

## SECTION 00 00 03

### DRAWING & SPECIFICATION STANDARDS

#### PART 1 REQUIREMENTS FOR DRAWING RECORD DOCUMENTS - REVIT, CAD & PDF FILES

##### 1.01 GENERAL INFORMATION

- A. Standards are required by Denver public Schools to ensure uniformity and clarity of the data submitted as final as-built record documents. It is not the intent to provide the drawing information necessary to reproduce plan sets, but rather migrate data from the projects to our internal systems. Upon completion of a project, the contractor, architect or designer will create a REVIT file with the standards described here. Also to include with the REVIT file, CAD file(s) and PDF file(s) formats that are required. Only the proposed and completed features are required to be submitted in final. The district recognizes this effort is an addition to the project burden, but the contractor, architect or designer can prepare plans to be used in construction in a manner in which they choose, these standards do not dictate any aspect for construction, only the final record documents.

##### 1.02 SOFTWARE REQUIREMENTS

- A. Denver Public Schools will provide guidance for consultants using REVIT, AutoCAD or other platforms.
  - 1. Note: The district recognizes that architects, consultants, contractors and designers may have custom routines, tools or plotting parameters. Please refrain from submitting any of these items. Keep the submittal to basic standards.
- B. Note: The district recognizes that contractors, architects, consultants, or designers may have custom routines, tools or plotting parameters and some may want to save some sort part of that but please refrain from submitting those and keep to basic standards.
- C. REVIT is the required software, but if REVIT is not available to the submitter, AutoCAD is the alternative required software.
- D. When converting from REVIT to AutoCAD please verify blocks have converted properly, and also any text, lines, polylines, etc.....
- E. The AutoCAD file format must be readable by the school district. (Those file formats can be verified, contact your DPS Project Manager or the Space Management Office)

##### 1.03 FILE FORMAT & NAMING

- A. The following requirements for file format and naming are as follows for REVIT, AutoCAD and PDF files.
  - 1. The primary drawing formats shall be REVIT 2017 and AutoCAD 2013 (currently).
  - 2. Also to be included are all drawings converted to a PDF format
- B. If the record documents are created using a program other than REVIT or AutoCAD, the contractor, architect, consultant or designer, must convert the file(s) to the REVIT 2017 [.rvt] and / or AutoCAD 2013 [.dwg] and ensure all data has been converted properly.
  - 1. \*\* REVIT drawings – All work shall be drawn in the required construction sets in architectural units
  - 2. \*\* AutoCAD drawings - All design work and annotations shall be drawn in model space with architectural units.

##### 1.04 FILE LABELING/TITLE BLOCK LABELING

- A. The following requirements for labeling all electronic files submitted for record documents shall be as indicated.
  - 1. Record documents from REVIT will have a record document file name as indicated by the school district and then the subsequent sheets will have individual labels vertical to the title block right edge.

2. The AutoCAD will have a record document file name as indicated by the school district and then the subsequent sheets will have individual labels vertical to the title block right edge.
3. PDF files shall be labeled to match the AutoCAD file record document.

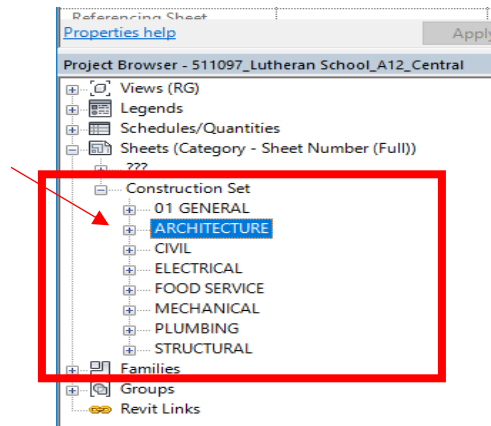
B. **REVIT** - .rvt file - The final submitted Record Document file shall be labeled as follows

- *Revit Model* file naming:

**Building/Property ID - Official Building/Property Name \_ Year \_ Project Type \_ DPS Project ID**  
**982-DELGADO-2012\_ADDITION\_REMODEL-8663**

