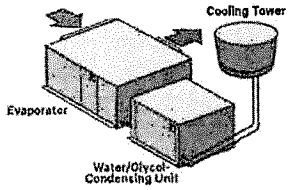


Indoor Air-Cooled Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

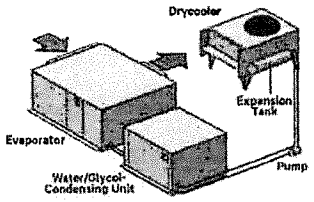


Outdoor Prop Fan Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

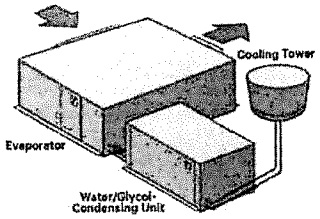
WATER/GLYCOL



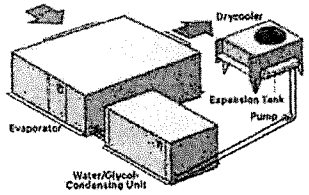
Remote Water/Glycol-Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available



Remote Water/Glycol Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

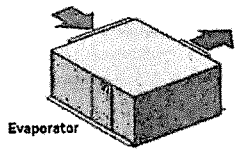


Remote Water/Glycol-Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

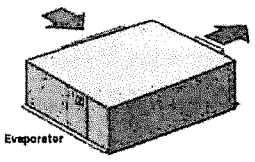


Remote Water/Glycol-Condensing Unit
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

CHILLED-WATER



Chilled-Water Coil
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available



Chilled Water-Coil
Supply & Return Air Ducted
Optional Filter Box/
Duct Connection Available

Evaporator Supply

Evaporator Return

Condenser Return

Condenser Supply

Specifications

5 And 8 Ton Systems

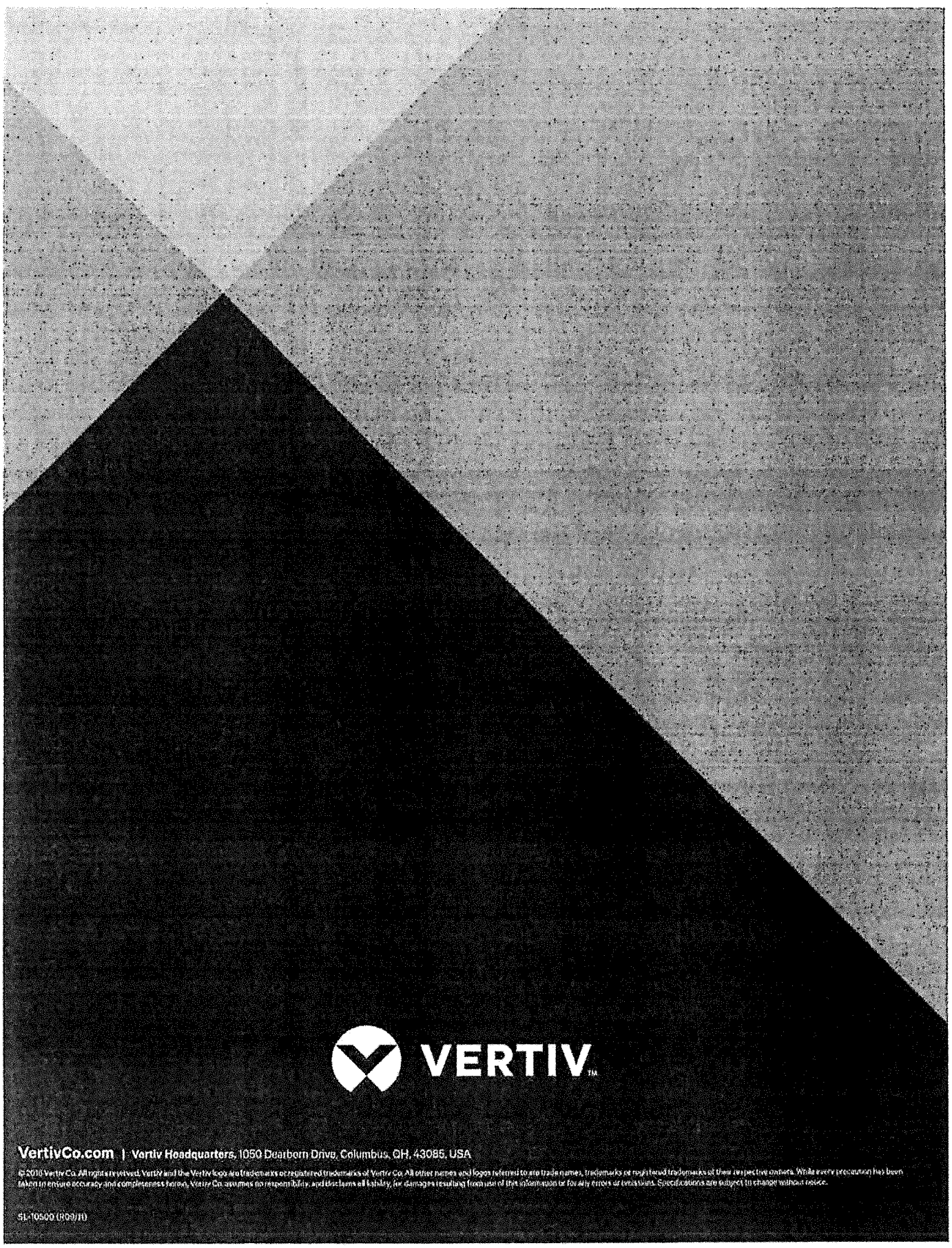
		60HZ		50HZ	
		AIR COOLED SYSTEM			
		with Outdoor Condensing Unit	with Centrifugal Condensing Unit	with Outdoor Condensing Unit	with Centrifugal Condensing Unit
		5 Tons	5 Tons	5 Tons	5 Tons
Evaporator		MMD60E	MMD60E	MMD59E	MMD59E
Condensing Unit		PFH - Outdoor	MCD - Indoor	PFH - Outdoor	MCD - Indoor
Net Capacity Data* - kW (Btuh)					
80°F DB, 62.8°F WB (26.7°C	Total	19.2 (65,400)	19.3 (65,700)	18.1 (61,600)	17.9 (61,000)
DB,17.1°C WB) 38% RH	Sensible	18.5 (63,000)	18.5 (63,200)	17.8 (60,700)	17.7 (60,400)
75°F DB, 61°F WB (23.9°C	Total	18.4 (62,700)	18.5 (63,000)	17.2 (58,800)	17.1 (58,300)
DB,16.1°C WB) 45% RH	Sensible	16.4 (55,800)	16.4 (56,000)	15.8 (53,900)	15.7 (53,700)
72°F DB, 60°F WB (22.2°C	Total	17.9 (61,200)	18.0 (61,500)	16.8 (57,300)	16.7 (56,900)
DB,15.5°C WB) 50% RH	Sensible	15.0 (51,300)	15.1 (51,500)	14.5 (49,500)	14.4 (49,300)

