

Test&Motion
Application Module

BA 25

C1550-12A Flexural Toughness of Fiber Reinforced
Concrete

Version 1.0 (State 20.05.2016)

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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 25 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.

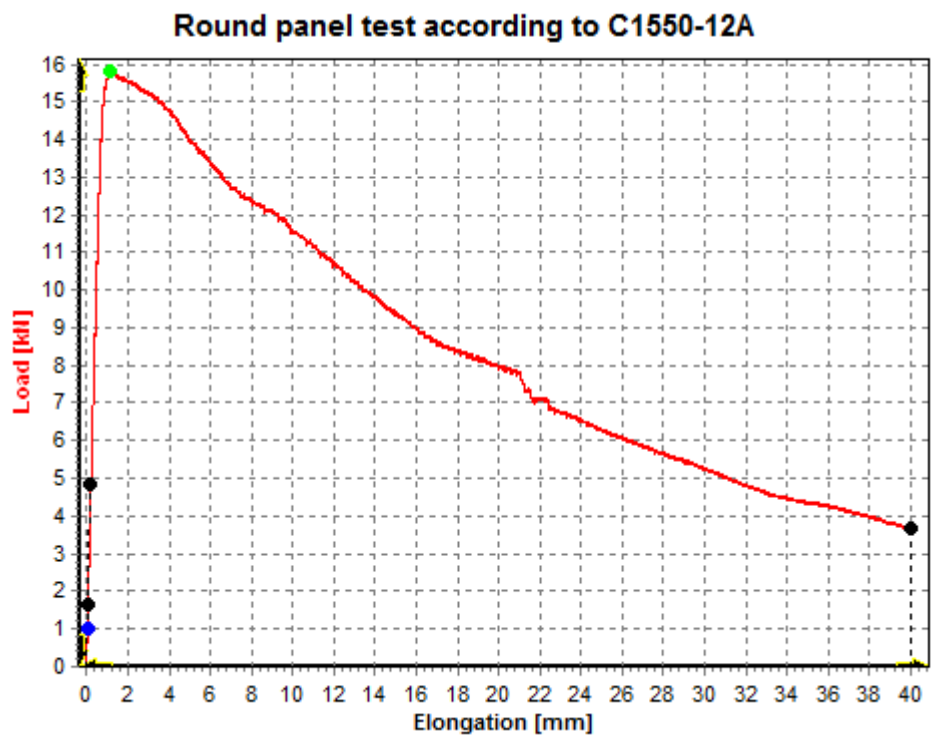
Symbol	Meaning
	Safety Instructions: In order to avoid interruptions in the work flow as well as damages to man and machine, follow the safety instructions at all cost.
	Job/work instructions: Instructive part of the document with precise work instructions. Here you are asked to do something.
	Information: 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 25 - C1550-12A Flexural Toughness of Fiber Reinforced Concrete

2.1 Field of application

This test method covers the determination of flexural toughness of fiber-reinforced concrete expressed as energy absorption in the post-crack range using a round panel supported on three symmetrically arranged pivots and subjected to a central point load. The performance of specimens tested by this method is quantified in terms of the energy absorbed between the onset of loading and selected values of central deflection.

2.2 Test graphic BA 25



2.3 Input values for test BA 25

Table 1: Input values for test BA 25

Parameter	Meaning	Dimension
Max.central displ.	Max. central displacement of the piston (of at least 45 mm)	[mm]
t	Measured average thickness	[mm]
t 0	Nominal thickness (75 mm)	[mm]
d	Measured average diameter	[mm]
d 0	Nominal diameter (800 mm)	[mm]

We start measurement so that the piston advances at a constant rate of 4 mm/min up to maximal central displacement of at least 45 mm.

2.4 Results BA 25

Table 2: Results of test BA 25

Result	Meaning	Dimension
P	Corrected peak load	[N]
P ‘	Measured peak load	[N]
W	Corrected energy absorption	[kN*mm]
W ‘	Measured energy absorption	[kN*mm]

2.5 Calculations BA 25

2.5.1 Corrected peak load P

$$P = P' \left(\frac{t_0}{t} \right)^2 \left(\frac{d_0}{d} \right) \quad (\text{equation 1})$$

P	-	Corrected peak load	[N]
P'	-	Measured peak load	[N]
t	-	Measured average thickness	[mm]
t ₀	-	Nominal thickness (75)	[mm]
d	-	Measured average diameter	[mm]
d ₀	-	Nominal diameter (800)	[mm]

