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Heating of Cryogenic Indirect Drive ICF Targets Upon Shroud Removal[1] RICHARD LONDON, JOHN MOODY, JORGE SANCHEZ, JAMES SATER, Lawrence Livermore National Laboratory, DONALD BITTNER, Schafer Corporation — Cryogenic inertial confinement fusion targets at the National Ignition Facility and the Laser Megajoule will be protected from thermal infrared radiation by a cold shroud. As the shroud is removed before the laser shot, radiation will heat and possibly degrade the symmetry of the deuterium-tritium fuel layer. A lumped component mathematical model has been constructed to calculate how long an indirect drive target can be exposed to thermal radiation before the fuel layer degrades. The model predicts that the maximum exposure time is $\approx$ 0.17 s for plastic capsules in hohlraums with transparent laser entrance holes. By covering the laser entrance holes with a partially reflective coating, and/or by using beryllium capsules, the exposure time can be increased to 1-2 s. Several other design concepts could increase the exposure time even further. The allowed exposure time sets the maximum shroud removal time and therefore has important implications for the design of the cryogenic shroud systems. Lengthening the exposure time to 1 s could allow a significant cost savings.

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