
MTS Exceed Series 40 System (MTS Corporation)**Model: E43.104E****Serial Number: 05300931****Location of Machine:** Composites Lab, IGRM 1202F**Location of SOP and Machine Operating & Safety Manual:** Composites Lab website under resources; Composites Lab TRACS site; and Hardcopy near machine.**Emergency Contact:**

- Call 911
- Call EHS & Risk Management at 512-245-3616
- Call Head Lab Technician, Dr. Ray Cook (office 512-245-2050)
- Call Dr. Jitendra S Tate (office 512-245-4872)

Before using this machine:

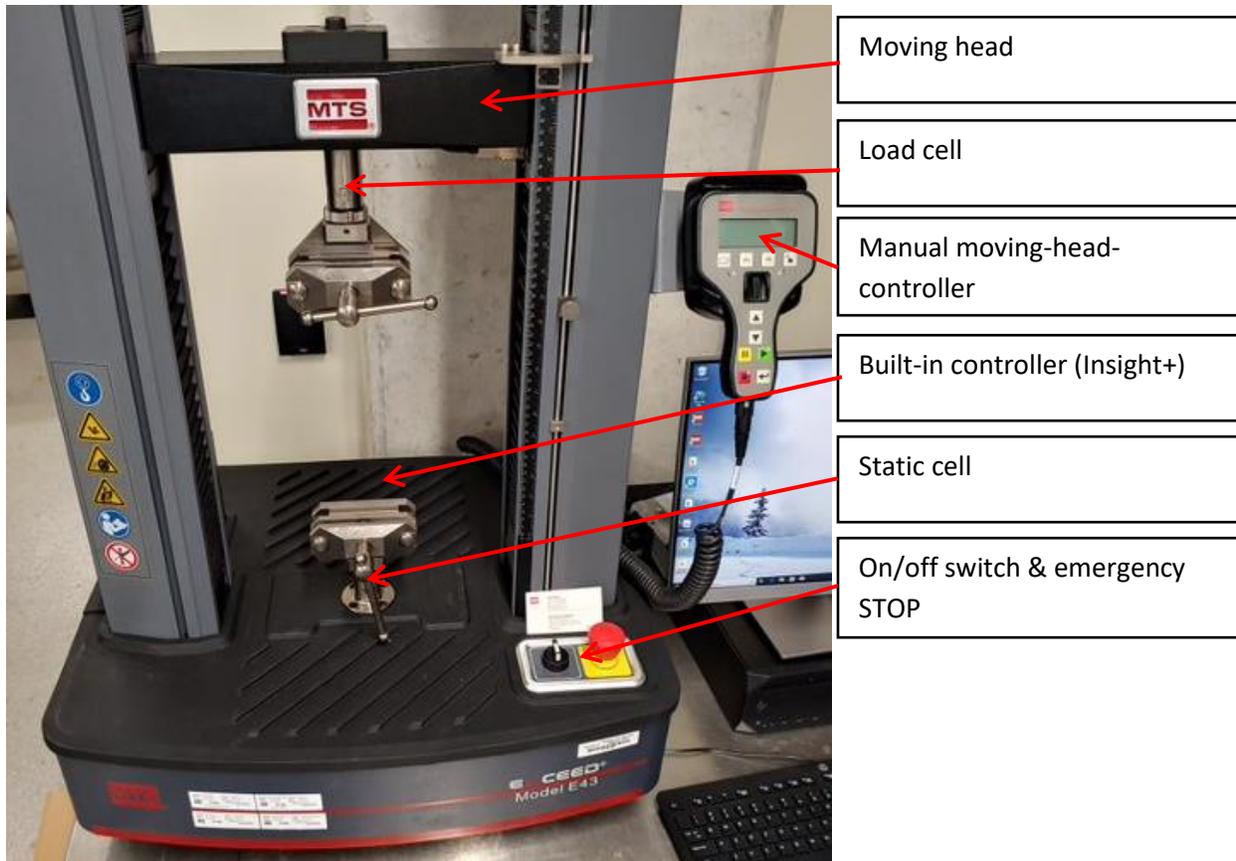
- You must have permission from Dr. Tate.
- You must have received formal training from technician or, trained research student (designated by Dr. Tate) related to machine safety and operation.
- You must read and understand **SOP and Machine Operating & Safety Manual.**
- You must use this machine under direct supervision of Dr. Tate or, Dr. Cook or, trained research student (designated by Dr. Tate).
- You must have signed “Lab Rules” document with Dr. Tate. This document must be signed every semester fall, spring, and summer (as applicable).
- If you do NOT follow above instructions, you will be held responsible for your own safety and damages.

