Date: 7/22/2021 **FT#: 21-237** **Technician: MC**

Project	**Guzman Hall Renovation** **Pre-Construction Survey of Chilled Water Pumps** **Mount St Mary College** **Newburgh, NY**
Architect	
Engineer	**McHugh Engineering Associates**
Prepared For	**Mount St Mary's College**

Address: 2421 Rt. 52 Hopewell Junction, NY 12533 - Tel: (845)265-2828 - Web: www.dlflowtech.com Email: info@dlflowtech.com

Date: **7/22/2021** **FT#:** **21-237** **Technician:** **MC**

Report Sections

FT# *21-237*

Certification
Guzman Hall Renovation
Pre-Construction Survey of Chilled Water Pumps
Mount St Mary College
Newburgh, NY

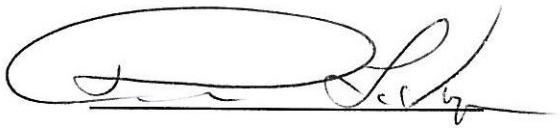
The data presented in this report is a record of the system performance and was obtained in accordance with the standards and procedures as outlined by the National Environmental Balancing Bureau and has been balanced to within the physical limits of the systems. Any variances from design quantities which exceed plus or minus ten percent of design, are noted through-out the attached report.

Submitted and Certified By:

dL flow tech

Registration # 2582

7/22/2021



Certified Professional: Dennis LaVopa

Date: 7/22/2021 **FT#: 21-237** **Technician: MC**

Established in 1982, dL Flow Tech, Inc is a independent Heating and Air Conditioning company specializing in HVAC system diagnostics, holding certifications from NEBB(National Environmental Balancing Bureau) , TABB (Testing Adjusting and Balancing Bureau) and IAQA (Indoor Air Quality Association) . dL Flow Tech is also affiliated wish SMACNA (Sheet Metal & Air Conditioning Contractors National Assn.) and ASHRAE (American Society of Heating, Refrigerating & Air Conditioning Engineers).

Our company offers the following services:

Air and Hydronic Testing and Balancing
HVAC System Survey
Retro-Commissioning
Sound and Vibration Measurement
Pipe Thickness Testing
Blower Door Testing
Duct Leakage Testing
Fire Damper Testing

For more information please visit www.dlflowtech.com or call 845-265-2828

Thank You,
The dL Flow Tech Staff

REPORT SUMMARY

July 22, 2021

FT #: 21-237

Project: MSMC Guzman Hall Chilled Water Survey

Our professional services have been performed and our findings obtained in accordance with customary principles in the engineering field. It should be noted that evaluations are inherently limited in the sense that conclusions are drawn from information obtained during dL Flow Tech's visit to the site. Balancing and testing has been performed as per the Procedural Standards set forth by the National Environmental Balancing Bureau (NEBB) to within the physical limits of the system testing. In NEBB's definition of a TAB report they note it "does not guarantee that systems included are balanced to design flows." This is noted to highlight the fact as a TAB contractor we do not perform testing and balancing services and guarantee it will work as intended, as we did not design it or install it. The dL Flow Tech, Co highly recommends that any commendations or suggestions noted in this report should be reviewed with your design professional.

Scope:

Provide a pre-construction survey on three pumps serving Guzman Hall.

Project Notes:

1. System is a dual temp. During the survey the system was in summer mode for cooling.
2. There is no system bypass, DP sensor or VFD on the pumps to control the water flow. As per MSMC personal the control valves in the space are 3 way valves.
3. In order to simulate a full flow scenario, all local thermostat temperature set points were decreased in order to get any control valves to open.
4. At this time it is unclear as to the condition of the control valves etc. in the space.
5. 1 Chiller provides chilled water for the system. There is full flow through the chiller at all times while in cooling mode.
6. 3 pumps are installed. Multiple tests were done with 1 pump running and 2 pumps running with 1 pump on standby for redundancy.
7. No pumps curves were provided. A full work up was performed on the pumps. 2 pumps were running when the work up was done. Water flow was determined by means of non-invasive ultra-sonic readings.

dL Flow Tech, Inc.

