



# National Standards Commission

## NATIONAL MEASUREMENT (PATTERNS OF INSTRUMENTS) REGULATIONS

### REGULATION 9

#### SUPPLEMENTARY CERTIFICATE OF APPROVAL No S146A

This is to certify that an approval for use for trade has been granted in respect of the pattern of the

Smith Model ATC Temperature Conversion Device for Liquid-measuring Systems

submitted by Email Electronics  
Cnr Canterbury and Liverpool Roads  
Kilsyth VIC 3137.

This certificate is issued upon completion of a review of NSC approval No S146.

#### CONDITIONS OF APPROVAL

##### General

This approval is subject to review on or after 1/11/94 and expires in respect of new instruments on 1/11/95.

Instruments incorporating a temperature conversion device purporting to comply with the pattern shall be marked NSC No S146A in addition to the approval number of the instrument, and only by persons authorised by the submitter.

##### Special

The conversion device shall only be connected to a meter measuring petroleum products other than liquefied gases.

Signed

Executive Director

#### Descriptive Advice

Pattern: approved 13/10/89

- A Smith model ATC temperature conversion device for use in Commission-approved liquid-measuring systems incorporating a Smith flowmeter.

Technical Schedule No S146A describes the pattern.

Filing Advice

The documentation for this approval comprises:

Supplementary Certificate of Approval No S146A dated 4/12/89  
Technical Schedule No S146A dated 4/12/89 (Incl. Test Procedure)  
Figures 1 to 4 dated 4/12/89



# National Standards Commission

## TECHNICAL SCHEDULE No S146A

Pattern: Smith Model ATC Temperature Conversion Device for Liquid-measuring Systems.

Submittor: Email Electronics  
Cnr Canterbury and Liverpool Roads  
Kilsyth VIC 3137.

### 1. Description of Pattern

A Smith model ATC temperature conversion device approved for use in Commission-approved liquid-measuring systems which incorporate a Smith flowmeter.

The range of densities for which this model should be used is 610 to 1075 kg/m<sup>3</sup>, at 15°C. It is approved for use with meters having a maximum speed of 275 r/min, and for use over a temperature range of -15°C to +270°C.

#### 1.1 Details

The model ATC temperature conversion device (Figures 1 to 4) consists of a double overriding-clutch type calibrator in conjunction with a bulb and bellows type thermal system, to automatically convert the gross metered volume at the product temperature, to a volume at a reference temperature of 15°C.

The product coefficient of expansion (C of E) is set by pinning the eccentric arm in the calibrator (Figure 4).

Each temperature conversion device is drilled for a specific C of E and can only be used for a product which has that C of E value.

#### 1.2 Marking

As the conversion device is unable to carry a plate large enough to contain all the required markings, one or more data plates are sealed to the calibrator, and marked with the following:

Manufacturer's name or mark	
Model number	
Serial number	
NSC approval number	NSC No S146A
Bulb temperature range	min .....°C max.....°C
Density for which conversion device is set	..... kg/m <sup>3</sup>
Type and density of liquid being metered	..... kg/m <sup>3</sup>
Reference temperature	15°C

In addition, the indicator reading face is marked with the reference temperature of 15°C.

### 1.3 Sealing

One or more data plates containing all the relevant markings are sealed to the callibrator (refer para. 1.2).

The sealing of the temperature conversion device etc. (as shown in Figure 2), is optional.

### TEST PROCEDURE No S146A

The following test procedure should be carried out in conjunction with any test procedure in the Technical Schedule for the instrument to which the pattern is connected, as appropriate, and in accordance with any relevant tests specified in the Inspector's Handbook.

If possible, tests should be conducted for at least two liquid temperatures, one in the lower 30% of the operating temperature range of the instrument and the other in the upper half of the range.

The temperature conversion device should be installed with provision for fitting, either permanently or during testing, an unconverted indicator. Hence, using the converted and unconverted indicators, the meter errors and temperature converted errors may be determined separately.

These temperature conversion device tests should include not less than 3 tests at any flow rate. The tests may be either gravimetric, volumetric, or by master meter.

#### 1. Meter Test Without Temperature Conversion

Maximum permissible error  $\pm$  0.3% of the delivered volume.

Carry out at least 3 runs into the prover at the normal flow rate at which the meter is used.

Repeat the above test at the minimum flow rate of the meter.

