

FMEDA ANALYSIS



WHAT FMEDA AIMS AT

To determine the diagnostic coverage and must include all components necessary to enable the element to process the safety function(s) required by the safety system.

FMEA + DA

FMEDA consists of two separate analyses:

- Failure Mode and Effects Analysis (FMEA)
- Diagnostic Analysis (DA)

COMPONENTS ANALYSIS

It must be considered for components:

- All possible dangerous failure modes that lead to an unsafe state, prevent a safe response when such response is required
- All possible dangerous failure modes that compromise the safety integrity of the safety systems

DIAGNOSTIC COVERAGE

Fraction of dangerous faults detected by automated online diagnostic tests calculated using the percentage of dangerous faults and detected dangerous faults divided by the total percentage of dangerous faults.

< 60 %	none
60 % to < 90 %	low
90 % to < 99 %	medium
> 99 %	high



$$DC = \frac{\sum \lambda_{dd}}{\sum \lambda_{dd} + \sum \lambda_{du}}$$

FMEDA: AN EXAMPLE

Sub-assembly	Part	Part	Failure Effect Probability	Justification (if less than 100%)	Failure Rate Estimate	SAFE	DC SAF	DC DNG	NO FA	NO EFF	OTHER	Justification (if other)	λ _{du}	λ _{dd}	λ _{du}	λ _{dd}	λ _{du}	λ _{dd}	λ _{du}	Notes
SPACER, 0.250" OD x 6.52 UNC x 0.312" LONG	11004	SPACER	0%	Dimensioned for the entire lifetime	0	0%	0%	0%	0%	0%	0.0%		0	0	0	0	0	0	0	
SPACER, 0.250" OD x 6.52 UNC x 0.312" LONG	11004	SPACER	10%	Protected by the frame	6,54632E-09	40%	0%	0%	0%	50%	0.0%		5,23706E-09	0	1,30926E-09	0	0	6,54632E-09	0	
SPACER, 0.250" OD x 6.52 UNC x 0.312" LONG	11004	SPACER	20%	Dimensioned for the entire lifetime	1,30936E-08	30%	0%	0%	0%	40%	0.0%		7,85559E-09	0	7,85559E-09	0	0	1,04741E-08	0	
SPACER, 0.250" OD x 6.52 UNC x 0.312" LONG	11004	SPACER	10%	Quality Check	3,27936E-09	30%	0%	0%	0%	50%	0.0%		1,9689E-09	0	1,30926E-09	0	0	3,27936E-09	0	
SPACER, 0.250" OD x 6.52 UNC x 0.312" LONG	11004	SPACER	0%	Equipment protected by insulating enclosure	0	0%	0%	0%	0%	0%	0.0%		0	0	0	0	0	0	0	

Failure Effect Probability

Failure Rate (Estimated)

Failure Rate Segmentation

Evaluation of each component