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Please contact the [ESM CM/Nomenclature POC](#) for interpretation, variance, and upkeep issues.

## 200 ITEM NUMBERING AND LABELING

This Section contains the general requirements for identifying and labeling systems and the items within them.

### 1.0 APPLICABILITY

- A. This section and its related, subordinate sections (210, 220, and 230) apply to all item numbering and labeling at LANL, thus including facility, utility, environmental, and programmatic.<sup>1</sup> Exception: R&D items not subject to PD340, *Conduct of Engineering and Configuration Management for Facility Work* and that do not warrant identification per the Responsible Manager.<sup>2</sup>
1. A **Project Equipment List (PEL)** is defined and required by ESM Ch. 1 Section Z10. PELs are precursors (inputs) to the **Master Equipment List (MEL)** and shall include all items specified by a design and expected to be maintained by the operating facility; PELs must follow applicable Section 200 requirements (syntax, approved acronyms, data, etc.) so that PEL-to-MEL translation and upload to CMMS and operations is seamless.
  2. MEL development and maintenance is addressed by [AP-341-404 Master Equipment List](#) (internal). **Section 200 supersedes aspects of AP-341-404 where that document may conflict, especially its MEL entry field guidance (Att A) and input spreadsheet.**<sup>3</sup>
  3. *ESM Chapter 4 [Architectural](#) addresses Tech Area, building, and room identification and signage (wayfinding).*
- B. *These IDs are used on drawings, field labels, and in the computerized maintenance management system (CMMS).*

### 2.0 DEFINITIONS

<b>CMMS</b>	Computerized maintenance management system that includes the MEL and facilitates work, history-keeping, and other functions (e.g., AssetSuite v9 from Hitachi ABB Power Grids)
<b>FDAR</b>	Facility Design Authority Representative
<b>FOD</b>	Facility Operation Director (or Directorate); responsible for management of a portion of LANL including its maintenance program. Currently, five FODs manage the nine directorates. <a href="http://int.lanl.gov/services/facilities/fod.shtml">http://int.lanl.gov/services/facilities/fod.shtml</a>
<b>IDS</b>	Identification string, the system-subtype-sequence number ID string defined by this document and used for numbering and labelling. Formerly called CLI (component location identifier).

<sup>1</sup> Programmatic types are process, R&D, and tenant per Ch. 1 Section Z10.

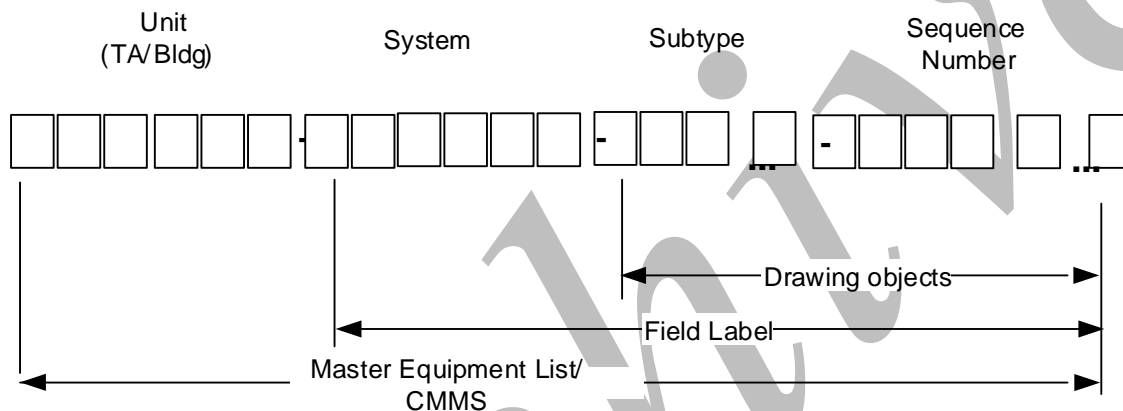
<sup>2</sup> Consistent item numbering and labeling supports safe operations across LANL by providing uniqueness and clarity (and is a key tenet of Conduct of Operations). This, in turn, allows capture in an MEL that controls other attributes such as management level for controlling risk. The MEL is the heart of the LANL computerized maintenance management system (CMMS) that can help management of preventive and corrective maintenance and the associated costs for same. Per [DOE-STD-1073 on CM](#): "Unique identifiers are important to support equipment and facility operations as well. See DOE O [422.1](#), *Conduct of Operations* [Component Labeling Attachment 2 Paragraph 2.r] and [DOE-STD-1044](#), *Guide to Good Practices for Equipment and Piping Labeling*, for additional discussion of equipment/component labeling."

