

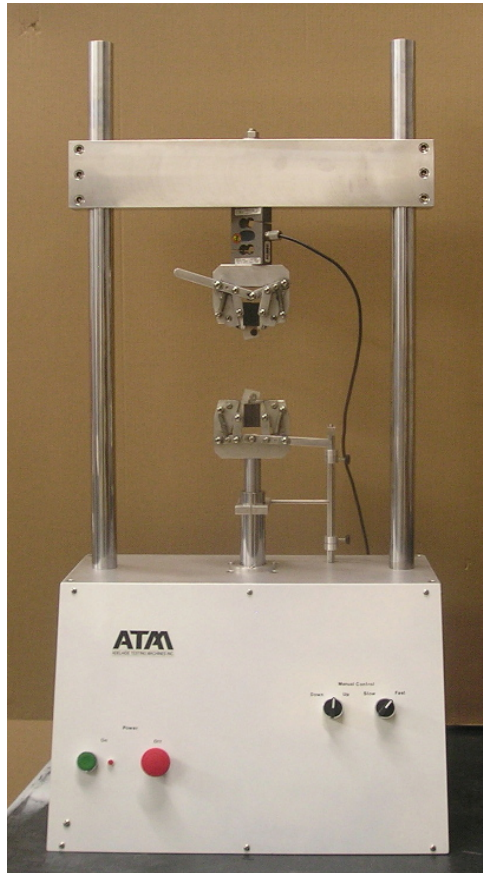


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TCC Series of
Universal Testing Machines
Specification Sheets

Revised: November 2011



Specifications for the following Models:

TCC-2KN (2 kN / 550 lb Capacity)
TCC-5KN (5 kN / 1,100 lb Capacity)
TCC-10KN (10 kN / 2,200 lb Capacity)
TCC-25KN (25 kN / 5,600 lb Capacity)
TCC-50KN (50 kN / 11,000 lb Capacity)

1.0 Introduction to the TCA Series

The TCC Series of computer controlled universal testing machines consists of five bench top mounted tensile/compression testing machines with loading capacities in the range from 2 kN (1,100 lb) up to 50 kN (11,000 lb). The design of these machines feature an actuator type loading system for applications not requiring the long stroke length capability and larger clearances featured in our long stroke TTS Series of testing machines. The Model TC-100 Tensile/Compression testing software included with the testing machine allows the TCC Series to be used for a wide variety of applications in both Quality Control and Research and Development testing of products and components. Additional software packages are available for performing creep tests and low cyclic fatigue testing. Figure 1 shows the 5 kN / 1,100 lb capacity TCC-5KN machine with the computer system used for data acquisition and system control. Figure 2 shows a view of the system load cell and optional tensile grips. Figure 3 shows a closeup view of the control switches on the front base panel. Figure 4 shows the major dimensions of the TCC Series machines and the main part locations.

