FAST
TRACK 2

J_{IC} Unloading Compliance Software

For Use With FastTrack™ 8800 Servohydraulic Testing Systems

INSTRON®
*The difference
is measurable*

Reliable J$_{IC}$ Unloading Compliance Testing to ASTM E813-89

The Unloading Compliance Program is a complete package for J$_{IC}$ tests on pre-cracked specimens, increasing laboratory efficiency and improving accuracy of test data. Operating within Windows® 95, 98, 2000, XP Professional and NT environments, the user interface is consistent with the other packages in the FastTrack™ 2 applications suite.

The J$_{IC}$ program includes:
- Test control and results to ASTM E813-89
- Frame compliance correction
- Universal ASCII format raw data

Ready for Testing in Minutes

Once the test parameters are entered, the program sets up the initial test conditions, and runs the J$_{IC}$ test. Upon completion, a graphical report and a summary report provide the information to suit the ASTM E813 standard, and the J$_{IC}$ value and/or invalidity messages are reported.

Running a Test

The program conducts a single-specimen J$_{IC}$ test in a sequence of selected steps.
- Pre-loading cycles - cycling phase for alignment and 'bedding in'
- Initial cycles - three cycles are performed for measurement of the initial crack length
- Main test - the main test then ramps to the initial load, and continues with the unloading compliance cycles

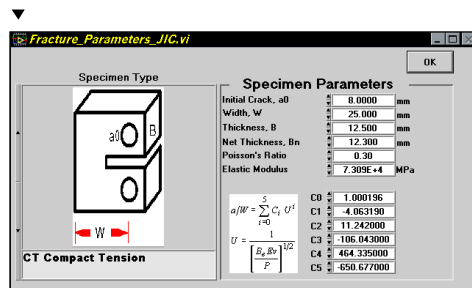At user specified intervals, the specimen is unloaded and reloaded.
The following options are available:
- Defined loading/unloading rate to suit different test materials
- A load hold duration at the end of each of the loading sequences enabling specimen relaxation prior to specimen unloading
- The ability to hold the peak load for a specified amount of relaxation

Various parameters may be changed realtime during the test.
▼
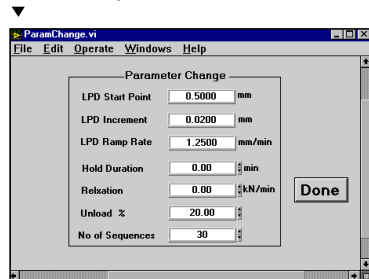
Both compact-tension and three-point bend specimen selection are available at the touch of a button.
▼

For each sequence, the J-Integral value and the crack length are calculated and stored in an ASCII file. Realtime graphics of load versus load point displacement and J-Integral versus crack extension keep the operator informed of the status of the test. Based on this data, modifications to test parameters can be made as the test is running.

Flexible Post-Test Analysis

Once the test is completed, the data is stored and the test data analysis performed. It is also possible to apply new test criteria to your test data to obtain alternative reports. For example, you may want to:

- Change the slope of the blunting line
- Add in a crack extension offset
- Choose a new J-Integral point such as J0.5
- Delete an outlying data point from the results calculations
- Investigate the J value at the point of cleavage instability

A new summary report can be created for each new test.

Range of Specimens

Both compact-tension and three-point bend specimen geometries are selectable. Your individual specimen dimensions and parameters must be entered.

FastTrack™ Software Suite

FastTrack is Instron®'s family of software applications for use with FastTrack 8800 testing systems. FastTrack applications work within the FastTrack Console environment or alongside the FastTrack 8800 Operator Panel. The FastTrack family includes:

- **MAX** for simple fatigue testing
- **WaveMaker** for more advanced fatigue applications
- **Merlin** for tension, compression and other static tests
- **K_{IC}** for fracture toughness/CTOD applications
- **da/dN** for fatigue crack propagation testing
- **J_{IC}** for unloading compliance testing
- **LCF** for low cycle fatigue testing
- **Random/spectral loading** for end-point data playback
- **RSPlus** for continuous data playback
- **Block Program** for simple block tests
- **LabVIEW Drivers** for programming FastTrack 8800 in the LabVIEW environment
- **Other applications** including stress corrosion and elastomeric tests

Data from all FastTrack applications can be freely exchanged with other Windows® programs.

A summary report including the J_{IC} value and all test and specimen information is available for each test.

It indicates if the test meets the ASTM standard and if not, cites the invalidity messages.

Analysis criteria can be changed after the test to refine the accuracy of the test result, providing flexibility and ease of use.
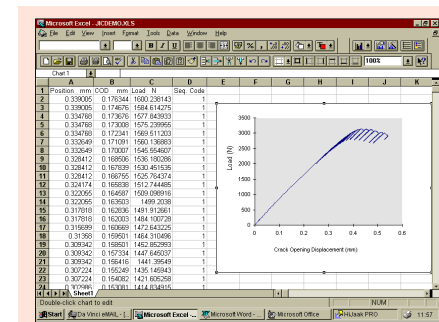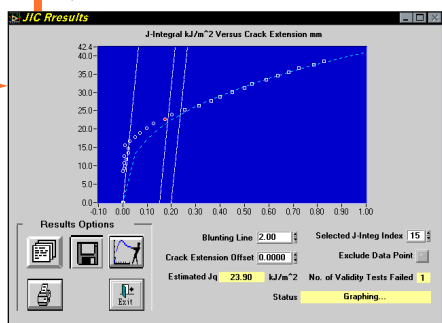
Complete Data Flexibility

The FastTrack 2 J_{IC} Unloading Compliance Program stores all the data files in ASCII format for convenient analysis and presentation in the spreadsheet or scientific graphics program of your choice. You can quickly create documents such as customized test reports using any commercial Windows 95, NT and 98 software such as Excel (including version 7.0), Word or Microcal Origin graphics software.

Specifications

Control

- Test procedure - in accordance with ASTM E813-89 standard

- Pre-load - user definable

- Control mode - position or crack opening displacement (COD) with compact-tension specimens only

- Frame compliance - compensation of the frame compliance to actuator displacement

- Pre-test functions
  - User defined pre-loading cycles ensure correct "bedding-in" of specimen
  - Three load and unload sequences provide an estimate of the initial crack length

- Test control
  - Up to fifty user specified load/unload sequences at selected intervals of load point displacement
  - Logging of temperature reading
  - User selectable end of loading sequence hold eliminates specimen relaxation from the unloading sequence

- Test end determination - automatic termination of test on specimen break or completion of selected number of cycles

- Runtime parameter - the following parameters can be changed during a test:
  - Load point displacement start point
  - Load point displacement increment
  - Load point displacement ramp rate
  - Hold duration
  - Relaxation
  - Unload %
  - No. of sequences

Results and Data Handling

- Results reporting - in accordance with ASTM E813-89 standard

- Post-test results manipulation
  - Blunting line slope modification
  - Crack extension offset
  - Exclusion of selected J-Integral points
  - Unlimited recalculation capability using new results and specimen parameters
  - Storage of measured crack lengths
  - Invalidity messages

- Data storage format - ASCII

- Max data sample rate - 1KHz

- Graphs
  - J-Integral versus crack extension
  - Load versus load point displacement

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