

TEMPORARY CHANGE REQUEST

TCR NO. TCR-ES-MECH-001,R2-002

(e.g., TCR-ENG-021,R0-001)

The Temporary Change Request (TCR) Form is to be used to process urgent or minor changes for PPPL Policies, Organization/Mission Statements and Procedures. The TCR should be used when changes are:
1) urgent, and can not wait the 2-4 week period for Department Head review/comment, or
2) minor, and do not warrant Department Head review.

Person Requesting Change: Andy Morrison Phone Ext: 2841

Department Name: QA/QC Best Practices

Document Number: ES-MECH-001 Revision No.: 2

Document Title: Mechanical Engineering Standards Document

Reason for change:

3 Year review, update titles and reference documents.

Change description: (Summarize and attach changed pages, with changes clearly indicated)

Updated Head of Engineering title and added 2 references:

ASTM E498/E498M-11, Standard Test Methods for Leaks Using the Mass spectrometer Leak Detector or Residual Gas Analyzer in the Tracer Mode

PPPL Engineering Standard ES-MECH-008 – Portable Coordinate Measuring Machine (pCMM) Metrology Standard.

1. Does this TCR significantly alter the intent or scope of the document? YES: _____ NO: X

2. Does this TCR significantly impact ES&H? YES: _____ NO: X

If 1 or 2 is YES, Explain why the changes should not be routed for Department Head review:

Department/Division Head Approval

Date

Head, Quality Assurance/Quality Control

Date

Release/Effective date of this TCR: 4/24/17

Incorporate this TCR into next revision of this document? YES: X NO: _____

Printed copies of this document are considered UNCONTROLLED / Information only copies. The official document is at http://bp.pppl.gov/PPPL_docs.html The QA/QC department maintains the signed originals.

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Subject:	Effective Date	Initiated
Mechanical Engineering Standards Document	12/1/2008	Fabrication & Operations Division
	Supersedes 9/23/94	Head, Engineering Department

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1. SCOPE/APPLICABILITY

This PPPL Standard indentified the broad spectrum of published codes, standards, specifications and guides that comprise the array of *standards* documents that are used and conformed to, in whole or part, by the Fabrication & Operations (FO) Division in the performance of its engineering duties.

All mechanical equipment and installations at PPPL must satisfy the basic intent of this standard.

2. INTRODUCTION

The FO Division manages the mechanical engineering resources and programs (i.e., welding fabrication, hoisting and rigging, etc.) on a Laboratory-wide basis. The management of these programs assures that designs analysis, Engineering Standards, fabrication, construction, maintenance, and training consistently meet and achieve PPPL objectives.

3. REFERENCE LIST OF CODES AND STANDARDS

3.1 SOURCES OF CODES AND STANDARDS

Standards, codes and specifications originate from a number of sources:

- *Professional Associations and Societies*
- *Government Agencies*
- *National and International Standards Organizations*

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These codes and standards are not a design handbook and do not do away with the need for competent engineering judgment.

When no standard specifically applies, at his discretion, the user may select any section determined to be generally applicable.

3.2 ORGANIZATIONS & STANDARDS

PPPL FO Division observes many codes, standards, specification, and guides published by various technical societies, associations, institutes, and organizations. The parts or sections of accepted codes, standards, and guides issued by the designated technical societies, associations, organizations and institutes most often conformed to by PPPL. FO Division activities are identified in the following listing. Where no sections are designated, the entire publication may be employed. Pertinent PPPL FO practices that represent variations to published codes or standards and are developed into PPPL standards are noted in Section 4.3. The absence of a standard or code from the following list does not preclude its use by the FO Division if its application is conducive to improved performance and/or results. Reference to the latest published version of the code or standard is implicit.

American Concrete Institute (ACI)

ACI Manual of Concrete Practice, Part 1-5

American Conference of Government Industrial Hygienist (ACGIH)

Industrial Ventilation – A Manual of Recommended Practice

American Institute of Steel Construction (AISC)

AISC Manual of Steel Construction

American National Standards Institute (ANSI)

(Referenced by Standards Organization which published the document. API-American Petroleum Institute, ASME – American Society of Mechanical Engineers, CGA-Compressed Gas Association, SAE- Society of Automotive Engineers)

