ADDENDA

ANSI/ASHRAE Addendum be to
ANSI/ASHRAE Standard 135-2016

BACnet™

A Data Communication Protocol for Building Automation and Control Networks

Approved by ASHRAE on June 15, 2018, and by the American National Standards Institute on June 15, 2018.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE® website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

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b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
d. permission to reprint portions of the Standard.

[This foreword and the "rationales" on the following pages are not part of this standard. They are merely informative and do not contain requirements necessary for conformance to the standard.]

FOREWORD

The purpose of this addendum is to present changes to ANSI/ASHRAE Standard 135-2016. These modifications are the result of change proposals made pursuant to the ASHRAE continuous maintenance procedures and of deliberations within Standing Standard Project Committee 135. The changes are summarized below.

135-2016*be*-1. Add Lighting BIBBs and Device Profiles, p. 3

In the following document, language to be added to existing clauses of ANSI/ASHRAE Standard 135-2016 is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. Where entirely new subclauses are added, plain type is used throughout.

The use of placeholders like X, Y, Z, X1, X2, etc., should not be interpreted as literal values of the final standard. These placeholders will be assigned actual numbers/letters only with incorporation of this addendum into the standard for republication.

135-2016*be*-1 Add Lighting BIBBs and Device Profiles

Rationale

With the addition of the Lighting Output and Binary Lighting Output object types, there is a need for lighting specific BIBBs and device profiles.

[Add new **Clauses K.1.X1 to K.1.X11**, p.1052]

K.1.X1 BIBB – Data Sharing-Lighting Output -A (DS-LO-A)

The A device modifies properties in Lighting Output, Binary Lighting Output, Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

BACnet Service	Initiate	Execute
WriteProperty	x	

Devices claiming conformance to DS-LO-A shall be able to write to the Present_Value property of the Lighting Output, Binary Lighting Output, Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

A device claiming support for DS-LO-A is interoperable with devices that support any combination of DS-LO-B, DS-BLO-B, or DS-WP-B in the case of Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

K.1.X2 BIBB – Data Sharing-Lighting Output Status-A (DS-LOS-A)

The A device reads properties in Lighting Output, Binary Lighting Output, Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

BACnet Service	Initiate	Execute
ReadProperty	x	

Devices claiming conformance to DS-LOS-A shall be able to read the Present_Value and Egress_Active properties of Lighting Output and Binary Lighting Output object types and to read the Present_Value property of Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

A device claiming support for DS-LOS-A is interoperable with devices that support any combination of DS-LO-B, DS-BLO-B, or DS-RP-B in the case of Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

K.1.X3 BIBB – Data Sharing-Advanced Lighting Output-A (DS-ALO-A)

The A device modifies properties in Lighting Output, Binary Lighting Output, Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

BACnet Service	Initiate	Execute
WriteProperty	x	

The A device shall be capable of modifying all of the standard properties of the Lighting Output, Binary Lighting Output, Channel, Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

A device claiming support for DS-ALO-A is interoperable with devices that support any combination of DS-LO-B, DS-BLO-B, DS-RP-B, or DS-WP-B in the case of Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, and Multi-State Value object types.

K.1.X4 BIBB - Data Sharing-Lighting Output-B (DS-LO-B)

The B device implements the Lighting Output object type.

BACnet Service	Initiate	Execute
ReadProperty		x
WriteProperty		x

Devices claiming conformance to DS-LO-B shall support the Lighting Output object type.

A device claiming support for DS-LO-B is interoperable with devices that support DS-LO-A or DS-ALO-A.

K.1.X5 BIBB - Data Sharing-Binary Lighting Output-B (DS-BLO-B)

The B device implements the Binary Lighting Output object type.

BACnet Service	Initiate	Execute
ReadProperty		x
WriteProperty		x

Devices claiming conformance to DS-BLO-B shall support the Binary Lighting Output object type.

A device claiming support for DS-BLO-B is interoperable with devices that support DS-LO-A or DS-ALO-A.

K.1.X6 BIBB – Device Management – Lighting Output Management-A (DM-LOM-A)

BACnet allows lighting object instances to be dynamically created and deleted. The A device shall be able to dynamically create and delete Lighting Output, Binary Lighting Output, and Channel object types supported by the B device.

