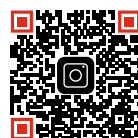


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GLYSANTIN



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RETHINKING COOLING

PRODUCT OVERVIEW WITH FOCUS ON SUSTAINABILITY AND ELECTROMOBILITY



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COOL... COOLER...



ABOUT GLYSANTIN®

GLYSANTIN®, invented and patented in 1929, proudly represents the world's first engine coolant. Ever since, the brand and its products have continuously evolved to meet and exceed the developing market needs.

Today, GLYSANTIN® offers dedicated product families that provide market-leading solutions with measurable sustainability contributions for current and future mobility concepts. Spanning from innovative products for battery and fuel cell cooling (GLYSANTIN® ELECTRIFIED® product family) to a low carbon footprint and circular solutions (GLYSANTIN® ECO product family) – there is only one Original when it comes to engine coolant.

MEET GLYS

As the brand's ambassador who reflects GLYSANTIN®'s essence, Glys is always at hand. The British bulldog is human's best friend as well as a reliable partner and protector. Just like GLYSANTIN®, Glys stands for protection under all circumstances and always keeps his cool even in the most precarious situations. He leads the way through the GLYSANTIN® brand world, providing guidance in both, the real as well as the digital world.

PRODUCT OVERVIEW

GLYSANTIN® is much more than just an antifreeze. The premium engine coolant from BASF provides manifold protection from corrosion, overheating and frost. **GLYSANTIN®** ensures that the cooling system works perfectly year round. Products are available for all types of vehicle and all types of engine. In addition, **GLYSANTIN®**'s Ready Mix products are ready to use and can be filled directly into the cooling system.

Product	Approvals	Recommended for	Specifications	Package	ECO
GLYSANTIN® G65° is a premium grade-coolant that protects the cooling system by employing organic acid technology in combination with silicate and phosphate. GLYSANTIN® G65° meets the special requirements of modern engines of the Volkswagen Group and offers excellent protection from corrosion and long-life performance even under the highest thermal stress.	Audi (TL 774-L), Bentley (TL 774-L), Bugatti (TL 774-L), Deutz (DQC CC-14), Lamborghini (TL 774-L), Porsche (TL 774-L), Seat (TL 774-L), Skoda (TL 774-L), Volkswagen (VW) (TL 774-L)		AS 2108-2004, ASTM D 3306, ASTM D7583, ASTM 4985, ASTM DBS6580:2010, CUNA NC 956-16, PN-C40007:2000, SAE J1034, ÖNORM V 5123, SANS 1251:2005 and China GB 29743-2013	1 L bottle 60 L drum 210 L drum	ECO ECO -

GLYSANTIN® G65° Ready Mix is ready for use and further dilution with water is not recommended. The product is a 50:50 mixture of **GLYSANTIN®** and water. The mixture is prepared using demineralized water with low conductivity to maximize corrosion protection and to prevent deposits forming in the cooling system due to hard water. **GLYSANTIN®** Ready Mix provides frost protection down to below -38°C.

Product	Approvals	Recommended for	Specifications	Package	ECO
GLYSANTIN® G64° is a premium grade-coolant employing robust organic acid technology fortified with silicate and phosphate. GLYSANTIN® G64° coolant offers excellent protection from corrosion and long-life performance even under the highest thermal stress of modern engines. Additionally, GLYSANTIN® G64° provides excellent protection against cavitation for heavy-duty vehicles.	Deutz (DQC CC-14), Deutz-Fahr (> 04/2017), Huerlimann (> 04/2017), Lamborghini-Tractors (> 04/2017), MAN Energy Solutions (BASF-CW-GLY00G64-01), MWM (TR 2091), Same (> 04/2017), Volvo Cars (TR-31854114-002)	John Deere (> 2011), Perkins, BMW (BMW LC-18 > 01/2019)	AS 2108-2004, ASTM D 3306, ASTM D 4985, ASTM D6210, ASTM D7583, BS6580:2010, CUNA NC 956-16, PN-C40007:2000, JIS K 2234:2206, SAE J1034, ÖNORM V 5123, SANS 1251:2005 and China GB 29743-2013	1 L bottle 60 L drum 210 L drum	ECO ECO -