Pump Summary

Pump #	Service	Required GPM	Operating GPM	Remarks
CWP-11	Chilled Water	Not Available	***	
CWP-12	Chilled Water	Not Available	***	
CWP-13	Chilled Water	Not Available	***	

Pump Performance Data

Pump No	CWP-11
Manufacturer	Taco
Size	FI3009E2GAJ1LOA
Impeller	9.25
Service	Chilled Water

	GPM	FT HD	BHP
Design	**Not Available**	**Not Available**	**Not Available**
Valve Open	***	42	4.2
Discharge	39.36		
Suction	21.24		
dP	18.12	X 2.31 =	41.86

Pump Shut-off Head	GPM	FT HD	BHP
	0	49	2.9
Discharge	39		
Suction	17.9		
dP	21.1	X 2.31 =	48.74

Final	GPM	FT HD	BHP
	***	42	4.2
Discharge	39.36		
Suction	21.24		
dP	18.12	X 2.31 =	41.86
System Static Head	23 PSI		

Discharge Valve set @ Open

System dP Set Point None

Motor Mfg	Baldor
Frame	184T
HP	5
RPM	1750

	Design	Actual
Amps	13.2	11
Voltage / Phase	230/3	208/3

Remarks:

Refer to port sheet for actual water flows as no pump curves were provided.

2 pumps running

Pump Performance Data

Pump No	CWP-12
Manufacturer	Taco
Size	FI3009E2GAJ1LOA
Impeller	9.25
Service	Chilled Water

	GPM	FT HD	BHP
Design	**Not Available**	**Not Available**	**Not Available**
Valve Open	***	40	4.3
Discharge	40.83		
Suction	23.5		
dP	17.33	X 2.31 =	40.03

Pump Shut-off Head	GPM	FT HD	BHP
	0	46	3.2
Discharge	45.23		
Suction	25.19		
dP	20.04	X 2.31 =	46.29

Final	GPM	FT HD	BHP
	***	40	4.3
Discharge	40.83		
Suction	23.5		
dP	17.33	X 2.31 =	40.03
System Static Head	23 PSI		

Discharge Valve set @ Open

System dP Set Point None

Motor Mfg	Baldor
Frame	184T
HP	5
RPM	1750

	Design	Actual
Amps	13.2	11.3
Voltage / Phase	230/3	208/3

Remarks:

Refer to port sheet for actual water flows as no pump curves were provided.

2 Pumps running

Pump Performance Data

Pump No	CWP-13		
Manufacturer	Taco		
Size	FI3009E2GAJ1LOA		
Impeller	9.25		
Service	Chilled Water		
	GPM	**FT HD**	**BHP**
Design	**Not Available**	**Not Available**	**Not Available**
Valve Open	***	45	4.5
Discharge	38.01		
Suction	18.74		
dP	19.27	X 2.31 =	44.51
Pump Shut-off Head	**GPM**	**FT HD**	**BHP**
	0	46	3.2
Discharge	45		
Suction	25		
dP	20	X 2.31 =	46.20
Final	**GPM**	**FT HD**	**BHP**
	***	45	4.5
Discharge	38.01		
Suction	18.74		
dP	19.27	X 2.31 =	44.51
System Static Head	23 PSI		
Discharge Valve set @	Open		
System dP Set Point	None		

Motor Mfg	Baldor	
Frame	184T	
HP	5	
RPM	1750	
	Design	**Actual**
Amps	13.2	11.8
Voltage / Phase	230/3	208/3

Remarks:

Refer to port sheet for actual water flows as no pump curves were provided.

2 Pumps running

Ultrasonic Flow Test								
Location	**Pipe Size**	**Material**	**Schedule**	**Transducer Space**	**Design GPM**	**Actual FPS**	**Actual GPM**	**Remarks**
2 pumps running								
P-11 and P-13	5"	Steel Carbon	40	4.562"	Not Available	6.1	380	
P-11 and P-12	5"	Steel Carbon	40	4.562"	Not Available	5.9	371	
P-12 and P-13	5"	Steel Carbon	40	4.562"	Not Available	6	374	
1 Pump Running								
P-11	5"	Steel Carbon	40	4.562"	Not Available	4.8	301	
P-12	5"	Steel Carbon	40	4.562"	Not Available	4.7	296	
P-13	5"	Steel Carbon	40	4.562"	Not Available	5.0	314	

