Customer Information Pack

Introduction of Loctite® 270 Upgrade

September 2023

Henkel

Introduction

The latest innovation from Loctite® is the reformulation of Loctite® 270 high strength threadlocker, involving the replacement of APH (1-Acetyl-2-phenylhydrazine) and CHP (Cumene hydroperoxide) with alternative raw materials. This innovation combines a more sustainable formulation with the high quality and reliability for which the Loctite® brand is known.

For several years, Henkel's customers have expressed an increasing interest in sustainability-oriented products and solutions. In response to this growing market trend and as a result of reclassification of some materials within the Loctite® 270 formulation, Henkel has upgraded Loctite® 270 by replacing the raw materials APH and CHP with more sustainable alternatives. This has been achieved without compromising the key properties such as cure speed, strength, gap cure, temperature resistance and shelf-life.

The data reported within this Information Pack supports the conclusion that the replacement of APH and CHP with the alternative raw materials has been achieved without compromise to the quality and performance properties expected for Loctite® 270.

This Information Pack provides a head-to-head performance comparison of the current Loctite® 270 formulation vs the new Loctite® 270 formulation, referenced in the following pages as "Loctite® 270 Current" and "Loctite® 270 New", respectively.

Maintained Loctite® Material Specification

Loctite® Material Specification (LMS) for Loctite® 270 remains unchanged.
The table below shows the test results of Loctite® 270 Current versus a batch of Loctite® 270 New. The results are comparable.

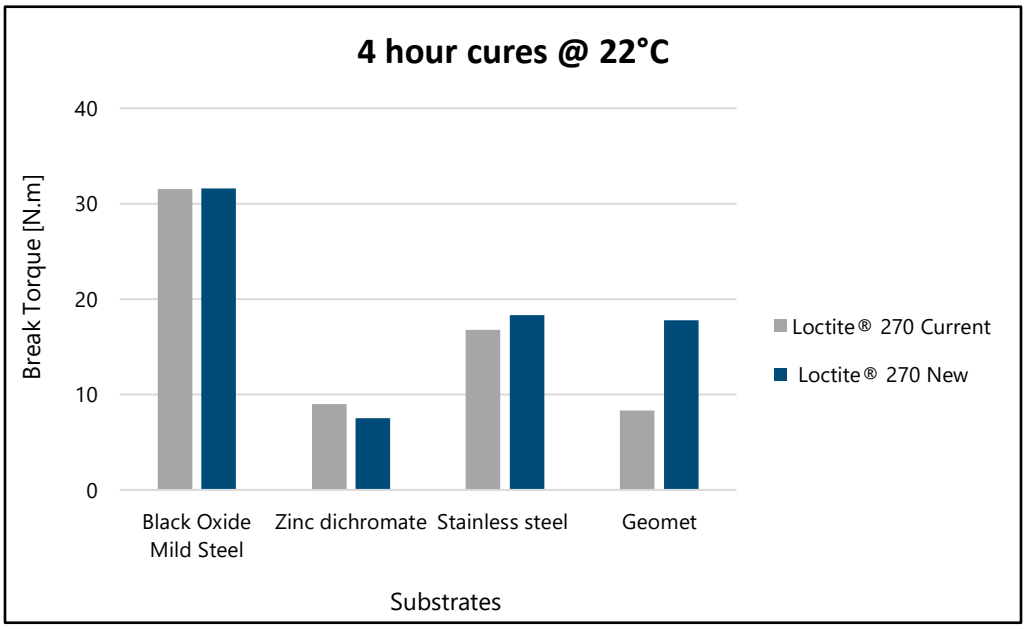
Parameter	Specification	Unit	Loctite® 270 Current	Loctite® 270 New
Appearance	Green liquid		Green liquid	Green liquid
Fluorescence (under UV light)	Positive		Positive	Positive
Brookfield viscosity (RVT, spindle no: 2, 25°C, 20 RPM)	400-600	mPa·s	532	504
Shear strength (Steel pins and collars, 24h cure at RT)	>= 9	N/mm^2 (MPa)	25	23

Head-to-head performance evaluation

Performance evaluation is based on the pilot plant batches of Loctite® 270 Current vs. Loctite® 270 New. Values quoted are average values.

