School of Engineering

Tuck Lab Safety Instructions

1. Generic Instruction of Safety procedures

1.1 Fire

Should fire alarm sound (continuous siren) then make way from the lab without delay to the grass area outside the front of James Watt South building and await further instructions.

1.2 First Aid

Should anyone requires first aid then speak to a member of staff who will contact a first aider.

List of names and contact details are located in the main corridor next to the lift; or speak to member of staff who will assist

1.3 Toilets

The toilets are located on the ground floor of this building.

1.4 Security

All bags, coats, head phones be left in cloakroom area.

1.4 Other Safety Notes

- Attention must be given to the STAFF explaining the Lab**.**
- Head caps baseball caps are not permitted.
- NO food or drink within the lab.
- Long hair **Will** be tied back when using mechanical Lab equipment. Protective snoop caps, elastic bands are provided for long hair.
- Loose clothing **WILL** be secured/ tucked in, while working with mechanical Lab equipment.

DYNAMICS 1

Lab Name: Pendulum Motion

Dr Trevor Davies

STOP ! *Only complete this exercise if you have received the relevant Safety Instructions*

Safety Instructions

In addition to the usual Health & Safety conditions that apply within the James Watt South Building and the Tuck Laboratory in particular, you must abide by the following instructions:

1). You must remain within the immediate vicinity of the test area: you are not permitted to explore other areas of the Tuck Laboratory.

2). You must not adjust, displace or reconfigure the apparatus in any way, unless given explicit authorization by do so by a member of staff.

3). You must not unplug, or otherwise interfere, with any electrical connection.

4). You must ensure that that the pendulum path is free of obstruction and that the bob is securely tightened in place. Particular care is needed if a large amplitude test ($\theta > 45°$) is being conducted.

THERMODYNAMICS 1 (ENG1066)

Lab Name: Bomb calorimeter

Dr Manosh Paul & Dr Nader Karimi

Safety Instructions

- Do not attempt any experiment without proper guidance received from lab demonstrator.
- Do not pressurise a bomb any higher than **20 bar**.
- Do not open the bomb head when it is fully pressurised.
- Depressurise fully by opening the knurled knob screw on the bomb head BEFORE opening the head of bomb.
- Lift by pulling the head of bomb vertically without any crinkling.
- Do not have the head, hands or any parts of the body over the calorimeter when firing the bomb.
- Continue to stand clear for 30 seconds after firing.

- Any electric equipment handling – follow the instruction given.

THERMODYNAMICS 1 (ENG1066)

Lab Name: Temperature Measurement

Dr Manosh Paul & Dr Nader Karimi

Safety Instructions

As instructed by the manufacture, this experimental rig has been designed to be safe in use when installed, operated and maintained in accordance with their instructions. However, dangers exist if the equipment is misused, mishandled or badly maintained. In addition to the generic safety instructions, some ground rules should be followed to avoid any potential hazards developing during the lab.

- Do not attempt any experiment without proper guidance received from lab demonstrator.
- Electric equipment handling – follow the instruction given.
- In the event of a water leak from the system, stop the experiment and wait for instruction.
- Don’t to touch any components subject to high temperatures without putting any hand gloves / protection.

Materials 2

Dr Phil Harrison

Lab A (Metals)

Safety instructions

- Students should be careful not to let clothing or hair become entangled in the tensile test machine gear system.

Lab B (Polymers)

Students should:

- be careful not to let clothing or hair become entangled in the tensile test machine gear system

- take care when testing the stiffer/brittle polymer specimens, make sure your unprotected eyes are not close (<1m) to the specimen during testing - safety or regular glasses should be worn if in close proximity

Design and Manufacture 2

Lab (heat treatment of metals)

Dr Phil Harrison

Safety instructions

Students should:

- be careful not to let clothing or hair become entangled in the tensile test machine gear system

- take care when the technician demonstrates the Jominy end quench test - the sample is removed from the oven at 900degC, make sure you are at a safe distance (not less than 1.5m) from the specimen.