Product	Approvals	Recommended for	Specifications	Package	ECO
GLYSANTIN® G40° is a premium-grade coolant in the new generation of GLYSANTIN® products. This product employs hybrid organic acid technology (Si-OAT). It combines the advantages of coolants that contain silicates and those that are silicate-free, i.e. excellent protection from corrosion and a long working life.	Audi (TL 774-G), Bentley (TL 774-G), Bugatti (TL 774-G), Cummins (CES 14603), Deutz (DQC CC-14), Deutz-Fahr (> 04/2017), Ducati, Irizar (> 09/2016), Lamborghini (TL 774-G), Liebherr (Minimum LH-01-COL3A), MAN Energy Solutions (BASF-CW-GLY00G40-01), MAN Truck and Bus (MAN 324 Typ Si-OAT), Mercedes-Benz Cars (MB-Approval 325.6), Mercedes-Benz Cars (MB-Approval 326.6 (Ready Mix)), Mercedes-Benz Truck and Bus (MB-Approval 325.5), Mercedes-Benz Truck and Bus (MB-Approval 326.5 (Ready Mix)), MTU (MTL 5048), Porsche (TL 774-G), Seat (TL 774-G), SETRA (MB- Approval 325.5), SETRA (MB-Approval 326.6 (Ready Mix)), Skoda (TL 774-G), Volkswagen (VW) (TL 774-G)	Faun, Tadano	AS 2108-2004, ASTM D 3306, ASTM D 4985, BS6580:2010, CUNA NC 956-16, AFNOR NFR 15-601, JIS K 2234:2206, PN-C 40007:2000, SAE J1034, ÖNORM V 5123, SANS 1251:2005 and China GB 29743-2013	1 L bottle 20 L canister 20 L bag-in-box 60 L drum 210 L drum	ECO ECO ECO -
GLYSANTIN® G40° Ready Mix is ready for use and further dilution with water is not recommended. The product is a 50:50 mixture of GLYSANTIN® and water. The mixture is prepared using demineralized water with low conductivity to maximize corrosion protection and to prevent deposits forming in the cooling system due to hard water. GLYSANTIN® Ready Mix provides frost protection down to below -38°C.				1 L bottle 210 L drum	ECO -



Product	Approvals	Recommended for	Specifications	Package	ECO
GLYSANTIN® G30° is a premium-grade coolant that is silicate-free. This product employs organic acid technology (OAT). It contains organic corrosion inhibitors to protect the cooling system.	Audi (TL 774-D/F), Bentley (TL 774-D/F), DAF (MAT 74002), Deutz (DQC CB-14), Ferrari (> 2010), Lamborghini (TL 774-D/F), MAN Truck and Bus (MAN 324 SNF), Mercedes-Benz Truck and Bus (MB-Approval 325.3), Mercedes-Benz Truck and Bus (MB-Approval 326.3 (Ready Mix)), Mini (BMW LC-07), MTU (MTL 5048), Porsche (TL 774-D/F), Seat (TL 774-D/F), SETRA (MB-Approval 325.3), SETRA (MB-Approval 326.3 (Ready Mix)), Siemens Windpower, Skoda (TL 774-D/F), Volkswagen (VW) (TL 774-D/F)	Alfa Romeo (> 2006), Aprilia, Chrysler (> 2011), Citroën (>1993), Dacia (> 2005), Daewoo, Daihatsu (> 1979), Dodge (>2011), Fiat (> 2005), Ford (> 1998), Fuso, Gilera, GMC, Harley-Davidson, Hitachi, Honda (> 1983), Honda Motorbike, Hyundai (> 1982), Iveco (> 01/2014), Jaguar (> 1999), Jeep (> 2011), Kawasaki, KIA (> 1991), KTM, Kymco, Lancia (> 2005), Land Rover (> 1998), Lexus (> 1994), Lotus (>2000), Mazda (> 1977), Mitsubishi (> 1982), Nissan (> 1982), Peugeot (> 1993), Peugeot Motorbike, Piaggio, Renault (> 1995), Renault Truck, Rover (> 1982), Subaru (> 1977), Suzuki (> 1981), Suzuki Motorbike, SYM, TGB, Toyota (> 1978), Triumph, Volvo Construction, Volvo Trucks (> 2006), Yamaha, Chevrolet (> 2001), Opel (> 2001), Saab (> 2001), Smart (> 11/2014)	AS 2108-2004, ASTM D 6210, ASTM D 3306, ASTM D 4985, BS6580:2010, CUNA NC 956-16, AFNOR NFR 15-601, JIS K 2234:2206, PN-C 40007:2000, SAE J1034, ÖNORM V 5123, SANS 1251:2005 and China GB 29743-2013	1 L bottle 20 L canister 60 L drum 210 L drum	ECO ECO ECO ECO
GLYSANTIN® G30° Ready Mix is ready for use and further dilution with water is not recommended. The product is a 50:50 mixture of GLYSANTIN® and water. The mixture is prepared using demineralized water with low conductivity to maximize corrosion protection and to prevent deposits forming in the cooling system due to hard water. GLYSANTIN® Ready Mix provides frost protection down to below -38°C				1 L bottle 210 L drum	ECO -