		WATER-COOLED	GLYCOL-COOLED	CHILLED WATER	WATER-COOLED	GLYCOL-COOLED	CHILLED WATER
		5 Tons	5 Tons	5 Tons	5 Tons	5 Tons	5 Tons
Evaporator		MMD60E	MMD60E	MMD92C	MMD59E	MMD59E	MMD91C
Condensing Unit		MCD68W	MCD68W		MCD68W	MCD68W	
Net Capacity Data* - kW (Btuh)							
80°F DB, 62.8°F WB (26.7°C	Total	21.5 (73,500)	18.2 (62,200)	20.1 (68,700)	20.7 (70,700)	16.9 (57,800)	20.1 (68,700)
DB,17.1°C WB) 38% RH	Sensible	19.6 (67,000)	17.9 (61,200)	18.7 (63,900)	19.3 (65,700)	16.9 (57,800)	18.7 (63,900)
75°F DB, 61°F WB (23.9°C	Total	20.8 (70,800)	17.4 (59,500)	16.3(55,600)	19.9 (68,000)	16.1 (54,900)	16.3(55,600)
DB,16.1°C WB) 45% RH	Sensible	17.5 (59,600)	15.9 (54,300)	15.1 (51,500)	17.1 (58,300)	15.2 (52,000)	15.1 (51,500)
72°F DB, 60°F WB (22.2°C	Total	20.3 (69,200)	17.0 (58,000)	13.8 (47,200)	19.5 (66,500)	15.7 (53,500)	13.8 (47,200)
DB,15.5°C WB) 50% RH	Sensible	16.1 (55,000)	14.6 (49,800)	12.8 (43,700)	15.7 (53,700)	14.0 (47,700)	12.8 (43,700)

		60HZ		50HZ	
		AIR COOLED SYSTEM			
		with Outdoor Condensing Unit	with Centrifugal Condensing Unit	with Outdoor Condensing Unit	with Centrifugal Condensing Unit
		8 Tons	8 Tons	8 Tons	8 Tons
Evaporator		MMD96E	MMD96E	MMD95E	MMD95E
Condensing Unit		PFH - Outdoor	MCD - Indoor	PFH - Outdoor	MCD - Indoor
Net Capacity Data* - kW (Btuh)					
80°F DB, 62.8°F WB (26.7°C	Total	28.4 (96,900)	28.1 (96,000)	27.9 (95,100)	27.6 (94,200)
DB,17.1°C WB) 38% RH	Sensible	27.9 (95,200)	27.8 (94,800)	27.5 (94,000)	27.3 (93,300)
75°F DB, 61°F WB (23.9°C	Total	27.2 (92,700)	26.9 (91,800)	26.6 (90,600)	26.3 (89,900)
DB,16.1°C WB) 45% RH	Sensible	24.9 (84,900)	24.9 (84,800)	24.6 (84,100)	24.5 (83,700)
72°F DB, 60°F WB (22.2°C	Total	26.5 (90,400)	26.3 (89,700)	25.9 (88,400)	25.7 (87,700)
DB,16.5°C WB) 50% RH	Sensible	22.8 (77,900)	22.8 (77,700)	22.7 (77,300)	22.5 (76,900)

		WATER-COOLED	GLYCOL-COOLED	CHILLED WATER	WATER-COOLED	GLYCOL-COOLED	CHILLED WATER
		8 Tons	8 Tons	8 Tons	8 Tons	8 Tons	8 Tons
Evaporator		MMD96E	MMD96E	MMD8 TC	MMD95E	MMD95E	MMD8 TC
Condensing Unit		MCD98W	MCD98W		MCD97W	MCD97W	
Net Capacity Data* - kW (Btuh)							
80°F DB, 62.8°F WB (26.7°C	Total	31.1 (106,000)	27.0 (92,000)	29.8 (101,800)	30.5 (104,000)	26.5 (90,300)	29.8 (101,800)
DB,17.1°C WB) 38% RH	Sensible	29.6 (101,000)	26.8 (91,600)	27.9 (95,100)	29.2 (99,600)	26.4 (90,100)	27.9 (95,100)
75°F DB, 61°F WB (23.9°C	Total	29.9 (102,000)	25.6 (87,500)	24.0 (82,000)	29.3 (100,000)	25.1 (85,600)	24.0 (82,000)
DB,16.1°C WB) 45% RH	Sensible	26.2 (89,400)	24.2 (82,400)	22.5 (76,700)	25.9 (88,500)	23.9 (81,500)	22.5 (76,700)
72°F DB, 60°F WB (22.2°C	Total	29.2 (99,800)	24.9 (85,100)	20.5 (69,900)	28.7 (98,000)	24.4 (83,200)	20.5 (69,900)
DB,15.5°C WB) 50% RH	Sensible	24.2 (82,600)	22.2 (75,600)	19.1 (65,300)	23.9 (81,600)	21.9 (74,800)	19.1 (65,300)

*The net capacity data has fan motor heat factored in for all ratings and the entering air conditions of 75°F (23.9°C), 45% RH, is the standard rating condition for ASHRAE 127-2007.
All capacities are nominal values; actual performance will be ±5%

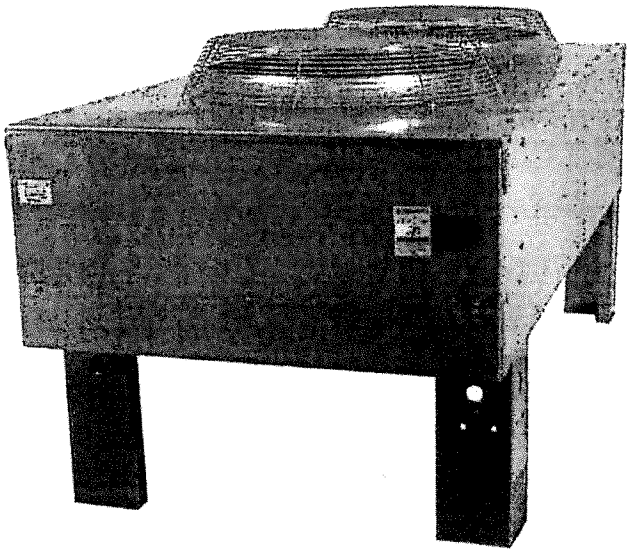


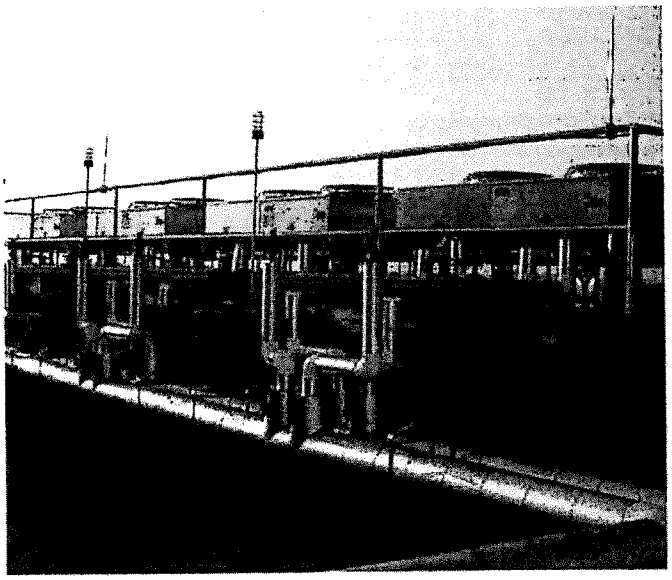
VertivCo.com | Vertiv Headquarters, 1050 Dearborn Drive, Columbus, OH, 43085, USA