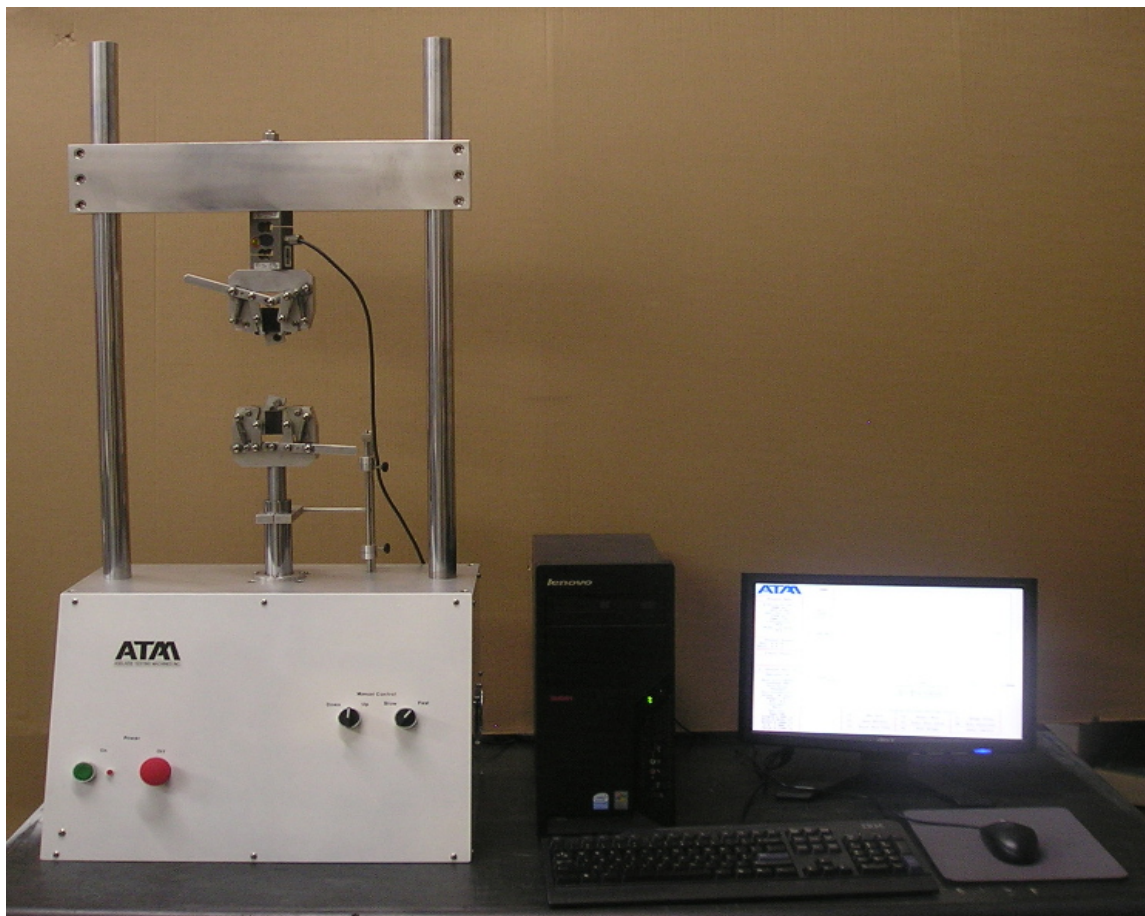


Figure 1
Model TCC-5KN Testing Machine
and Computer Control System