Product	Approvals	Recommended for	Specifications	Package	ECO
GLYSANTIN® G48° is a premium-grade coolant that employs hybrid technology. It contains a mixture of inorganic and organic corrosion inhibitors to protect the cooling system.	2G, Audi (TL 774-C), BMW Motorrad (BMW LC-87), BMW (BMW LC-87 < 12/2018), Deutz (DQC CA-14), Deutz-Fahr (< 03/ 2017), Eicher Engines (TMTL Part No. 93183798), Fendt, Huerlimann (<03/2017), Jenbacher (TA 1000-0200), LamborghiniTractors (< 03/2017), Liebherr (Minimum LH-00-COL3A), MAN Truck and Bus (MAN 324 NF), MAN Energy Solutions (Liste 3.3.7), Mercedes-Benz Cars (MB-Approval 325.0), Mercedes-Benz Cars (MB-Approval 326.0 (Ready Mix)), Mercedes-Benz Truck and Bus (MB-Approval 325.0), Mercedes-Benz Truck and Bus (MB-Approval 326.0 (Ready Mix)), Mini (BMW LC-87), Mitsubishi Carisma (1996-2004), Mitsubishi Colt (2004-2007), MTU (MTL 5048), MWM (TR 2091), Opel (B 040 0240), Porsche (< 1995), Rolls-Royce (BMW LC-87), Saab (690 1599), Same (< 03/2017), Seat (TL 774-C), SETRA (MB-Approval 325.0), Skoda (TL 774-C), Smart (MB-Approval 325.0), Volkswagen (VW) (TL 774-C), Volvo Trucks (TR 1286083)	Alfa Romeo (1976-2005), ATLAS, Bentley (1980-2005), Ferrari (1979-2009), Fiat (1982-2005), Ford (< 1997), Jaguar (1986-1999), Lada, Lancia (1976-2005), Lotus (1980-1999), Morgan, Toyota (> 2015)	AS 2108-2004, ASTM D 3306, ASTM D 4985, BS6580:2010, CUNA NC 956-16, AFNOR NFR 15-601, JIS K 2234:2206, SAE J1034, PN-C 40007:2000, ÖNORM V 5123, SANS 1251:2005 and China GB 29743-2013	20 L canister 60 L drum 210 L drum	- - -
GLYSANTIN® G48° Ready Mix is ready for use and further dilution with water is not recommended. The product is a 50:50 mixture of GLYSANTIN® and water. The mixture is prepared using demineralized water with low conductivity to maximize corrosion protection and to prevent deposits forming in the cooling system due to hard water. GLYSANTIN® Ready Mix provides frost protection down to below -38°C.				20 L canister 210 L drum	- -