BACnet Service	Initiate	Execute
CreateObject	x	
DeleteObject	x	

K.1.X7 BIBB - Data Sharing-Lighting View-A (DS-LV-A)

The A device retrieves values from a minimum set of lighting objects and properties and presents them to the user. Devices claiming conformance to this BIBB shall support DS-RP-A. The A device shall be capable of using ReadProperty to retrieve any of the properties listed below. The A device may use alternate services where support for execution of the alternate service is supported by the B device.

BACnet Service	Initiate	Execute
ReadProperty	x	

Devices claiming conformance to this BIBB shall be capable of reading and displaying the object properties listed in Table K-X1.

Table K-X1. Object Properties for Which Presentation Is Required

Lighting Output	**Binary Lighting Output**	**Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, Multi-State Value**	**Channel**
Object_Name Present_Value Tracking_Value Lighting_Command Status_Flags Blink_Warn_Enable Current_Command_Priority	Object_Name Present_Value Status_Flags Blink_Warn_Enable Current_Command_Priority	Object_Name Present_Value Status_Flags	Object_Name Present_Value Status_Flags

The format of a presented property value is unrestricted; the intent of this BIBB is not to impose how, or in what form, a device displays data values. For example, enumerated values could be displayed as icons, references could be displayed using the referenced object's name, and numerical values could be displayed graphically.

Actions taken by the A device when retrieval of a value for display fails are a local matter.

Devices claiming conformance to this BIBB are not required to support presentation of objects and properties that are introduced in a Protocol_Revision newer than that claimed by the A device.

A device claiming support for this BIBB is interoperable with devices that support DS-RP-B and one or more of the objects listed in Table K-X1.

K.1.X8 BIBB - Data Sharing-Lighting Advanced View-A (DS-LAV-A)

The A device retrieves property values and presents them to the user. The A device shall be capable of using ReadProperty to retrieve any standard property of any standard object type listed in Table K-1, excluding Averaging, Loop, Accumulator, and Pulse Converter objects, except for those properties listed in Table K-2 and any property defined by the standard as not readable via ReadProperty. Device A may use alternate services where support for execution of the alternate service is supported by Device B.

BACnet Service	Initiate	Execute
ReadProperty	x	

The information conveyed by the properties in Table K-2 can be otherwise determined and as such need not be read and presented by devices claiming conformance to this BIBB.

In order to ensure that products that claim support for this BIBB are capable of presenting accurate data values across the full range of values for each data type, devices claiming support for this BIBB shall be able to meet the requirements described in Table K-3. In addition, the device shall be able to present all valid values for fields of the Lighting_Command property. The format is unrestricted as long as each valid value is distinguishable.

For Character String property values, the A device shall be capable of presenting string values for specific BACnet properties with at least the number of characters, independent of their encoding, specified in Table K-4.

The above presentation requirements are not required to be applied in all circumstances, but rather shall be available for every property value in the system. This should allow a product to restrict its presentation under specific conditions yet still allow the user full access to any specific property value.

The A device shall be capable of reading and presenting all standard forms of the datatypes as defined per the A device's claimed Protocol_Revision.

Actions taken by the A device when retrieval of a value for display fails are a local matter.

Devices claiming conformance to this BIBB are not required to support presentation of objects and properties that are introduced in a Protocol_Revision newer than that claimed by the A device.

A device claiming support for this BIBB is interoperable with devices that support DS-RP-B and one or more of the objects listed in Table K-1.

K.1.X9 BIBB – Data Sharing-Lighting Modify-A (DS-LM-A)

The A device writes properties of standard objects that are generally expected to be adjusted during normal operation of the lighting system. Devices claiming support for this BIBB are not expected to be capable of fully configuring lighting controller BACnet devices, although they are not inherently restricted from doing so.

BACnet Service	Initiate	Execute
WriteProperty	x	

Devices claiming conformance to this BIBB shall be capable of commanding and relinquishing standard commandable properties at priority 8 (other priorities may also be supported) of those objects listed in Table K-X3 and writing the properties listed in Table K-X3.