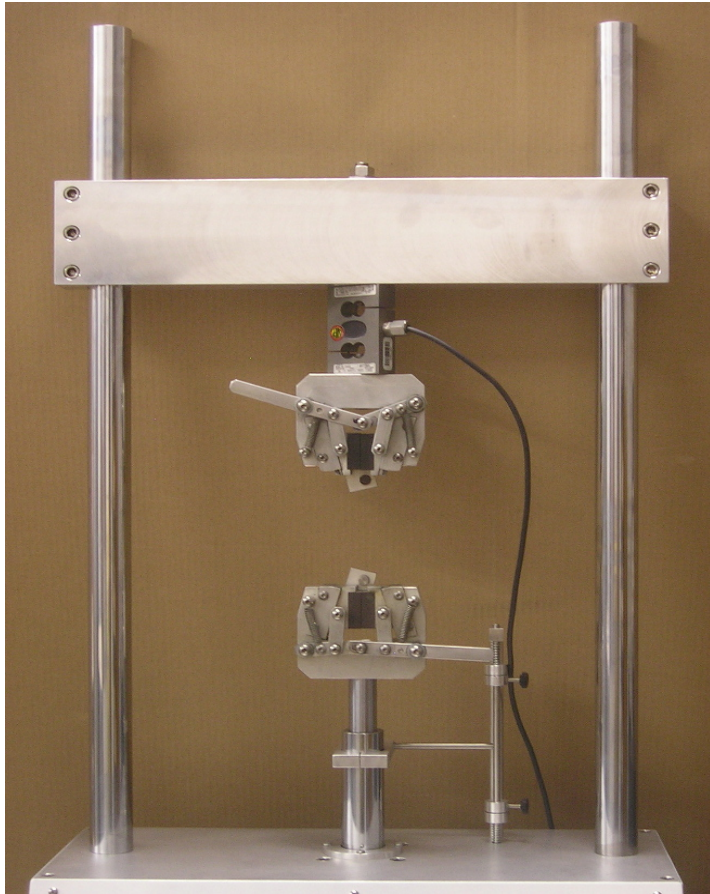
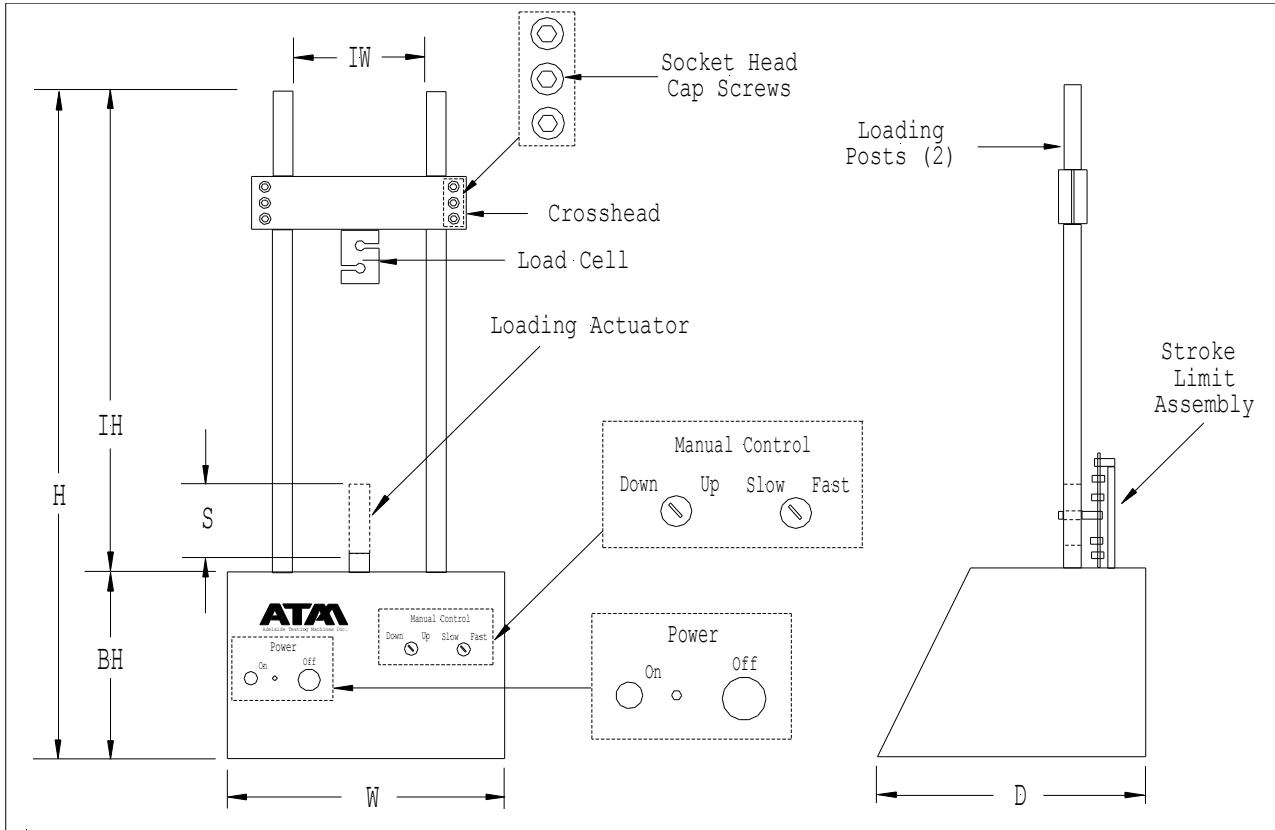


