

SOLUTIONS FOR EV AND ELECTRONICS

- *Thermally Conductive Grease*
- *Thermally Conductive Adhesives*
- *Thermally Conductive Pads*
- *Thermal Runaway / Barrier Pads*
- *Foam Gasket*
- *Conformal Coating*
- *Structural Acrylic Adhesives*
- *Pre-applied Thread Locking*
- *Nylok - Thread Locking Patch*
- Under the head coating

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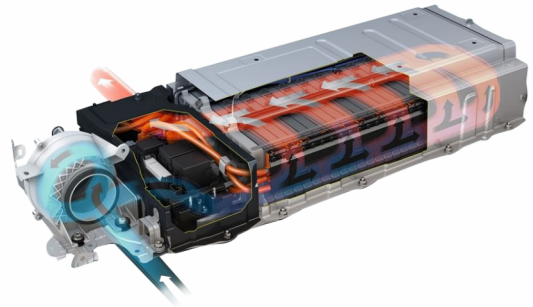
A must for Industrialists, Engineers, Architects, Developers, Professionals & Consultants.



Thermally conductive products play a crucial role in the design and performance of Electric Vehicles (EV). Heat management is a significant concern in EV due to the high-power electric components and batteries they use. Here are the key reasons why thermally conductive products are important for EV

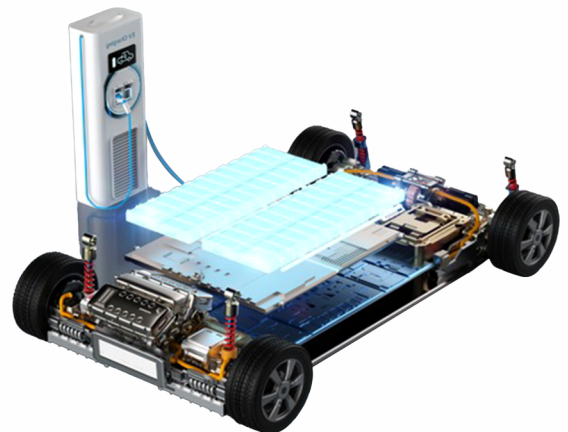
• Battery Cooling

Lithium-ion batteries used in EV generate heat during charging and discharging. To maintain the battery's efficiency, safety, and lifespan, it's essential to dissipate this heat effectively. Thermally conductive materials such as thermally conductive pads are used to transfer the heat away from the battery cells to the heat-sinks. Efficient heat transfer also enables faster charging. Ask Metlok for special solutions in this space.



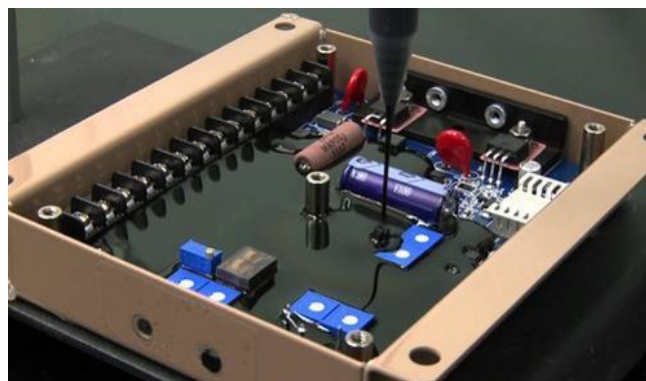
• Power Electronics Cooling

EV have power electronics components like inverters and electric motors that generate heat. Efficient cooling systems, including thermally conductive products, are vital to manage this heat and prevent overheating, which can lead to reduced performance and damage to electronic components.



• Charging Infrastructure:

Electric vehicle charging stations can generate heat due to the high-power charging process. Thermally conductive materials help dissipate heat, ensuring the safety and longevity of these components.