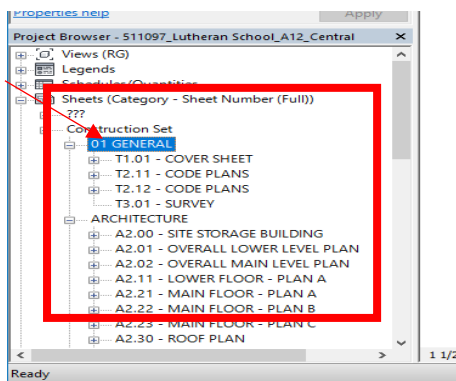
- *Sheets within Project Browser* (Discipline Designator)
  - Each discipline shall be designated as per construction set

- General
- Architectural
- Civil
- Electrical
- Fire Alarm
- Food Service
- Landscape
- Mechanical
- Plumbing
- Structural
- Survey
- Other



- Each sheet labeled with Sheet number and Title Block Description

*ex: A2.01 – Overall Lower Level Plan*



**Building/Property ID - DPS Parent Project ID \_ Project Type Code \_ Sheet ID**  
**458-8513-ME-E.01**

The list of DPS Project codes and their definitions and denotes the overall projects work. DPS is aware that due to the nature of individual projects not all submissions may fall into these codes, MS if provided for those needs.

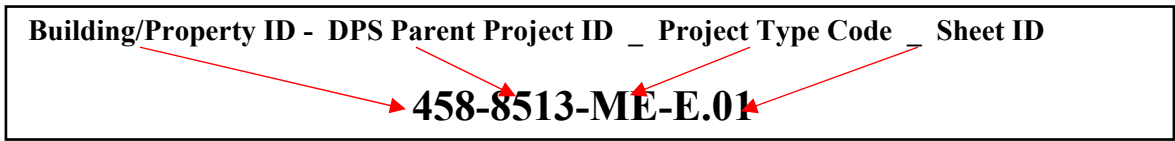
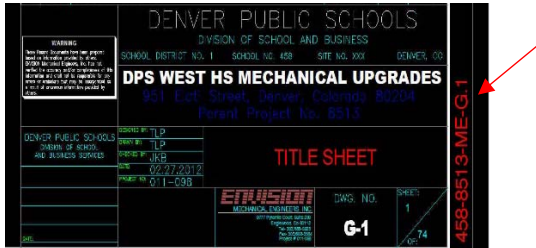
DPS PROJECT CODES	DEFINITION OF CODES
OR	ORIGINAL AS-BUILTS
AD	ADDITIONS
RVI	RENOVATIONS / INTERIOR (ex: finish improvements, updates w/no structural change)
RVE	RENOVATIONS / EXTERIOR
ARV	ADA RENOVATIONS
RI	REMODEL / INTERIOR (ex: physical, w/ structural changes; walls, etc.)
RE	REMODEL / EXTERIOR
HV	HVAC IMPROVEMENT/REPLACEMENT
ME	MECHANICAL IMPROVEMENT/REPLACEMENT
PL	PLUMBING IMPROVEMENT/REPLACEMENT
EL	ELECTRICAL IMPROVEMENT/REPLACEMENT
MEP	MORE THAN ONE IMPROVEMENT IS PRIMARY (HV, ME, PL, EL)
IRG	IRRIGATION IMPROVEMENT/REPLACEMENT
RF	ROOF IMPROVEMENT/REPLACEMENT/REPAIR
UT	UTILITY IMPROVEMENT/REPLACEMENT/REPAIR
SI	SITE IMPROVEMENTS (ex: Learning Landscape, Parking lots, etc...)
TO	TOPO – SITE SURVEYS
MOD	MODULAR BUILDINGS
COT	COTTAGE BUILDINGS
ST	EXTERNAL STORAGE BUILDINGS (NOT ATTACHED TO OR APART OF MAIN BLDG)
MS	MISCELLANEOUS SETS NOT DESIGNATED OR FALL INTO A PROJECT CODE
FDS	FIRE SUPPRESSION AND OR FIRE DETECTION
SGN	INTERIOR SIGNAGE (ROOM NUMBERING ONLY)
SOL	SOLAR PANELS
CELL	CELL TOWERS

The school district has a standard sheet id for the discipline; the discipline designators denote the major category of the data contained.