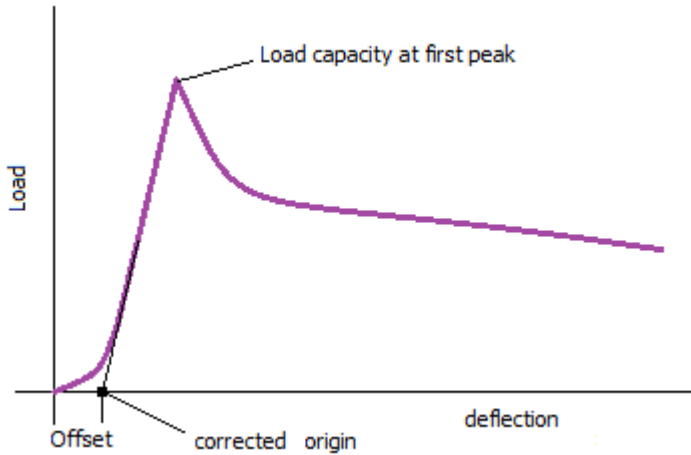
2.5.2 Corrected energy absorption W

$$W = W' \left(\frac{t_0}{t} \right)^\beta \left(\frac{d_0}{d} \right) \quad (\text{equation 2})$$

W	-	Corrected energy absorption	[J]
W'	-	Measured energy absorption	[J]
β	-	Specified central deflection at which the capacity to absorb energy is measured	[mm]

β = 0.5 is an estimate of the elastic deflection of the specimen that occurs prior to cracking.

