

### Set-up for Viscosity of Bitumen by Vacuum Capillary Viscometer

ASTM D2171 - IP 222 - EN 12596 - AASHTOT 202



- ⊕ **High accuracy**
- ⊕ **Small footprint**
- ⊕ **Low noise pump, long lifetime**
- ⊕ **Four positions**
- ⊕ **Easy calibration**

#### General

This test method covers procedures for the determination of viscosity of asphalt (bitumen) by vacuum capillary viscometers at 60°C. It is applicable to materials having viscosities in the range from 0.0036 to over 20,000 Pa.

#### Construction

The Tamson Vacuum System (TVS) is designed to offer a precise preselected negative pressure, i.e. -300 mm Hg for ASTM D2171. The systems range offers 20 .. 320mmHg [30 .. 430mBar]. An internal pump provides vacuum which can be set using the up/down key on the front panel. The set point is stored in memory and automatically set after power up. Internal pneumatics regulate the vacuum around this set point. In case of leakage or volume fluctuations, the electronic feedback system will maintain the pre-set vacuum.

A simple menu offers easy calibration for zero and span when a calibrated reference vacuum meter is available. Via this menu, readout in mBar or PSI can be selected.

| Item         | Unit              | TV4000mkII   |           |
|--------------|-------------------|--|-----------|
| Part number  |                   | 230V 50-60Hz   | 115V 60Hz |
| Part number  |                   | 00T0772  | 00T0774   |
| Range        | [°C/°F]           | Ambient..230°C /446°F  |           |
| Setting      | [°C/°F]           | 0.01   |           |
| Stability    | [°K]              | ± 0.01   |           |
| Bath volume  | [L]               | 40   |           |
| Opening bath | [mm]              | 260 x 240  |           |
| Depth bath   | [mm]              | 300  |           |
| Item         | Unit              | TVS  |           |
| Part number  | [V]               | 00T0940 [85~250 wide input range]                              |           |
| Range        | [mm Hg]<br>[mBar] | 20 to 320 (negative pressure)<br>30 to 430 (negative pressure) |           |
| Readout      |                   | Mm HG, mBar, PSI<br>selectable via setup                       |           |
| Accuracy     | [mBar]            | ± 0.5  |           |
| Linearity    | [%F.S.]           | < 0.5  |           |
| L x W x H    | [mm]              | 265 x 128 x 205  |           |
| Weight       | [kg]              | 4  |           |
| Item         | Unit              | Four Position  |           |
| Part number  |                   | 00T0941  |           |
| L x W x H    | [mm]              | 320 x 195 x 170  |           |
| Weight       | [kg]              | 3  |           |
| CE           |                   | Product conform to CE regulation                               |           |

In asphalt laboratories the TVS may be used in conjunction with Cannon-Manning, Asphalt Institute, and Modified Koppers Vacuum Viscometers for measurement of highly viscous materials such as asphalt cement at 60°C (140°F) according to ASTM D2171. The TVS also is useful in other laboratory systems where accurate measurement and control of vacuum is required.

#### Advantages

One of the main advantages of the TVS is the extremely small footprint compared to the few other vacuum systems available in the market, saving important workbench space. The system further offers high precision and a feedback regulation on the vacuum. This control keeps the vacuum within 0.5 mm Hg of its set point.

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The system is very quiet and the inside vacuum pump can be switched off by a single button on the front of the instrument. With this practical button, the low noise of the vacuum pump is eliminated between tests and increases lifetime of the vacuum pump. When using small tubing, vacuum almost instantaneous builds up, no waiting until vacuum is available. The two fluid traps located on the backside prevent fluid to be sucked into the system accidentally.

The "Tamson Vacuum System" is small, reliable, silent and offers versatile applications to general vacuum system for viscosity measurement or the mentioned specific "ASTM D2171 bitumen" method.

In addition to our TVS, you can use the Tamson TV4000MKII viscometer bath, which has defined the worldwide standard in the petrochemical market for manual kinematic viscosity measurements. In conjunction with this bath, Tamson has developed a Tamson Vacuum Manifold (TVM).

The TVM can be easily mounted on our TV4000mkII by using the standard holes of the top plate. The manifold offers four positions and is delivered with 4mm blue PU-tubing between TVM and TVS.

Additional silicone tubing can be found in the list of accessories.

