THE PERFORMANCE OF FIBRES: CE REGULATION, MINIMUM DOSAGE AND FURTHER DETERMINATIONS

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Abstract

Since June 2008 only fibres with CE marking are allowed to be sold within the European member states. CE marking became mandatory for all fibres produced, sold and used in the EU. The CE mark is a conformity mark that harmonises technical specifications of many European products in the fields of health, safety and minimum quality levels.

Keywords: CE mark, CE-label, EN 14889, Quality control, Type of steel fibre, Fibre reinforced concrete, Effect on strength, Fibre performance

Summary of the work of the paper

Quality control is an essential element in providing safe and durable structures and the product quality is always linked to the quality control regime applied to that specific product. Steel fibres are no exception here. The minimum requirements are described in the European Norm 14889. The CE mark guarantees the same minimum quality in all European countries and this will lead to more confidence in quality of construction. It is well known that the performance of fibre reinforced concrete differs in dependency of the fibre type. One crucial point in EN 14889 is a test procedure to reveal the “effect on strength”, where a minimum dosage for reaching a certain performance needs to be declared. The European Norm 14889-1 distinguishes between two systems of conformity for steel fibres, system 1 and system 3. System 1 is specified as “fibres for structural use” and system 3 is specified as “fibres for other use”. According to EN 14889-1, structural use of fibres is where the addition of fibres is designed to contribute on the load bearing capacity of a concrete component. Care needs to be taken not to confuse fibres with declaration of conformity (system 3) with fibres with EC-certificate of conformity (system 1). As the steel fibre performance is taken in consideration in almost all relevant cases it is strongly advisable just to choose fibres with conformity according system 1. A table in the full paper version shows the responsibilities for the quality control of steel fibres according EN 14889-1 for system “1” and system“3”. The CE label allows for a quick and effective estimation about the properties and henceforth the performance of individual steel fibre types. Specifications like geometrical and mechanical properties of the intended steel fibre type are presented herein. Furthermore essential characteristics like tensile strength, delivery form but mainly also the effect on strength are revealed within the CE label. Essential characteristics are revealed in the full paper versions by means of traceable

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illustrations. In order to determine the effect on strength of individual fibres, beam testing according EN 14651 is subject to EN 14889.

Geometry and properties of a steel fibre play a decisive role in terms of the final performance in concrete. Especially length, diameter, length/diameter ratio, type of anchorage and suitable wire tensile strength are crucial parameters to determine whether the performance is rather high or low. See following pictures. More pictures showing influence factors are to be found in the full paper version.

**Fig. 1:** effect of l/d-ratio

**Fig. 2:** effect of fibre length

**Conclusions**

The mandatory standard for steel fibres in Europe is the EN 14889-1. To avoid any risk, steel fibres should always comply with system “1”. The CE-label allows for a quick estimation of steel fibre properties. Important details, such as geometry, tensile strength and l/d-ratio are revealed on that label. Kind of determining information is made obviously with the minimum dosage that is directly related to a required minimum performance level of a fibre. Comparing different kind of steel fibres by means of the CE-label offers the user a possibility to win an idea about the performance of different fibre types.

**References**