SL-10500 (R09/18)

Liebert® Air-Cooled, Direct-Drive Drycoolers

Technical Design Manual—50 Hz & 60 Hz





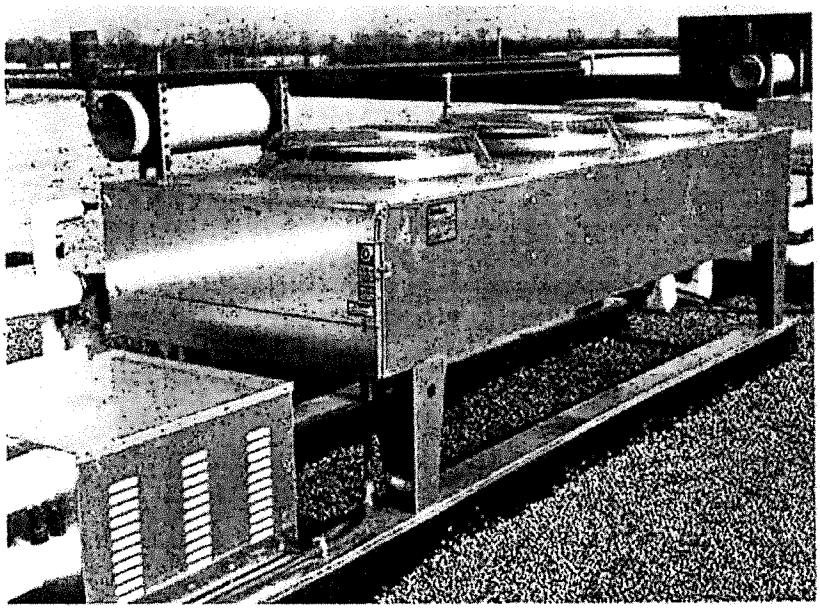
EMERSON.
Network Power

1.0 Introduction

1.1 Product Description and Features

The Liebert drycooler is a low-profile, direct-drive propeller fan-type air-cooled unit. Constructed with an aluminum cabinet and a copper-tube aluminum fin coil, the unit is quiet and corrosion resistant. All electrical connections and controls are enclosed in an integral NEMA 3R rated electrical panel section of the drycooler.

Figure 1-1 Liebert 3-fan drycooler



1.2 Agency Listed

Standard 60Hz units are CSA certified to the harmonized U.S. and Canadian product safety standard, CSA C22.2 No 236/UL 1995 for "Heating and Cooling Equipment" and are marked with the CSA c-us logo.

C US

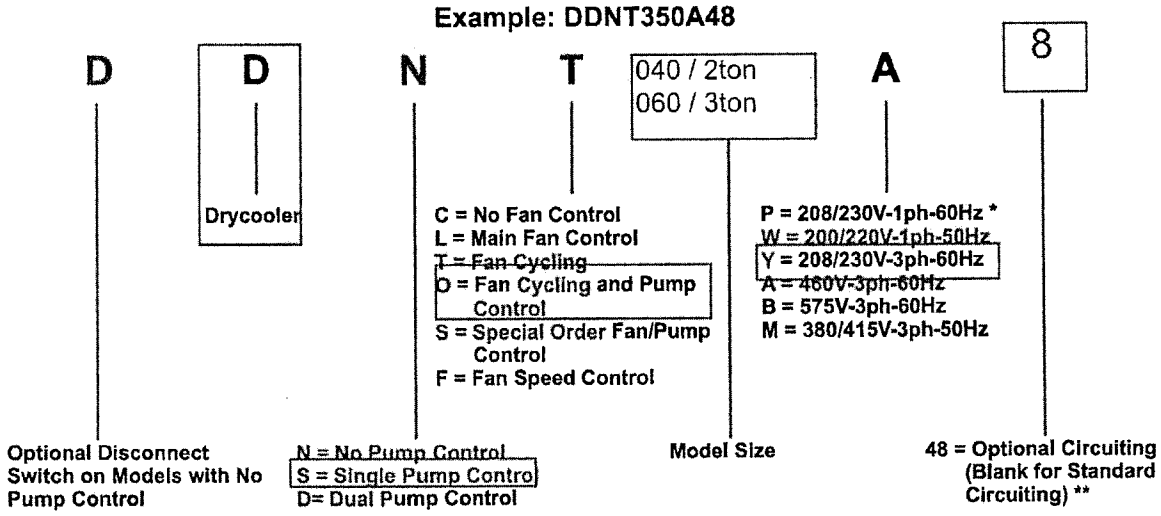
1.3 Site Considerations

When considering installation locations, consider that these units reject heat into the atmosphere and should be located in a clean air area, away from loose dirt and foreign matter that may clog the coil. The drycoolers and pumps should be installed in a location offering maximum security and access for maintenance. Avoid ground level sites with public access and areas that are subject to heavy snow or ice accumulations and sites in the vicinity of steam, hot air or fume exhausts. Drycoolers should be located no closer than 3 feet from a wall, obstruction or adjacent unit. There should be no obstructions over the unit. Drycoolers must not be installed in a pit, where discharge air is likely to be recirculated through the drycooler or installed where objects restrict the air inlet free area.

The drycooler must be installed on a level surface to ensure proper glycol flow, venting and drainage. For roof installation, mount the drycooler on suitable curbs or other supports in accordance with local codes. To minimize sound and vibration transmission, mount steel supports across load-bearing walls. Utilize Piggyback drycoolers whenever interior building locations must be used.

Allow adequate space for pump packages, expansion/compression tanks, piping and additional field supplied devices. When mounting pump packages, mount on level surface or suitable curbs that will allow cooling ventilation air to enter from underneath the pump package frame and exit through the louvers.

Figure 1-2 Product model nomenclature



*** Single-phase input voltage available only on DSF and DDF drycoolers and will require single-phase pumps. For single-phase voltage on other drycoolers, consult factory for SFA DC2022 availability.**
**** See 7.3 - Piping Connections for standard and optional circuits available**

2.0 Standard Features

2.1 Standard Features—All Drycoolers

Liebert drycoolers consist of drycooler coil(s), housing, propeller fan(s) direct-driven by individual fan motor(s), electrical controls and mounting legs. Liebert air-cooled drycoolers provide for heat rejection needs of glycol-cooled Thermal Management units by using outdoor air to remove heat from circulating water/glycol mixtures and to maintain water/glycol temperatures within designed and controlled ranges. Various control methods are employed to match indoor unit type, indoor unit to drycooler/pump combinations and maximum sound requirements.