Thermally Conductive Grease (TCG) Silicone Technology

Thermally Conductive Grease (TCG) is a non-curing solution for increasing heat transfer. They are specialized thermal interface materials used to improve heat transfer between two surfaces by filling the gaps and irregularities between them. They have a greasy or paste-like consistency and are formulated to have high thermal conductivity and electrical resistance over a wide temperature range. TCGs improve heat transfer, helping to maintain battery temperature within a safe and efficient operating range. Inverters, converters, and other power electronics in EV generate heat during operation. TCGs are used to improve the thermal connection between semiconductor devices and heat sinks, reducing the risk of overheating.

PRODUCTS

My-T-THERM [®] 70 TCG	My-T-THERM [®] 100 TCG	My-T-THERM [®] 200 TCG	My-T-THERM [®] 300 TCG
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Appearance	Off White Paste	White Paste	White Paste	Grey Paste
Specific Gravity (25±2°C) ASTM D1875	1.84 ±0.03	2.19±0.03	2.93±0.03	2.75±0.03
Viscosity, Brookfield (25±2°C) ASTM D1084	(cP) 200000 - 250000	45000 - 50000	85000 - 90000	60000 - 70000
Cure	Non Curing	Non Curing	Non Curing	Non Curing
Thermal Conductivity (25±2°C) ISO 22007	(W/(m-K)) 0.7	1	2.2	3
Service Temperature	(°C) -50 to 150	-50 to 150	-50 to 200	-50 to 200
Shelf Life	(Months @ 25°C) 12	12	12	12
Pack Size	500g & 1Kg	500g & 1Kg	500g & 1Kg	500g & 1Kg

**My-T-THERM**

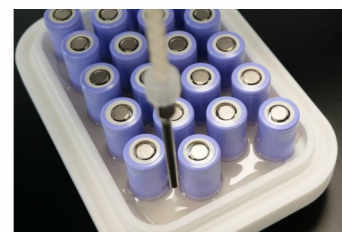
THERMALLY CONDUCTIVE Adhesives



Thermally conductive adhesives are specialized adhesive materials designed to bond components together while also facilitating the efficient transfer of heat between them. They are commonly used in various electronic and thermal management applications where both bonding and thermal conductivity are critical. Electric motors in EV can generate significant heat, especially during high-performance or extended operation. Thermally conductive adhesives are employed to bond components within the motor and facilitate efficient heat transfer, helping to maintain optimal motor performance and longevity.

• **Potting Compounds:** Potting compounds are specialized materials used for the process of potting or encapsulating electronic components and assemblies. They are designed to protect, insulate, and secure electronic and electrical components from environmental factors, such as moisture, dust, chemicals, and physical stress. Potting compounds are used to encapsulate the sensitive electronic components of the Battery Management System.

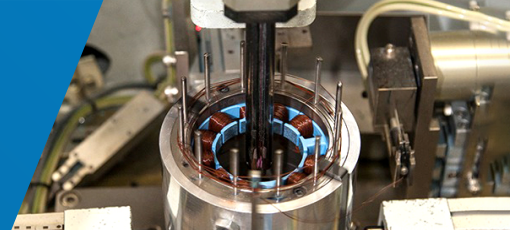
• **Battery Applications :** Battery Cell Potting provides enhanced safety, mechanical protection, corrosion resistance, electrical isolation, improved overall performance, and also increases the life of the battery.



