

## **EFCA ENVIRONMENTAL DECLARATION PLASTICISING ADMIXTURES – March 2006.**

### **NORMAL PLASTICISERS**

Admixtures are an important component of concrete, together with the cement, water, aggregates and, where applicable, reinforcing steel. Normal plasticisers currently make up about 40% of all admixtures sold in Europe. Superplasticisers account for a further 38% and are the subject of a separate EFCA Declaration Sheet.

EFCA Declaration Sheets also exist for Waterproofing admixtures, Accelerators, Retarders and Air entraining admixtures.

Normal plasticisers, also known as Water Reducing admixtures, are usually based on lignosulphonate. This is a natural water-soluble organic polymer found in wood and extracted as a waste stream during paper pulp processing. When refined lignosulphonate is added to concrete, it disperses the cement particles, reducing the amount of water needed to achieve a given consistence in fresh concrete. This effect can be utilised in three ways:

- To reduce water content for increased strength and reduced permeability / improved durability
- As a cement dispersant at the same water content to increase consistence and workability retention
- To reduce the amount of cement needed to obtain a concrete of specified strength and durability.

With a slightly higher admixture dosage, two or more of these effects can be achieved in the same mix.

This Eco-profile is only valid for normal plasticisers based on lignosulphonate.

The Lignosulphonate may be factory blended with other chemicals to give carefully targeted properties.

The normal plasticisers are dissolved in water and typically contain 30-45% active matter.

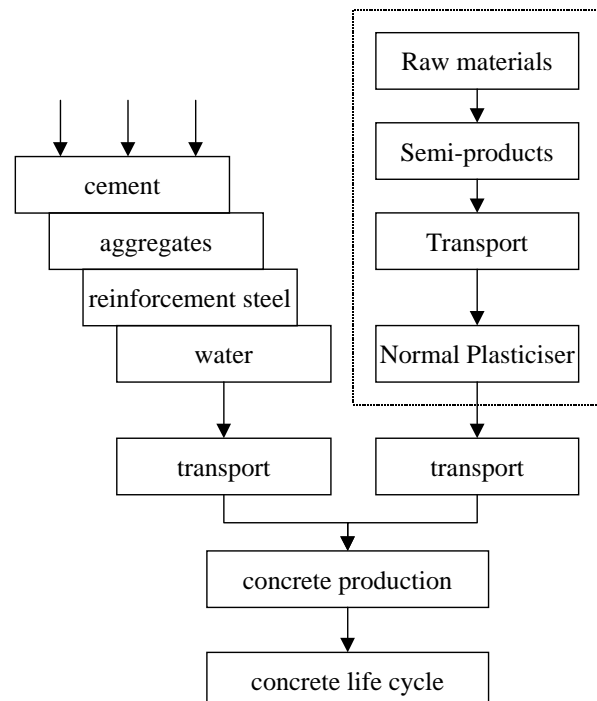
### **SCOPE OF THE ECO-PROFILE**

The Eco-profile covers cradle-to-gate production of normal plasticisers in Europe. Transport of normal plasticisers from fabricator to customer is not included.

Members of EFCA, the European Federation of Concrete Admixtures Associations collected manufacturing data for synthesis and blending of normal plasticisers in 2000-2001. This environmental declaration is based on the figures from eight of Europe's largest admixture producers and is an average of the normal plasticisers types detailed above. The variation between these types and between manufacturers is relatively small in LCA's of concrete, but the figures should not be taken as absolute values for that manufacturer or normal plasticiser type.

### **ENVIRONMENTAL IMPACT**

The figure below reveals how the Eco-profile for normal plasticisers fits in a concrete life cycle. This Eco-profile includes processes shown within the dotted line. To complete the life cycle, environmental data from other materials and processes should be added.



## ECO-PROFILE NORMAL PLASTICISERS

### Eco-profile for 1 kg plasticisers, 30-45% solids

<i>Raw materials - input</i>	<i>Unit</i>	<i>Value</i>
coal, brown	g	8.2
coal, hard	g	6.5
crude oil	g	52
natural gas	m3	0.018
<i>Emissions to air</i>		
CO <sub>2</sub>	kg	0.22
CO	g	0.11
NO <sub>x</sub>	g	0.52
SO <sub>x</sub>	g	0.85
Methane	g	0.38
Butane	mg	3.5
Pentane	mg	4.4
Benzene	mg	1.0
Non-methane VOC	g	0.17
PAH's	µg	7.8
Arsenic (As)	µg	47
Chromium VI (Cr)	µg	0.68
Mercury (Hg)	µg	2.8
Nickel (Ni)	mg	0.93
Vanadium (V)	mg	1.9
Sodium dichromate	µg	2.0
Dioxins	ng	7.9
Halon-1211	µg	0.58
Halon-1301	µg	2.8
<i>Emissions to water</i>		
Chemical Oxygen Demand	g	0.34
PAH's	µg	13
Oils, unspecified	mg	0.62
Phosphate	mg	0.94
Barite	mg	4.0
<i>Emissions to soil</i>		
Chromium VI (Cr)	mg	0.28
Oils, unspecified	g	0.046

### Indicators for 1 kg of plasticisers, 30-45% solids

<i>Solid waste</i>	<i>Unit</i>	<i>Value</i>
Non-hazardous waste	g	3.4
Hazardous waste	g	0.17
<i>Total energy</i>		
Total energy	MJ	4.6

## ACCOUNTABLES

The Eco-profile is derived from primary data supplied by EFCA and its member organisations.

An independent consultancy from The Netherlands, INTRON, verified the primary data and computed the Eco-profile.

Additional information for LCA practitioners:

- The Eco-profile on this sheet is valid for admixtures in a range of solids percentages. Even though this percentage may vary substantially it is not a major contributor to the total Eco-profiles and individual admixtures will all be within an acceptable range. The average profile should therefore not be related to the solids percentage of an individual admixture.
- The data collection has been carried out according to ISO 14040 series on Life Cycle Assessment.
- INTRON used literature data on raw material production primarily based upon the Eco-Invent (v1.2) database. Close proximity substitution has been applied.
- Eco-Invent data contain capital goods.
- LCI data for electricity production are based on the European fuel mix.
- Substances that contribute more than 1% to the environmental impact on any of the following environmental categories have been included in the Eco-profile: ADP, GWP, ODP, HTP, TETP, FAETP, POCP, AP and EP.
- The substances in the Eco-profile typically amount to at least 90-95% of the environmental impact in any category.

The membership of EFCA, the European Federation of Concrete Admixture Associations, EFCA, currently consists of the following national associations:

<b>Belgium</b>	<b>FIPAH</b>	<b>Norway</b>	<b>NCCA</b>
<b>France</b>	<b>SYNAD</b>	<b>Spain</b>	<b>ANFAH</b>
<b>Germany</b>	<b>DB</b>	<b>Sweden</b>	<b>SACA</b>
<b>Italy</b>	<b>ASSIAD</b>	<b>Switzerland</b>	<b>FSHBZ</b>
<b>Netherlands</b>	<b>VHB</b>	<b>United Kingdom</b>	<b>CAA</b>

EFCA does its best to ensure that any advice, recommendations or information it may give is accurate. However, no liability or responsibility of any kind (including liability for negligence) is accepted in this respect by EFCA, its staff or members.

### Environmental Consultant

INTRON B.V.  
Dr Nolenslaan 126, 6136 GV Sittard  
Postbus 5187, The Netherlands

### For more information please contact:

The EFCA secretary  
tel. +44 (0) 1564 77 63 62  
fax +44 (0) 1564 77 63 62  
www.efca.info or www.admixtures.org.uk