



## Certificate of Conformity No 511-00758

**Object** FLOWTI 704-1 (Venturi type model)

**Applicant** **I.G.S. DATAFLOW S.r.l.**  
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**Requirements** Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full  
- ISO 5167-1 Part 1: General principles and requirements  
- ISO 5167-2 Part 2: Orifice plates  
ISO 5167, second edition 01.03.2003  
  
Orifice Metering of natural gas and other related hydrocarbon fluids  
- ISO 12213-3: SGERG

**Confirmation** This conformity certificate confirms that the FLOWTI 704-1's (Venturi type model) flow calculation for orifice plates corresponds to the mentioned standards above.  
(Measurement report No. 135-11422 and 135-11460)

**Date of Test** 16. to 30.05.2011

CH-3003 Bern-Wabern, June 9, 2011

For the Test

Certification Body METAS-Cert

Martin Tschannen

Jürg Ramseyer, Head of METAS-Cert



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### 1. Type designation

Volume conversion device FLOWTI 704-1 (Venturi type model).

### 2. Description of the Type

The FLOWTI 704-1 (Venturi type model) is a volume conversion device. In operation, the device has to be connected to a orifice plate with specifications according to ISO 5167-2. The FLOWTI 704-1 converts the flow rate calculated according to ISO 5167-1 and ISO 5167-2 into the flow rate at base conditions. The flow rate is calculated by means of the measured pressure difference over the orifice plate at measurement conditions.

#### 2.1 Design

The volume conversion device FLOWTI 704-1 (Venturi type model) is made up of two processor boards, a case, a LC display, control keys and several external sensors (temperature, pressure, differential pressure) connected to the device. The power is supplied either by an external power supply or an internal battery (by a failure of the external power supply). The access to the metrological parameters is protected by a sealed key switch and/or a password.

In accordance with the specific National Metrological Requirements key switch protection can be disabled for some function.

#### 2.2 Transducers

Any temperature transducer, who fulfills the requirements of range for the FLOWTI-704-1 (Venturi type model), can be connected and used with the FLOWTI-704-1 (Venturi type model).

Any absolute pressure transducer, who fulfills the requirements of range for the FLOWTI-704-1 (Venturi type model), can be connected and used with the FLOWTI-704-1 (Venturi type model).

Up to two difference pressure transducers, who fulfills the requirements of range for the FLOWTI-704-1 (Venturi type model), can be connected and used with the FLOWTI-704-1 (Venturi type model).

The cable length for all transducers is limited to a maximum length of 50m.

It is also possible to combine the volume conversion device with a gas chromatograph.

#### 2.3 Flow calculations

The flow calculation methods permit to determine the flow rate using orifice plates which are inside in a conduit running full. To calculate gas flow-rate FLOWTI 704-1 (Venturi type model) performs mathematical calculations in compliance to the following standards:

- ISO 5167-1 and ISO 5167-2
- ISO 12213-3
- ISO 6976



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### 3. Technical data

#### 3.1 Rated operating conditions

##### 3.1.1 Measurand

The volume conversion device calculates the volume ( $m^3$ ) at base conditions by using the measured difference pressure generated by the orifice plate and the measured pressure and temperature from the gas.

##### 3.1.2 Measuring range

###### Pressure transducers

The measuring range of this instrument is limited to the following absolute pressure ranges:

$p_{\max}$	120.0	bar
$p_{\min}$	0.9	bar

$p_{\max} / p_{\min} > 2$ .

###### Temperature transducers

The measuring range of this instrument is limited from  $-10\text{ °C}$  up to  $+60\text{ °C}$ .

###### Difference pressure transducers

The measuring range of this instrument is limited to the following difference pressure ranges:

$\Delta p_{\max}$	600.0	mbar
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###### Orifice plates

The orifice plates have to be manufactured according to the ISO 5167-2 specifications.

Upstream internal pipe diameter  $D$ : 50 – 1000 mm

Diameter ratio  $\beta$ : 0.10 – 0.75 ( $\beta = d/D$ ,  $d$  = diameter of orifice)