Computerized Building-Management Control Systems for Plumbing

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Nowadays, most new buildings utilize a computerized building-management control system (BMCS). A BMCS centralizes monitoring, operations, and management to achieve more efficient building operation. It has evolved from a simple supervisory control method to a totally integrated computerized control system.

Direct digital control (DDC) is a similar system. *DDC* ordinarily refers to executing control of devices using electronic digital technology to the point of the controlled device. Digital inputs sense a discrete input (i.e., on/off). Digital inputs are isolated so that induced voltages do not damage the DDC controller. Some digital inputs may be able to accumulate pulse streams from devices such as power meters or flow meters. A relay used to start or stop a piece of equipment is an example of a digital output.

The use of digital controls and monitoring of plumbing equipment can save the owner money through lower maintenance costs, lower energy usage, fewer repair bills, and a reduction in the number of complaints. DDC also provides the building owner or manager with historical data on the system.

Building controls can do many things. Sensors can detect flow, temperature, deviation from set point, and pressure. Valves can open and close. There also are run-time accumulation and counters. Time-and-event programs are another option. Information from another source, such as plumbing systems, can be integrated in one of two ways:

- surface integration: a stand-alone system that provides point information to the BMCS
- in-depth integration: utilizes system-level controllers, which

Checklist

Items to Include in a Computerized Building-Management Control System

Equipment	Location	Items to Monitor
Acid neutralization basin	Exterior in pit	pH monitoring Remote alarm on failure High-water alarm
Air compressor	Mechanical penthouse	Air pressure (in psi) Dryer dew point Remote alarm
Booster pump	Panel in boiler room	Alarm annunciation Discharge pressure On/off status of each pump
Emergency shower and eye wash	Laboratory or point of use	Water-flow alarm Water temperature
Freeze protection cable	Point of use	Low-limit alarm set point Alarm annunciation
Fuel oil pump	Panel in boiler room	Alarm annunciation On/off status of each pump
Gas meter	Exterior at service entrance	Alarm annunciation (low gas pressure) Flow (in cfh)
Hot water temperature maintenance cable	One contact per floor	Alarm annunciation End-point supply temperature
Irrigation system	Boiler room	Water flow or meter (in gpm)
Oil tank and piping	Panel in boiler room Tank exterior on site	Alarm annunciation Spill, overflow Leak detection Presence of hydrocarbons
Pure-water equipment	Mechanical room	Alarm annunciation Resistivity monitor
Sump or Sewer pump	Exterior or point of use	High-water alarm On/off status of each pump Internal moisture-sensing probe and alarm
Vacuum pump	Mechanical penthouse	Vacuum Pressure (in in. of mercury) Remote alarm
Water heaters	First-floor boiler room	Probe (by BMCS contractor) to monitor water temperature Burner failure High-water temperature alarm
Water meter	Service entrance (boiler room)	Alarm annunciation (low gas pressure) Flow in gallons per day or cubic ft

communicate over a common bus for each subsystem.

Cost is a concern. A single monitoring point can cost $1,000. An average-size building can have 10 or more plumbing points to pick up, so they could add up to $10,000 in unanticipated project costs. Proper planning and design are essential.

For a noncritical, non-life-threatening system, BMCS is not mandatory or required by code. It falls instead under the heading of good engineering practice or good manufacturing practice for those in the process industry.

Typically, plumbing engineers don't specify or design these systems. However, they should communicate with the controls engineer to ensure that the plumbing equipment is monitored by a central system. The checklist can help you communicate what is required and avoid unnecessary costs. ■

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This article is meant to provide some basic guidelines. Always check all relevant codes and resources for a particular project.