Table K-X3. Standard Properties That DS-LM-A Devices Shall Be Capable of Writing

Lighting Output	**Binary Lighting Output**	**Analog Output, Analog Value, Binary Output, Binary Value, Multi-State Output, Multi-State Value**	**Channel**
Present_Value Lighting_Command	Present_Value	Present_Value	Present_Value

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in Table K-6. In addition, the device shall be able to manipulate all of the fields of the Lighting_Command property.

Devices claiming conformance to this BIBB are not required to support presentation and modification of objects and properties that are introduced in a Protocol_Revision newer than that claimed by the A device.

A device claiming support for this BIBB is interoperable with devices that support DS-WP-B and support one or more of the objects listed in Table K-X3.

K.1.X10 BIBB – Data Sharing-Lighting Advanced Modify-A (DS-LAM-A)

The A device is able to use WriteProperty to modify any standard property of object types listed in Tables K-5, excluding Averaging, Command, Program, Loop, Accumulator, Timer, and Pulse Converter objects, where the property is not required to be read-only, or to which access is otherwise restricted by the standard (e.g., Log_Buffer). The A device shall be capable of commanding and relinquishing standard commandable properties at any priority. The A device may use alternate services where support for execution of the alternate service is supported by the B device.

BACnet Service	Initiate	Execute
WriteProperty	x	

Devices claiming support for this BIBB shall be capable of writing values within the full range as defined in Table K-6. In addition, the device shall be able to manipulate all of the fields of the Lighting_Command property.

The A device shall be capable of writing all standard forms of the datatypes as defined per the A device's claimed Protocol_Revision.

Devices claiming conformance to this BIBB are not required to support presentation and modification of objects and properties that are introduced in a Protocol_Revision newer than that claimed by the A device.

A device claiming support for this BIBB is interoperable with devices that support DS-WP-B and support one or more of the objects listed in Table K-5.

[Change **Annex A**, p.775]
[Add new device profile checkboxes for lighting devices]

BACnet Standardized Device Profiles (Annex L):

☐ BACnet Cross-Domain Advanced Operator Workstation (B-XAWS)
☐ BACnet Advanced Operator Workstation (B-AWS)
☐ BACnet Operator Workstation (B-OWS)
☐ BACnet Operator Display (B-OD)
☐ *BACnet Advanced Lighting Workstation (B-ALWS)*
☐ *BACnet Lighting Operator Display (B-LOD)*
☐ BACnet Advanced Life Safety Workstation (B-ALSWS)
…
☐ BACnet Access Control Security Display (B-ACSD)
☐ *BACnet Advanced Lighting Control Station (B-ALCS)*
☐ *BACnet Lighting Control Station (B-LCS)*
☐ BACnet Building Controller (B-BC)
...
☐ BACnet Smart Sensor (B-SS)
☐ *BACnet Lighting Supervisor (B-LS)*
☐ *BACnet Lighting Device (B-LD)*
☐ BACnet Advanced Life Safety Controller (B-ALSC)
…

[Change **Annex L**, p. 1079]

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

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

This annex provides descriptions of "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.

BACnet device profiles are categorized into families:

- Operator Interfaces. This family is composed of B-XAWS, B-AWS, B-OWS, and B-OD.
- *Lighting Operator Interfaces. This family is composed of B-XAWS, B-ALWS, and B-LOD.*
- Life Safety Operator Interfaces. This family is composed of B-ALSWS, B-LSWS, and B-LSAP.
- Access Control Operator Interfaces. This family is composed of B-XAWS, B-AACWS, B-ACWS, and B-ACSD.
- *Lighting Control Stations. This family is composed of B-ALCS and B-LCS.*
- Controllers. This family is composed of B-BC, B-AAC, B-ASC, B-SA, and B-SS.
- *Lighting Controllers. This family is composed of B-LS and B-LD.*
- Life Safety Controllers. This family is composed of B-ALSC, and B-LSC.
- Access Control Controllers. This family is composed of B-AACC, and B-ACC.
- Miscellaneous. This family is composed of B-RTR, B-GW, B-BBMD, B-ACDC, and B-ACCR.

...