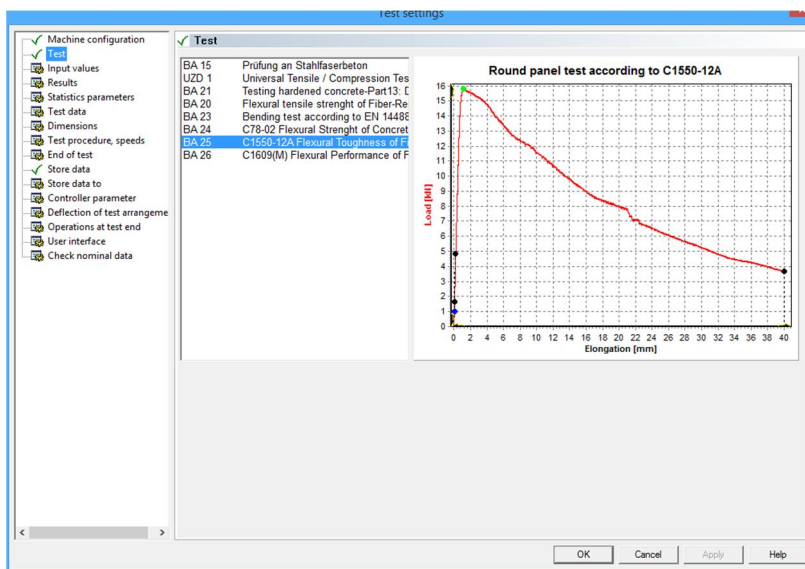
2.6 Hints BA 26



3 Carry out the test

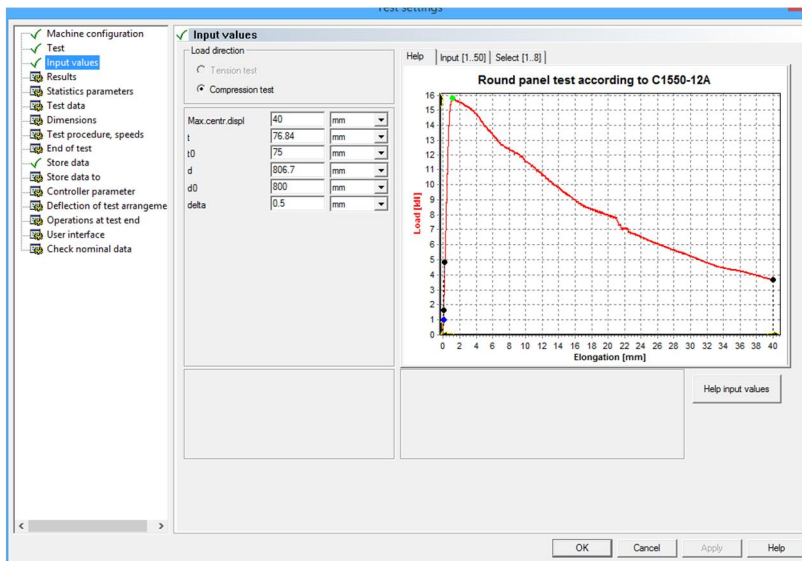
3.1 Selection of basic test

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



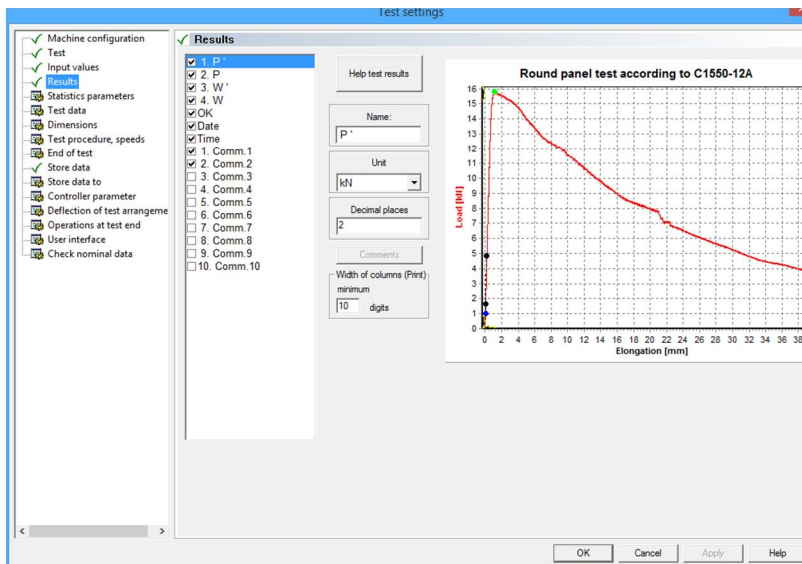
3.2 Enter input data

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.



3.4 Enter sample dimensions

Please enter here the values for sample height h and diameter of the plate D.

The 'Dimensions' window is shown with the following settings:

- Sample shape: ☒ Flat
- H: 75 mm
- W: 400 mm
- D: 800 mm
- Unit: 1 g
- Constant/Varying/Port settings for each dimension.
- Automatic read in, Confirm with OK, Only test no. 1 checkboxes.
- Unit conversion: Lc, Le, L0
- Check nominal data checkbox.

3.5 Enter test speeds

Definition of test speeds and switching points according standard.

We start with speed $v_0 = 5$ mm/min (xhead controlled) until preload 1 kN reached.

After reaching preload we continue with speed $v_1 = 4$ mm/min (xhead controlled).

The 'Test procedure, speeds' window is shown with the following settings:

- Test rates: V0: 5 mm/min, V1: 4 mm/min, V2: 10 mm/min, V3: 10 mm/min, V4: 10 mm/min, V5: 10 mm/min, VR: 50 mm/min.
- Rate switch points: F0: 1 kN, V1->V2: 300000 N, V2->V3: 300000 N, V3->V4: 300000 N, V4->V5: 300000 N.
- Automatic crosshead return after the end of test: ☒
- Distance, Speed, and Force settings for various test phases.
- Time and Set Bit settings for test sequence.

3.6 Definiton of test end criterions

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

Test settings

End of test

End of test criterions

☐ Time 240 s

☐ Piston 50 mm

☒ Load 300 kN

☒ Elongation 2 mm

☐ Extension 500 %

☐ Stress 1000 N/mm²

Sample fracture criterions

☐ Force drop of 270000 N

☐ Force drop of 80 %

☐ Force drop rate 1000 %/s

☐ Force < 100 N

☐ Test force drop from 0

☐ Automatic fracture recognition

The real sample fracture is measured values before the last value.

End of test criterions

☒ Drop of Time 0 %

☐ Activate, stop test, if

abs (Time) < 0 s

after Time > 0 s

☐ Message

USER 1.8

	Minimum	Maximum	
☐ User 1	-10	10	Dim 1
☐ User 2	-10	10	Dim 2
☐ User 3	-10	10	Dim 3
☐ User 4	-10	10	Dim 4
☐ User 5	-10	10	Dim 5
☐ User 6	-10	10	Dim 6
☐ User 7	-10	10	Dim 7
☐ User 8	-10	10	Dim 8

OK Cancel Apply Help