

ACTIVE DEFENSE AGAINST CORROSION.

Zagnelis[®] Protect

Corrosion resistant coated steel for automotive motor cups



ABOUT

AM/NS INDIA

AM/NS India is the joint venture between ArcelorMittal and Nippon Steel – two of the world's leading steel companies. As an integrated steel manufacturer with iron-making, steel-making and downstream facilities spread across India, we produce over 600 varieties of steel for a range of applications across industries. Our goal is to create smarter, more sustainable steels for India that empower its growth trajectory and enable brighter futures for all.

OUR HAZIRA STEEL PLANT

With a capacity of 10 Million Tonnes Per Annum (MTPA), the AM/NS India Hazira Steel Plant in Gujarat is an integrated, sophisticated and environment-friendly facility that is one of the largest single-location flat steel plants in the world. The plant incorporates comprehensive support infrastructure that includes power, lime and oxygen plants, a township and a captive port that can accommodate capesize vessels. This modern operations and handling system enables self-sufficiency and global logistics.

CGL-4: INDIA'S MOST INTELLIGENT AND SUSTAINABLE GALVANIZING LINE

Zagnelis® Protect is manufactured in AM/NS India's newly inaugurated, first-in-India, state-of-the-art Continuous Galvanising Line (CGL-4) at the Hazira plant. This facility is designed to produce smarter, higher-quality, and more sustainable steel to support India's industrial growth. CGL-4 is India's most advanced galvanizing line, featuring the country's first fully automatic laser welding machine and robotics for precision and consistency. The line operates in a dust-free environment and uses automation (robots for data validation, dross removal, and zinc charging) to eliminate human error and ensure a perfect, uniform surface finish on every coil. It includes a global product qualification system that uses AI to predict and guarantee quality based on real-time process data, ensuring every order meets exact specifications.

INTRODUCING ZAGNELIS® PROTECT

This Zn-Al-Mg coated steel is engineered specifically for automotive motor cup applications offers excellent corrosion resistance required for deep drawn parts like Motor cups. By combining advanced coating chemistry, **Zagnelis® Protect** helps motor cups resist corrosion for motors to stay younger for longer.

WHY CHOOSE ZAGNELIS® PROTECT?

Zagnelis® Protect stands out for its highly-engineered structure and combination of advanced characteristics. It helps in meeting motor cups performance requirement. Its self-healing Zn-Al-Mg coating composition (93.3% Zn, 3.7% Al, 3% Mg), supports improved drawability, strong adhesive bonding, and consistent manufacturing performance.

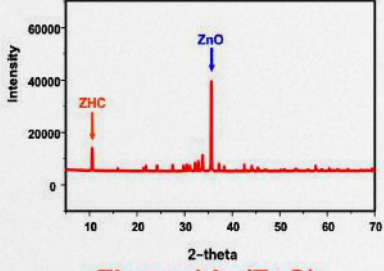
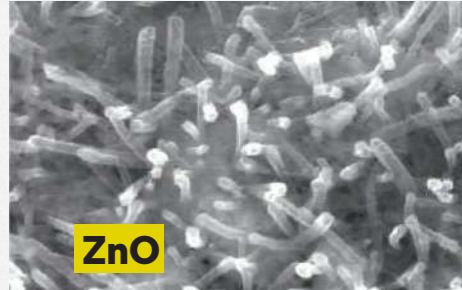
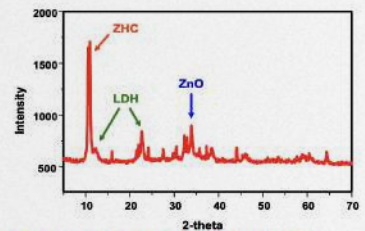

The following reasons highlight what makes Zagnelis® Protect an ideal choice for motor cup and sub-assembly applications.





















SUPERIOR CORROSION RESISTANCE

Protected by an advanced alloy coating (93.3% Zn + 3.7% Al + 3% Mg), Zagnelis® Protect delivers superior corrosion protection versus conventional zinc coatings.