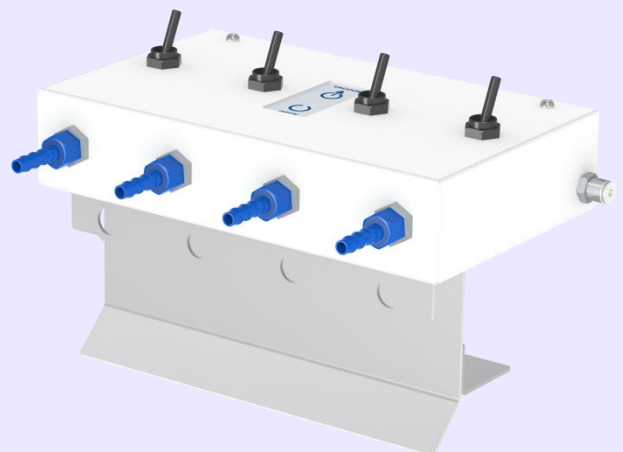
Viscosity measurement such as ASTM D2171 or equivalent test methods, the use of following three instruments is advised:

- TV4000mkII viscometer bath
- TVS
- TVM which fits onto the TV4000MKII.

Tamson also supplies all other necessary test accessories such as the vacuum viscometers, vacuum viscometer holders, reference standards, etc. These items can be found on the following pages.



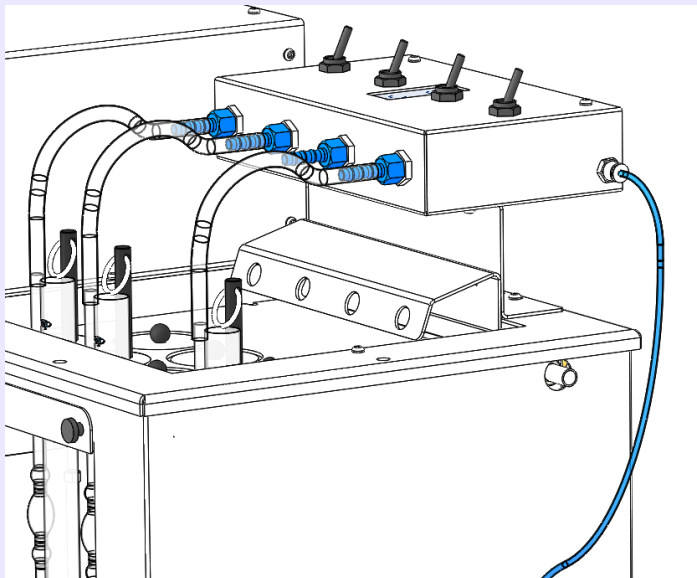
The TVS (P/N 00T0940) with standard (backside) and aside an extra fluid trap. This side bottle is optional, see option list.



The Tamson Vacuum Manifold (P/N 00T0940) offers four positions. The unit fits on all existing TV4000 viscosity bath younger than 10 years. No modification is needed for mounting.

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#### Accessories & spareparts













Set-up for practical use of the manifold

| Necessary Items                       | Picture | 230V/50-60Hz   | 115V/60Hz  |
|---------------------------------------|---------|--|--|
| Tamson Vacuum System                  |         | <b>00T0940</b>   |  |
| Tamson Vacuum Manifold for TV4000mkII |         | <b>00T0941</b><br>(includes 2 m of tubing between manifold and pump) |  |
| TV4000mkII                            |         | <b>00T0772</b><br>(See specification sheet "tvseries")               | <b>00T0774</b><br>(See specification sheet "tvseries") |

| Accessories                   | Picture | Part number                      |
|-------------------------------|---------|----------------------------------|
| Illuminator "Z41" stand alone |         | 85 ~ 230V/50-60Hz <b>00T0909</b> |
| Illuminator "Z41" backpanel   |         | 85 ~ 230V/50-60Hz <b>00T0908</b> |
| Timer                         |         | <b>10T6090</b>                   |
| ASTM Thermometer 47C          |         | <b>25T0940</b>                   |

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#### Accessories & spareparts

| Accessories                              | Picture   | Part number   |
|--|---|---|
| TT-3 digital contact thermometer         |    | See datasheet "thermometer-tt3"   |
| Thermometer holder                       |    | <b>00T0239</b>  |
| General purpose viscosity standards      |    | See datasheet "General Purpose Viscosity Standards"   |
| Vacuum viscometers (CMVV, AIVV and MKVV) |    | See datasheet "Viscosity Accessories"   |
| Viscometer holder CMVV/AIVV              |  | <b>10T6052</b>  |
| Viscometer holder MKVV                   |  | <b>10T6053</b>  |
| Silicon tubing 7 x 10 mm                 |  | <b>24T0046</b><br>(optional accessory to connect viscometer tube and manifold (inner diameter 7mm)).  |
| Blue tubing 4 x 2.5 mm                   |  | <b>24T0049</b><br>(2 m standard included. To connect TMV and TVS).  |
| Bracket for fluid trap                   |  | <b>13T8030</b> (Fluid trap bracket for <u>additional</u> fluid trap. Standard 2 small filters are mounted on the backside of the pump unit.)  |
| Fluid trap                               |  | <b>02T0230</b> Additional fluid trap flask complete for use with fluid trap bracket(P/N 13T8030):<br>- Glass Jar P/N 08T0130<br>- Cap(red) P/N 08T0140<br>- Cover with two hose connections<br>- O-ring |