

IQARUS USER MANUAL

Quality Management Software

v.2.5

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www.iqarus.eu

Table of Contents

1.	Introduction.....	3
1.1.	Goal	3
1.2.	Main features	3
1.3.	Supported Quality Management Documents	3
	Design-related documents	4
	Process-related documents	4
2.	Installation guide	6
3.	Quick start	7
3.1.	Design document workflow: dFMEA and DVP&R	7
3.2.	Process document workflow: CM, PFD, pFMEA and CP	9
4.	User interface overview.....	12
4.1.	Main window	12
4.2.	dFMEA	12
4.3.	DVP&R.....	13
4.4.	Characteristics Matrix	14
4.5.	Process Flow Diagram.....	15
4.6.	pFMEA	15
4.7.	Control Plan	16
5.	How to use specific features	18
5.1.	Starting the software	18
5.2.	dFMEA	18
5.3.	Design Validation Plan & Report	24
5.4.	Characteristics Matrix	26
5.5.	Process Flow Diagram.....	29
5.6.	pFMEA	31
5.7.	Control Plan	39
5.8.	General actions.....	41
5.9.	Preferences.....	42
6.	Frequently asked questions	44
7.	Troubleshooting	46
8.	Administrator options	47
8.1.	Main menu options.....	47
8.2.	Administrator options for FMEA's	49
8.3.	Settings.ini file parameters	50
9.	Contact info	51

1. Introduction

1.1. Goal

IQARUS helps users quickly create and maintain connected Quality Management documents. It supports two document chains: the design chain, which includes dFMEA and DVP&R, and the process chain, which includes the Characteristics Matrix, Process Flow Diagram, pFMEA, and Control Plan. The dFMEA and DVP&R are connected to each other and are normally created before the process documents. They are not directly connected to the Characteristics Matrix, Process Flow Diagram, pFMEA, or Control Plan. IQARUS was originally developed to support compliance with the aerospace standard AS13100, but it can also be used in other industries.

1.2. Main features

IQARUS is a software tool for organizations that regularly create and maintain Quality Management documents. It provides the following standard features:

- The Characteristics Matrix, Process Flow Diagram, pFMEA, and Control Plan remain synchronized to keep the process documentation organized and up to date. Similarly, the dFMEA and DVP&R remain synchronized with each other.
- Use reference FMEAs to quickly build a product dFMEA or partnumber pFMEA.
- Receive automatic updates for imported reference and general FMEAs, and quickly review the changes.
- Directly send feedback to the process owner of reference FMEA's for change proposals.
- Extensive options to add GD&T dimensions (and symbols).
- Easily switch between RPN (Risk Priority Number) and AP (Action Priority) scoring.
- Customizable color coding for RPN.
- Use default descriptions for Severity, Occurrence and Detectability from the automotive or aerospace standards, or create your own customized descriptions.
- Create action lists from your FMEA and Pareto lists based on RPN scores.
- Import an existing Characteristics Matrix, pFMEA or dFMEA from Excel.
- Export the dFMEA, Design Validation Plan & Report, Characteristics Matrix, Process Flow Diagram, pFMEA, or Control Plan to Excel or PDF, or send it directly to a printer.
- Supports multiple users working simultaneously.
- Provides an extensive header field for documenting team members, product details, customer information, and manufacturer information.

1.3. Supported Quality Management Documents

The software consists of six main QM (Quality Management) documents. These documents are organized in two connected chains.

The design chain consists of the dFMEA and DVP&R. The process chain consists of the Characteristics Matrix, Process Flow Diagram, pFMEA, and Control Plan. The sections below describe each document and how the documents relate to each other.

Design-related documents

- General dFMEA

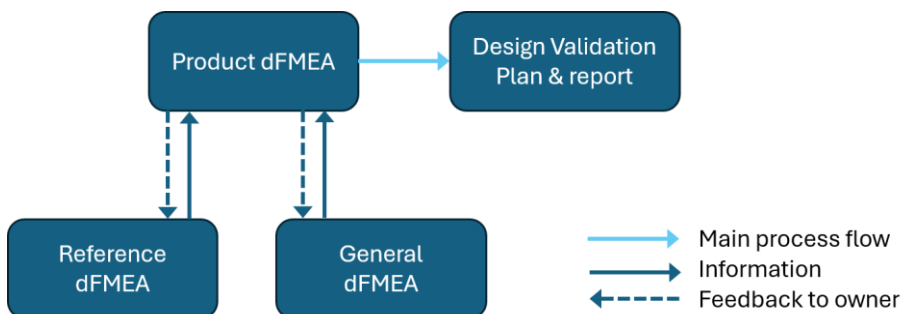
A general dFMEA contains failure modes and risks that apply broadly to a design feature. It may include interface or boundary-condition risks, such as thermal cycling or vibration. A general dFMEA can be imported into product dFMEAs as a building block for an item.
- Reference dFMEA

A reference dFMEA is a reusable dFMEA for standard design elements that repeat across product features, such as a connector type, seal or gasket design, or PCB solder interface. It can be imported into product dFMEAs as a building block for a specific requirement on an item.
- Product dFMEA

The (main) product dFMEA, listing all functions and requirements. By default, 3 levels can be used to create a hierarchy in the dFMEA; Level 1 = System, level 2 = Component and level 3 = Feature.
- Design Validation Plan & Report

A Design Validation Plan & Report (DVP&R) defines validation activities, acceptance criteria, test planning, test results, and reporting. It is connected to the dFMEA and is normally created from or alongside it. The relationship between the dFMEA and DVP&R is similar to the relationship between the pFMEA and Control Plan, but it focuses on validating design risks rather than controlling process risks during production.

The scheme below shows how the different documents from the software interact with each other for design related documents.



Process-related documents

- Characteristics Matrix

A table with all (ballooned) characteristics and their requirements on the left side and all operation steps on the top. The matrix is used to mark in which operation step each characteristic is created (X), inspected (I) or affected (A).
- Process Flow Diagram

Lists all actions in all process steps and describes the key input and output characteristics.
- General pFMEA

A pFMEA with failure modes and risks that are general for a process but are not product related. This pFMEA can include general machine or operator risks, such as the risk of a chemical spill in an etching process. In some cases, the general pFMEA can be equipment specific if very different machines are used for the same process. The general pFMEA can be imported into all partnumber pFMEAs as a building block for a process.

This pFMEA should be maintained by the accountable Manufacturing Engineer or Equipment Engineer.

- Reference pFMEA

A reusable pFMEA for a specific process, describing the failure modes and risks for different general features created in this process. For example, in the CNC drilling process, features such as hole diameter and hole location are created. The reference pFMEA can be imported into all partnumber pFMEAs as a building block for a part-specific characteristic.

This pFMEA should be maintained by the accountable Process Engineer.

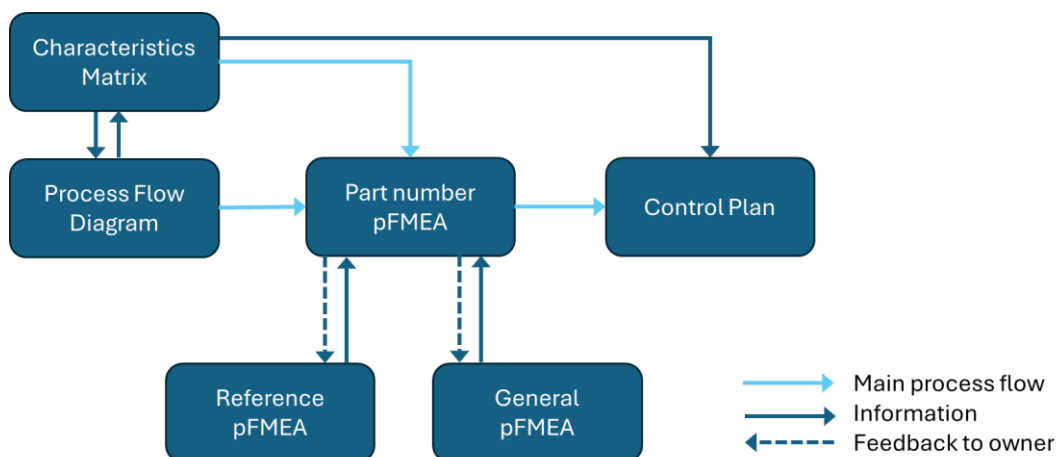
- Partnumber pFMEA

The main partnumber pFMEA lists all processes and all characteristics created in each process step, imported from the Characteristics Matrix. General pFMEAs are imported per process step, and relevant elements of the reference pFMEA are imported per characteristic.

- Control Plan

A table with all process and product controls necessary to ensure conforming product, combining the Characteristics Matrix and partnumber pFMEA. The Control Plan is designed to work alongside work instructions or operator instructions and provides a written summary of the controls required when producing a specific part.

The scheme below shows how the different process documents from the software interact with each other. Either the Characteristics Matrix or the Process Flow Diagram can be used as the input document for the Partnumber pFMEA.



2. Installation guide

The software does not require registry changes. During installation, the selected folder is populated with the required files and subfolders. For best results, install the software in a network location that all relevant employees can access.

The installation package contains the following files and folders:

/Main folder

IqarusLauncher.exe	(launcher to start the program)
Iqarus_x86.exe	(main program for 32-bit machine)
Iqarus_x64.exe	(main program for 64-bit machine)
Update.exe	(used to install software updates)
DGVPrinter2.dll	(dll for printing and export to PDF)
Iqarus_manual.pdf	(this user manual)
CurrentVersions.config	(configuration file for updates)
ReleaseNotes.txt	(information on software changes)
Google.Apis.dll	
Google.Apis.Auth.dll	
Google.Apis.Core.dll	
Google.Apis.Drive.v3.dll	
Newtonsoft.JSON.dll	

/Database

FMEA_DB.mdb	(database containing the saved pFMEA's)
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/Fonts

VFSymbols.TTF	(Font for GD&T symbols)
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/Templates (Excel templates for export of QM documents)

Char Matrix TEMPLATE.xlsx
Control Plan TEMPLATE.xlsx
dFMEA TEMPLATE.xlsx
Design Validation Plan & Report TEMPLATE.xlsx
pFMEA TEMPLATE.xlsx
Process Flow Diagram TEMPLATE.xlsx
Action List TEMPLATE.xlsx
RPN Pareto TEMPLATE.xlsx

To create a desktop shortcut, hold Alt and drag IqarusLauncher.exe to the desktop.

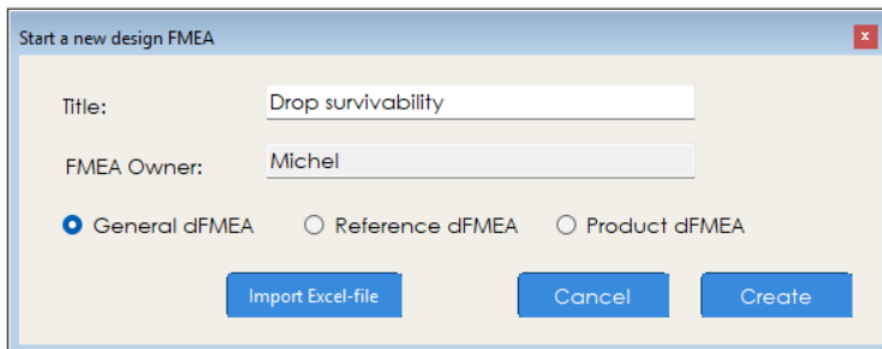
3. Quick start

The recommended workflow starts with the design documents and then continues with the process documents. Use the design workflow to define and validate product risks through the dFMEA and DVP&R. Use the process workflow to define, analyze, and control production risks through the Characteristics Matrix, Process Flow Diagram, pFMEA, and Control Plan.

3.1. Design document workflow: dFMEA and DVP&R

Step 1: Create General dFMEA's (optional)

In the menu bar of the main window, click on **Start**, select **New...** and select **dFMEA**.



Enter a title for the dFMEA, select **General dFMEA**, and click **Accept**.

An item description is required to create the General dFMEA. Enter the description and click **Create New Item**.

Add extra process steps, requirements, failure modes, potential effects, or potential causes using the buttons

 or the menu bar.

When you add a new item, IQARUS automatically creates the correct hierarchy. For example, a new failure mode is added under the same requirement as the selected failure mode. Enter the Severity, Occurrence, and Detectability scores by typing a value from 1 to 10 or by double-clicking the field and selecting a value from the table. When all scores in a row are entered, IQARUS automatically calculates and color-codes the RPN.

When the initial version of the General dFMEA is finished, select the **Released** checkbox to make it available for import into Product dFMEAs. Otherwise, it will remain in Draft status.

Save your dFMEA via the menu bar or **Ctrl-S**.

Step 2: Create Reference dFMEA's (optional)

This is nearly identical to creating a General pFMEA, except the option **Reference dFMEA** should be selected when a new dFMEA is started. The columns which are product specific are greyed-out and read-only and are not required in the reference dFMEA.

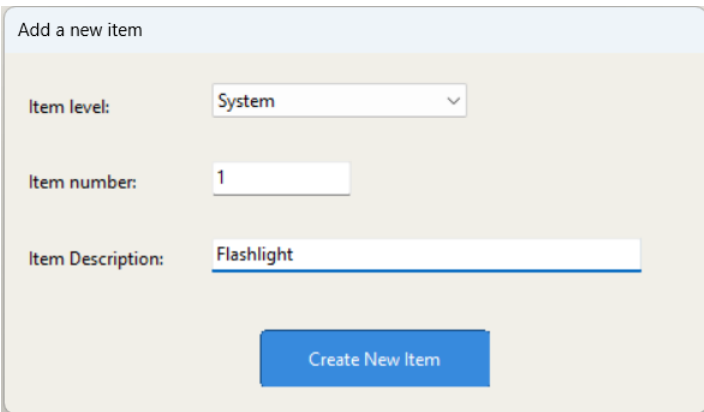
Step 3: Create Product dFMEA

In the menu bar of the main window, click **Start**, select **New...**, and select **dFMEA**. Enter a title for the dFMEA, select **Product dFMEA**, and click **Create**.

Items can be added in a three-level hierarchy: System, Component, or Feature. To maintain the hierarchy in the dFMEA, use the proposed item numbering logic:

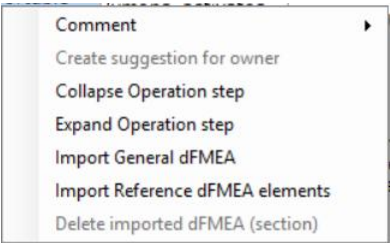
- Level 1 – System: Item number 1
- Level 2 – Component: Item number 1.1
- Level 3 – Feature: Item number 1.1.1

Click on **Create New Item** to insert the first item into the dFMEA.

