



SYSTEM PROCEDURE Design Control

REVISION: 05

PROCEDURE NO.: 11

DATE EFFECTIVE: 01/04/18

1. PURPOSE

1.1. To define Tempco Electric Heater Corporation design and development process.

2. SCOPE

2.1 This procedure applies to all products designed and or changed by Tempco Electric Heater Corporation and or their customers.

3. PROCEDURAL REQUIREMENTS and RESPONSIBILITIES

3.1. General Responsibilities

3.1.1. The Vice President of Operations in conjunction with the various design and project engineers for the designated product areas shall be the primary persons responsible for ensuring compliance of this procedure and to ensure the necessary resources for successful implementation are provided.

3.1.2. The Vice President of Operations shall be responsible for planning and controlling the design and development of product (new or revised) manufactured by Tempco Electric Heater Corporation. This includes managing the interface between the different departments involved in the design and development activities of the product.

3.1.2.1. The assigned design and project engineers for the designated product areas and/or projects shall share this responsibility with the Vice President of Operations and shall be responsible for directing the planned activities per this procedure.

3.2. Design Planning

3.2.1. Design Engineering activities have been planned such that Engineering is divided into various product groups, including Casting products, Process and Tubular Heaters, Cartridge and Band Heaters, Sheet Metal Products, Infrared Heaters, Silicone Rubber Heaters, Coil Heaters, Temperature and Power Control Products and Temperature Sensors.

3.2.2. The design process starts with the receipt of the customer order or the quotation, which includes the necessary design basic information of watts, volts, metal and any customer drawings. Products are subsequently designed in a single stage process and released based on customer drawings, additional customer specific requirements and the delivery dates of the products.

3.3. Design Inputs

3.3.1. Inputs related to product requirements are determined by the sales and product engineer and include the following areas, when applicable:

- 3.3.1.1. Functional and performance requirements
- 3.3.1.2. Applicable statutory and regulatory requirements
- 3.3.1.3. Information derived from previous similar designs, and
- 3.3.1.4. Other requirements essential for design and development.
- 3.3.1.5. Potential consequences of failure.

3.3.2. These inputs are reviewed for adequacy. Requirements shall be complete, unambiguous and not in conflict with each other.



SYSTEM PROCEDURE Design Control

REVISION: 05

PROCEDURE NO.: 11

DATE EFFECTIVE: 01/04/18

3.4. Design Output

- 3.4.1. The design process involves the creation of a job packet that documents the new product outputs consisting of the drawing/specification sheet, manufacturing order and job tickets, when applicable.
- 3.4.1.1. The drawing/specification sheet shall contain the specifications, bill of material and all pertinent information to indicate that the design/drawing meets all customer requirements.
- 3.4.1.2. The drawing/specification sheet will be used by Purchasing, Manufacturing and/or Quality Assurance for procurement, production and verification purposes. Outsourced processes will have an outside services (OSS) part number assigned within the drawing/specification sheet that provides a description of the outside process to be performed. When an outside service is a standard procedure for a product line, it is documented in the work instructions and not assigned within the drawing/specification sheet.
- 3.4.2. Design approval is indicated on the drawing/specification sheet along with the date printed and the bar code that is traceable to the manufacturing order, where applicable.

3.5. Design Review and Approval

- 3.5.1. Depending on the designated level, a product will be reviewed and approval indicated based on the following categories:

Modification of Existing Product

Approved Drawing/
Specification Sheet

New Product Design

Approved Drawing/
Specification Sheet
Engineering Verification Form

- 3.5.2. Designs that require significant design and/or application engineering will be categorized as a New Product Design and will have the design reviewed and approved by the assigned product engineer on the Drawing/Specification Sheet and Engineering Verification Form. New Product Design is defined as any product which meets any one of the following criteria:
- 3.5.2.1. Customer submits a drawing
- 3.5.2.2. Tempco drawing is submitted for customer approval
- 3.5.2.3. Customer provides a physical sample
- 3.5.2.4. If requested by Sales and/or Engineering
- 3.5.3. The Design and subsequent Design Review process is typically conducted in a single stage process where the design is created, reviewed and approved in one sequence. If an iterative design review is conducted between Sales, Engineering and or the Customer it will be documented in an email or correspondence and maintained as part of the engineering record.
- 3.5.4. Designs that are minor variations of existing product lines will have the design reviewed and approved by the assigned product engineer and documented on the drawing/specification sheet. Separate design verification is not required and at the completion of the manufacturing order the QC log evaluation record and/or electrical test records will demonstrate compliance to the specified design requirements.