#### 2. Meter Test With Temperature Conversion

Maximum permissible error  $\pm$  0.5% of the delivered volume.

Carry out at least three runs into the prover at the normal flow rate. Read the temperature at the meter. Reduce the prover volume indication to its equivalent volume at 15°C using the temperature indicated at the meter and the appropriate table (\*) for the density of the liquid for which the meter temperature conversion device is set. Compare the calculated volume with the meter indicated volume. (\* - refer API Standard 2540)



**National Standards Commission**  
**Notification of Change**  
**Supplementary Certificate of Approval No S146A**  
**Change No 1**

The following change is made to the approval documentation for the

Smith Model ATC Temperature Conversion Device for Liquid-measuring Systems

submitted by Email Electronics  
Cnr Canterbury and Liverpool Roads  
Kilsyth VIC 3137.

In Supplementary Certificate of Approval No S146A and its Technical Schedule, both dated 4 December 1989, all references to the submitter should be amended to read;

Diamond Key International Pty Limited  
110 Henderson Road  
Rowville VIC 3178.

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

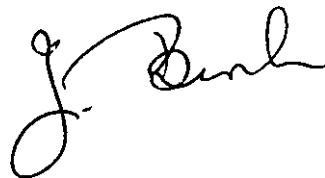
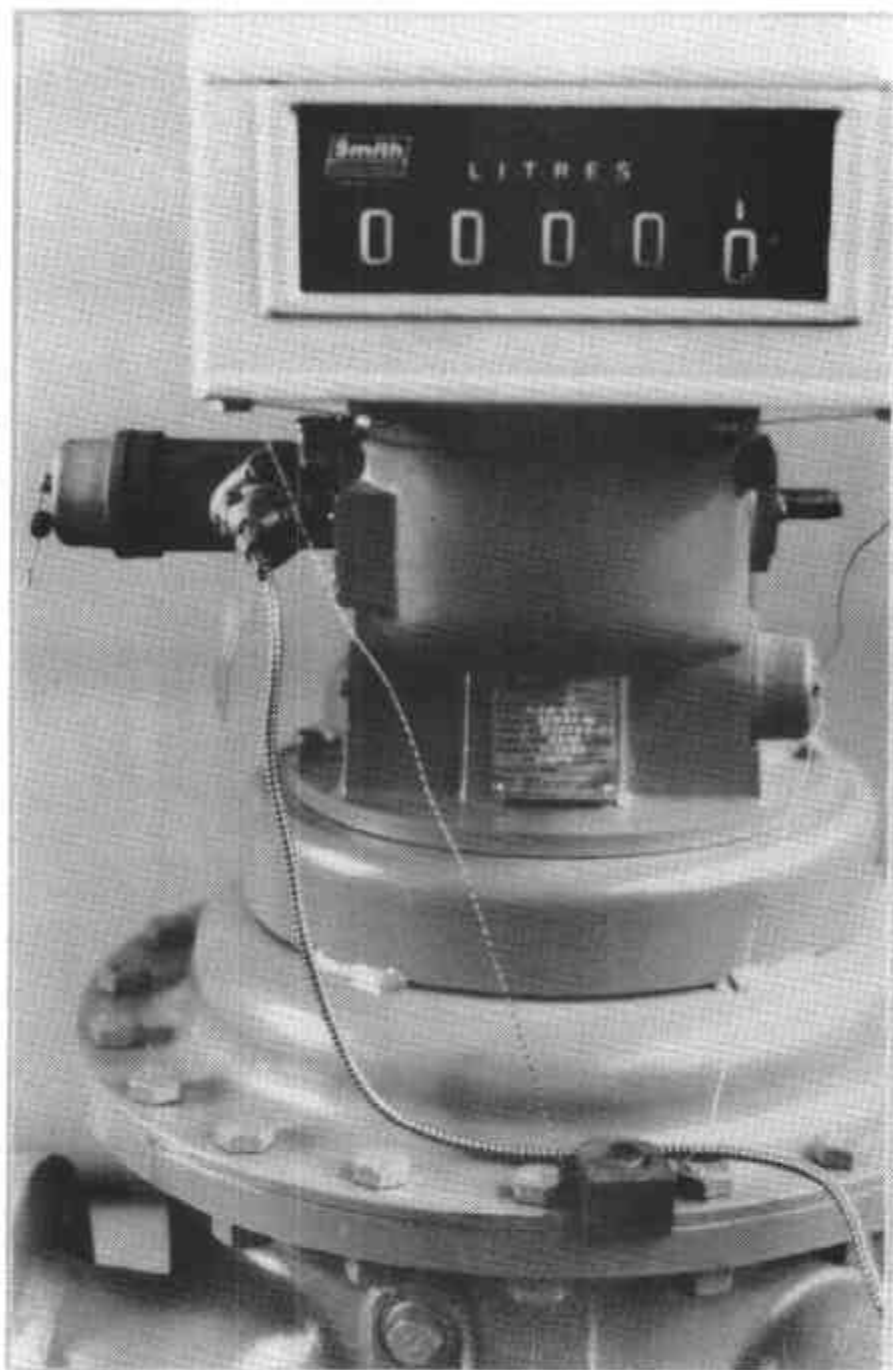
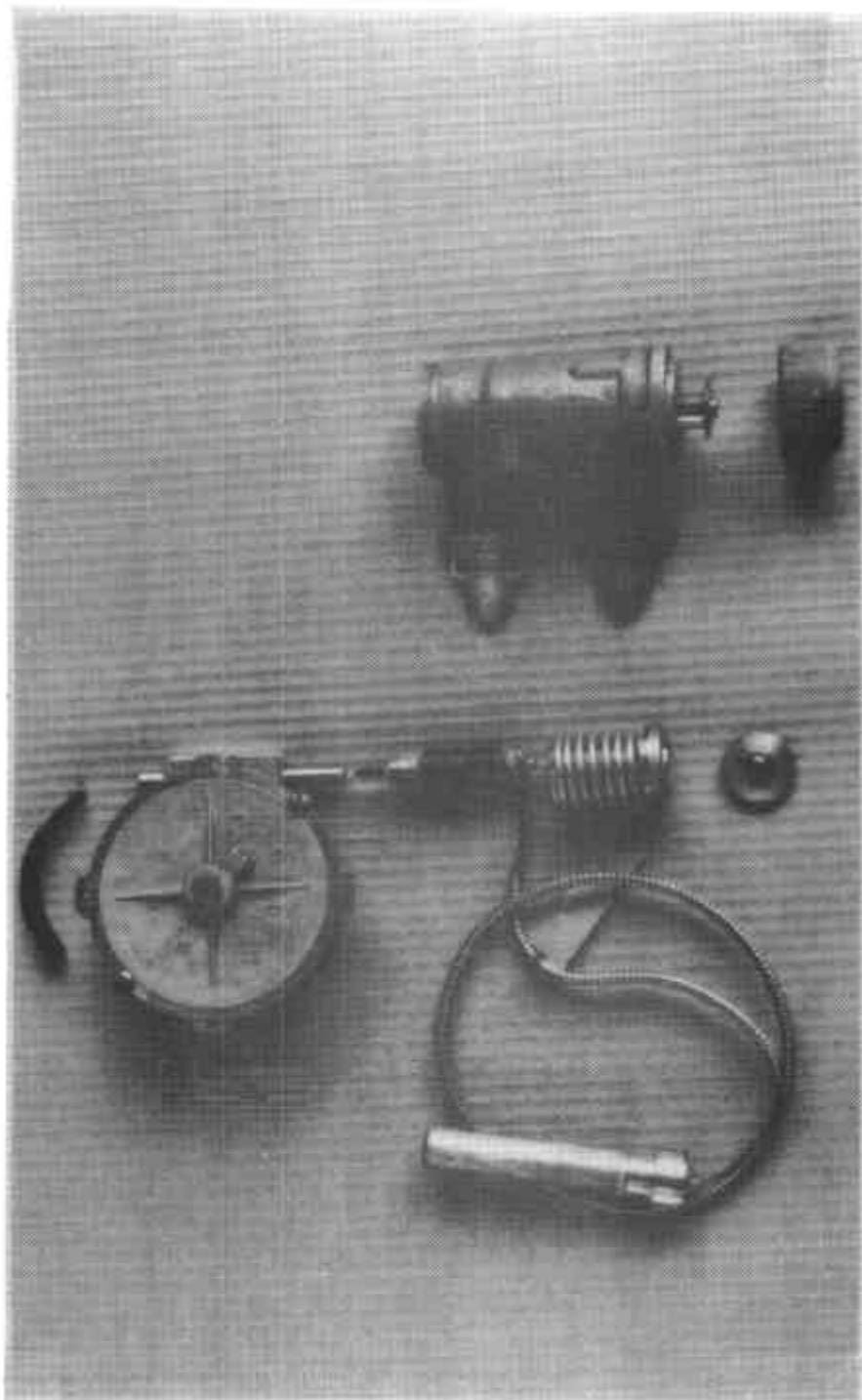


