Author's Accepted Manuscript

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PII: S0143-7496(18)30057-5
DOI: https://doi.org/10.1016/j.ijadhadh.2018.02.024
Reference: JAAD2149

To appear in: *International Journal of Adhesion and Adhesives*

Cite this article as: Dario Croccolo, Massimiliano De Agostinis, Stefano Fini and Giorgio Olmi, AN EXPERIMENTAL STUDY ON THE RESPONSE OF A THREADLOCKER, INVOLVING DIFFERENT MATERIALS, SCREW DIMENSIONS AND THREAD PROPORTIONING, *International Journal of Adhesion and Adhesives,* https://doi.org/10.1016/j.ijadhadh.2018.02.024

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AN EXPERIMENTAL STUDY ON THE RESPONSE OF A THREADLOCKER, INVOLVING DIFFERENT MATERIALS, SCREW DIMENSIONS AND THREAD PROPORTIONING

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Abstract: This research has investigated the effect of the Engagement Ratio (ER, namely the thread length over the thread diameter) on tightening and untightening torques and frictional coefficients of threaded joints, following the application of a medium strength threadlocker. This experimental study has focused on LOCTITE 243 and has involved hexagonal head class 8.8 screws with three different diameters (M6, M8 and M10), plates of two different materials (steel and aluminium alloy) with threaded holes, and three levels or ER (1, 1.5 and 2). Three replications have been chosen for an overall number of 108 trials. In the literature, several studies are available in the field of anaerobic adhesives, but very few are focused on threadlokers and none of them investigates the effect of ER. The results confirm the well known effect of threadlokers at providing a lubrication effect. However, it tends to be lowered for increasing ER, presumably due to the simultaneous cure occurring during tightening. Upon untightening, ER significantly affects torque with a linear increase in all the tested conditions. In particular for steel-to-steel contact ER=1.5 seems to be the optimal condition that maximizes the adhesive shear strength.

Keywords: Engagement Ratio, threadlocker, anaerobic adhesive, aluminium and alloys, steels, mechanical properties of adhesives

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