Code	Remarks
AS Reqt'd	Final airflow has been adjusted to suit requests of occupants
ABV CLG	Register (ETC) is located above ceiling line
BKN DPR	Volume Damper (VD), Face Damper (OPD), Splitter Damper (SD) is broken/stuck
CC	Ceiling conflict; kinked flex duct causing low flow
DD	Unit is direct drive; no adjustment can be made without a speed controller.
DD on HI	Direct drive fan set to High, medium (MED) or low (LO)
DT	Duct Traverse
DLF	DL Flow Tech Inc.
FACE	Velocity taken at the balance point
HDW MSG	Volume or splitter damper hardware is missing
Inline	Fan is an inline fan; Actual RPM can not be obtained
Long Flex	Flexible duct configuration and length is probable cause for low flow
Locked	No key available at time of balance
Max Flow	Maximum flow achievable
MAN OPN'D	Temporarily opened manually to set
New outlet	Outlet not shown on contract drawing; no CFM given; CFM assigned by DLF
Noisey	Register (ETC) has been set low to reduce objectionable air noise.
NPA	No provision to adjust; requires installation of volume damper / face damper
NI	Outlet not installed
NW	Device not working
TP	Test point location for duct traverse and/or static pressure
PT	Poor take -off / inlet flex to VAV box causing turbulence / probable cause for low flow
RAW	Raw opening -- Ductwork and collar is installed; register (etc.) is missing; tap is balanced high to compensate.
Set High	Set high due to missing register and/or to maintain total room flow (etc).
T'stat REV	The t'stat is reverse or opposite of design
T'stat LOC	T'stat not in area served
VD FO	Volume Dampers are in their maximum open position
VD FC	Volume Dampers are in their full closed position
VAV	Variable air volume box
CAV	Constant Volume Box
FPVAV	Fan powered variable air volume box
Register Types	
CD	Ceiling Diffuser
CR	Ceiling Register
EC	Egg Crate Type register
ER	Exhaust Register
FH	Fume Hood
LD	Linear Diffuser
LT	Light Troffer
WMS	Wire Mesh Screen
TR	Top Register
BR	Bottom Register
RAW	Raw opening
No CC	Flow metering device not installed, temp/pressure differential across elements used to determine flow.
Simulated flow	Where available pump or fan capacity is less than the total flow requirements, flow temporarily restricted to other parts.

TAB Equipment List dL Flow Tech NEBB CERT# 2582

FUNCTION	RANGE	MINIMUM ACCURACY	INSTRUMENT INFORMATION
Rotating Measurement	0 to 5000 RPM	+/- 2% of reading, +/- 2 RPM	Shimpo DT 207L
Temperature Measurement	Air: 40-140 Immersion: 40-140 Contact: 40-140	0.1 % + 1,4 degrees F (for all)	Make and Model: Shortridge ADM 860
Electrical Measurement	0 to 600 VAC 0 to 100 Amps	+/-2% +/-5 digits +/-2% +/- 5 digits	Make and Model: Fluke 323 Clamp On Meter
Air Pressure Measurement	0 to 10.00 in. w.g.	+/-2% +/- 0.0001 in. w.g.	Make and Model: Shortridge ADM 860
Air Velocity Measuring Rotating Vane	50-2500 FPM	+/-5% of reading	Make and Model: Testo
Humidity Measurement	10 - 90% RH	+/-3% RH	Make and Model: Extech RH390
Direct Reading Hood	100-2000 CFM	+/-5% of reading, +/- 5 cfm	Make and Model: Shortridge ADM 860
Pitot Tubes (2 required)	adequate length and width for intended use	N/A	
Hydronic Pressure Measuring	-30"hg - 60psi 0-100 psi 0-200 ps1	+/-2% of reading, +/- 1 psi +/-2% of reading, +/- 1 psi +/-2% of reading, +/- 1 psi	Shortridge HDM 250
Hydronic DP Measurement	0-100 in. W.G. 0-100 ft. W.G.	+/-2% of reading, +/- 2 in. w.g. +/-2% of reading, +/- 0.2 ft. w.g.	Shortridge HDM 250
Ultrasonic Flow Meter (Optional)	0.5" to 24" dia.	+/-1% of reading	Make and Model: Fuji FSCS

***All instrumentaion meets or exceeds NEBB Standards. Certificates are available upon request.*

Firm Certification

DL FLOW TECH, INC.

HAS MET ALL REQUIREMENTS FOR NEBB CERTIFIED STATUS IN THE FOLLOWING DISCIPLINE

Testing, Adjusting and Balancing of Environmental Systems

2582

NEBB Certification Number

March 31, 2022

Expiration Date

NEBB President

NEBB President-Elect