Cure performance: Speed

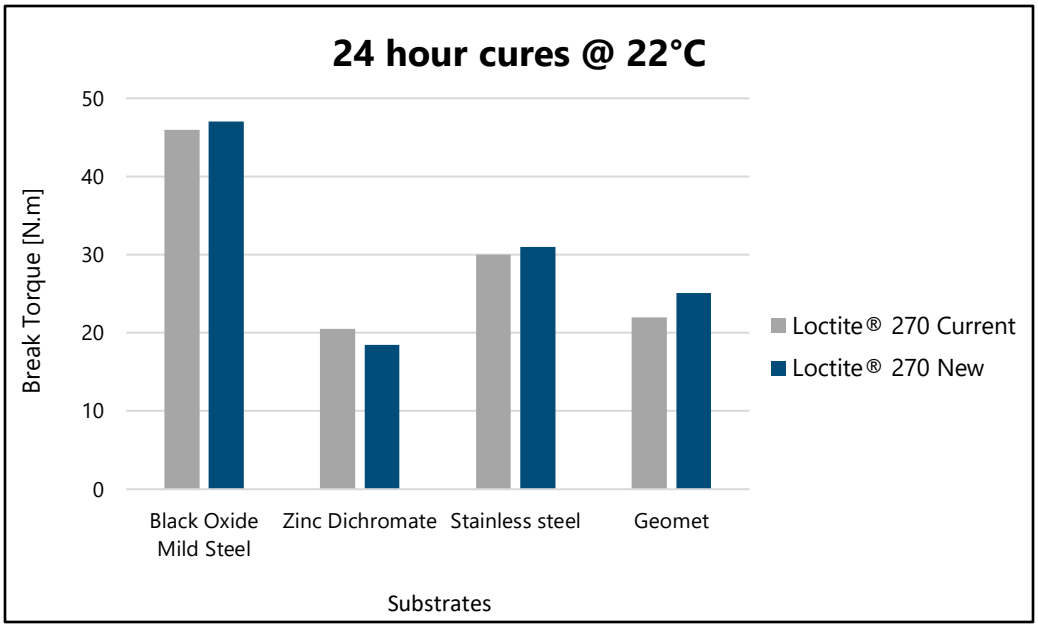
The graph below shows the breakaway torque strength of Loctite® 270 Current vs. Loctite® 270 New after 4 hours on various nut and bolt substrates.



Conclusion: Consistent cure performance is observed for Loctite® 270 Current and Loctite® 270 New on all substrates tested.

Cure performance: Strength

The graph below shows the breakaway torque strength of Loctite® 270 Current and Loctite® 270 New after 24 hours on various nut and bolt substrates.



Conclusion: Overall comparable strength observed for Loctite® 270 Current and Loctite® 270 New.

Typical performance of cured material

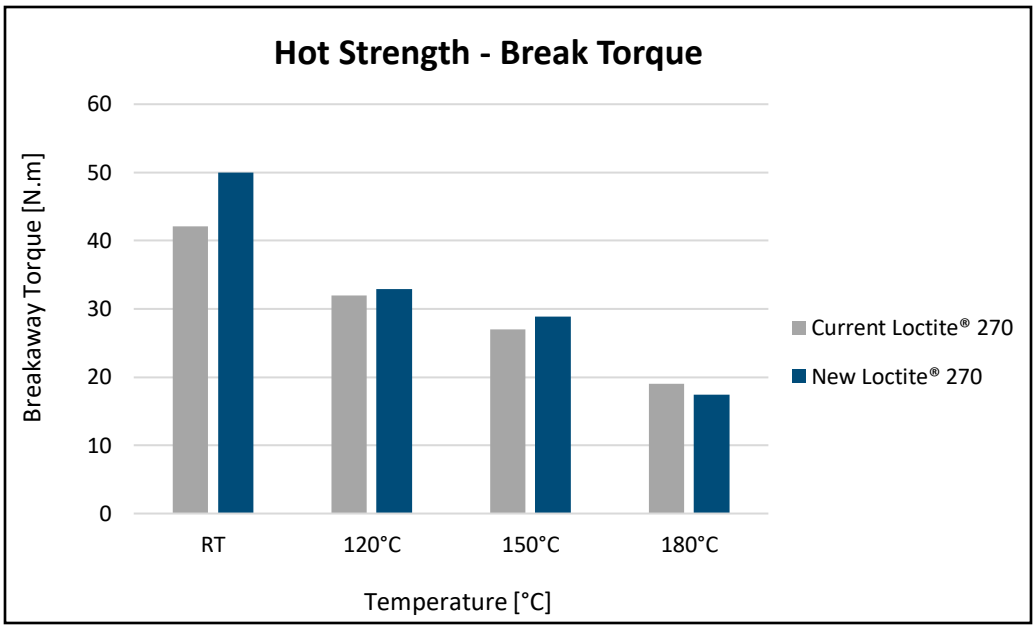
Target: Maintain characteristic high strength properties on standard substrates, e.g., black oxide steel and mild steel.

Parameter	Substrate	Unit	Loctite® 270 Current	Loctite® 270 New
Breakaway torque (Cured for 24h @ 22°C)	M10 mild steel nuts and black oxide steel bolts	N·m	45	47
Prevail torque @ 180° (Cured for 24h @ 22°C)	M10 mild steel nuts and black oxide steel bolts	N·m	34	38
Shear strength (Cured for 24h @ 22°C)	Steel pins and collars	N/mm^2 (MPa)	25	23

Conclusion: The key strength properties of Loctite® 270 are maintained. The results can be considered equivalent within the limits of experimental variations.