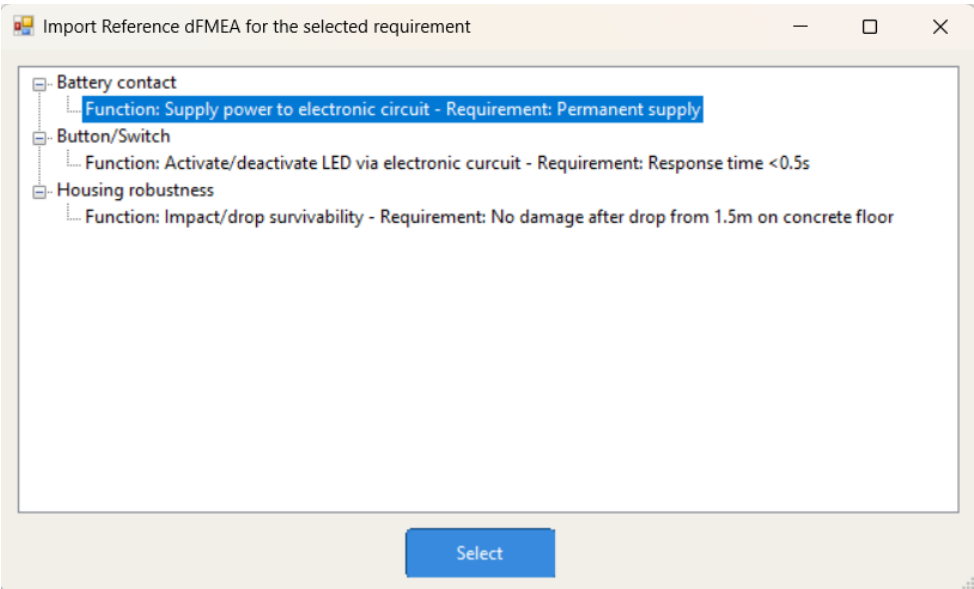


A form titled "Add a new item" with a light blue header. It contains three input fields: "Item level:" with a dropdown menu showing "System", "Item number:" with a text box containing "1", and "Item Description:" with a text box containing "Flashlight". Below these fields is a blue button labeled "Create New Item".

By right-clicking in the dFMEA, the context menu below is shown and can be used to import the previously created and released General dFMEAs, which will appear in purple text.



When the same action is performed on a requirement (of a function), a Reference dFMEA element can be imported. A tree view with all released Reference dFMEA's is shown. Use the (+) to view all available features from the dFMEA and select the feature that matches the requirement of the characteristic; click on **Select**.



The dFMEA section will be imported into the Product dFMEA and displayed in dark blue text. Fill in all remaining fields, including the Severity, Occurrence, and Detectability scores and any recommended actions with an owner and due date. Save your dFMEA via the menu bar or **Ctrl-S**.

Step 4: Create a Design Validation Plan & Report

In the menu bar of the main window, click on **Start**, select **New...** and select **Design Validation Plan & Report**. Enter a title for the Design Validation Plan & Report, select the applicable product dFMEA, and click **Create**. All Functions and Requirements from the dFMEA will be imported (dark green text color and with the reference number from the dFMEA).

By double-clicking on a Requirement, the Cause of Failure and Current Controls that were entered in the dFMEA are shown on the right. Use this as a guidance to fill in the test name and method, the sample size and frequency and acceptance criteria.

If the dFMEA has process controls mentioned, add these to the Control Plan by selecting them and clicking **Copy Detection to Test Method**.

Save the Design Validation Plan & Report from the menu bar or by pressing **Ctrl-S**.

3.2. Process document workflow: CM, PFD, pFMEA and CP

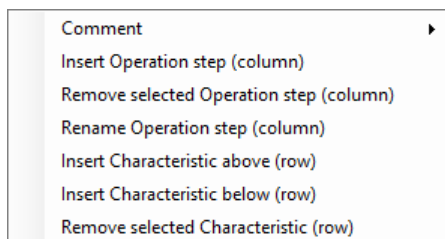
Step 1: Create the Characteristics Matrix (optional)

In the menu bar of the main window, click on **Start**, select **New...** and select **Characteristics Matrix**.

Enter a title for your matrix and click on **Create**.

A first operation step is required to create the Characteristics Matrix. Enter the operation number and description, then click **Create New Step**.

Add extra characteristics (rows) and operation steps (columns) using the buttons  , the menu bar, or the context menu opened with the right mouse button.

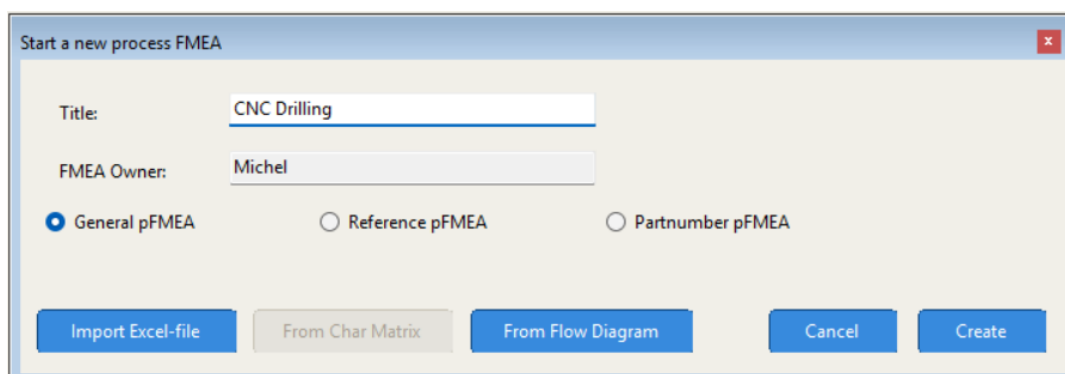


For each characteristic, mark the operation step in which it is created (X), inspected (I), or affected (A). Combinations are possible, but a characteristic can be created in only one operation step.

Save your Characteristics Matrix via the menu bar or **Ctrl-S**.

Step 2: Create General pFMEA's

In the menu bar of the main window, click on **Start**, select **New...** and select **pFMEA**.



Enter a title for your pFMEA, select **General pFMEA** and click on **Create**.

A process description is needed to create the General pFMEA, enter the description and click on **Create New Step**.

Add extra process steps, requirements, failure modes, potential effects, or potential causes using the buttons



When you add new items, IQARUS automatically creates the correct hierarchy. For example, a new failure mode is added under the same requirement as the selected failure mode. Enter the Severity, Occurrence, and Detectability scores by typing a value from 1 to 10 or by double-clicking the field and selecting a value from the table. When all scores in a row are entered, IQARUS automatically calculates and color-codes the RPN.

When the initial version of the General pFMEA is finished, select the **Released** checkbox to make it available for import into partnumber pFMEAs. Otherwise, it will remain in Draft status.

Save your pFMEA via the menu bar or **Ctrl-S**.

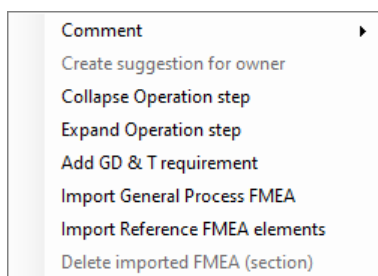
Step 3: Create Reference pFMEA's

This is nearly identical to creating a General pFMEA, except the option **Reference pFMEA** should be selected when a new pFMEA is started. The columns that are part-specific are greyed out and read-only and are not required in the reference pFMEA.

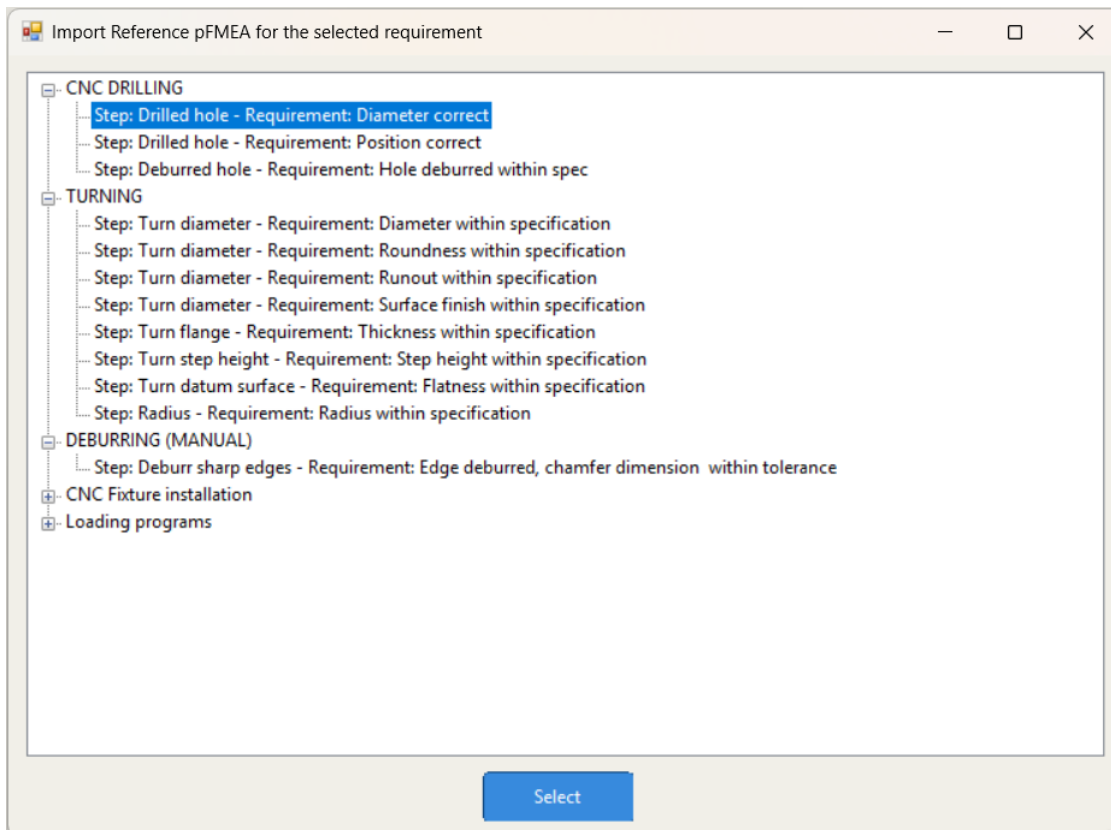
Step 4: Create Partnumber pFMEA

In the menu bar of the main window, click **Start**, select **New...**, and select **pFMEA**. Enter a title for the pFMEA, select **Partnumber pFMEA**, and click **From Char Matrix**.

Select the applicable Characteristics Matrix from the table shown and click **Select**. The operation steps from the Characteristics Matrix will be imported in the FMEA and the characteristics will be added to the operation step where they are created (marked with X (created) in Characteristics Matrix), recognizable by the brown text color. By right-clicking in the pFMEA, the content menu below is shown and can be used to import the previously created (and released) General pFMEA's which will have a purple text color.



When the same action is performed on a requirement (of a characteristic), a Reference pFMEA element can be imported. A tree view with all released Reference pFMEA's is shown. Use the (+) to view all available features from the pFMEA and select the feature that matches the requirement of the characteristic; click on **Select**.



The pFMEA section will be imported into the Partnumber pFMEA and displayed in dark blue text. Fill in all remaining fields, including the Severity, Occurrence, and Detectability scores and any recommended actions with an owner and due date. Save your pFMEA via the menu bar or **Ctrl-S**.

Step 5: Create a Control Plan

In the menu bar of the main window, click on **Start**, select **New...** and select **Control Plan**.

Enter a title for the Control Plan, select the type of Control Plan you want to create (Prototype, Pre-Launch, or Production), select the applicable Partnumber pFMEA, and click **Create**.

All characteristics from the pFMEA will be imported (dark green text color and with the reference number from the pFMEA), all characteristics from the Characteristics Matrix marked with I (inspected) will be imported at the corresponding operation step (brown text color).

By double-clicking on a 'green' Product Characteristic (imported from the pFMEA), the current controls that were entered in the pFMEA are shown on the right. Use this as a guidance to fill in the evaluation method, sample size and frequency and control method.

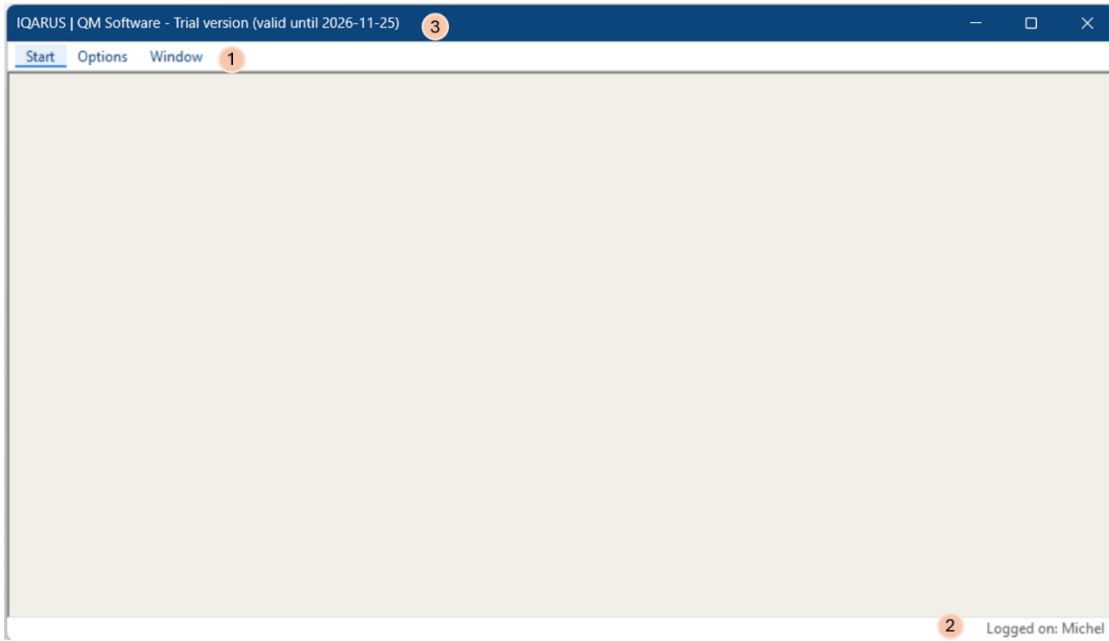
If the pFMEA has process controls mentioned, add these to the Control Plan by selecting them and clicking **Add selection as extra Process Characteristic**.

Save your Control Plan via the menu bar or **Ctrl-S**.

4. User interface overview

This section shows a general overview of the main interfaces, being the main window and the windows for the dFMEA, DVP&R, Characteristics Matrix, Process Flow Diagram, pFMEA and Control Plan. Detailed descriptions about all functionalities and options are given in chapter 5 *How to use specific features*.

4.1. Main window



The main window contains:

- (1) a menu bar on the top,
- (2) the (Windows) username at the bottom right, which is also used to identify the table owner and to label changes made in the table, and
- (3) Trial period or license information in the program header.

The program is available as a free trial for a period of 3 months, after which it is no longer possible to open or create new QM documents. A license can be purchased to have unlimited access.

Via the Start menu, you can open or start a new document (dFMEA, Design Validation Plan & Report, Characteristics Matrix, Process Flow Diagram, pFMEA or Control Plan).