Product	Approvals	Recommended for	Specifications	Package	ECO
GLYSANTIN® G05° is a premium-grade, hybrid coolant that contains silicates. It contains a mixture of inorganic and organic corrosion inhibitors to protect the cooling system. Due to its nitrite content, this product is especially recommended for use in heavy-duty engines. Additionally, the product is particularly suitable for the cast-iron engines of classic cars from the 1950s to 1980s.	Chrysler (MS-9769), Deutz-Fahr (< 03/2017), Dodge (MS-9769), Ford (North America) (WSS-M 97B51-A1), Huerlimann (< 03/2017), JCB (STD00088), Jeep (MS-9769), John Deere (JDM H24), Lamborghini-Tractors (< 03/2017), MTU (MTL 5048), Same (< 03/2017)	Iveco (< 12/2013)	AS 2108-2004, ASTM D 3306, ASTM D6210, BS6580:2010, CUNA NC 956-16, AFNOR NFR 15-601, SAE J1034, ÖNORM V 5123, SANS 1251:2005 and China GB 29743-2013	1 L bottle 20 L canister 60 L drum 210 L drum	- - - -

SUSTAINABILITY

At **GLYSANTIN®**, we are committed to continuously driving towards a more sustainable future. While many of our products are already contributing to the UN Sustainability Goals via safety benefits and preservation of resources (durability), we continue to push further. By leveraging our expertise, we are able to offer a broad set of market-leading solutions and measurable contributions to sustainability via **GLYSANTIN®'s ECO umbrella**.

GLYSANTIN® ECO BIOMASS BALANCE APPROACH

For the **GLYSANTIN® ECO BMB** line, fossil raw materials are replaced by bio-based raw materials at the beginning of the value chain according to a mass balance approach. This claim is certified by REDcert², a provider of certification systems and audited by TÜV Nord. As a result of using bio-based instead of fossil raw materials, CO₂ emissions are significantly reduced when producing the **GLYSANTIN® ECO BMB** series. Measurable CO₂ emission savings depend on product and biomass substitution grade. The biomass content in the products ranges from 25 % – 100 %, delivering customized CO₂ emission savings.

GLYSANTIN® ECO LOOP – CIRCULAR SOLUTIONS

Besides the biomass balance approach, BASF is evaluating further options to enhance the sustainability profile of its product offerings. Ongoing projects include a broad range of initiatives, for instance circular economy solutions using mechanical and chemical recycling approaches (e.g., use of post-recycled packaging).



BATTERY ELECTRIC VEHICLE
+ SUSTAINABLE SOLUTION



SUSTAINABLE
SOLUTION





GLYSANTIN® ECO BMB







The new **GLYSANTIN® ECO BMB** series proves that sustainable products do not have to compromise on quality or performance. With **GLYSANTIN®**'s new solution, 100 % of the fossil raw materials needed for its production are replaced by certified biomass. Compliance with this claim is verified by REDcert², provider of certification systems under audit by TÜV Nord. By using less fossil raw materials, the products from the **GLYSANTIN® ECO BMB** series make a measurable contribution to the reduction of CO₂ emissions in production.

Approvals and recommendations for the respective **GLYSANTIN®** products remain valid. Mixing of conventional **GLYSANTIN®** products with **GLYSANTIN® ECO BMB** is technically possible while maintaining the same product quality.

Being the world's first patented engine coolant with a broad range of approvals from leading original equipment manufacturers (OEMs), **GLYSANTIN®** is committed to innovation and progress. With **GLYSANTIN® ECO BMB**, the traditional brand now combines premium quality and outstanding product performance with a tangible contribution to sustainability.

GLYSANTIN® ECO BMB

- Proven premium quality – Made in Germany
- Identical product performance
- 100 % sustainably sourced renewable feedstock (biogas)
- Saves fossil resources
- Reduces the CO₂ footprint in production

Climate Change	Renewables	Emissions	Durability
 7 13 UN SDG	 15 UN SDG	 11 UN SDG	 9 12 UN SDG

ELECTROMOBILITY

Mobility solutions are continually evolving and vehicle fleets around the globe are changing. The amount of available powertrain technologies has expanded significantly: advancements in internal combustion engines (ICE), battery electric vehicles (BEV), fuel cell electric vehicles (FCEV) and hybrid technologies (FHEV, PHEV) are putting a mix of powertrains on the road. This also translates into new requirements for coolant technologies. Continuously rethinking cooling, **GLYSANTIN®** has developed a portfolio to specifically address the needs of today's and tomorrow's powertrain technologies.

