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Summary of Evaluation Findings on 71 Instruments evaluated from 2003 to 2007 by Evaluation International, WIB and EXERA

INTERNATIONAL INSTRUMENT USERS' ASSOCIATIONS
EVALUATION INTERNATIONAL-WIB-EXERA

CIRCULATION

This report has been prepared for the in-house use of EI, WIB and EXERA (EWE) members. Because of the general interest shown in it and because it contains only published information freely provided for the purpose by equipment manufacturers or objective information derived by independent, impartial research, it may also be made available (freely or for sale) to non-member organisations.

ABOUT EWE (EI, WIB and EXERA)

EI, WIB and EXERA (EWE) are international instrument users' associations who collaborate in the sponsoring, planning and organisation of instrument evaluation programs. They have the long term objective of encouraging improvements in the design, construction, performance and reliability of instrumentation and related equipment.

The evaluation of the selected instruments is undertaken by approved, independent and impartial laboratories with respect to the manufacturers' performance specifications and to relevant International and National standards.

Each evaluation report describes the assessment of the instrument concerned and the results of the testing. No approval or certification is intended or given. It is left to the reader to determine whether the instrument is suitable for its intended application. Reports are circulated throughout the entire membership of the EWE Associations.

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United Kingdom

WIB - International Instrument Users' Association
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EXERA - Association des Exploitants d'Equipments du Mesure, du Régulation et d'Automatisme
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France

International Instrument Users' Associations

EWE Membership List

January 2008

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Technical Approval	Managers of Evaluation International, WIB and EXERA

Interpreting the Analysis of the EI-WIB-EXERA 2003-2007 Evaluation Report Findings

BACKGROUND

Membership of EI, WIB and EXERA (EWE) is open to users of instruments for measurement and control and to test houses. They came together to fund the evaluation of commercially available instrumentation (and to share the reports) because in the 1960's there was a widespread view that purchased instruments did not necessarily perform in accordance with manufacturers' specifications.

While membership is not open to instrument manufacturers, EI, WIB and EXERA have excellent relations with many manufacturers who often co-operate in evaluations of their instruments by providing instruments on loan for the tests and partial funding. In return, the manufacturers are able to have their own comments on the evaluation included verbatim in the report and, if they have funded at least 25% of the project, they are able to use the final report for their own publicity and sales promotion purposes.

After a few years of carrying out comprehensive evaluations of all performance aspects, SIREP (now Evaluation International - EI) commissioned an independent assessment of the findings of all the evaluation projects which had been carried out. This was done initially on a year by year basis from 1963 onwards but, to give more confidence in the assessment by including a greater number of instruments, the results were regularly published by EWE as a rolling five-year average. The findings attached to this note are presented in the same chart form as previously.

1. THE EVALUATION PROCESS

For every instrument evaluated, a test programme is devised to check whether the manufacturer's specification is met under controlled laboratory conditions. When the manufacturer's specification is not fully comprehensive, EWE user members propose, as a basis for comparison, performance parameters based on experience and the specifications of similar instruments.

The actual tests are based on international standards or, when these do not exist, on national or company standards. In all cases the test programme is agreed with the manufacturer before the project is commenced. The manufacturer supplies the instrument on loan free of charge, and provides information on its status, for example whether it is a normal production instrument or a pre-production prototype.

The evaluations are carried out at accredited, independent laboratories the evaluators in which are responsible for writing the reports. The uncertainty of measurement of all test equipment used is traceable to international or national standards. The manufacturer is given a copy of the report at draft stage and is asked to comment on the findings. His written comments are included in the final published report.

2. THE EVALUATION FINDINGS

The main findings reported here are very similar to those in earlier years. 37% of instruments tested met all specifications but the scenario is very much a "worst case" one and the findings need to be interpreted with the caveats below in mind.

3. WHAT THE CATEGORIES MEAN

The categories of tests given in the main chart must be understood.

- **Unsatisfactory as received** means that the instrument did not operate correctly when set up in accordance with the manufacturer's instructions. The reasons for being "unsatisfactory" range from the less serious (eg wrong instrument supplied) to catastrophic (failed to operate).

- **Outside specification under reference conditions** (20 C +/-2 C; less than 60% relative humidity) means failure to meet specification for accuracy, repeatability, sensitivity, frequency or step response, input impedance, output noise, start-up and long-term drifts, mounting position etc.