SHEET DISCIPLINE DESIGNATOR	DESCRIPTION
<b>T</b>	TITLE SHEET OR COVER SHEET
<b>G</b>	GENERAL NOTES / INDEX SHEET
<b>A</b>	ARCHITECTURAL
<b>C</b>	CIVIL
<b>E</b>	ELECTRICAL
<b>F</b>	FIRE SUPPRESSION / FIRE DETECTION
<b>FS</b>	FOOD SERVICES
<b>I</b>	IRRIGATION
<b>S</b>	STRUCTURAL
<b>L</b>	LANDSCAPE
<b>M</b>	MECHANICAL
<b>P</b>	PLUMBING
<b>R</b>	ROOFING

C. REVIT - .rvt file and AutoCAD - .dwg file

1. In addition, each sheet title block shall be labeled according to DPS Title Block Label for REVIT and AutoCAD. (Block is available upon request).
2. Additional Title block label for record drawings to include:
  - a) **Additional title block label** is required to be placed on the right edge of the title block. The label includes the building id, DPS parent project number, a DPS project code and the sheet number. Project codes are for overall project, only (1) one code used per project.



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<b>L</b>	LANDSCAPE
<b>M</b>	MECHANICAL
<b>P</b>	PLUMBING
<b>R</b>	ROOFING

- D. Leave three inch (3”) minimum empty space above title block for the documentation of changes and as-built notes and/or notations. All drawings produced at a scale to be legible at one-half reduction.

**1.05 DRAWING CONTENT**

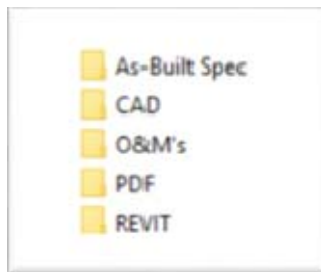
- A. Plan Drawings (All large or small scale Project Architectural, Mechanical, Electrical & Structural Plans, Detail Plans, Reflected Ceiling Plans, etc.) shall contain:
  - 1. North Arrow
    - a) If building is oriented other than true north; show True North and Reference North on all plans.
    - b) All references to compass directions in the documents (i.e. building elevations) are to be titled to refer to Reference North.
  - 2. Scale
  - 3. Graphic Scale
  - 4. Building Grid Lines
  - 5. Room Numbers
  - 6. Key Plan (if entire building is not represented on the sheet)
- B. Blocks and Symbols
  - 1. All blocks and symbols for data are stored within the drawing. DPS has a minimum set of standard district blocks, otherwise the district recognizes that contractors, architects, consultants, or designers have viable reasons for displaying data a certain way and the district is not requiring them to be displayed in a certain way as part of the standard.
- C. External References
  - 1. The district accepts external references as part of a plan set, but for submittals of record documents all XREFS are required to be merged, attached, bound, etc.... to a single CAD file and provided to the district upon final submittal.

D. PDF Files

1. A Copy of the Revit or AutoCAD Files shall be converted to a set of PDF files and submitted along with the record documents. If individual, the files shall be labeled as the DPS Title Block Label, if one file submitted, it shall be labeled as the AutoCAD record document file, and all individual sheets shall be labeled as the Revit or AutoCAD sheets. All PDF files are to be saved so that all the text/dawings are right side up.

E. Submission of Media

1. Files shall be received for as-built project in folders Labeled as follows on media submitted.



2. Disclaimer

These CAD Standards are in addition to other documentations, requirements, and standards that may exist. All record documents must adhere to the district checklists, closeout processes and standards. It is recognized that there remains existing documentation found within the districts standards that may conflict with this guide. All efforts have been made to resolve these instances of conflict, but the district does not guarantee that all discrepancies have been found and resolved.

## 1.06 ROOM NUMBERING STANDARD

- A. Room numbering plans shall be approved by the Space Management Office. All room number changes shall reflected on the Record Drawings and shall be included in close-out documents.
  1. Rooms shall be numbered in a logical sequence which will permit the building visitors to determine from room numbers that they are getting closer (or farther) from the desired room.
  2. Additions to existing buildings shall have rooms numbered to extend the existing room numbering scheme where possible. No changes to existing building room numbers are permitted without the approval of the Space Management Office.
  3. Room numbering shall match the fire alarm control panel and DFD (Denver Fire Department) door tags mounted on door frame above door as well as the DPS Master Drawings Standards.
  4. Rooms with more than one entry shall have DFD room sign at entries. Center sign on head of door frame.
- B. Verify room numbering in existing buildings prior to setting numbers for remodeling or additions.
- C. All rooms shall be numbered; all attempts shall be made to use the best scenario of keeping as many current numbers in place as possible. For new buildings, all number series shall be required to follow DPS numbering process.
- D. All numbering shall also meet Denver Fire's requirement that every exterior door shall be tagged (inside & outside), including all doors on the roof.
- E. All rooms to have individual numbers including:
  1. Corridors
  2. Mechanical Rooms
- F. Room numbers shall indicate the floor upon which the room is located. Floors shall be designated per IBC floor determination. Room number series shall be as follows:
  1. Basement – 000 series