The **GLYSANTIN® ELECTRIFIED®** product family addresses the specific requirements of modern mobility concepts. It also offers premium engine coolants suitable for all current and future powertrains delivering manifold protection. While traditional **GLYSANTIN®** products used in ICE are also suitable for hybrid technologies and indirectly cooled BEV, new dedicated products for FCEV and BEV (direct and indirect cooling) have been developed.

GLYSANTIN® FC G20® ELECTRIFIED® is a coolant especially developed for FCEV with a low electrical conductivity. Compared to non-inhibited glycol/water mixtures, the product maintains constant low electrical conductivity, securing corrosion protection and the electrical safety of the system.

GLYSANTIN® G22® ELECTRIFIED® is BASF's first premium battery coolant developed specifically for indirectly cooled BEV. The ready-to-use coolant delivers a low electrical conductivity and maintains low and stable currents when exposed to a voltage source. This translates into low fluid decomposition and low generation of hydrogen, making it a safety-optimized product while ensuring optimal corrosion protection.



FUEL CELL ELECTRIC
VEHICLE



BATTERY ELECTRIC
VEHICLE



INTERNAL COMBUSTION
ENGINE

ELECTRIFIED®





GLYSANTIN® FC G20® ELECTRIFIED®



As future low-emission technologies for the transportation sector are evolving, fuel cells represent one approach due to their sustainable use of resources. Fuel cells are based on the concept of creating electric power by converting the chemical energy of hydrogen-rich fuels. With this technology and hydrogen from renewable sources, virtually no harmful emissions are generated and carbon footprint is low. The technology provides opportunities that affect passenger cars, heavy duty applications and even the marine sector. However, fuel cells also need an effective cooling system to ensure their efficient performance.

This represents significant new challenges for the ideal coolant – especially when it comes to low conductivity. As a committed development partner to the industry, **GLYSANTIN®** has developed a coolant especially for fuel cells to support the current advancements in fuel cell technologies.

GLYSANTIN® FC G20® ELECTRIFIED® Ready Mix provides the renowned triple protection against corrosion, overheating and frost, while also delivering extremely low electrical conductivity. Its formulation allows it to be used with or without ion exchange resins in the fuel cell cooling system.

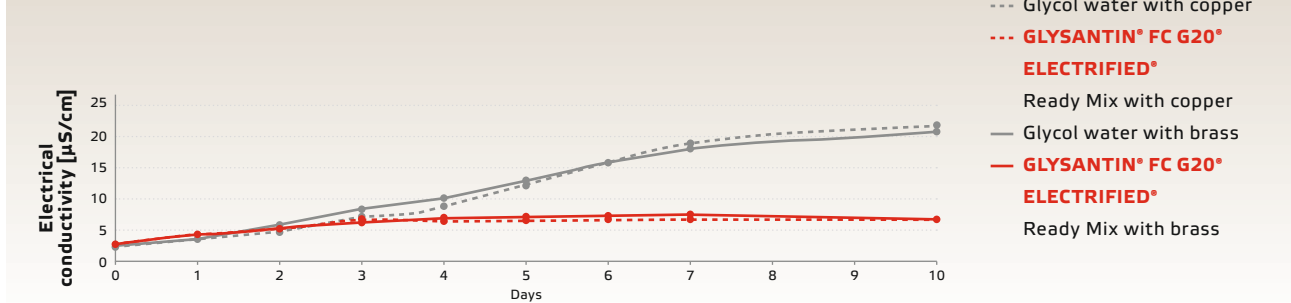
Compared to non-inhibited glycol water mixtures, the product maintains constant low electrical conductivity, thereby securing the electrical safety of the system and reducing loss of energy. Building on these properties, **GLYSANTIN® FC G20® ELECTRIFIED®** helps to enable further advancements in the drive to mass market when it comes to the application of fuel cell technology.

