

Industrial Emission Measurement Proficiency Testing Scheme

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Proficiency Testing

- Industrial emissions are measured by companies that follow approved methods (e.g. EN 14792 for NO; EN 13284-1 for dust; etc.)
- Proficiency testing (PT) schemes check that participants are able to produce results that are precise and accurate enough to meet the requirements of the relevant standards
- Results are published anonymously so companies can compare their results with the rest of the sector
- NPL periodically analyse data from multiple rounds of UK PT schemes to indicate changes in the performance of the UK stack testing sector

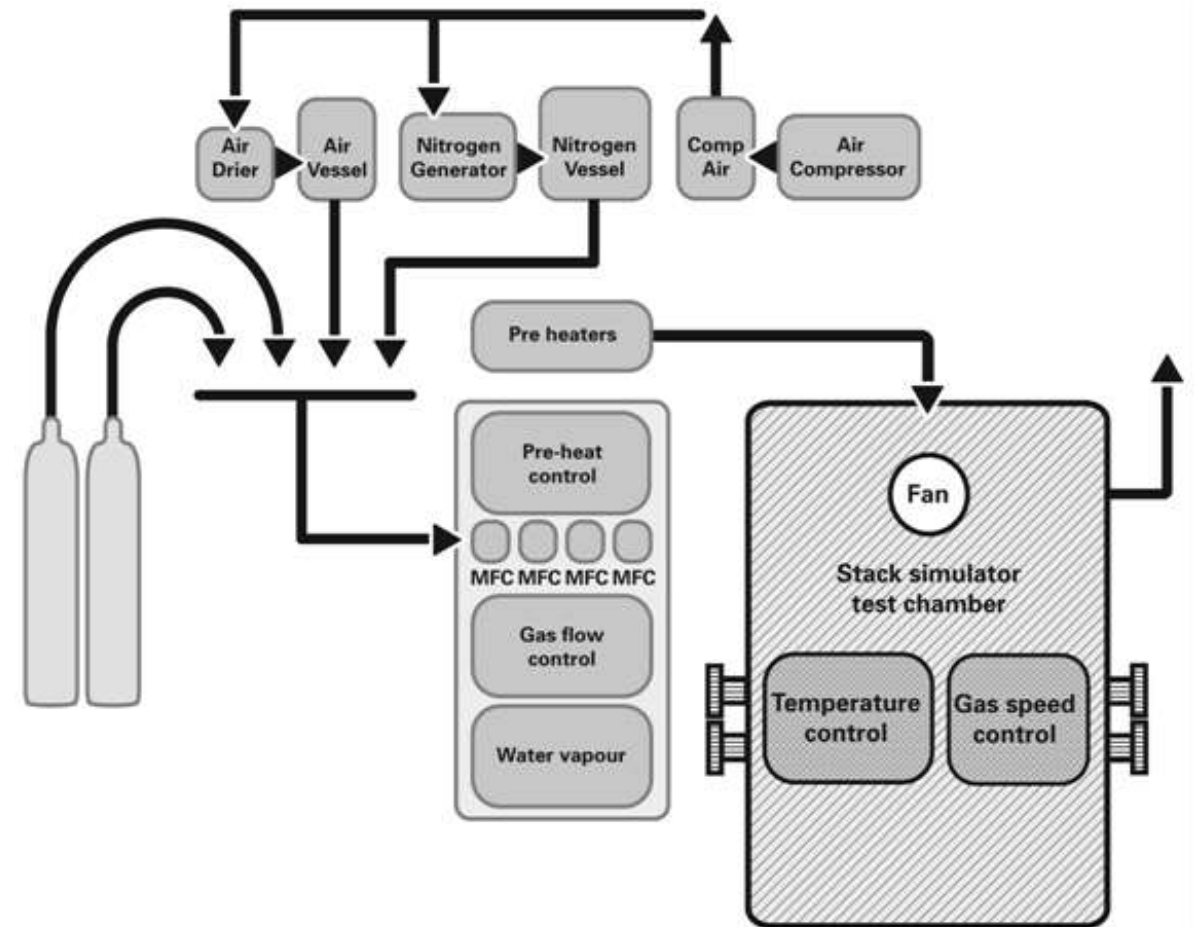
- NPL runs three forms of PT scheme to test different aspects of stack measurement:
 - **Calibration Gas** – Measuring gas concentration from cylinders
 - Tests calibration proficiency
 - **Gas Measurement** – Using NPL Stack Simulator Facility
 - Tests sampling and calibration proficiency
 - **Particulate** – Measuring foil shims and NaCl solutions
 - Tests weighing proficiency
- All results are expressed as z-scores using performance limits from ISO 13528
Statistical methods for use in proficiency testing by inter-laboratory comparisons

NPL Calibration Gas PT Scheme

- Participants measure directly from certified cylinders
- Check of calibration with no interfering species/dust
- Direct measurement from cold, dry cylinder so no sampling line losses and conditioning system effects
- Multiple cylinders are measured covering a range of measurands:
 - SO₂
 - NO
 - NO₂/NO_x
 - CO
 - O₂
 - Propane

NPL Gas Measurement PT Scheme

- The NPL Stack Simulator Facility provides a suitable test of participant's full measurement process, including sampling lines and gas conditioning units
- Species ($\text{SO}_2/\text{NO}/\text{NO}_x/\text{CO}/\text{O}_2/\text{H}_2\text{O}/\text{Propane}$) are measured simultaneously over thirty minute tests



NPL Particulate PT Scheme

- Participant laboratories are sent foil shims and NaCl solution to assess their drying and weighing performance
- Shims are approximately the same sizes and weights as filters used in particulate monitoring
- The NaCl solution simulates a probe washing solution which should be evaporated following standard procedures, allowing the NaCl to be weighed in accordance with EN 13284-1
- Test does not cover sampling proficiency, just laboratory weighing competence
- NPL is developing a particulate stack simulator that would allow sampling proficiency to be included in future PT schemes

IMPRESS European PT Scheme Inter-Comparison

- Other European countries run their own similar PT schemes as part of regulation of the stack emission testing sector
- Under IMPRESS NPL are putting together a database of the anonymised results for PT testing in Germany, the Netherlands and the UK
- Larger sample sizes will allow greater statistical analysis of trends in the results
- Results should indicate the impact on performance of tightening emission limits in the European Industrial Emissions Directive