PRODUCTS

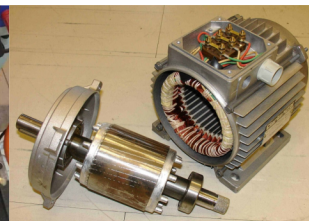
My-T-THERM 3002**My-T-THERM 3005F**

Properties		It is a two component, thermally conductive silicone elastomer system specially designed to be used as a thermal gap filling interface in electrical and electronic components. It works with heat sink or metal cases to dissipate heat from critical electronic component.	It is a two component, thermally conductive silicone elastomer system specially designed to be used as a thermal gap filling interface in electrical and electronic components. It works with heat sink or metal cases to dissipate heat from critical electronic component.
Colour(Mix adhesive)		White	Light Grey
Component		Two	Two
Specific Gravity @ 25 °C ASTM D1875			
Part A		1.74	2.96
Part B		1.66	1.47
Viscosity, Brookfield DV II +Pro (25±2 °C) ASTM D1084			
Part A	(cP)	7000 - 10000	25000 - 35000
Part B	(cP)	10000 - 15000	25000 - 35000
Mix ratio, Part A : Part B		1:1	1:1
Thermal Conductivity ISO 22007	(W/m-°K)	0.7	0.8
Service Temperature	(°C)	-50 to 250	-50 to 250
Cure Characteristics @ Room Temperature (25±2 °C) / 50±5 % RH			
Pot life, 25±2 °C (100g mix)	(min)	25-30	30
Total Cure, 25±2 °C	(Hrs)	3	24
Hardness, Shore A, ASTM D2240		45-50	57-63
Shelf Life	(Months @ 25 °C)	6	6
Pack Size	(Kg)	1 & 5	1 & 5

**My-T-THERM****THERMALLY CONDUCTIVE Adhesives**

- Motor Applications**

Motor cell potting provides improved insulation, enhanced performance, vibration damping, enhanced cooling, and corrosion resistance, and also increases the life of the motor.

**PRODUCTS****My-T-THERM****2420
(1K Epoxy)****My-T-THERM****2505
(2K Epoxy)****My-T-THERM****2515
(2K Epoxy)****Properties**

It is a one-component thermally conductive heat curable epoxy adhesive. Provide excellent heat dissipation by forming a thermal interface between the two substrates. Used for shrink fitting of motor housing to stator in electric motor assembly, enhances heat transfer as well provides good bonding strength.

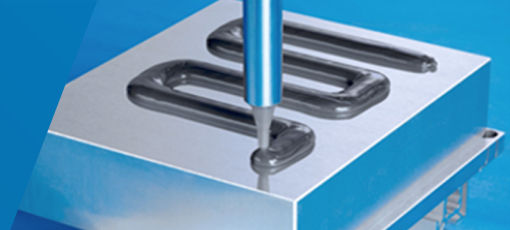
It is a low viscosity thermally conductive, room temperature curing potting compound. It is a 2K Epoxy system designed to bond various electrical and electronic assemblies to dissipate heat efficiently.

It is a paste grade thermally conductive, room temperature curing 2K-Epoxy system. After curing, it cures to a tough polymer and develops good bonding strength. It is designed to bond and pot electric motor, chargers and various electrical and electronic assemblies to dissipate heat efficiently.

Technology	Epoxy	Epoxy	Epoxy
Components	1K	2K	2K
Mix ratio by weight Part A: Part B	—	1:1	1:1
Appearance (mix)	Gray	White	Blue
Viscosity - Part A (cP)	275000-325000	8000±2000	Paste
Viscosity - Part B (cP)	—	8000±2000	Paste
Specific Gravity, At 25±2 °C			
Part A	1.85±0.03	2.2±0.02	1.85±0.02
Part B	—	2.1±0.02	1.75±0.02
Thermal Conductivity ISO 22007 (W/m°K)	2	0.56	1.5
Dielectric Breakdown Voltage ASTM D149 (KV/mm)	≥ 10	≥ 10	≥ 10
Temperature Range (°C)	-30 to 200	-30 to 200	-30 to 200
Applications	Shrink Fitting and Encapsulation	Bonding and Encapsulation	Bonding and Encapsulation

**My-T-THERM**

THERMALLY CONDUCTIVE Adhesives



● Gap Fillers

Gap fillers are materials used in Electric Vehicles (EVs) to bridge gaps and irregularities between components, creating a strong bond and providing additional benefits such as thermal conductivity and insulation. Gap fillers act as shock absorbers, helping to dissipate mechanical shocks and vibrations. This property is especially important in EVs where components are exposed to road irregularities and mechanical stresses.