- **Outside specification under influence conditions** means that the instrument has been subjected, where appropriate, to variations one at a time in temperature/humidity, vibration, shock, line interference, power supply variation, signal perturbation, salt spray, driving rain, dust and sand etc.

- **Breakdown** means that the instrument failed to operate properly and the manufacturer was asked to repair it.

- **Inadequate performance specification in (manufacturer's) documentation** is based on the evaluator's opinion that the instrument is not as fully specified as could be expected, use of non-standard terms etc.

- **Subsequent instrument modification** is based on the manufacturer's formal comments in the report in which he says that as a result of the evaluation he will modify the design or other aspects of the instrument. This finding shows that instrument manufacturers take seriously the independent evaluation of their products.

4. FAILURE TO MEET PERFORMANCE SPECIFICATION

- **39% failed to meet manufacturers' own specification** means that the subject instrument failed to meet one or more of the manufacturer's specification parameters. Put another way, 61% of instruments met the manufacturer's specification (even though many of those specifications may not have been fully comprehensive).

- **63% failed manufacturers' or users' specifications -** this not only includes the immediately preceding statistic but also, those for which the manufacturer's specification was not comprehensive; it takes account of failure to meet assumed user specifications agreed in advance by the manufacturer.

5. CAVEATS IN INTERPRETING THE FINDINGS

It should be appreciated that these findings do not take account of the extent of any failure to meet specification. An instrument only marginally outside specification is counted as being a failure in this regard, as well as those with a very poor performance characteristic.

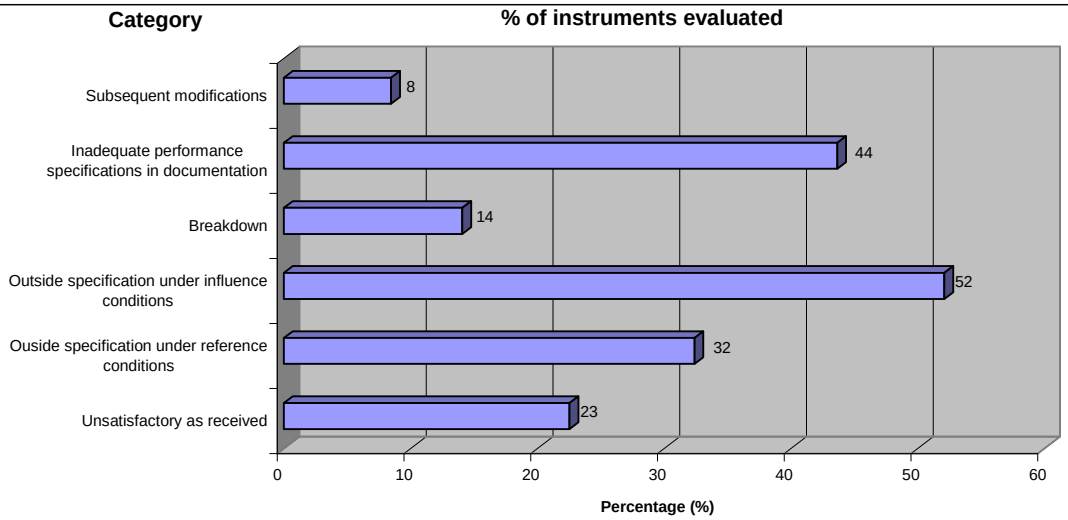
Under marketing pressures to recoup development investment, some instrument manufacturers are known to have indulged in "specmanship". There is no doubt that if specifications were slightly relaxed, then the failure-to-perform statistics would be considerably better.

There is another factor, which has adversely influenced the findings – the way that instruments are selected for evaluation by EWE members. The users have substantial interest in analytical and environmental instrumentation which tend to be complex, sometimes involving fluid handling. In addition, their interests are generally with new-on the-market instruments and those embracing new technology. Frequently, therefore, the instruments are from first or early production runs in which the manufacturer may not have had adequate opportunity to identify all potential problems with an instrument.

6. A FINAL FEW WORDS

The correct course of action is to read the comprehensive evaluation report itself before making any judgement on the subject instrument.