2. Sub-Basement – 0000 series
  3. Garden Level – 00 series
  4. First Floor – 100 series
  5. Second Floor – 200 series and continuing
  6. Roof/Penthouses – Shall be numbered with one series above the floor immediately below (if above second floor; penthouses shall be numbered with 300 series).
  7. Mezzanines – Shall be consistent with primary floor series (ex: first floor mezz = 100 series).
  8. Rooms internal to other rooms such as walk-in closets, offices, etc. accessed from a room are numbered with the main room only number followed by an alpha character(s). (ex: main room 100 – has internal room(s) 100A, 100B both have an independent door). If a room is within an internal room it will use the internal room number followed by an alpha character (ex: internal room 101A – has a sub-internal room(s) 101AA).
  9. Storage rooms and/or closets not designed as a walk-in, do not need to be numbered unless required for location of fire detection or sensor.
  10. Modularity/Cottages – shall be numbered beginning with an even count number plus ten beyond the last number used on the first floor and stay sequential for all additional buildings. (Ex: First floor ends with 127 – modular #1 will start with 140 and ends with 146, modular #2 will start with 150).
- G. Wings shall not be numbered with prefixes except when approved by the Space Management Office.
- H. Numbering of rooms shall be planned to permit building additions at the end of wings to be constructed and numbered without changing original room numbers. Alternating room numbers on opposite sides of corridor are acceptable. Room numbering shall be required to stay in sequence; do not jump series of numbers to separate wings of floors, but if needed a number may be omitted. A number may only be used once per building, per floor, an internal or sub-internal room with an alpha character will make it the unique number being used once per floor.
- I. Stairways shall be designed with letters and designated the same on all floors accessed. Example: “Stair A the identification of a stairway shall be the same on ALL corresponding floors. (Ex: First floor “Stair A”, second floor “Stair A”).
- J. Corridors, lobbies and other spaces which are not generally identified with signage shall be assigned numbers and be numbered consistent with rooms. The main corridor or lobby shall start the corresponding series (Ex: main corridor first floor “100”, main corridor second floor “200”). Building support rooms accessed from corridors and hallways will be numbered accordingly to the corridor / hallway id (ex: Corridor 100 has a restroom, mechanical room, custodial closet, etc.... would be 100A, 100B, 100C, etc.... and sub-internal rooms to those rooms would be 100AA, 100AB, etc... if applicable).
- K. Room numbering plans shall be approved by the Space Management Office. All room number changes shall reflect on the record drawing drawings and shall be included in close-out documents.
- L. Deleted 04/21/17
- M. Square feet in each room (net area from interior face of walls).

## 1.07 REFERENCING

- A. Consecutively number all sheets (example: “M-2.1 sheet 23 of 45”).
- B. Number all drawings including plans, sections, and details so that any Drawing can be referenced by reference mark or note to other Drawings in the set.
- C. Provide reference marks or notes on Drawings to identify where sections and details were taken.
- D. Grid Lines:

1. Provide column lines referenced to the building structure
2. Column lines to appear on all Plan Drawings:
  - a) Project Architectural
  - b) Structural
  - c) Mechanical
  - d) Electrical
3. Reference exterior walls and/or major building offsets where column lines do not exist.

#### **1.08 PROJECT ARCHITECT COORDINATION**

- A. Coordinate format and content of Drawings:
  1. Consultant Coordination.
  2. Plan Orientation Coordination:
    - a) Same orientation for Project Architectural and Consultant Drawings.
    - b) Same orientation for large and small scale Drawings.
  3. Scale Coordination: Project Architectural, Mechanical and Electrical Floor Plans shall be drawn at the same scale(s).
  4. Project Architect to review drawings to eliminate vague “by others” notations and to assure that work is shown in the portion of the Drawings that the trade involved will be using most. (I.E. notes on mechanical drawings referred to “by Electrical” should be shown on electrical drawings.

