1 **EC TYPE-EXAMINATION CERTIFICATE**

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: **Sira 03ATEX1118** Issue: **5**

4 Equipment: **Vibrating Fork Density/Viscosity Transducer (7826, 7827, 7828 & 7829)**

5 Applicant: **Mobrey Limited**

6 Address: 158 Edinburgh Avenue
Slough
Berkshire SL1 4UE
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in the confidential reports listed in Section 14.2.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 50014:1997 (amendments A1 and A2) EN 50018:2000 EN 50284:1999

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 1/2 G
EEx d IIC T4
$-40°C \leq Ta \leq +110°C$

Project Number
C. Index

C Ellaby
Certification Officer

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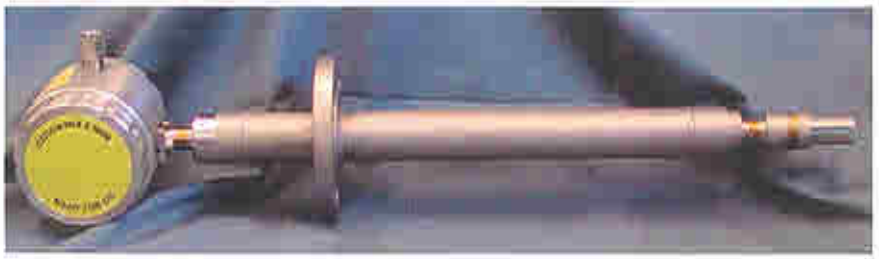
13 DESCRIPTION OF EQUIPMENT

The Vibrating Fork Density/Viscosity Transducers (7826, 7827, 7828 & 7829), illustrated in figure 1, provide a continuous on-line measurement of density and/or viscosity in pipelines and tanks using tuning fork technology. Viscosity and density is determined by the resonance of the tuning fork immersed in the fluid. There are four variants of the product as detailed below:

7826 Density (standard electronics)
7827 Viscosity (standard electronics)
7828 Density (advanced electronics)
7829 Viscosity (advanced electronics)

Cast Head



Machined Head with associated probe

Figure 1 – Photographs of the two enclosures and the associated probe assembly

Principle of operation: The transducers work on the vibrating element principle, the element in this case being a tuning fork structure, which is immersed in the liquid being measured. The tuning fork is exited into operation by a piezoelectric device internally secured at the root of one tine. Frequency of vibration is then detected by a second piezoelectric device, which is secured in the root of the other tine. The transducer sensor is vibrated at its natural resonant frequency and modified by the characteristics of the surrounding fluid. The frequency of vibration is a function of overall mass of the tine element and the fluid in contact with it. As the density and/or viscosity of the liquid changes the overall vibrating mass changes, along with the resonant frequency.

Safety characteristic: The product utilises two enclosure types (machined housing and cast housing). These enclosures are fundamentally similar and consist of a main tubular body and two-screwed end covers. Grub screws secure these covers. These enclosures are designed to incorporate the vibrating fork assembly. The interface between the two items forms a cylindrical flamepath. The flamepath is retained by split clamps or clamp pin. The overall assemblies have been designed to maintain the reference pressure and process pressure without deformation or damage. The vibrating fork assembly is of welded construction therefore they are routinely overpressure tested. The vibrating fork assembly consists of two main parts at either end of a steel tube. The first part is the vibrating element and the second is the interface into the main enclosure. These two parts are filled with cement and fitted with suitably certified cable entry devices. The tube simply contains suitably certified cable entry devices and associated cable.

Electrical & pressure characteristics:	Maximum voltage	30 V
	Maximum power	2 W
	Maximum working pressure	100 Bar

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SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE **Sira 03ATEX1118**
Issue 5

Variation 1 - This variation introduced the following changes:

i. The use of carbon steel as an alternative material of manufacture for component parts other than the electronic housings was recognised.
ii. The vibrating element was allowed to have an alternative length.
iii. The introduction of a separate drawing that defines the model codes of the long stem fork design types.
iv. The use of the alternative stem to be used on the non cast housing was acknowledged.
v. The model 7825 may be defined as "Model Type 7825 – Density Transmitter".

Variation 2 - This variation introduced the following changes:

i. The use of an alternative, cast aluminium head in place of the existing cast and machined heads was recognised.
ii. The introduction of a new printed circuit board.

Variation 3 - This variation introduced the following changes:

i. The use of alternative grades of aluminium alloy was permitted.
ii. The label was redesigned, this included the introducing alternative label materials and method of attachment.
iii. introduction of an alternative catalyst for potting material.
iv. The recognition of minor drawing corrections.

Variation 4 - This variation introduced the following changes:

i. The introduction of alternative wet-side materials of manufacture, nickel steel alloys UNS N06022 & UNS N10675.

Variation 5 - This variation introduced the following changes:

i. The maximum length of the tubular body was increased.
ii. The information incorporated in the certificate schedule drawings was clarified.

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14 DESCRIPTIVE DOCUMENTS

14.1 Drawings

Refer to Certificate Annexe.