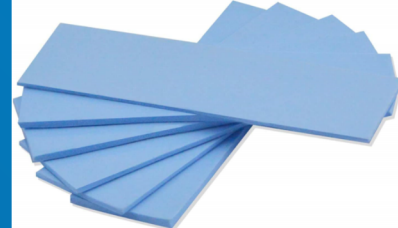


PRODUCTS

My-T-THERM 3910 Gap Filler

My-T-THERM 3920 Gap Filler

Description		It is a low viscosity two component, thermally conductive silicone elastomer system specially designed to be used as a thermal gap filling interface in electrical and electronic components. It works with heat sink or metal cases to dissipate heat from critical electronic component.	It is a high viscosity two component, thermally conductive silicone elastomer system specially designed to be used as a thermal gap filling interface in electrical and electronic components. It works with heat sink or metal cases to dissipate heat from critical electronic component.
Appearance		Part A - White Part B - White A+B = White	Part A - White Part B - White A+B = White
Specific Gravity (25±2°C)		(A) 2.2 (B) 2.2	(A) 2.8 (B) 2.8
Viscosity (25±2°C)		(A)15000-20000 (B)10000-15000	(A)200000-300000 (B)200000-300000
Pot life (100g) (25±2°C)	(min)	25-30	45-50
Total Cure time (25±2°C)	(Hrs)	24	24
Mix Ratio by Weight		1:1	1:1
Hardness Shore A (25±2°C) ASTM D2240	50±5% RH	25±5	60 ± 3
Thermal Conductivity (25±2°C) ISO 22007	(W/(m-K))	1	2
Dielectric Breakdown Voltage ASTM D149	(KV/mm)	≥10	≥10
Service Temperature	(°C)	-50 to +180	-50 to +180
Shelf Life @ 25±2°C	(Months)	6	6
Pack Size		400ml (Dual Cartridge)	400ml (Dual Cartridge)



THERMALLY CONDUCTIVE PADS

Thermally conductive pads are materials designed to facilitate the efficient transfer of heat between two surfaces. They are commonly used in electronics, particularly for applications where electronic components generate heat, such as microprocessors and power transistors. These pads help dissipate heat and prevent overheating, which can damage electronic components.

Metlok offers a range of Thermally Conductive Pads

Metlok's TCP My-T-Therm 1000, 2000, 3000, ... ,series are available in

- Thermal conductivity ranging from 1 to 12 W/m-K
- Available in customizable sizes
- Available in different thickness
- Good Dielectric Properties
- Removable/Reworkable
- Ease to use and apply



THERMALLY RUNAWAY / BARRIER PADS

Thermal runaway pads in EVs are a crucial part of the overall safety strategy to minimize the risk of thermal runaway events and ensure the safe operation of electric vehicles. Metlok's TCPs have a thermal runaway barrier feature aimed at preventing or delaying the spread of heat and thermal events within the battery pack. The goal is to isolate by a malfunctioning or overheating battery cell, preventing it from affecting neighboring cells and exacerbating the problem.

Specifications of Thermal Barrier Pads offered by Metlok:

- Thermally Insulative
- Does Not Allow Heat to Transfer Between Cells
- Thermal Conductivity: 0.05 to 0.20 W/m-K
- Electrically Insulative
- Compression Range: 50-80%

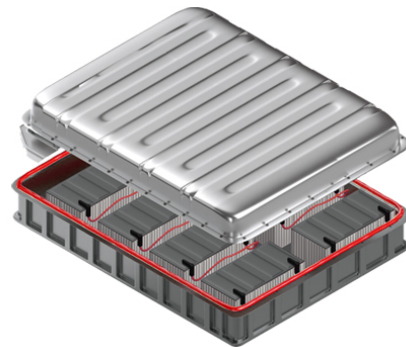
FOAM GASKET CONFORMAL COATING

FOAM GASKET

Foam Gaskets in Electric Vehicles (EVs) are sealing components made from foam materials with various properties, such as flexibility, compressibility, and resilience. These gaskets are used in a variety of applications within EVs to provide sealing, insulation, vibration damping, and protection. Foam gaskets are used to create watertight and airtight seals in EV components such as doors, windows, and sunroofs. They prevent water, moisture, and environmental contaminants from entering the vehicle's interior, contributing to passenger comfort and safety.