Thermodynamics 2

Lab: Refrigeration Lab

Dr Zhibin Yu

Safety Instructions

The refrigeration rig includes a set of automatic safeguards to shut it down before it enters any potentially dangerous state. However, there are some ground rules that should be followed to ensure everyone's safety during the lab.

Electrical Safety

-Students should not make any attempt to open the casing of the experimental rig or data logging computer. Problems with either should be reported directly to the person in charge of the lab.

-If water is spilt in the vicinity of any electrical components, the lab should be stopped and the person in charge informed.

Hot and Cold Surfaces

-The compressor and certain refrigerant lines can become hot enough to cause burns. Students should not touch these components without checking with the person in charge of the lab, and verifying the temperature from the computer display.

-In the event of a leak, the refrigerant can reach extremely low temperatures, causing cold burns. If a leak is suspected, students should stand back from the rig and inform the person in charge

Water

-The rig contains a large reservoir of water for use as a heat source and sink. A spill onto the floor would represent a slip hazard, and should be reported to the person in charge.

High Pressure

-The rig is pressurised to above atmospheric pressure, resulting in a large amount of stored energy. It should not be roughly treated, as this poses the risk of violent decompression, causing injury and releasing refrigerant.

Introduction to Aerodynamics 2 (ENG 2037)

Dr Hossein Zare-Behtash

Laboratory Safety Instructions

- The Equipment contains moving parts. Do not insert limbs or materials other than the processing material while the Equipment is functioning. In the event of malfunction, danger or lack of appropriate safety systems, shut down the Equipment immediately and inform the qualified personnel.

- All maintenance, inspection and assembly operations related to the Equipment are carried out by qualified technicians.

- Changes or modifications to the machine, within the limits that do not go beyond extraordinary maintenance, are only permitted if agreed on beforehand with the manufacturer.

- The unit is designed to use clean air at ambient temperature and pressure during normal operation. Clean water is used in the optional C15-11 Inclined Manometer Bank to measure changes in pressure inside the wind tunnel and this must be replaced at regular intervals to avoid stagnation. Cleaning should be carried out regularly as described in the maintenance section of this manual which may involve the use of detergents/chemicals.

- The optional C15-11 Inclined Manometer Bank described in this instruction manual involves the use of water, which under certain conditions can create a health hazard due to infection by harmful micro-organisms. Any water/fluid contained within the product must not be allowed to stagnate, i.e. the water must be changed regularly.

- The Equipment must always observe the operating limitations for which it was constructed and those stated in the order confirmation: observe the temperature, pressure, capacity, viscosity and speed limits. Unless otherwise stated in the order, the Equipment must not be used in environments subject to the formation of potentially explosive atmospheres.

Fluid Mechanics M3

Dr Manosh Paul

LAB 1: Performance Analysis of a Centrifugal Fan

Do not attempt any experiment without proper guidance received from lab demonstrator.

Safety Instructions

1. An electrical enclosure is mounted on the upper work surface and contains the fan contactor and fan start and stop pushbuttons. In case of any problem occurring during the experiment, just press the start/stop button!

2. When the fan runs, do not stand close to its conical inlet or do not put anything in front of the fan inlet.

3. Make sure that the manometer tubes are connected properly to avoid any suction of manometer liquid by the fan! Any drop of liquid on to the floor will cause a slip hazard.

4. Damper must be tightened properly to avoid fall from the fan outlet which can also cause hazard if it falls on you.

LAB 2: Performance Analysis of a Centrifugal Pump

Safety Instructions

1. Pump flow rate is maintained with a variable speed controller and the speed of a selected pump can be displayed individually on the Pump Speed Display Unit. Do not over speed the pump and follow the instruction given.

2. Make sure you have enough water in the tank to run this experiment and also check the tank is clean! Any debris will cause blockage and give misreading.

3. Make sure there is no spilling of water in the floor which will cause a potential health hazard. Any water spill needs to be mopped and let the affected area dry before any experiment.

4. Electric equipment handling – follow the instruction given. Must make sure your hand is dry while handling electric kits.