

MINOR CHANGE REQUEST FORM

MCR NO. **MCR-ENG-006,R8-002**
(e.g., MCR-ENG-021,R0-001)

The Minor Change Request (MCR) Form is to be used to process Minor, or in some necessary cases, Urgent or Temporary changes to PPPL Lab-wide procedures). The MCR should be used when changes are:

- 1) **minor** and do not warrant further SME review;
- 2) **urgent** and cannot wait the 2-4 week period for further SME review; or
- 3) **temporary**, to revert to original state by a given expiration date (must be within 6 months).

For questions about definitions of “minor,” “urgent,” and “temporary” changes, please review Lab-wide Procedure GEN-001, **Development, Review, and Approval of Lab-wide Documents**.

Person Requesting Change: **V. Riccardo**

Phone Ext: **2866**

Department Name: **Engineering**

Document Number: **ENG-006**

Revision No.: **8**

Document Title: **Preparation, Review & Approval of Technical Specifications**

Reason for change:

1. Allow unsigned documents to be used for bid after the Design Approval Form is signed off

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

1. Paragraph expanded in Applicability on the level of maturity of Technical Specifications in different phases of procurement.
2. Same clarification implemented in Part A of the procedure.

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

2. Does this change significantly impact ES&H? YES: NO: **X**

If 1 or 2 is YES, explain why the changes should not be submitted as a revision:

3. Place a check mark next to the appropriate type of change request:

- Minor change?
- Urgent change? (revision must follow within 2 weeks) **X**
- Temporary change?

If “temporary change” is checked, provide expiration date, allowing document to revert to original state (must be within 6 months):

Management System Owner/Designee Approval

Date

Head, PPRM/designee

Date

Release/Effective date of this MCR: **12/14/18**

PPPL	PRINCETON PLASMA PHYSICS LABORATORY	PROCEDURE	No. ENG-006 Rev 8 page 1 of 4
Subject: Preparation, Review & Approval of Technical Specifications		Effective Date: 8/1/2018	Initiated by: Head, Engineering
		Supersedes: Revision 7 January 31, 2018	Approved: Director

MCR-ENG-006,R8-002

Management System (Primary): 03.00 Engineering
Management System Owner: Head, Engineering
Management Process: 03.04 Engineering and Design Processes
Process Owner: Head, Engineering
Subject Matter Expert (SME): Head, Engineering; Head, Design Group; Head, Fabrication Group; Head, Power Systems Group

APPLICABILITY

This procedure defines the process to create, review, approve, use and revise Technical Specifications at PPPL. It implements the PPPL QAPD graded approach requirements for developing and issuing Technical Specifications as described herein. Table 1 flows down the QAPD requirements regarding the approval authority for issuing Technical Specifications.

If technical specifications are generated as part of a design process that is subject to Final Design Review, they shall be identified on the Design Approval Form (ENG-033) and shall not be used in formal procurement until the form is signed off. However, the Design Approval Form may be used for long lead items ahead of a Final Design Review. The scope of a Final Design Review may be divided among more than one Design Approval Form.

Before the Design Approval Form has been signed, draft technical specifications may be used for budgetary estimates and other non-binding requests for information.

After the Design Approval Form has been signed, technical specifications listed therein may be used for procurement quotes and bids documents.

Only approved final Technical Specifications shall be used to award subcontracts.

MCR-ENG-006,R8-002

Technical specifications that are generated or modified by an external Engineering Subcontractor may be accepted by PPPL for use in procurements providing: 1) the specifications meet the requirements developed in accordance with ENG-050, 2) the specifications are reviewed and issued in accordance with the subcontractor's procedure(s), and 3) have been included or subjected to a design review performed in accordance with ENG-033.

INTRODUCTION

Technical Specifications define the technical requirements for hardware and hardware treatments (e.g. surface coatings). They may define scope for procurement from external sources or for in-house activities performed at PPPL.

Attachment 1 provides a sample template for developing a PPPL Technical Specification. This template provides a guide but is not a strict requirement. Actual content should be customized to suit the scope, and alternate formats may be used if desired by the applicable project.

