

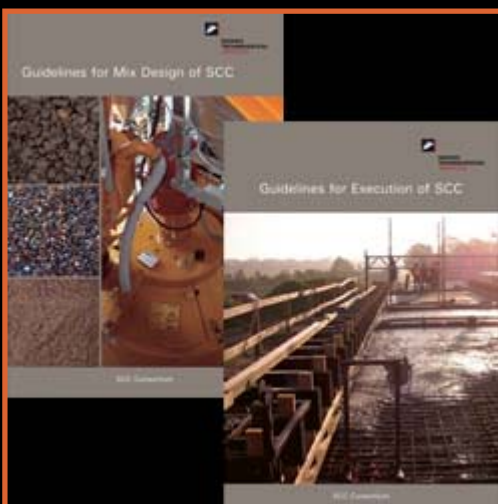
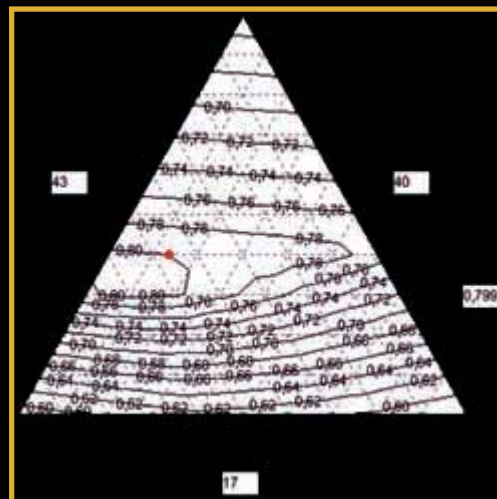


CONCRETE CENTRE NEWSLETTER 1 - 2009

4C-Rheometer – Quick and easy measurement of the rheology of Self-Compacting Concrete ... >



4C-Packing – Use particle packing to improve your concrete mix ... >



Guidelines for SCC – What to aim for and how to achieve it when using SCC ... >



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4C Rheometer

The 4C-Rheometer is new equipment for automatic determination of the yield stress and plastic viscosity of Self-Compacting Concrete (SCC). Good correlation has been established between rheological parameters determined with 4C-Rheometer and the predicted behaviour of SCC during casting into formwork.

The 4C-Rheometer can be applied:

- At the concrete plant or job site for quality assurance testing of SCC - *Only one bad SCC batch may lead to very costly repairs!!!*
- During development and optimization of SCC mix designs - *Get performance at the right cost!!!*
- In research and development studies - *Rheology expressed in fundamental units increases research validity and applicability of results!!!*

Advantages of the 4C-Rheometer system:

- Provides yield stress and plastic viscosity in fundamental units
- Provides slump flow and t_{500}
- Less than 2 minutes to perform analysis
- User friendly and easy to operate and maintain
- Can be used in a laboratory and at the job site
- Test results are completely independent on the operator.

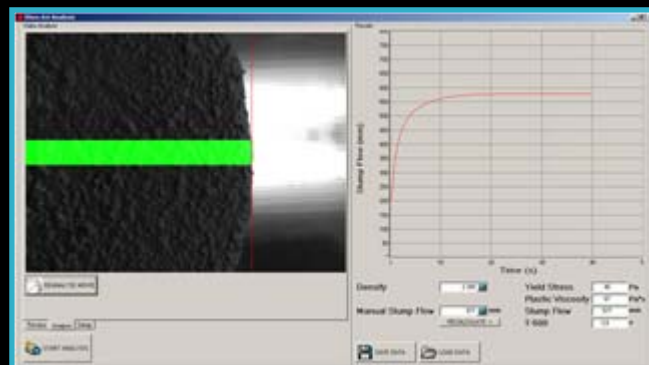
Current users of 4C-Rheometer:

BASF Construction Chemicals, Treviso, Italy
Aalborg Portland Group, Aalborg, Denmark
AIDICO Construction Technology Inst., Valencia, Spain
Consolis Technology, Rusko, Finland
Sika, Fredensborg, Denmark

[Read more about 4C-Rheometer](#)

For more information please contact Dr. Lars Nyholm Thrane, lars.nyholm.thrane@teknologisk.dk or phone +45 7220 2215

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The system is a PC automated slump flow test where the flow curve (spread vs. time) is determined using digital image analysis. The flow curve is used to determine yield stress and plastic viscosity.





SCC Guidelines

Guidelines for Mix Design of SCC

Guidelines for Mix Design of SCC are intended to contribute to a better understanding of the correlation between concrete composition and the flow properties (rheology) of SCC.

The concrete producer can use the Guidelines to obtain better knowledge about how changes in concrete composition influence the flow properties which in turn control the casting and finishing properties of the SCC. Also, a concept for developing a mix design from scratch is provided in the Guidelines.

Guidelines for Execution of SCC

The main purpose of the Guidelines for Execution of SCC is to contribute to a better understanding between the parties on the construction site regarding the use of SCC.

