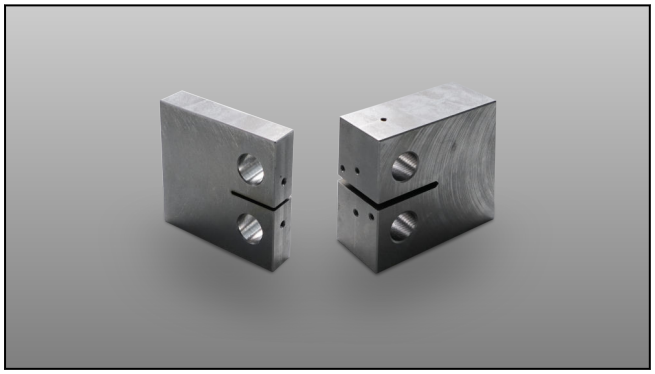
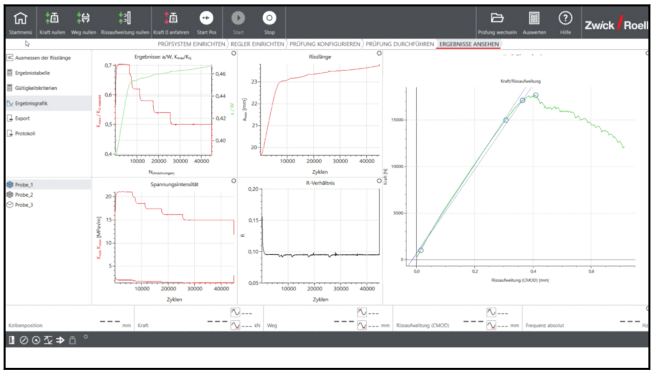
Product Information

testXpert R fracture mechanics testing software for determination of the critical stress intensity factor K_{1C} to ASTM E399

CTA: 26863 211513



Left: CT-Specimen with W/B=4 – common geometry for ASTM E647, right: CT-Specimen with W/B=2 – common geometry for ASTM E399



Pre-cracking the specimen and driving up to break with testXpert Research

The crack growth of a material is depicted in the crack growth curve. This curve is divided into three regions.

- The region with low crack growth rate and initial value at which crack growth is just beginning.
- The region with constant crack growth rate, mathematically depicted by the Paris slopes.
- The region with a high crack growth rate, which ends with fracture K_{1C}.

K_{1C} determination is generally performed for brittle materials.

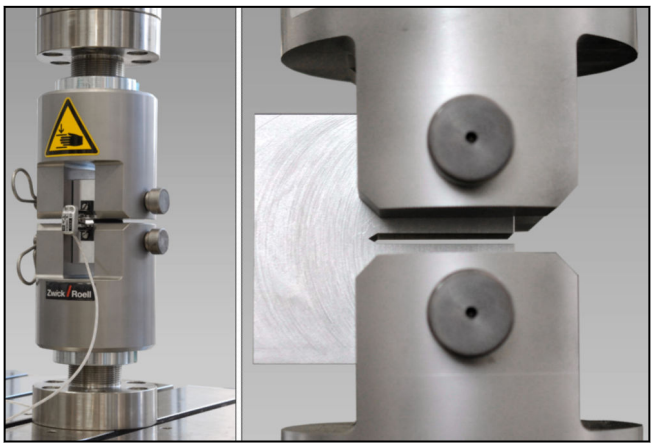
First a defined crack is generated in the specimen by pre-cracking in accordance with ASTM E399. 2.5% before attainment of the defined crack length the stress intensity is reduced.

In the next step a constant tensile force is applied to the specimen until failure and attainment of the KQ value. After the test the KQ value obtained is expressed as a ratio to the specimen width, crack length and offset yield of the material.

If this ratio corresponds to the minimum validity criterion specified in the standard, KQ is declared a valid K_{1C} value.

