

**Test&Motion**

**Application Module:**

**UZD 1 – Universal Tensile / Compression  
Test**

Version 1.0 (State 20160819)

**DOLI Elektronik GmbH**

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|------------------------|------------------------------------------------------------|
| <b>Corporate name:</b> | DOLI Elektronik GmbH                                       |
| <b>Headquarters:</b>   | Adi-Maislinger-Straße 7, 81373 München, Germany            |
|                        | ☎ +49-89-20243-0                                           |
|                        | Fax +49-89-20243-243                                       |
|                        | E-Mail <a href="mailto:info@doli.de">info@doli.de</a>      |
| <b>Sales:</b>          | E-Mail <a href="mailto:sales@doli.de">sales@doli.de</a>    |
| <b>Production:</b>     | Ulmer Straße 34, 89584 Ehingen, Germany                    |
|                        | ☎ +49-7391-58039-0                                         |
|                        | Fax +49-7391-58039-71                                      |
|                        | E-Mail <a href="mailto:ehi@doli.de">ehi@doli.de</a>        |
| <b>Internet:</b>       | <a href="http://www.doli.de">www.doli.de</a>               |
|                        | <a href="http://www.flexometer.com">www.flexometer.com</a> |



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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 Plastics Tensile Test UZD 1 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 meanings.*

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

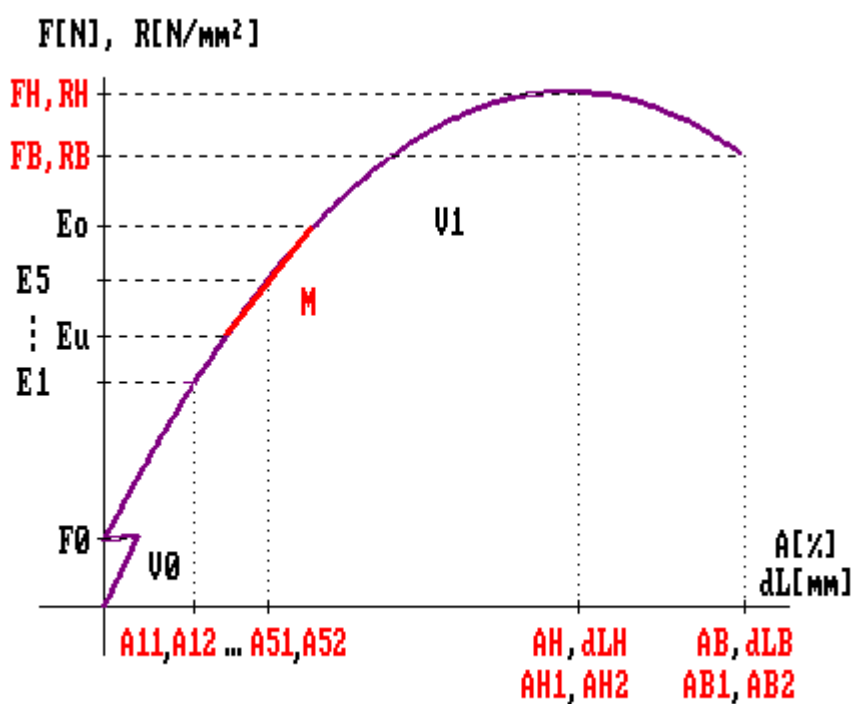


## 2 Application module UZD 1: Universal tensile/compression test

### 2.1 Field of application

Determination of maximum test force, breaking force, strength as well as extensions of the same and up to 5 reference values in tensile or compression test.

### 2.2 Test graphic UZD 1





## 2.3 Input values UZD 1



1. Click [Menu Test](#) → [Command Settings](#) → [Input values](#). Here you can find expedient input values for this test regulation, already. If necessary adjust the values to your needs.

Table 2: Input values for test UZD 1.

| Parameter | Meaning                               | Dimension / Selection possibilities                                                                                                                                                                             |
|-----------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E1        | Reference value 1                     | <ul style="list-style-type: none"> <li>• [N]</li> <li>• [N/mm<sup>2</sup>]</li> <li>• [mm_S]</li> <li>• [mm_dL]</li> <li>• [%]</li> <li>• [s, min, h]</li> <li>• [Dim User1]</li> <li>• [Dim User30]</li> </ul> |
| E2        | Reference value 2                     | Dimensions similar to E1                                                                                                                                                                                        |
| E3        | Reference value 3                     | Dimensions similar to E1                                                                                                                                                                                        |
| E4        | Reference value 4                     | Dimensions similar to E1                                                                                                                                                                                        |
| E5        | Reference value 5                     | Dimensions similar to E1                                                                                                                                                                                        |
|           |                                       |                                                                                                                                                                                                                 |
| Eu        | Tensile / compression modulus limit 1 | [N], [N/mm <sup>2</sup> ], [mm], [%]                                                                                                                                                                            |
| Eo        | Tensile / compression modulus limit 2 | [N], [N/mm <sup>2</sup> ], [mm], [%]                                                                                                                                                                            |