In the options menu, user specific preferences can be set.

Each QM document that is created will have a unique table number, which is always indicated in the window title between square brackets. This also serves as a reference to link different documents. In the pFMEA's, each line has a unique reference number (last column), consisting of the table number, the operation step number and an index. This can be used to determine from which table a pFMEA is imported.

4.2. dFMEA

The dFMEA window is expected to follow the same general layout and way of working as the pFMEA window, with a menu bar, insert/delete options, general header information, scoring fields, actions and a content area for the design risk analysis.

The layout of the dFMEA window has the following basic content:

- (1) Menu bar at the top
- (2) Buttons to insert a line above or below the active line or to delete a line
- (3) General header info field
- (4) Color legend for imported documents
- (5) The column headers of the dFMEA
- (6) Content area of the dFMEA

The dFMEA can be fanned out:

- Each Item can have multiple Functions
- Each Function can have multiple Requirements
- Each Requirement can have multiple Potential Failure Modes
- Each Potential Failure Mode can have multiple Potential Effect of Failures
- Each Potential Effect of Failure can have multiple Potential Causes of Failure
- Each Potential Causes of Failure can have multiple Current Controls
- Each Potential Causes of Failure can have multiple Recommended actions

The Severity (S) is related to the Potential Effect of Failure

The Occurrence (O) is related to the Potential Cause of Failure

The Detection (D) is related to the Current Controls

The Criticality Class (CC) is related to the requirement.

The Reference and General dFMEA need to be released before they can be imported in a Product dFMEA. To release the document, tick the checkbox in the top right of the header info field. This action cannot be undone. A Product dFMEA cannot be released because it is a living document. However, the current status can be recorded by exporting the dFMEA to Excel or printing it to a printer or PDF, which will include the last saved date and the current date.

The Product dFMEA contains a legend for the different colors used in the content area for imported details.

For a reference dFMEA, a number of columns in the content area are greyed out and locked for editing because these columns are part-specific.

4.3. DVP&R

The DVP&R window is expected to follow the same general layout and way of working as the Control Plan window, with a menu bar, insert/delete options, general header information, linked dFMEA references, validation planning fields and a content area for validation test planning and reporting.

Design Validation Plan & Report DVP & R Demo Flashlight [1]

File View Edit Actions 1

2

DVP & R Title: DVP & R Demo Flashlight 3 Company: Partnumber: Customer: 4
DVP & R Owner: MichelWerts Department: Customer partnumber: Legend: Green: Imported from dFMEA
Team members: Design details: Last revision date: 2026-08-25 Purple: Imported General dFMEA

Nr	Item	Function	Requirement	Reference	Test name	Test method	Acceptance criteria	Sample size
1	Flashlight assembly	Provide portable illumination on demand	Light output >200 lumens, activates within 0.5s of switch press	2.1.1	FAI	First Article Inspection	All tests passed	
1.1	Battery contact	Supply power to electronic circuit	Permanent supply	2.1.6	BAT-1	Spring force verified via DVP&R life-cycle test		
				2.1.7	SST-1	Salt spray test per DVP&R	after 500h no corrosion visible	8
1.2	LED	Provide light output	Light output >200 lumens	2.1.8	THERIMG	Thermal imaging test during DVP&R	Tmax < 65°C	4
				2.1.9	LUMEN-1	Lumen output measured at 0, 500, 1000 hours per DVP&R	Output change <5%	8 (3 lots)
1.3	Driver circuit/switch electronics	Provide constant power	Current fluctuations >10%	2.1.10	IPC610	X-ray/visual inspection per IPC-A-610	Pass IPC-A-610	50
1.4	Lens & seal	Prevent water on electronic components	IPX7	2.1.11	IPX7	IP rating verification test (IPX7) per DVP&R	Pass IPX7	4
		Impact/drop survivability	No damage after drop from 1.5m on concrete floor	2.1.12	DT-1	Drop test per DVP&R	Visual acceptance criteria ABC after 20x drops according Spec F	6
1.5	Switch	Activate/deactivate LED via electronic circuit	Response time <0.5s	2.1.13	ACT-1	Actuation cycle test per DVP&R	10000 cycles max. response time 0.5 sec	24
1.6	Housing	Frequent handling	No visible surface wear after 1000h	2.1.14	HCT-1	Handling cycle test	Visual acceptance criteria ABC	8

Function: Provide light output

Requirement: Light output >200 lumens

Reference: 2.1.8

7

dFMEA details

Potential Cause	Prevention	Detection	Reference
LED junction failure from thermal overstress	Thermal overstress design (heat sink)	Thermal imaging test during DVP&R	2.1.8
LED operated beyond rated current	Driver circuit current-limited per LED spec	Lumen output measured at 0, 500, 1000 hours per DVP&R	2.1.9

Copy Detection to Test method

The layout of the Design Validation Plan & Report window has the following basic content:

- (1) Menu bar at the top
- (2) Buttons to insert a line below the active line or to delete a line
- (3) General header info field
- (4) Color legend for imported documents
- (5) The column headers of the DVP&R
- (6) Content area of the DVP&R
- (7) Current controls from dFMEA

4.4. Characteristics Matrix

Characteristics Matrix Demo IQARUS [2]

File Edit View Actions 1

2

Char Matrix Title: Demo IQARUS 3 Partnumber: Customer: X
Owner: Michel Customer partnumber: Team members:
Last revision date: Part / family description:

Char.	Description	Requirement	Location	Char Designator	Is equal to:	10. CNC MILLING

5

X = Created, I = Inspected, A = Affected

The layout of the Characteristics Matrix window has the following basic content:

- (1) Menu bar at the top
- (2) Buttons to insert or delete a characteristic (row) or to insert or delete a process step (column)
- (3) General header info field
- (4) The column headers of the Characteristics Matrix
- (5) Content area of the Characteristics Matrix

4.5. Process Flow Diagram

The layout of the Process Flow Diagram window has the following basic content:

- (1) Menu bar at the top
- (2) Buttons to insert or delete an operation or process step (row)
- (3) General header info field
- (4) The column headers of the Process Flow Diagram
- (5) Content area of the Process Flow Diagram

4.6. pFMEA

The layout of the pFMEA window has the following basic content:

- (1) Menu bar at the top
- (2) Buttons to insert a line above or below the active line or to delete a line
- (3) General header info field
- (4) Color legend for imported documents
- (5) The column headers of the pFMEA
- (6) Content area of the pFMEA

The header of the third column is called *Feature* for Reference pFMEA's, *Process step* for General pFMEA's and *Process step/Char* for Partnumber pFMEA's.

The pFMEA can be fanned out:

- Each Operation step can have multiple process steps and/or characteristics

- Each Process step can have multiple Requirements
- Each Requirement can have multiple Potential Failure Modes
- Each Potential Failure Mode can have multiple Potential Effect of Failures
- Each Potential Effect of Failure can have multiple Potential Causes of Failure
- Each Potential Causes of Failure can have multiple Current Controls
- Each Potential Causes of Failure can have multiple Recommended actions

The Severity (S) is related to the Potential Effect of Failure

The Occurrence (O) is related to the Potential Cause of Failure

The Detection (D) is related to the Current Controls

The Criticality Class (CC) is related to the requirement.

The Reference and General pFMEA need to be released before they can be imported in a Partnumber pFMEA. To release the document, tick the checkbox in the top right of the header info field. This action cannot be undone. A Partnumber pFMEA cannot be released (since it is a living document), however the actual status can be stored by exporting to Excel or printing the pFMEA (to a printer or PDF), which will include the last saved and actual date.

The Partnumber pFMEA contains a legend for the different colors used in the content area for imported details. For a reference pFMEA, a number of columns in the content area is greyed out and locked for editing, since these columns are part specific.

4.7. Control Plan

Control Plan Demo (IQRUS Prototype) [2]

File Edit View Actions (1)

Type: ☒ Prototype ☐ Pre-launch ☐ Production (3)

Control Plan Title: Demo IQRUS

Control Plan Owner: michel.werts

Team members:

Company: Iqarus Mfg

Department: Small tools production

Manufacturing site: Building B

Process details:

Partnumber: AEROFLY-X-49B

Customer: AEROFLY

Customer partnumber: X-49B

Last revision date:

Legend: (4)
Green: Imported from FMEA
Brown: Imported from Char Matrix

Op.	Operation description	Machine, device, jig, tools	Reference (5)	Product Characteristic	Process characteristic	CC	Product/Process specification	Evaluation / measurement method
10	TURNING BOTTOM		5.10.17	1. Install fixture		NC	Correct fixture	
			5.10.20	1. Install fixture		NC	Flatness < 0.02 mm	
			5.10.14	2. Load CNC program		C	Correct program	
			5.10.3	3. Place product in fixture		NC	Runout < 0.02 mm	
			5.10.5	6. Clean part			Part is clean	
			5.10.6	6. Check dimensions on lathe			Char. 1 ID: $\varnothing 8.50 \pm 0.05$ mm	
			5.10.12	6. Check dimensions on lathe			Char. 5 OD: $\varnothing 13.50 \pm 0.10$ mm	
			5.10.13	6. Check dimensions on lathe			Char. 10 Flatness: ≤ 0.02 mm	
			5.10.9	9. Store product on tray			No damage	
20	TURNING TOP							
30	DRILLING							
40	CMM							
50	DEBURR (MANUAL)							
60	FINAL INSPECTION							

Process step/Char: 2. Load CNC program

Requirement: Correct program

Reference: 5.10.14 (7)

Current controls

Prevention	Detection	Reference
Program names checked during verification phase	none	5.10.14
none	Visual check of name after loading of program by operator	5.10.15
none	Visual check of name after loading of program by operator	5.10.16

Add selection as extra Process Characteristic

Copy Detection to Evaluation method

The layout of the Control Plan window has the following basic content:

- (1) Menu bar at the top
- (2) Buttons to insert a line above or below the active line or to delete a line
- (3) General header info field
- (4) Color legend for imported documents
- (5) The column headers of the Control Plan
- (6) Content area of the Control Plan
- (7) Current controls from pFMEA

The type of Control Plan (Prototype, Pre-launch, Production) is selected when a new Control Plan is made. Via the menu, it can be 'upgraded' from Prototype to Pre-launch or from Pre-launch to Production. This automatically locks the previous type for changes.

5. How to use specific features

5.1. Starting the software

Start the program *IqarusLauncher.exe*. A splash screen will appear while the database is loading, showing the software logo and revision number.

New users will see a welcome message, indicating they are successfully added as user to the database.

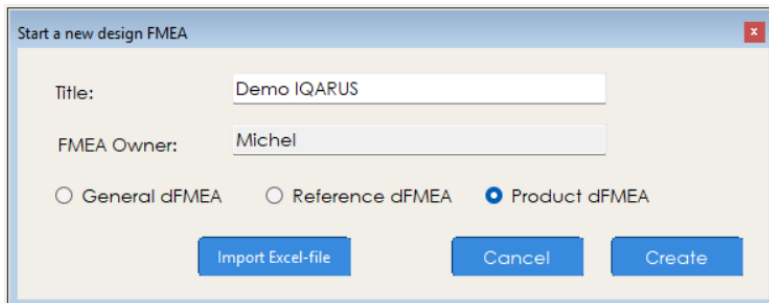
Owners of Reference or General pFMEA's might get a window, showing a list of suggestions for their pFMEA's.

5.2. dFMEA

Start a new dFMEA

Click on **Start – New - dFMEA** or alternatively press **Ctrl-N** to open the **New** menu.

Enter a title name (can be changed afterwards) and select the type of dFMEA you want to create.



For each type of dFMEA, either import an existing dFMEA from Excel (by clicking on **Import Excel-file**) or create a new (empty) dFMEA

When an Excel-file is imported, the software will try to recognize the header descriptions and match them with the required fields. The Excel-file is opened and a table with found headers is shown. If needed, the number of the column to be imported can be changed manually in the last column.

Select correct column number for headers

Required column name	Column name found in Excel file	Column number (change if needed)
Nr.	Nr.	1
Item	Item	2
Function	Function	3
Requirement	Requirement	4
Potential Failure Mode	Potential Failure Mode	5
Potential Effect of failure	Potential Effect(s) of Failure	6
S	S	7
CC	Class	8
Potential Cause of Failure	Potential Cause(s) of Failure	9
O	O	10
Prevention of Potential Cause	Prevention of potential cause of failure	11
Detection of Potential Cause	Detection of potential Failure Mode occurrence	12
D	D	13
RPN	RPN	14
Recommended action / Corrective action	Recommended Improvement / Corrective Actions	15
Action owner	Action owner	16
Due date	Due Date	17
Actual Improvement	Actual Improvement / Corrective Actions implemented	18
Actual Date	CompletionDate	19
S	S	20
O	O	21
D	D	22
RPN	RPN	23

Cancel Accept

Open a dFMEA

Click on **Start – Open - dFMEA** or alternatively press **Ctrl-O** to open the **Open** menu. A list of all active dFMEA's is shown with the main header info (title, type of FMEA, release status, owner and last update). Click **Open** to load the selected dFMEA.

Open dFMEA

Table number	Title	Type	Status	Owner	Last update
2	Example flashlight	Product		MichelWerts	2026-08-11
3	Battery contact	Reference	Released	MichelWerts	2026-07-31
4	Button/Switch	Reference	Released	MichelWerts	2026-07-31
6	Housing robustness	Reference	Released	MichelWerts	2026-07-31
7	Housing wear	General	Released	MichelWerts	2026-07-31

Cancel Open

If a Product dFMEA is opened, the software will automatically check for updates in the imported General and Reference dFMEA's.

- Changed text or comments are marked in bold
- New added rows are marked in bold
- Deleted rows are struck through

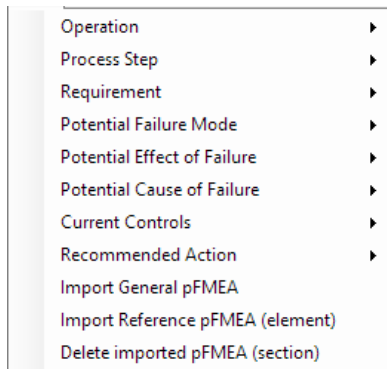
Changes are also summarized in a new window *Updated fields from imported dFMEA's for Product dFMEA ...*, with the old and new text. Review these changes and add comments in the dFMEA or uncheck if not applicable. When the pFMEA is saved, all changes will be included.

A pFMEA can be open for only one user at a time. Other users can open it in read-only mode.

Insert a new row

Adding new rows to the dFMEA can be done by:

- Clicking on one of the following buttons  , the dFMEA will be fanned out by adding an item (row) at the selected cell (if applicable), see chapter 4.6xxxx.
- Via the menu bar, click **Edit**, click the desired item to add and select **Insert above** or **Insert below**. An item can only be added at the selected column or left of the selected column.



- By pressing Ctrl-Ins (a new row is added below the active row)

To insert a new Item, a dialog screen is shown to enter the Item level, number and description. After being added, the number and description cannot be changed.

A Recommended action can only be added below the last action of a Cause of Failure, to have a chronological order of the actions performed. The RPN value of the last performed action is considered to be the current status.