<sup>3</sup> Per VAR-10424

<b>item</b>	CMMS captures “equipment” and their “components” differently; “item” is used herein to refer to both generically.
<b>MEL</b>	Master Equipment List, a subset of CMMS data used for configuration management of items including data for unique identification such as system and key attributes such as management level.
<b>TA</b>	Technical Area (e.g., TA-3)

### 3.0 IDENTIFICATION STRING (IDS) CONCEPT; KEY DATA FIELDS

- A. The item IDS is the key fields required for item identification. See Figure 200-1 for a depicting of the IDS in its simplest form and an illustration of how shortened versions appear outside of the CMMS database.<sup>4</sup>



**Figure 200-1 – Simplified Illustration of IDS Usage**

#### WARNINGS:

1. The above and all of Section 200 is the default, mandatory **syntax**; variations are possible only when specifically allowed (e.g., see Labelling/Tagging appendices).
2. **Names and acronyms** other than those in Sections 210 and 230 may only be created and used by written permission of the Chapter 1 Item Numbering/Labelling POC or listing delegates shown on the POC/Tech Committee page [here](#).

<sup>4</sup> In CMMS, labwide uniqueness is achieved by the entry of this IDS data along with other required fields such as Facility and Operating System (OpSys). As well as being implied by AssetSuite, the IDS concept is suggested by ASHRAE Guideline 4, *Preparation of Operating and Maintenance Documentation for Building Systems*. Also [DOE-STD-1073 on CM](#): “Unique identifiers that incorporate system designators, component type, and numbers, (e.g., SW-MOV-91) are more useful than strictly numeric identifiers (e.g., 135711317).” National standards such as IEEE 803.1 also support the concept (ref. Section 230).

- B. Brief explanation of Figure 200-1 code fields (Att. 1 covers these and others in detail):
1. **FOD** - Identification of the Facility Operations Directorate; 3 characters maximum (*e.g.*, *F01*). Only used in LANL's CMMS database, not on design documents or field labels. See listing at the end of this document.
  2. **UNIT** – A concatenation of the TA and Building; maximum of 6 characters. For example, TA-3, Building 410 would be 030410. This is used in CMMS and may be omitted from each item's identification in design documents and facility procedures if the TA and Building are identified on the document (*e.g.*, title block of drawing, header or title of procedure). *Utilities outside a building typically use 0000 for the building number; if no single TA use 990000 in CMMS.*
  3. **SYSTEM** - Identifies the system. Systems are defined as elements (subsystems, equipment, and any components) with physical or notional interconnection and collective purpose. System boundary setting direction is in Chapter 1 Section 220.  
*Note: Field tags may use System alone (preferred) or OpSys and System.*
  4. **EQUIPMENT or COMPONENT TYPE** -- A more general category of item, a six-character-maximum alphanumeric ID, controlled by Section 230. A required CMMS field, but normally not on label IDS. Example: VALVE. CMMS captures in the left-hand Equipment (or Component) field (the right-hand, unlabelled field used to capture the equipment ID).  
  
Equipment and Component note: CMMS supports a hierarchical relationship for items. When there is complex equipment for which associated component tracking is needed, such components may be entered as subrecords hooked to that equipment. Components of equipment should be added to the associated Equipment when information on them warrants capture, including when they need separate PMs/history or have a lower ML level. Components need not be directly connected. Examples are: (1) pressure gauge on a pump (equipment is the pump), (2) main drain valve on a sprinkler system (equipment is the trip valve), and (3) flow gauge for regenerating air on a desiccant air dryer (equipment is the air dryer). The Section 230 Type and Subtype name/acronym choice listings for equipment and their components are identical.
  5. **EQUIPMENT or COMPONENT SUBTYPE** – Allows for more-specific designation for an item than just Type. Subtype is a four-character-maximum alphanumeric ID. Choices controlled by Section 230. Example: VB for Valve, block.
  6. **SEQUENCE NUMBER:** See Appendix A.
- C. Grouping guidance, *e.g.*, fire protection:
1. In some cases, a single MEL entry for one fire protection sprinkler loop/segment/branch's sprinkler heads can be captured by a single entry for purposes of ML level and preventative maintenance task (PM) creation. The location description and name should be clear that it is multiple items. This concept might be applied to other items such as fire extinguishers or other non-fire items that are reasonably inspected as a lot based on a listing or geographical area.