Figure 2
System Load Cell
and Optional
Tensile Grips



Figure 3
Control Switches on Front Panel



MODEL NUMBER

DESCRIPTION	TCC-2KN	TCC-5KN	TCC-10KN	TCC-25KN	TCC-50KN
Load Capacity, kN	2	5	10	25	50
lb	550	1,100	2,200	5,600	11,000
Overall Height, H	113.0 (44.5)	116.3 (45.8)	123.2 (48.5)	138.4 (54.5)	151.1 (59.5)
Platen to Top Height, IH	81.3 (32.0)	81.3 (32.0)	86.4 (34.0)	91.4 (36.0)	91.4 (36.0)
Base Height, BH	31.8 (12.5)	34.9 (13.8)	36.8 (14.5)	47.0 (18.5)	59.7 (23.5)
Maximum Width, W	45.7 (18.0)	53.3 (21.0)	53.3 (21.0)	55.9 (22.0)	55.9 (22.0)
Inner Working Width, IW	30.5 (12.0)	40.6 (16.0)	40.6 (16.0)	40.6 (16.0)	40.6 (16.0)
Maximum Depth, D	30.5 (12.0)	35.8 (14.1)	35.8 (14.1)	38.1 (15.0)	40.6 (16.0)
Stroke Length, S	-----12 (5.0)-----				
Test Speed Range at Rated Capacity	----- 5 - 100 mm/min (0.2 - 4.0 in/min) -----				
Machine Mass, kg	52	66	75	107	141
Weight, lb	115	145	165	235	310

NOTES :

1. Dimensions in Table are given as cm (in).
2. Machine Mass/Weight does not include actuator cover, safety doors, or other options.
3. Specifications and Dimensions are Subject to Change without Notice.

Figure 4
Major Parts Locations and Machine Dimensions

2.0 Mechanical Specifications

Summary for the TCC Series machines

1. Test Speeds/Range
0.05 - 125 mm/min at rated capacity
(0.002- 5.0 in/min at rated capacity)

Note: Modified versions of the TCC Series machines may have speed ranges different from the standard speed range. Please check the model number of the machine for the exact speed specifications.

2. 12 cm (5 in) maximum stroke length.
3. The loading mechanism consists of a ball screw driven actuator which drives a piston up and down through the platen of the testing machine. The fixed posts have an adjustable crosshead mounted on them which can be moved up and down by loosening off socket head cap screws. The location for the upper test grip can be adjusted to allow maximum utilization of the stroke length of the actuator. The ball screw is mechanically coupled to a DC servo motor.
4. The drive motor is a DC servo motor with an encoder mounted on the rear shaft. The encoder is used for both actuator position and speed calculations and control. Limit switches with adjustable intermediate stops are used to prevent overshoot of the actuator rod at both upper and lower stroke positions.
5. Standard Load Cell: Rated for testing system capacity in tension and compression. Other load cell capacities are also available.
6. Power Requirements: 110 - 120 VAC, 60 Hz, 1 phase
220 - 240 VAC, 50 Hz, 1 phase

The power requirement is indicated on the rear of the base of the machine next to the AC power line input connection.

Specifications are Subject to Change without Notice

3.0 Computer Requirements and Motor Control System

The TCC Series of machines requires an IBM compatible Pentium type PC system with a color VGA monitor, hard drive, R/W CD or DVD drive, and a Windows compatible printer for printing test reports. One unused PCI slot must be available on the PC for the servo controller / data acquisition card. The ATM software requires Microsoft Windows2000 or the WindowsXP operating system. The motor control and data acquisition hardware consists of the PCI card, a motor control electronics system, and a combined DC and AC conditioners system. The PCI card features include a combination of 12

bits resolution A/D channels and servo motor controller capability. A 16 bits A/D resolution is available as an Option. The PCI card uses the encoder feedback signal and software commands to produce the motor control system command signal. The motor control system consists of a DC power supply for powering the DC servo motor and a DC servo amplifier for amplification of the servo controller card command signal.

Note: A 4 channel DC conditioner board is available as an option with the system as a substitute for the standard 2 channel AC / 2 channel DC conditioner board. The 4 channel DC conditioner board is recommended for systems that may require additional lower capacity load cells and extensometers for the tests to be performed with the system.