Remove a row

A row can be removed from the dFMEA by:

- Clicking on the button , the selected item and all items that are fanned out from this item (right side of the selected cell) will be deleted,
- Via the menu bar, click **Edit**, click the desired item and select **Delete**. Only the selected column can be deleted.
- By pressing Ctrl-Del.

Collapse/Expand Items

For readability of the dFMEA, all content of an Item can be hidden by collapsing its content. This is done by double-clicking on the Item number or description (first 2 columns). The text *Double click to expand* appears in the column *Function*.

The Item can be expanded again by double-clicking on any cell in the row.

No.	Item	Function	Requirement	Potential Failure Mode	Potential Effect of Failure
1	Flashlight assembly	Double click to expand			

Add a GD&T description for a characteristic

In the requirement column, right-click on a row and select **Add GD&T requirement**. From the pull-down menu **GD&T feature**, a list of the most common features can be selected, the tolerance definition will automatically change depending the selection (without tolerance, min - max value, nominal with min/max tolerance, only upper tolerance, only lower tolerance), but this can be changed manually.

Input requirement with GD&T symbols

GD & T feature: Linear dimension

☐ Free state ☐ Basic dimension

Tolerance definition: Nominal with min/max tolerance

Units: mm

Nominal value: 15.000 Min. tolerance: 0.025 Max. tolerance: 0.025

Result: 15.000 ±0.025 mm

Cancel Insert

- Linear dimension
- Diameter
- Radius
- Concentricity/coaxiality
- Cylindricity
- Circularity/roundness
- Runout
- Total runout
- Straightness
- Symmetry
- Flatness
- Parallelism
- Perpendicularity
- Angle
- Angularity
- Surface roughness
- Position
- Line profile
- Surface profile

For the *referenced datums*, enter only the letter of the datum. The combined result of the entries is shown at the bottom.

Below an example for a runout of 0.050 mm, relative to datum [A] and [B]. The result is placed in the Characteristics Matrix by clicking on **Insert**.

Input requirement with GD&T symbols

GD & T feature: Runout

☐ Free state

Referenced datums: a b

Tolerance definition: Only upper tolerance

Units: mm

Upper tolerance: 0.050

Result: 0.050 [A] [B] mm

Cancel Insert

Release a Reference or General dFMEA

When the initial version of a Reference or General dFMEA is finished, tick the checkbox **Released** to make it available for import in Product dFMEA's, otherwise it will have the status **Draft**. The status is visible in the list of available dFMEA's when a dFMEA is opened.

In a released Reference dFMEA, it is not possible to add new Potential Failure Mode or Potential Cause of Failure above the first row of a Requirement

In a released General dFMEA, it is not possible to add a new row above the first row.

Import a Reference or General dFMEA in a Product dFMEA

A (released) General dFMEA can be imported by:

- Right-clicking in the dFMEA and selecting **Import General dFMEA** from the menu
- Via the menu bar, clicking **Edit** and clicking **Import General dFMEA**.

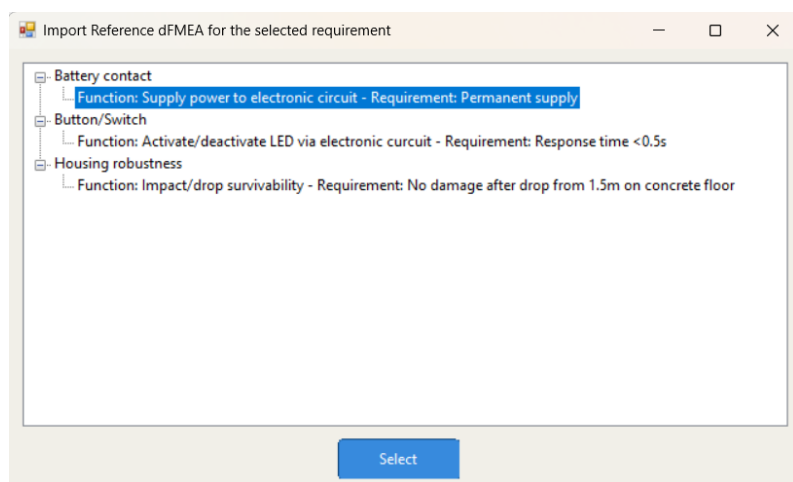
Select the dFMEA from the presented list and click **Select**. If your dFMEA is not in the list, check if it is indeed a General dFMEA and that it is released.

The dFMEA will be imported at the top of the Item in which a cell is selected, and will have a purple text color.

A (released) Reference dFMEA can be imported by selecting a Requirement, and:

- Right-clicking and selecting **Import Reference dFMEA Element** from the menu
- Via the menu bar, clicking **Edit** and clicking **Import Reference dFMEA Element**.

A tree view with all released Reference dFMEA's is shown. Use the (+) to view all available features from the dFMEA and select the feature that matches the requirement of the characteristic; click on **Select**.



The dFMEA section will be imported in the Product dFMEA with a dark blue color.

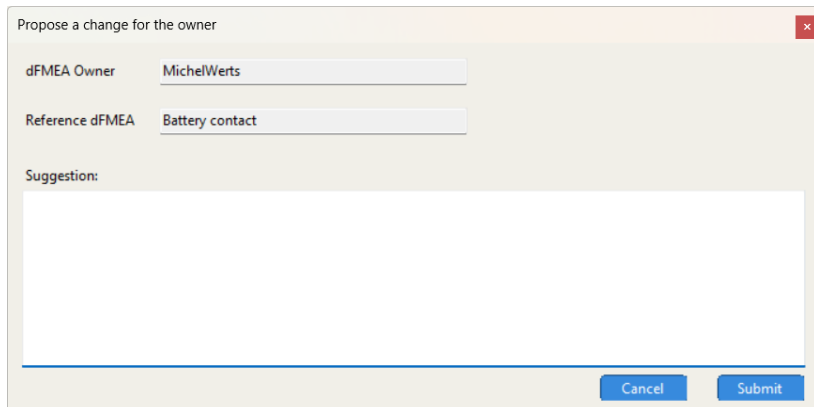
File Edit View Actions																	
																	
FMEA Title: Example flashlight				Company:				Partnumber:				Legend: Blue: Imported Reference dFMEA Purple: Imported General dFMEA					
FMEA Owner: MichelWerts				Department:				Customer:									
Team members:				Design details:				Customer partnumber:									
Last revision date: 2026-08-11																	
No.	Item	Function	Requirement	Potential Failure Mode	Potential Effect of Failure	S	CC	Potential Cause of Failure	O	Current Control: Prevention of Cause	Current Control: Detection of Failure or Cause	D	RPN	Recommended action / Corrective Action	Action Owner	Due Date	Act
1.1	Battery contact	Supply power to electronic circuit	Permanent supply	Intermittent power delivery	Local: Flickering or no light output Local: End: unsatisfied customer	8		Contact spring fatigue (loss of spring force over cycles) Corrosion at contact surface	4 3	Spring material selected for fatigue life >10000 cycles Contact plating spec	Spring force verified via DVP&R life-cycle test Salt spray test per DVP&R	3 4	96 96				
1.2	LED	Provide light output	Light output >200 lumens	No light output	Complete loss of function	8		LED junction failure from thermal overstress	3	Thermal overstress design (heat sink)	Thermal imaging test during DVP&R	3	72				
				Reduced light output over time	Local: Gradual loss of usable brightness End: unsatisfied customer	8		LED operated beyond rated current	3	Driver circuit current-limited per LED spec	Lumen output measured at 0, 500, 1000 hours per DVP&R	4	96				
			Color temperature 3000K	Color not white	System: Customer return Component: No effect	3		LED specification	2	Specify to supplier	Color measurement	3	18				

Propose a change for the owner

Imported Reference or General dFMEA's may be incomplete, incorrect (too specific) or unclear. Since these sections are imported in a Product dFMEA, they cannot be altered. The owner of the Product dFMEA can send a request to the owner of the Reference or General dFMEA for a change.

Right-click in a cell and select **Create suggestion for owner** in the menu. A window will appear to enter the suggestion.

Next time the Reference or General dFMEA owner start the Iqarus software, a window will appear showing the suggestion, including the sender, and a reference to the applicable table, row and column. Optionally, an email-message can be prepared automatically in your email program (this option can be set by the Administrator).



Set the Due date and Actual date

Dates are entered by double-clicking in the cell and selecting the date from the calendar. Press Delete to remove a date.

Non-applicable items in a Product dFMEA

Some imported rows from a Reference or General dFMEA might not be applicable for the specific Product dFMEA, but cannot be deleted, since the structure needs to match the original dFMEA to correctly update changes.

These rows can be marked as non-applicable by unchecking the checkboxes in the column *Applicable*. The Occurrence and Detectability score are set to zero.

Unchecked rows will not be:

- Exported or printed
- Listed in the Pareto or action list
- Imported in the Control Plan

Set the severity, occurrence or detectability score

For the severity, occurrence or detectability (S-O-D) score, the value 1 – 10 can be entered directly. The severity score will also be filled in the second S-O-D columns (after improvements). If all 3 values are entered, the RPN (or AP) will be calculated automatically.

To aid the user in selecting the correct score, a detailed description for each value (from 1 – 10) is shown by double-clicking on a S-O-D cell. In the preferences, select for which industry (or custom) the descriptions should be shown. Use the buttons **Next** and **Previous** to scroll through them. If a value is selected, clicking **Accept** will fill in the value in the dFMEA.

Custom descriptions can be added and/or changed by the administrator, see chapter 8.

Selection of Severity rating

Previous

Next

AS13100: Severity of Effect on Product

Potentially hazardous failure without warning. Failure potentially affects safe operation of the product or causes regulatory non-compliance.	10
Potentially hazardous failure with warning. Failure potentially affects safe operation of the product, causes regulatory non-compliance or results in a significant reduction in safety margins.	9
Product is not operational; safety not compromised. Failure causes major customer dissatisfaction and severe disruptions.	8
Operability severely affected; primary functions/systems may be degraded. Failure causes high degree of customer dissatisfaction or severe disruptions.	7
Operability significantly degraded; secondary systems may be inoperable. Failure causes significant customer dissatisfaction or significant disruptions.	6
Moderate effect on operability; secondary systems may be degraded. Product secondary systems do not conform to operational requirements. Failure causes customer dissatisfaction, often resulting in operational disruption.	5
Moderate effect on operability. Non-compliance to functional requirement, although all systems operational. Failure causes some customer dissatisfaction noticed by most customers, often requiring in-service repair.	4
Minor effect on operability. Non-compliance to functional requirement. Failure causes	-

Cancel

Accept

Selection of Detection rating

Previous

Next

AIAG: Likelihood of Detection by Design Control

shipping evaluation, etc.)	-
Product verification/validation after design freeze and prior to launch with test to failure testing (Subsystem or system testing until failure occurs, testing of system interactions, etc.).	7
Product verification/validation after design freeze and prior to launch with degradation testing (Subsystem or system testing after durability test, e.g., function check).	6
Product validation (reliability testing, development or validation tests) prior to design freeze using pass/fail testing (e.g., acceptance criteria for performance, function checks, etc.)	5
Product validation (reliability testing, development or validation tests) prior to design freeze using test to failure (e.g., until leaks, yields, cracks, etc.)	4
Product validation (reliability testing, development or validation tests) prior to design freeze using degradation testing (e.g., data trends, before/after values, etc.)	3
Design analysis/detection controls have a strong detection capability. Virtual analysis (e.g., CAE, FEA, etc.) is highly correlated with actual or expected operating conditions prior to design freeze.	2
Failure cause or failure mode cannot occur because it is fully prevented through design solutions (e.g., proven design standard, best practice or common material, etc.)	1

Cancel

Accept

Create an action list (F6)

The action list contains all rows that have a recommended action or action owner but no *Actual date*, plus all risks with an RPN score above the set limit, even if no recommended action is entered. This limit is set in the Preferences screen (see chapter 5.7).

The action list can be exported to Excel with the **Export** button.

Create RPN Pareto list (F7)

When the Risk Profile is set to RPN (Risk Priority Number), a Pareto list can be made, ranking the RPN scores from high to low.

The Pareto can be exported to Excel with the **Export** button.

Show linked documents (F8)

This shows QM documents that are related to the current dFMEA.

For a Product dFMEA it will show the imported Reference dFMEA's, imported General dFMEA's and Design Validation Plan & Report. For a Reference or General dFMEA, it will show all Product dFMEA's in which this dFMEA is used.

The QM documents can be opened by double-clicking on a row.

5.3. Design Validation Plan & Report

Start a new Design Validation Plan & Report

Click on **Start – New – Design Validation Plan & Report** or alternatively press **Ctrl-N** to open the **New** menu.

Enter a title name (can be changed afterwards), select the Product dFMEA to import and click on **Accept** to create the Design Validation Plan & Report (DVP&R).
The list will only show Product dFMEA's without a linked DVP&R, e.g. each dFMEA can only have one DVP&R.

Table number	Title	Part number	Owner	Last update
2	Example flashlight		MichelWerts	2026-08-11

All Functions and Requirements from the dFMEA (including unchecked rows) are imported in the DVP&R and are shown with a dark green text color. Functions and Requirements from a General dFMEA are shown in a purple text color. The reference is to the specific row in the dFMEA.

Open a Design Validation Plan & Report

Click on **Start – Open - Design Validation Plan & Report** or alternatively press **Ctrl-O** to open the **Open** menu. A list of all active DVP&Rs is shown with the main header info (title, product, owner and last update). Click **Open** to load the selected DVP&R.

Table number	Title	Product	Status	Owner	Last update
9	Demo flashlight		Open	MichelWerts	2026-08-14

A DVP&R can only be open by one user and will automatically be opened read-only for other users. The DVP&R will automatically be updated with recent changes in the dFMEA.

Filling the table

The DVP&R should contain all tests that need to be conducted to validate the design.

By double-clicking on a Requirement (imported from the dFMEA), the current controls that were entered in the dFMEA are shown on the right. Use this as a guidance to fill in the test method, sample size and acceptance criteria.

Test methods in the Detection column can directly be imported in the DVP&R, by selecting the applicable cells and clicking **Copy Detection to Test Method**.

Insert a new row

Adding new rows to the Control Plan can be done by:

- Clicking on the button ,
- Via the menu bar, click **Edit**, select **Insert row below**.
- Via the right-mouse button menu, by selecting **Insert row below**.
- By pressing Ctrl-Ins (a new row is added below the active row).

It is not possible to add new Items in the DVP&R, add these in the dFMEA instead.

Remove a row

A row can be removed from the DVP&R by:

- Clicking on the button , the selected item and all items that are fanned out from this item (right side of the selected cell) will be deleted,
- Via the menu bar, click **Edit**, select **Remove selected row**.
- Via the right-mouse button menu, by selecting **Remove row**.
- By pressing Ctrl-Del.

Non-applicable items in a Design Validation Plan and Report

Some imported rows from the Product dFMEA might not be applicable in the DVP&R, but cannot be deleted, since the structure needs to match the original dFMEA to correctly update changes.