#### 4.0 FORMS

FM01 CMMS Change Approval Form  
FM01 CMMS Change Approval Form Instructions

#### 5.0 ATTACHMENTS<sup>5</sup>

No.	Title	Purpose
1	CMMS Field Requirements	An extensive listing of CMMS MEL-related fields and their usage; this was formerly AP-341-404 Att A.
2	CMMS Upload Worksheet	A spreadsheet to capture key item attributes for manual or script-based uploads to the CMMS. This was formerly AP-341-404 Att. 1.
3	CMMS Parameters (Guidance)	A tabbed workbook of fields for capturing item details called parameters for several classes of item. These should be uploaded where practical; in addition, other documents may require their use (e.g., the Pressure Safety Program).

#### 6.0 APPENDICES<sup>6</sup>

Appendix A. Sequence Number  
Appendix B. Existing Facilities  
Appendix C. Labelling/Tagging  
Appendix D. Label Material, Attachment, and Other Matters

#### 7.0 RECORDS

Section 200 generates the following documents and records:

- CMMS Change Approval Form with CMMS Upload Worksheet and/or CMMS Parameters workbook

Control documents and records per P1020-2, Laboratory Document Control, and P1020-1, Laboratory Records Management.

#### 8.0 REVISION RECORD

Rev	Date	Description	POC	OIC
0	9/26/01	Initial issue as Chapter 1 Section 230, Component Nomenclature.	Tobin Oruch, <i>FWO-SEM</i>	Mitch Harris, <i>FWO-SEM</i>
1	5/22/02	Adopted acronyms used frequently at LANL historically.	Tobin Oruch, <i>FWO-SEM</i>	Kurt Beckman, <i>FWO-SEM</i>
2	11/18/02	Eliminated unused/hardly-used historical acronyms, added shop equipment, other IDs.	Tobin Oruch, <i>FWO-SEM</i>	Kurt Beckman, <i>FWO-SEM</i>

<sup>5</sup> Attachments may be revised independently of Section 200 proper by Standards Mgr approval.

<sup>6</sup> Chapter POC may allow minor variations from appendices in writing.

## Section 200 – Item Numbering and Labelling

Rev. 8, 01/28/21

3	2/9/04	Body: loop numbering guidance; converted appendices to atts and reordered; clarified acronym disciplines are typical, not binding; added/clarified several fire acronyms.	Tobin Oruch, <i>FWO-DO</i>	Gurinder Grewal, <i>FWO-DO</i>
4	8/16/04	Changed suggested CMMS/MEL use of IDs to reference FWO IFMP Procedure AP-MNT-10.	Tobin Oruch, <i>FWO-DO</i>	Gurinder Grewal, <i>FWO-DO</i>
5	5/18/05	This section split off from Section 230 which became Functional ID listings only. Organizational and URL changes.	Tobin Oruch, <i>ENG-CE</i>	Gurinder Grewal, <i>ENG-CE</i>
6	10/27/06	Organizational, URL, spec number changes.	Tobin Oruch, <i>CENG-OFF</i>	Kirk Christensen, <i>CENG-OFF</i>
7	6/16/08	Clarified existing facility use, added CLI term, addressed sequence number reuse, other minor clarifications.	Tobin Oruch, <i>CENG-OFF</i>	Kirk Christensen, <i>CENG-OFF</i>
8	1/28/21	Major revision to implement Opsys-Sys-Type-Subtype hierarchy (for MEL realignment to support Builder). Change in title. Creation of appendices covering labeling including material from TA55 desk instruction. VAR-10424 was issued simultaneously to enable new dictionary, upload file, and approval form to supersede those with AP-341-404.	Tobin Oruch, <i>ES-FE</i>	Jim Streit, <i>ES-DO</i>

## APPENDIX A SEQUENCE NUMBER

This is an alphanumeric code that ensures a unique identification string for each item. It is collected in the input worksheet (attached) and joined with Subtype using a hyphen in CMMS to form the Equipment (or Component) ID which is captured in the unlabeled fields to the right of Equipment or Component.