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ANSI B94 - *Standards for Cutting Tools*
ANSI/API 526:527- *Standards for Safety Relief Valves*
ANSI/ASME B1 - *Standards for Screw Threads*
ANSI/ASME B16 - *Standards for Flanges, Fittings and Valves*
ANSI/ASME B18 - *Standards for Fasteners*
ANSI/ASME B29 - *Standards for Transmission Power Drives*
ANSI/ASME B30 - *Standards for Hoisting and Rigging Equipment*
ANSI/ASME NQA - 1 - *Quality Assurance Program Requirements for Nuclear Facilities*
ANSI/ASME PTC 25.3 - *Performance Test Code – Safety Relief Valves*
ANSI/CGA V-1. - *Standards for Compressed Gas Cylinders Valve Inlet and Outlet Connections*
ANSI/CGA V-9. - *Standards for Compressed Gas Cylinder Valves*
ANSI/SAE - *Standards for Hose and Hose Assemblies*

American Society for Testing and Materials (ASTM)

- Section 1 - Iron and Steel Products
- Section 2 – Nonferrous Metal Products
- Section 3 – Metals Test Methods and Analytical Procedures
 - Volume 03.01 – *Metals – Mechanical Testing Elevated and Low – Temperature Test: Metallography*
 - Volume 03.03 – *Nondestructive Testing*
- Section 14 - General Methods and Instrumentation
 - Volume 14.02 – *General Test Methods, Nonmetal: Laboratory Apparatus; Statistical Methods; Appearance of Material; Durability of Nonmetallic Materials*
- Section 15 – General Products, Chemical Specialties; and End Use Products
 - Volume 15.01 – *Refractories; Carbon and Graphite Products; Activated Carbon*
 - Volume 15.06 – *Adhesives*

ASTM E498/E498M-11, Standard Test Methods for Leaks Using the Mass spectrometer Leak Detector or Residual Gas Analyzer in the Tracer Mode

American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)

ASHRAE Handbook:

- *Applications Volume*
- *Fundamentals Volume*
- *Systems Volume*
- *Equipment Volume*

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American Society of Mechanical Engineers (ASME)

ASME Boiler and Pressure Vessel Code

- Section II – *Materials Specification*
- Section III – *Nuclear Power Plant Components – Division 1*
- Section VII - *Pressure Vessels – Division 1 & 2*
- Section IX – *Welding and Brazing Qualifications*

ASME Code for Pressure Piping

- Section B31.1 – *Power Piping*
- Section B31.3 – *Chemical Plant and Petroleum Refinery Piping*
- Section B31.9 – *Building Services Piping*

American Vacuum Society (AVS)

Conference Proceedings (Guidelines and calibration methodology for vacuum gages, mass spectrometers, et al)

American Welding Society (AWS)

AWS D1.1 – *Structural Welding Code – Steel*
 AWS D1.2 – *Structural Welding Code – Aluminum*
 AWS D1.3 – *Structural Welding Code – Sheet Steel*
 AWS D9.1 – *Sheet Metal Welding Code*

Building Officials Conference of America (BOCA)

BOCA National Building Code: Article 11 – Structural Loads

Department of Energy (DOE)

DOE - DOE-STD-1090-2011– *Hoisting and Rigging Standard*
 UCRL- 15910 – *Design and Evaluation Guidelines for DOE Facilities Subjected to Natural Phenomena Hazards (5/89)*

Institute of Electrical and Electronic Engineers (IEEE)

IEEE Standard 500 – *IEEE Guide to the Collection and Presentation of Electrical, Electronic, Sensing Component, and Mechanical Equipment Reliability Data for Nuclear –Power-Generating Stations*

Instrument Society of America (ISA)

Standards and Practices for Instrumentation

National Fire Protection Association (NFPA)

Fire Protection Handbook:

NFPA 70 – *National Electric Code*
 NFPA 72 – *Installation, Maintenance, and Use of Protective Signaling Systems*

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Underwriters Laboratories (UL)

Standards for Safety

4.3 PPPL ENGINEERING STANDARDS & PROCEDURES

In addition to the national codes and standards, PPPL observes the following Laboratory Engineering Standards and Procedures developed by the FO Division that are relevant to the oversight and development of the programs and resources under its responsibility. Procedures developed by the FO Division include and conform to DOE Manuals and/or Orders (if pertinent) and have precedence over the published national standards.

- PPPL Engineering Procedure No. ENG-037 – General Welding and Brazing Requirements
- PPPL Procedure No. ENG-021 – Program for Hoisting & Rigging, Forklifts, Manlifts, Special Purpose Vehicles, Utility Vehicles and Portable Equipment
- PPPL Engineering Procedure EM-004 – Controlled Atmosphere Brazing
- PPPL Engineering Procedure EM-005 – Torch Soldering Requirements
- PPPL Engineering Standard ES-MECH-004 – Seal Welds on Threaded Joints
- PPPL Engineering Standard ES-MECH-007 – Hoisting and Rigging Standard
- PPPL Engineering Standard ES-MECH-008 – Portable Coordinate Measuring Machine (pCMM) Metrology Standard