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## Evaluation of ITER CS Module OD Band Structure for Lead Supports

The central solenoid modules for the ITER project are powered by a complex system of busbars, feeders, lead extensions, electrical joints and integral coil terminals. The leads carry time-varying module currents through predominantly poloidal fields, and thus develop substantial toroidally-oriented, cyclic, Lorentz loads. The support of such loading requires a robust structure which can function reliably over the design life of the tokamak. A unique design scheme, utilizing a thin band of Nitronic 50 stainless steel around the outer diameter (OD) of the coil, reacts and resists the Lorentz forces from the leads. To this end, various structures (i.e., double-lead cassettes and long-lead support channels) are attached to this 1.6 mm thick OD band. Numerous electrical breaks minimize eddy currents from transient fields but do not diminish the structural capacity of the band. All structural aspects of the OD band assembly are evaluated and qualified relative to ITER magnet structural design criteria (MSDC) requirements; static, fatigue and fracture. Flaws size requirements are specified at various locations with the smallest allowable flaws located at the edges of helium outlet penetrations and welded joints connecting OD band panels. In addition, the effects of heating from eddy currents on OD band temperature and thermal ratcheting from successive plasma pulses are addressed with multi-physics analysis.

### Eligible for student paper award?

No

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