STANDARD HDG VS ZAGENLIS PROTECT CORROSION INHIBITION CHARACTERISTICS

COATING	MAIN CORROSION PRODUCTS	STRUCTURE	CHARACTERISTIC
HDG COATING (10µm)	 <p>Zinc oxide (ZnO)</p>	 <p>ZnO</p>	<p>POROUS CORROSION PRODUCTS</p> <p>LOW INHIBITION</p>
ZnMg3Al3.7 COATING (10µm)	 <p>Simonkollite (ZHC) and AlZn basic salt (LDH)</p>	 <p>ZHC / AlZn LDH</p>	<p>COMPACT CORROSION PRODUCTS</p> <p>HIGH INHIBITION</p>

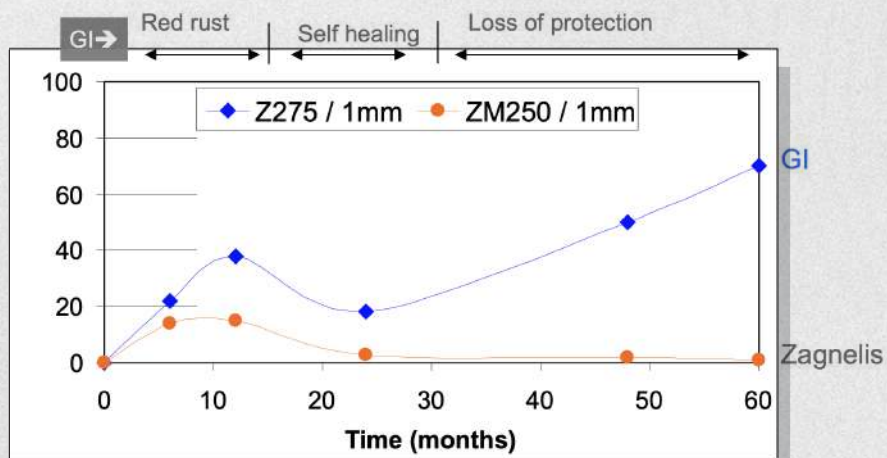
**CORROSION PERFORMANCE COMPARISON WITH
SAME COATING THICKNESS ZAGNELIS® PROTECT VS GI**

	1 YEAR	2 YEAR	3 YEAR
ZAGNELIS® PROTECT (10µm)	  	  	  
GI (10µm)	  	  	  

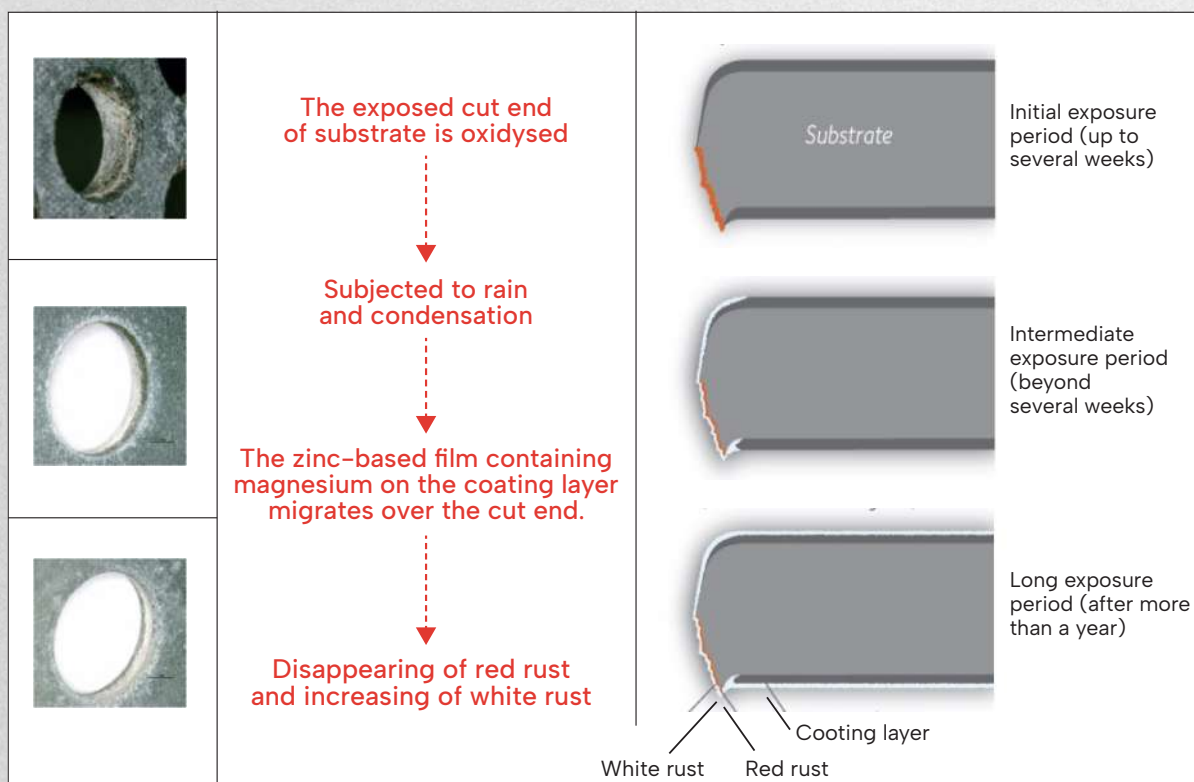
On full panels no
red rust on Zagnelis®
Protect coating after
3 years of exposure..