Note: Technical requirements for software projects are prepared and issued in accordance with PPPL's Software QA Program; see QAPD for further instruction.

REFERENCES

- EQP-004, Quality Assurance Program Description
- GEN-023, Records Management
- ENG-033, Design Verification
- ENG-050, Job Requirements Documentation and Control
- ENG-060, Preparation, Review & Approval of Statements of Work
- ENG-063, Breakdown Structure and Graded Approach Categorization
- QA-003, Procurement Quality Assurance
- QA-005, Control of Non-conformances
- P-018, Subcontract Proposal Evaluation Board (SPEB) Policy
- PPPL Procurement Policies and Procedure Manual (PPPM)

PROCEDURE

A. Creation of Technical Specifications

The Cognizant Individual is responsible for preparing Technical Specifications, having them reviewed and approved as specified in Table 1, and delivering them to the Operations Center.

Responsibility

Action

Cognizant
Individual

1. Confirms the item category (A1/2/3), if missing follows ENG-063 to obtain category.
2. Develops the Technical Specification in accordance with the template (Attachment 1), including the list of all deliverables, and submits for review including, as a minimum, the reviewers listed in Table 1 per graded approach risk classification.
3. Obtains a unique identification number for the Technical Specification from the Operations Center.
4. Resolves reviewer comments. Updates the Technical Specification as necessary, signs as the preparer, and obtains the Table 1 reviewers' and approver's signatures.
5. Provides a copy of the Technical Specification to the Operations Center.

Operations
Center

6. Maintains Technical Specifications as controlled documents and issues them to users upon request.

B. Use of Technical Specifications in subcontracts

Only approved technical specifications shall be used to award subcontracts.

For quotes and bids, “for quote / bid” technical specifications may be used, after the Design Approval Form has been signed off.

Draft technical specifications can be used to gather non-binding information from vendors.

MCR-ENG-006,R8-002

C. Revisions to a Technical Specification during a subcontract

MCR-ENG-006,R8-002

Technical Specifications requiring revision during production shall be promptly remedied as described herein.

If the revision is due to a technical issue, the Princeton Technical Representative shall follow the NCR process detailed in QA-005.

Revised Technical Specifications (whether a consequence of an NCR or driven by the project to improve the quality of the product or to minimize the risk of the supply) need to be reviewed and approved per Table 1.

A1	A2	A3
Preparer: Cognizant Individual Reviewers: Project Manager, QA, Responsible Engineer, applicable Technical Authorities (including ESH if relevant) Approver: Chief Engineer	Preparer: Cognizant Individual Reviewers: Project Manager, QA, Responsible Engineer, applicable Technical Authorities (including ESH if relevant) Approver: main Technical Authority	Preparer: Cognizant Individual Reviewer: QA and ESH if relevant Approver: Responsible Engineer

Table 1 – Reviewers and Approvers for graded approach application

D. TRAINING

Head, Engineering 1. Provides/assures the following training.

A. Target Audience: Cognizant Individuals and all Engineers involved with Tech Specs, Project Managers, Project Directors, Responsible Engineers, Technical Authorities, Chief Engineer, QA, Department Heads

Instructor: Head, Engineering

Training Methods:

Major revision: Briefings

Minor and Major revision: Required Reading

B. Target Audience: All Supervisors and Laboratory Leadership Council Members

Distributed by: Planning Office

Training Methods:

Minor and Major revision: Required Reading

X Email distribution (minor revisions)

- Head, Engineering or Designee 2. Notifies the Human Resources Training Office of the training so that they will be aware of the training requirements and be able to provide assistance and guidance in the course development, implementation, tracking, and maintenance.

E. RECORDS MANAGEMENT

Records Documented	Record Custodian	Where Record Kept	Record Duration
Technical Specifications	Operations Center	Operations Center	Indefinitely if project cost >750k\$. When component is disposed off otherwise.