2.1.1 Drycooler Coil

Liebert-manufactured coils are constructed of copper tubes in a staggered tube pattern. Tubes are expanded into continuous, corrugated aluminum fins. The fins have full-depth fin collars completely covering the copper tubes, which are connected to heavy wall Type "L" headers. Inlet coil connector tubes pass through relieved holes in the tube sheet for maximum resistance to piping strain and vibration. Coil circuit options can be selected and factory built to provide the right combination of heat transfer and pressure drop for the glycol system. The glycol supply and return pipes are either spun shut (1-4 fan) or capped (6-fan and 8-fan) at the factory and include a factory-installed Schrader valve. Coils are factory leak-tested at a minimum of 300 psig (2068kPag), dehydrated, then filled with an inert gas holding charge for shipment and sealed.

2.1.2 Housing

The condenser housing is fabricated from bright aluminum sheet and divided into individual fan sections by full-width baffles. Structural support members, including coil support frame, motor and drive support, are galvanized steel for strength and corrosion resistance. Aluminum legs are provided for mounting the unit for vertical discharge and have rigging holes for hoisting the unit into position. The unit's electrical panel is inside an integral NEMA 3R weatherproof section of the housing.

2.1.3 Propeller Fan

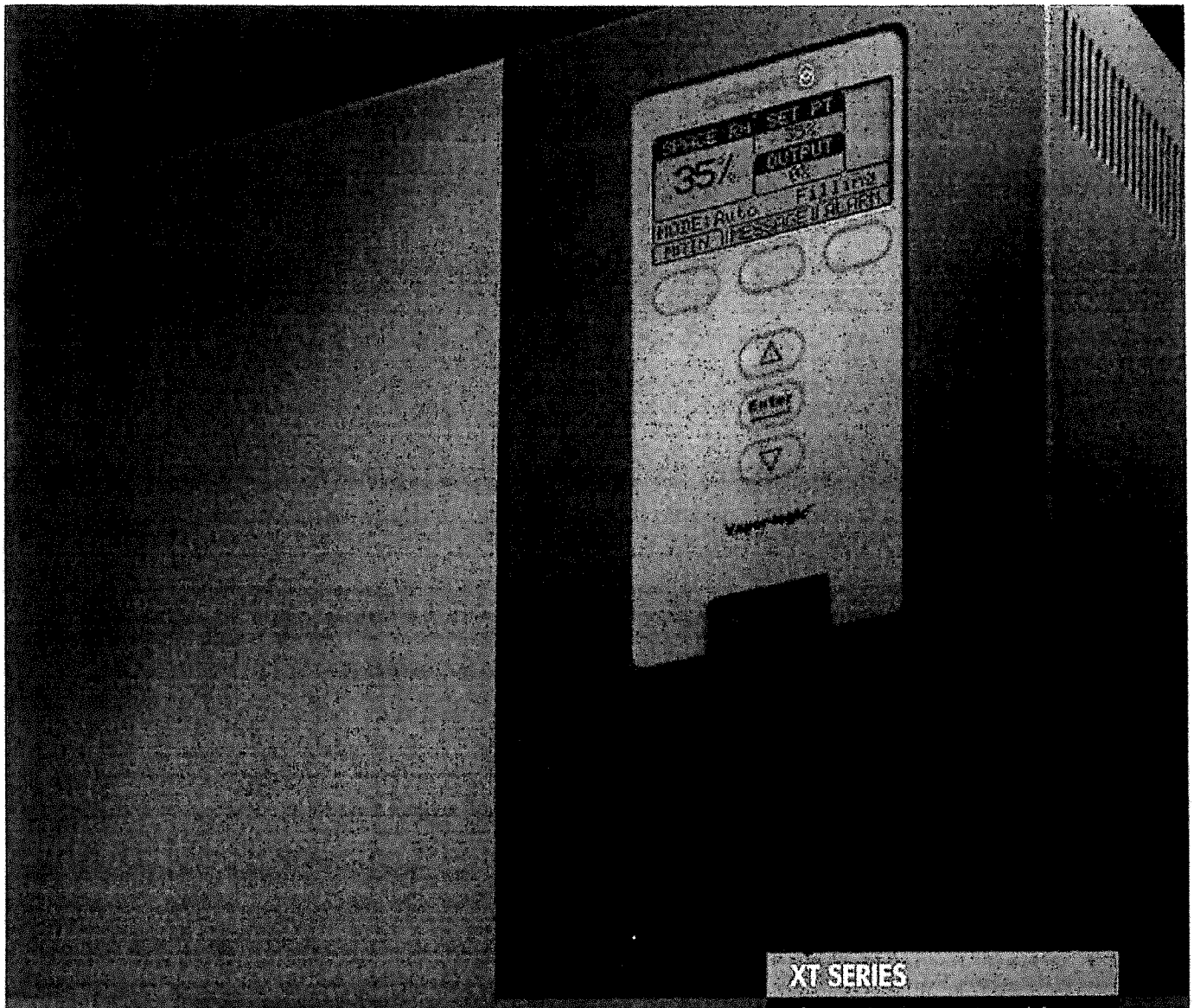
Aluminum propeller fan blades are secured to a corrosion-protected steel hub. Fan guards are heavy gauge, close-meshed steel wire with corrosion-resistant polyester paint finish rated to pass a 1000-hour salt spray test. Fans are secured to the fan motor shaft by a keyed hub and dual setscrews. Fan diameter is 26" (660mm) or less. The fans are factory-balanced and run before shipment.

2.1.4 Fan Motor

The drycooler's fan motor is a continuous air-over design equipped with rain shield and permanently sealed bearing. Die-formed, galvanized steel supports are used for rigid mounting of the motor.

2.1.5 Electrical Controls

Electrical controls, overload protection devices and service connection terminals are factory-wired inside the integral electrical panel section of the housing. A locking disconnect switch is factory-mounted and wired to the electrical panel and controlled via an externally mounted locking door handle. An indoor unit interlock circuit enables drycooler operation whenever the indoor unit's compressors are active. Supply wiring and indoor unit interlock wiring are required at drycooler installation, along with any pumps controlled by the drycooler's electrical panel.



XT SERIES

Electrode Steam Humidifiers

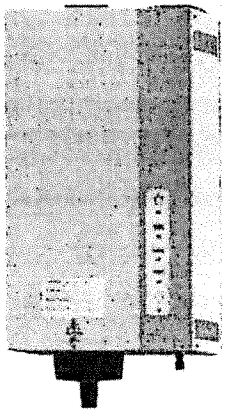
- *Easy to operate and maintain*
- *Compact*
- *Disperse steam into ductwork or open spaces*
- *Comprehensive Vapor-logic® controls (Model XTP)*

driSteem

Cost-effective steam humidification

Model XTP

Model XTR



XT Series electrode steam humidifiers from DriSteem provide humidification for a wide range of buildings, including health care, commercial, industrial, and government facilities. Easy installation and minimal maintenance make XT Series one of the most affordable humidification systems to purchase and install.

