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Upgraded Neutron Time-of-Flight Detectors for DT Cryogenic Implosions on OMEGA V.YU. GLEBOV, C.J. FORREST, J.P. KNAUER, O.M. MANNION, S.P. REGAN, T.C. SANGSTER, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester — The neutron time-of-flight (nTOF) system on the OMEGA laser was recently upgraded. Three new nTOF detectors of different designs were added to the existing detectors. There are now six nTOF detectors on OMEGA in the different lines of sight (LOS) to record the DT primary yield in 1×10^{12} to 1×10^{14} ranges and infer ion temperature above 2 keV. One new nTOF detector is located in a collimated LOS with a photomultiplier tube in a shielded location. For this nTOF detector it is possible to measure x-ray instrument response function, construct neutron response function, and calculate ion temperature by forward-fitting method. The ion-temperature fitting parameters for the other nTOF detectors located in the OMEGA Target Bay on an uncollimated LOS were adjusted to match the ion temperature against the nTOF detector in the collimated LOS on low-areal-density, warm target shots. All six nTOF detectors were calibrated by DT yield against a copper activation diagnostic on warm target shots. The design details, calibration results, and limitations of these OMEGA nTOF detectors will be presented. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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