Figure S146A - 1



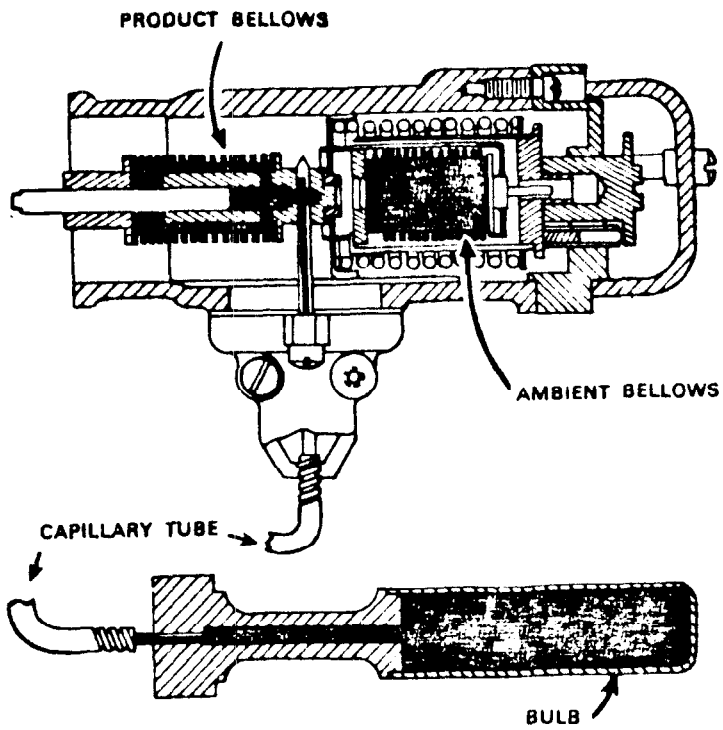
Typical Installation With Smith Model ATC

Figure S146A - 2



Model ATC Main Assembly And Temperature Bulb

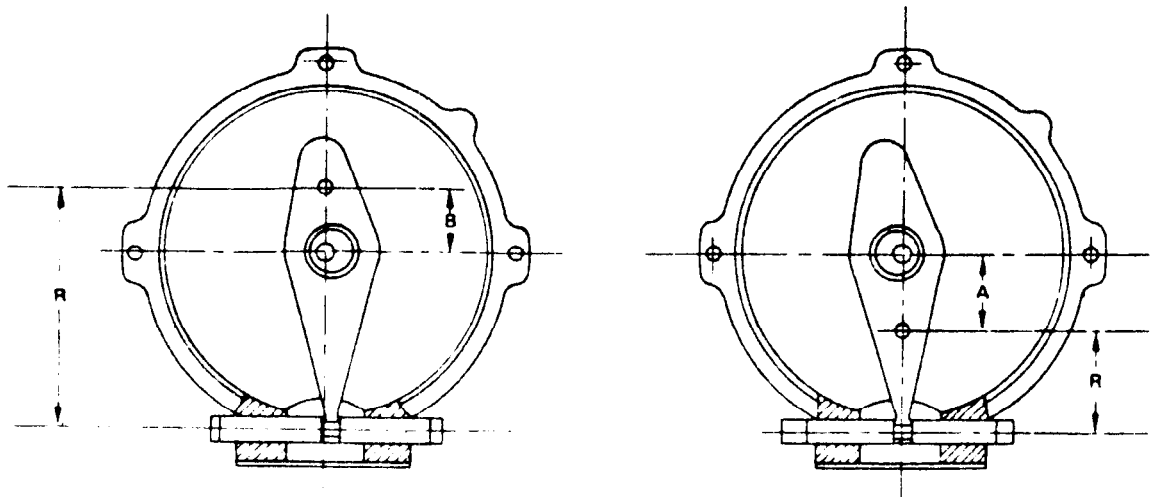
Figure S146A - 3



Schematic of Model ATC



Figure S146A - 4



Examples of Model ATC Calibrator Drilling