EASY TO MAINTAIN

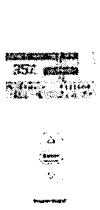
No cleaning required. Just replace the affordable steam cylinder when prompted by the controller display.

ADAPTABLE

- Compact in size to fit into small spaces
- Model XTP capacity range is 5 to 287 lbs/hr (2 to 130 kg/h); Model XTR capacity range is 5 to 11 lbs/hr (2 to 5 kg/h)
- Disperses steam into ductwork or open spaces
- Works with water conductivity from 350 to 1250 µS/cm
- User-selectable drain water tempering, if desired

COMPREHENSIVE CONTROL

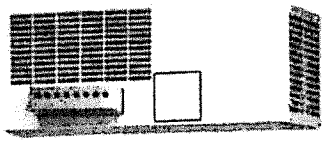
- The Vapor-logic controller is included with the Model XTP and sets the standard for control capabilities in electrode humidifiers.
- An easy-to-use standard controller is provided on the Model XTR.



	Vapor-logic controller (Model XTP)	Standard controller (Model XTR)
Easy-to-use menus for all humidifier functions	✓	
Push-button operation, with LED indicators for operating status and troubleshooting		✓
Web interface for Ethernet access to all functions	✓	
Accurate, responsive RH control with PID tuning for maximum performance	✓	
BACnet®, Modbus®, and optional LonTalk® for inter-operability with multiple building automation systems	✓	
Automatic drain and fill events for optimized humidifier performance based on water type	✓	✓
Cylinder drains after a user-specified time with no call for humidity to prevent microbial growth	✓	✓
A USB port is provided for downloading controller data to a PC for viewing and analysis, data backup and restore, and firmware updates	✓	

XT SERIES ELECTRODE HUMIDIFIERS

The XT series electrode humidifier uses heat caused by electrical resistance in conductive fill water to boil the water into steam. Automatic drain and fill cycles keep electrical current within demand parameters, based on water conditions and steam production.



XT SERIES FAN PACK OR STEAM BLOWER

An optional fan pack or steam blower is available for use in finished spaces. They disperse steam into open spaces and are used when there is not associated air handling equipment.

Table 3-1:
Line currents and recommended fusing for XT Series humidifiers

Model	Nominal steam capacity lbs/hr	Nominal steam capacity kg/h	kW	Phase	Volts	Maximum line current (amps)	Recommended fusing (amps)
	5.6	2.5	1.9		120		
XTR	7.9	4.5	3.3	1	208	19	25
	10.8	4.9	3.7		230		
	11.3	5.1	3.8		240		
XTP							
					120	17	25
002	5	2	1.7	1	208	10	15
					230	9	15
					240	8	15
					208	19	25
					230	17	25
					240	17	25
				1	277	14	20
					400	10	13
003	10	5	3.3		480	8	15
					600	7	10
					208	11	15
					240	10	15
				3	400	6	10
					480	5	10
					600	4	10
					208	35	45
					230	31	40
					240	30	40
				1	277	26	35
					400	18	25
006	15	8	6.0		480	15	20
					600	12	15
					208	20	25
					240	17	25
				3	400	10	13
					480	9	15
					600	7	10
					208	33	45
					240	29	40
010	30	14	10.0	3	400	17	25
					480	14	20
					600	12	15
					208	55	70
					240	48	60
017	50	22	16.5	3	400	29	40
					480	24	35
					600	19	25
					400	43	63
025	75	34	25.0	3	480	36	50
					600	29	40
					400	58	80
033	100	45	33.3	3	480	48	70
					600	39	50
					400	72	100
042	125	57	41.7	3	480	60	80
					600	48	70
					400	90	100
048	145	65	47.8	3	480	69	90
					600	55	70
					400	2 x 43	2 x 63
050*	150	68	50.0	3	480	2 x 36	2 x 50
					600	2 x 29	2 x 40
					400	2 x 58	2 x 80
067*	198	90	66.7	3	480	2 x 48	2 x 70
					600	2 x 39	2 x 50
					400	2 x 72	2 x 100
083*	250	113	83.3	3	480	2 x 60	2 x 80
					600	2 x 48	2 x 70
					400	2 x 80	2 x 100
096*	287	130	95.7	3	480	2 x 69	2 x 90
					600	2 x 55	2 x 70

*These models have two steam cylinders and require two power service connections

DRI-STEEM Corporation
a subsidiary of Research Products Corporation
DriSteem U.S. operations are
ISO 9001:2015 certified

U.S. Headquarters:
14949 Technology Drive
Eden Prairie, MN 55344
800-328-4447 or 952-949-2415
952-229-3200 (fax)

European office:
Grote Hellekensstraat 54 b
B-3520 Zonhoven
Belgium
+3211823595
E-mail: dristeem-europe@dristeem.com

Form No. XT-BRO-EN-0119

EXPECT QUALITY FROM THE INDUSTRY LEADER
Since 1965, DriSteem has been leading the industry with creative and reliable humidification solutions. Our focus on ease of ownership is evident in the construction of the XT Series humidifier. DriSteem leads the industry with a Two-year Limited Warranty and optional extended warranty.

For more information
www.dristeem.com
sales@dristeem.com

For the most recent product information visit our website:
www.dristeem.com

driSteem

Proposed Management and Oversight Plan

This project will be managed and overseen by the City's Facilities Manager in conjunction with the Head Librarian. The City's Procurement Officer will assist in seeking price quotes/bids for the new HVAC units and their installation. The Facilities Manager will serve as clerk of the works; and the Head Librarian will ensure that library services continue without interruption, and that the project is completed according to the needs assessment.

CITY OF NEWBURYPORT
HISTORICAL COMMISSION
60 PLEASANT STREET • P.O. BOX 550
NEWBURYPORT, MA 01950
(978) 465-4400
WWW.CITYOFNEWBURYPORT.COM

January 28, 2020

Ms. Giselle Stevens, Head Librarian
Newburyport Public Library
94 State Street
Newburyport MA 01950

Subject: The Newburyport Public Library's application for a CPA grant

Dear Ms. Stevens,
I understand that the application for CPA funds made by the Newburyport Public Library's requires a letter from the Newburyport Historical Commission indicating our determination that the Library's Archival Center is a "Historic Resource" for the city, since the request is for funds to acquire HVAC equipment to ensure that the center's collections are adequately protected.