These rows can be marked as non-applicable by unchecking the checkboxes in the column *Applicable*.

Unchecked rows will not be exported or printed.

Open the linked dFMEA

To open directly the linked dFMEA, click in the menu bar on **Actions, Linked dFMEA, Open Linked dFMEA**.

Linked dFMEA – Update with changes

To implement changes made in the linked dFMEA, click in the menu bar on **Actions, Linked dFMEA, Update**.

- Textual changes are marked in bold
- New Functions or Requirements are marked in bold in the updated cells
- Deleted Functions or Requirements are struck through

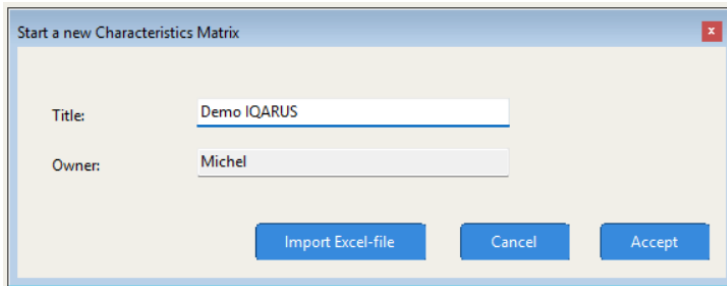
The DVP&R is also updated automatically when it is opened.

5.4. Characteristics Matrix

Start a new Characteristics Matrix

Click on **Start – New – Characteristics Matrix** or alternatively press **Ctrl-N** to open the **New** menu.

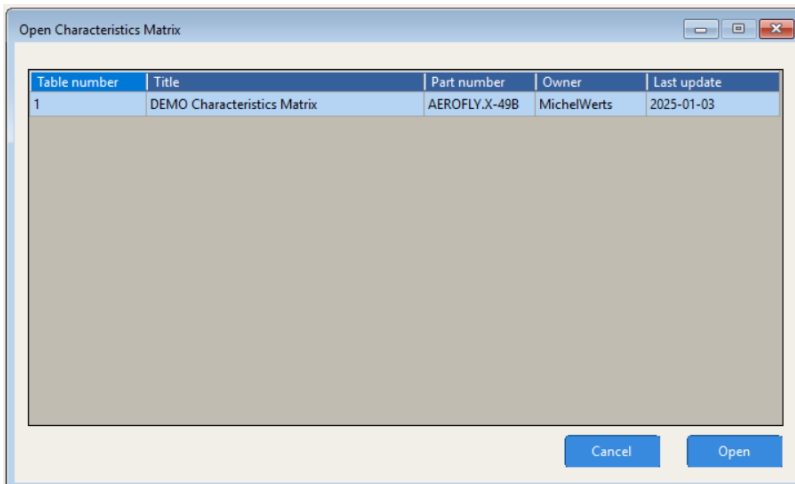
Enter a title name (can be changed afterwards) and click on **Accept** to open an empty Characteristics Matrix.



If a Characteristics Matrix is already available in Excel, this can be imported by clicking on **Import Excel-file**. The layout of the Excel-file needs to match the template, as provided with the software.

Open a Characteristics Matrix

Click on **Start – Open – Characteristics Matrix** or alternatively press **Ctrl-O** to open the **Open** menu. A list of all active Characteristics Matrices is shown with the main header info (title, Partnumber, owner and last update). Click **Open** to load the selected Characteristics Matrix.



A Characteristics Matrix can only be open by one user and will automatically be opened read-only for other users.

If a Characteristics Matrix is opened, the software will automatically check for updates on the Operation steps in the linked Process Flow Diagram (if applicable).

- Change in the operation description
- New added Operation steps is added as an extra column
- Deleted Operation steps are removed

A pop-up will show a summary of the changes.

Insert a new characteristic

A new characteristic (row) can be inserted with the following methods:

- Clicking on one of the following buttons  ,
- Right-clicking on a row and select **Insert Characteristic above (row)** or **Insert Characteristic below (row)**,
- Via the menu bar, click **Edit** and click **Insert Characteristic above (row)** or **Insert Characteristic below (row)**,

- By pressing Ctrl-Ins (a new row is added below the active row).

Remove a characteristic

A characteristic (row) can be removed by:

- Clicking on the button ,
- Right-clicking on a row and select **Remove selected Characteristic (row)**,
- Via the menu bar, click **Edit** and click **Remove selected Characteristic (row)**,
- By pressing Ctrl-Del.

Add a GD&T description for a characteristic

See the description in Chapter 5.2 dFMEA.

Add a new operation step

A new operation step (column) can be inserted with the following methods:

- Clicking on the button ,
- Right-clicking in the matrix (not in the header) and select **Insert Operation step (column)**,
- Via the menu bar, click **Edit** and click **Insert Operation step (column)**

Enter the operation number and description in the new window and press **Create New Step**. An operation number can be used only once a characteristics matrix.

Remove an operation step

An operation step (column) can be removed by:

- Clicking on the button ,
- Right-clicking on an operation step column (not in the header) and select **Remove selected Operation step (column)**,
- Via the menu bar, click **Edit** and click **Remove selected Operation step (column)**.

Rename an operation step

The name of an operation step can be changed by right-clicking on an operation step column (not in the header) and select **Rename Operation step (column)**. Only the description can be changed.

Equal or comparable characteristics

All characteristics from the matrix can be imported in a Partnumber pFMEA, but when the matrix contains many characteristics, the pFMEA will become very long, repetitive and hence unreadable. Often, similar characteristics are made in the same operation step and have the same risks. These can be combined to make the pFMEA more condensed.

To combine characteristics, enter the number of one characteristic in the column *Is equal to* at another ('main') characteristic.

In the example below, the Char number "1" is entered in the *Is equal to* column for Char. 2 and 3. For Char. 1 the text *Referenced* is added automatically and cannot be changed. It will be removed by deleting the reference (at Char. 2 and 3). Multiple characteristics can refer to the same 'main' characteristic.

Char.	Description	Requirement	Location	Char Designator	Is equal to:
1	Inner diameter [B]	Ø 8.50 ±0.05 mm		Major	Referenced
2	Inner diameter	Ø 9.50 ±0.05 mm		Minor	1
3	Outer diameter	Ø 10.00 ±0.05 mm		Minor	1
4	Radius	R 0.4 ±0.1 mm		Minor	

When the example above would be imported in a Partnumber pFMEA, the characteristic will be on one line with description *Char. 1 – Outer diameter [2, 3]*.

Filling the table (X, I, A)

For each characteristic, enter the appropriate letter(s) (X for created, I for inspected and/or A for affected) in the column of the corresponding operation step. The letters can be toggled on/off by pressing them again. A field can be cleared with Delete. A characteristic can be created (marked with X) only in one operation step. The filled information is used to fill the Partnumber pFMEA and Control Plan.

5.5. Process Flow Diagram

Start a new Process Flow Diagram

Click on **Start – New – Process Flow Diagram** or alternatively press **Ctrl-N** to open the **New** menu. Enter a title name (can be changed afterwards) and click on **Accept** to open an empty Process Flow Diagram.

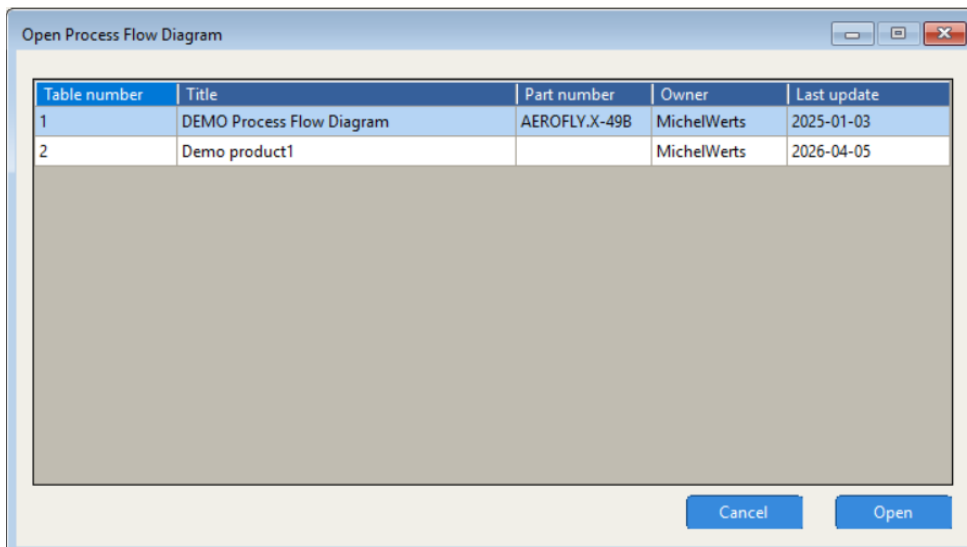
It is possible to start a Process Flow Diagram from an existing Characteristics Matrix. In this case:

- a) the general header info will be imported,
- b) all operation steps will be imported,

It is only possible to have one Process Flow Diagram linked to a Characteristics Matrix.

Open a Process Flow Diagram

Click on **Start – Open – Process Flow Diagram** or alternatively press **Ctrl-O** to open the **Open** menu. A list of all active Process Flow Diagrams is shown with the main header info (title, Partnumber, owner and last update). Click **Open** to load the selected Process Flow Diagram.



A Process Flow Diagram can only be open by one user and will automatically be opened read-only for other users.

If a Process Flow Diagram is opened, the software will automatically check for updates on the Operation steps in the linked Characteristics Matrix.

- A change in the operation description is marked in bold
- New added Operation steps are marked in bold
- Deleted Operation steps are struck through

A pop-up will show a summary of the changes.

Insert a new row

Adding new rows to the Process Flow Diagram can be done by:

- Clicking on one of the following buttons  ,
- Via the menu bar, click **Edit**, click the desired item to add and select **Insert above** or **Insert below**.
- Via the right-mouse button menu, by selecting **Insert Operation step**, **Insert process step above** or **Insert process step below**.
- By pressing Ctrl-Ins (a new row is added below the active row).

To insert a new Operation step, enter the Operation number and description in the dialog screen. After the step is added, the number cannot be changed. If the Process Flow Diagram is linked to a General pFMEA, no new Operation steps can be added.

Remove a row

A row can be removed from the Process Flow Diagram by:

- Clicking on the button , the selected item and all items that are fanned out from this item (right side of the selected cell) will be deleted,
- Via the menu bar, click **Edit**, click the desired item and select **Delete**. Only the selected column can be deleted.
- Via the right-mouse button menu, by selecting **Remove Operation step** or **Remove process step**.
- By pressing Ctrl-Del.

Rename an operation step

The name of an operation step can be changed by right-clicking on an operation step and select **Rename Operation step**. Only the description can be changed.

Select type of action

The type of action can be selected by

- pressing the first letter of the action (e.g. "L" for Lift, "M" for Move) or the number in case of the custom added actions,
- right-click on a cell and select **Action**, followed by the required action, from the menu, or
- Double-click in the cell below the required action.

Add connectors

Select the starting point, click on **Add Connection** (in the **Edit** menu or right-mouse button menu), select the end point and click on **OK** in the pop-up window.

An action can have multiple connectors, both pointing to next steps or previous steps (e.g. in case of rework). The latter are drawn in red.

Auto-connect all process steps

This option will automatically connect all subsequent actions.

Remove connectors

This option will remove all connectors starting from this action.

Open the linked Characteristics Matrix

To open directly the linked Characteristics Matrix, click in the menu bar on **Actions, Open Linked Characteristics Matrix**.

Show linked documents (F8)

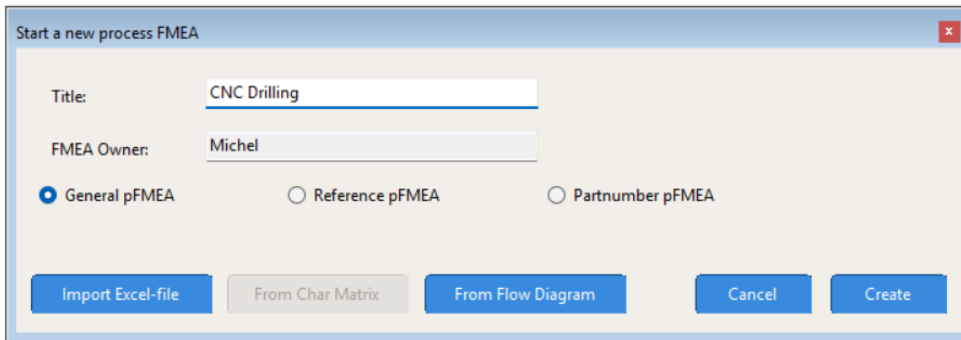
This shows QM documents that are related to the current Process Flow Diagram, being the Characteristics Matrix, and the Partnumber pFMEA.

5.6. pFMEA

Start a new pFMEA

Click on **Start – New - pFMEA** or alternatively press **Ctrl-N** to open the **New** menu.

Enter a title name (can be changed afterwards) and select the type of pFMEA you want to create.



Start a new process FMEA

Title:

FMEA Owner:

☒ General pFMEA
 ☐ Reference pFMEA
 ☐ Partnumber pFMEA

For a general pFMEA:

- Import an existing pFMEA from Excel (by clicking on **Import Excel-file**)
- Start from a Process Flow Diagram (by clicking on **From Flow Diagram**)
- Start an empty pFMEA

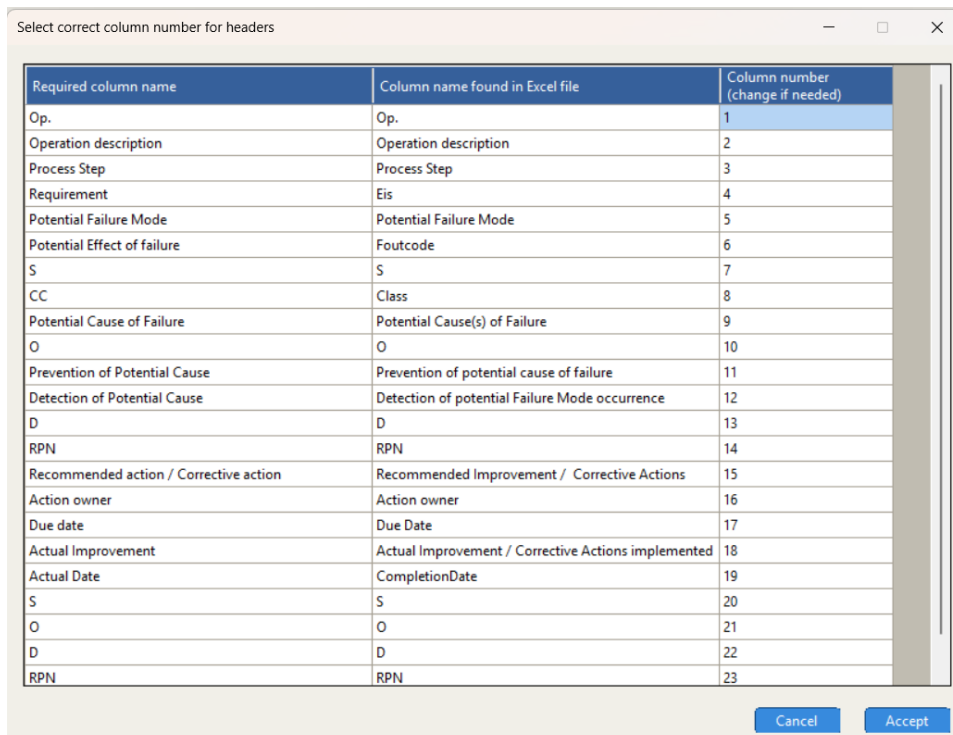
For a Reference pFMEA:

- Start an empty pFMEA

For a Partnumber pFMEA:

- Import an existing pFMEA from Excel (by clicking on **Import Excel-file**)
- Start from a Characteristics Matrix (by clicking on **From Char Matrix**)
- Start from a Process Flow Diagram (by clicking on **From Flow Diagram**)
- Start an empty pFMEA

When an Excel-file is imported, the software will try to recognize the header descriptions and match them with the required fields. The Excel-file is opened and a table with found headers is shown. If needed, the number of the column to be imported can be changed manually in the last column.