ATTACHMENTS

1. Sample template for Technical Specification (including documentation/deliverables list)

TECHNICAL SPECIFICATION

FOR

TITLE OF ITEM TO BE SUPPLIED

*(Enter the name of the items being specified in this document)*CAT: ☐A1 ☐A2 ☐A3**UNIQUE IDENTIFIER:**

Reference Work Planning #: _____

REVISION 0**DATED Month DD, YYYY**PREPARED BY: _____
Cognizant Individual (COG)REVIEWED BY: _____
(list per Table 1, one line each)APPROVED BY: _____
(per Table 1)**PRINCETON UNIVERSITY
PLASMA PHYSICS LABORATORY
P.O. BOX 451
PRINCETON, N.J. 08543
609-243-2000**

1.0 INTRODUCTION & SCOPE

Provide background information, as appropriate, to improve understanding of the nature of the items required. Information on the Laboratory, projects, or systems should be included, if they provide valuable context.

Describe the intended use of the items being procured briefly.

2.0 APPLICABLE DOCUMENTS

Provide a listing of those documents that are referenced. These may include industry standards issued by nationally recognized organizations (e.g., ASME, IEEE, NFPA, ANSI, OSHA, etc.), bulletins, manuals, drawings, and DOE Orders. References should be to the specific items required by this technical specification. For example, rather than stating PPPL Engineering Standards, include the name of the standards that apply (e.g., ES-MECH-007, Hoisting and Rigging).

The listing should include the edition/revision level of each listed document or have a statement that the applicable edition/revision level is the latest in effect at the time of the award. If only part of a particular document is in effect or applicable, it should be so noted.

The source location of the referenced documents should be specified. Industry standards may be presumed to be available to all industry participants. Government and PPPL documents should be made available in hard copy form, or at a public Internet web site. Internet addresses should be included.

3.0 APPLICABLE DRAWINGS

Provide a listing of those drawings that are part of the technical specification.

The listing should include the edition/revision level of each drawing or have a statement that the applicable edition/revision level is the latest in effect at the time of award. If only part of a particular drawing is in effect or applicable, it should be so noted.

The source location of the referenced drawings should be specified. Drawings should be made available in hard copy form, or at a public Internet web site. Internet addresses should be included.

4.0 RESPONSIBILITIES**4.1. PRINCETON PLASMA PHYSICS LABORATORY**

Describe what is provided by PPPL (e.g. drawings, free issue materials).

4.2. SUPPLIER

Describe what is required from the supplier (e.g. deliverables, documentation, plans).

For A-1 and A-2 items and service, required submittals shall include:

- *Detailed fabrication/manufacturing plans that comprehensively describe processes, including in-process inspections, verifications, monitoring and other quality control methods, to be used to ensure these critical components meet technical requirements.*
- *Qualification data and information demonstrating the fidelity of complex fabrication or manufacturing processes in meeting the technical requirements.*

Repairs are not to take place until they are reviewed per QA-005, and specifically authorized by the PPPL PTR. Resumption of work that has been stopped by PPPL due to off-normal events and issues must follow the provisions of PPPL Policy P-012, STOP Work Authority.

5.0 REQUIREMENTS

5.1. PERFORMANCE REQUIREMENTS

5.1.1. PERFORMANCE CHARACTERISTICS

Identify the functional characteristics which have been established by analysis or design including those which are not necessarily mission critical, but which must be specified to properly constrain a complete design. State requirements in quantitative terms that can be measured to determine acceptability of end-products and services.

5.1.2. OPERATING ENVIRONMENT

State the environment that the component is to withstand such as maximum/ minimum temperature, humidity, pressure, magnetic fields, radiation, etc. Specify any constraints to eliminate an environmental impact (e.g., no PCB's, CFC's, etc.).

5.1.3. DESIGN LIFE

Identify the required life cycle of the product in terms of cycles or hours of operation required. Include requirements for shelf-life and storage prior to usage.

5.1.4. RELIABILITY

Identify reliability requirements by stating in quantitative terms such as mean time to failure, duration of down time, etc.

