As part of the leak test, the cast parts are tested for possible gas defects and porosities caused by shrinkage. In the area of boiler production in particular, the rejection rate due to gas defects was reduced by more than 5 per cent with ECOCORE SL.

Fig. 2 (opposite page) As part of the leak test, the cast parts are tested for possible gas defects and porosities caused by shrinkage. In the area of boiler production in particular, the rejection rate due to gas defects was reduced by more than 5 per cent with ECOCORE SL.

Fig. 3 (left) The quantity of part 2 that needs to be added can be reduced by more than 20 per cent with the new system. Dosing quantities of the rival product: 0.52 per cent of part 1 and 0.45 per cent of part 2.

IMpressive Co-operation Results
A conventional cold box system can be described as a three-part system: component 1 is comprised of around 55 per cent phenolic resin and 45 per cent solvents. Component 2 is mainly comprised of polyisocyanate derivatives and 15 to 30 per cent solvents. Finally, the tertiary amine catalyst, which initiates the reaction, forms component 3. Both component 1 and component 2 of the binding agent can contain special additives that are used to optimise special features or casting properties. The polyurethane reaction consists of phenolic hydroxyl groups in component 1, which react with the NCO groups (isocyanate groups) in component 2. In the new solvent-less system, component 3 has been specifically designed to be just as effective as a normal 2-component system, but without using solvents. The solvent-free formulation for component 2 contains a special polyisocyanate component. Special additives that interact exactly with the adapted component 1 were added. With this unique combination, the total amount of binding agents can be reduced by 20 per cent. The new SL technology contains VOC-free solvents that use high-quality chemicals. In the formulations, the known plant esters are replaced by these solvents to offer the unique option of reducing a part of the emissions.

The physical properties of the cores that were produced using the new technology were able to convince MGG. Huskes was impressed by the dimensional accuracy and thermal load capacity of the cores that were shot in Tegelen (fig. 3 and 4).

The good core removal capability is a result of using less organic material while maintaining the same amount of oxygen during casting.

This means a reduced build-up of deposits and therefore less need for tool cleaning.

By using the new generation of binders, MGG ultimately achieved a significant reduction of emissions during the casting, cooling and shake-out processes, while maintaining excellent dimensional accuracy at the same time.

As revealed by the example formulation (fig. 5), the dosing ratio is more favourable with the new technology than with the rival product. In addition, the amine content is a convincing 30 per cent lower as compared to the competitive product. While the available processing time is up to 90 minutes long with the ECOCORE SL technology, MGG had a time window of just 60 minutes when using the rival product. The advantage of the new technology brings to the Dutch foundry is therefore clear: increased productivity.

In addition, MGG discovered that the sand used by the company reduces the absorption of moisture by 60 per cent. The rejection rate of the produced sand cores is currently at 2 per cent. Especially in boiler production, where foundries rely on particularly high-quality cores, the rejection rate caused by gas defects was reduced by more than 5 per cent.

Sustainability Criteria Such as Energy and Resource Efficiency - A Competitive Factor
Environmental friendliness and sustainability play an important part today when it comes to selecting suppliers and customers.

For this reason, MGG commissioned the IFG (Institut für Gießereitechnik) in Düsseldorf to examine the BTX emissions and energy output by the SL technology system and by its rival products used to date. Here, too, the new development from ASK Chemicals displayed its strength. While the odour generated was 20 per cent lower (fig. 6), the BTX emissions were reduced by 60 per cent (as compared to the other two cold box binders) with the new technology. In addition, visible smoke development is a thing of the past in this foundry. For the foundry and not least for its employees and the people living nearby in Tegelen, results like these are an important and clear signal that the company is doing its best to support environmentally-friendly technologies.

This best practice example highlights the importance of the contribution made by suppliers of foundry consumables to foundries’ added value case of efficient, low-emission binder systems in particular shows that the basis for quality improvements and emissions reductions can already be created at the component production stage by carefully selecting the components and consumables for the relevant casting process.