- A. As a minimum, the Sequence Number assignment shall be used to provide uniqueness within a System.<sup>7</sup>
- B. Only upper-case alpha characters and numbers should be used in the makeup of a Sequence Number. Other characters allowed are the hyphen (-), period (.), and ampersand (&). No other symbols should be used. Non-recommended symbols include the at (@), plus (+), the underscore symbol (\_), forward or back-slash symbols ( /, \ ), single or double quotes ( ' , " ), percent (%), brackets ( [ ] ), and parentheses [ ( ) ]. (Such symbols affect various software programs and can yield unexpected/unintended results).
- C. *Guidance: Sequence number flexibility can be employed in a number of ways. Ordinarily the Sequence Numbers are assigned beginning with 1, 01, 001, or 0001 (use of zeros is a formatting choice)—or letters (A, B...)—, and typically progress in ascending order (e.g., 1, 2, 3, etc.). Thus, VB-1, VB-2, etc.*
- D. *Guidance: For large systems that run throughout a building, a location identifier can be incorporated into the Sequence Number or elsewhere to ensure uniqueness and aid in locating (see Labelling/Tagging appendices that follow for examples).*
- E. Instrumentation Loop Numbering
  - 1) Beyond simply providing a unique item number, added intelligence shall be built into this field for instrumentation and this approach may be used for other applications. Instruments in a loop shall have the same sequence number. *For example, the primary element, transmitter, controller, and final control element for a control loop should all have the same number, e.g.: TE-102, TT-102, TIC-102, and TCV-102.*
  - 2) For loops with multiple items of the same type, add an upper case letter to the item number for each of the duplicate items. *For example, if there are three temperature elements, they would be TE-102A, TE-102B, and TE-102C.*
  - 3) *To avoid any duplication of the numbers in the master equipment list (MEL), the sequence number should be followed by a hyphen and the parent item designation if present. For example, a temperature element on HVA-1 could have a sequence number of 102A-HVA-1.*
  - 4) *When utilized in a P&ID drawing, the instrument bubbles should contain the Function ID and the first part of the sequence number excluding the subsystem designation, e.g.: TE-102A. Because the P&ID drawings are typically applicable to only one subsystem, the subsystem designation will be shown in the title block and is not needed in the instrument bubbles.*
  - 5) *When utilized in an instrument list applicable to multiple subsystems on a drawing, the subsystem designator can be attached with a hyphen or added in a separate column to ensure a unique instrument number.*

<sup>7</sup> Thus, there can only be one V-1 valve in a system, but an adjacent system could also have a V-1 (and tags have additional, distinguishing information). However, to avoid potential operator valving or other mix-up, facilities may choose to assign valve and instrument numbers from a single, sequential list—e.g., "1" and "101" and other numbers used only once.

6) *The recommended maximum number of characters for the main Sequence Number for instruments is four plus two for alpha subcodes so it fits in the P&ID bubble (e.g., 1002AB). Although not generally recommended, inclusion of System in the bubble may also be expected at some facilities (e.g., TA-55); verify when producing drawings.*

7) The LANL Engineering Standards I&C POC can grant variance to the I&C sequence number requirements above by email.

F. Electrical Suffixes. Use as follows:

- 1) Apply suffixes in ascending order, if more than one like item per structure.
- 2) Suffix the Sequence Number based on system voltage as follows (in existing facilities, coordinate the assignment of suffixes with the Engineering Manager)<sup>8</sup>:
  - a) With a number if the system voltage is in excess of 1000V (e.g., 13.8 kV). Example the third 13.8 kV motor-operated disconnect switch in a substation will be identified DMO-3.
  - b) With a letter if the system voltage is in excess of 250V but less than 1000V (e.g., 480Y/277V). Example: The second 480Y/277V power panelboard in a building will be identified PP-B.
  - c) With a number if the system voltage is 250V (e.g., 208Y/120V) or less. Example: The fourth 208V panelboard in a building will be identified PP-4.
- 3) Add suffix IG for isolated-ground panelboards. Example: LP-1-IG.

G. Other Suffix Guidance. A suffix may also be used as follows:

- Where associative coding is used to associate one or more similar items with a primary items. Ordinarily the suffix is an alpha character. An example of this might be a primary control relay fed by an array of secondary relays: the primary might be numbered 001 while the sub-relays are numbered 001A through 001Z.
- For certain power distribution items, it is allowable to show the alpha acronym as well the numerical device function number. For example, an AC circuit breaker Subtype might be "CBA," but it is also listed as a "52;" thus one could choose to include both in the identification code – e.g., CBA52-1.

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<sup>8</sup> This method of designating system voltage has generally been used at LANL for decades (not always consistently).