The Archival Center is home to archival material relating to all aspects of Newburyport history, going back as far as its settlement in 1635 and up to the present. These materials include printed documentation, microfilms, manuscripts, rare monographs, genealogical material, family papers, scrapbooks, newspapers, maps, charts, plans, photographs and more. These physical materials are literally priceless in the sense that many could not be replaced at any cost. Being physical objects, they are also subject to accelerated damage and deterioration from variations in temperature and humidity outside a tightly controlled range - hence the need for special HVAC capability.

The value of this collection as a historic cultural resource can hardly be understated. In addition to the 'normal' items any similar collection might have, such as books and maps, we are blessed to have many photographs of the area taken by local pioneers back in the earliest days of photography. The entire collection is a treasured resource for local residents, schoolchildren, and scholars seeking to learn about the rich and colorful history of our city.

The Newburyport Historical Commission is pleased to support your application for CPA funding for purchase and installation of the replacement HVAC units to preserve this unique cultural historic resource.

Sincerely,

Glenn Richards, Chair

Newburyport Public Library Board of Directors
94 State Street
Newburyport, MA. 01950
978 465-4428

February 5, 2020

Community Preservation Committee
Newburyport, MA.

Dear Community Preservation Committee:

The Newburyport Public Library Archival Center is a repository for local history resources, with a collection spanning nearly four hundred years. With over 1,200 linear feet of material, the rich fabric of this community is documented in a growing collection of monographs, photographs, maps, pamphlets, newspapers, physical ephemera, and many one-of-a-kind materials. Every year, hundreds of visitors from throughout the world conduct in-depth personal and scholarly research with these preserved resources. The Archival Center houses valuable community records including vital statistics, town planning and property information, local industry accounts, regional history, family genealogies, and a variety of other unique primary sources.

The Archival Center has recently been hard at work with professionally trained staff and a dedicated group of local volunteers to implement archival preservation mechanisms for vulnerable, irreplaceable materials. Because of the inherent monetary and cultural value of the Archival Center collection, it is imperative that these precious local history resources reside in carefully controlled temperature and humidity conditions. The Newburyport Public Library seeks to proactively replace aging, inefficient, and unreliable HVAC systems to ensure continued preservation of all archival materials onsite.

The Newburyport Public Library Archival Center is a destination for discovery and education. Improving infrastructure for the Newburyport Public Library Archival Center directly supports the mission of the Community Preservation Act, benefitting the local community and beyond for future generations.

Sincerely,

Newburyport Public Library Board of Directors

THE FRIENDS OF THE
NEWBURYPORT
PUBLIC LIBRARY

94 State Street
Newburyport, MA 01950
(978) 465-4428

February 4, 2020

Re: Replacement of HVAC system for the Newburyport Public Library Archival Center

The Friends of the Newburyport Public Library, a 501 (c) (3) organization whose purpose is to provide financial assistance for programs and other needs that are not covered by its city-funded operating budget or the resources of the Library Trustees; foster community awareness of the library and its resources through the Friends' own programs, initiatives and activities; advocate for the library at the local level for both public and private support. The purpose of this letter is to advocate for the library's request for funding to replace the Archival Center's HVAC system.

The importance of climate control in a facility that houses Newburyport's most important historical documents, books, photographs and other media cannot be under estimated. A well-functioning climate control system provides the optimum balance of temperature and humidity. Wide variations in temperature and humidity are stressors for paper, film and other materials and adversely impact the long-term preservation of materials. This is particularly the case with materials printed in the 19th century, which tend to have a high sulfur content. In humid conditions, the sulfur converts to sulfuric acid and literally dissolves the paper. When you see old books with brown pages, this is what is occurring.

An aging system can result in the loss of valuable and often irreplaceable materials. I can attest to this personally, as former Head Librarian of the Rhode Island Historical Society. During my tenure in the 1970's, the library experienced a flood from a faulty HVAC system. It rained, literally, from the third floor down to the first floor. We were able to save and restore all of our pre-1820 materials, which were printed on rag paper and, therefore, did not contain sulfur. We were not so fortunate with some of our later materials, which were printed on wood pulp paper with a high sulfur content. The majority of Newburyport's Archival Center collections fall into the latter category.

The Board of the Friends of the Newburyport Public Library strongly urges the allocation of Community Preservation Act funds to replace the Archival Center's HVAC system in order to insure that the community's historical records will be protected and preserved.

Sincerely yours,

Nancy E. Peace

Nancy E. Peace, President

February 4, 2020

To: Chair of the CPA Committee

Re: Support for a HVAC system for the Newburyport Public Library Archival Center

We are formal Newburyport Public Library, CORI screened, special project volunteers with thirty years of experience in historical research, lecturing, and writing. Among our ongoing volunteer support was a six-year, 1,000 hour project inventorying and archivally assessing the 13,000 items in the Archival Center's collection; from this experience we add our support to this HVAC project.

The Archival Center collection is comprehensive, rare for a city of our size, comprising, for example all documents stored in the City Hall basement from before Newburyport separated from Newbury through the mid-twenty century including the original 1764 document of separation from Newbury; the original 1851 City Charter; over 700 published Newburyport 18th and 19th century sermons; a five volume first edition of the *Papers of George Washington* edited by John Marshall; a rare copy of John Paine's 1776 *Common Sense* that spoke to the people of America, the first to openly ask for independence from Great Britain; the two volume, 1775-1777, original manuscript of the Newburyport Committee of Correspondence, Safety, and Inspection minutes, a committee that governed the town's response to liberty and freedom from British attack.

These and thousands of other original and published documents, maps, and photographs require special archival materials; skilled archivists, data cataloging and retrieval systems; but underlying all is a controlled temperature and humidity environment physically protecting this special Newburyport collection.

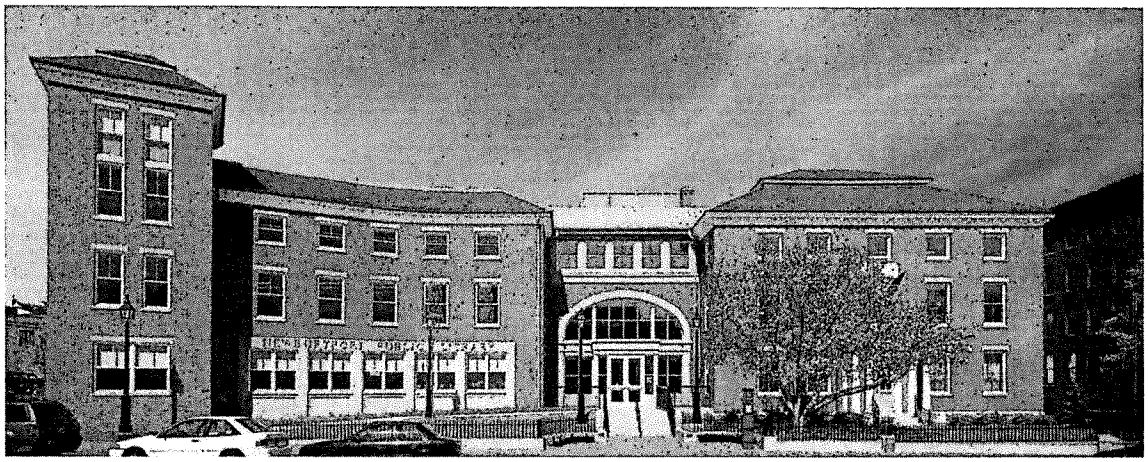
Newburyport has grown and prospered on its historical and architectural heritage; a heritage that the CPA Committee has generously supported; the proposed HVAC project is part of that ongoing needed support.