Safety Precautions:

Protective Equipment: Prior to performing this procedure, the following personal protective equipment must be obtained and ready for use: **Gloves, Safety Goggles, Lab Coat.** Wear eye protection when working with the MTS Exceed and follow all safety practices.

Important Safeguards:

1. **Locate emergency stop buttons** – machine power can be killed at any time by pressing the Emergency Stop button on the machine, located on the front right corner of the machine (big red knob).
2. Specimens can develop sharp edges as a result of testing, handling the specimens with unprotected hands can result in cuts.



General information:

The MTS-Exceed machine is used for static electromechanical testing, to include tension, compression, and flexure. The system is equipped with MTS Insight+ controller (C43.104). The software used is called MTS TestSuite TW Essential. The software comes with multiple templates already installed, however the user will select only from 1 of 3 mentioned:

- MTS EM Compression (simplified)
- MTS EM Tension (simplified)
- MTS EM Flexure (3-Point Bend)

Materials that can be tested are: plastics, rubbers, and other non-metal materials.

Accessories:

- Fixtures: ASTM Test Fixtures: 1. Tension D3039; 2. Compression D6641; 3. Flexure D790

Specifications:

Model	E43.104
Maximum rated force capacity	10 kN (2200 lbf)
Frame type	Table top
Test zones (Single/dual)	Single
Maximum test speed	508 mm/min (20 in/min)
Minimum test speed	0.001 mm/min (0.00004 in/min)
Position resolution	0.000041 mm (0.0000016 in)
Vertical test space crosshead travel – extended	1300 mm (51.2 in)
Space between columns	340 mm (13.4 in)
Frame height – extended	1917 mm (75.5 in)
Frame width	681 mm (26.81 in)
Frame depth	588 mm (23.15 in)
Weight – extended	130 kg (287 lb)
Power requirement	Single-phase 200-240 V AC, 3 Amp 50/60 Hz, 600 W

Know the controls:

Before you operate the system for the first time, make a trial run through the operating procedures with the drive power off. Locate all hardware and software controls and know their functions and required adjustments. The upper jaw of the machine is the moving part and the lower jaw is the stationary part. Use the jog controls to move the upper jaw accordingly. If any control function or operating adjustment is unclear, review the applicable information until you understand it thoroughly. The operator has two methods of controlling the upper jaw movement. 1. Through the manual moving-head controller and 2. Through the software.

1. Manual moving-head controller can be detached from home allowing the user to operate it from a distance.



2. Crosshead controls through software can be done one click at a time, or by holding down the clicker for faster movement.



Turning and Preparing the MTS for Instructed Operation

1. On MTS control panel:

- Locate the emergency stop and start switch. It is on the front, right corner of the control panel.

- Pull up and twist right on the emergency knob.

-Then, turn the switch from 0 to 1 position.

Verify that the machine is on when you open the software. It will notify you that the connector is online or not in the upmost bar.



2. On the computer:

- Turn on the machine.

- Locate the MTS TestSuite TW Essential software on the desktop.

- Double-click on icon and wait for interface to load.

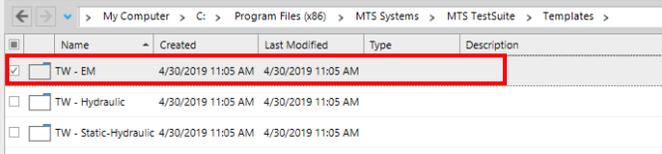


3. Locate the moving-head controller on the software for moving the upper jaw through the software.

- The interlock will be checked upon loading the software. This disables the user from using the software crosshead controls. The user can still use the manual moving-head controller.