## 2.4 Results UZD 1



1. Click [Menu Test](#) → [Command Settings](#) → [Results](#). Here you can already find expedient results. If necessary, adjust the values to your needs.

Table 3: Results for test UZD 1.

| Parameter | Meaning                                                  | Dimension                            |
|-----------|----------------------------------------------------------|--------------------------------------|
| FH        | Maximum force (tensile or compression)                   | [N]                                  |
| RH        | Tensile or compression stress                            | [N/mm <sup>2</sup> ], [MPa]          |
| AH        | Overall extension at maximum force                       | [%]                                  |
| dLH       | Elongation at maximum force                              | [mm]                                 |
|           |                                                          |                                      |
| FB        | Breaking force                                           | [N]                                  |
| RB        | Stress at break                                          | [N/mm <sup>2</sup> ], [MPa]          |
| AB        | Overall extension at sample break                        | [%]                                  |
| dLB       | Elongation at sample break                               | [mm]                                 |
|           |                                                          |                                      |
| A11, A12  | Reference values at E1                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
| A21, A22  | Reference values at E2                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
| A31, A32  | Reference values at E3                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
| A41, A42  | Reference values at E4                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
| A51, A52  | Reference values at E5                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
|           |                                                          |                                      |
| AH1, AH2  | Reference values at FH                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
| AB1, AB2  | Reference values at FB                                   | [N], [N/mm <sup>2</sup> ], [mm], [%] |
| M         | Module between the two input values Eu and Eo            | [kN/mm <sup>2</sup> ]                |
| t         | Duration of load (time from reaching F0 to end of test)  | [sec]                                |
|           |                                                          |                                      |
| S0        | Sample cross section                                     | [mm <sup>2</sup> ]                   |
| PA1       | Sample dimension 1 (not available for all sample shapes) | [mm]                                 |
| PA2       | Sample dimension 2 (not available for all sample shapes) | [mm]                                 |



## 2.5 Hints for the test UZD 1

### 2.5.1 Pre-load F0

For the test control, the elongation and the strain will be set to zero when pre-load F0 is reached (see explanations about elongation and strain further down, also).

The gauge length L0 will be corrected to  $L0' = L0 + dL(F0)$

whereas

$L0'$  corrected measuring length

$L0$  measuring length

$dL(F0)$  sample deformation at F0

### 2.5.2 Input values E1 ... E5

At 5 different points of the measured value curve, defined by the input values E1 ... E5, you can determine for each input value 2 reference values (A11, A12, .. ,A51, A52). The meaning of the output values depends on the units of the of the output values:

### 2.5.3 Tensile modulus limits

Manual detection: you can define the end points of the tensile-compression modulus-line via the input values Eu and Eo.

### 2.5.4 Elongation, strain

Elongation and strain are identical until reaching the pre-load  $F0 = 0$ . The elongation is the increase in length of the sample from the point F0. The strain will be calculated out of the elongation via the following formula:

$$Ax = \frac{dL(Fx) - dL(F0)}{L0} * 100\%$$



## 2.5.5 Pairs of reference values

Three pairs of reference values are available. Here, you can define the wanted result type by choosing the dimensions for these pairs. See the following table:

*Table 4: Meaning of the input and output values.*

| Dimension of input- and output values | Meaning                 |
|---------------------------------------|-------------------------|
| N, kN                                 | Load                    |
| N/mm <sup>2</sup>                     | Stress                  |
| %                                     | Strain                  |
| mm_dL                                 | Elongation              |
| mm_S                                  | Crosshead travel        |
| s, min, h                             | Time period             |
| Dim User1                             | User defined meaning 1  |
| Dim User2                             | User defined meaning 2  |
| ...                                   | ...                     |
| Dim User30                            | User defined meaning 30 |



**Note:** Please note that the tensile characteristics of plastics do very much depend on the test speed. Hence, we recommend to preferably not interrupt a test if possible!



