

Steel

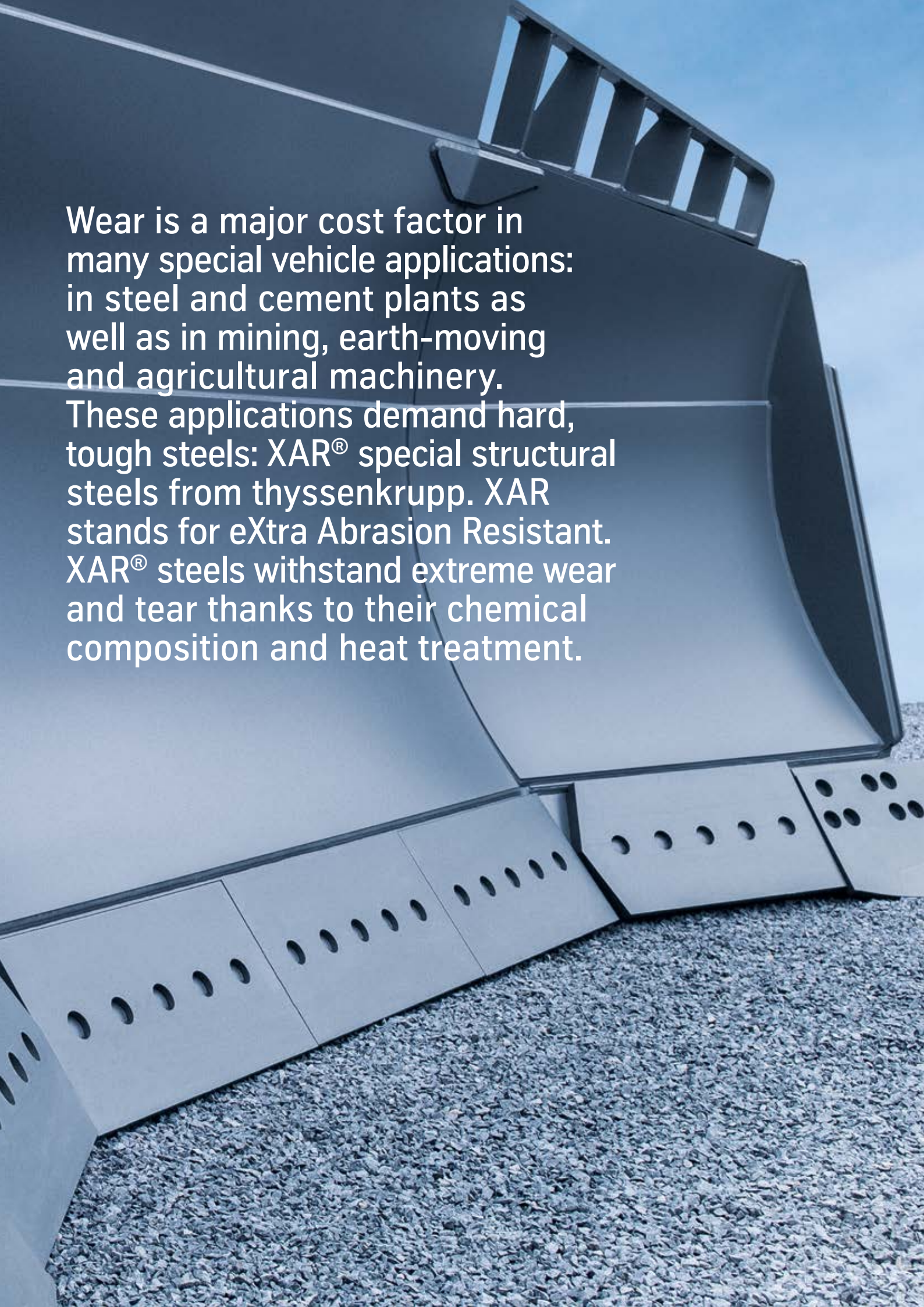
XAR®

Wear-resistant steels for longer service life and reduced costs in special vehicles.



thyssenkrupp





Wear is a major cost factor in many special vehicle applications: in steel and cement plants as well as in mining, earth-moving and agricultural machinery. These applications demand hard, tough steels: XAR[®] special structural steels from thyssenkrupp. XAR stands for eXtra Abrasion Resistant. XAR[®] steels withstand extreme wear and tear thanks to their chemical composition and heat treatment.

