LNP™ LUBRILOY™ N2000 COMPOUND

FOR AUTOMOTIVE INTERIOR APPLICATIONS

The perception of quality in an automotive interior goes beyond how the interior looks and includes how it “feels” and “sounds”. Buttons and knobs should move smoothly without sticking. Harsh and unwanted noises should be eliminated to support an enjoyable driving experience for consumers. The panels and trim pieces that make up the structure of the vehicle’s interior are prone to noise generation when two parts come in contact with each other. Referred to as “Buzz, Squeak and Rattle” (BSR), it is one of the primary quality issues facing automotive manufacturers today.

Traditional solutions include adding non-woven tape-based spacers to keep material separated or applying an external lubricant. Either process can add cost and complexity to the build. SABIC’s LNP™ LUBRILOY™ N2000 compound has been developed to address BSR issues. As a replacement to standard PC/ABS, this innovative, drop-in material can help automotive OEMs and tiers reduce friction and stick-slip behavior between molded parts to limit or prevent unwanted noise.

In addition to automotive interior parts – such as mirror housings and trim, cupholders, button guides and heating-ventilation-air conditioning (HVAC) frames – LNP LUBRILOY N2000 compound can potentially be used in consumer electronics applications where reduced friction or improved wear is required.

EXCELLENT WEAR AND FRICTION PERFORMANCE

SABIC’s proprietary lubricating technology is based on a fully compatibilized olefinic alloy that is free of silicone and polytetrafluoroethylene (PTFE). It enables the LNP LUBRILOY N2000 compound to deliver a low coefficient of friction (COF) and excellent wear performance in plastic parts moving over metal and plastic surfaces.

Standard wear and friction measurements such as thrust washer wear (ASTM D3702) or sliding sled (ASTM D1894) testers cannot always determine if two mating materials will generate noise. Specialized testing for slip-stick characteristics can be a more effective tool for noise comparison. Recognized by multiple OEMs and tiers as a useful tool in rating BSR potential, the BSR test VDA 230-206 generates a Risk Priority Number (RPN) for material pairs. The RPN uses a scale from 1 to 10, where a rating of 3 or less is considered a low potential for noise generation. When evaluated using this test, LUBRILOY N2000 compound demonstrated a risk priority number (RPN) of less than 3 versus non-modified PC/ABS materials that typically have values greater than 5.

RPN COMPARISONS OF MATERIAL TEST PAIRS USING VDA 230-206 TEST METHOD AND THE ZEIGLER SSP-04

Velocity (mm/s)	Force (N)	Standard PC/ABS against standard PC/ABS	Low gloss PC/ABS against low gloss PC/ABS	LNP™ LUBRILOY™ N2000 compound against low gloss PC/ABS
1	5, 10, 40	≥ 6	≤ 3	≤ 3
5	5, 10, 40	≥ 6	4-5	≤ 3
10	5, 10, 40	≥ 6	4-5	≤ 3

BLUE = RPN 3 or less, low probability of squeaking
YELLOW = RPN 4-5, some squeaking possible
ORANGE = RPN 6 or greater, high probability of squeaking

COMPLIANCE WITH PFOA REGULATIONS

In July 2020, the European Commission placed limitations on the amount of perfluorooctanoic acid (PFOA), its salts and PFOA-related substances that can be present in a material[1]. This industrial surfactant was commonly used during the production of PTFE. Suppliers now must certify that materials containing PTFE fall below the recommended PFOA threshold (<25 ppb)[2]. With LNP LUBRILOY N2000 compound, manufacturers can now emulate the tribological performance of traditional lubricated materials while avoiding the use of PTFE and, therefore, any trace impurities from PFOA that may be present in PTFE.

COLORABILITY FOR STYLISH INTERIORS

To help designers create attractive automotive interiors, the new LNP compound offers molded-in color in custom shades that can be difficult to achieve with other commercially available compounds utilizing solid lubrication packages like graphite or molybdenum. Paintability is an additional material feature and addresses the challenge often found with traditional silicone-based materials since the silicone oil can cause surface defects.

LNP LUBRILOY N2000 COMPOUND - TYPICAL PROPERTIES

Property	Units	LNP LUBRILOY N2000 compound
Density ISO 1183	g/cm^3	1.11
Tensile - ISO 527 Stress at Yield	Mpa	46
Flex Strength ISO 178	Mpa	72
Flex Modulus ISO 178	Mpa	2016
Charpy V-notch, 23°C ISO 179/1eA	kJ/m^2	39
Charpy V-notch, -40°C ISO 179/1eA	kJ/m^2	16
HDT@1.82 MPA ISO 75	°C	102
Wear Factor, ASTM D3702 modified	10^{-10} in^5-min/ft-lb-hr	85
Dynamic COF, ASTM D3702 modified		0.37

1 In addition to limiting PFOA, both European Commission Regulation (EU) 2020/784 of July 2020 amending Annex I to Regulation (EU) 2019/1021, and European Commission Regulation (EU) 2021/1297 of 4 August 2021 amending Annex XVII to Regulation (EC) No 1907/2006, placed limitations on the amount of perfluorocarboxylic acids (C9-C14 PFCAs) and their salts and C9-C14 PFCA-related substances that can be present in a material.
2 Suppliers now must certify that materials fall below the threshold (<25 ppb) for the sum of C9-C14 PFCAs and their salts.

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