



## BACnet Verification System Pre-Functional Checklist

Equipment ID	[Equipment ID]
Building	[Building]
Location	[Room]

### Statement of Readiness

The above equipment and/or systems integral to them are complete and ready for functional testing, except as noted. None of the outstanding items preclude safe and reliable functional tests being performed. This checklist does not take the place of the manufacturer's recommended checkout and startup procedures or report.

### Responsible Contractor Sign Here

CONTRACTOR	PRINTED NAME	SIGNATURE	DATE
General Contractor (GC)			
Mechanical Contractor (MC)			
Electrical Contractor (EC)			
TAB Contractor (TAB)			
Controls Contractor (CC)			

This statement of readiness has been received by the Commissioning Agent on \_\_\_\_\_ and will be incorporated as part of the final commissioning report.

### Equipment Information

System	Device Type	Location	Manufacturer	Model / number	Serial number
CDDCW	Computer				
	Monitor				
	Printer				
SOFTWARE	Network Protocol				
	CDDCW Operating System				
	CDDCW Applications				



System	Device Type	Location	Manufacturer	Model / number	Serial number
	Controller Applications				
	Graphics				
NETWORK	Gateway				
	Router				
	Bridge				
	Modem				
PNEUMATICS	Air compressor				
	Dryer				
	PRV				
CONTROLLER	AHU				
	Chiller				
	Heating				
UNITARY CONTROL	VAV				
	FCU				
GLOBAL DEVICES	Outside air temp sensor				
	OA humidity sensor				
	Power Surge suppressors				
	Phone line surge suppressors				



## System Readiness Checklist

Yes = Checked and Completed, N/A = Not Applicable

General Configuration and Installation					
Description	Yes	N/A	Initials	Date	Comments
Permanent labels affixed.	<input type="checkbox"/>	<input type="checkbox"/>			
Permanent mounting of all components is complete with wires run neatly.	<input type="checkbox"/>	<input type="checkbox"/>			
All wires are terminated and labeled.	<input type="checkbox"/>	<input type="checkbox"/>			
CPU cooling fan and heat sinks are operating and clean.	<input type="checkbox"/>	<input type="checkbox"/>			
Printers are tested and all ink supplies are filled.	<input type="checkbox"/>	<input type="checkbox"/>			
The paper tray is full and the printer is ready to print test results and all requested trend reports.	<input type="checkbox"/>	<input type="checkbox"/>			
All software is installed.	<input type="checkbox"/>	<input type="checkbox"/>			
All software is licensed to the government with an original loadable copy of the software and software license on sight or in a safe storage cabinet selected by the government.	<input type="checkbox"/>	<input type="checkbox"/>			
All graphic displays are created and loaded.	<input type="checkbox"/>	<input type="checkbox"/>			
All points specified to be linked to a graphic display have been associated to that display and appear when the graphic is selected.	<input type="checkbox"/>	<input type="checkbox"/>			
All points are labeled with a unique point descriptor.	<input type="checkbox"/>	<input type="checkbox"/>			
Specific Application parameters defined for all points.	<input type="checkbox"/>	<input type="checkbox"/>			
Power and lighting in place for component servicing and testing.	<input type="checkbox"/>	<input type="checkbox"/>			
Network Infrastructure operational.	<input type="checkbox"/>	<input type="checkbox"/>			
BACnet/IP (annex J) for Internet connectivity	<input type="checkbox"/>	<input type="checkbox"/>			
BACnet (Annex L) Standard devices for OWS, Building Controller, Advanced Application Controller, Application Specific Controller are provided (Annex L is Attached for reference).	<input type="checkbox"/>	<input type="checkbox"/>			
Server is rack-mounted in Ford House Office Building and can read/write to a floppy drive.	<input type="checkbox"/>	<input type="checkbox"/>			
Operator Work Station (OWS) including: Computer configured with sufficient speed and capacity to allow HVAC operations as described in the specifications and related printers, keyboard, mouse and display monitor to provide the required performance.	<input type="checkbox"/>	<input type="checkbox"/>			
Building Controllers programmed and operational.	<input type="checkbox"/>	<input type="checkbox"/>			
Advanced Application Controllers programmed and operational.	<input type="checkbox"/>	<input type="checkbox"/>			
Application Specific Controllers programmed and operational.	<input type="checkbox"/>	<input type="checkbox"/>			
Application and network software for all devices configured and operational.	<input type="checkbox"/>	<input type="checkbox"/>			
Operating software licenses and related source installation disks have been provided.	<input type="checkbox"/>	<input type="checkbox"/>			



