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on the examination of a flame detector device
according to DIN EN 61508 parts 2 – 3

Date: 2009-11-16

Our reference:
IS-TAF-MUC/ku

Order no. 1378632

Document:
CF10810209_SIL_BST.doc

Test Laboratory: TÜV SÜD Industrie Service GmbH
Abteilung Feuerungs- und Wärmetechnik

TÜV SÜD Rail GmbH

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Subject of Test: Flame detector device
type **Insight**
models **95IRxx-yy,**
95UVxx-yy,
95DSxx-yy

The document consists of
2 pages

Ordering Company: Fireye Inc.
Derry, NH 03038, USA

Product description: Integrated Flame Scanner with Integral Flame Relay

Basis of Test: DIN EN 61508:2002, parts 2 – 3

Test Report: No. TM82838 Rev.1 dated 2009-11-06

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The test results refer exclusively
to the units under test.

The tests have been performed with positive results.
The results in detail, the evaluation of the results and the conclusions out of
the results are described in the above mentioned test report. A list of models
and an excerpt from the test report is printed on the reverse.

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Type designation	Insight
Models	95IRxx-yy, 95UVxx-yy, 95DSxx-yy Key: xx = S1, S1E, S2 or S2E (Sensor) yy = 1, 2, 3, 1CG, 2CG or 3CG (Connection)
Electrical supply data	24 V DC
Safety time	1 second (optionally 2, 3, 4, 5 or 6 seconds)

The flame detector device is suitable for flame detection of burners and combustion systems for fluid, gaseous or solid fuels with **permanent operation**, also in hot air generators.

The flame detector device also fulfils the applicable requirements of DIN EN 61508:2002, parts 2–3 for safety integrity level **SIL 2**.

A failure modes, effects and diagnostic analysis performed by exida.com L.L.C. according to report no. FIR 04/08-21 R002, version V1, revision R1, dated 2004-12-01, resulted in the following safety parameters:

Probability of a dangerous failure **$PFH_D = 5 \cdot 10^{-9} \text{ 1/h}$** (high demand mode);

Probability of a dangerous failure **$PFD_{AVG} = 2,2 \cdot 10^{-4}$** (low demand mode);

Safe failure fraction **$SFF = 99,6 \%$** .

These parameters apply to the safety related flame relay output (terminals C and D). They have been calculated under the assumption of a Mean Time to Restoration MTTR = 8 hours and a Proof Test Interval $T_1 = 10$ years.

The flame detector device is suitable to be used as single device for safety instrumented functions (SIF) according to DIN EN 61511-1 up to **SIL 2**.

The conditions listed below have to be considered:

- The output contact of the flame relay (terminals C and D) and the output contact of the fault relay (terminals E and F) have to be fused externally with max. 2 Amps.
- The output contact of the fault relay shall only be used to indicate the internal state of the flame detector device but not for flame detection.
- Proper and safe flame detection must be ensured in any operation condition of the burner, even if the selection of the programmed files via an external switch at terminals J and K fails (e.g. by opening of lines, shorting between lines or shorting to ground).
- Set-up of safety related parameters (e.g. flame failure response time, flame relay thresholds) must be performed under consideration of the applicable requirements for the combustion system.
- After parameter set-up, proper flame detection and discrimination must be verified. The flame relay must reliably de-energize for all flame out conditions in any operation condition of the burner.
- Any information technology equipment connected to the communication interface must fulfill the requirements of DIN EN 60950 / IEC 60950.