**APPENDIX B EXISTING FACILITIES**

- A. This appendix provides direction on existing item field, drawing, and procedure use of labelling. A MEL usage and data realignment in 2019/2020 resulted in CMMS data reflecting the current conventions shown in Section 200/210/230 circa the summer of 2020, and future data entry following same.<sup>9</sup>
1. Not an NCR: The Realignment resulted in MEL data not always being identical to all data appearing on existing field labels and in documents (e.g., drawings and procedures). This is not a nonconformance, and is generally not considered unsafe or problematic because the MEL and field item are linked by the MEL Equipment-Component Tag field which will sufficiently match (and if it does not, it should be made to match). Also, there is a second tag field in CMMS, the Eq-Comp **Alt**-Tag field that can and should be used to capture the new (post-realignment) ID string.<sup>10</sup>
- B. Modification projects: Because of the potential for confusion this appendix creates on how to label new items for an existing facility, design agency shall obtain concurrence on IDs from LANL system engineers and include them in the 30% design submittals (e.g., on P&IDs and/or in project equipment list).
- C. *Like-for-like Guidance: When items are replaced with a different model performing the same function, the IDS identification should not be changed.<sup>11</sup> Even a total upgrade project should retain the original Eq ID (or else people may think "Where is HVA-001? We need to keep it running.")*
1. *The MEL record history should indicate the reason the replacement occurred, e.g., failure, upgrade, etc. The new item record should include the new info (make/model/size, etc.) and address what was replaced.*
- D. *Uniqueness guidance: It may be necessary to add a system identifier to legacy convention labels in the field to obtain unique item identification and labels. Labeling is further addressed in Appendix C.*
- E. Moving toward Consistency
1. General: When multiple numbering and/or labeling conventions are in use in a facility, progression toward this institutional standard is desirable and shall be the goal.
  2. When field relabeling an entire system or modifying over 70% of an existing system's items,<sup>12</sup> current LANL standards shall be followed and MEL to match (drawings and procedures should be made to match over time).<sup>13</sup>

<sup>9</sup> The main effects of this realignment were, for all items:

- A two-tiered Opsystem/System hierarchy was imposed
- A two-tiered Type/Subtype hierarchy was imposed. Subtype choices are largely the previous "Functional ID" acronyms, but shortened to four characters when longer.
- Existing field tag information was captured in a CMMS for same.

<sup>10</sup> Tag info appears on work orders and therefore enables maintenance personnel to locate the affected item. The Equip-Comp ID field will generally match the tag as well. Location intelligence may precede or succeed the subtype depending on where captured (e.g., FGF-RM50-1 is in CMMS while RM50-FGF-1 appears on item's tag; see labeling examples appendix).

<sup>11</sup> Unless the System, Subtype, or other designator is model specific, or when transitioning to the new Type/Subtype schema introduced in Rev. 8 of this document.

<sup>12</sup> Fifty percent is a generally accepted threshold for system upgrade to current standards when modifying it; this has a basis in safety and cost effectiveness (ref IEBC Alt Level 3). Item identification relates to safety and cost effectiveness, though arguably less so; thus 70 percent was chosen. Requirement does not apply in rare cases where a facility was specifically allowed to deviate for unique functional reasons, not merely project inadvertent noncompliance. (E.g., TWF added bldg. no at the beginning of the IDS per VAR-2015-071 because of similarity of buildings and systems within and potential for mistakes).

<sup>13</sup> Alignment (exact matching) between drawings, MEL, labels, and other numbering usages is always ideal; however, except for the case of system relabeling, it is generally not cost effective to relabel to achieve greater alignment—so long as misalignment is not

3. Guidance on reaching consistency:
  - a. When modifying a system in a minor way (FDAR judgement on minor):
    - i. If nuclear procedures are NOT affected, THEN it makes more sense to revise field label and document nomenclature for the P&ID.
    - ii. If nuclear facility procedures ARE affected, perpetuating existing field label and document reference conventions is generally reasonable.
  - b. Also, if/when most/all of system's tech baseline documents are being updated, follow current ESM nomenclature/approach.
  - c. Any time a P&ID sheet is updated, it as well as all system field labels and CMMS should be made to conform to this Section.

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judged a safety risk by FOD or FDAR. The MEL includes a Tag field that must always match the actual field label; this allows documents to be correlated to field item.

**APPENDIX C LABELING/TAGGING**

- A. Item labels and tags shall contain the following minimum IDS data: System, Subtype, and Sequence Number. Additional data is allowed when addressed below or approved by Section 200 POC but generally not recommended; see below for approved examples.
- Exception: Where small tags are necessary due to congestion and preclude such detail (e.g., small, brass, sequence number-only valve tags on a manifold that is labelled with its system).<sup>14</sup>*
- B. *Description: Along with the above, tags/labels should also include a concise and meaningful verbal description of the function for the item being identified that correlates with the system and subtype on a separate line from IDS, assuming helpful. Examples: "XXXX Feed Pump" or "Bldg XXX Main Breaker."*
- C. Detailed label requirements exist in LANL Master Specifications [22 0554](#), Identification for Plumbing, HVAC, and Fire Piping and Equipment, 25 0553, Identification for BAS Electrical Systems, and [26 0553](#), Identification for Electrical Systems; ESM Chapter 7, Electrical; and [P315](#) Conduct of Operations Manual.
- Relevant requirements and guidance may be contained in [P101-19](#), Safety Signs, Labels, and Tag.
  - When an item is placed out of service, labeling to this document should remain; however, an "Out of Service" label/tag should be installed.<sup>15</sup>
- D. Identification rules and examples:  
CMMS fields for a hypothetical gas-fired furnace in TA-3-410:

**Typical CMMS Field Data:**

FOD	Unit	Opsys	System	Type	Subtype	(Seq. Num. <sup>16</sup> )	Eq. ID
F07	030410	VNT	HVAC	HTR	FGF	1	FGF-1

**CMMS Field Data with location intelligence in Eq. ID's sequence number portion:**

FOD	Unit	Opsys	System	Type	Subtype	(Seq. Num)	Eq. ID
Same as above example						RM50-1	FGF-RM50-1

**The ID string for above would be HVAC-FGF-RM50-1**

**Typical Tag on Furnace (TA/BLDG is optional for most facilities):**

03-410 HVAC-FGF-1 East Wing Furnace
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**Tag with location intelligence (note how location now precedes Subtype on label):**

03-410 HVAC-RM50-FGF-1 East Wing Furnace
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<sup>14</sup> Correlation with system and type is not a mandate for identical match, although that's always ideal.

<sup>15</sup> [FSD-315-00-001](#), Conduct of Operations Glossary of Terms and Acronyms, includes Out of Service. The shorthand "OOS" should only be used for logbooks and status boards where users are familiar with it.

<sup>16</sup> Sequence number is not a CMMS field, but appears in Eq. ID and Eq.-Comp Tag fields as a concatenation.

**HVAC P&ID diagram's furnace symbol label or bubble:**

FGF-1

**Another equipment CMMS and Tag Field example:**

OP. Sys.	System	Equip SubType	Equip ID	Comp. Type	Comp ID	Equip. Tag
VNT	HVAC	RUA	RUA-3	---	---	HVAC-RUA-3

**A component of the above:**

Same as above example	CDD	CDD-7	HVAC-CDD-7
-----------------------	-----	-------	------------

Equipment-Component association: Including the associated equipment info on a component's label may be helpful. Thus:

Same as above example	HVAC-RUA3-CDD-7
-----------------------	-----------------

Above, the hyphen normally in the Eq string is eliminated to reduce confusion on syntax when it is used as an association reference in the component tag string (thus RUA-3 becomes RUA3). Adding an Eq association is very similar to the addition of a location reference (described below) and is in that same position on the tag.

E. Locational Intelligence in Item ID and/or Tag  
 FDARs sometimes build detailed location-based intelligence into their IDS nomenclature and tagging conventions; this is allowed where described herein and likely to be required for future work there; it may be employed elsewhere with notification to Section 200 POC. The purposes of these variants are (1) to identify where to find something, and (2) in some cases, to make the IDS unique. The "Location ID" is a LANL construct that is not the from 3+8+6 character "Location" field in CMMS, nor necessarily the 65-character Location Description CMMS field data, nor necessarily the "Area" field data. See below for usage conventions.

**Locational Intelligence at TA-55 (FOD 1 and RLUOB); Elsewhere with POC Notification****Syntax: System–Location ID–Eq/Comp SubType–Sequence Number**

Acro	Meaning	Location Usage Example in Item Tag Field
B	basement	B-#, where # is nearest numbered structural basement column
---	building	HVAC-0410-FE-001, HVAC-410-FE-001, or HVAC-PF4-FE-001, where 0410, 410, or PF4 is the building number indication
GB	glovebox	AR-GB147-V-1, where GB147 is used in Equipment field together with Subtype and Sequence Number to identify an argon valve by associated glovebox
XB	transfer box	similar to GB
DB	drop box	similar to GB
RM	room	AR-RM117-V1, where 117 is the room and V1 is first isolation valve from floor penetration
TB	tank bank	AR-TB2-V1, where TB2 is Tank Bank 2

## F. Gas Cylinders versus “House” Gas: Boundaries and Labelling Guidance

When a facility has both “house” gas and standalone cylinders of the same gas:

1. For cylinders and downstream gas items serving only one system, make them part of the using system and the IDS reflect that. For example, for a nitrogen PCV valve fed by standalone N2 cylinders, the using/owning system is in the beginning of the tag string (normal practice) and the gas acronym is included later as part of the sequence number: SOLA-PCV-N2-1.
2. For gases fed from (and thus belonging to) the house N2 system, the label would lead with that system as normal (e.g., N2-PCV-1).

## APPENDIX D. LABEL MATERIAL, ATTACHMENT, AND OTHER MATTERS

### 1.0 Labels

The LANL Responsible Engineer (RE) is responsible for designating piping, valves, and equipment/components to be labeled and to ensure that labels and fonts are sized appropriately so that they can be easily viewed from a normal viewing distance. The RE is responsible for providing guidance of label placement so that the labels can be easily read without manipulation. *Text size will be dependent on the number of characters and the size of label required.*

Deviations: Deviation from this appendix, including label materials, labeling methods, and pipe markers/arrow tape, may be made with the documented approval of the ESM Ch. 1 POC.

