University of Colorado at Boulder  
Control Guide Specifications  
Preface and Implementation Guidance to the Design Engineer

These Guide Specifications set forth guidelines to assist the designers of building mechanical systems in specifying and procuring the controls for those building systems. The intent of this document is not to require a “one-size-fits-all” solution because that is simply not in the best interest of UCB (University of Colorado at Boulder), nor is it a practical approach for procuring controls.

This document provides tools for the designer to specify the appropriate level of control system quality for reliable control.

Decision-making guidance to the design A/E is provided throughout these documents in the form of ‘Editor’s Notes’ so that the A/E may make prudent decisions and specify the most effective requirements for the system being installed and for those that have to use them. It is ultimately the designer’s job to assess the systems to be controlled and the environments in which they will be installed, commissioned, and operated and utilize the appropriate elements of this specification.

Edits to each specification section shall be performed in Microsoft Word (2007) software. All editing shall be performed using the ‘Track Changes’ options with all changes not accepted. This allows the Owner to review all changes proposed to the Master Documents.

These Guide Specifications apply the following principles to the control systems at UCB in the order they are presented:

- **Principle 1 – The control system must first and foremost provide effective and reliable control, commensurate with the systems it is controlling.** Obviously the types, complexities and the criticalities of the systems being controlled will dictate the quality/power of the control system that should be applied to them. The ultimate quality of the control system is primarily dictated by the components that sense, execute logic for, actuate, and document the systems they are controlling. These components are generally specified in Master Sections 15951 (BAS Basic Materials, Interface Devices, And Sensors), and 15953 (BAS Field Panels). This specification applies the concept of an “Application Category” for controllers whereby the performance requirements of the controllers are grouped into categories allowing UCB to apply these specifications to any vendor’s product line.

- **Principle 2 – The manufacturer and installer must be highly qualified with extensive experience and must be committed and bound to thorough Commissioning (Cx).** While the control system power/quality is very important, equally or more important is the expertise and commitment of the installing contractor and their collaboration with the overall commissioning team. Qualifications should insure that a quality contractor with an extensive proven track record is specified; and that effective, thorough commissioning of the control systems by that contractor – whether or not a formal Commissioning process is employed - is essential. Given this,
there lies a challenge to the designer to fairly restrict installers to those that can deliver effectively within the context of both the construction and the service/support arenas. To deal with this, Section 15950 (BAS – General) provides for qualifications of both the installer and manufacturers of the systems. Section 15959 (BAS Commissioning) dictates a high standard for the Commissioning of the system by the installer.

- **Principle 3 – The control installation must be fully documented as consistently as practical with nothing required to fully operate and maintain the system withheld from UCB.** The system must always be put in the context of how it will integrate with existing University systems and implemented and documented using standard approaches wherever possible. Programming logic, network configuration requirements, security information, etc. must be strictly adhered to and wholly documented. No element for the continued operation and maintenance of the control system may be withheld in any way. No part of the installation may be considered confidential or proprietary information. This specification requires applicable documentation throughout. These requirements are not optional; however, certain documents are only applicable for certain approaches.

- **Principal 4: Energy Management**

  Where these specifications are flexible in the selection of equipment and devices within the bounds of these documents, cost should not always be the primary decision maker. UCB is striving to provide more “green” solutions through their building automation systems. Existing pneumatic systems should not simply be repaired and maintained as part of a project when upgrading may yield a payback in energy savings. All aspects of this design should strive to incorporate USGBC (LEED) and ASHRAE (Advanced Energy Design Guide) principals where practical.
Conclusion:

Application of these Principles to a given project requires the designer to research/consider the project-specific environment and requirements and to edit this specification appropriately. The specific decision depends on a number of other important variables, including the specific HVAC control applications being served, the critical nature of the area or facility being served, the quality and capabilities of the local installer, and operator capabilities. Only those items listed in Blue Text are to be modified, all other items in the specification are to remain unchanged unless prior, explicit permission has been obtained by UCB. The designer is cautioned to apply or find the appropriate level of expertise to complete this specification - otherwise, the result could be a specification with inadequate and contradictory requirements that cannot be enforced.