

# Electrical and fluid interfaces

Status Work in progress

## Discussion topics

- What level of standardisation is reasonable and achievable?
- What sizes, types etc. of connectors do the instrument need?

## Section Intro

## Links

## Error rendering macro 'toc' : null

### Routing

Electrical and fluid interfaces (“utilities”) for one module shall be concentrated at one point with relatively easy access for connecting and disconnecting.

Connections on the equipment should not be required to be disconnected for maintenance purposes before the module is extracted. Metal gaskets and seals should be used if required.

Cables should be routed upwards towards the bunker roof and connected to the fixed installation. Utilities should be routed upwards using a self-supporting section of pipe, called a snorkel, attached to the module. The snorkel should end with a flexible section where it connects with the fixed installation. This will minimise the radiation exposure and wear sensitive flexible sections and allowing polymer seals in the maintenance connections. Utilities and cables shall be routed so any disconnection needed for extraction is placed within 200mm of the bottom of the bunker roof shielding.

After the maintenance connection point the cables and utilities should be routed along the bunker pillars downstream towards the bunker wall.

The cables and utilities should be routed to avoid access limitations to remote handling interfaces and extraction/re-installation of modules.

### Bundling

The cables and utilities shall be collected in appropriate bundles. This is to avoid damage and unnecessary wear during handling. It also simplifies the interface during remote handling activities by clearly separating bundles belonging to different extraction modules. Larger collected connectors are preferred over multiple smaller connectors.

### Electrical Connectors

Connectors shall be suitable for remote handling procedures to minimise exposure to radiation during connection/disconnection. Different connector series are available on the market for different levels of integration. From full remote actuation to fast manual actuation. In most cases, fast manual actuation connectors are sufficient NSS needs. This means mostly push-pull type of connectors with lanyard pulls but also “breakaway” plugs in bayonet type connector series.

Exposure time during connection, position of the connection point and radiation level at the time of connection have to be taken into account when selecting a connector. Activation of a connector might be a problem for handling. Local shielding of connector can be a solution to this.

## Utilities connectors

### Water connectors

To ensure remote handling compatibility a quick release coupling is preferred. An example of this is the STÄUBLI RBE series. This is a stainless steel 316L connector which incorporates a raised button for disconnection.

Double shut-off couplings (plug and socket) shall be specified.

### Pneumatic connectors

To ensure remote handling compatibility a quick release coupling is preferred. An example of this is the STÄUBLI RBE series. This is a stainless steel 316L connector which incorporates a raised button for disconnection.

The preferred nominal diameter for pneumatic connectors is 8mm, however, where air consumption or safety considerations determine a larger diameter 11mm nominal diameter is acceptable.

The design features adopted for pneumatic connectors are the same as for the water connectors.

### Vacuum connectors

The connector to the fixed end of system shall be a ISO-KF type flange with clamp. The short section of flexible corrugated hose, connecting the snorkel to the fixed installation, shall be standard stainless steel (304/316L) ISO-KF corrugated flexible hose.

If required, for radiation purposes, the connector at the module end can be of ISO-CF type.

### Gas connectors

To ensure remote handling compatibility a quick release coupling is preferred. An example of this is the STÄUBLI RBE series. This is a stainless steel 316L connector which incorporates a raised button for disconnection.

Double shut-off couplings (plug and socket) shall be specified.

## Related Articles

## References

## Contributors

## Related JIRA issues