

Environmental team continues to develop green solutions

An environmental committee provided an overview of its work at the recent ICG/GlassTrend conference in Eindhoven and how legislation can impact glassmakers. Greg Morris reports.

Glass and its impact on the environment is a key talking point within the industry.

It is already a considerably 'green' material but many of the industry's brightest minds are dedicated to finding ways of reducing pollution even further from the production process. The International Congress of Glass's (ICG) Technical Committee 13: Environment (TC13) 13 is made up of members committed to finding ways to protect the planet while making glass.

The committee's Secretary, Simon Slade, of Pilkington NSG, UK, updated delegates of some of its work at the recent GlassTrend workshop at the Van Abbe museum, Eindhoven, the Netherlands conference, hosted by CelSian.

Mission

The committee's mission is: 'To achieve best practice by exchange of information on current and developing techniques for reducing the environmental impact of glass during its production, use and disposal.'

"This includes the comparison of results of different control techniques and the determination of best practice for measuring pollutants (particulates, NO_x, SO_x, HCl, HF and heavy metals) by parallel measurements, material balances and round robin tests."

There are 21 members and they are from industry, consultant bodies and academia worldwide. The committee is focused on technical issues, meets frequently and publishes minutes,

briefing papers and journal articles.

Its work is extremely diverse. Previous examples have included assessment and to share information on new furnace waste gas abatement techniques, such as catalytic ceramic filters and a cloud chamber scrubber, and to discuss best practice and new developments in energy efficient production process such as novel furnace designs, oxy-fuel combustion and waste heat recovery.

It has regular round table updates of changing emission regulations and its implementation in countries worldwide, such as different regulations for Sox/Pm in the USA and the EU.

It has also worked to understand factors affecting the formation of specific pollutants as well as the main five (NO_x, SO_x, Cl, F, PM) such as NO_x from nitrates, B, and Se.

Some of its work and discussions in previous years included a proposal to characterise emission of different boron compounds in different states (gaseous, condensed) and then to develop a best practice measurement technique.

The measurement and analysis of sulphur trioxide and antimony were also discussed at one of its meetings. It also debated observations made in performance of air pollution control equipment applied in glass companies, for instance the combined reduction of SO_x and NO_x emissions.

Presentation

Mr Slade gave three examples of TC13's work. The first was pollutant characterisation and the size of

particulates in furnace waste gas; the second was emission monitoring and measurement uncertainty. The third was round-robin laboratory assessments including a test to support glass's exemption from the Registration, Evaluation and Authorisation of Chemicals (REACH) regulation and a test to assess compliance with Construction Products Regulation (CPR) requirements.

Particulate matter

The composition of particulate matter in soda-lime-silica glass furnace emissions is well known – it is mainly sodium sulphate in raw gas; sodium sulphate or calcium sulphate in EP dust, but there was only a basic understanding of particle size.

TC 13 asked two questions: What is mass median diameter of Particulate Matter before and after a pollution control plant (PCP) and do electrostatic precipitators selectively capture large particles? It conducted a study of the particulate emissions from 17 furnaces of four flat glass manufacturers and particles in waste gas before and after a PCP was studied.

A paper on this study was published in *Glass International* in September 2009, (Vol 32, No 7). The study found that electrostatic precipitators (EPs) are effective techniques for reducing the emissions of particulate matter and

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collecting the reaction products of acid gas scrubbers.

Particles in the emissions are very small (PM2.5), both before and after the pollution control plant. EPs do not preferentially collect any size fraction of particles. The size of particles (MMD) in the waste gas stream after an EP is the same as in the unabated furnace emissions (about 1.4µm).

Legislation

Mr Slade discussed REACH European legislation. Regulation EC 987/2008 states that glass is exempt from the legislation if it does not contain any constituents that meet the 'dangerous' criteria in concentrations above the lowest of the applicable concentration limits.

It is also exempt if 'conclusive scientific experimental data shows that its constituents, meeting the criteria as dangerous...are not available throughout the life-cycle of the substance.'

Most glass does not have potentially harmful constituents so is automatically exempt from REACH registration. But there is some glass that does contain these elements and a test was required to

determine whether these are 'available throughout the life-cycle of the substance.'

As a result TC13 developed a REACH test. It decided that if glass passes a leaching test for suitability for landfill, then components are not available through its life cycle and so the glass should be REACH exempt.



TC13 developed a test to see if some glass was exempt from REACH legislation

In developing the test it followed test method EN12457.

A crushed sample of glass was agitated in water for 24 hours. The method states 'not finely ground' but TC13 realised particles of crushed glass are unrealistic

and recommends that fines (<0.5mm) are removed before elution. Tests were developed on black tableware and ceramic glass.

Results showed some Sb leached from PV rolled plate glass. It was therefore below landfill limit and exempt from REACH registration.

No Se leached from the dark automotive tinted glass so was exempt from REACH registration

Pb did not leach from some special glass so was exempt from REACH registration. However there was Pb leaching from another special glass and exceeded the landfill limit, so that glass will have to be registered.

Future work

TC13 will meet throughout 2013. Practical studies are planned, including a round-robin assessment of methods for collecting condensable particulate matter from glass furnace emissions.

Plans for a study of boron measurement techniques are also being developed. ■

The 23rd International Congress of Glass takes place in Prague, Czech Republic between 1st - 5th July 2013.



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