framatome

Flexible Radiation Plugging - Flex Rad Plug

Flexible plugging solutions for shielding wall penetrations

Shielding walls often have to be penetrated nevertheless of their shielding function for cable and pipe routing. This smart solution yields maximal flexible radiological plugging of these penetrations with less effort.

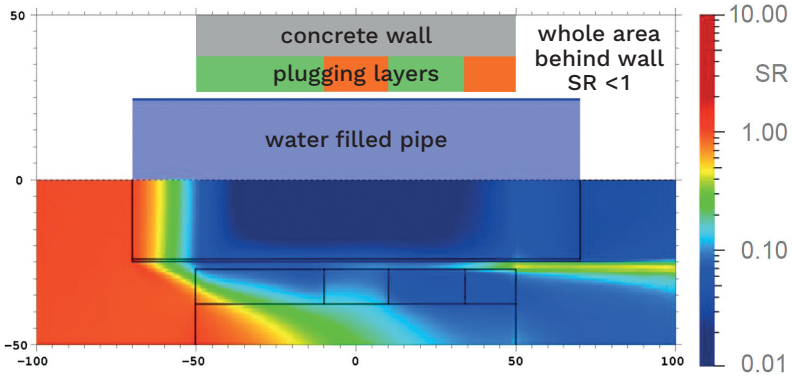
Challenge

Radiation shielding walls – e.g. neutron and gamma radiation in NPPs, heavy ion, proton, or neutron and gamma radiation in nuclear research facilities like accelerators or medical institutes especially radiation therapy, have often to be penetrated for cabling and pipe routing. These penetrations might be located in areas where maximum shielding has to be ensured. The issue gets even more complex if these cabling or piping also needs to be installed in a removable manner.

Solution

Flex Rad Plug plugging technology ensures full shielding efficiency of penetrated walls. Planning and preparatory work are reduced to a minimum allowing a quick installation and – if required – a later easy reemptying of the penetrations and removing of any inserted installations.

It can be inserted into penetrations independent of their shape, the given cable or pipe routing inside, the number of cables or pipes, their diameter, or orientation. This is rendered possible by using highly flexible and reusable material in Flex Rad Plug to be inserted in the wall penetrations after the installation of the cabling/piping.



Water filled pipe of diameter 50 cm passes a 100 cm thick concrete wall in a penetration of diameter 75 cm.
Top: MCNP geometry model of pipe penetration including 2 cm air gap, e.g. thermal isolation.
Bottom: Graphical illustration of MCNP calculation result for a neutron + gamma radiation field. Impact as shielding ratio (**SR**) of total dose rate of plugged penetration and unpenetrated concrete wall (1 means same shielding efficiency as the unpenetrated wall).

Your performance
is **our** everyday **commitment**

Customer benefits

- Cost Reduction of more than 40%*)
- Less pre-work
- Less time consuming during installation
- Penetration can be re-opened, emptied and re-plugged

Technical information

Properties of the plugging material:
- Temperature experience up to 300°C
- Self-adapting to shape of penetration
- Self-adapting to shape, orientation and amount of pipes/cables inside penetrations
- Approved and commonly accepted insertion and installation methodology of plugging materials – thermal insulation included

The plugging system has Finish STUK approval and patent is pending.

Key figures

> 40% cost reduction*)

> 650 penetrations are already plugged and approved by authority

300°C inner pipe medium temperature is the upper experience value, higher values feasible (appropriate material selection)

Contact: integrated-systems@framatome.com
www.framatome.com

MCNP® is a trademark of Los Alamos National Security, LLC.
Flex Rad Plug patent is pending.
*) compared to typical available plugging solutions