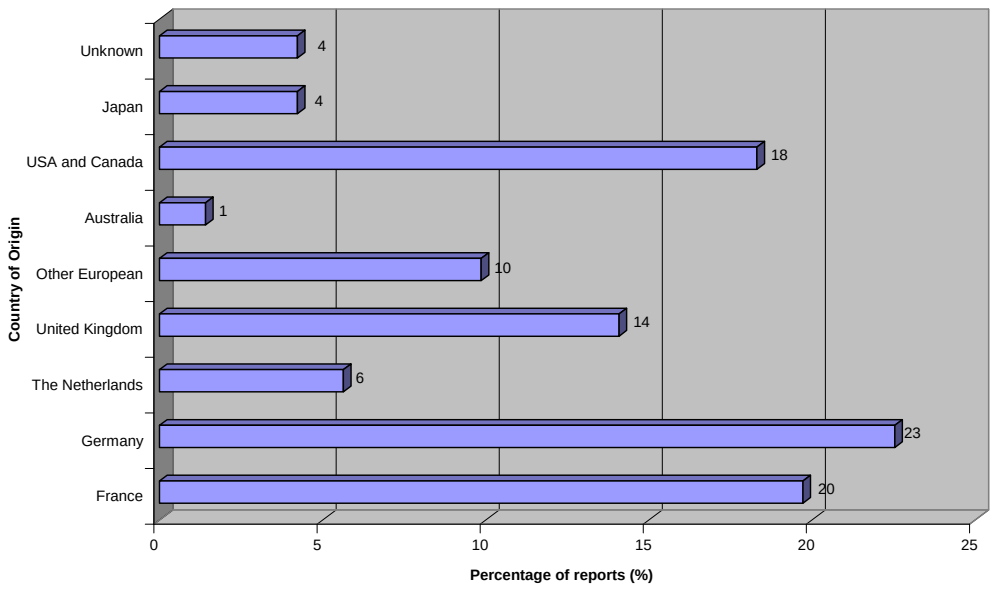
Summary of Evaluation Findings
on 71 instruments evaluated during 2003-2007
by
EVALUATION INTERNATIONAL, WIB and EXERA
THE INTERNATIONAL INSTRUMENT USERS' ASSOCIATION



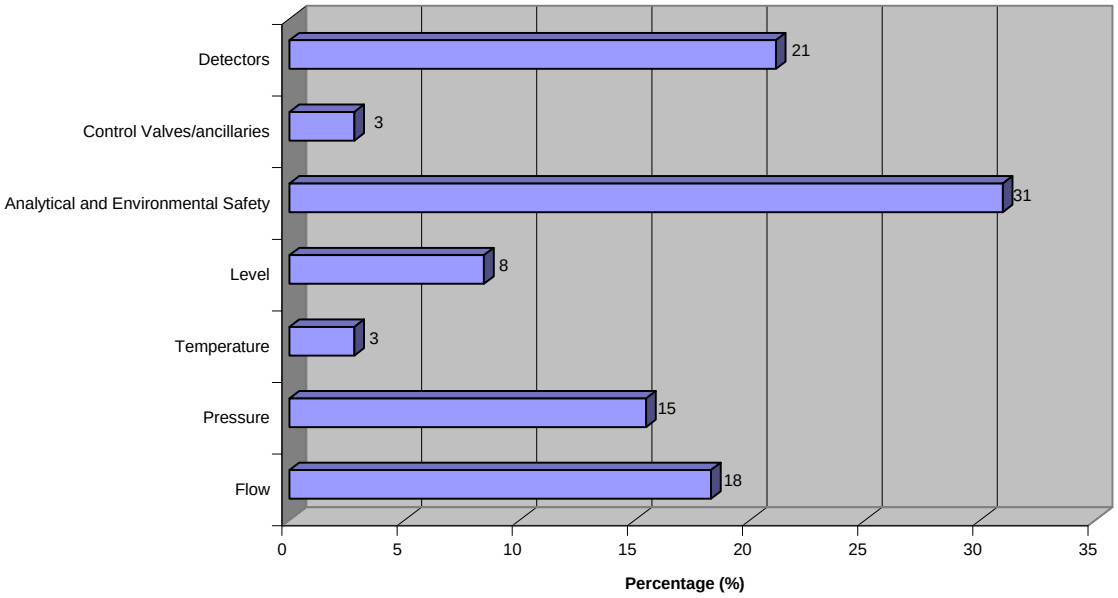
Instruments failing to meet performance specification
39% failed manufacturers' own specification
63% failed manufacturers' or users' specifications

