UNC CHARLOTTE
Department of Engineering Technology

# LABORATORY SAFETY ANALYSIS

## OPERATING THE DOUBLE PIPE HEAT EXCHANGER

Location: Smith 129

Required Training: The Double Pipe Heat Exchanger is designed and intended for use by properly trained and experienced operators. If you are not familiar with the proper and safe operation of this apparatus, do not use until proper training and knowledge have been obtained.

Required Personal Protective Equipment (PPE): Safety glasses, non-slip shoes.

Reference Materials: Manufacturer's safety rules and operating instructions

| PHOTOS | TASK | HAZARDS | CONTROLS |
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|  | Wear clear safety glasses with side shields and if necessary use a dust mask. | Potential water splashes. | • Students are required to provide their own safety glasses.<br>• See laboratory instructor or laboratory manager if you do not have safety glasses before proceeding to use equipment. |
| | Inspect safety glasses for cracks, scratches or other defects. Ensure the ANSI standard Z87.1 is stamped into the side of glasses. If necessary inspect leather gloves and face shield. | Potential water splashes. | • If defects are found report to your laboratory instructor before using. |
| | Put on PPE | Potential water splashes, water on floor, slips, falls. | • Always wear safety glasses.<br>• Wear non-slip shoes due to potential water on floor. |
| | Inspect work area, walk around area looking for water spills and ensure adequate lighting. | Slips, trips & falls | • Minimize potential sources of spills.<br>• Tighten all hose connections.<br>• Clean up any spills as they occur. |
| | Visually inspect the electrical power cord. | Electrical shock | • If the electrical cord is damaged or worn the electrical cord should be unplugged and tagged "Out of Service-Do Not Use".<br>• This should be reported to the laboratory manager immediately.<br>• Electrical cord replacement should only be conducted by a factory authorized technician or electrician. |

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| | Ensure the electrical cord is connected to electrical outlet. | Electrical shock, injury | • Caution: Apparatus is moveable. Always disconnect electrical cord before moving. |
| | Fill the heater tank (if required) | Spills, electrical hazards. | • Water heater must be in "off" position for tank filling.<br>• Ensure all hose connections are tight.<br>• Monitor sight glass on tank to avoid overfilling.<br>• Remove vent cap during filling. |
| | Turn on water heater | Electrical hazards, thermal hazards | • Do not turn heater on until filling of tank is complete.<br>• Water temperature set point should not exceed 130 degrees F.<br>• Caution: Exterior of heater tank and associated pipework can be **HOT!** |
| | Start cold water flow (counter flow) | Spills | • Ensure cold water hose connections are tight and not leaking.<br>• During experiments, monitor cold water collection tank closely to avoid overfilling and potential spills. |
| | Run experiment (turn hot water pump on). | Spills, thermal hazards | • Monitor all fluid levels and flow rates to avoid overflow spills (especially cold water collection tank).<br>• Note that tanks and hot water lines will remain hot; monitor temperatures using thermocouples only. |
| | Ending experiment | | • Stop pump and turn off heater.<br>• Shut off cold water supply to avoid overflow.<br>• Open drain on cold water collection tank and ensure that water is draining properly.<br>• If draining into floor drain, ensure that the drain is clear and open to avoid backing up onto floor |
| | Clean work area and return all PPE to clean, dry storage area. | Injury | • To ensure adequate housekeeping measures to prevent accidents.<br>• Clean up any areas where water may have collected on the floor around the apparatus. |

For more information about this LSA, contact the *Department of Engineering Technology* at UNC Charlotte (704) 687-2305

Please visit our website at: http://www.et.uncc.edu\

***The development of Laboratory Safety Analyses is a very effective means of helping reduce incidents, accidents, and injuries in the workplace. It is an excellent tool to use for training purposes and can also be used to investigate "near misses" and accidents.***