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Standardized integration of ITER diagnostics equatorial port plugs

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The Diagnostic Shielding Modules (DSM) are secondary containers of diagnostic Port Plugs where shielding and diagnostics components have to be integrated. For the development of equatorial DSMs several key requirements have to be met. The total dry Plug weight shall not exceed the allowable maximum (45 t) in other to guarantee the consistency of the design with the specification of other interfacing systems. A shielding capability able to limit Shut-Down Dose Rate in the Interspace Zone (man access corridors) below 100 μSv/h is required as to allow the human accessibility needed for the sealing disassembly as well as for the inspection and maintenance of diagnostics in the interspace. Remote Handling compatibility for refurbishment of the Port Plug and maintenance of all systems and components integrated inside is necessary as well. These operations involve activated components that are processed in the Hot Cell.
The Port Integration team has developed the Modular Equatorial DSM able to answer the weight/shielding/RH requirements following the ALARA principle while offering standard infrastructure for the common integration problems.
This paper describes the key aspects considered in the development of the Modular DSM, a concept that offers a structural and shielding schemes capable to meet SDDR limits within stipulated weight limits being compatible with the principle of assembly and testing, meaning that once installation and setting-up is complete, a system should not be taken apart for final implementation of other systems. This fairly simplifies the tenants design constraints and integration process adding flexibility. In this regard the Modular DSM may be understood as a diagnostics friendly concept since it follows a component, subsystem and system design, implementation and testing approach with certification at each assembly stage. The DSM solution is currently the integration approach followed for First Plasma Port Plugs which have already faced the Preliminary Design Review.

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