Program Family Title [FamNameshould appear in the title —SS]

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1 Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

2 Reference Material

This section records information for easy reference.

2.1 Table of Units

Throughout this document SI (Système International d'Unités) is employed as the unit system. In addition to the basic units, several derived units are used as described below. For each unit, the symbol is given followed by a description of the unit and the SI name.

symbol	unit	SI
m	length	metre
kg	mass	kilogram
s	time	second
°C	temperature	centigrade
J	energy	Joule
W	power	Watt ($W = J\,s^{-1}$)

[Only include the units that your CA actually uses. If there are no units for your problem, like for a general purpose library, you should still include the heading, with the content "not applicable" (or similar). —SS]

2.2 Table of Symbols

The table that follows summarizes the symbols used in this document along with their units. The choice of symbols was made to be consistent with the heat transfer literature and with existing documentation for solar water heating systems. The symbols are listed in alphabetical order.

symbol	unit	description
A_C	m^2	coil surface area
A_{in}	m^2	surface area over which heat is transferred in

[Use your problems actual symbols. The si package is a good idea to use for units. —SS]

2.3 Abbreviations and Acronyms

symbol	description
A	Assumption
DD	Data Definition
GD	General Definition
GS	Goal Statement
IM	Instance Model
LC	Likely Change
PS	Physical System Description
R	Requirement
SRS	Software Requirements Specification
FamName	[put your famram name here —SS]
T	Theoretical Model

[Add any other abbreviations or acronyms that you add —SS]

Contents

3 Introduction

3.1 Purpose of Document

3.2 Scope of the Family

3.3 Characteristics of Intended Reader

3.4 Organization of Document

4 General System Description

This section identifies the interfaces between the system and its environment, describes the potential user characteristics and lists the potential system constraints.

4.1 Potential System Contexts

- User Responsibilities:

    –

- FamName Responsibilities:

    – Detect data type mismatch, such as a string of characters instead of a floating point number

    –

4.2 Potential User Characteristics

The end user of FamName should have an understanding of undergraduate Level 1 Calculus and Physics.

4.3 Potential System Constraints

5 Commonalities

5.1 Background Overview

5.2 Terminology and Definitions

This subsection provides a list of terms that are used in the subsequent sections and their meaning, with the purpose of reducing ambiguity and making it easier to correctly understand the requirements:

-

5.3 Data Definitions

This section collects and defines all the data needed to build the instance models. The dimension of each quantity is also given. [Modify the examples below for your problem, and add additional definitions as appropriate. —SS]

Number	DD1
Label	**Heat flux out of coil**
Symbol	q_C
SI Units	$\mathrm{W\,m^{-2}}$
Equation	$q_C(t) = h_C(T_C - T_W(t))$, over area A_C
Description	T_C is the temperature of the coil (°C). T_W is the temperature of the water (°C). The heat flux out of the coil, q_C ($\mathrm{W\,m^{-2}}$), is found by assuming that Newton's Law of Cooling applies (A**??**). This law (GD**??**) is used on the surface of the coil, which has area A_C ($\mathrm{m^2}$) and heat transfer coefficient h_C ($\mathrm{W\,m^{-2}\,{}^{\circ}C^{-1}}$). This equation assumes that the temperature of the coil is constant over time (A**??**) and that it does not vary along the length of the coil (A**??**).
Sources	Citation here
Ref. By	IM**??**

5.4 Goal Statements

Given the [inputs —SS], the goal statements are:

GS1: [One sentence description of the goal. There may be more than one. Each Goal should have a meaningful label. —SS]

5.5   Theoretical Models

This section focuses on the general equations and laws that FamName is based on. [Modify the examples below for your problem, and add additional models as appropriate. —SS]

Number	T1
Label	**Conservation of thermal energy**
Equation	$-\nabla \cdot \mathbf{q} + g = \rho C \frac{\partial T}{\partial t}$
Description	The above equation gives the conservation of energy for transient heat transfer in a material of specific heat capacity C ($\text{J\,kg}^{-1}\,{}^{\circ}\text{C}^{-1}$) and density ρ ($\text{kg\,m}^{-3}$), where $\mathbf{q}$ is the thermal flux vector ($\text{W\,m}^{-2}$), g is the volumetric heat generation ($\text{W\,m}^{-3}$), T is the temperature (${}^{\circ}\text{C}$), t is time (s), and ∇ is the gradient operator. For this equation to apply, other forms of energy, such as mechanical energy, are assumed to be negligible in the system (A**??**). In general, the material properties (ρ and C) depend on temperature.
Source	http://www.efunda.com/formulae/heat_transfer/conduction/overview_cond.cfm
Ref. By	GD**??**

6   Variabilities

6.1   Assumptions

A1: [Short description of each assumption. Each assumption should have a meaningful label. Use cross-references to identify the appropriate traceability to T, GD, DD etc., using commands like dref, ddref etc. —SS]

6.2   Calculation

6.3   Output

7   Requirements

This section provides the functional requirements, the business tasks that the software is expected to complete, and the nonfunctional requirements, the qualities that the software is expected to exhibit.

7.1 Functional Requirements

R1: [Requirements for the inputs that are supplied by the user. This information has to be explicit. —SS]

R2: [It isn't always required, but often echoing the inputs as part of the output is a good idea. —SS]

R3: [Calculation related requirements. —SS]

R4: [Verification related requirements. —SS]

R5: [Output related requirements. —SS]

7.2 Nonfunctional Requirements

[List your nonfunctional requirements. You may consider using a fit criterion to make them verifiable. —SS]

8 Likely Changes

LC1: [If there is a ranking of variabilities, or combinations of variabilities, that are more likely, this information can be included here. —SS]

9 Traceability Matrices and Graphs

[You will have to add tables. —SS]

10   Appendix

[Your report may require an appendix. For instance, this is a good point to show the values of the symbolic parameters introduced in the report. —SS]

10.1   Symbolic Parameters

[The definition of the requirements will likely call for SYMBOLIC_CONSTANTS. Their values are defined in this section for easy maintenance. —SS]
[Advice on using the template:

- Assumptions have to be invoked somewhere

- "Referenced by" implies that there is an explicit reference

- Think of traceability matrix, list of assumption invokations and list of reference by fields as automatically generatable

- If you say the format of the output (plot, table etc), then your requirement could be more abstract

- For families the notion of binding time should be introduced

- Think of families as a library, not as a single program

—SS]