Our best wishes and thanks,

Skip and Marge Motes
26 High Street, Newburyport

Commercial Construction Consulting, Inc.

HVAC Assessment & Retro-Commissioning



Newburyport Public Library
Newburyport, MA

REPARED FOR:
Giselle Stevens – Head Librarian
Newburyport Public Library
94 State St., Newburyport MA 01950

PREPARED BY:
COMMERCIAL CONSTRUCTION CONSULTING, INC.
313 CONGRESS STREET
BOSTON, MA. 02210

August 30, 2019

TABLE OF CONTENTS

Executive Summary:

Commercial Construction Consulting (C3) was commissioned by Newburyport Public Library to assess the condition and operation of their HVAC systems. The intent of this assessment was to determine the condition and operation of the existing systems and provide recommendations on potential upgrades and future operational considerations as the systems approach the end of their useful life.

C3 performed an initial inspection on June 26, 2019 and a site inspection and limited retro-commissioning on August 20th, 2019. The purpose of the initial inspection was to review existing conditions and gather preliminary information. The follow up inspection was to determine the causes of the ongoing temperature complaints at the library as well as determine the condition of the HVAC systems and equipment. A series of functional tests were performed with the help of the Controls Contractor, Viking Controls. These tests identified operational issues in need of correction as well as providing a broader picture of the future capital needs of the library. We have included an issues log of the deficiencies we found during this site visit that require corrective actions. In addition to these issue log items, we will make recommendations that will improve the building energy efficiency, maintainability, and occupant comfort.

Existing System Description:

The Newburyport Public Library underwent an expansion and renovation in 2001. As part of this project the building's HVAC systems and controls were replaced. The current equipment dates back to this renovation making the existing systems and controls 19 years old. The systems that were installed as part of the addition and renovation included a new chiller, boilers, and air handling units with associated terminal units, a cooling tower and a specialized climate control system for the Archival research room (Hamilton).

Heating and cooling of the Library is done by three air handling units (AHUs) located within the library that provide conditioned air to terminal units with hot water reheat coils. The air-handling units are provided with chilled and hot water coils as well as electric-steam humidifiers. The main hydronic loop serves the three air-handling units as a dual temperature loop. One air handler serves the 1st and 2nd levels of the new addition and is located in a basement mechanical room. A second air handle serves the 1st and 2nd floors of the existing building and is located in a basement mechanical room. The third air handlers serves the 3rd floor of both building sections and is located in the attic of the existing building. A dual temperature loop requires manual or automatic opening and closing of valves to provide hot water in the winter and cold water in the summer. During the summer when the loop is providing chilled water, the portion of the hot water loop that serves the terminal unit reheats is isolated from the plant to prevent the circulation of chilled water to these units. When the main hydronic loop is switched to heating mode in the winter this loop is opened back up. A single 94-ton water-cooled screw chiller and its associated cooling tower produce chilled water. The condenser loop for this system was designed to operate with a 40% glycol solution. Hot water for the AHUs and reheat coils in the terminal units is generated by five non-condensing gas fired boilers sized at 350,000 BTU/hr each. Two dedicated air-cooled air conditioning units control the space temperate and relative humidity of the library's Archives. Aside from these standalone air conditioning units, all of the remaining equipment is integrated into a central control system for remote adjustment of set points, monitoring of operation, and scheduling.

Existing Systems Condition:

The type of systems provided are complex and require a significant amount of maintenance and upkeep to keep the systems reliable and operating at a high level of efficiency. Overall, the equipment looks well maintained and we would expect the equipment to exceed the estimated useful life expectancy as provided by ASHRAE. Below is a list of the equipment currently installed and used to maintain the indoor air environment and our assessment of their current condition and estimate remaining useful life. In regards to the chiller in particular, it is difficult to assess its condition from a visual inspection and functional test. Truly assessing this piece of equipment requires more invasive tests and cleaning of the internals to determine its condition. This includes an eddy current test that would determine the condition of the internal tubes as well as an oil test, which can indicate deterioration in the compressors. These two tests will provide a clear picture of the condition of the chiller and its ability to continue to provide chilled water to the building.

NEWBURYPORT PUBLIC LIBRARY HVAC EQUIPMENT ASSESSMENT				
SYSTEM	AGE	ASHRAE LIFE EXPECTANCY	CONDITION	C3 ESTIMATED REMAINING USEFUL LIFE
Chiller	19 Years	23 Years	Fair	5-10 Years
Cooling Tower	19 Years	20 Years	Good	10 Years
Boilers	19 Years	25 Years	Good	5-10 Years
Hydronic Pumps	19 Years	20 Years	Poor	5 Years
Archive AC Units	19 Years	15-20 Years	Poor	Budget to Replace Existing
Air Handling Units	19 Years	15-20 Years	Good	10-15 Years
Terminal Units	19 Years	20 Years	Fair	10-15 Years
VFDs & Unit Controllers	19 Years	15 Years	Poor	Budget to Replace Existing
Control Valves	19 Years	15 Years	Poor	Budget to Replace Existing

Air Handling Units and Terminal Units:

The air handling units and terminal units from a mechanical standpoint will continue to function for many years to come with some basic upkeep required. The air-handling units will be able to be maintained and upgraded over their lifetime as components fail. As we have noted in the issues log at the back of this report there are existing valves that are failed that will require replacement. We expect electrical components like the valves, Variable Frequency Drives (VFDs), and sensors to continue to fail at an increasing rate until all of them have been replaced. At 19 years old, these components have exceeded their estimated useful life by 4 years with a large number of valves and sensors already replaced. As the units are located indoors there is little concern for the housing of the air handling units with the only major component that would conceivably require replacement being the hydronic coils in the units. These can be replaced easily without the need to purchase new units. Basic preventative maintenance of the units should allow them to continue to operate effectively for 10-15 more years.

Terminal Units

Similar to the air-handling units, the main components that would ever need to be replaced in these units are their associated electrical components. This would include actuator, controller, hot water reheat valves, and sensors associated with the terminal units. Some of these components have been replaced as needed and during the retro-commissioning effort back in 2014 but there are still a large percentage of existing components in the building. In the Issues log at the back of this report, we identified at least four terminal unit controllers that have failed leaving the spaces they serve with no means of controlling space temperature to the desired set points. There are also an additional two controllers that we suspect to be failed or near to failing that should be replaced along with those we know to be failed. Sensors like the CO2 sensors used for demand-controlled ventilation are very prone to failures due to dirt build up and a degradation of the internal CO2 sensor. We identified eight CO2 sensors while we were on site that were reading incorrectly and will require replacement. This is very common for sensors and electrical controls beyond 15 years of service, we would expect more of these failures to occur until all of the terminal unit controllers, and various sensors are replaced.