### General Configuration and Installation

Description	Yes	N/A	Initials	Date	Comments
Final data files have been installed, debugged and backed up.	<input type="checkbox"/>	<input type="checkbox"/>			
Manufacturer's BACnet Protocol Implementation Conformance Statement Submitted (refer to ASHRAE standard 135, section 22).	<input type="checkbox"/>	<input type="checkbox"/>			
Notes:					

### Test and Balance

Description	Yes	N/A	Initials	Date	Comments
All system pressure and airflow Setpoints have been determined during the test and balance procedure per specifications.	<input type="checkbox"/>	<input type="checkbox"/>			
All calibration adjustments and set point values determined during the Test and Balance activity have been permanently loaded and saved to nonvolatile memory within this system (at each controller and backed up in a central OWS accessible and down loadable file)	<input type="checkbox"/>	<input type="checkbox"/>			
Notes:					

### Direct Digital Controls (DDC) System

Description	Yes	N/A	Initials	Date	Comments
All DDC panels controlling field equipment are connected to the system	<input type="checkbox"/>	<input type="checkbox"/>			
Each DDC controller has a local port for full access and programming.	<input type="checkbox"/>	<input type="checkbox"/>			
Portable computer with OWS software for direct connection and local configuration, interrogation, and control of field controllers has been provided.	<input type="checkbox"/>	<input type="checkbox"/>			
All analog and digital points such as temperature/pressure reading points, status & alarming points' have been labeled and graphically depicted using a unique nomenclature and representative graphics	<input type="checkbox"/>	<input type="checkbox"/>			
All temperature sensing points are calibrated and read correctly from sensor to graphic display of HVAC system at OWS.	<input type="checkbox"/>	<input type="checkbox"/>			
All temperature/pressure Setpoints have been set to the correct values as determined by the engineer or by the balancing contractor during balancing.	<input type="checkbox"/>	<input type="checkbox"/>			



Direct Digital Controls (DDC) System					
Description	Yes	N/A	Initials	Date	Comments
Current operating software and data base parameters are backed up at all levels of the DDC system. <b>This is critical, as power will be removed during verification testing.</b>	<input type="checkbox"/>	<input type="checkbox"/>			
All system failure alarms are programmed with a suitable alarm message sufficient to guide the operator to the appropriate action in the event the alarm is received	<input type="checkbox"/>	<input type="checkbox"/>			
Control device and panel labeling is complete	<input type="checkbox"/>	<input type="checkbox"/>			
Notes:					

Electrical					
Description	Yes	N/A	Initials	Date	Comments
Power is connected to a clean reliable power source including surge protection that is labeled.	<input type="checkbox"/>	<input type="checkbox"/>			
Power disconnects (Circuit breakers) in place and labeled.	<input type="checkbox"/>	<input type="checkbox"/>			
DDC panel controlling OWS and related OWS components are connected to <b>emergency power</b> . Panel number: _____	<input type="checkbox"/>	<input type="checkbox"/>			
All electrical connections (both power and data) are tight	<input type="checkbox"/>	<input type="checkbox"/>			
Proper grounding and polarity (power and data) installed for component and unit	<input type="checkbox"/>	<input type="checkbox"/>			
Notes:					

Final					
Description	Yes	N/A	Initials	Date	Comments
Inspect the interior of the controls enclosures for accumulation of dirt or indications of water. In the event that any of the surfaces are found to be unacceptable or contaminated, the surface(s) and related active products should be cleaned prior to Functional Performance Testing (FPT).	<input type="checkbox"/>	<input type="checkbox"/>			
The entire system is installed and the software revision dates are recorded.	<input type="checkbox"/>	<input type="checkbox"/>			
Notes:					



## ANNEX L - DESCRIPTIONS AND PROFILES OF STANDARDIZED BACnet DEVICES (NORMATIVE)

(This annex is part of this Standard and is required of its use.)