SYSTEM PROCEDURE Design Control

REVISION: 05

PROCEDURE NO.: 11

DATE EFFECTIVE: 01/04/18

3.6. Design Verification and Validation

- 3.6.1. New Product Designs will require design review and approval by the assigned product engineer and will be documented on the drawing/specification sheet. The Engineering Verification Form, in conjunction with the QC log evaluation record and/or electrical test records, will be used by the assigned product engineer to document the design verification.
 - 3.6.1.1. The Engineering Verification Form will be used to ensure that product meets specified design requirements and that the design meets the customer requirements.
 - 3.6.1.2. Engineering Verification Form may be used to document a first piece/article inspection for the first time a product is manufactured.
 - 3.6.1.3. Validation that the product is capable of meeting the requirements for the specified application or intended use can only be determined by the customer, as Tempco products are typically a component of the larger system. The customer system and/or end item application is typically not communicated to Tempco due to confidentiality requirements or business concerns. The objective evidence that the product was capable of meeting the requirements for the specified customer application is demonstrated when a customer complaint/return is not documented and through any subsequent customer orders, if applicable.
 - 3.6.1.4. Tempco will perform additional validation and/or qualification testing when specified as a customer requirement and will maintain the appropriate records demonstrating compliance with these specified requirements.

3.7. Control of Design Changes

- 3.7.1. Design and development changes and revisions will be identified and records will be maintained. The changes shall be reviewed, verified as appropriate, and approved by the product engineer before implementation.
- 3.7.2. The Engineering Change Request/Order process may also be used for any subsequent changes after the initial release of drawing to document any interdepartmental or customer initiated request for a change.
 - 3.7.2.1. The Engineering Change Request/Order provides for the identification of the part number, drawing number, revision level, description of the request and reason for the request. ECO action items relevant to the change will be documented within the ECO.
 - 3.7.2.2. An "ECR Pending" message will be indicated in the system when ECR's are pending approval. Engineering must determine the impact of any ECR Pending prior to initiating and/or continuing the manufacturing or purchasing process.
 - 3.7.2.3. The Engineering Change Request/Order shall be reviewed, verified as appropriate, and approved by the product engineer before implementation.
- 3.7.3. The review of design and development changes shall include evaluation of the effect of changes on the constituent parts and delivered product, as well as the potential consequences of failure.

4. PROCESS FLOW CHART

The sequential steps for Tempco Electric Heater Corporation Design Control Process are presented in flowchart format on the next (1) page. The function and/or position responsible for the activity in the flow are identified outside the initial activity. This responsible function and/or position continues until a change is identified. The function of a decision or option requires the responsible function and/or position be identified for each result.



SYSTEM PROCEDURE
Design Control

REVISION: 05

PROCEDURE NO.: 11

DATE EFFECTIVE: 01/04/18

5. RECORD

- 5.1. Drawing/Specification Sheet
- 5.2. Engineering Verification Form

6. REVISION HISTORY

REVISION LEVEL	DATE OF REVISION	SECTIONS	DESCRIPTION OF CHANGE
00	04/27/09	All	Initial release
01	06/22/11	3.5, 3.6 & 3.4.2	Deleted 3.4.2.1 and 3.4.2.2 since delivery date information within these paragraphs is not part of design control. Modified paragraph 3.5 to define New Product Design and the Design Review and Design Approval process Modified paragraph 3.6 to further clarify the design verification and validation process
02	06/06/12	3.4.1.2	Added last line (When an outside service. . . .)
03	6/9/14	3.2.2	Replaced the word "Manufacturing" with "Customer"
04	6/2/16	3.7.1	Removed text (on the Drawing . . .) from the first line
05	1/4/18	3.3.1 3.7.2.1 3.7.3	Was Procedure 7.3. Updated paragraph 3.3.1 to ensure any potential consequences are considered; paragraph 3.7.2.1 ECO action items relevant to the change will be documented within the ECO and paragraph 3.7.3 to include potential consequences of failure as required by ISO 9001:2015.



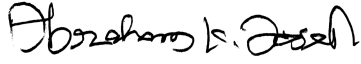

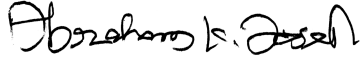
SYSTEM PROCEDURE
Design Control

REVISION: 05

PROCEDURE NO.: 11

DATE EFFECTIVE: 01/04/18

7. AUTHORIZATION

POSITION	HELD BY	AUTHORIZATION SIGNATURE OR INITIALS
Prepared By: Vice President of Operations	Abe Joseph	
Senior Management Representative: Chief Financial Officer	Paul Wickland	
Management Representative:	Abe Joseph	



SYSTEM PROCEDURE
Design Control

REVISION: 05

PROCEDURE NO.: 11

DATE EFFECTIVE: 01/04/18