Tough enough for the hard jobs: XAR[®] steels.

XAR[®] steels from thyssenkrupp are the perfect solution to your wear challenges: they are easy to process, minimize the impact of use under tough conditions and, depending on the application concerned, can extend service life many times over compared to conventional structural steel. In short: XAR[®] steels offer huge cost-saving potential.

Advantages at a glance



Higher wear resistance



Good cutting and welding characteristics



Better formability



Lower costs



Dimensions and mechanical properties

| | Plate thickness [mm] | Brinell hardness [HBW] | Typical toughness ¹⁾ [J] | Guaranteed properties | Typical CET/CE ⁴ [%] |
|--------------------|----------------------|------------------------------------|-------------------------------------|--|---------------------------------|
| Steel grade | | | | | |
| XAR® 300 | 4–50 | ≥ 270 (≤ 20 mm) ≥ 240 (> 20 mm) | | Hot-formable | 0.42/0.68 |
| XAR® HT | 40–100 | 310–370 | 70 | Impact toughness ³⁾ | 0.38/0.60 |
| XAR® 400 | 4–100 | 370–430 | 45 | Impact toughness and through hardening ³⁾ | 0.28–0.38/0.38–0.63 |
| XAR® 400 W | 4–40 | 360–430 | | Heat-resistant up to 400 °C | 0.41/0.60 |
| XAR® 450 | 4–100 | 420–480 | 40 | Impact toughness and through hardening ³⁾ | 0.31–0.42/0.45–0.70 |
| XAR® 500 | 4–100 | 470–530 | 30 | | 0.40–0.48/0.60–0.74 |
| XAR® 600 | 4–50 | > 550 | 20 ²⁾ | | 0.55/0.80 |

¹⁾ At –40 °C and 10 mm–25 mm plate thickness (XAR® HT: 50 mm), longitudinal samples.

²⁾ At –20 °C and 15 mm plate thickness, longitudinal samples.

³⁾ See material sheet for details.

⁴⁾ CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15; CET = C + (Mn + Mo)/10 + (Cr + Cu)/20 + Ni/40.

The right XAR[®] steel for every requirement.

XAR[®] steels are special structural steels whose quality has been perfected at one of the world's leading flat steel production facilities: thyssenkrupp in Duisburg. Backed up by over 50 years of experience, XAR[®] steels have been continually developed and optimized, resulting in today's range of grades with plate thicknesses from 4 to 100 mm. For a broad spectrum of applications: mining, earth-moving machinery, steel works, cement plants and agricultural machinery.

For all-round use.

In a wide range of different applications, XAR[®] 400 is the world's most frequently used wear-resistant steel. Depending on the type of exposure, it extends service lives many times over compared to conventional structural steel. XAR[®] 400 combines high wear resistance with exceptional cold-forming and welding characteristics. The heat-resistant variant XAR[®] 400 W is the ideal steel when you need great hardness and wear resistance at temperatures of up to 400°C – for instance in cement plants and coal mills.

For moderate wear.

Some applications don't entail quite such extreme wear. XAR[®] 300 was developed for these applications: a steel that is produced using normalizing rolling, without any heat treatment. And one that is ideal for hot forming. It offers great value for money together with excellent surface quality.

The golden mean – with guaranteed toughness as a standard feature.

XAR[®] 450 is the steel of choice where both higher wear resistance and processability comparable to the standard grade XAR[®] 400 are required. Special feature: superior toughness. thyssenkrupp guarantees the toughness of both XAR[®] 400 and XAR[®] 450 and documents it in the material sheet.

For extreme abrasion.

The steel grade XAR[®] 500 is available for high-wear applications: a steel that can be both formed and welded easily. Thanks to its exceptional hardness, XAR[®] 600 is precisely the right steel for extremely high abrasion – without impact loads.

For extreme toughness requirements.