Select correct column number for headers

Required column name	Column name found in Excel file	Column number (change if needed)
Op.	Op.	1
Operation description	Operation description	2
Process Step	Process Step	3
Requirement	Eis	4
Potential Failure Mode	Potential Failure Mode	5
Potential Effect of failure	Foutcode	6
S	S	7
CC	Class	8
Potential Cause of Failure	Potential Cause(s) of Failure	9
O	O	10
Prevention of Potential Cause	Prevention of potential cause of failure	11
Detection of Potential Cause	Detection of potential Failure Mode occurrence	12
D	D	13
RPN	RPN	14
Recommended action / Corrective action	Recommended Improvement / Corrective Actions	15
Action owner	Action owner	16
Due date	Due Date	17
Actual Improvement	Actual Improvement / Corrective Actions implemented	18
Actual Date	CompletionDate	19
S	S	20
O	O	21
D	D	22
RPN	RPN	23

When a Partnumber pFMEA is started from a Characteristics Matrix, then

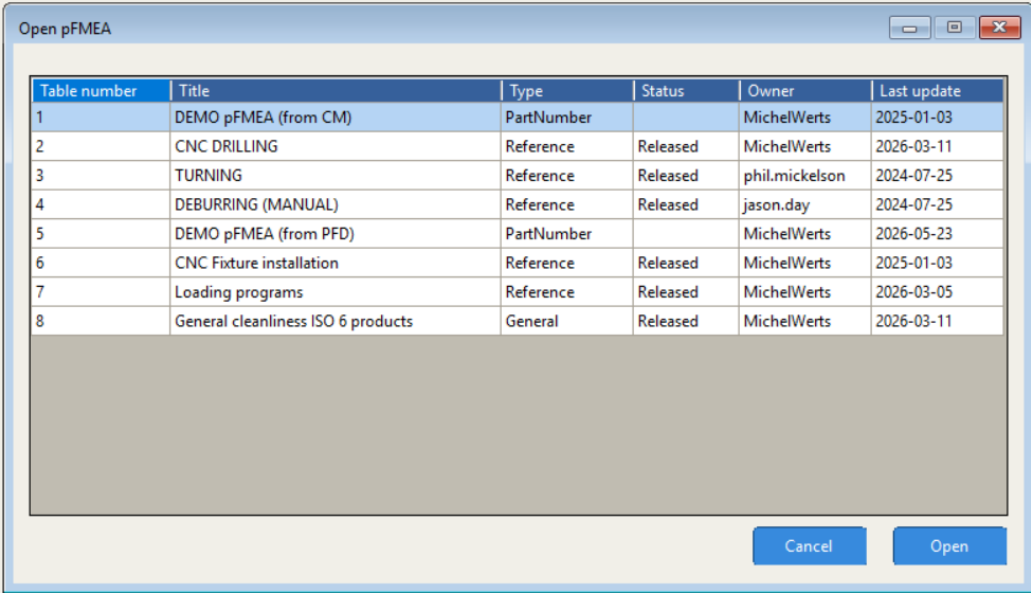
- c) the general header info will be imported,
- d) all operation steps will be imported,
- e) characteristics with an X are added at the specific operation step,
- f) if the characteristic is not inspected after being created or affected, a comment will be added to the *Detection of Potential Failure* column.

When a Partnumber pFMEA is started from a Process Flow Diagram, then

- a. the general header info will be imported,
- b) all operation steps will be imported,
- c) the process steps within each operation step are imported.

Open a pFMEA

Click on **Start – Open - pFMEA** or alternatively press **Ctrl-O** to open the **Open** menu. A list of all active pFMEA's is shown with the main header info (title, type of FMEA, release status, owner and last update). Click **Open** to load the selected FMEA.



The screenshot shows a window titled "Open pFMEA" with a table of active pFMEAs. The table has six columns: Table number, Title, Type, Status, Owner, and Last update. There are eight rows of data. Below the table is a large empty rectangular area, and at the bottom right are "Cancel" and "Open" buttons.

Table number	Title	Type	Status	Owner	Last update
1	DEMO pFMEA (from CM)	PartNumber		MichelWerts	2025-01-03
2	CNC DRILLING	Reference	Released	MichelWerts	2026-03-11
3	TURNING	Reference	Released	phil.mickelson	2024-07-25
4	DEBURRING (MANUAL)	Reference	Released	jason.day	2024-07-25
5	DEMO pFMEA (from PFD)	PartNumber		MichelWerts	2026-05-23
6	CNC Fixture installation	Reference	Released	MichelWerts	2025-01-03
7	Loading programs	Reference	Released	MichelWerts	2026-03-05
8	General cleanliness ISO 6 products	General	Released	MichelWerts	2026-03-11

If a Partnumber FMEA is opened, the software will automatically check for updates in the imported General and Reference pFMEA's.

- Changed text or comments are marked in bold
- New added rows are marked in bold
- Deleted rows are struck through

Changes are also summarized in a new window *Updated fields from imported pFMEA's for Partnumber pFMEA ...*, with the old and new text. Review these changes and add comments in the pFMEA or uncheck if not applicable.

Changes in the Characteristics Matrix or Process Flow Diagram will also be updated automatically (see for more details **The linked Char Matrix – Update with changes** or **The linked Process Flow Diagram – Update with changes**)

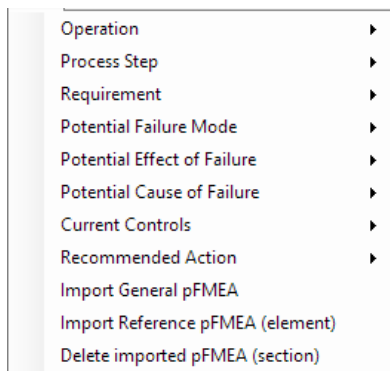
When the pFMEA is saved, all changes will be included.

A pFMEA can only be open by one user and will automatically be opened read-only for other users.

Insert a new row

Adding new rows to the pFMEA can be done by:

- Clicking on one of the following buttons  , the pFMEA will be fanned out by adding an item (row) at the selected cell (if applicable), see chapter 4.6.
- Via the menu bar, click **Edit**, click the desired item to add and select **Insert above** or **Insert below**. An item can only be added at the selected column or left of the selected column.



- By pressing Ctrl-Ins (a new row is added below the active row)

To insert a new Operation step, a dialog screen is shown to enter the Operation number and description. After being added, the number and description cannot be changed.

A Recommended action can only be added below the last action of a Cause of Failure, to have a chronological order of the actions performed. The RPN value of the last performed action is considered to be the current status.

Remove a row

A row can be removed from the pFMEA by:

- Clicking on the button , the selected item and all items that are fanned out from this item (right side of the selected cell) will be deleted,
- Via the menu bar, click **Edit**, click the desired item and select **Delete**. Only the selected column can be deleted.
- By pressing Ctrl-Del.

Collapse/Expand operation steps

For readability of the pFMEA, all content of an Operation can be hidden by collapsing its content. This is done by double-clicking on the Operation number or description (first 2 columns). The text *Double click to expand* appears in the column *Process Step/Char*.

The operation step can be expanded again by double-clicking on any cell in the row.

Op.	Operation description	Process step / Char	Requirement	Potential Failure Mode	Potential Effect of Failure	S
10	TURNING BOTTOM	Double click to expand				

Add a GD&T description for a characteristic

See the description in Chapter 5.2 dFMEA.

Release a Reference or General pFMEA

When the initial version of a Reference or General pFMEA is finished, tick the checkbox **Released** to make it available for import in Partnumber pFMEA's, otherwise it will have the status *Draft*. The status is visible in the list of available pFMEA's when a pFMEA is opened.

In a released Reference pFMEA, it is not possible to add new Potential Failure Mode or Potential Cause of Failure above the first row of a Requirement

In a released General pFMEA, it is not possible to add a new row above the first row.

Import a Reference or General pFMEA in a Partnumber pFMEA

A (released) General pFMEA can be imported by:

- Right-clicking in the pFMEA and selecting **Import General pFMEA** from the menu
- Via the menu bar, clicking **Edit** and clicking **Import General pFMEA**.

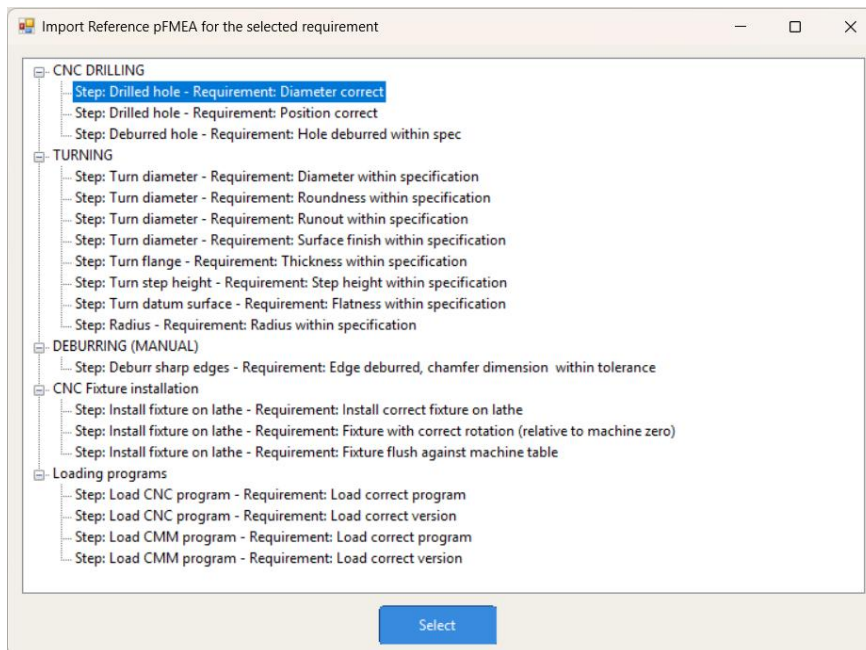
Select the pFMEA from the presented list and click **Select**. If your pFMEA is not in the list, check if it is indeed a General pFMEA and that it is released.

The pFMEA will be imported at the top of the Operation step in which a cell is selected, and will have a purple text color.

A (released) Reference pFMEA can be imported by selecting a Requirement, and:

- Right-clicking and selecting **Import Reference pFMEA Element** from the menu
- Via the menu bar, clicking **Edit** and clicking **Import Reference pFMEA Element**.

A tree view with all released Reference pFMEA's is shown. Use the (+) to view all available features from the pFMEA and select the feature that matches the requirement of the characteristic; click on **Select**.



The pFMEA section will be imported in the Partnumber pFMEA with a dark blue color.

FMEA Title: DEMO pFMEA (from CM)				Company: Iqarus Mfg				Partnumber: AEROFLY.X-49B				Legend: Brown: Imported Char from Char Matrix Cyan: Imported Process Step from PFD Blue: Imported Reference FMEA Purple: Imported General FMEA																
FMEA Owner: MichelWerts				Department: Small tools production				Customer: AEROFLY																				
Team members: Phil Mickelson, Shane Lowry, Cameron Smith				Manufacturing site: Building B				Customer partnumber: X-49B																				
Last revision date: 2025-01-03				Process details: Routing version 1 (March 2024)																								
Op.	Operation descriptor	Process step / Char	Requirement	Potential Failure Mode	Potential Effect of Failure	S	Cc	Potential Cause of Failure	O	Current Control: Prevention of Cause	Current Control: Detection of Failure or Cause	D	RPN	Recommendation / Corrective Action	Action Owner	Due Date	Actual improvem	Actual Date	S	O	D	RPN	Appl	Con	Reference			
10	TURNING BOTTOM	Char. 1 - Inner diameter (B) [5]	ø 8.50 ±0.05 mm	Diameter too small	Part needs to be reworked	5	M.	Insert wear/ breakage/damage	3	Tool life management in software	PCF: Machine alarm after max. lifetime is reached FM: dimensional check in-process	3	45						5						1.10.1 (3.10.1)			
								Incorrect reference cut measurement	3	none	FM: dimensional check in-process	5	75											1.10.2 (3.10.11)				
								Wrong insert placed in holder	3	Inserts in labeled boxes and numbers marked on holder	FM: dimensional check in-process	5	75										1.10.3 (3.10.12)					
				Diameter too large	Part is scrapped	8	Insert wear/ breakage/damage	3	Tool life management in software	PCF: Machine alarm after max. lifetime is reached FM: dimensional check in-process	3	72									8						1.10.4 (3.10.6)	
							Incorrect reference cut measurement	3	none	FM: dimensional check in-process	5	120																1.10.5 (3.10.13)
							Wrong insert placed in holder	3	Inserts in labeled boxes and numbers marked on holder	FM: dimensional check in-process	5	120																1.10.6 (3.10.14)
		Char. 10 - Flatness	±0.02 mm	Flatness too large	Concession request to customer	6	M.	Part deformed due to clamping	4	Clamping force defined in work instruction. Use of torque	PCF: Torque reading FM: free state dimensional check	5	120							6							1.10.7 (3.10.17)	

Propose a change for the owner

Imported Reference or General pFMEA's may be incomplete, incorrect (too specific) or unclear. Since these sections are imported in a Partnumber pFMEA, they cannot be altered. The owner of the Partnumber pFMEA can send a request to the Reference or General FMEA for a change.

Right-click in a cell and select **Create suggestion for owner** in the menu. A window will appear to enter the suggestion.

The next time the Reference or General FMEA owner starts Iqarus, a window shows the suggestion, the sender, and a reference to the applicable table, row, and column. If enabled by the Administrator, IQARUS can also prepare an email message automatically in the user's email program.

Propose a change for the owner

pFMEA Owner

phil.mickelson

Reference pFMEA

TURNING

Suggestion:

Cancel

Submit

The linked Char Matrix – Import a matrix

If a Partnumber pFMEA was not started from a Characteristics Matrix, it is possible to import the matrix later via the menu bar by clicking on **Actions, Characteristics from Char Matrix** and **Import**, and selecting the matrix from the list.

