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| **SJA title:**  High pressure fluid measurements | | | **Project no:**  Generic | | **Project title:**  Generic | |
| **Project manager:**  Kjetil Folgerø | | | **Responsible for SJA:**  Anna Mathea Skar | | | **Participants in the SJA:**  Anna Mathea Skar, Kjetil Folgerø |
| **Short work description**  Use of pressure vessel to test permittivity of non-flammable fluids | | | | | | **Premises:**  NORCE Bergen |
| No. | Task | Possible danger | | Possible consequence | | Recommended action |
| 1 | Hydrostatic pressure test of measurement cell | * Deformation of equipment that cannot withstand the pressure * Water leakage | | * Impact damage to personnel or equipment * Damage to electrical equipment and personnel | | * Follow the order of procedure (attached) and checklist (below) * Use mechanical separation between operator and measuring cell * Use safety glasses * Carry out experiments during working hours and under the supervision of a laboratory supervisor who has sufficient training for the equipment * Ensure communication with the project team, laboratory users and those affected nearby before start (and when finished) * Check that all connections to the measuring cell are securely fastened * Consider whether the measuring cell and cables should be permanently installed * Interrupt measurement in the event of a major water leak. Have fire safety equipment available * Follow a gradual pressure build-up and continuous check of the pressure gauge * Release the pressure before removing the mechanical separator * Do not put your head over the lid when opening the cylinder * Choose measures to avoid exposure to hazards, i.e. ensure that the working environment is suitable, e.g. work room, ventilation, first aid equipment |
| 2 | Initial installation | * Gas leakage may occur * High pressure produces large forces that can destroy equipment | | * Health damage to personnel by inhaling gas * Impact damage to personnel or equipment | | * Follow procedure and checklist * Ensure that the operator has sufficient training/knowledge * Follow the emergency shutdown procedure (below) in case of leakage or other unwanted incidents * Consider the use of mechanical separation between operator and measuring cell * Use safety glasses * Ensure communication with the project team, laboratory users and any others affected before start (and when finished) * Check that all connections to the measuring cell are securely fastened * Make sure that the gas outlet is discharged into a fume hood * Consider whether the measuring cell should be placed under extraction * Consider whether the measuring cell and cables should be fixed |
| 3 | Gas testing | * Gas leak * Deformation of equipment | | * Health damage to personnel by inhaling gas * Impact damage to personnel or equipment | | * Follow procedure and checklist * Ensure that the operator has sufficient training/knowledge * Follow the emergency shutdown procedure (below) in case of leakage or other unwanted incidents * Use safety glasses * Clear sign "gas under pressure" * Consider how high a pressure is necessary for the gas being measured. A goal should be to use as low a pressure as possible * If the gas leak is out of control, leave the laboratory and notify the room manager. * In case of serious personal injury, call 113 and the NORCE emergency number (21 08 01 86) |
| 4 | Disconnection | * Gas leak * Deformation of equipment | | * Health damage to personnel by inhaling gas * Impact damage to personnel or equipment | | * Follow procedure and checklist * Use safety glasses * Ensure communication with the project team, laboratory users and any others affected when finished * Release the pressure and ensure that the pressure has dropped to atmospheric pressure before removing the mechanical separation between operator and measuring cell |

**Check list:**

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|  | **Yes** | **No** | **Comments** |
| **Have you informed the room manager and the person in charge of emergency response for the laboratory?** |  |  | **Inform room manager well in advance of the start of the experiment. Also inform when the experiment is finished** |
| **Will the experiment be done under supervision?** |  |  | **Consider supervision at high pressures and if there is a lack of sufficient training and experience with the equipment used** |
| **Are the fluid(s) explosive?** |  |  | **Follow a different/create new SJA and always conduct experiments with supervision** |
| **Are the fluid(s) health hazardous?** |  |  | **Be careful using gas exhaust hoods during gas emissions. Use a laboratory room with adequate ventilation** |
| **Should the fluid(s) be pressurized?** |  |  | **Follow the procedure and be careful with the order of procedure** |
| **Is the gas from the measuring cell released into the exhaust before the chamber is opened or the seperator is removed?** |  |  | **Check that the pressure sensor has returned to atmospheric pressure** |

**Emergency shutdown procedure:**

1. If the gas leak is out of control, leave the laboratory and notify the room manager.
2. In case of serious personal injury, call 113 and the NORCE emergency number: 21 08 01 86