GLYSANTIN® FC G20® ELECTRIFIED® Ready Mix

- Minimized loss of energy thanks to low ion concentration and low electrical conductivity
- Specially designed for modern fuel cell engines to support low-emission technologies
- Keeps engine safe through triple protection against corrosion, overheating and frost

 Emissions 11 UN SDG	 Climate Change 7 13 UN SDG	 Energy 7 13 UN SDG	 Durability 9 12 UN SDG
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GLYSANTIN® FC G20® ELECTRIFIED®





GLYSANTIN® G22® ELECTRIFIED®



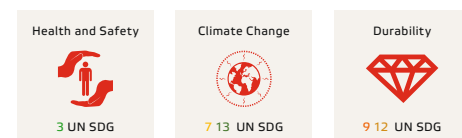
Battery-run vehicles play an important role in the ambitious efforts to further decarbonize tailpipe emissions in the transportation sector. Electric vehicle technologies are continuously advancing, but to successfully drive broad public acceptance, drivers require solutions that deliver performance, reliability and safety at the same time.

GLYSANTIN® G22° ELECTRIFIED® is a high-performance response to this challenge. The low conductivity, ready-to-use coolant for indirect cooling of electric vehicles is based on ethylene glycol. With its low conductivity **GLYSANTIN® G22° ELECTRIFIED®** maintains low and stable currents when exposed to a voltage source. This translates into low fluid decomposition, low generation of hydrogen, and low self-discharge, making it a safety optimized product for battery electric vehicles. The coolant provides good passivation in the low temperature coolant circuits (battery operation) as well as at high temperatures (battery charging). Beyond that, the product reliably delivers the

renowned **GLYSANTIN®** corrosion protection – protecting the vital parts of the battery cooling system such as the cooling plate and channels, heat sink, chiller, radiator, water pump and the heater core against corrosion and deposits.

GLYSANTIN® G22° ELECTRIFIED®

- Low conductivity and ready-to-use protection for electric vehicles
- Specifically designed for next-generation electric vehicles to support low-emission technologies
- Protects cooling system of battery, engine and electronic parts against corrosion, overheating and frost



GLYSANTIN® G64® AND GLYSANTIN® G65®



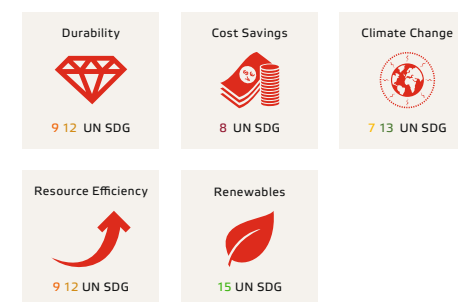
To reduce emissions in road traffic, car manufacturers are developing modern internal combustion engines that are smaller, lighter, and hotter and which use new construction materials in the engine cooling system. As a result, problems in the cooling system such as deposits, reduced functionality of the heat exchanger and increased corrosion can occur, which in turn poses a threat to the service life of a modern engine.

BASF's **GLYSANTIN® G64°** and **GLYSANTIN® G65°** engine coolants provide solutions that promote advancements in modern engine systems. Both products are suitable for modern fuel-efficient internal combustion engines, but also for indirectly cooled battery electric vehicles and hybrid technologies. These high-performance coolants exceed all technical prerequisites, fulfill legislative requirements and set a new benchmark for the sustainable protection of modern engines by delivering excellent corrosion protection, minimized build-up of deposits and excellent thermal stability.

Like many other **GLYSANTIN®** premium engine coolants, **GLYSANTIN® G64°** and **GLYSANTIN® G65°** are suitable for electric vehicles. They are also available as **GLYSANTIN® ECO BMB** products, delivering customized CO₂ emissions savings.

GLYSANTIN® G64° und GLYSANTIN® G65°

- Improved thermal stability, minimized build-up of deposits and an excellent corrosion inhibition ensure long-life performance of the engine cooling system
- Enjoy freedom to operate through full regulatory compliance, e.g., REACH
- Also suitable for electric vehicles
- Available as **GLYSANTIN® ECO BMB** products, delivering customized CO₂ emissions savings





**GLYSANTIN® – THE ORIGINAL
THE WORLD OF
PREMIUM ENGINE COOLANTS**

Shaping the future together
with market-leading solutions
for today's and tomorrow's
powertrain technologies.



COOL... COOLER... COOLANT