[Change **Clause L.1.1**, p. 1079]

L.1.1 BACnet Cross-Domain Advanced Workstation (B-XAWS)

The B-XAWS workstation is an advanced operator workstation for all building automation domains except life safety that includes the functionality of the following device profiles:

- B-AWS, see Clause L.1.2
- B-AACWS, see Clause L.3.1
- *B-ALWS, see Clause L.X.1*

[Insert new **Clause L.X**, p. 1081]

L.X Lighting Operator Interface Profiles

The following table indicates which BIBBs shall be supported by the device types of this family, for each interoperability area. The B-XAWS is not shown in this table. See Clause L.1.1.

Data Sharing

B-ALWS	**B-LOD**
DS-RP-A,B	DS-RP-A,B
DS-RPM-A	
DS-WP-A	DS-WP-A
DS-WPM-A	
DS-LAV-A	DS-LV-A
DS-LAM-A	DS-LM-A
DS-WG-A	DS-WG-A
DS-ALO-A	DS-ALO-A

Alarm & Event Management

B-ALWS	**B-LOD**
AE-N-A	
AE-ACK-A	
AE-AS-A	
AE-AVM-A	
AE-AVN-A	
AE-ELVM-A	

Scheduling

B-ALWS	**B-LOD**
SCHED-AVM-A	

Trending

B-ALWS	**B-LOD**
T-AVM-A	

Device & Network Management

B-ALWS	**B-LOD**
DM-DDB-A,B	DM-DDB-A,B
DM-ANM-A	
DM-ADM-A	
DM-DOB-B	DM-DOB-B
DM-DCC-A	
DM-MTS-A	
DM-OCD-A	
DM-RD-A	
DM-BR-A	

L.X.1 BACnet Advanced Lighting Workstation (B-ALWS)

The B-ALWS workstation is an advanced operator workstation with abilities to monitor, control, and configure lighting devices.

The B-ALWS profile enables the specification of the following:

Data Sharing
- Presentation of data (i.e., reports and graphics)
- Ability to monitor the value of BACnet objects relevant for lighting, including all required and optional properties
- Ability to modify lighting parameters
- Ability to create, delete, and configure Lighting Output, Binary Lighting Output, and Channel objects
- Ability to command lighting devices using WriteGroup
- Ability to configure advanced lighting parameters in lighting devices

Alarm and Event Management
- Operator notification and presentation of event information
- Alarm acknowledgment by operators
- Alarm summarization
- Adjustment of alarm limits and conditions
- Adjustment of alarm routing
- Ability to create, delete, and configure Event Enrollment, Notification Class, and Notification Forwarder objects
- Presentation and modification of Event Logs

Scheduling
- Modification of calendars and schedules
- Display of the start and stop times (schedule) of scheduled devices
- Display of calendars
- Creation and deletion of calendars and schedules

Trending
- Modification of the parameters of a Trend Log object
- Display of trend data
- Creation and deletion of new Trend Log objects

Device and Network Management
- Ability to find other BACnet devices
- Ability to find all objects in BACnet devices
- Ability to silence a device on the network that is transmitting erroneous data
- Ability to synchronize the time in devices across the BACnet internetwork at the request of the operator
- Ability to cause a remote device to reinitialize itself
- Ability to backup and restore the configuration of other devices

L.X.2 BACnet Lighting Operator Display (B-LOD)

The B-LOD is a basic operator interface with limited capabilities relative to a B-ALWS. The B-LOD profile could be used for wall-mounted display devices, simple web server gateways to BACnet lighting devices, displays affixed to BACnet devices; handheld terminals or other very simple control stations.

The B-LOD profile enables the specification of the following:

Data Sharing
- Presentation of basic data
- Ability to monitor the value of BACnet objects relevant for lighting
- Ability to modify lighting parameters
- Ability to command lighting devices using WriteGroup
- Ability to configure advanced lighting parameters in lighting devices

Alarm and Event Management
- No requirement

Scheduling
- No requirement

Trending
- No requirement

Device and Network Management
- Ability to find other BACnet devices
- Ability to choose among discovered BACnet devices
- Ability to find objects in other BACnet devices
- Ability to choose among discovered BACnet device’s objects

[Insert new **Clause L.Y**, p. 1086]

L.Y Lighting Control Station Profiles

The following table indicates which BIBBs shall be supported by the device types of this family, for each interoperability area.