For applications with high impact wear, XAR[®] HT is the steel you need. It is optimized for extremely high impact toughness. That means it is highly resistant to cracking under impact loads, in addition to its abrasion resistance.

Gets in shape the easy way.

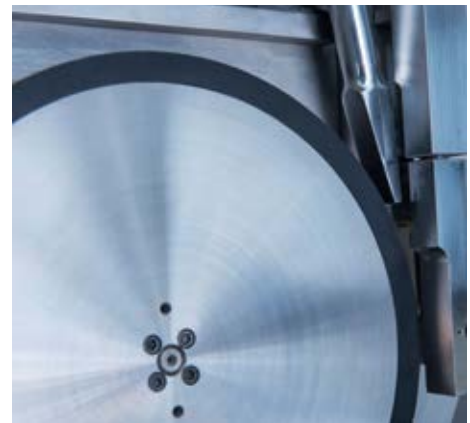
Highly wear-resistant – yet easy to process.

XAR® steels combine high wear resistance with good processing characteristics. Microalloying with niobium enhances toughness and cold-forming characteristics as well as resistance to impact wear. Alloying with chromium additionally increases wear resistance in corrosive media. New and improved products are continually tested in our own wear laboratory, which is also available for customer tests.

The optimized compositions and low-carbon equivalent of XAR® steels facilitate cutting and welding as well as cold forming with tight bending radii. For example, no preheating is required to flame-cut XAR® 400 steel up to plate thicknesses of 45 mm. 20 mm plates of XAR® 400 permit bending with an r/t ratio of ≥ 3.0 (perpendicular to rolling direction).

Primers for high-quality corrosion protection.

The plates are shot-blasted and primer-coated to meet the most stringent surface quality requirements. We carry out these processes at our state-of-the-art blasting and coating facility at our plant in Duisburg. Here, a silicate shop primer with a low zinc content is evenly applied in a thickness of 12 to 20 μm following shot-blasting. In studies, these primer-coated plates have proven suitable for trouble-free processing with laser cutting machines. Thanks to its inorganic components, the shop primer can be easily welded over, so it generally does not need to be removed before welding.



What do scientists say?

An expert opinion of the Institute for Tribology at the Mannheim University of Applied Sciences attests to the superior suitability of XAR® steels.

“Among low-alloyed, wear-resistant special structural steels with good processing characteristics, the thyssenkrupp XAR® steels, with hardnesses of 300 to 600 HB, constitute an optimum solution with respect to the steel composition, manufacturing process and microstructure”*.

* „Gutachtliche Stellungnahme zum Verschleißverhalten der verschleißfesten Sonderbaustähle der Thyssen Krupp Steel AG“ (“Expert opinion on the wear behavior of wear-resistant from Thyssen Krupp Steel AG special structural steels”) 2001 and 2006, Prof. Dr. Feinle.

thyssenkrupp – a partner that understands its business. And yours.

Our mission is to advance your business – through sound advice, individual and innovative solutions and fulfillment of your specific needs. Our extensive technological know-how, gained over many years, makes this possible. As does our ability to see things the way you do. This enables us to develop an in-depth understanding of your business model. Our brand promise says it all: “engineering. tomorrow. together.” Because when it comes to finding successful solutions for tomorrow, the closer we cooperate the better.

Comprehensive advice.

To ensure that you get the best advice on the selection and processing of XAR® steels, our Technical Customer Service is at your disposal. They are 100% committed to offering you comprehensive assistance with regard to design and processing, answers to structure- and forming-related issues, product training, and of course technical support in optimizing fabrication processes.

Tailored service.

For high-quality logistics and processing, our global distribution network ensures rapid supply and just-in-time delivery of XAR® steels – in top quality and with excellent value for money. Close cooperation with our steel service centers additionally enables us to offer pre-fabricated, cold-formed or welded parts.

Practical virtual tool.

Naturally, you can find specific information about our special structural steels on our website:



www.thyssenkrupp-steel.com/plate

This includes useful product information, processing recommendations and a direct line to your personal service representatives for sales and technical consulting. You can also access ProWeld, thyssenkrupp’s web-based application for welding calculations. After registering as a user, you can log in and use this tool for your projects at any time, free of charge.

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