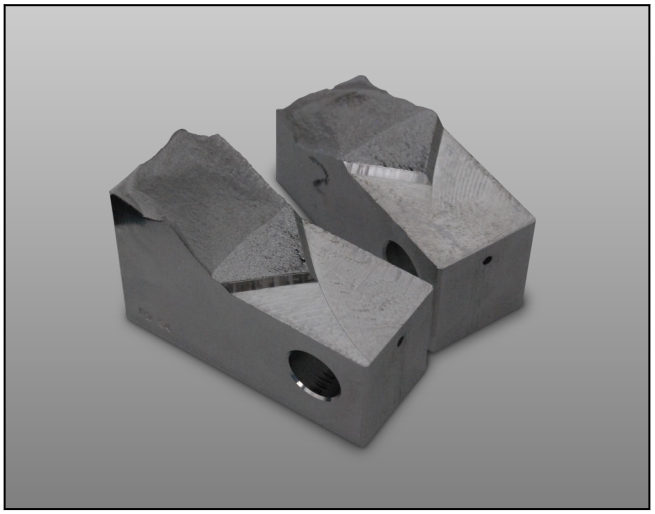
Crack growth is determined using a suitable crack-propagation extensometer and employing the arithmetic compliance method.

CTA: 204385



Fracture mechanics specimen with crack opening displacement extensometer

CTA: 204405



Cracked CT specimen

PI842 723

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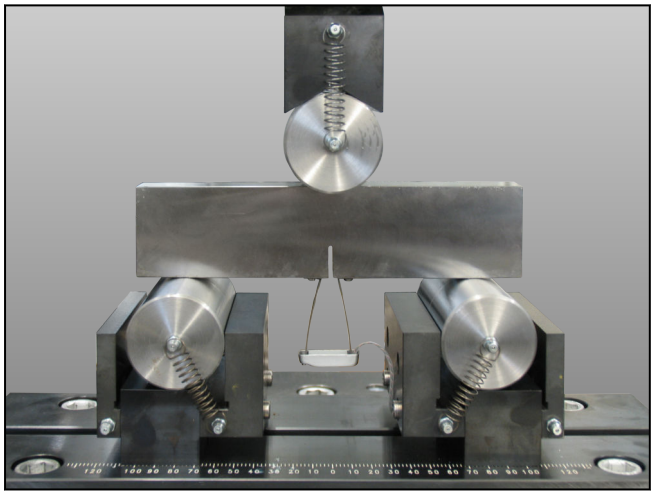
CTA: 23499



K_{1C} test on SEB bending specimen

In addition to the very common compact tension (CT) specimens, bending specimens (SEB) can also be used to determine the critical stress intensity K1c. To switch, the user only has to select the bending specimen and enter its dimensions.

The controller PID settings, test-sequence parameters and results are stored together in one file. This information remains permanently available.

The design of all testXpert R test programs is workflow oriented and mirrors a lab's operating processes. This guides the user through the test with logical and traceable steps:

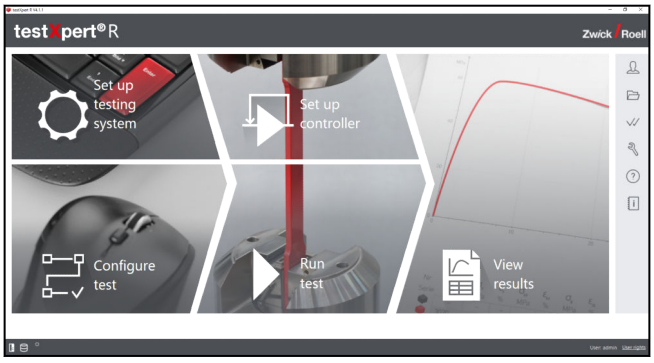
1. Set up testing system
2. Set up the controller
3. Configure the test
4. Run the test
5. View the results

This structure, as well as the software interface are almost identical to the software for static tests: testXpert III. Therefore the training requirements are minimized and laboratory personnel can operate diverse ZwickRoell machine types in a short time.

CTA: 204361

CTA: 205599

Input mask of control parameters



Start screen testXpert R - workflow oriented design

Description	ArticleNumber
testXpert R, test program, ASTM E399	**1070888**
tXp R, master test program, metals industry package - fracture mechanics Includes testXpert Research master test programs for performing the following standard-compliant tests: • ASTM E 399, K1C • ASTM E 647, da/dn • ASTM E 1820, J1C • ISO 12135 quasi-static fracture toughness	**1118638**

All data at ambient temperature.

Subject to change in the course of further development.