This annex provides descriptions of six "standardized" types of BACnet devices. Any device that implements all the required BACnet capabilities for a particular device type and interoperability area may claim to be a device of that particular type. Devices may also provide additional capabilities and shall indicate these capabilities in their PICS. The devices defined herein are: BACnet Operator Workstation, BACnet Building Controller, BACnet Advanced Application Controller, BACnet Application Specific Controller, BACnet Smart Actuator, and BACnet Smart Sensor.

### L.1 BACnet Operator Workstation (B-OWS)

The B-OWS is the operator's window into a BACnet system. While it is primarily used for the operation of a system, it may be used for configuration activities that are beyond the scope of this standard. It is not intended to perform direct digital control. It enables the specification of the following:

#### Data Sharing

- Ability to provide the values of any of its BACnet objects
- Archival storage of data
- Presentation of data (i.e., reports and graphics)
- Ability to monitor the value of all BACnet object types, including all required and optional properties
- Ability to modify setpoints and parameters

#### Alarm and Event Management

- Operator notification and presentation of event information
- Alarm acknowledgment by operators
- Alarm summarization
- Adjustment of alarm limits
- Adjustment of alarm routing

#### Scheduling

- Modification of schedules
- Display of the start and stop times (schedule) of scheduled devices

#### Trending

- Modification of the parameters of a trend log
- Display and archive of trend data

#### Device and Network Management

- Ability to respond to queries about its status
- Ability to respond to requests for information about any of its objects
- Display of information about the status of any device on the BACnet internetwork
- Display of information about any object in the BACnet internetwork
- Ability to silence a device on the network that is transmitting erroneous data
- Ability to synchronize the time in devices across the BACnet internetwork
- Ability to cause a remote device to reinitialize itself
- Ability to backup and restore the configuration of other devices
- Ability to command half-routers to establish and terminate connections
- Ability to query and change the configuration of half-routers and routers



## **L.2 BACnet Building Controller (B-BC)**

A B-BC is a general-purpose, field-programmable device capable of carrying out a variety of building automation and control tasks. It enables the specification of the following:

### **Data Sharing**

- Ability to provide the values of any of its BACnet objects
- Ability to retrieve the values of BACnet objects from other devices
- Ability to allow modification of some or all of its BACnet objects by another device
- Ability to modify some BACnet objects in other devices

### **Alarm and Event Management**

- Generation of alarm / event notifications and the ability to direct them to recipients
- Maintain a list of unacknowledged alarms / events
- Notifying other recipients that the acknowledgment has been received
- Adjustment of alarm / event parameters

### **Scheduling**

- Ability to schedule output actions, both in the local device and in other devices, both binary and analog, based on date and time

### **Trending**

- Collection and delivery of (time, value) pairs

### **Device and Network Management**

- Ability to respond to queries about its status
- Ability to respond to requests for information about any of its objects
- Ability to respond to communication control messages
- Ability to synchronize its internal clock upon request
- Ability to perform re-initialization upon request
- Ability to upload its configuration and allow it to be subsequently restored
- Ability to command half-routers to establish and terminate connections

## **L.3 BACnet Advanced Application Controller (B-AAC)**

A B-AAC is a control device with limited resources relative to a B-BC. It may be intended for specific applications and supports some degree of programmability.