- To use the software crosshead control, simply click on the counterclockwise arrow located to the left of *Interlock*. The box will then appear empty and the

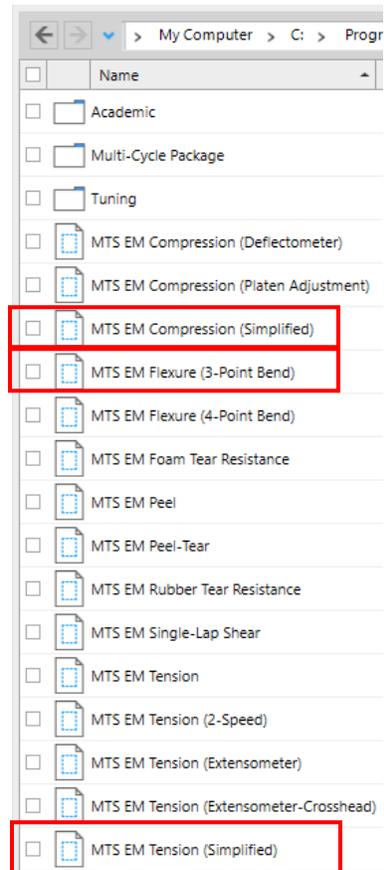


<p>crosshead controls will turn blue. The user can now operate the upper jaw using both methods of control.</p>																					
<p>4. On the TWE interface, the first screen the user experiences are the one located to the right.</p> <p>- The user will select the first option only, always, no matter what test they will perform. This machine is electromechanically controlled (EM).</p> <p>-The title is TW-EM</p>	 <table border="1"> <thead> <tr> <th>Name</th> <th>Created</th> <th>Last Modified</th> <th>Type</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><input checked="" type="checkbox"/> TW - EM</td> <td>4/30/2019 11:05 AM</td> <td>4/30/2019 11:05 AM</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> TW - Hydraulic</td> <td>4/30/2019 11:05 AM</td> <td>4/30/2019 11:05 AM</td> <td></td> <td></td> </tr> <tr> <td><input type="checkbox"/> TW - Static-Hydraulic</td> <td>4/30/2019 11:05 AM</td> <td>4/30/2019 11:05 AM</td> <td></td> <td></td> </tr> </tbody> </table>	Name	Created	Last Modified	Type	Description	<input checked="" type="checkbox"/> TW - EM	4/30/2019 11:05 AM	4/30/2019 11:05 AM			<input type="checkbox"/> TW - Hydraulic	4/30/2019 11:05 AM	4/30/2019 11:05 AM			<input type="checkbox"/> TW - Static-Hydraulic	4/30/2019 11:05 AM	4/30/2019 11:05 AM		
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5. Choose desired test:
tensile, compression, or flexure.

- It seems as the user has many options, however, the only options allowed are the highlighted tests:

- (1) MTS EM Compression (Simplified)
- (2) MTS EM Flexure (3-Point Bend)
- (3) MTS EM Tension (Simplified)



6. Set measured parameters

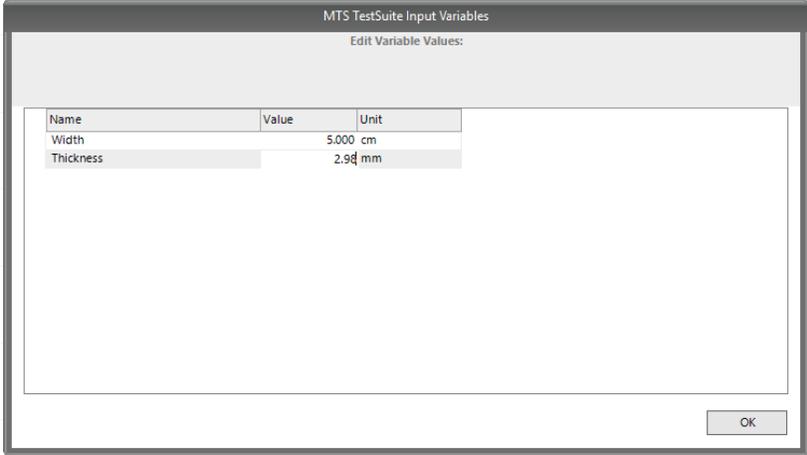
-The grip separation is the gage length, or distance between fixtures.