#### 1.1 Label Materials

Labels shall be made from

1. material per the LANL ESM and STD-342-200, *LANL Master Specifications*;
2. microsurfaced ABS (acrylonitrile butadiene styrene) impact acrylic with engraved letters; or
3. metal-coated plastic with engraved letters. Dual-finish Gravostrat™ material from Gravotech has been used but other materials may be used.

Temporary labels may be made of paper (additional direction follows later).

#### 1.2 Labeling Method

At the discretion of the RE, labels shall be attached with:

- methods in the LANL ESM and STD-342-200, *LANL Master Specifications*;
- stainless steel beaded chain and couplings/connectors;
- stainless steel swaged wire cable;
- stainless steel or brass jack chain (single or double);
- Kynar cable ties for use in corrosive environments (typically inside gloveboxes) only; cable ties are also known as zip ties, tie wraps, and hose ties; or
- double-sided sticky tape or foam to attach to equipment/component surfaces.

#### 1.3 Pipe Markers/Arrow Tape

Pipe markers/arrow tape may be used following methods in the LANL ESM and STD-342-200, *LANL Master Specifications*.

Other types of pipe markers/arrow tape may be used with the documented approval of the ESM Mechanical POC.

### 2.0 Labeling Requirements

*Each label should be placed in a highly visible (conspicuous) location so that the person viewing the label does not have to turn it. In addition, the label should not cover existing labels (including etching, paper labels, criticality postings, mass location labels, etc.).*

#### 2.1 Pipe Labels

Pipe labeling is required for the following as a minimum:

- Safety-class and safety-significant SSCs
- Piping systems containing hazardous materials (e.g., acids/bases, poisonous or suffocating gases)
- Systems with pressure above 50 psig, regardless of material contained and including portable systems

Pressure safety equipment shall also be labeled per ESM Chapter 17 and P101-34.

**Step Description**

1. Follow the color and nomenclature of the ESM Mechanical specifications as closely as possible. Discuss variations with the RE.
2. Place the labels at intervals of not more than approximately 20 feet of horizontal or vertical runs; at each branch connection; and where the pipe penetrates walls, ceilings, and floors. Discretion may be used as long as confusion from more or fewer labels will not result.
3. Place the labels axially on the pipe (except as noted in Step 4).
  - If flow is unidirectional, place an arrow decal showing the direction of flow by each identification label.
4. Mark small piping or tubing with a tag at the prescribed intervals where it is not practical to attach a label axially on the pipe or tubing. Use the type of tag provided for valves.

**2.2 Valve Labels**

The minimum requirements for valve labeling are as follows:

- Valves that are required to be in a locked or throttled position, including those located inside a glovebox
- Valves that are routinely operated in accordance with an approved procedure, including those located inside a glovebox

The RE is responsible to ensure that valve labels follow the format listed below.

Pressure safety equipment shall also be labeled per ESM Chapter 17 and P101-34.

**Step Description**

1. The valve label shall consist of four parts:
  - The service abbreviation identifying the system
  - TA55, RLW, only: The floor penetration number, room number, or a glovebox number (if the valve is associated with a glovebox)
  - The letter V, denoting valve
  - A unique number

**NOTE:** Consult with the RE for an appropriate abbreviation from this standard.

2. It is preferred that a piping distribution system entering a room starts with the number "1." In these cases, the first valve encountered from the pipe's entry into the room is numbered 1; other valves are numbered sequentially from there. If the first valve entering a room is not numbered 1, the valves should be sequentially numbered with the first valve starting the sequence, if possible/available.  
Where distribution piping branches to service that is associated with a single glovebox, Step 3 applies.
3. For branches going to specific gloveboxes, valves are numbered from the glovebox to a point where the line combines with other piping, therefore losing its glovebox specificity. It is preferred that these valves are numbered starting with 1 from the glovebox out. Valves on subsequent penetrations should begin at the next available number, with the lowest number closest to the glovebox.  
Example:
  - A valve in an argon line going into GB-147 (closest valve to the GB) in Room 113 is labeled AR-GB147-V1.
  - If a second valve existed in the same pipe between the first valve and the argon supply header, it is labeled AR-GB147-V2.
  - If positive-pressure circulating chilled water is also supplied to the same glovebox, the supply isolation valve nearest the glovebox is labeled PPCCWS-GB147-V1.
  - The return line isolation valve nearest the glovebox is labeled PPCCWR – GB147-V1 (note the S and R differentiate supply and return).



