

# Design of the Future High Energy Beam Dump for the CERN SPS

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The future CERN Super Proton Synchrotron (SPS) internal dump (Target Internal Dump Vertical Graphite, known as TIDVG#5), to be installed during CERN's Long Shutdown 2 (LS2, 2019-2020), will be required to intercept beam dumps from 14 to 450 GeV, with increased intensity and repetition rates with respect to its predecessor (TIDVG#4).

The new dump will be installed at a different location in the accelerator (LSS5) as this area provides more space and hence increased flexibility for a new design (including a massive shielding) capable of coping with the upgraded beams expected after LS2.

The average beam power to be managed by the dump will be as high as 236 kW (hence, almost four times higher than presently). This increased power produces new challenges in terms of design in order to fulfil the highly demanding specification, which is based on guaranteeing a good performance of the machine with little or no limitations imposed by the dump itself (to note that approximately 90% of the beam power is actually absorbed by the dump-shielding assembly).

This paper presents the proposed design, including material selection, manufacturing techniques and thermo-mechanical simulations under different operational scenarios expected during the lifetime of the device.

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