

# Safety and Incident Management Plan for Heat and Mass Transfer Lab

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## Introduction

The Heat and Mass Transfer Lab at Ahsanullah University of Science & Technology (AUST) is a foundational facility that provides students with hands-on experience in heat transfer principles, including conduction, convection, and mass transfer. The lab is equipped with apparatus such as a thermal conductivity meter for metal bars, setups for natural and forced convection, parallel and counter flow heat exchangers, transient heat transfer equipment, and a mass diffusivity meter. This document outlines the lab's safety protocols, incident prevention measures, and emergency response plans as part of the accreditation requirements.

## Safety Rules and Practices

To ensure a safe and controlled environment, the following safety rules and procedures are implemented:

- **Personal Protective Equipment (PPE):** All lab users must wear PPE, including lab coats, safety goggles, and heat-resistant gloves, when operating high-temperature equipment.
- **Restricted Access:** Only authorized students and personnel are permitted to use the lab. Students must be supervised by the Lab In-Charge or Lab Assistant while conducting experiments.
- **Safe Handling of Equipment:** All equipment should be used following operational guidelines to prevent burns, electrical hazards, and other injuries. Malfunctioning equipment must be reported immediately.
- **Heat Safety:** Students are instructed on handling hot surfaces and high-temperature equipment. Hot surfaces are clearly labeled, and heat-resistant gloves are required for handling hot apparatus.
- **Emergency Exits and Fire Safety:** Emergency exits are clearly marked, and fire extinguishers are accessible. Students are briefed on fire evacuation procedures.
- **Chemical Safety for Mass Transfer Experiments:** If chemicals are used in experiments, proper handling and disposal procedures must be followed. Safety Data Sheets (SDS) for all chemicals are available in the lab.

# Incident and Accident Prevention Procedures

To minimize the risk of incidents, the following preventive measures are implemented:

- **Routine Inspections:** The Lab In-Charge conducts regular safety checks to ensure that all equipment is functioning correctly and safely.
- **Equipment Maintenance:** All apparatus, including thermal conductivity meters and heat exchangers, undergo periodic maintenance to ensure reliable operation.
- **Safety Training:** Students receive safety training, including the correct use of PPE, emergency procedures, and specific handling techniques for heat-related equipment.
- **Emergency Drills:** Periodic emergency drills familiarize students and staff with evacuation routes and procedures in the event of fire or other hazards.

## Provisions for Managing Accidents and Health Hazard Conditions

In the event of an accident or health hazard, the following provisions are in place:

- **Emergency Contacts:** Contact information for the Lab In-Charge, Warden, Assistant Warden, and emergency medical services is posted prominently in the lab.
- **First Aid Kit:** A fully stocked first aid kit is available in the lab to treat minor burns, cuts, or other injuries.
- **Fire Extinguishers:** Fire extinguishers are located at strategic points.
- **Emergency Response Protocol:** In case of an emergency, the Lab In-Charge is notified immediately. If necessary, the Lab In-Charge will contact the Warden and Assistant Warden to coordinate with the AUST Fire/Disaster Safety Team.
- **Evacuation Procedures:** For severe incidents, such as a fire or chemical spill, personnel should follow the designated evacuation route to the assembly point outside the building.

## Roles and Responsibilities

### Lab In-Charge

The Lab In-Charge holds overall responsibility for lab safety, accident prevention, and incident management. Key responsibilities include:

- Conducting regular safety inspections and maintenance checks on all lab equipment.
- Providing initial safety training to students and lab personnel before experiments commence.

- Responding to incidents and coordinating with the Warden and Assistant Warden during emergencies.
- Reporting safety issues to the Department Head and implementing corrective measures.

## Lab Assistant/Attendant

Under the supervision of the Lab In-Charge, the Lab Assistant is responsible for:

- Assisting in the setup and maintenance of lab apparatus.
- Supervising students during lab sessions to ensure compliance with safety protocols.
- Reporting any equipment malfunctions or safety concerns to the Lab In-Charge.

## Warden and Assistant Warden

As part of the AUST Fire/Disaster Safety Team, the Warden and Assistant Warden are responsible for:

- Assisting with evacuation procedures during emergencies.
- Coordinating with external emergency services if required.
- Reporting the incident to the Campus Safety Task Force.

## Lab-Specific Incident Prevention Plan

The following precautions are specific to the Heat and Mass Transfer Lab to ensure safe conduct of activities:

1. **Thermal Conductivity Tests:** Use caution when handling the thermal conductivity meter, as the metal bars may reach high temperatures. Heat-resistant gloves are required.
2. **Convection Experiments:** Students must avoid direct contact with heated fins and plates during convection experiments to prevent burns.
3. **Heat Exchanger Experiments:** During parallel and counter flow heat exchanger experiments, all connecting tubes should be checked for secure attachment to prevent leaks.
4. **Transient Heat Transfer Equipment:** Students must avoid touching heated components during operation. Proper cooling time should be allowed after each experiment.
5. **Mass Diffusivity Tests:** In experiments involving mass transfer, students should handle chemicals carefully, following chemical safety guidelines and using PPE as required.

## **Conclusion**

The Heat and Mass Transfer Lab adheres to strict safety protocols to protect students, faculty, and staff. Through established safety rules, incident prevention practices, and emergency response plans, the lab aims to minimize risks and provide a safe learning environment. Regular reviews and updates to this safety plan ensure compliance with accreditation standards and evolving safety practices.