Graphite Tile Thermal Performance on New DIII-D Lower Divertor

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The lower divertor of the DIII-D tokamak has being modified to provide improved density control of the tokamak plasma during operation in a high triangularity double-null plasma configuration. Installation of the new divertor is complete and operation has started.

UCAR ATJ Graphite tiles cover the new divertor and were designed for higher heat flux than other tiles during past operations. New tile designs for the vessel floor and lower inner wall were also implemented. Vertical alignment between tiles was achieved within 0.1 mm as a result of the very flat divertor plate surface, well-machined graphite tiles, and hand filing. The small gaps between the tiles and good vertical edge alignment greatly reduce the number and size of thin edges visible to the plasma, thus minimizing possible carbon introduction into the plasma.

Heat flux capability up to 11.2 MW/m^2 peak for 10 seconds was originally specified and shown by analysis to be potentially damaging to the ATJ tiles. This paper will compare analysis with operational experience for thermally cycling the new tiles.

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