

Test&Motion
Application Module

BA 26

C1609(M) Flexural Performance of Fiber Reinforced
Concrete

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1 Introduction

Dear customer, thank you for choosing a product of **DOLI Elektronik GmbH**. **Test&Motion** is a modern application for the operating systems Microsoft Windows XP/7/8/10®.

This manual does not deal with the **Test&Motion software** in general but with the application module BA 26 in particular. Hence, it is recommended to read the **Test&Motion** application manual in order to get familiar with the software. Please follow the demands and safety hints listed in the manual!

1.1 Symbols

The different symbols in this manual will allow you to find your way more easily.

Table 1: Symbols and their meaning.

Symbol	Meaning
	Safety Instructions: In order to avoid interruptions in the work flow as well as damages to man and machine, follow the safety instructions at all cost.
	Job/work instructions: Instructive part of the document with precise work instructions. Here you are asked to do something.
	Information: General information and descriptions of working procedures, etc.
	Note: Important note for the operation, the function or for the working procedures.
	Tip: Gives tips for easy handling of the Test&Motion Software , the EDCs or the testing instrument.

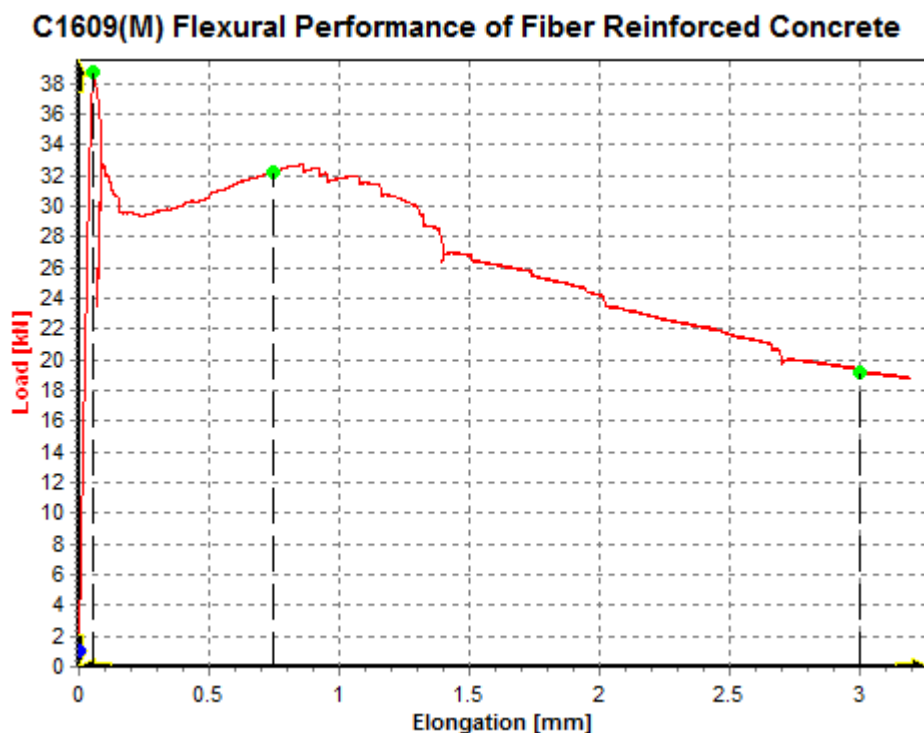
2 BA 26 - C1609(M) Flexural Performance of Fiber Reinforced Concrete

2.1 Field of application

This test method evaluates the flexural performance of fiber-reinforced concrete using parameters derived from the load-deflection curve obtained by testing a simply supported beam under third-point loading using a closed-loop, servo-controlled testing system.

This test method provides for the determination of first-peak and peak loads and the corresponding stresses calculated by inserting them in the formular for modulus of rupture.

2.2 Test graphic BA 26



2.3 Input values for test BA 26

Table 1: Input values for test BA 26

Parameter	Meaning	Dimension
dP (Delta P)	Force drop in percent to determine a first local maximum	[%]
μ	Poisson's ratio	
E est	The estimated modulus of elasticity of the concrete	[MPa]
L	Span length, distance between the supports.	[mm]
d	Average depth of specimen	[mm]
b	Average width of specimen	[mm]