#### **1.09 DRAWING REVIEWS**

- A. DPS will record comments for backchecking.
- B. Project Architect will return all “red-marked” drawings to the DPS no later than the time of the next review submittal and at delivery of bid ready documents.
- C. No variations from the approved drawing standards are allowed.
- D. Project Architect shall respond to all “red-marked” comments in writing indicating the comment was addressed.  
04/21/17

#### **1.10 BID-READY DRAWINGS**

- A. Label every sheet (above title block), “issue for bid and construction” with date of issue noted.
- B. All drawings to have same issue date.

### **PART 2 SPECIFIC DRAWING REQUIREMENTS:**

#### **2.01 ARCHITECTURAL:**

- A. Cover and Abbreviations/Notes sheet shall include:
  1. Project location map
  2. Building data
    - a) Floor areas, area separations, etc.
    - b) All code related information as required by Building Department
  3. Index to drawings
  4. Materials legend (purge any materials not used in the Drawings)
  5. Symbols legend including room and door numbering symbols
    - a) Standard symbols shall be used throughout drawings



- b) Include mech. and elec. symbols on the first sheet of their respective sections
- c) Purge any symbols not used in the Drawings
- 6. Name, address and phone number & fax number and point of contact of A/E and all Consultants.
- B. Site Plan(s) shall include:
  - 1. Soils test information:
    - a) Hole locations
    - b) Soils information which might affect the cost of construction
    - c) Statement that complete soils report is available for inspection at offices of Owner and A/E
  - 2. All existing underground utilities (Manholes to include rim, inlet and outlet invert elevations).
  - 3. Property lines
  - 4. Easements
  - 5. Adjacent streets
  - 6. Building location dimensioned from property line
  - 7. All site improvements
  - 8. Existing and new contours
  - 9. Grading plan(s) shall be separate from other site development plans
    - a) Elevation references (USGS datum or Denver Datum to Finish First Floor = (100'-0"))
    - b) Provide spot elevations at critical grade conditions such as "top of curb", "flow line", etc.

**2.02 SURVEY DRAWING:**

- A. DPS will provide a reproducible or electronic copy of the survey drawing for inclusion in the Construction Drawings. Label drawing "FOR INFORMATION ONLY".

**2.03 STRUCTURAL DRAWINGS:**

- A. SHEET S-1 (first structural sheet of set):
  - 1. General Notes:
  - 2. Along right side of sheet include in a General Notes block:
    - a) Design loads - List all design live loads used in structural calculations
    - b) Floor loads
    - c) Roof loads
    - d) Wind loads
    - e) Seismic zone
    - f) Any other pertinent design loads
  - 3. Material strengths - List strengths of structural materials used in design calculations
    - a) Concrete strengths
    - b) Reinforcing steel strengths
    - c) Structural steel strengths (and weld strengths)
    - d) Masonry mortar strengths
    - e) Other structural materials

4. Structural notes - include general structural notes on:

- a) Foundation systems
- b) Drilled piers
- c) Column
- d) Masonry bearing wall notes

5. Symbols Legend

**2.04 MECHANICAL DRAWINGS:**

A. SHEET M-1 (first mechanical sheet):

- 1. Mechanical Site Plan
- 2. Symbols Legend (purge any symbols not used in the Drawings)
- 3. General Mechanical Notes

B. Separate HVAC Plans from Plumbing Plans

C. Coordination:

- 1. Provide match-lines or other means to identify the continuation of mechanical piping and duct work between various partial plans.
- 2. Include column line reference numbers as shown on Project Architectural Drawings.
- 3. Show room numbers matching Project Architectural.

**2.05 PLUMBING DRAWINGS:**

A. Show all supply and waste lines including valves, cleanouts, shock absorbers, unions, etc.

B. Isometrics are required for:

- 1. Toilets
- 2. Kitchens

**2.06 HVAC DRAWINGS:**

A. Show all HVAC components including:

- 1. Registers & grills
- 2. Ductwork and devices including dampers, mixing boxes, fire dampers and other duct connected devices
- 3. HVAC piping

B. Air Handling equipment:

- 1. All HVAC equipment including boilers, condensers, chillers, etc.
- 2. Show sections and/or elevations at large air handling units.
- 3. Plans and sections through Boiler Rooms and other Mechanical Rooms.