14.2 Associated Sira Reports and Certificate History

Issue	Date	Report no.	Comment
0	19 November 2003	R51A9563A	The release of the prime certificate.
1	20 August 2004	R51V11961A	The introduction of Variation 1, this document was re-issued 11 July 2006 to clarify the model changes.
2	24 February 2005	R51A12261A	The introduction of Variation 2.
3	4 December 2006	R51A15722A	The introduction of Variation 3.
4	22 April 2008	R51A18074A	The introduction of Variation 4.
5	5 September 2008	VR51A13857A R51A16605A	This Issue covers the following changes: • All previously issued certification was rationalised into a single certificate, Issue 5, Issues 0 to 4 referenced above are only intended to reflect the history of the previous certification and have not been issued as documents in this format. • The change of the Applicant's address was re-confirmed, former name and address Solartron Mobrey, Crompton Way, Crawley, West Sussex RH10 9QR; this was first recognised 8 March 2006. • The option to replace the "Mobrey Logo on the product nameplate with the "Micro Motion" Logo was re-confirmed; this was first recognised 14 May 2007. • The introduction of Variation 5.

15 SPECIAL CONDITIONS FOR SAFE USE (denoted by X after the certificate number)

None

16 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in the reports listed in Section 14.2.

17 CONDITIONS OF CERTIFICATION

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

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Certificate Annexe

Certificate Number: **Sira 03ATEX1118**

Equipment: **Vibrating Fork Density/Viscosity Transducer (7826, 7827, 7828 & 7829)**

Applicant: **Mobrey Limited**

Issue 0

Number	Sheet	Rev.	Date	Description
5010	-	2	13 Feb 03	Certification drawing zone 0 – viscosity transducer
5011	-	2	12 Feb 03	Certification drawing zone 0 – viscosity transducer
5014	-	3	26 Sep 03	Long stem fork assy. (with new housing) certification drawing
5016	-	3	22 Sep 03	Long stem fork assy. (cast housing) certification drawing
5018	-	2	12 Feb 03	Certification drawing zone 0 – viscosity transducer arrangement for insert/retract version
5050	-	2	13 Feb 03	Housing (G.A.) certification drawing
5051	-	2	13 Feb 03	Housing (body) certification drawing
5052	-	2	18 Feb 03	Housing plain cover certification drawing
5056	-	3	28 Oct 03	Label blank – long stem forks atex certified units
5058	-	4	28 Oct 03	Label certification drawing
78265058	-	1	18 Feb 03	Warning label – end covers
78273788	-	1	25 Feb 03	Certification drawing upper nodal mass (all 4 options)
78295013	-	2	14 Feb 03	Certification-drg atex cast housing + boards

Issue 1

Number	Sheet	Rev.	Date	Description
5014*	-	4	21 June 04	Long stem fork assy. (with new housing) certification drawing
5016	-	4	21 June 04	Long stem fork assy. (cast housing) certification drawing
78295019	-	1	11 June 04	Model codes for Long Stem Forks

* This drawing was amended by Sira on 2 August 2004.

Issue 2

Number	Sheet	Rev.	Date	Description
78265066	1 of 1	2	Dec 04	Explosion Proof Sensor Housing
78285023	1 of 1	1	02 Feb 05	Alternative Terminal PCB Layout
78295019	1 of 1	2	05 Aug 04	Model Codes for Long Stem Forks

Issue 3

Number	Sheet	Rev.	Date	Description
78295013	1 of 1	3	20 Sep 06	General Assembly – Housing
78265050	1 of 1	3	15 Sep 06	General Assembly – Housing
78295010	1 of 1	3	20 Sep 06	General Assembly – Viscosity Transducer
78295018	1 of 1	3	20 Sep 06	General Assembly – Viscosity Transducer Insert/Retract Version
78295014	1 of 1	4	21 Sep 06	General Assembly – Housing with long stem
78295056	1 of 1	4	21 Sep 06	Certification Label
79295058	1 of 1	5	21 Sep 06	Certification Label – Long Stem Forks
78265066	1 of 1	4	21 Sep 06	Explosion Proof Sensor Housing

Note: The following drawings have been re-numbered as indicated.

Old number	New number
5050	78265050
5010	78295010
5016	78295016

Old number	New number
5018	78295018
5014	78295014

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Certificate Number: **Sira 03ATEX1118**

Equipment: **Vibrating Fork Density/Viscosity Transducer (7826, 7827, 7828 & 7829)**

Applicant: **Mobrey Limited**

Issue 4

Number	Sheet	Rev.	Date (Sira stamp)	Description
78295014	1 of 1	5	21 Apr 08	Long Stem Fork Assy (New Hsng)
78295016	1 of 1	5	21 Apr 08	Long Stem Fork Assy (Cast Hsng)
78295019	1 of 1	3	21 Apr 08	Model Codes For Long Stem Forks
78295028	1 of 1	1	21 Apr 08	Fork, Tube & Spigot Material Specifications

Issue 5

Number	Sheet	Rev.	Date	Description
78295016	1	6	29 May 08	Long Stem Fork Assembly – Cast Housing
78273788	1	3	19 Aug 08	Certification Drawing - Upper Nodal Mass
78295010	1	5	19 Aug 08	General Assembly – Zone 0 Viscosity Transducer
78295014	1	6	29 May 08	General Assembly – Long Stem Fork Assembly – New Housing
78295018	1	4	29 May 08	General Assembly – Zone 0 Viscosity Transducer - Retract Version

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