

# Certificate

No. W 56 2010 C4-1

Manufacturer: **Enraf B.V.  
Delftechpark 39  
2628 XJ Delft  
Netherlands**

Product: **Tank Gauge**

Type: **854 XTG, 854 ATG**

Test item: **Mechanical part of the above mentioned series**

Application / Safety function: **Detect height of fluid surface or height of interface between fluids**

Test results: **The test item is suitable for use in single-channel safety related systems of up to and including SIL 2 and up to and including SIL 3 in multi-channel systems according to IEC 61508 and IEC 61511.**

For detailed results see test report No. W 56 2010 S3, dated 2010-11-04

A short summary of test results is filed up on the backside of this certificate.

For the final assessment of the usability of the test item as a part of a safety related system the final system has to be assessed according to IEC 61508 or IEC 61511.

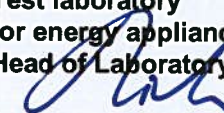
**This certificate remains valid until October 2014**

Cologne 2010-11-04

Inspector

  
Dipl.-Ing. Th. Küppers

Test laboratory  
for energy appliances  
Head of Laboratory

  
Dipl.-Ing. F. Rick

TÜV Rheinland Energie und Umwelt GmbH, Am Grauen Stein, D-51105 Köln, Germany

www.tuv.com

 **TÜVRheinland®**  
Precisely Right.

<b>Certificate No.</b>	<b>W 56 2010 C4-1</b>
Manufacturer:	<b>Enraf B.V. Delftechpark 2628 XJ Delft Netherlands</b>
Type series:	<b>854 XTG, 854 ATG</b>

#### Appliance-specific values determined:

probability of failure per hour	PFH	1/h	$9,71 \times 10^{-8}$
Confidence niveau	1- $\alpha$	%	70
Safe failure fraction	SFF	%	99,4*
Hardware fault tolerance	HFT	[-]	0
Diagnostic coverage	DC	%	90
Type of sub system	IEC 61508-2, 7.4.4.1.2		Type A
Mode of operation	IEC 61508-4, 3.5.16		High demand mode
Mode of operation	IEC 61511-1, 3.2.43		Continuous mode
Dangerous failure rate	$\lambda_D$	1/h	$9,71 \times 10^{-8}$
Dangerous failure rate	FIT	1/(1E-9 h)	97,1
<b>Derived values</b>			
MTBF dangerous failures	MTBF <sub>D</sub>	h	$1,03 \times 10^7$
		y	1173
Safe failure rate	$\lambda_S$	1/h	$1,61 \times 10^{-5}$
	FIT	1/(1E-9 h)	1387
Total failure rate	$\lambda_S + \lambda_D$		1,62E-05
	FIT	1/(1E-9 h)	16200
MTBF total		h	$6,17 \times 10^4$
MTBF total		y	7

\*: The safe failure fraction takes into account the failure detection provided by the electronic and software components of the test item.

#### Test results

It is the opinion of the test centre that the test item is suitable for installation in safety related systems as a single channel safety related subsystem of up to and including SIL 2. With a structure establishing a HFT of 1 the test item is usable in SIL 3.

#### Validity of test results

Based on the experience with these devices and regarding the corrosion protection and aging behaviour of the materials assumed in the FMEA, this statement is restricted to equipment on which the required maintenance specified by the manufacturer is performed. The necessity for maintenance has to be checked at least once per year as described in the manual of the 854 XTG, 854 ATG tank gauge.

#### Remarks:

This statement applies only to equipment for which all safety-relevant operating conditions as stated by the manufacturer are complied with.

This statement applies only to the mechanical parts of the tank gauges of series 854 XTG, 854 ATG.

This statement is bound to the proven and verified employment of a safety-related quality management by the manufacturer.

This statement is bound to the certification of the electric, electronic and software components of the 854 XTG, 854 ATG as usable in safety related systems with the respective SIL and the employment of these components in combination with the test item.

The complete 854 XTG, 854 ATG devices are considered as proven in use. Since the test result for the mechanical part is based on this consideration and the failure probability is derived from field data, a periodic re-evaluation of the test results is required.