If a Characteristics Matrix is already linked to the pFMEA, this option is greyed-out.

The linked Char Matrix – Open the matrix

To open directly the linked Characteristics Matrix, click in the menu bar on **Actions, Characteristics from Char Matrix, Open Linked Char Matrix**.

The linked Char Matrix – Update with changes

To implement changes made in the linked Characteristics Matrix, click in the menu bar on ***Actions, Characteristics from Char Matrix, Update.***

- Textual changes are marked in bold
- New, combined, split, moved, deleted characteristics are marked in bold in the updated cells and struck through in the previous cells (including all related rows).

The pFMEA is also updated automatically when it is opened.

The linked Char Matrix – Delete characteristics

To remove all characteristics from the linked Characteristics Matrix, click in the menu bar on ***Actions, Characteristics from Char Matrix, Delete all Characteristics.*** This will also remove all related rows (Potential Failure Modes, Potential Effects of Failure, etc.)

The linked Process Flow Diagram – Open the PFD

To open directly the linked Process Flow Diagram, click in the menu bar on ***Actions, Process steps from Process Flow Diagram, Open Linked PFD***

The linked Process Flow Diagram – Update with changes

To implement changes made in the linked Process Flow Diagram, click in the menu bar on ***Actions, Process steps from Process Flow Diagram, Update.***

- Textual changes are marked in bold
- New, moved process steps are marked in bold in the updated cells
- Deleted process steps are struck through

The pFMEA is also updated automatically when it is opened

Set the Due date and Actual date

Dates are entered by double-clicking in the cell and selecting the date from the calendar. Press Delete to remove a date.

Non-applicable items in a Partnumber FMEA

Some imported rows from a Reference or General pFMEA might not be applicable for the specific Partnumber pFMEA, but cannot be deleted, since the structure needs to match the original pFMEA to correctly update changes.

These rows can be marked as non-applicable by unchecking the checkboxes in the column *Applicable*. The Occurrence and Detectability score are set to zero.

Unchecked rows will not be:

- Exported or printed
- Listed in the Pareto or action list
- Imported in the Control Plan

Set the severity, occurrence or detectability score

For the severity, occurrence or detectability (S-O-D) score, the value 1 – 10 can be entered directly. The severity score will also be filled in the second S-O-D columns (after improvements). If all 3 values are entered, the RPN (or AP) will be calculated automatically.

To aid the user in selecting the correct score, a detailed description for each value (from 1 – 10) is shown by double-clicking on a S-O-D cell. In the preferences, select for which industry (or custom) the descriptions should be shown. Use the buttons **Next** and **Previous** to scroll through them. If a value is selected, clicking **Accept** will fill in the value in the pFMEA. The owner of an FMEA can preselect a default descriptions list (**Set as Default**), which is stored for each individual FMEA separately. Other users will always see this list first, all other lists are available but text is greyed out.

Custom descriptions can be added and/or changed by the administrator, see chapter 8.

Selection of Severity rating

PreviousNext

AIAG:

inoperable product or system shutdown that has a high impact on customer operations	-
High degree of customer dissatisfaction due to failure such as an inoperable product or system shutdown that has a medium impact on the customer's operations	7
Failure causes significant customer dissatisfaction, e.g. major disruption or cost	6
Failure causes customer dissatisfaction, e.g. disrupts customer's operations or add cost	5
Failure causes some customer dissatisfaction, e.g. extra effort or rework needed to use product	4
Failure causes minor customer dissatisfaction, e.g. deterioration in their product or system performance	3
Nature of failure only causes slight customer annoyance	2
Unreasonable to expect that the minor nature of this failure would cause any real effect on the product or system performance. Customer will probably not notice failure	1

CancelAccept

Selection of Occurrence rating

PreviousNext

AIAG:

1 per shift or greater Cpk < 0.33 > 1 in 2 Close to or at total failure	10
1 per day Cpk > 0.33 1 in 3 failure rate Rate of failure likely to shut process down	9
1 per two days Cpk > 0.51 1 in 8 failure rate Rate of failure causes major disruption	8
1 per week Cpk > 0.67 1 in 20 failure rate Failure often encountered	7
1 per two weeks Cpk > 0.83 1 in 80 failure rate Rate of failure now likely to cause disruption	6
1 per month Cpk > 1.00 1 in 400 failure rate Failure rate significant enough to cause problems	5
1 per three months Cpk > 1.17 1 in 2000 failure rate Moderate rate of failure. Some evidence of process instability	4
1 per 6 months Cpk > 1.33	-

CancelAccept

Create an action list (F6)

The action list contains all rows where a recommended action or action owner is described, but no *Actual date* is entered, and all risks with an RPN score above the set limit (even without Recommended Action). This limit is set in the Preferences screen (see chapter 5.9).

The action list can be exported to Excel with the **Export** button.

Create RPN Pareto list (F7)

When the Risk Profile is set to RPN (Risk Priority Number), a Pareto list can be made, ranking the RPN scores from high to low.

The Pareto can be exported to Excel with the **Export** button.

Show linked documents (F8)

This shows QM documents that are related to the current pFMEA.

For a Partnumber pFMEA it will show the Characteristics Matrix, Process Flow Diagram, imported Reference pFMEA's, imported General pFMEA's and Control Plan. For a Reference or General pFMEA, it will show all Partnumber FMEA's in which this pFMEA is used.

The QM documents can be opened by double-clicking on a row.

5.7. Control Plan

Start a new Control Plan

Click on **Start – New – Control Plan** or alternatively press **Ctrl-N** to open the **New** menu. Enter a title name (can be changed afterwards), select the type of Control Plan (Prototype, Pre-launch or Production), the Partnumber pFMEA to import and click on **Accept** to create the Control Plan. The list will only show Partnumber pFMEA's without a linked Control Plan, e.g. each pFMEA can only have one Control Plan (but 3 different types: Prototype – Pre-Launch - Production).

Start a new Control Plan

Title: DEMO lqarus

Owner: Michel

☒ Prototype ☐ Pre-launch ☐ Production

Table number	Title	Part number	Owner	Last update
5	DEMO pFMEA (from PFD)	AEROFLY.X-49B	MichelWerts	2026-05-23

Cancel

Accept

All characteristics from the pFMEA (including unchecked rows) are imported in the Control Plan and are shown with a dark green text color. The reference is to the specific row in the pFMEA. In a brown text color, the characteristics that are inspected in another operation step are also imported to complete the Control Plan.

Open a Control Plan

Click **Start – Open – Control Plan** or press **Ctrl-O** to open the **Open** menu. A list of all active Control Plans is shown with the main header information, including title, Partnumber, owner, and last update. Click **Open** to load the selected Control Plan.

Open Control Plan

Table number	Title	Part number	Type	Status	Owner	Last update
1	DEMO Control Plan	AEROFLY.X-49B	Prototype	Open	MichelWerts	2024-08-15

Cancel

Open

A Control Plan can only be open by one user and will automatically be opened read-only for other users. The Control Plan will automatically be updated with recent changes in the Characteristics Matrix and or pFMEA. This might not be possible if the changes in the Characteristics Matrix are more recent than in the pFMEA.

Filling the table

The Control Plan should contain all characteristics that need to be controlled during production.

By double-clicking on a 'green' Product Characteristic (imported from the pFMEA), the current controls that were entered in the pFMEA are shown on the right. Use this as a guidance to fill in the evaluation method, sample size and frequency and control method.

If the pFMEA has process controls mentioned, add these to the Control Plan by selecting them and clicking **Add selection as extra Process Characteristic**.

Insert a new row

Adding new rows to the Control Plan can be done by:

- Clicking on one of the following buttons  ,
- Via the menu bar, click **Edit**, select **Insert row above** or **Insert row below**.
- Via the right-mouse button menu, by selecting **Insert row above** or **Insert row below**.
- By pressing Ctrl-Ins (a new row is added below the active row).

It is not possible to add new Operation steps in the Control Plan, since these are already imported from the other QM documents.

Remove a row

A row can be removed from the Control Plan by:

- Clicking on the button , the selected item and all items that are fanned out from this item (right side of the selected cell) will be deleted,
- Via the menu bar, click **Edit**, select **Remove selected row**.
- Via the right-mouse button menu, by selecting **Remove row**.
- By pressing Ctrl-Del.

Non-applicable items in a Control Plan

Some imported rows from the Partnumber pFMEA might not be applicable in the Control Plan, but cannot be deleted, since the structure needs to match the original pFMEA to correctly update changes.

These rows can be marked as non-applicable by unchecking the checkboxes in the column *Applicable*.

Unchecked rows will not be exported or printed.

Change the Control Plan type

In the menu bar, click on **File** and **Change Type**. A Prototype Control Plan can be changed to Pre-launch, and a Pre-launch Control Plan can be changed to Production.

By changing the type, the current version is closed and locked for further editing, and a copy is created with the new type (and new table number).

Open the linked pFMEA

To open directly the linked Partnumber pFMEA, click in the menu bar on **Actions**, **Open Linked pFMEA**.

The linked pFMEA – Open the pFMEA

To open directly the linked pFMEA, click in the menu bar on **Actions**, **Linked pFMEA**, **Open Linked pFMEA**.

The linked pFMEA – Update with changes

To implement changes made in the linked pFMEA, click in the menu bar on **Actions, Linked pFMEA, Update**.

- Textual changes are marked in bold
- New, combined, split, moved, deleted characteristics are marked in bold in the updated cells and struck through in the previous cells (including all related rows).

The Control Plan is also updated automatically when it is opened.

5.8. General actions

Save/save as

Press Ctrl-S or click **File** and **Save** in the menu bar to save your QM document. By selecting **Save as copy**, a Characteristics Matrix or pFMEA will be saved with a new table number and the text “copy” is added to the title. The **save as** option is not available for Control Plans.

Export

Each QM document can be exported to Excel, by clicking **File** and **Export to Excel...** in the menu bar. In the dialog box, select the folder and enter a filename. The templates for the Excel files are in the subfolder *Templates* of the software and should not be moved, deleted or changed.

Print

Each QM document can be printed, by clicking **File** and **Print...** in the menu bar. Either send the document directly to a printer or print to PDF. The page layout and formatting is fixed.

Zoom in/out

Zoom in or out in your QM document by pressing Ctrl+ + (plus sign) or Ctrl+ - (minus sign), by holding the Shift-button and using the scroll wheel of the mouse, or via the menu bar, by clicking **View**, and then **Zoom In** or **Zoom Out**.

Copy/Cut/Paste

Copy/paste is possible with single or multiple cells; multiple cells need to be adjacent. When pasting multiple cells in an pFMEA, select the first cell to paste, this should be the same column as the first cell of the copied area. If text is already present in the paste field, new rows will be added automatically to keep the original text.

Add/edit/delete a comment

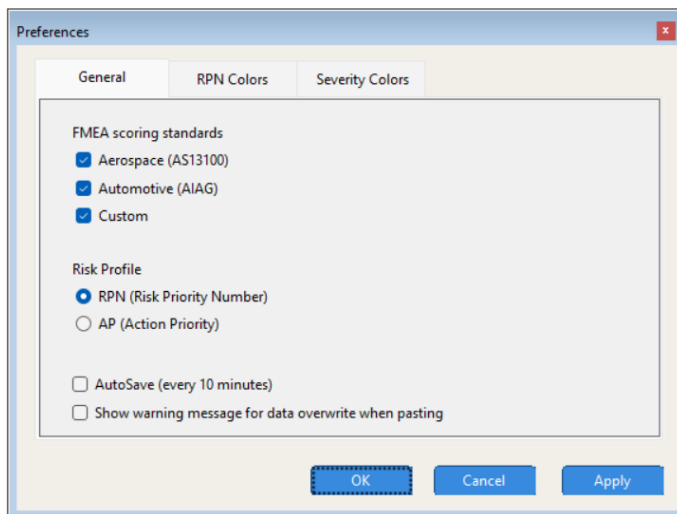
Right-click in a cell and select **Comment** in the menu. If a comment is added, a red triangle will be visible in the top-right corner of the cell. Hovering over the cell with the mouse will show the comment, as well as the user and date of the last change.

Undo

Use Ctrl-Z to undo your previous steps (inserted or deleted rows, changed text or comments). The Undo steps are cleared after saving the document, or after importing a General or Reference FMEA.

5.9. Preferences

General preferences



FMEA scoring standards

The FMEA scoring standards contain descriptions to determine the scores for the Severity, Occurrence and Detectability of a risk.

The Aerospace standards are from the AS13100 (AESQ RM13004), March 2021.

The Automotive standards are from the AIAG 4th edition FMEA, 2008.

In addition, custom (company specific) descriptions can be selected. These descriptions can be added by the administrator (see chapter 8.1).

Risk Profile

Determines how the overall score for a risk is determined. RPN calculates Severity x Occurrence x Detectability. AP uses the table below (which can also be found in the Help menu)

		Occurrence									
		10 to 8		7 or 6		5 or 4		3 or 2		1	
Severity	9 or 10	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6
		2-4	1	2-4	1	2-4	1	2-4	1	2-4	1
	7 or 8	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6
		2-4	1	2-4	1	2-4	1	2-4	1	2-4	1
	4 to 6	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6
		2-4	1	2-4	1	2-4	1	2-4	1	2-4	1
	2 to 3	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6
		2-4	1	2-4	1	2-4	1	2-4	1	2-4	1
	1	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6	7-10	5-6
		2-4	1	2-4	1	2-4	1	2-4	1	2-4	1

Detection scores are inside each combination of Severity and Occurrence

RPN Colors

Preferences

General RPN Colors Severity Colors

RPN score

< 60 >=

< 100 >=

< 150 >=

Show in action list all 'risks without defined action' with RPN above

OK Cancel Apply

Option to set the limits for the color scale of RPN values. For the action list, the limit can be given above which RPN value a risk must always be added to the action list, independent of a recommended action.

Severity Colors

Preferences

General RPN Colors Severity Colors

☐ Highlight Severity

< 8 >=

☐ RPN override

When Severity >= , set RPN value to

OK Cancel Apply

To highlight high Severity risks, these can be colored red in the FMEA. To make sure these risks are mitigated, it is possible to set the RPN value to a fixed (high) value, to make sure it will always be shown in the action list.

6. Frequently asked questions

General

What is IQARUS?

A quality management application for manufacturing companies, with pFMEA/dFMEA as a core module. It is aimed at multi-industry use, including aerospace, automotive and electronics.

Which industries and standards does it support?

Aerospace (AS13004), automotive and custom company-specific approaches. S/O/D rating scales for Aerospace and Automotive are built in, and you can define your own.

Does IQARUS include example FMEA projects?

No. This is deliberate: IQARUS does not present itself as an authority on FMEA content, and your database stays clean from the start.

FMEA / DFMEA

Can I use more than one rating scale (Severity/Occurrence/Detection)?

Yes. In Preferences you can tick Aerospace, Automotive and/or Custom. In the rating selection window, use Previous/Next to browse the selected scales as reference while choosing a number.

Does the scale I browse affect the saved rating?