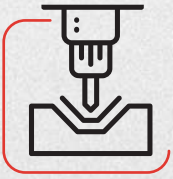
IMPROVED PERFORMANCE AT SIMILAR THICKNESS

RED RUST, SELF HEALING & LOSS OF PROTECTION



SELF-HEALING PROPERTY OF ZAGNELIS® PROTECT





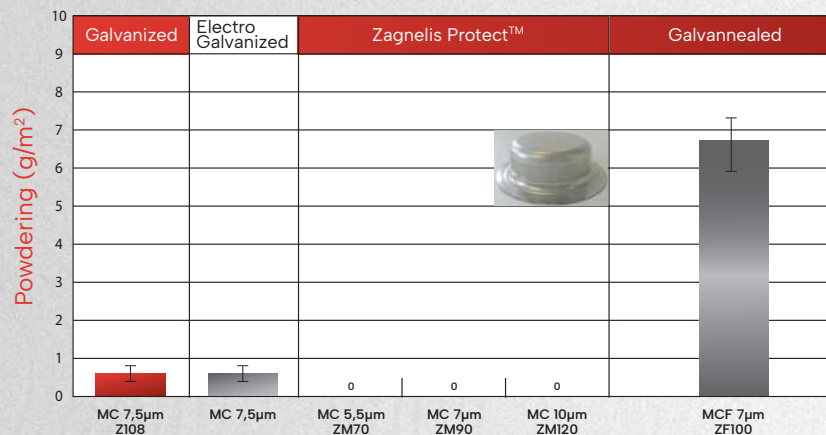
ENHANCED CUT-EDGE PROTECTION

The Zagnelis® Protect coating provides exceptional corrosion protection, even in cases of damage (impact, scratches, stone chipping) or high deformation. The presence of magnesium in the coating delivers a very high performance, thanks notably to the formation of highly stable corrosion products. These products not only act as a barrier, but also substantially reduce the coating consumption kinetics. The protection of edges is also significantly enhanced. It therefore allows you to reduce the thickness of the coating used or increase corrosion protection at an equivalent coating thickness.



IMPROVED COLD STAMPING PERFORMANCE

Zagnelis® Protect combines a low friction coefficient (0.10–0.15 with standard oiling) and optimised drawability to facilitate smoother metal flow between punch and die. This results in increased stampability and lower coating peeling during forming. Additionally, Zagnelis® Protect induces less tool pollution than galvanised coatings and is less abrasive than HSLA, supporting cleaner operations, reduced die wear, and more stable cold stamping performance.