Two selector switches mounted on the front panel of the test machine base are used for Manual Control positioning of the actuator piston. The actuator piston is moved using the left spring loaded selector switch labelled Down/Up. The right selector switch labelled Slow/Fast is used to select the speed of the manual positioning motion. The test speeds corresponding to the Slow/Fast positions are set from within the software. Two DC and two AC conditioners are provided in the base of the testing machine on a single circuit board. All of the input connections from the rear panel and front mounted Manual Control switches are made to this board through connectors. The DC conditioners can be used for excitation and amplification of the ATM line of full Wheatstone bridge type load cells. The AC conditioners are used for excitation and amplification of LVDT type devices including certain types of extensometers and other position feedback transducers. Provision is made on the base rear panel for monitoring the conditioner output signals through female type BNC connectors. The 15 turn potentiometers accessible through a slot in the base right side panel are used for the 2 DC conditioners for electrical adjustment of the Gain, Input Offset (In OS), and Output Offset (Out OS). The AC conditioners have potentiometers for adjustment of the + Offset (+OS), - Offset (-OS), and Gain. In addition, the DC conditioners have a push button Calibration Check (Cal Chk) switch for a quick check of correct DC conditioner calibration. In a typical setup, the DC conditioner 1 is used with the standard capacity load cell and DC conditioner 2 is used for a full Wheatstone bridge type extensometer or lower capacity rated load cell.

4.0 Data Acquisition System

Data acquisition for the standard system utilizes the 12 bit A/D channels on the PCI data acquisition / controller card. The servo connector on the rear panel of the base of the machine is used to make the cable connection between the machine and the computer system.

The A/D input range is set at +/-10 VDC. For the standard system, an I/O port on the base rear panel is not used but is available for use in special applications. The AC and DC conditioner connections are made internally in the test machine base and are connected to the PCI card through the Servo connector. In addition, other connectors may have been

mounted on the rear panel for input of other transducer signals in the particular system.

5.0 Computer Software Description

The TC-100 Tensile/Compression software package is the standard package included with a TCC Series machine. The software features a user friendly environment to perform the tasks necessary to run the system. The various features are available through use of the computer keyboard Function keys or clicking on the associated boxes. A brief description of the software is given as follows.

The Main Screen of the TC-100 software is shown in Figure 5. When the software is started, the data set and test parameters which are displayed on the X-Y graph are those which were current at the previous software shutdown. This data set and test parameters are stored in the TESTBAK.000 file. The present Tensile/Compressive and Yield Strengths for the data set are displayed in the Present Data box in the upper left hand screen.

Note: The Yield Strength will only be shown if the test was performed with an extensometer or actuator position on the horizontal axis which is required to calculate the strain or the elongation in the specimen.

Below this box, the Limits Status box will indicate if any load, stroke, strain, or time limits are being exceeded. The Current Test box shows test parameters such as testing speed, data sampling rate, specimen type, specimen dimensions, etc. Additional screens for the Current Test box are accessed using the <Up Arrow> key or clicking in the Current Test title box. The lower right portion of the screen displays the major command descriptions of the keyboard function keys F1 to F8 and the <Right Arrow> key. The <Right Arrow> key box is selected to display a second set of command descriptions for additional features.

The software design allows a high degree of Operator control of the testing configuration. The Operator can make changes to the display screen with the F7 Change Setup box with minimum disruption of the background display. Up to 1000 data sets can be stored at any given time in the directory which contains the software. The data file named TESTS.NAM contains a listing of the data sets that are available for display. The data set generated during a test can be stored to the hard drive with a filename which the Operator either enters or is automatically generated by the software. An additional archive copy can also be made of the data file to another specified folder. The resulting data files may be reloaded or erased from within the program.