Boilers:

The boilers appear to be in good condition and we estimate they will continue to provide reliable heating for 5-10 years. The boilers currently installed are non-condensing type, which require high supply and return temperatures to prevent condensing inside the heat exchanger. This inherently makes the heating plant less efficient than today's plants as the hot water supply temperature can only be reset so much before risking condensation in the boilers which will rapidly corroded them and cause them to need to be replaced. The current set-up of the plant and our observations on site show the risk of condensing to be very low and the condition of the heat exchangers to be good.

Chiller & Cooling Tower:

Trending showed the chiller plant is maintaining the space temperature set points throughout the library. We were able to identify the cooling issues in the library to be associated with the terminal units and not related to the chiller plants operation. Based on these observations there does not appear to be any major deficiency associated with the chiller or cooling tower aside from some failed sensors. Currently the flow proving safety switch is failed and jumped out to allow the unit to run. The replacement part is on site but needs to be installed. Operating the chiller with this crucial safety switch can cause a potential catastrophic failure of the chiller if it is allowed to run in a no flow condition. This failure would all but destroy the chiller and release refrigerant onto the lower levels, which can cause harm to occupants within the mechanical room.

We observed what appeared to be chilled water flowing through the hot water reheat loop that is intended to be isolated from the chilled water loop during the cooling season. Flowing water through this reheat loop can lead to overcooling in some instances, increasing the demand on the chiller, and pumps leading to inefficient operation and increased wear and tear on these components.

Conducting an eddy current and oil test of the chiller will provide a true assessment of the condition of the chiller but in general, we have seen Carrier screw chillers last 30 years with little to no maintenance. With proper maintenance, this chiller could feasibly run longer than that with minor sensor and valve replacements. Once these tests are, conducted C3 can review them and provide additional feedback on the condition of the chiller and its expected life.

Hydronic Pumps:

The primary dual temperature pumps and condenser water pump housings are heavily corroded due to water pooling on the housings. This can be caused by condensation or potentially leaks at the pump seals, which regularly need replacement. Inspection of the seals and impellers will provide a better indication of the remaining useful life of these pumps as they approach the average end of their useful life.

Hamilton Room Air Conditioning Units:

These units are currently exceeding their expected useful life and appear to be nearing the end of their usefulness. These units are not integrated into the central control system so our ability to assess these pieces of equipment limited to thermostat adjustments and visual inspections. The housings of the units are in rough shape with the panels taped onto the housing. We found one of the units unable to control to a humidity set point and without a Liebert technician on site we were unable to see if that component had failed, or was ever provided with that particular moment. The original schedule sheet where these units were specified is currently not included in the original plans provided by the town of Newburyport and the unit tags are worn off. Today's controllers are more sophisticated making them able to provide better control of space temperature and relative humidity as well as having the ability to integrate into the existing central control system to allow remote monitoring and alarming.

The central control system is quite sophisticated with advanced energy saving strategies implemented already. This system is integrated to all of the equipment but there are no associated graphics that would greatly aid in the monitoring and troubleshooting of the system. As it currently is configured, all the points associated with a piece of equipment are simply listed. This makes it difficult to find the valuable points of interest for someone familiar with the building automation controls and nearly impossible for anyone with moderate to no experience.

System Recommendations:

There are three components in our assessment that we feel should be addressed in the near future to maintain consistent space temperatures throughout the library and the Archives. These include the controllers for the terminal units, hot and chilled water valves, and the AC unit serving the Archives. These components are at or exceeding their useful life and will continue to fail at an increasing rate over time.

In regards to the terminal unit controllers and hot and chilled water valves, we recommend enlisting Viking Controls to perform an audit of the existing control valves and terminal unit controllers and provide pricing to provide replacement of all the original components. This will quantify the number of remaining original components and allow the library to budget out the replacement of these components over several years. Some of the components have been replaced and upgraded over the years so it would be a good starting point to know how many original components remain. We feel this will address any current space temperature complaints and set the library up for another 15-20 years of operation.

Given how critical the space temperature and humidity control of the Archives is to the library and history of Newburyport we recommend proactively replacing the two AC units that serve them. Given their age, major repairs or overhauls would not be recommend. An early replacement would mitigate against a potential failure in the future that would necessitate emergency repairs or replacement. Emergency replacement would be more costly and require temporary cooling units to be brought in until the units can be replaced. By budgeting to replace these units now, the library will ensure that the spaces are

maintained at the proper relative humidity and temperature for the next 15-20 years. The recommended replacement units are air-cooled, which will eliminate the need for glycol in the existing system and its associated maintenance and costs. The new units are also smarter and more efficient allowing greater integration with the building management system for alarming as well as tighter control of set points. We estimate the cost to replace these units to be $40,000 each for a total of $80,000.

The following is a list of additional recommendations that do not directly affect the occupants comfort but would reduce operational and maintenance costs. Some of these items can also be found in the issues log at the back of this report while others are general observations and recommendations.

- Enhance the existing building management system (BMS) by providing graphics for the floors and individual pieces of equipment. This will help in troubleshooting and monitoring the performance of the equipment and allow areas of complaints to be targeted and quickly addressed.
- Determine if chilled water is flowing through the hot water reheat loop and identify the failed valve or cross connection that is allowing this to happen. This will increase the plants efficiency, occupant comfort, and reduce the wear and tear on the pumps and chiller increasing their useful life.
- Adjust the occupancy schedule of the equipment to match the hours of operation of library. The equipment is programmed with optimum start, which will automatically start the equipment earlier than the occupancy schedule in order to meet the space set points prior to the building going into occupied mode. This is an advanced energy conservation program that learns how long it takes to bring the building to set point. By monitoring things like the outdoor air temperature and average space temperatures and the time it took to get to set point the program will adjust when it starts the equipment. By effectively reducing run time while maintain occupant comfort this will extend the useful life of the equipment and increase the overall energy efficiency of the building reducing operational costs.
- The boilers are non-condensing and approaching the end of their useful life. These could be replaced prematurely with a favorable payback by installing condensing type boilers. This would allow the building to reset hot water supply temperatures aggressively based on outdoor air temperature to provide great efficiency and reduced operational costs.
- Pending the results of the eddy current and oil test, we recommend having done on the chiller there is also some incentive to premature replacement. The current chiller operates with a full load efficiency of around 0.71kW/ton while today's chillers of this size and type operate at full load efficiencies of 0.53kW/ton or use 25% less electricity. They also have greater part load efficiencies that provide further operational savings.
- Conduct a full evaluation of all service and maintenance agreements to supplement the task list with additional preventive and predictive tasks. This is intended to increase the performance and reliability of the systems while reducing down time and unexpected repair costs.

End of Section