

MNP TOWER: 1021 WEST HASTINGS STREET MECHANICAL SYSTEMS

PROJECT TEAM:

Owner:	Oxford Properties
General Contractor:	Ledcor Construction
Architect of Record:	MCM Partnership
Design Architect:	Kohn Pederson Fox Associates PC

MECHANICAL CONSTRUCTION TEAM:

Prime Mechanical Contractor:	Fred Welsh Ltd.
Consultant:	Cobalt Engineering/Integral Group
Sheet Metal:	York Sheet Metal
Controls:	Control Solutions Ltd
Fire Protection:	Gisborne Group

Mechanical Contract Value:	\$10,200,000.00
Project Duration:	2 ½ years
Total Man Hours:	80,000

MNP Tower at a Glance:

The MNP Tower is a 35 storey commercial tower of concrete and glass, built in a unique wave shape, covering 395,646 square feet. There are four levels of underground parkade connected through to existing Guinness Tower and the building is constructed on the last available site of downtown Vancouver's Harbour District. There is 1,196 square feet of retail space, 12,109 square feet of restaurant space, and 10,472 square feet of amenities. Typical floor plate ranges from 7,500 square feet to 8,000 square feet.

Mechanical Systems:

The building mechanical systems are comprised of: Variable Refrigerant Flow (VRF) system for heating and cooling throughout the building; split refrigeration units for the rooftop mechanical room, the back-of-house parkade areas, and also serving the double height entrance lobby; heat recovery ventilators to reclaim heat from exhaust air and bring in fresh air when needed; fluid cooler and condenser water system for additional tenant cooling; gas detection system in the parkade; carbon dioxide monitors on every tenant floor; exhaust fans for electrical room cooling and parkade transfer air/exhaust; low flow plumbing fixtures; domestic water system that is boosted by a Quad-plex skid mounted pump package (600 GPM & 452 ft of head); hot water tanks for tenant floor washrooms.

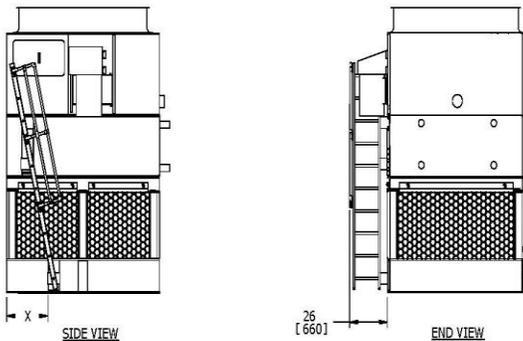
Technical Solutions for the building:

Mechanical Rooms

The unique exterior architecture of the building coupled with its prominent location next to the Marine Building (a designated Heritage Site) and in view of the cruise ship terminal meant that aesthetics was a necessity. To maintain the symmetry of the wave shape, each floor has a dedicated mechanical room that houses the condensing units for the floor VRF system, supply and return mains for condenser water system, domestic water risers, and main supply and exhaust ducting. This design also allows for each floor to have VRF components that essentially act as a separate system.

Variable Refrigerant Flow (VRF) System for Heating and Cooling

This system uses refrigerant as the heat transfer medium. Each floor has 16 fan coils and inside the dedicated floor mechanical room, two condensing units. There is a local thermostat controller for every FC unit. When a set point is reached and action is required, the thermostat sends information to the fan coil for the appropriate response. The system is capable of running in heating and cooling at the same time. This flexibility is courtesy of Electronic Expansion Valves (EEV) inside the fan coils, the condensing units, and the branch selector boxes. The EEV's have over 2000 settings and the CU's in the mechanical rooms function as both an evaporator and a condenser. The branch selector box is placed between each fan coil and its respective CU, which means that end users can call for heating or cooling within the same office space at the same time. There is a centralized controller on the 16th floor and in the water entry room on Lower Main. They work together to control and monitor the system. The system can also be controlled and accessed through the internet and BACnet, which is part of the DDC system.



Secondary Cooling: Fluid Cooler & Condenser Water System

There is a condenser water piping loop that runs from level 2 up to level 35 with cap-offs inside each mechanical room for additional tenant cooling as required. The condenser water loop carries heat away from the floors, up through the 200 ton (flow = 532 GPM) cooling tower on the roof of the building, where it is rejected out into the atmosphere. The condenser water flows through the coil section of the fluid cooler and the cooling components are staged to maintain condenser water set point: first the damper, second the water spray apparatus, third the fan. The fan is controlled by an external VSD and the whole system is modulated by the DDC.

Rooftop Fluid Cooler

Heat Recovery Ventilators (HRV's)

There are two HRV's on each floor located above the men's and women's washroom ceilings. When the floor is occupied, the supply/exhaust fans run continuously at low speed to maintain 800 CFM airflow through the entire floor space. The HRV's reclaim heat from the exhaust air of each floor and the supply air temperature is a function of the flat plate heat exchanger inside the unit. There are also two carbon dioxide sensors on each floor that monitor levels within the breathing zone. If CO₂ levels rise above 800PPM, the outside air damper on the relevant HRV will open to bring in fresh air until the CO₂ levels are reduced.



Inner Workings of Typical HRV Unit

LEED Contributions

MNP Tower is currently targeting LEED Gold Core and Shell. The mechanical systems and components that contribute to this process are: VRF system, condenser water secondary cooling, low flow plumbing fixtures with sensors, BTU meters for tenants, carbon dioxide sensors on each floor, heat recovery ventilators, low VOC mechanical materials used for service installation, fully integrated Direct Digital Control system.