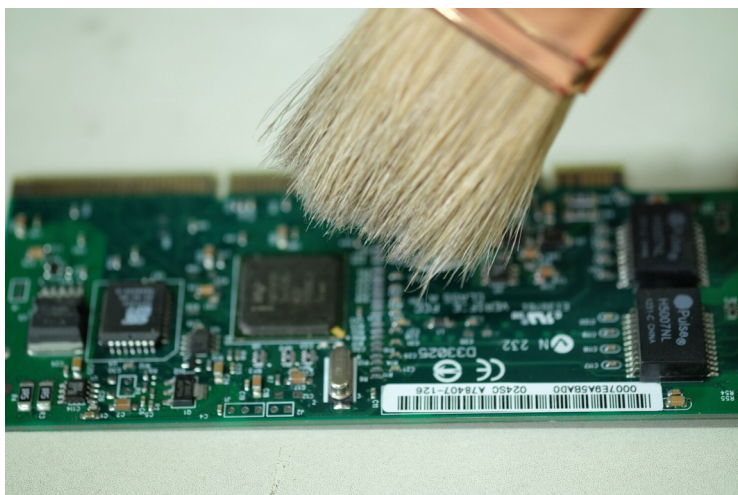
Specifications of the Foam Gaskets offered by Metlok:

- Prevent the ingress of dust, water, and other contaminants into critical areas of the vehicle, such as the battery pack, electronic control units, and various connectors.
- Reusable
- Cushioning and Impact Absorption
- Max Compression: >52%.
- Temperature Range (°F): -60 to 400.
- Vibration Damping
- Noise Reduction



CONFORMAL COATINGS - PROTECT 77, 77LV, 77MV & 77HV

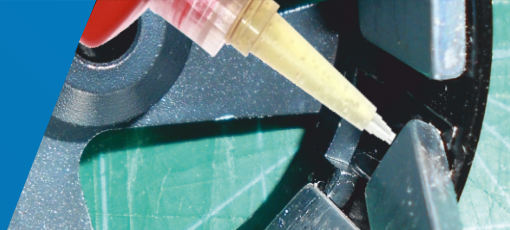
Metlok's Conformal Coating Protect 77, 77LV, 77MV and 77HV is a clear, sprayable coating without chlorinated solvents or CFCs. The coating air dries and is tack-free in five minutes to provide a tough environmental, solvent and corrosion-resistant coating.



Used for protection of printed circuit boards, electronic components, and thick-film circuits and other metal substrates.

FEATURES

- Strong environmental resistance
 - Available in different dispensable form – Sprayable & Brush
 - Good Salt Spray resistance
 - Good Dielectric resistance
 - Fast Curing
-

**My-T-BOND®****STRUCTURAL ACRYLIC Adhesives**

Structural acrylic adhesives are a type of adhesive known for their strength, durability, and versatility in a wide range of bonding applications. These adhesives are used to create strong, load-bearing bonds between various substrates, making them ideal for applications where structural integrity is essential.

