

# Local rules for the use of the Instron 5567 mechanical testing apparatus

**Location:** 2\_014 (CCMM Main Laboratory)  
Department of Materials Science and Metallurgy

## Scope

These local rules cover the use of Cambridge Centre for Medical Materials' (CCMMs) Instron 5567 mechanical testing apparatus.

These rules cover only the use of the Instron apparatus and do not consider any risks associated with samples being tested. These risks should be covered by separate COSHH forms.

## Description

The Instron 5567 is part of the Instron 5500 Series of material testing systems. It is a screw driven test frame controlled by a remote keypad or through Instron's Bluehill Software. The CCMM system has two load cells available, one with a capacity of 1 KN and the second with a capacity of 30 KN.

The load frame and load cells are protected by physical displacement limits and the load cells are protected by software set load limits.

The frame also has a large emergency stop button on the front of the base.

## Authorised Users

Authorised users may use the Instron apparatus unsupervised, subject to adequate training, authorised by Prof. Ruth Cameron and/or Prof. Serena Best. This authorisation is recorded using the usual laboratory user generic equipment risk assessment training record.

**Under no circumstances can a user operate the Instron without the appropriate training record having been signed off correctly.**

No maintenance tasks, may be carried out by users, other than changing the load cell. Any maintenance shall be carried out by the laboratory technician or a duly authorised Instron service engineer.

## Mechanical testing check list

### Pre test

- Be clear about what data you wish to obtain from your test.
- Check for existing test methods, base your tests on these and do not 're-invent' the wheel (ASTM and other standards are available via the Department's Library on line subscriptions.)
- Select the appropriate load cell and other transducers for your experiment. For example the load achieved during your tests must fall within 5% and 85% of the Load cells stated range. Never exceed 95% of a load cells capacity if

you are this close to these limits you have designed your experiment incorrectly.

- Ensure your samples are suitable for use in the machine and for the experiment you are planning. For example samples for compression have the correct aspect ratio and parallel ends.
- Make sure you know where the emergency stop is and how it works.

## Using the machine

### General comments.

- Only trained and authorised users are allowed to use the machine unsupervised.
- **DO NOT** modify anyone else's test method.
- If you are unsure of anything stop and ask for help. This machine is dangerous and easily damaged.
- Wear safety glasses at all times when using a mechanical testing machine.
- A safety shield must be used for all experiments.

### Preparing the machine.

- If the machine is off and/or the software is not running seek assistance before proceeding.
- Once the machine is on ensure the following:
  - Limits are set for the load and displacement.
    - Load limits are normally set within the software. Set them approximately 10% above your expected failure load and never higher than 95% of the loads cells static rating.
    - Displacement limits are set with physical interlocks on the frame and within the software. Both must be set. Ensure that the physical limit is set so that it is impossible for the crosshead to strike the grips.
    - Check that the specimen-protect setting has a sensible value. This can be changed so be careful. A corrupted file has been seen where the specimen protect has reset to a dangerous 5kN.
  - No other programs are running in the background especially something that would or could distract the user.

### Preparing the experiment

- Always set the software and load your specific test method prior to setting up your sample.
- Check no one has modified the software method.
- Check all the parameters set within the software carefully.

- Use the correct grips for your experiment. These must have the appropriate loading rating and design otherwise your data will be poor and you run the risk of an accident.
- Set the starting position for your experiment and zero the extension channel. This will help prevent an accidental automatic return to a 'random' position.
- Some test methods use auto return. It is advised to turn this feature off.
- Before loading the sample set specimen protect to on.
- Make sure the sample is centred to prevent off axis loading which will eventually damage the load cell and produce incorrect values.
- Where possible check the alignment.
- Fit the safety shield
- When you have checked and rechecked all the settings turn off specimen protect.
- Run the experiment and be prepared to stop the experiment should anything look wrong.

#### Post test

- Turn specimen protect on.
- Safely remove sample.
- Return crosshead to zero position.
- Clear up and leave the machine clean and in a safe state.
- Remove your data from the hard drive. The data on the computer hard drive may and will be periodically removed to save space.

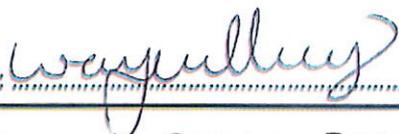
#### Further information

- Mechanical testing introductory talk by Andrew Rayment  
<http://intranet.msm.cam.ac.uk/mechtest/docs/mechanical%20testing%202014%20presentation.pdf>
- General advice information  
<http://intranet.msm.cam.ac.uk/mechtest/index.html>

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Local rules compiled by: **Wayne Skelton-Hough**

Date: **30<sup>th</sup> March 2020**

Signature: 

Approved by: ..... **SERENA BEST** .....

Date: ..... **4/6/20** .....

Signature: 

## Change Log

<b>Change</b>	<b>Date</b>	<b>Updated By</b>	<b>Description</b>
1	30/03/2020	W. Skelton-Hough	Document issued