

Manufacturer's Statement

14830220.01

Failure rate details for

Diaphragm seal

This manufacturer's statement summarizes the failure rates within the scope of functional safety for WIKA Diaphragm seal components in accordance with IEC 61508 -2:2010 and under the specified condition in product datasheet.

In general, for a complete evaluation of a system, all requirements of IEC 61508 must be considered for all components used in the safety instrumented system. Please note that the individual failure rates for each component must be added up to get the overall failure rate for a probabilistic model of the entire system.

The safety function can only be described as the Diaphragm Seals are used as part of a sensor element. This evaluation assumed that the safety function of the transmitter assembly is to trip on either a high-pressure signal (High Trip) or a low-pressure signal (Low Trip). This evaluation assumes that the Diaphragm Seals are being used in a filled system.

The tables listed in the appendix apply to the failure rates in accordance with IEC 61508 for the worst-case configurations of the following variants (Failure rates based on exida Report No.: WIK 18/11-152 R001):

Diaphragm seal*	according to the valid data sheet
990.42	DS 99.42
990.67	DS 99.67
990.68	DS 99.68
990.69	DS 99.69

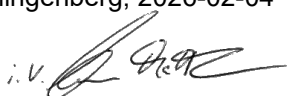
** For safety applications only the described configurations of the Diaphragm Seals have been considered. All other possible variants and configurations are not covered.*

The use of diaphragm seal in safety applications requires installation and operation according datasheet and regular maintenance of the components. The connected transmitters must be calibrated with the diaphragm seal.

Signed for and on behalf of

WIKA Alexander Wiegand SE & Co. KG

Klingenberg, 2026-02-04



Matthias Kirch, Vice President
Global Business Unit Pressure

WIKAI Alexander Wiegand SE & Co. KG
Alexander-Wiegand-Straße 30
63911 Klingenberg
Germany
WEEE-Reg.-Nr. DE 92770372

Tel. +49 9372 132-0
Fax +49 9372 132-406
E-Mail info@wika.de
www.wika.de



Andreas Massong, Head of Quality Assurance
Global Business Unit Pressure

Kommanditgesellschaft: Sitz Klingenberg –
Amtsgericht Aschaffenburg HRA 1819

Komplementärin:
WIKAI International SE - Sitz Klingenberg -
Amtsgericht Aschaffenburg HRB 10505
Vorstand: Alexander Wiegand
Vorsitzender des Aufsichtsrats: Prof. Dr. Roderich C. Thümmel

Appendix - Failure rates for WIKA Diaphragm Seals

The Diaphragm Seals are classified as a device that is part of a Type A sensor element according to IEC 61508, having a hardware fault tolerance of 0.

The individual Diaphragm Seals can be classified as a 2_H device when the listed failure rates are used. When 2_H data is used for all the devices in an element, then the element meets the hardware architectural constraints up to SIL 2 at HFT=0 (or SIL 3 @ HFT=1) per Route 2_H. If Route 2_H is not applicable for the entire final element, the architectural constraints will need to be evaluated per Route 1_H.

The failure rates are valid for a useful life period of approximately 10 years. When plant/site experience indicates a shorter useful lifetime, the number based on plant/site experience should be used.

The failure rates are valid for specific environmental profiles (*exida* profiles 3 and 6) and are limited by the published ratings specified in product data sheets.

Environmental <i>exida</i> profile	3	6
Description (Mechanical)	General Filled mounted	Process wetted
IEC 60654-1 profile	C3 (also applicable for D1)	N/A
Average Ambient Temperature	25°C	25°C
Average Internal Temperature	45°C	Process Fluid Temperature
Exposed to Elements / weather conditions	Yes	Yes

The failure rates listed below are based on over 250 billion-unit operating hours of process industry field failure data. The failure rate predictions reflect realistic failures and include site specific failures due to human events for the specified Site Safety Index (SSI).

Failure rate tables

The following tables show the failure rates per IEC 61508 for the worst-case configurations of the considered variants.

Failure rates with Good Maintenance Assumptions in FIT @ SSI = 2

Seal	Application	λ_{SD}	λ_{SU}	λ_{SDD}	λ_{DU}	#	E
990.69	High Trip Clean Service	0	3	0	49	5	12
	Low Trip Clean Service	0	49	0	3	5	12
	High Trip Severe Service	0	3	0	74	5	12
	Low Trip Severe Service	0	74	0	3	5	12
990.67	High Trip Clean Service	0	3	0	42	0	10
	Low Trip Clean Service	0	42	0	3	0	10
	High Trip Severe Service	0	3	0	70	8	25
	Low Trip Severe Service	0	70	0	3	8	25
990.68	High Trip Clean Service	0	3	0	45	8	25
	Low Trip Clean Service	0	45	0	3	8	25
	High Trip Severe Service	0	3	0	67	0	10
	Low Trip Severe Service	0	67	0	3	0	10
990.42	High Trip Clean Service	0	3	0	44	0	53
	Low Trip Clean Service	0	44	0	3	0	53
	High Trip Severe Service	0	3	0	69	0	53
	Low Trip Severe Service	0	69	0	3	0	53

λ_{SD} Fail Safe Detected

λ_{DU} Fail Dangerous Undetected

λ_{SU} Fail Safe Undetected

No effect Failures

λ_{SDD} Fail Dangerous Detected

E External Leakes

Severe Service Condition that exists when material in contact with the Diaphragm Seal has abrasive particles.

Clean Service Abrasive particles are absent.