No. Only the number you choose is stored. The owner of the FMEA can set the default scale.

Can I define my own company scales?

Yes. Custom lists are defined in the Admin screen. You can create several lists, for example by consequence type (operational, customer satisfaction, EHS).

Is RPN still supported? Why not only Action Priority?

Yes. RPN remains supported because IEC 60812 still permits it, and IQARUS is not locked to the automotive (AIAG-VDA) approach.

Why is an item flagged even though its RPN is low?

Any item with Severity ≥ 9 is flagged regardless of RPN or the active scale. High-severity items warrant review on their own. This behaviour can be changed in the Preferences menu.

How do I create a multi-level DFMEA (system / component / feature)?

Use the Level dropdown on the “Add new item” form. It pre-fills hierarchical numbering (1, 1.1, 1.1.1) and a tiered Effect template (“System: ... / Component: ... / Feature: ...”).

Does Severity automatically cascade between levels?

No. This is a deliberate soft convention, so IQARUS does not force one industry’s workflow onto others.

What are General and Reference FMEAs?

Reusable content building blocks that can be inserted into FMEAs.

When should I release a Reference or General Process FMEA?

When an initial version is ready, the FMEA can be released. The only limitation is that no new rows can be added at the beginning of the FMEA.

Are the dFMEA and DVP&R connected to the pFMEA and Control Plan?

The dFMEA and DVP&R are connected to each other, but not directly connected to the Characteristics Matrix, Process Flow Diagram, pFMEA or Control Plan. They are normally created first as part of the design quality workflow.

Is there a formal approval or sign-off workflow?

No. FMEA is treated as a living document. For a formal sign-off export the document to pdf, which will have a date/time stamp.

Is there a full change history?

Currently only the most recent change is tracked and visible (username and date of change).

7. Troubleshooting

Problem	Possible cause	Solution
I get an error message pop-up (Unhandled exception has occurred in your application)	This is most probably a software bug.	Click on Continue and save your data. Reopen to check the content, otherwise ask the administrator to recover a backup.
I cannot uncheck a row in the FMEA	- This option is not possible for reference or General Process FMEA's.	
The option to open or create a new document is greyed out	- Your trial period has expired - You have no license to use the software - An illegal modification was found in the database	Contact info@igarus.eu to purchase a license.
I have accidentally released an FMEA		Updating the FMEA is still possible. If needed, contact the administrator to revert the status to <i>draft</i> .
I cannot import a General or Reference FMEA element that I just created	- The FMEA is not released - You have created a Partnumber FMEA	Reopen your FMEA and check the release status and type of FMEA.

8. Administrator options

8.1. Main menu options

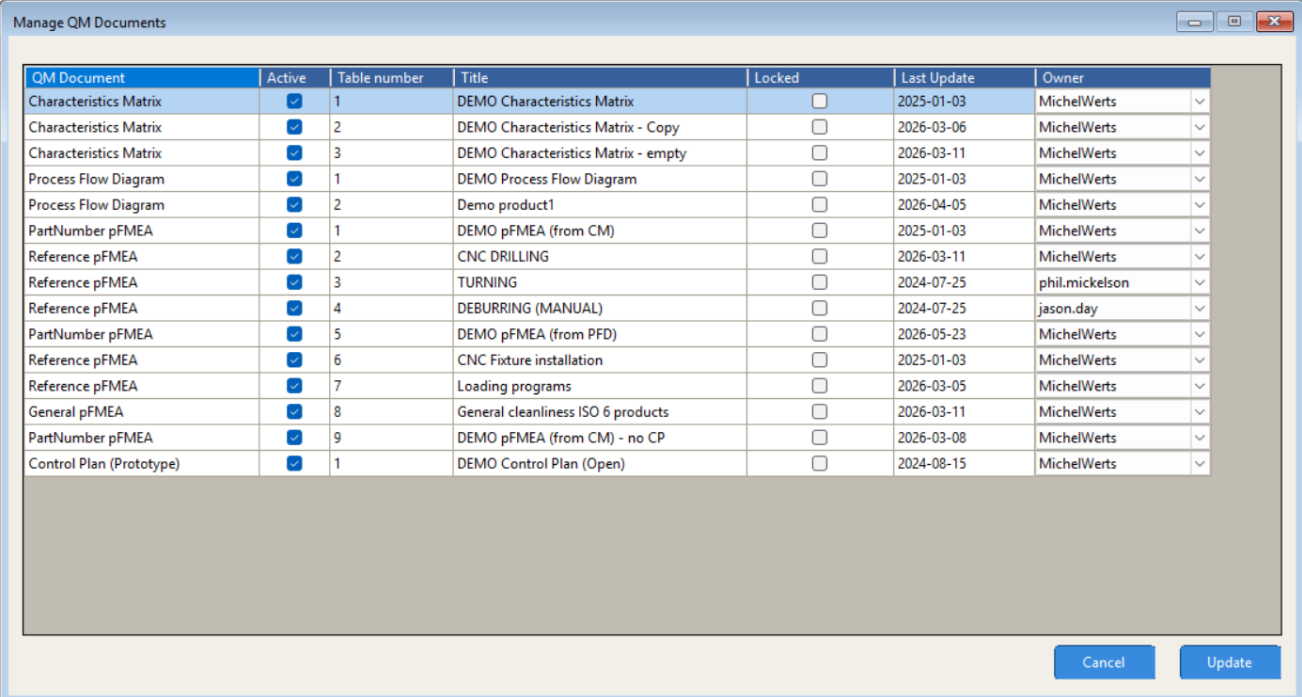
Manage users

Shows a list of all users, which user is registered as administrator and the last time the user has opened the software.

Option to manually add new users and change the administrator status of users.

Manage QM Documents

Shows a list of all created Quality Management Documents.



QM Document	Active	Table number	Title	Locked	Last Update	Owner
Characteristics Matrix	☒	1	DEMO Characteristics Matrix	☐	2025-01-03	MichelWerts
Characteristics Matrix	☒	2	DEMO Characteristics Matrix - Copy	☐	2026-03-06	MichelWerts
Characteristics Matrix	☒	3	DEMO Characteristics Matrix - empty	☐	2026-03-11	MichelWerts
Process Flow Diagram	☒	1	DEMO Process Flow Diagram	☐	2025-01-03	MichelWerts
Process Flow Diagram	☒	2	Demo product1	☐	2026-04-05	MichelWerts
PartNumber pFMEA	☒	1	DEMO pFMEA (from CM)	☐	2025-01-03	MichelWerts
Reference pFMEA	☒	2	CNC DRILLING	☐	2026-03-11	MichelWerts
Reference pFMEA	☒	3	TURNING	☐	2024-07-25	phil.mickelson
Reference pFMEA	☒	4	DEBURRING (MANUAL)	☐	2024-07-25	jason.day
PartNumber pFMEA	☒	5	DEMO pFMEA (from PFD)	☐	2026-05-23	MichelWerts
Reference pFMEA	☒	6	CNC Fixture installation	☐	2025-01-03	MichelWerts
Reference pFMEA	☒	7	Loading programs	☐	2026-03-05	MichelWerts
General pFMEA	☒	8	General cleanliness ISO 6 products	☐	2026-03-11	MichelWerts
PartNumber pFMEA	☒	9	DEMO pFMEA (from CM) - no CP	☐	2026-03-08	MichelWerts
Control Plan (Prototype)	☒	1	DEMO Control Plan (Open)	☐	2024-08-15	MichelWerts

Via the menu bar in the main screen, clicking on **Administrator**, and **Manage Users**, the administrator can:

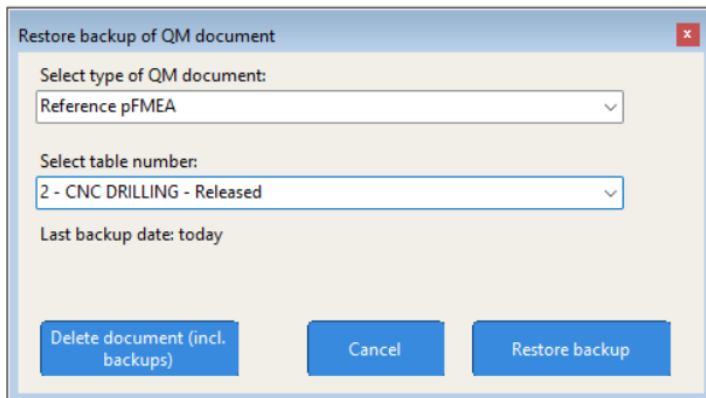
- Set a QM document to inactive by unticking the checkbox *Active*. These QM document can no longer be opened. If these are Reference of General pFMEA's that have already been imported, this information remains available in the Partnumber pFMEA. Optionally, an inactive QM document can be set to active again.
- As soon as a user opens a QM document, it will be marked as locked in the database, to prevent multiple users editing the same QM document. In case a QM document is not unlocked after closing the QM document (e.g. due to a software crash), the QM document can be unlocked by unticking the checkbox *Locked*.
- Via the drop-down list in the last column, the owner of a QM document can be changed.

Restore backups

In case a QM document has not been saved correctly and has become corrupted, it is possible to restore a backup. Via the menu bar in the main screen, clicking on **Administrator**, and **Manage FMEA's**, the administrator can restore a backup of a QM document.

Select the type of document, and subsequently select the specific table. Below the selected table, the last backup date is shown. There is only 1 backup per day, either from 'today' or from a specific date. Click on **Restore backup**.

It is also possible to completely remove a table and all it's backups. **Attention:** this can affect linked documents and may make these corrupted.



Company settings

- *Custom descriptions for header texts*
In case of company specific terms for columns in the dFMEA, pFMEA or DVP&R, the text can be changed by clicking on **Administrator** and then **Company Settings – Custom dFMEA header text**, **Custom Design validation Plan & Report header text** or **Custom pFMEA header text** in the menu bar of the main screen.
- *Custom descriptions for dFMEA or pFMEA scoring of severity, occurrence and detectability*
The Iqarus QM software contains some default descriptions for the dFMEA and pFMEA scoring for the severity, occurrence and detectability. To use custom descriptions, these can be added by clicking on **Administrator** and then **Company Settings – Custom dFMEA scoring** or **Custom pFMEA scoring** in the menu bar of the main screen.
Multiple lists can be added.
- *Custom Process Flow Diagram Layout*
The list of actions in the Process Flow Diagram can be customized.

Process Flow Diagram Settings

Select which types of actions to show in the Process Flow Diagram:

Action	Symbol	Value-add	Order
☒ (A)dministration	△	NVA-N	☐
☒ (P)ackaging interaction	■	NVA-N	☐
☒ (L)ift (meachnical / other)	⇨	NVA	☐
☒ (U)nload / load	⇧	NVA	☐
☒ (F)abrication / Transformation	□	VA	☐
☒ (M)ove	○	NVA	☐
☒ (S)tores	●	NVA	☐
☒ (I)nspect	◇	NVA-N	☐
☒ (R)ework	⬠	NVA	☐
☒ (O)ther	⊠	NVA	☐
☐ (1)	⊠	NVA	☐
☐ (2)	⊠	NVA	☐
☐ (3)	⊠	NVA	☐

UP DOWN

Cancel Apply

Actions can be ticked/unticked to select which actions will be available in the Process Flow Diagram. By selecting an action with the radio button on the right, the order can be changed, using the buttons **UP** and **DOWN**. The symbol corresponding to each action can be selected, and optionally 3 custom descriptions of actions can be added.

Existing Process Flow Diagrams will automatically be updated with the new layout.

Check for updates

Option to check for software updates. To install new updates (overwrite current program files), it is necessary that the Iqarus software is not in use by others. Before starting the updating, the program will only check if QM documents are open.

When the update is started, Iqarus will close, *update.exe* is started to copy new files and then restart Iqarus.

Export all QM documents to Excel

All the Iqarus QM documents are stored in a password-protected database and can only be read by the Iqarus software. To reduce the risk of accidental data loss or the inability to access the database, the administrator has the option to export all QM documents to Excel with one click. Enter the date from which newly created or edited documents should be exported. It is recommended to do this regularly, depending on the usage of the software.

Attention: the links between the different QM documents is not saved, so reimporting these Excel documents into Iqarus will not have all benefits compared to the original data.

Administrator rights for user

The number of administrators should be kept to its minimum. If a user needs to be added as an administrator, that user can access the login screen by pressing Ctrl-Shft-F9. The administrator password is requested, which is available at the current administrator, or can be retrieved by contacting info@iqarus.eu.

8.2. Administrator options for FMEA's

Administrators have the option to change the status of released Reference of General FMEA's back to *draft*. The option is available in the FMEA window under **Actions – Change status to Draft (Admin)**. Changing a

status back to draft for a FMEA that is already imported in one or more Partnumber FMEA's, might result in corrupt FMEA's and should only be done for non-linked FMEA's.

8.3. Settings.ini file parameters

Additional settings can be set in a .ini file.

Create a text-document and rename it to *settings.ini*. Place the file in the main folder of the Iqarus QM software.

The following options can be added:

- Add a specific file location for the database if this is different from the default location (in subfolder Database). Give the complete path, including the database filename:
 - o `DB_Location=[path]\FMEA_DB.mdb`
- Add a specific file location for the Excel templates if these are different from the default location (in subfolder Templates). Give the complete path, including the filenames:
 - o `xls_dFMEA_template=[path]\dFMEA TEMPLATE.xlsx`
 - o `xls_DVP_template=[path]\ Design Validation Plan & Report TEMPLATE.xlsx`
 - o `xls_CM_template=[path]\Char Matrix TEMPLATE.xlsx`
 - o `xls_FMEA_template=[path]\pFMEA TEMPLATE.xlsx`
 - o `xls_CP_template=[path]\Control Plan TEMPLATE.xlsx`
 - o `xls_PFD_template=[path]\Process Flow Diagram TEMPLATE.xlsx`
 - o `xls_RPN_template=[path]\RPN Pareto TEMPLATE.xlsx`
 - o `xls_AL_template=[path]\Action List TEMPLATE.xlsx`
- Initial setup of the software is that each QM document has an owner, and only the owner (or an administrator) can make changes and save the document. In case you want everybody to be able make changes, add the following line:
 - o `OnlyOwnerCanSave=False`
- When suggestions are created for General or Reference FMEA owners, optionally an email message can be prepared in the users email program, by adding the following line:
 - o `SendEmailAllowed=True`
- The software automatically checks for new updates at startup, when the logged on user has Administrator rights. To prevent this check, add the following line:
 - o `AutoCheckUpdates=False`

9. Contact info

For all questions and comments or to request a free demo, please send an email to info@iqarus.eu.

If you want to use the software after the trial period has expired, contact me to purchase a one-time license for unlimited use of the software.

After having received the license code, the administrator can enter the code via the menu bar in the main screen, by selecting **Administrator** and then **Enter License code**.

After entering the correct code, the program header text will change (from *Trial version* to *Licensed to ...*).

The software is protected against illegal copying. If the software is moved to another network location or the network name changes, first remove the license code by selecting **Administrator – Remove License code**, and then re-enter the license code as described above.