**2.07 ELECTRICAL DRAWINGS:**

A. SHEET E-1 (first electrical sheet):

- 1. Electrical Site Plan
- 2. Symbols Legend (purge any symbols not used in the Drawings)
- 3. General Electrical Notes

B. Other Electrical

1. Separate Power Plans, Lighting Plans and Fire Alarm / Communications Plans
2. Coordination:
  - a) Provide match-lines or other means to identify the continuation of electrical piping between various partial plans.
  - b) Include column & grid line reference numbers as shown on Project Architectural Drawings.
  - c) Room Numbers as shown on Project Architectural Drawings.

**PART 3 GENERAL PROJECT MANUAL / SPECIFICATION GUIDELINES**

**3.01 GENERAL**

- A. All specifications shall be submitted during Design Reviews.
- B. All revisions made after the Construction Document Phase shall be clearly marked by bolding, underlining or other method to indicate all changes made including deletions and additions.

**3.02 FORMAT**

- A. Produce specifications on 8-1/2" x 11" sheets
- B. CSI Format
- C. Project Cover must exactly match the drawing's title block information. Cover format shall include:

PROJECT MANUAL  
for the construction of  
<project title>  
<SCHOOL NAME>

PARENT PROJECT NUMBER <0000>  
<school address>

DENVER PUBLIC SCHOOLS  
School District Number 1  
Denver, Colorado 80202

<date> (same as drawings)

<A/E NAME AND ADDRESS>

<set number>

**3.03 ORGANIZATION**

- A. Organize the Manual according to the index contained in the General Conditions of the Contract.
- B. Procedural and Contract Documents will be furnished by the District's Project Manager for inclusion in the Project Manual. Documents will include:

1. Advertisement for Bids
  2. DPS PROJECT MANAGER will furnish dates to be inserted in Advertisement.
  3. ARCHITECT will insert information.
  4. Instructions to Bidders
  5. Base Proposal
  6. Bid Bond
  7. Agreement
  8. Contractor's Performance Bond
  9. Notice to Proceed
  10. Notice of Contractor's Settlement
  11. General Conditions of the Contract
- C. Technical Specifications are to follow the Contract and Procedural Documents.
- D. Page Format to include specification section numbers and page numbers in the heading or footing of each page.

#### **3.04 REFERENCING**

- A. All references to recognized industry standards such as ASTM, National Bureau of Standards, Federal Specifications, etc. shall be identified by specific type, grade, class, year, etc.
- B. Where recognized national standards are used, the A/E shall make copies of such standards available to the DPS Project Manager and the Contractor.
- C. Individual specification sections shall contain numbers or other referencing devices in order to specify location of specific sub-paragraphs, subsections, etc.
- D. Nomenclature:
  1. Coordinate nomenclature between the various portions of the Specification.
  2. Eliminate references to "General Contractor", "Mechanical Contractor", "Subcontractor", etc. Use the term "Contractor" for all references to the entity performing the work.
  3. Where reference to a specific trade is required to produce proper results, use the term "Trade Contractor" or provide statements such as "by trade performing work under this section".

#### **3.05 PROJECT ARCHITECT COORDINATION**

- A. Coordinate Specifications with Drawings, Bid Form(s), General Conditions and other established Contract Document forms.
- B. General Conditions Modification
  - 1. All modifications to the General Conditions shall be made in the Supplemental General Conditions.
  - 2. All changes to the General Conditions shall be approved in writing by DPS.
- C. Supplemental General Conditions
  - 1. Prepared by Architect.
  - 2. Approved by DPS.

**3.06 SUBMITAL REQUIREMENTS**

- A. List all required submittals, testing requirements, spare parts, etc. in the same subsection of Part 1 of each specification section.
- B. Prepare a summary of all above requirements and compile them into a table to be inserted in appropriate section of Division 1.

**3.07 PRODUCT SPECIFICATION**

- A. Product Based Specification
  - 1. Two products minimum.
  - 2. Include as many critical performance-based criteria as possible.
  - 3. Include minimum information required for approval of equals.
- B. Performance Based Specification
  - 1. Specify critical characteristics only.
  - 2. Include (minimum) and (maximum) where appropriate.

**END OF SECTION 00 00 03**