-In this lab, the test rate should always be 1.000 mm/s or 2.000 mm/s, unless otherwise approved by Dr. Tate.

-Units can be changed by clicking on the desired unit tab and a drop-down menu will appear to change the units.

-Data Acquisition Rate can remain as is.

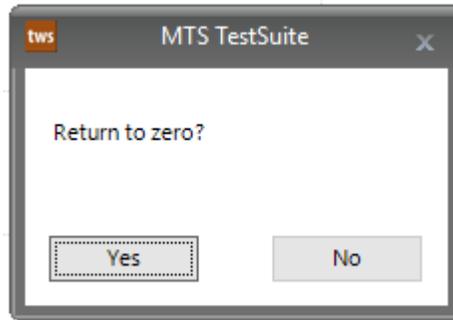
Pretest	Value	Unit
Width	5.000	cm
Thickness	2.680	mm
Grip Separation	8.500	cm
Test Rate	2.000	mm/s
Data Acquisition Rate	10.0	Hz

<p>7. Set Load and Crosshead to ZERO located on southern most part of the page</p> <p>-Must be done individually</p> <p>-Right-click on individual tabs and select option to zero</p> <p>-The time running is an indication of how long the user has been on the program since first opening TWE</p>	
<p>8. Ensure correct values</p> <p>-After setting measured parameters and selecting apply/OK, this screen will automatically pop up where you can ensure you have entered the correct values for Width and Thickness.</p> <p>-IF values and units are correct, click OK.</p>	
<p>9. Ready to run test</p> <p>-At this point, the user is ready to perform the desired test.</p> <p>-Press play located in the crosshead control bar</p>	

10. Once test is done, the user has the option to Return to Zero

-Keep in mind that the material has been either stretched or compressed and returning to zero could damage the material

-Click yes or no

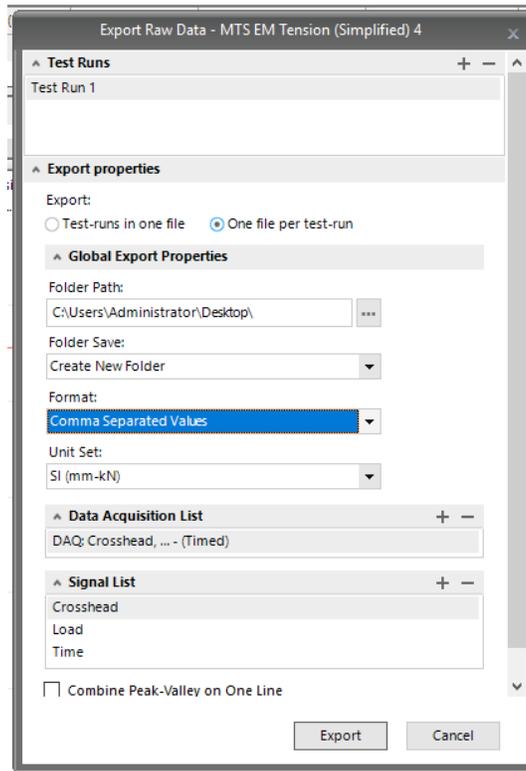


11. Export Raw Data

-The data can be exported into an excel sheet

-The main point is to make sure you change the format to Comma Separated Values before clicking export

-The file will upload onto the desktop for easy access.



Summary of Basic Steps for Performing a Test

1. Locate emergency stop and OFF/ON switch
2. Turn on machine and locate manual control
3. Open TW Essential software and locate software control
4. Load specimen using preferred control method, ensure straightness and stability
5. Select TW-EM test
6. Select desired test: tensile, compression, or flexure
7. Input measured parameters
8. Zero out Load and Crosshead by right clicking on individual tabs
9. Ensure correct values
10. Run test – press play
11. Export raw data to desktop