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# P2.153 Investigation on the in-situation pipe bending tool for the sector sub-assembly of ITER thermal shield

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The main components of the ITER tokamak are assembled from the nine sub-assemblies of the 40° sectors. During the sub-assembly, the Toroidal Field coils (TFCs) are installed outside of the Vacuum Vessel Thermal Shield (VVTS) by rotation. The clearance between TFCs and VVTS is very small, in relation to the cooling tube end points, which connect to the thermal shield manifolds. The dimensional analysis results reveal that in-situ bending of the VVTS cooling tube is required, instead of pre-bending like the reference design. This paper describes the development of the in-situ bending tool and mock-up validation. The specialized suitable tool is designed and the in-situ bending procedure is verified by a mock-up test.

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