5.1.5. MAINTAINABILITY

Include schedule of intended maintenance per storage or operating hour. Describe requirements for service such as access doors; built in tools; self test capability; test jacks; and other appropriate requirements.

5.1.6. HUMAN FACTORS

Specify requirements related to user operation, such as color recognition, foolproof assembly, interlocks, etc.

5.1.7. SUSTAINABILITY

PPPL's prime contract requires the purchase of certain types of environmentally preferable products such as, but not limited to, EPEAT-registered electronic devices, ENERGYSTAR and FEMP-listed energy-consuming equipment, Water-Sense listed products, bio-based materials, EPA-designated recycled content products, non ozone-depleting chemicals and non-toxic or less toxic alternatives when practical. Where such products are available and meet the technical requirements of the work, they should be specified to the maximum extent practical. In addition, SOWs for architecture and facility design, construction, demolition and maintenance services should include the use of sustainable design practices, inventory, tracking and reporting of recyclables, and the specification on sustainable building materials and equipment to the maximum extent practical. Additional information on environmentally preferable products is available online at: https://pppl.princeton.edu/PPPL_Environmentally_Preferable_Purchasing

5.2. EQUIPMENT DEFINITION**5.2.1. SPECIFICATIONS AND STANDARDS**

Identify and explain requirements, criteria, and constraints, pertinent to the component. Include requirements that apply from nationally recognized codes and standards as well as federal/military specifications and standards. Any referenced documents should also be listed in Section 2.0.

5.2.2. GENERAL DESIGN FEATURES

Specify physical characteristics such as size, weight, shape, and individual critical dimensions. Requirements may be descriptive or expressed in quantitative terms. All requirements should be verifiable by inspection and should include appropriate tolerances.

5.2.3. MATERIALS

List specific materials that are required and any materials that are prohibited for the various parts of the hardware. Identify any material/equipment that is being provided by PPPL.

5.2.4. ELECTROMAGNETIC INTERFERENCE AND SUSCEPTIBILITY

Identify the electromagnetic radiation fields the hardware may be subjected to (the susceptibility specification) and the maximum electromagnetic radiation permitted from the hardware (the interference specification).

5.2.5. IDENTIFICATION AND MARKING

Include requirements for marking and coding the parts of the hardware such as wiring, plumbing, nameplates, etc. (see procedure ENG-012, Identification and Control of Items).

5.2.6. EQUIPMENT

Vendors must provide their own equipment and not use government equipment. Should the use of government equipment become absolutely necessary, that use of equipment will require a liability release covering the use of PPPL equipment to be defined in the contract.

6.0 TEST & INSPECTION REQUIREMENTS

6.1. PERFORMANCE TESTS

Identify each of the performance tests that the supplier is to perform on the hardware before shipping and the acceptance criteria that must be met. These may include destructive and nondestructive tests. The tests should verify that the specified performance values have been met. Impose inspection and test limitations to preclude component damage or degradation.

6.2. ACCEPTANCE AND INSPECTION TESTS

Identify each of the acceptance tests and inspections, including receipt inspections, that PPPL is to perform. If these tests and inspections require participation by supplier personnel, their participation should be specified. Also state where and when they must be performed. Acceptance criteria must be clearly identified.

6.3. SUPPLIER HOLD POINTS

Identify hold points for the supplier where inspections must be made and approved prior to continuing work. Hold points are especially critical when additional fabrication and assembly will obscure performed work and workmanship. (See procedure QA-003).

7.0 QUALIFICATIONS

List specific worker qualifications requirements – for example, describe if a vendor must provide certification or proof that personnel successfully completed manufacturer's training, or that welders are certified per a specific ANSI/ASME code section, or that equipment operators have documentation that they are qualified or certified to operate the equipment. Indicate what proof of the qualifications is required (resume, certification card, operator license, certificate of manufacturer's training, etc.)

8.0 ENVIRONMENT, SAFETY, AND HEALTH

If relevant, the ES&H Department will provide assistance in developing this section.