4. Other valves in the room not associated with a specific glovebox are labeled as follows at TA55 and RLW:

**[System acronym]-RM#-V[Sequential #]**

Examples:

- The argon supply pipe enters Room 117 and has an isolation valve near the floor penetration. That valve is labeled AR-RM117-V1.
- The next valve in that pipe is labeled AR-RM117-V2, and so on.
- The first positive-pressure, circulating chilled water (PPCCW) supply piping valve, from its entry into the room, is labeled PPCCWS-RM117-V1.
- The first return valve from where the pipe enters the room is labeled PPCCWR-RM117-V1.

### 2.3 Equipment/Component Labels

The minimum requirements for equipment/component labeling are as follows:

- Equipment/components associated with safety class, safety-significant systems that would significantly affect the system function of the SS SSC and/or the SC SSC. Additionally, other facility equipment that should be labeled may be designated by the RE, design engineer, engineering manager, etc. These equipment/components include, but are not limited to, gloveboxes, support stands, pressure transducers, temperature transmitters/elements, flexible hoses (bellows), pumps, pressure indicators, etc.
- Equipment/components requiring maintenance
- Pressure safety equipment shall also be labeled per ESM Chapter 17.

### Step Description

1. Obtain a copy (typically from Design Engineering) of a relevant system drawing (e.g., system equipment drawing, P&ID, etc.).
2. If a relevant drawing does not exist, the RE:
  - performs a walkdown of the system,
  - sketches a relevant system drawing, and
  - assigns current nomenclature/labeling convention (the labeling coordinator may assist with this convention).
3. For large systems, it is appropriate to maintain the legacy labeling format that is currently implemented. The glovebox system is an example of a large system that will maintain the legacy labeling format, examples being:
  - For Glovebox 259, the legacy labeling format would be GB-259.
  - Transfer Boxes (XB) and Drop Boxes (DB) will follow suit.
4. Other equipment/components are labeled using the outline in Step 1. Examples:
  - Label the support stand associated with Glovebox 567 with a label that reads:  
– SPRTC-SPRT-GB567
  - The pressure differential indicator associated with GB-1068 would have the label GB-GB1068-PDI1.
  - The pressure control valve on the argon line associated with GB-1069 would have the label AR-GB1069-PCV1.
  - The filter on the argon line associated with OF-1148 would have the label AR-OF1148-FLT1.
  - The flow-indicating control on the compressed air line associated with FH-1050 would have the label CA-FH1050-FIC1.



### 3.0 Labeling Requests (TA55 and RLW follow this; others follow local direction. Superseded if/when addressed by a more-recent AP-341-404).

#### 3.1 Permanent Labels

The process to obtain permanent labels is below. *The requester is typically the RE but may be anyone who needs the system labeled.*

##### Step Description

1. The requester obtains a Label Request Form from Documentum (TA55-DI-014-FM2 or successor).
2. The requester fills out the Label Request Form using information consistent with facility procedures (including this DI), equipment alignment sheets, and P&IDs. Submit multiple labels on an Excel Spreadsheet accompanied by the Label Request Form. Request support from the RE, as needed.
3. If multiple labels need to be created, a single Label Request Form may be filled out and an Excel spreadsheet file may be submitted to the label coordinator.
4. The requester submits the Label Request Form (and Excel Spreadsheet if applicable) to the label coordinator.
5. The label coordinator reviews the request to ensure that it is compliant with the applicable standards (including this DI). If the requester is not the RE, the label coordinator notifies the appropriate RE of the labels created for their system.
6. The label coordinator submits the request to the label creator.
7. The label creator processes the request and informs the label coordinator that the labels are available.
8. The label coordinator informs the requester that the labels are ready.

#### 3.2 Temporary Labels

The process to obtain temporary labels is shown below. The requester is typically the RE but may be anyone who needs the system labeled. Example label:

TEMPORARY LABEL (EXAMPLE)
System: HVACOB
Equipment Type: Temperature Element (TE)
Equipment Number: 94130
Field Label: HVACOB-TE-94130
Authorized by (Z#): On-Duty Operator (Z# XXXXXXX)
Date: 2/29/2014

##### Step Description

1. If the label coordinator is unavailable and the need for a label is immediate, the Requester fills out the Label Request Form using information consistent with facility procedures (including this DI), equipment alignment sheets, and P&IDs. Request support from the RE, as needed.
2. The Operations Center will issue a temporary label and send an email to the label coordinator detailing the temporary label that was issued.
3. A knowledgeable, qualified, and authorized worker installs the temporary label after the Operations Center concurs that the installation may proceed.
4. The label coordinator processes the request from the Operations Center to make a permanent label.