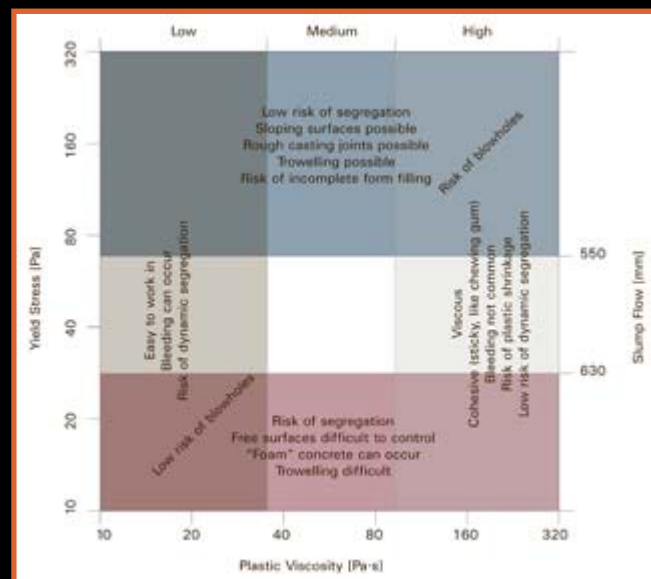
The contractor who orders the concrete and performs the concrete works on the construction site can use the Guidelines to specify the correct flow properties (rheology) for the concrete with regards to the method of casting, structural type and the form geometry.

The concrete producer achieves a greater understanding of the contractors' needs and requirements.

[Read more about the SCC Guidelines](#)

For more information please contact Dr. Lars Nyholm Thrane, lars.nyholm.thrane@teknologisk.dk or phone: +45 7220 2215

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4C Packing

4C-Packing has recently been released in a new version 3.0. The software is developed as a tool for use in concrete proportioning. It calculates the packing of aggregate combinations, but may be used to calculate the packing of any particle system on the assumption that only gravitational force exist between the particles. The software also enables finding the combination of aggregates that best fits a target grading curve.

In the proportioning of concrete, the software can be used to compose the aggregate skeleton in order to make it as dense as possible. A dense aggregate skeleton means that the concrete can be mixed with a minimum of paste, i.e. a minimum of cement. Reduced paste content equals lower production cost, but also has a beneficial effect on a number of concrete properties, e.g. less shrinkage and heat generation during hardening.



[Read more about 4C-Packing](#)

For more information please contact Claus Pade,
claus.pade@teknologisk.dk or phone: +45 7220 2183

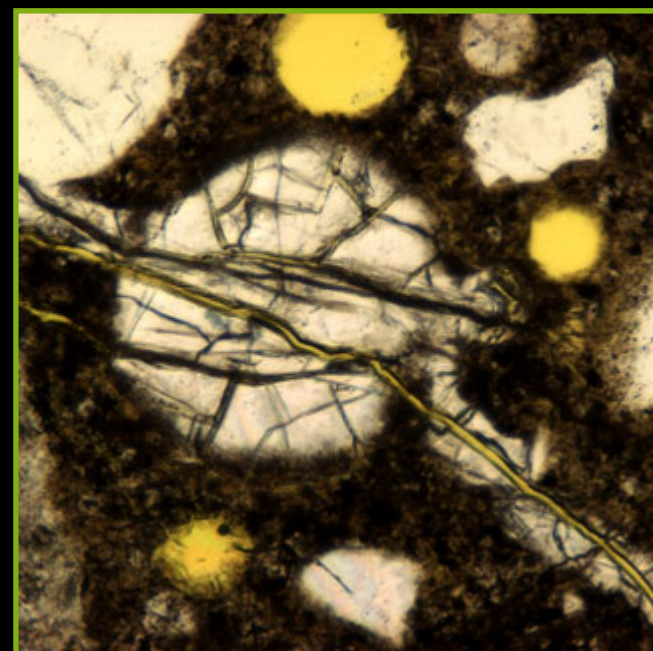
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Petrography courses

Danish Technological Institute offers courses in petrography of concrete. The courses focus on the use of optical fluorescence microscopy analysis and will specifically target the pre-knowledge of the attendants. During the courses we make sure that attendants learn to identify the concrete constituents such as e.g. aggregates, cement phases, fly ash, slag and silica fume, interpret the observed features of the microstructure, estimate the mix design, determine the water to cement ratio and much, much more. You will learn how to identify various deterioration mechanisms occurring in concrete such as alkali silica reaction ASR, sulfate attack, delayed ettringite formation DEF, freeze/thaw- and fire damage. The regular 5-day training course takes place at DTI's facilities in Copenhagen, Denmark, but special courses can be arranged based on our clients needs.

[Read more about Training Courses in Concrete Petrography](#)

For more information please contact Dr. Ulla Hjorth Jakobsen, ulla.hjorth.jakobsen@teknologisk.dk or phone: +45 7220 2198



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