General Dilatometer Maintenance

Introduction

For all dilatometers, some routine maintenance and inspection is required to assure proper operation, and therefore accurate results. The typical maintenance is basic, and relatively quick and easy to perform. The procedures below should not be confused with periodic calibrations, which are addressed in a separate document (TPN-108).

Sample Chamber

The sample chamber for any dilatometer must be free of foreign deposits and/or debris prior to loading a sample and running a test. To clean a chamber, the preferred method is to use a vacuum cleaner with a small soft nozzle and gently remove any particles inside the chamber (TA Instruments can provide both vacuum cleaner and soft nozzle if needed). An alternate method is to use a clean, low pressure air supply and gently blow any material inside the chamber from the area. Caution must be used because many air supplies have oil and water vapor in it which may deposit and lay inside the chamber. A lint free cloth dipped in isopropyl alcohol may be used to wipe the inside of the chamber.

The tube base plate (for tube type dilatometers), or backing rod (for block type dilatometers) must be flat and have no surface irregularities on it to assure the sample will seat properly. If any irregularities or chips are noted, replacement of the part may be required. The pushrod should also be inspected for surface blemishes and chips, especially at the tip. Also useful for cleaning is a very soft lenz cleaning brush (available from TA Instruments). Bent pushrods must be replaced.

Displacement Transducer

The transducers require periodic maintenance depending on the cleanliness of the environment in which the instrument operates. They employ an optical system, so extra care must be exercised to keep them clean. The transducers have a shaft which is connected to the pushrod for the dilatometer system. This shaft must be free to move, as the shaft is coupled directly to the internal optical sensor in the transducer. Usual problems are limited to dust collecting on this shaft and interfering with the movement.

To begin cleaning the shaft, first expose the transducer(s). For tube/pushrod systems, this is usually accomplished by removing the purge/vacuum head cover. If a pushrod/backing rod system is employed, the transducers are located internally, and the front access panel(s) must be removed to view the transducer(s).

Each transducer has a shaft protruding from the main housing. Using a lint free cloth and some isopropyl alcohol, gently clean the shaft to remove any build-up on the surface. Do this for the sections on both sides of the main transducer housing. Do not permit any excess alcohol to enter the housing as it may cause damage to the internal electronics. Also, never use any type of lubricant on the shaft as this may also cause damage to the internal electronics and will promote collecting dust.

Examine the connections on the transducer to assure they are still fully inserted. The power for the transducer enters via a separate power supply connector, and the communications is linked to the system (where applicable) through a cable with a 5 pin connector on it.

Once these procedures are completed, assure the pushrod has free movement. Realign the pushrod where necessary and reattach the covers. No rubbing against the walls by the pushrod is allowed.

Water Block

For most systems which operate in excess of 500^{o}C, a combination flow switch/water entry block is employed. If this water block were to become plugged by foreign matter in the cooling lines, the safety feature could be defeated, or operation interrupted.

Assure that cooling lines are disconnected and the coolant remaining in the dilatometer has been removed. This can be accomplished by gently blowing air through the lines. The water switch is usually located on the rear of the dilatometer near the coolant outlet (in some instances, the switch may be external to the dilatometer on a manifold assembly). Carefully disconnect the hoses from the water block assembly, noting the positioning of each hose for proper reconnection.

Remove the metal block assembly and disconnect the electrical connector from the switch. As with the hoses, note the direction of connection prior to removal. Do not remove the electrical switch from the metal housing as this is preset at the factory. Remove the screw and washer holding the metal plug and o-ring seal in position and extract them from the housing. Remove the magnetic float and clean any debris from inside the housing. Also clean the float and the inlet and outlet feeds to the block. Replace the float, and reinstall the plug and retaining screw. Connect the electrical sensor wire. Reattach the housing to the system. Connect the coolant lines tot air appropriate positions and begin coolant flow. Check for any leaks. Never use acids or abrasive means for cleaning.

Bubbler

Systems equipped with antisyphon exit gas valves require periodic maintenance of this item. Roughly after 100-200 hours of use, the unit should be disconnected and the head containing the check valve pulled off. Using a soft (wood or plastic) stick, remove the ball and the seal. Wash with alcohol, apply a thin coat of vacuum grease on the seal and reinstall. Make sure it is installed groove facing up if it is a "V" seal type. "O"-rings can be installed either way. Keep the cup filled with a light weight (10W-30) oil to the mark.

TA Instruments

United States
159 Lukens Drive, New Castle, DE 19720 • Phone: 1-302-427-4000 • E-mail: info@tainstruments.com
Canada
Phone: 1-905-309-5387 • E-mail: shunt@tainstruments.com.
Mexico
Phone: 52-55-5200-1860 • E-mail: mdominguez@tainstruments.com
Spain
Phone: 34-93-600-9300 • E-mail: spain@tainstruments.com
United Kingdom
Phone: 44-1-293-658-900 • E-mail: uk@tainstruments.com
Belgium/Luxembourg
Phone: 32-2-706-0080 • E-mail: belgium@tainstruments.com
Netherlands
Phone: 31-76-508-7270 • E-mail: netherlands@tainstruments.com
Germany
Phone: 49-6196-400-7060 • E-mail: germany@tainstruments.com
France
Phone: 33-1-304-89460 • E-mail: france@tainstruments.com
Italy
Phone: 39-02-2742-11 • E-mail: italia@tainstruments.com
Sweden/Norway
Phone: 46-8-555-11-521 • E-mail: sweden@tainstruments.com
Japan
Phone: 813-5479-8418 • E-mail: j-marketing@tainstruments.com
Australia
Phone: 613-9553-0813 • E-mail: sshamis@tainstruments.com
India
Phone: 91-80-2839-8963 • E-mail: india@tainstrument.com
China
Phone: 8610-8586-8899 • E-mail: info@tainstruments.com.cn
Taiwan
Phone: 886-2-2563-8880 • E-mail: skuo@tainstruments.com
Korea
Phone: 82.2.3415.1500 • E-mail: ykson@tainstruments.com

To contact your local TA Instruments representative visit our website at www.tainstruments.com