Performing replicate tests is easily accomplished with a minimum number of Operator inputs. Some of the features include the following. The

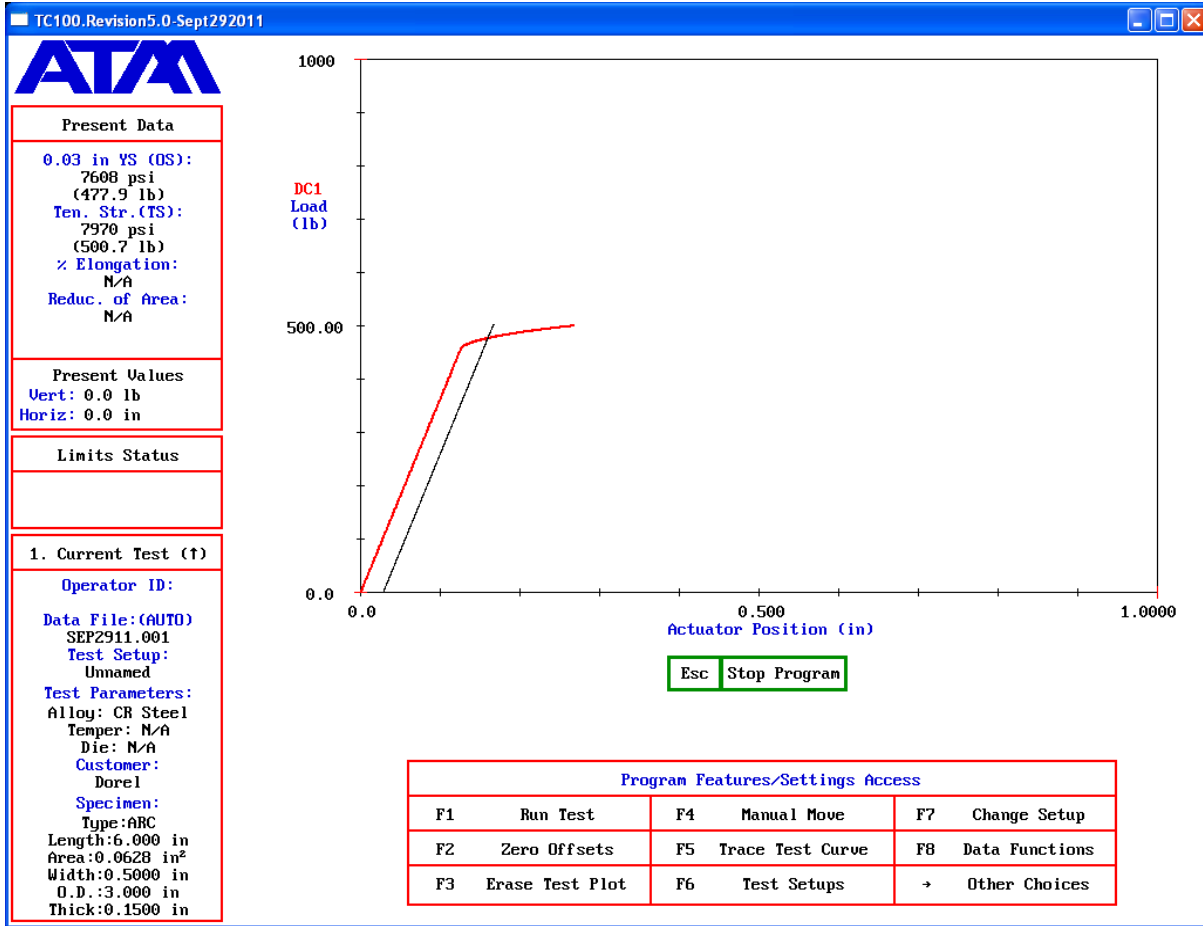


Figure 5
Main Screen Display of the TC-100 Software

F2 Zero Offsets command is used to perform a software zeroing of an existing offset load resulting from changes in the test grips or test setup. F3 Erase Test Plot is used to erase the existing displayed data file with an option to store the test result before erasure. F4 Manual Move is used to activate the front panel mounted Manual Control switches. F5 Trace Curve allows the Operator to trace the curve on the screen to determine the individual data points on the curve. F6 Test Setups and F8 Data Functions allow an existing test setup or previous test to be uploaded to the software. The F7 Change Setup is used to make changes to the existing test setup include axis scales, display units, test speed, etc. In addition, an Actuator Return feature which is activated at test completion may be chosen which automatically or after an Operator key input returns the actuator piston to its position at the start of the test.