### **Data Sharing**

- Ability to provide values for any of its BACnet objects upon request
- Ability to allow modification of some or all of its BACnet objects by another BACnet device

### **Alarm and Event Management**

- Generation of limited alarm and event notifications and the ability to direct them to recipients
- Tracking acknowledgments of alarms from human operators
- Adjustment of alarm parameters

### **Scheduling**

- Ability to schedule actions in the local device based on date and time

### **Trending**

- No requirement



#### Device and Network Management

- Ability to respond to queries about its status
- Ability to respond to requests for information about any of its objects
- Ability to respond to communication control messages
- Ability to synchronize its internal clock upon request
- Ability to perform re-initialization upon request

### **L.4 BACnet Application Specific Controller (B-ASC)**

A B-ASC is a controller with limited resources relative to a B-AAC. It is intended for use in a specific application and supports limited programmability. It enables specification of the following:

#### Data Sharing

- Ability to provide the values of any of its BACnet objects
- Ability to allow modification of some or all of its BACnet objects by another device

#### Alarm and Event Management

- No requirement

#### Scheduling

- No requirement

#### Trending

- No requirement

#### Device and Network Management

- Ability to respond to queries about its status
- Ability to respond to requests for information about any of its objects
- Ability to respond to communication control messages

### **L.5 BACnet Smart Actuator (B-SA)**

A B-SA is a simple control device with limited resources; it is intended for specific applications.

#### Data Sharing

- Ability to provide values for any of its BACnet objects upon request
- Ability to allow modification of some or all of its BACnet objects by another device

#### Alarm and Event Management

- No requirement

#### Scheduling

- No requirement

#### Trending

- No requirement

#### Device and Network Management

- No requirement





## L.6 BACnet Smart Sensor (B-SS)

A B-SS is a simple sensing device with very limited resources.

### Data Sharing

- Ability to provide values for any of its BACnet objects upon request

### Alarm and Event Management

- No requirement

### Scheduling

- No requirement

### Trending

- No requirement

### Device and Network Management

- No requirement

## L.7 Profiles of the Standard BACnet Devices

The following tables indicate which BIBBs must be supported by each device type for each interoperability area.

	B-OWS	B-BC	B-AAC	B-ASC	B-SA	B-SS
<b>Data Sharing</b>	DS-RP-A,B	DS-RP-A,B	DS-RP-B	DS-RP-B	DS-RP-B	DS-RP-B
	DS-RPM-A	DS-RPM-A,B	DS-RPM-B	DS-WP-B	DS-WP-B	
	DS-WP-A	DS-WP-A,B	DS-WP-B			
	DS-WPM-A	DS-WPM-B	DS-WPM-B			
		DS-COVU-A,B				

	B-OWS	B-BC	B-AAC	B-ASC	B-SA	B-SS
<b>Alarm &amp; Event Mgmt</b>	AE-N-A	AE-N-I-B	AE-N-I-B			
	AE-ACK-A	AE-ACK-B	AE-ACK-B			
	AE-INFO-A	AE-INFO-B	AE-INFO-B			
	AE-ESUM-A	AE-ESUM-B				

	B-OWS	B-BC	B-AAC	B-ASC	B-SA	B-SS
<b>Scheduling</b>	SCHED-A	SCHED-E-B	SCHED-I-B			

	B-OWS	B-BC	B-AAC	B-ASC	B-SA	B-SS
<b>Trending</b>	T-VMT-A	T-VMT-I-B				
	T-ATR-A	T-ATR-B				



	B-OWS	B-BC	B-AAC	B-ASC	B-SA	B-SS
Device &	DM-DDB-A,B	DM-DDB-A,B	DM-DDB-B	DM-DDB-B		
Network Mgmt	DM-DOB-A,B	DM-DOB-A,B	DM-DOB-B	DM-DOB-B		
	DM-DCC-A	DM-DCC-B	DM-DCC-B	DM-DCC-B		
	DM-TS-A	DM-TS-B or DM-UTC-B	DM-TS-B or DM-UTC-B			
	DM-UTC-A					
	DM-RD-A	DM-RD-B	DM-RD-B			
	DM-BR-A	DM-BR-B				
	NM-CE-A	NM-CE-A				

**Additional Comments:**