KEY FEATURES

- Metal to Metal High Strength Bonding
- Fast Cure
- Non-Sag Consistency
- Low Energy Surface Plastic Bonder
- High-Strength Magnet Bonder
- Good Chemical Resistance

My-T-BOND®**1107****(Sealing & Potting)****My-T-BOND®****1171****(Multi Metal Bonder)****My-T-BOND®****1161****(Low Energy Surface Plastic (PP) Bonder)**

Description	<p>It is a two component solvent free reactive acrylic adhesive for sealing and potting of metals and plastics. It is a low viscous system. It is a quick cure system with short pot life. It comes in a two part system and applied in 1:1 ratio by volume using common double cartridges.</p>	<p>2K system with 10:1 mix ratio developed for bonding multiple galvanized processed metals, having features like high strength, toughness and impact resistance on galvanized metals and dissimilar metals with low surface energy. Excellent bonding to all Zinc coatings, metals and other coatings, high Spangled z-90, z- 60HDG, galvanneal, galvalume, E- coated steel etc. with out any surface preparation or primer application</p>	<p>TPO Bonder a, 2K system with 10:1 mix ratio & 5-7 min pot life with very high green strength. Specially developed for bonding multiple low energy surface plastics and metals like PP, HDPE, LDPE, Nylon, 6 & 66, Urethane, CFRP & galvanized processed metals, other metals and coatings. Excellent bonding to all low energy surface plastics and Zinc coatings, metals and other coatings, with out any surface preparation or primer application</p>
Appearance	<p>Part A - Dark Straw Part B - Straw A+B = Green</p>	<p>Part A - Off White Part B - Yellow A+B = Yellow</p>	<p>Part A - Light Yellow Part B - Light Yellow A+B = Off White</p>
Specific Gravity (25±2°C) ASTM D1875	(A) 1.0 (B) 1.0	(A) 1.0 (B) 1.4	(A) 1.0 (B) 1.63
Viscosity, Brookfield (25±2°C) ASTM D1084 (cP)	(A) 2000 - 3500 (B) 700 - 1200	(A) Paste (B) Paste	(A) Paste (B) Paste
Mix Ratio by Weight (A&B)	1:1	10:1	10:1
Pot Life @ 25±2°C (min)	3 - 5	5 - 8	4 - 6
Total Cure @ 25±2°C (Hrs)	24	24	24
Hardness Shore D (25±2°C) ASTM D2240	68	65 ± 5	65 ± 5
Lap Shear Strength ASTM D1002 (Steel) (N/mm ²)	23 - 30	≥ 12	PP, HDPE ,LDPE, PC, ABS - Substrate Failure
Service Temperature (°C)	-40 to 120	-40 to 120	-40 to 90
Shelf Life @ 25±2°C (Months)	06	06	06
Pack Size (ml)	50 & 400 (Dual Cartridge)	50 & 400 (Dual Cartridge)	50 & 400 (Dual Cartridge)



PRE-APPLIED Thread Lockers

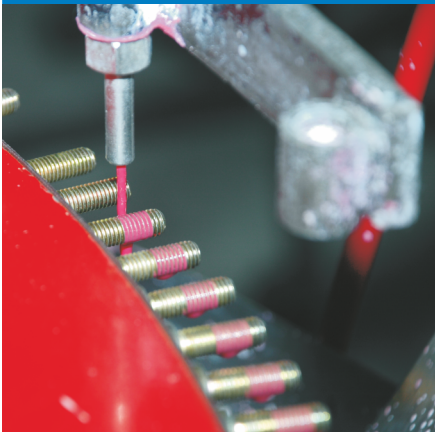


What's precote® ?

precote® is a pre-coatable two-component adhesive for thread locking and sealing tasks. With the help of modern omniTECHNIK micro-encapsulation technology, droplets of a proven two-component acrylate system are surrounded by a thin polymer wall. By incorporating these micro-encapsulated individual components in a paint-like binder system, precote® coating products are produced. After application and drying of the liquid precote® results in a dry, grip-resistant and corrosion-inhibiting coating, which is firmly connected to the thread after application.

How does precote® work?

When screwing the threaded parts coated with precote®, the micro-capsules contained in the precote® layer are destroyed by pressure and/or shear stress. The liquid components are released, mixed and cured in conjunction with the binder system. After curing, the threads are secured against vibration and reliably sealed. Micro-encapsulated, modified acrylates, in combination with the specific precote® binders, make it possible to meet the various requirements of practice in terms of strength, friction coefficient and temperature resistance.