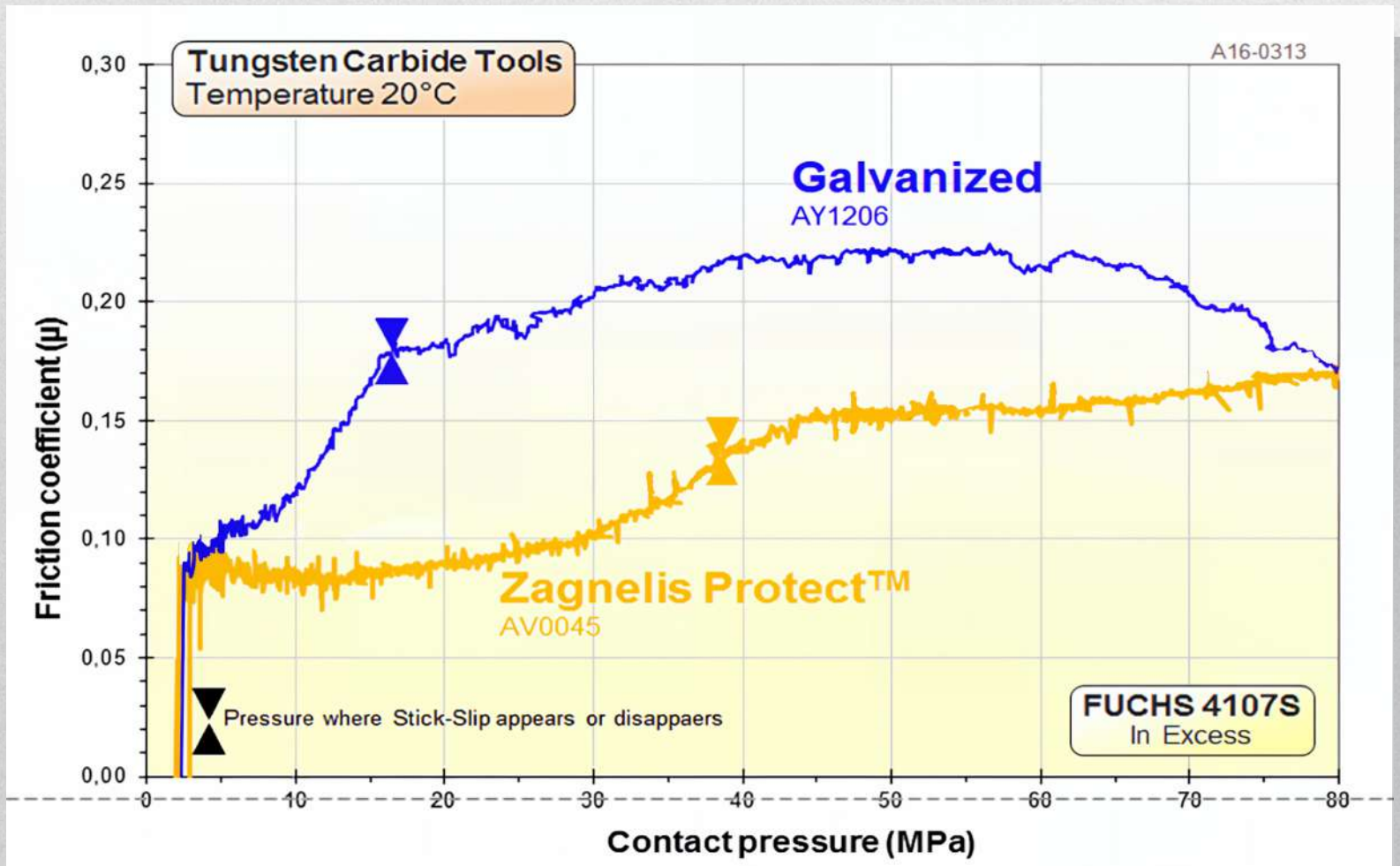


Improved cold stamping performance versus zinc*

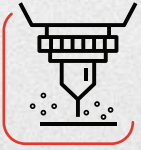


OPTIMIZED DRAWABILITY

Zagnelis® Protect has a low friction co-efficient (from 0.10 to 0.15 with standard oiling) which facilitates metal flow between matrix and punch, delivering an excellent drawing performance. It also presents a very low level of abrasion in the drawing dies, thereby increasing their lifecycle and productivity.