9.0 QUALITY ASSURANCE REQUIREMENTS

Provide a description of the quality assurance and controls that need to be implemented for this work. As appropriate, include a general statement such as "Work under this technical specification shall be performed under an effective Quality Assurance Program. The Vendor shall maintain an effective Quality Assurance Program to assure that the Vendor's work meets the required quality and is performed in accordance with contractual requirements. Vendor's quality assurance function shall be actively involved in the planning, processing oversight,

Technical Specification Template

Attachment 1

MCR-ENG-006,R8-002

problem resolution, and determination of acceptability of all work under this technical specification. The function shall be organized to have sufficient authority and independence to identify quality problems, verify conformance of supplied items or services to specified requirements and obtain satisfactory resolution of conflicts involving quality."

Select and include appropriate specific requirements from the list contained at:

<http://www-local.pppl.gov/ga/PQA/QAClauses.doc>

Identify QA/QC oversight of the work, as this can drive costs on the vendor's part. Refer to QA-003 and consult Procurement Quality Assurance to assist in determining these requirements and agree upon general approach to vendor oversight.

10.0 SHIPPING STORAGE AND HANDLING

Specify the requirements for packing (e.g., crating, pallets, accelerometers, nitrogen purge, desiccant, etc), shipping and handling of the component. Identify temperature and humidity storage requirements. Specify labeling to be placed on shipping container. Also identify requirement for receipt inspection, if necessary.

11.0 WARRANTY

Identify if a warranty is required or desired and describe in detail.

12.0 ATTACHMENTS

Provide a list of attachments, including each attachment referred to in the text. Attachments may include examples of documentation of similar work, done previously.

13.0 DELIVERABLES**13.1. ITEMS**

List the items required, specifying the quantity of each and their packing and shipping requirements.

13.2. DOCUMENTATION & DELIVERABLES

List the required documents that must be delivered to fulfill the requirements.

A typical list includes items like:

QA Plan

Manufacturing Plan

Fabrication plan

Design and drawings for auxiliary components

Printed copies of this document are considered UNCONTROLLED / Information Only copies. The official document is at

<https://sportal.pppl.gov/bp/pppldocs/SitePages/Home.aspx>

The Project, Performance, and Requirements Office maintains the signed originals.

Technical Specification Template

Attachment 1

MCR-ENG-006,R8-002

First-off qualification and verification
List of vendor-supplied materials
Certified Material Test Reports
Manufacturing/Inspection/Test (MIT) plan, template
Procedures identified in the MIT
MIT reports
Clean Area dimensions
Non-conformance reports
Repair procedures
Test procedures
Special process procedures (braze, impregnate...)
Packing and shipping details
Manufacturing/Inspection/Test plan, filled out and signed off, per coil
Photographs of packed and crated items
Process history and PPPL Shipping Release Form

Define whether digital or paper format is required, and define the file type (PDF, Excel, PowerPoint, etc.) if relevant.

If environmentally preferable materials / products are requested, the vendor has to include documentation of compliance with these requirements.

List the required deliverables, and if possible the relative timeframe when these need to be received.

Notes / Exceptions – If supplier cannot deliver one of the deliverables, this needs to be brought to the attention of the PM (or in absence the cost center owner,) who must note and justify it on the delivery list, if acceptable.

Technical Specification Template

Attachment 1

MCR-ENG-006,R8-002

Deliverables List

PO / Subcontract / BOA / BPA #: _____

#	Physical Deliverables Required	When Deliverable Is Required	Deliverable Received (✓)
1			
2			
3			
4			
5			
Exceptions (Add justification for any missing physical deliverables that will not be received):			

#	Document Deliverables Required	When Deliverable Is Required	Deliverable format (paper, electronic etc.)	Storage Location for Deliverable	Deliverable Received (✓)
1					
2					
3					
4					
5					
Exceptions (Add justification for any missing document deliverables that will not be received):					

Princeton Technical Representative/COG: _____

(Sign-off and provide to the Operations Center when job is completed and deliverables are dispositioned and placed/filed in Operations Center (or other Project, Department or Division designated file center)