Thermal performance: Hot strength

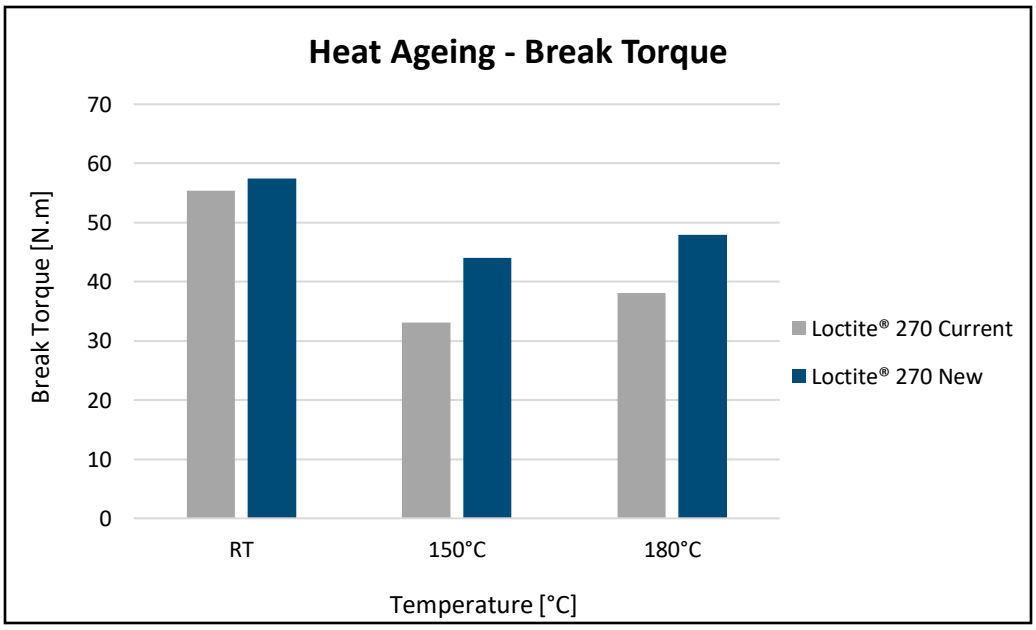
M10 zinc phosphate steel nuts and bolts, pre-torqued to 5 N·m, cured for 1 week at a temperature of 22°C. Breakloose torque tested at temperature.



Conclusion: Hot strength performance maintained up to 180°C.

Thermal performance: Heat ageing

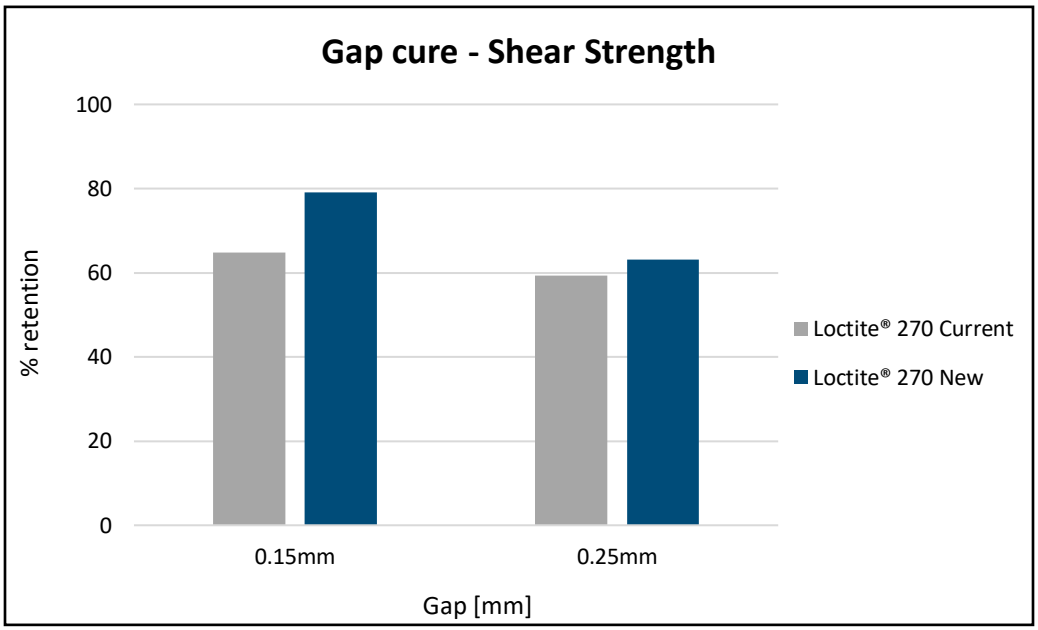
M10 zinc phosphate steel nuts and bolts, pre-torqued to 5 N·m, cured for 1 week at a temperature of 22 °C. Assembled parts are stored at temperatures stated for 500 hours and tested at 22 °C.



Conclusion: Heat resistance is maintained up to 180°C.

Gap cure

Mild steel pins and collars cured for 72 hours at a temperature of 22°C. Tested gap sizes were 0.05mm (zero gap), 0.15mm and 0.25mm. The graph below shows the gapped pins and collars as a percentage of initial strength 'zero gap' pins and collars (percentage retention).



Conclusion: Gap cure performance has been maintained.

Conclusion:

Loctite® 270 has been successfully upgraded without any compromise to the current LMS specifications.

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