During a test, the results are displayed in Real-Time to the monitor on an X-Y plot. The current value of the individual point being displayed is updated during the test in the Present Data box. The test is stopped at a preselected end point determined by such parameters as maximum time limit, load limit, after sample breakage, % load drop after maximum value, or by pressing the <Esc> key. The values of the Tensile/Compressive

Strength, % Elongation, and % RA (ie. Reduction of Area) are calculated and displayed after test completion. If an extensometer or actuator position is used for the X axis, the Yield Strength (Y.S.) may also be displayed. At test completion, the individual data points may be scrolled with the F5 Trace Test Curve function using the <Left Arrow> and <Right Arrow> keys or by inputting of the number of the data point to be displayed. Also, the data may be replotted by changing the axes scales or with different Engineering Units and the resultant data stored under a different filename. The F8 Data Functions key may be used to display multiple data sets for comparison, storing data sets, or erasing stored data sets.

For simplifying multiple test setup requirements, up to 100 test setups may be stored using the F6 Test Setups feature. These are listed in the SETUP.NAM file. When a test setup is loaded, the current data on the screen is automatically reconfigured for the new test setup X and Y axes and Engineering Units.

Other software features include the capability of printing a test report to a Windows compatible printer. Figure 6 shows an example of the one page test report format for the TC-100 Tensile/Compression software package. The Operator may change the axes scales of the graph and view the results on the monitor before printout. The test report contains information such as the Test Parameter descriptions which may be preset by the Operator to include such parameters as Order No., Alloy, etc. In addition, the Test Date/Time and the Test Operator are also included in the report.

Other software packages are available for performing creep tests and low cycle fatigue cycling tests. In addition, existing software packages can be customized for unique testing requirements which can not be handled by the standard software package. Please contact Adelaide Testing Machines if you have requirements which can not be handled by our standard software packages.

Adelaide Testing Machines Inc. Test Report

Customer Name: ABC Manufacturing Inc. Test Date/Time: Oct. 25, 2011 at 9:50 pm Test Number: 12
Order No.: 1-2321 Color: Black
Alloy Type: 6061 Temper No.: T651
Test File Name: testbak.000 Operator: Patrick Sooley
Testing Machine - Model No.: TCA-5KNBS Serial No.: A100119

Transducers (Axis)	Type	Model No.	Serial No.
Vertical	DC1.CAL	LF-5KN(RSC-1K)	4587799A
Horizontal	ACTUATOR	N/A	N/A

Test Result Summary: 182 Data Points

Tensile Yield Point (0.050 in - OS): 5795.7 psi (Load: 362.23 lb)
Ultimate Tensile Strength: 6275.3 psi (Load: 392.21 lb)
Actuator Position at: Max. Load: 0.6170 in Break Load: 0.6170 in
% Elongation: 21.600% (2.0000 in Gage Length) % Reduction of Area: N/A
Test Speed: 1.0000 in/min (Tension)
Points Sampling Interval: 0.20000 s A/D Averaging Sample Size: 30 Points
Specimen - Type: SQ Length: 6.0000 in
Width: 0.25000 in
Area: 0.062500 in²
Test Comments:

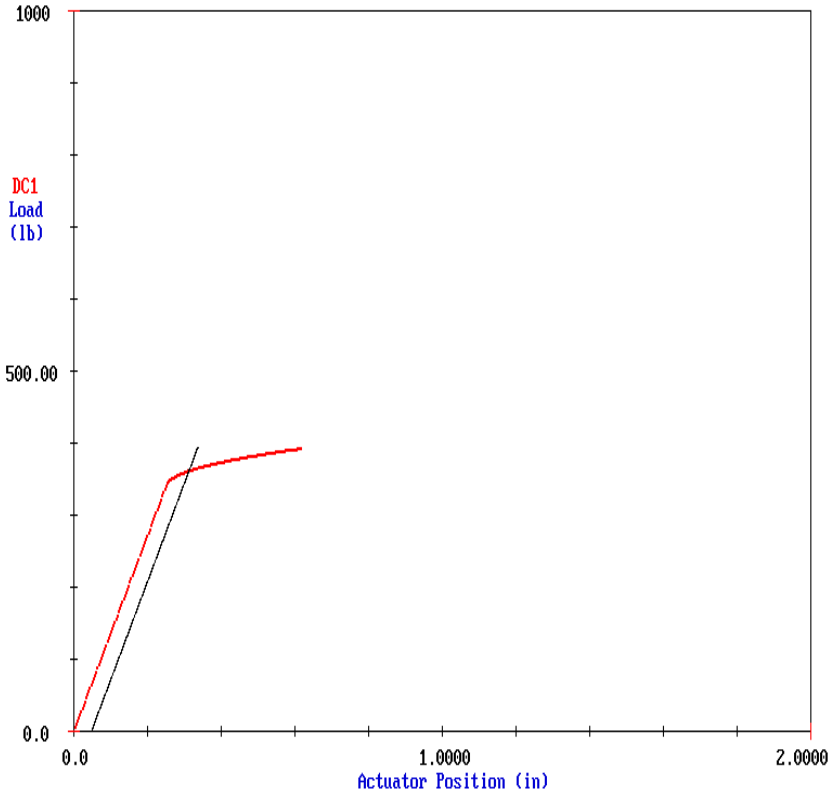


Figure 6
Test report for the TC-100 Tensile/Compression Software

6.0 Options and Accessories

Additional options, accessories, and other customized features may be added to the TCC Series of machines for special applications. Some of the available options are listed as follows:

A. Safety Shields for Front and Rear (Option TCCxxKN.SAF)

The TCC Series machines may be supplied with clear safety shields for the front and/or rear working area of the systems. The safety shield package consists of two side panels and two front hinged panels of 3/8 in (9.5 mm) thick clear polycarbonate sheet. This design ensures a large enclosed working distance for specialized setups. The side panels are approximately 4 in (10 cm) wide and do not open. The hinged doors are secured in place by two sliding bolts.

The safety shield package includes two hinged door panels, two side panels, and mounting hardware. A complete package is used to enclose each of the front and rear working areas of the system. Price of each package includes factory installation of the safety shields on the machine when ordered with the TCC Series machine.

B. Optional Safety Shield Door Switches (Option TCCSERIES.SAFSW)

Switches will monitor the open/close condition of the safety doors. In the TCC Series, opening a door will cause the motor to stop running if the Start/Stop selector switch is in the Start position. The software will indicate a door open condition in the Limits Box.

C. Bellows Covers on Actuator (Option TCCxxKN.BSC)

For dusty environments, TCC Series machines can be supplied with a bellows cover over the loading actuator piston to prevent dust from coating the linear bushing guiding the piston through the top of the base. This option is factory installed and should be ordered with the system.

D. Testing Grips

A wide range of test grips are available to perform tensile, compression, bending, and tear tests and others. Custom designed fixtures can also be provided by ATM to allow testing of many different specimen types or customer products. Please contact us with your requirements for test grips and/or custom designed fixtures for your application.

E. Additional Software Packages for TCC Series of Testing Machines

In addition to the standard TC-100 Tensile/Compression software package supplied with the machine, other software packages are available to perform a wide variety of tests. Two of these software packages are as follows:

- a) Creep Testing Software - Part No.: CR-100
- b) Low Cycle Fatigue Software (< 1 Hz.) - Part No.: FC-100

The standard packages may also be customized to include features necessary to perform unique tests on the TCC Series. Please contact ATM if you have questions regarding the features of any of our software products or if you need custom features added.

F. Optional Load Cells

A large selection of optional load cells are available for use with the TCC Series for special testing situations. Please contact ATM if you need assistance selecting a proper size load cell.

G. High Temperature Testing Ovens

ATM custom builds split tube and box type chambers for applications of the TTS Series for elevated testing. Please contact ATM with your specific elevated temperature testing needs.

H. Other Modifications

ATM can supply special versions of the TCC Series machines for applications where the standard models will not meet the requirements. Modifications that can be supplied include increased stroke length, increased spacing between the loading posts, guided compression plates, modified speed ranges, horizontal versions, extremely low speed versions for corrosion testing, and others. Please contact ATM if you require a special modification of a TCC Series machine to meet your testing requirements.