



the Sign of Quality

CEMENT ADMIXTURES ASSOCIATION

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ADMIXTURE ENVIRONMENTAL SHEET AES 11 SUSTAINABILITY & ADMIXTURES

The UK admixture industry:

Admixtures are the smallest component of concrete but provide significant beneficial effects to the properties in terms of performance, durability, environmental optimisation and hence sustainability.

The main sustainability benefit of admixture use comes from optimisation of the mix constituents in order to reduce both the embedded Carbon Dioxide and the water content of the concrete without any loss in other properties.

The 7 major UK manufacturers are represented by the Cement Admixture Association (CAA) whose members supply admixture to dose about 70 million tonnes of concrete annually.

The CAA members are committed to working with Concrete Industry suppliers and producers to minimise the environmental impact of concrete as supplied and to demonstrate the whole life sustainability and socio-economic benefits that concrete provides to society. The CAA's own environmental policy includes the provision of environmental information, use of responsibly sourced materials, optimised production, minimised waste and effective transportation of its products to customers.

Environmental Product Declarations (EPD's):

The CAA in conjunction with the European Admixture Federation EFCA has produced 6 generic 'Environmental Product Declarations' that cover about 80% of total admixture production. These provide information on the energy use and embedded CO₂ equivalent and can be used to produce 'Life Cycle Assessment (LCA) and Environmental Profiling' of concrete elements.

The Admixture EPD's are available for free download from the CAA website www.admixtures.org.uk publications page, together with Environmental Sheets AES 7 & AES 8 giving background information on LCA and examples of Environmental Impacts when using admixtures.

Admixtures and ECO₂ in concrete:

Admixtures are mainly organic chemicals and therefore have inherently high embedded carbon (ECO₂) content the amount depending on admixture type, typically 80 kg/tonne for retarders, 220 kg/tonne for plasticisers and 760kg/tonne for superplasticisers. However, the quantity of admixture added to concrete is small, rarely more than 0.3% on concrete weight and more typically less than half this quantity.

This means that in accordance with ISO 14000 series of standards and BRE guidance, the contribution to embedded carbon from admixtures at less than 1% is too small to be significant and can be ignored when calculating the ECO₂ of the concrete. Against this the environmental benefits from admixture use can be significant as they allow other high carbon components of concrete to be reduced without affecting the concrete properties. Based on published ECO₂ figures for other concrete constituents, it is estimated that current admixture use already saves about 600,000 tonnes of ECO₂ per annum and this could be significantly increased by further mix optimisation.

Admixtures and Water use in concrete:

Water is becoming an increasingly precious resource and reductions in water use have become a key environmental indicator in the latest BRE guidelines. 80% of admixture usage is of water reducing or high range water reducing types that allow significant reductions to be made in the water demand of concrete without affecting the consistence (workability). At the same time, environmental performance and/or durability and strength will generally be improved.

The water reductions can range from 10% to over 30%. If the average water reduction was only 10% this could be saving 600,000 cubic meters of water use by the concrete industry every year.

Performance Indicators:

CAA manufacturing companies have provided information for 2007 on their sourcing and manufacture as key industry sustainability indicators. This was based on historic information but will be used as a baseline for future improvement.

Management Systems:

All CAA members work within Quality Management Systems accredited to ISO 9001. In addition nearly all companies are also accredited to ISO 14001 Environmental Management Standard or are actively working towards its attainment

Accreditation to ISO 14001 particularly requires each company to review and record the environmental aspects of its operation and take actions to continually minimise these impacts

Responsible Sourcing:

CAA member preferentially use raw materials suppliers who have ISO 14001 accreditation and currently 54% of suppliers meet this requirement.

Waste Management:

CAA member's solid waste including packaging averaged 8 tonnes/ company/ year.

Liquid waste averaged 76 tonnes/ company/ year.

Packaging: Most admixture is supplied in bulk by tanker delivery or returnable IBC containers. Where supply is in smaller non returnable packaging units, most CAA members subscribe to the VALPAK scheme to cover sustainable disposal. Further details can be found on the CAA website publications page Information Sheet AIS 9

Health and Safety:

CAA members had no reportable accidents in 2007.

Transport:

This has proved difficult to measure as many deliveries use external hauliers who deliver split loads and may or may not have a return load. Technical service journeys may also include other product areas. The best estimates for 2007 are:

Deliveries 370,000 miles / company, Technical Service 270,000 miles / company

Staff Training:

All staff of CAA members are subject to annual training and procedural updates.

Stakeholder Engagement:

CAA is a member of the UK Concrete Platform Sustainability Group and works with other concrete materials suppliers and concrete producers to improve all aspects of its sustainability and responsible sourcing.

Other:

Admixtures are generally produced in dedicated factories, usually on industrial estates. CAA members take pride in ensuring that their sites meet high standards of appearance and comply with all local bylaws. Site stewardship and local liaison will be recognised within the companies own environmental management systems.

Admixture raw materials are generally chemicals of synthetic origins but several are produced from natural products including lignin from pulping of wood from sustainably managed forests.

Admixtures:

Although sustainability considerations are a current focus for admixture use, the historic benefits should not be ignored as they contribute to the durability of concrete which in itself is a key sustainability benefit for concrete over other construction materials. Admixtures can give economic benefits in both production and placing, optimising mix design, reducing the need for heat curing in precast and allowing modern placing methods to be employed which reduce noise and vibration as well as faster construction.

The CAA website contains further information on admixtures including technical and environmental sheets that are available for free download. Visit www.admixtures.org.uk.

Information on Admixtures:

For general information on admixtures contact:

John Dransfield, CAA Secretary (see above).