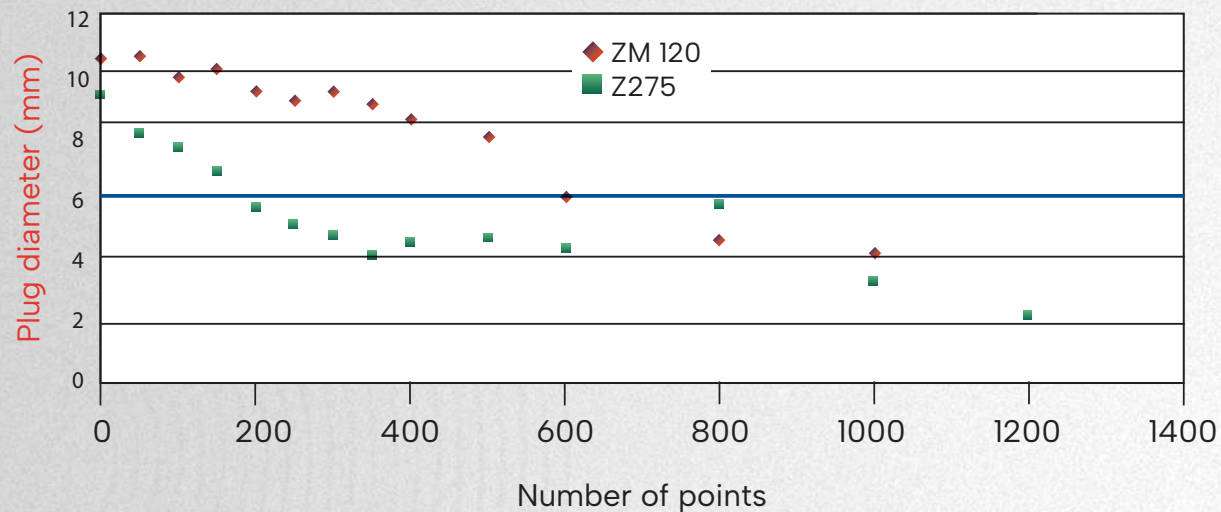
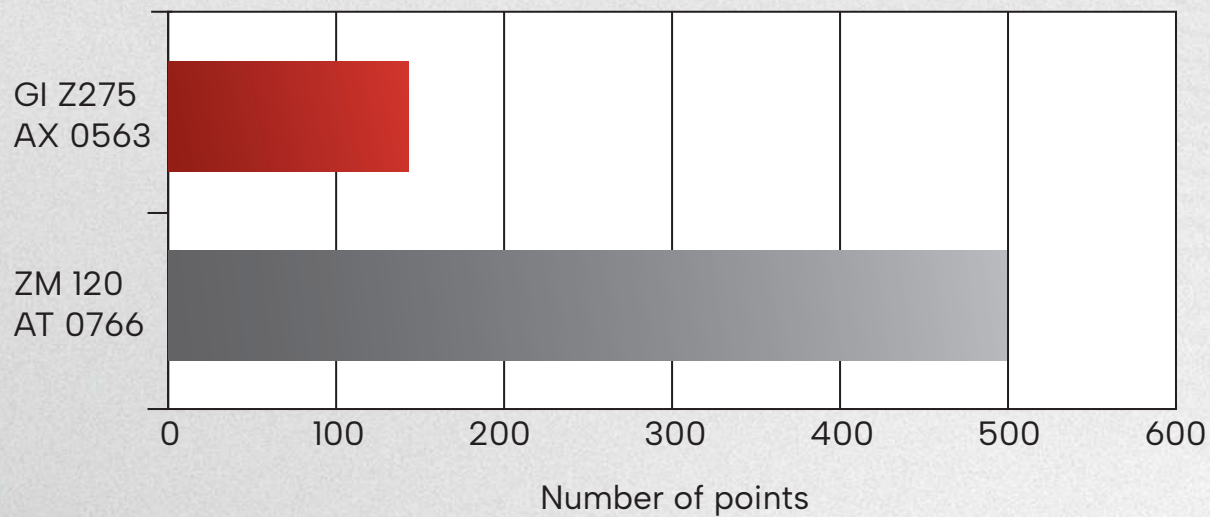


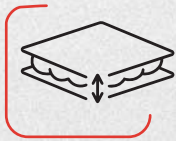
*tests performed with Fuchs 4107S



EXCELLENT WELDABILITY

Zagnelis® Protect coated steels are well-suited to spot welding with a welding range compatible with industrial requirements. It offers excellent corrosion resistance and spot weld-ability. It helps to attain high corrosion performance with Optimum coating thickness compare to the conventional HDG coated material.





GOOD ADHESIVE BONDING BEHAVIOUR

Zagnelis® Protect coating presents a good adhesive bonding behaviour with most adhesives used in the automotive industry.



STRONG DOMESTIC ADVANTAGE

Developed and manufactured in India, Zagnelis® Protect provides a high-performance alternative to imported Zn-Al-Mg steels, helping improve motor cup durability, streamline sourcing and reduce reliance on fragile overseas supply chains. It helps the country to achieve common Goal of Atma nirbhar Bharat.

