

## Some key elements of isolation (lock-out/tag-out) for maintenance

(see e.g. 29 CFR 1910.147 (USA) or HSG 253 (UK))

- Each isolation device must be:

**Durable, Standardised, Substantial, Identifiable, and Regularly Inspected**

- Any single device will achieve lock-out.
- Suitable warning notices (tags) should be used, e.g.

**DO NOT START, DO NOT OPEN, DO NOT CLOSE, DO NOT ENERGIZE, DO NOT OPERATE**

Procedures should be written and verified covering (as appropriate):

1. Hazard identification and risk assessment of isolation scheme
2. Shutdown of the equipment
3. Disconnection (isolation) from energy sources
4. Disconnection (isolation) from toxic or flammable fluid sources
5. Application of lock-out devices
6. Removing or rendering safe any stored energy
7. Draining/venting/purging/flushing any existing toxic or flammable fluids
8. Testing/verifying isolation, de-energising, ventilation, low toxicity, low flammability  
*(At this point the Permit To Work can be issued, and the work can take place)*
9. De-isolation, re-energising, and testing

Personnel using isolation devices should have received suitable training

There must be clear and unambiguous handover arrangements for shift or crew change

*Forced removal of an isolation device should be an exceptional occurrence and should only be approved after extremely careful and thorough management review.*