Use in Battery Packs

Wide range of Locking

A Balanced product line, which fulfills all engineering requirements

	precote Reactive			precote Non-reactive	
Grade	precote® 30	precote® 80	precote® 85	precote® 10	precote® 10-1
Colour	YELLOW	RED	TURQUOISE	BLUE	GREY
Appearance	-	-	-	Dry, Tack free Solid	Dry, Tack free Viscous Solid
Coating	Acrylate + Peroxide	Acrylate + Peroxide	Epoxy - Acrylate + Peroxide	Smelted Polyamide Dispersion	Polyamide Dispersion
Strength	Medium	Very High	High	-	-
Temperature Range (°C)	- 60 To + 150	- 60 To + 170	- 60 To + 170	- 60 To + 130	- 60 To + 150
Thread Friction (μ)	0.1 - 0.15	> 0.25	0.1 - 0.15	0.16 - 0.20	0.18 - 0.23
Curing	Fast	Fast	Fast	-	-
Main Functions	Sealing+Locking	Sealing+Locking	Sealing+Locking	Clamping (Loss Locking)	Clamping (Loss Locking)



NYLOK Thread Locking Solution NYLOK Under-the Head Sealant



NYLOK Thread Locking (Non-Reactive) Solutions

The Nylok Blue Patch is the world-leading self-locking product from Nylok USA and was introduced by Metlok. Nylok patch or My-T-Patch is a self-locking element comprised of nylon permanently bonded onto the threads of a fastener. Nylok Blue patch is effective in preventing the vibrational loosening of small screws and bolts, especially in electric vehicles (EVs) where vibration from road conditions and vehicle operation can be significant.

Advantages of NYLOK Blue Patch offered by Metlok;

- Reusable/adjustable
- Exceptional vibration resistance
- Resistant to lubricants, fuel, hydraulic fluids & most commercial solvents
- Can be applied to any size or thread configuration of a fastener
- Bonds to a broad range of fastener finishes
- Complies with or exceeds IFI, DIN, and major OEM specifications
- Provides a seal for threads
- Parts are ready for assembly
- Precise thread coverage on every part
- Can be applied to external and internal threaded fasteners
- Is not affected by high humidity conditions
- Environment friendly/non-toxic 180° (std.)
- Torque can be adjusted to meet specific applications
- No metal removal to reduce fastener strength or performance

NYLOK Under-the-Head Sealant (Resistant To Automotive Fluids)

NYLOK Under-the Head Sealant creates a gasket-type seal, preventing leakage of fluids and gases under pressure. The coating is permanently fused on the bearing surface of the fastener. As the screw is seated to its final position against the mating part, the NYLOK element compresses slightly and fills the void between the bearing surface of the head and the counter sink/counter bore.

Typical Performance Results (M10 plain finish)

- Seals up to 500psi

Features

- Resistant to most chemicals: alcohol, gasoline, oil, kerosene, diesel fuel and hydraulic fluids
- Can be applied to virtually any headed fastener
- Durable
- Permanently bonded to the bearing surface
- Shelf-Life indefinite
- Will not shrink or dry out from age
- Assembly ready
- Eliminates time-consuming, in-house applications of O-rings, gasket seals and sealant compounds
- Reusable
- Prevents galvanic corrosion between dissimilar materials



NYLOK Non-reactive

Grade	Colour	Coating	Appearance	Effect	Temperature Range	Thread Friction	Main Function
NYLOK Blue Patch	Blue	Polyamide	Dry, tack free Solid	Only clamping high to very high	-56 to + 121°C	0.1 - 0.15	Clamping (Loss Locking)



NAGPUR UNIT I : W-27, MIDC Industrial Area, Kalmeshwar, Dist. Nagpur - 441 501, Maharashtra, INDIA.
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