2.4 Results BA 26

Table 2: Results of test BA 26

Result	Meaning	Dimension
P 1	First-Peak Load, Load value at the first point on the load-deflection curve, where the slope is zero.	[kN]
P p	Peak Load, Maximum load on the load-deflection curve.	[kN]
δ 1 (d 1)	Net deflection at First-Peak Load	[mm]
δ p (d p)	Peak-Load deflection, Net deflection value on the load-deflection curve at peak load.	[mm]
f 1	First-Peak strength, Stress value, obtained when the first-peak load is inserted in formula for modulus of rupture given by Eq. 1	[MPa]
f p	Peak strength, Stress value, obtained when the peak load is inserted in the formula for modulus of rupture given by Eq. 1	[MPa]
P 600	Residual Load, Load value corresponding to a net deflection of L/600	[kN]
P 150	Residual Load, Load value corresponding to a net deflection of L/150	[kN]
f 600	Residual strength, Stress value, obtained when the residual load P600 is inserted in the formula for modulus of rupture given by Eq. 1.	[MPa]
f 150	Residual strength, Stress value, obtained when the residual load P150 is inserted in the formula for modulus of rupture given by Eq. 1.	[MPa]
T150	Specimen toughness, Toughness of beam specimen of nominal depth D at the net	[N*m], [J]

	deflection of L/150. (Area under the load vs. net deflection curve 0 to L/150)	
δ 1 (delta 1)	First peak deflection, Net deflection value on the load-deflection curve at first peak load.	[mm]

2.5 Calculations BA 26

2.5.1 First-peak strength (Formula for modulus of rupture)

$$f = \frac{P * L}{b * d^2} \quad (\text{equation 1})$$

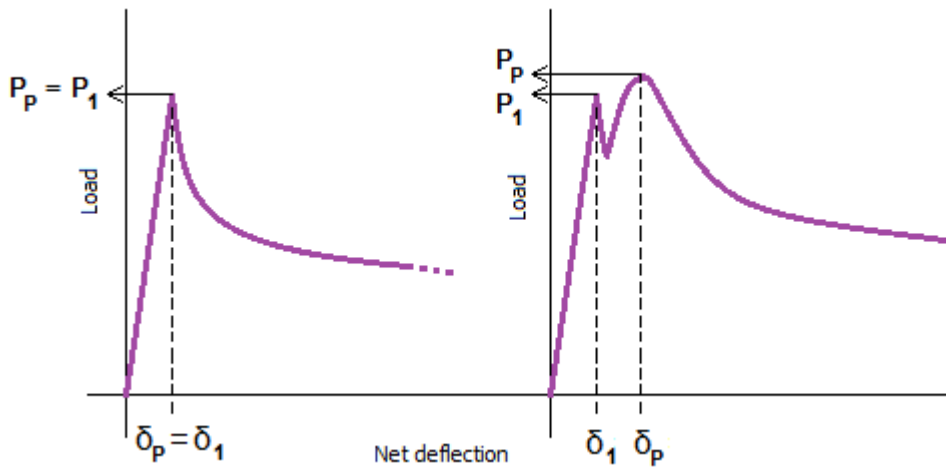
P	-	Load	[N]
L	-	Span length	[mm]
d	-	Average depth of specimen	[mm]
b	-	Average width of specimen	[mm]

2.5.2 First peak deflection for 3point loading

$$\delta_1 = \frac{23 * P_1 * L^3}{1296 * E * I} * \left[1 + \frac{216 * d^2 * (1 + \mu)}{115 L^2} \right] \quad (\text{equation 2})$$

P₁	-	First-peak load	[N]
L	-	Span length	[mm]
E	-	Estimated modulus of elasticity of the concrete	[MPa]
I	-	Cross sectional moment of inertia	[mm⁴]
d	-	Average depth of specimen	[mm]
μ	-	Poisson's ratio	