Data Sharing

B-ALCS	**B-LCS**
DS-RP-A,B	DS-RP-B
DS-RPM-A	
DS-WP-A	DS-WP-A
DS-WPM-A	
DS-WG-A	
DS-ALO-A	DS-LO-A

Alarm & Event Management

B-ALCS	**B-LCS**

Scheduling

B-ALCS	**B-LCS**
SCHED-E-B	

Trending

B-ALCS	**B-LCS**

Device & Network Management

B-ALCS	**B-LCS**
DM-DDB-A,B	DM-DDB-A,B
DM-DOB-B	DM-DOB-B
DM-DCC-B	DM-DCC-B
DM-TS-B or DM-UTC-B	

L.Y.1 BACnet Advanced Lighting Control Station (B-ALCS)

A B-ALCS is any device that needs to interact with Lighting Output, Binary Lighting Output, and Channel objects in other devices for the purpose of monitoring and/or controlling them. B-ALCS devices are not Workstations and Operator Displays. Instead, they are more limited devices nonetheless used for configuration. Examples might include smart wall switches/dimmers, scene preset consoles, etc. B-ALCS devices differ from B-LCS devices in B-ALCS's ability to configure and command advanced lighting parameters in lighting devices.

Data Sharing
- Ability to monitor and command BACnet lighting devices
- Ability to provide the values of any of its BACnet objects
- Ability to command lighting devices using WriteGroup

Alarm and Event Management
- No requirement

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
- No requirement

Device and Network Management
- Ability to find other BACnet devices
- 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.Y.2 BACnet Lighting Control Station (B-LCS)

A B-LCS is any device that needs to interact with Lighting Output or Binary Lighting Output objects in other devices for the purpose of monitoring and/or controlling them. B-LCS devices are different from Workstations and Operator Displays in that their interactions with humans are more limited. Examples might include smart wall switches/dimmers, scene preset consoles, etc.

Data Sharing
- Ability to command BACnet lighting objects' Present_Value properties
- Ability to provide the values of any of its BACnet objects

Alarm and Event Management
- No requirement

Scheduling
- No requirement

Trending
- No requirement

Device and Network Management
- Ability to find other BACnet devices
- 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

[Insert new **Clause L.Z**, p. 1089]

L.Z Lighting Controller Profiles

The following table indicates which BIBBs shall be supported by the device types of this family, for each interoperability area.

Data Sharing

B-LS	**B-LD**
DS-RP-B	DS-RP-B
DS-WP-A,B	DS-WP-B
DS-WG-E-B	
DS-ALO-A	DS-BLO-B or DS-LO-B

Alarm & Event Management

B-LS	**B-LD**

Scheduling

B-LS	**B-LD**
SCHED-E-B	

Trending

B-LS	**B-LD**

Device & Network Management

B-LS	**B-LD**
DM-DDB-A,B	DM-DDB-B
DM-DOB-B	DM-DOB-B
DM-DCC-B	DM-DCC-B
DM-TS-B or DM-UTC-B	

L.Z.1 BACnet Lighting Supervisor (B-LS)

A B-LS is any device that implements Channel objects and optionally Lighting Output and/or Binary Lighting Output objects with the ability to forward channel writes to other BACnet devices.

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
- Ability to execute WriteGroup commands
- Ability to propagate Channel values to objects external to the device

Alarm and Event Management
- No requirement

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
- No requirement

Device and Network Management
- Ability to find other BACnet devices
- 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

L.Z.2 BACnet Lighting Device (B-LD)

A B-LD is any device that implements Binary Lighting Output and/or Lighting Output objects

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
- 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

[Add a new entry to **History of Revisions**, p. 1364]

(This History of Revisions is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard.)

HISTORY OF REVISIONS

…	…	**…**
1	20	**Addendum *be* to ANSI/ASHRAE 135-2016** Approved by ASHRAE on June 15, 2018; and by the American National Standards Institute on June 15, 2018. 1. Add Lighting BIBBs and Device Profiles

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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