37% met all specifications

Country of Manufacture of Sample Instruments



Categories of Instruments Reviewed



INDEX OF REPORTS ASSESSED IN PREPARING THE EWE REVIEW OFSTATISTICS 2003-2007									
MANUFACTURER		**INDEX**	**REPORT NUMBER**					**REPORT TITLE**	**REMARKS**
Name	**Country**	**Class**	**type**	**number**	**lab**	**yr**	**sufx**	**Title**	**Remarks**
Servomex	UK	4.2	E	1802	X	2003		Xendos 2510 Hydrogen Chloride Analyser	
ABB Instrumentation Ltd.	UK	4.2	E	1803	X	2003		Oxygen Probe and Analyser System ZFG2/ZDT	
Yamatake Corporation	Japan	8.1	E	2739	T	2003		Electropneumatic valve positioner, Modle SVP3000 Alphaplus AVP302	
ABB Automation Products	Germany	4.2	E	3800	C	2003		GmbH Multi-Fid Total Volatile Organic Compound Analyser	
Bernath	Germany	4.2	E	3801	C	2003		Atomic Total Volatile Organic Compound Analyser,Model 3006	
COSMA (Environment SA)	France	4.2	E	3802	C	2003		Total Volatile Organic Compound Analyser, Model Graphite 655	
Seres	France	4.2	E	3803	C	2003		Total Volatile Organic Compound Analyser, Model HCT 2000G	
Mess-AnalysentechnikGmbH	Germany	4.2	E	3811	C	2003		GmbH Thermo FID PT Total volatile organic compound analyser	
General Monitors	USA	5.1	E	3813	C	2003		Infared Long optical travel explosion meter Model IR 5000	
Zellweger Analytics	UK	5.3	E	3814	C	2003		Infared Long optical travel explosion meter Model Searchline Excel	
Spectrex	Israel	5.3	E	3815	C	2003		Infared Long optical travel explosion meter Model Searchline Excel	
Krohne Messtechnik & Co	Germany	6.3	T	2735	X	2003		KG Radar level transmitter Type BM 70 A (4-wire 4-20 mA)	
Siemens Milltronics	Canada	6.3	T	2736	X	2003		Radar level transmitter Type IQ Radar 300/Sitrans LR 300 (4-Wire 4-20 mA)	
Magnetrol	USA	6.3	T	2737	X	2003		Guided Wave level transmitter Type Eclipse 705 (2-Wire 4-20 mA)	
Procal Analytics Ltd.	UK	4.2	E	1814	X	2004		Gas Analyser and Control Unit Models Pulsi 250 LR and ACU Mk3	
AB	Sweden	1.2	T	1819	S	2004		Microtome Differential pressure transmitter Model MICAFLEX MF-PFA	
ABB Space spa Italy	Italy	1.2	E	1820	S	2004		2600T Series Pressure Tansmitter - Model 268DS Differential Transmitter	
Crowcon	UK	5.3	E	1821	X	2004		IR-detector type Nimbus	

