

Heat Exchanger Restoration (M&V): DENSO Manufacturing Facility



HVAC



Monitoring & Verification



Power Consumption



Flow



Energy Reduction

PERFORMANCE RESTORATION
DEEP CLEAN & RESTORE
EMPOWERING CLIENTS

Scope of Services

Biotechnik Environmental conducted a Heat Exchanger Restoration at the DENSO manufacturing facility in Guelph, Ontario. The goal of this Heat Exchanger Restoration was to improve the heat transfer between the Cooling Tower Water basin and the Process Cooling Water Loop.

To validate the results Biotechnik Environmental performed the following pre and post measurements:

- Power Consumption on Cooling Tower Pump
- Flow on Cooling Tower Loop
- Supply and Return Temperature on the Cooling Tower Loop
- Supply and Return Temperature on the Process Cooling Water Loop

The measurement equipment with the exception of the Power Consumption on the Cooling Tower Pump (which is permanent) remained in place for a period of one week pre and two weeks post restoration.

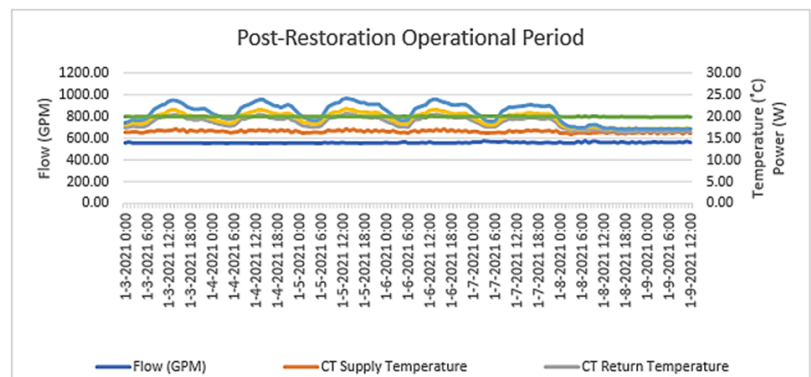
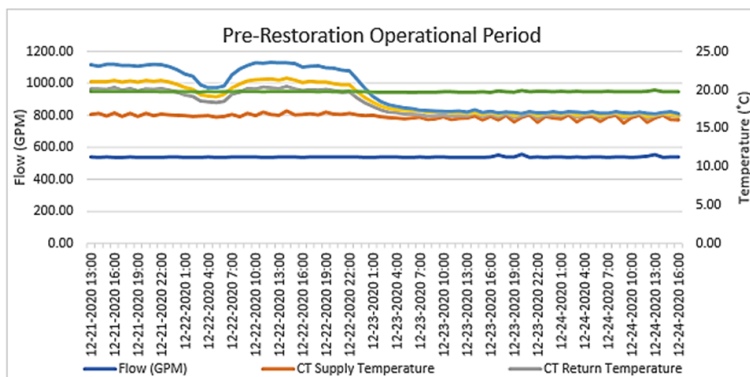
The measurement dates were as follows:

- Pre: December 22 - December 26, 2020
- Implementation: December 28, 2020
- Post: December 30, 2020 to January 10, 2021

Pre and Post Restoration Data

Pre-Restoration Data

The following details below demonstrate both the Pre and Post Measurement and Verification Data:





DENSO

Data Evaluation

The Heat Exchanger Restoration Performance was evaluated based on the analysis of the Temperature performance Pre And Post Restoration as well as the Flow and Temperature Differential performance between the Periods. Additionally, the average delivered Heating Capacity (MBTUh) was calculated for both Pre and Post Periods.

Cooling Tower Evaluation

Based on the data obtained from the Pre and Post Monitoring Periods there was a noted average increase on the Temperature Differential across the Heat Exchanger. This increase in conjunction with the increase in water flow post Restoration indicates that the System is able to deliver on average **41 kW (141 MBTUh)** more heat, resulting in a **10% improvement** in the heat available at the Heat Exchanger.

Process Cooling Water Loop Side Evaluation

Based on the data obtained from the Pre and Post Monitoring Periods there was a noted average increase on the Temperature Differential across the Heat Exchanger. In addition it was identified that the approach temperatures between the Cooling Tower Side and the Process Water Side were reduced, indicating an overall improvement on the efficiency of the Heat Exchanger.

Project STATS

**7%
IMPROVEMENT**
COOLING TOWER
LOOP TEMPERATURE

**3.2%
IMPROVEMENT**
COOLING TOWER
LOOP FLOW

**48%
IMPROVEMENT**
PROCESS WATER
LOOP TEMPERATURE

**7%
IMPROVEMENT**
HEAT EXCHANGER
TEMPERATURE

Average Heat Transfer (Based on Cooling Tower)							
Q=mCp*ΔT	m (m3/s)	Density (kg/m3)	Cp	ΔT	kW	BTUh	% (Diff)
Pre	0.0340	997	4.182	2.83	401.44	1369.78	10.32%
Post	0.0351	997	4.182	3.02	442.86	1511.08	41.41 kW

Post Restoration shows System able to deliver on avg. 41.41 kW (141.3 MBTUh) more heat

Summary

Based on the Pre and Post measurements and data above, it can be concluded that the BioScrub™ Heat Exchanger Restoration performed at DENSO in December 2020, was successful in improving the heat transfer between the Cooling Tower Water basin and the Process Cooling Water Loop. This improvement will have a positive impact on the overall operational performance of the System.

Contact us today to learn more!
1-855-634-3888 | Info@bioteknikenviro.com | Bioscrubefm.com

BioScrub™/MC
PERFORMANCE RESTORATION