TECHNICAL SPECIFICATIONS

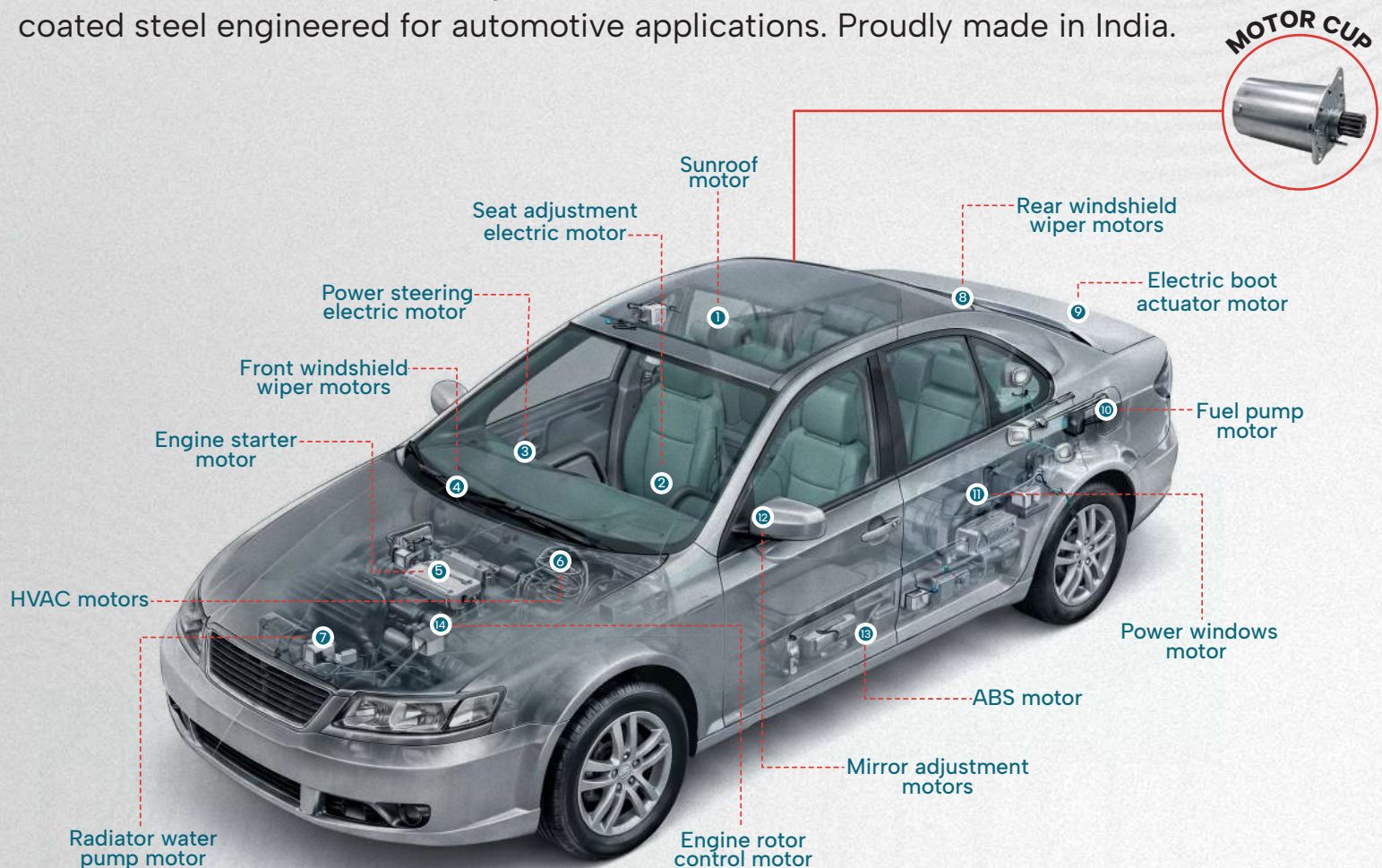
Thickness	1.0 - 2.2 mm	
Width	900 - 1550 mm (or) slit coil form	
Coating	ZM90 - ZM180	
Steel Grades	EN10346 - 2015	
	Forming Quality	DX54D
	IS 18513-2023	
	Forming Quality	IZMCCR4
Surface Aspect & Type	'B' (as per EN10346) & Skin passed	
Surface Treatment	Cr-free Passivation or Cr free Thin Organic Coating (TOC)	

MOTOR CUP APPLICATION IN AUTOMOBILES

Modern vehicles can use over 30 compact DC motors to power everyday features such as windows, mirrors, wipers and seats. These Motors are designed to operate with lowest levels of NVH (Noise, Vibration, Harness). Zn/Al/Mg coated material offers excellent corrosion resistance over traditional powder coated steel.

For manufacturers, the motor cup is a small component with a large performance footprint. Every motor cup must be formed precisely and resist corrosion over years of real-world exposure. Today, motor cups in India are typically made from CRCA or imported coated steel grades, with cost, processing, and supply constraints.

Now, there is an alternative, Zagnelis® Protect- a corrosion resistant coated steel engineered for automotive applications. Proudly made in India.



AM/NS INDIA

ArcelorMittal Nippon Steel India

**/ SMARTER STEELS
BRIGHTER FUTURES**