Oldham	France	5.3	E	3804	C	2004		Low-maintenance O2 detector Model OX 2000+	
Draeger Sicherheitstechnik	France	5.3	E	3805	C	2004		GmbH Low-maintenance O2 detector Model microPac	
BW Technologies	Canada	5.3	E	3806	C	2004		Low-maintenance O2 detector Model GasAlert	
BW Technologies	Canada	5.3	E	3807	C	2004		Low-maintenance O2 detector Model GasAlertClip	
Foxboro	USA	1.2	E	3824	N	2004		Type IDP 10, model T22B, version HART differential pressure transmitter	
Honeywell	USA	1.2	E	3825	N	2004		Type ST 3000, Series 900, Model STD 924, version Hart differential pressure transmitter	
Endress + Hauser	Germany	1.2	E	3827	N	2004		Type Deltabar S PMD 75 differential pressure transmitter	
Krohne	The Netherlands	3.2	E	3874	N	2005		Electromagnetic flowmeter Optiflux 5300 C	
Emerson Process Management	Sweden	6.3	T	2742	X	2004		SAAB Rosemount Guided Wave Radar level transmitter Type Rosemount 3300 (2-Wire 4-20mA)	
Endress + Hauser	Germany	6.3	T	2743	X	2004		Guided Wave Radar level transmitter Type M FMP 40 (2-Wire 4-20 mA)	
Goyen Controls	Australia	4.2	E	1826	S	2005		EMS6 Particulates Emission Monitor	
Environment MIR	France	4.2	E	1827	S	2005		9000 Multi-gas Analyser Monitor	
Micropack (Engineering) Ltd.	Scotland, UK	5.1	E	1840	X	2005		FDS-101 Imaging Based Flame Detector - Part 1	
Micropack (Engineering) Ltd.	Scotland, UK	5.1	E	1841	X	2005		FDS-101 Imaging Based Flame Detector - Part 2	
MSA	Israel	5.1	E	1843	X	2005		SafEye Series 300 Cross Duct Open Path Gas Detector	
Yokogawa	Not Stated	3.4	E	1844	X	2005		US300FM Clamp-On ultrasonic flowmeter	
Flexim Fluxus ADM	Not Stated	3.4	E	1847	X	2005		7202 Clamp-On ultrasonic flowmeter	
Endress + Hauser	Germany	2.2	E	2755	T	2005		Wtzer Gmbh+Co.KG Temperature transmitter Mode iTEMP HART TMT162	
Flowserve Corporation	Not Stated	8.1	E	2756	T	2005		Electropneumatic valve positioner, MOD:LOGIX 3200IQ {"Audit based testing"]	
ABB Automation	Germany	1.2	E	3822	N	2005		Type 2010TD differential pressure transmitter	
Emerson Process Management	USA	1.2	E	3823	N	2005		Type 3051STD differential pressure transmitter	

Yokogawa	Japan	1.2	E	3826	N	2005		Type DP HARP EJA 110 A differential pressure transmitter	
Hastings	USA	3.6	E	3851	N	2005		Type HFM-300 Thermal mass flowmeter	
Hastings	USA	3.6	E	3852	N	2005		Type HFM-D-300 Thermal mass flowmeter	
Brooks	The Netherlands	3.6	E	3853	N	2005		5860S Thermal mass flowmeter	
Bronkhorst	The Netherlands	3.6	E	3854	N	2005		Type F-111C HGD Thermal mass flowmeter	
Bronkhorst	The Netherlands	3.6	E	3855	N	2005		Type F-111C AGB Thermal mass flowmeter	
Bürkert	Germany	3.6	E	3856	N	2005		Type 8702 Thermal mass flowmeter	
Krohne Messtechnik & Co	Germany	6.3	T	2741	X	2005		KG Guided Wave Radar level transmitter Type BM 100 A (4 Wire 4-20 mA)	
Krohne	UK	3.6	T	2746	X	2005		Optimas series 7000 straight pipe Coriolis mass-flow meter	
Yokogawa	Germany	3.4	E	1848	S	2006		Coriolis mass flowmeter, model Rotamass RCCT38	
ABB Automation Products	Germany	3.6	E	1857	X	2006		Multivariable differential pressure transmitter 267 CS including PC software SMART VISION	
MSA	France	5.3	E	3865	X	2006		Gallet Model Ultima XE Chlorine detector	
Compur Monitors	Germany	5.3	E	3866	X	2006		Model STATOX 501 Chlorine detector	
Draeger Safety	Germany	5.3	E	3867	X	2006		Model Polytron 7000 Chlorine detector	
Oldham	France	5.3	E	3868	X	2006		Model OLCT80d Chlorine detector	
G.E I.T.	France	5.3	E	3877	X	2006		Model TX401M-Safe Chlorine detector	
Endress + Hauser	France	3.2	E	3873	N	2006		Electromagnetic flowmeter Promag 53 P	
Yokogawa	Germany	3.2	E	3876	N	2006		Electromagnetic flowmeter Admag AXF	
Yokogawa	Japan	3.6	E	1858	X	2007		Multivariable differential pressure transmitter EJX910A including PC software EJXMVTool	
Emerson Process Management	USA	3.6	E	1859	X	2007		Multivariable differential pressure transmitter Rosemount 3095 including PC software Engineering Assistant	
RKI Instruments	USA	5.1	E	1871	X	2007		65-2450RK H2 Specific Sensor/Transmitter	
H2SCAN HYALERTA	USA	5.1	E	1872	X	2007		Model 500 Handheld Hydrogen Leak Detector	