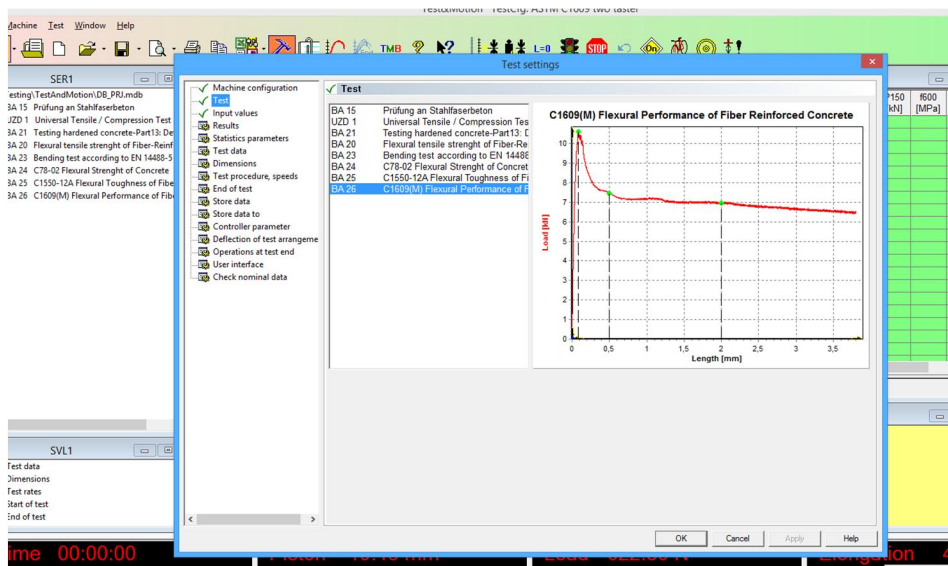
2.6 Hints BA 26



3 Carry out test

3.1 Selection of basic test

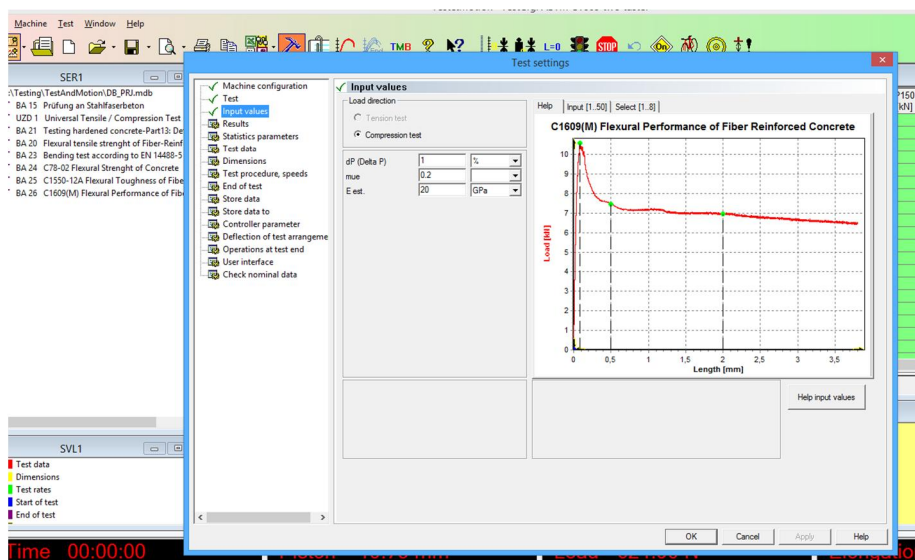
Select test procedure from list of available tests or load a parameter file (SVL) for that test.



Test&Motion Application Modules

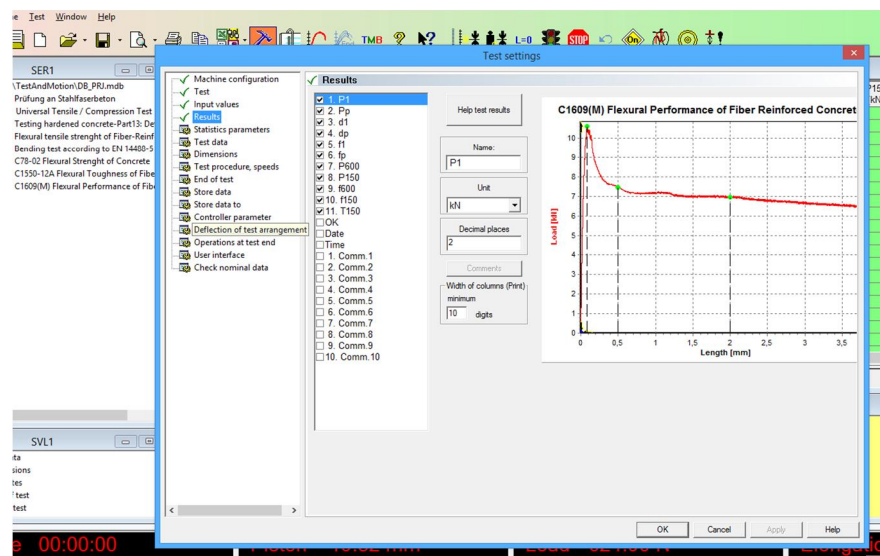
3.2 Enter input data

Here you can enter test data acc. table 1.



3.3 Define test results

In this dialog you can activate the required test results and define their dimensions and number of digits.



3.6 Definiton of test end criterions

The test will be terminated if elongation = 2 mm is reached.

