Principle

The test rig's purpose is the testing of oil mist separators re capture rate, flow rate curve (pressure loss relative to flow rate), pressure regulation curve and leakage. The unit to be tested will be fed with an oil aerosol (flow rate and temperature adjustable) either in positive or negative pressure conditions. The immediate vicinity of the filter is temperature controlled. During the collection efficiency measurement the separated and the let-to-pass oil amounts are measured in dependence on the volumetric flow. They are automatically recorded, applying the gravimetric method, by means of an absolute filter. The amount of oil leaving the separator can be recorded online. Additionally, the leakage of the oil drain valve can be measured. The test rig simulates the operating conditions in typical fields of oil aerosol separator application. When recording the pressure control characteristic, the „pressure in the crankcase“ is simulated in dependence on the „suction pipe pressure“ for different flow rates.

Special Advantages

- Wide range of flow rate for overpressure and underpressure operation mode
- Special operating mode for testing pressure control valves
- Sample holder adjustable for different sample dimension
- Heatable test chamber (ambient temperature up to 120°C/248°F)
- Closed loop test air recovery system (with cooling stage)
- Aerosol generation by means of ATM 243 and/or LDG 244
- Safe test chamber with hinged cover
- Software guided testing procedure
- Convenient Windows software for test rig control, data acquisition and data export

Test chamber (opened) with upstream and downstream test piece connectors, being adjustable for different test object sizes. Integrated in the rear plate the heater blower combination.
Principle

Schematic of the test rig SPT 140

**Design**

The test rig consists of:
- a volumetric flow unit to implement varying volume flows in overpressure or underpressure mode
- a specially configured aerosol generator
- a facility for gravimetric collection efficiency measurement
- a multitude of sensors and controllers for the measurement of temperature and differential pressure
- switch box, rack and test rig control

The test rig requires certain media supply connections as electric power, pressurized air and cooling water connecting lines. The cooling system permits either to emit the exhaust air in a common discharge system or to conduct a recalculated air operation. It is recommended to connect to an exhaust system for safety reasons.

A special technical solution applying a backup filter was developed to allow the determination of the separation performance of the unit under test over a determined period under constant test conditions. Two filters, each of them separately replaceable, are alternately connected. In the start-up period initially the first filter is used until the test conditions do not vary anymore. For the measurement itself it is changed over to the second filter.

Convenient access to the replaceable filters next to the test chamber
Atomizer Aerosol Generator ATM 243
The ATM 243 was specially developed to meet the requirements on test aerosol to be produced for testing oil separators (and is subject to utility model protection). Its design ensures a highly stable particle size distribution and concentration with high reproducibility and high aerosol output. The oil is atomized by binary nozzles. The binary nozzles as well as the carrier gas and the oil storage are heated to the required temperature.

Aerosol Generator LDG 244 for coarse oil dosage
For special applications requiring large oil amounts, e.g. simulation of gushes of oil and wall film respectively, a new generator for the dosage of coarse oils (subject to utility model protection) was developed as an attachment for the SPT 140. By means of a heated single medium nozzle and an integrated oil preheater (temperature range 90 to 120°C/194 to 248°F) oil droplets with an extremely large diameter (50 to 100 μm) and in a very high throughput mass flow can be generated.
Specifications

Control and Data Acquisition Software

For control of the test rig and data acquisition and user friendly software has been developed. This software is widely self-explanatory. It displays the current status of the test rig in graphical format by means of real-time visualization.

Further distinctive features of the Control and Data Acquisition Software are:

- Very largely automated test procedures
- Manual control for calibration, single component services or research purposes
- Data monitor for independent data recording (long-term behaviour measurements)
- Data presentation in tables and diagrams
- Data export function for data-exchange with other Windows applications
- Software integrated select-language feature (English/German)

Technical Data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td>15...300 l/min alternative 20...400 l/min</td>
</tr>
<tr>
<td>Pressure range of unit under test</td>
<td>± 150 mbar</td>
</tr>
<tr>
<td>Differential Pressure</td>
<td>200 mbar</td>
</tr>
<tr>
<td>Testing liquid</td>
<td>mineral or synthetic engine oil</td>
</tr>
<tr>
<td>ATM 243 Generated oil aerosol</td>
<td>max. 5...60 g/h (^2) (d_{50.3}) approx. 1.3 μm</td>
</tr>
<tr>
<td>ATM 243 Nozzle temperature</td>
<td>80°C .... 120°C (176°F ... 248°F)</td>
</tr>
<tr>
<td>Option LDG 244 Generated oil aerosol</td>
<td>50... 2000 g/h (d_{50.3}=50...100 \mu m)</td>
</tr>
<tr>
<td>Option LDG 244 Nozzle temperature</td>
<td>90°C .... 120°C</td>
</tr>
<tr>
<td>Temperature range of the testing chamber</td>
<td>ambient air temperature up to 120°C (248°F)</td>
</tr>
<tr>
<td>Supply air quality requirements</td>
<td>room air (common laboratory grade)</td>
</tr>
<tr>
<td>Cooling water</td>
<td>tap water; max. 6 bar, max. 20 l/h, cooling circuit (outlet temperature max. 40°C)</td>
</tr>
<tr>
<td>Compressed air supply</td>
<td>max. 6 bar; 300 l/min (alternative 400 l/min)</td>
</tr>
<tr>
<td>Power supply</td>
<td>400 V, 16 A</td>
</tr>
<tr>
<td>Dimensions(L x W x H)</td>
<td>2100 x 925 x 1200 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 400 kg</td>
</tr>
</tbody>
</table>

\(^1\) according to characteristic curve of side channel blower  
\(^2\) dependent on brand and type of oil

For more information please visit our website at www.topas-gmbh.de

Specifications are subject to change without notice.

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