

**UNIVERSITY OF STELLENBOSCH
DEPARTMENT INDUSTRIAL ENGINEERING**

WORK SPECIFIC SAFETY INSTRUCTIONS (Form 1.2)

- **According to the Public Health and Safety Act (no 85 of 1993), a student is considered an employee of the University of Stellenbosch.** Copies of the Public Health and Safety Act, no 85 of 1993 are available from the Departmental Chairman.
- **The student must prepare a safety guide specific to the laboratory equipment and tools they will be using. This safety guide must be in the form of the template attached and must be signed by the relevant responsible persons. The safety guide will be used to highlight what the student will be doing as well as all of the risks involved and how they will be managed.**
- **Forms 1.1 and 1.2 must be kept with the student at all times when working in the labs and must be clearly visible. If a student fails to produce the forms when asked to, they will be asked to leave the lab immediately and will be subject to a disciplinary hearing.**

Your safety report should consist of the following:

- A cover page which clearly shows emergency contact details
- A brief overview of the work to be performed.
- A description of the equipment to be used.
- General lab safety instructions:
 - In this section general safety mitigating factors, (e.g., wear closed shoes, no afterhours work alone etc.) should be listed in bullet form.
 - Clearly state the procedures for turning equipment on and off, including emergency stoppage.
- Compile your activity based risk assessment
 - Break your tasks in the lab down into individual activities
 - List the risk associated with each task – indicate whether they are personal (P) or equipment (E) risks
 - List the mitigating factors for each task.
 - An activity based risk assessment is best performed in a tabular format
- Space for the signatures of the Student, the Lab technician, the Lab Manager, and your Supervisor.

Please do note that this is a guideline and does not preclude you from the adhering to the departmental safety instructions and safety report requirements. Safety reports compiled before an induction session is held have no value and will not be accepted.

An example of the template and what is required from you for this report can be observed in the following sections:



Industrial Engineering Safety Instructions Report (Form 1.2)

Name of Experiment: Tensile Test (Example)

Date:

Supervisor:

Student:

Laboratory Technician:

Emergency Contacts:

In case of an emergency: Contact the technician/lecturer/ Campus Security: (021) 808-2333				
DIVISION	TECHNICIAN / LECTURER IN CHARGE	ROOM No.	WORK TEL No.	Cell No.
General	Prof Corne Schutte <i>CAMPUS SECURITY</i>	M520	(021) 808 4250 (021) 808 2330	082 447 7780
Stellenbosch Technology Centre	Mnr Devon Hagedorn-Hansen	198 A & B	(021) 808 4567	082 338 5087
	Prof Tiaan Oosthuizen		(021) 808 9531	072 602 4531
Metrology Lab	Mnr Devon Hagedorn-Hansen	M197	(021) 808 4567	082 338 5087
LaserCusing Lab	Mnr Devon Hagedorn-Hansen	M248	(021) 808 4567	082 338 5087
	Mnr Xola Madyibi		078 212 2712	
Bamboo Lab Micro-milling Lab	Mnr Devon Hagedorn-Hansen	M244 & M246	(021) 808 4567	082 338 5087
Senrob – Learning Factory	Mnr Devon Hagedorn-Hansen	M262 & M263	(021) 808 3733	084 810 9281
	Dr Louis Louw		(021) 808 4448	082 365 0061
Fire Brigade			(021) 808 8888	
Ambulance			10177 / (021) 883 344	
ER24			0729806353	
Police			10111 / (021) 809 5015	
Student Health Services			(021) 808 3496	

Overview of Testing

Tensile testing of PMMA as per ASTM E8/M is to be performed. The purpose of these tests is to obtain a Young's modulus for the particular sheet of PMMA in order to validate an implementation of the Virtual Fields Method (VFM) for the extraction of material properties from optically measured full field surface displacements. As the data is to be used for validation purposes a high level of accuracy and repeatability is required in order to minimize the effect of the experimental setup on the results.

In order to obtain an accurate measure for the change in length in the longitudinal axis required for determining Young's Modulus, the 25mm extensometer will be used locally in the gauge of the sample. This will eliminate any error due to extension within the grips that would be included in the calculation should one determine the change in length via the cross head of the tensile machine.

Based on the estimated maximum load that will be encountered during the testing, the 30kN load cell is judged to be correct for this testing. The sample cross section, estimated UTS and estimated failure load is detailed below:

Sample Cross Section	Expected UTS	Expected Max. Load
15 mm x 15 mm	71 MPa	5.3 kN

While typically the higher resolution offered by the 1kN load cell is advantageous in determining the Young's Modulus from the initial stages of the linear-elastic region of a stress strain curve, the stress strain behaviour for higher loads is required for this particular validation, hence the selection of 30kN load cell.

Equipment to be used

The equipment to be used is detailed as follows:

Equipment:
MTS Tension/compression load frame fitted with 30kN Load Cell
MTS standard tensile grips (max load 25kN)
MTS 25mm Extensometer

General Laboratory Safety

The following general lab safety instructions are applicable:

- No afterhours testing may be performed without the necessary permissions.
- An induction is required before testing may be undertaken.
- Closed shoes must be worn at all times.
- Loose clothing may not be worn.
- Good housekeeping practices should be kept during testing.
- No food or drink is permitted in the lab.
- Safety report must be visible and accessible during testing.
- If uncertain, ask for help – it will be willingly provided!

Activity Based Risk Assessment

Activity	Risk	Risk Type	Mitigating Steps
Entering the lab	Hand Injuries from gate	P	Be careful not to get your hand stuck in the security gate
Turning on Equipment	Electrical Shock	P	Briefly check over cables to

			ensure that insulation is intact
Moving around lab	Tripping	P/E	Be aware of your surroundings. Do not trip over cables or the equipment
Fitting Sample	Crushing fingers	P	Use only fine adjustment. Be careful.
	Overtightening grips	E	Do not break grips by overtightening the wedges onto the sample.

Every student doing any work in any of the Labs must sign the form below and hand it in at M409.

If a student does not comply with this, he/she may not use the laboratories.

I (name).....(student number) acknowledge receipt of a copy of the document titled "General Safety Instructions" and "Work Specific Safety Instructions" of the Department of Industrial Engineering. I hereby declare that I have studied the document and understand it.

Signed Student: **Date:**

Signed Study Leader:

Study Leader Name:

Date:

Signed Laboratory Technician:

Laboratory Technician Name:

Signed Laboratory Manager:

Laboratory Manager Name: