ArcelorMittal

ArcelorMittal 70 S AR High Strength Weldable

ArcelorMittal 70 S AR is a rebar produced in straight bars with a higher tensile strength than standard CA50. It has low carbon content, which ensures excellent weldability. ArcelorMittal 70 S AR was developed with the aim of reducing the concentration of reinforcement in structural elements, increasing productivity on site, facilitating the industrialization of reinforced elements, and promoting the dematerialization of construction sites, thereby reducing greenhouse gas emissions.

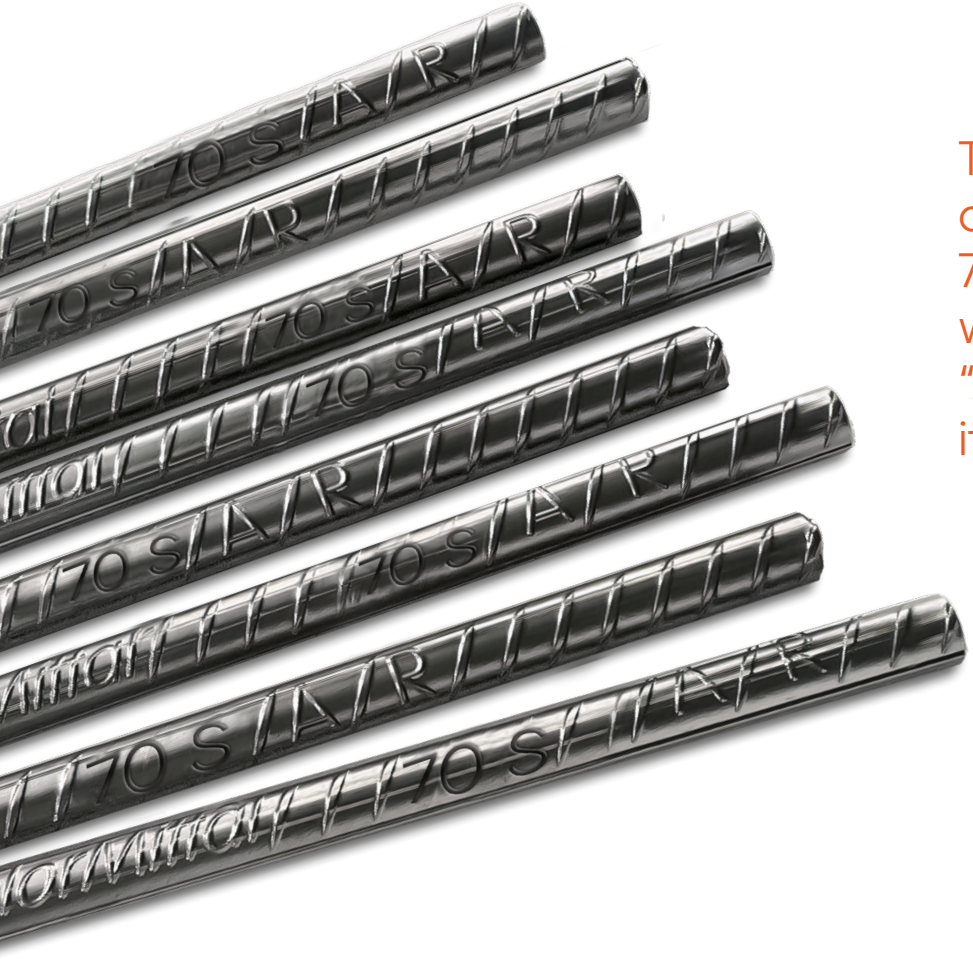
Product Features

CA70 S AR is weldable and its physical and mechanical properties comply with ABNT NBR 7480 standard. Product certified with the ABNT Ecolabel, which attests to ArcelorMittal's commitment to sustainability.

This steel has added alloying elements that increase the product's tensile strength, reaching a minimum yield strength of 700 MPa, while maintaining its ductility characteristics.

QUALIDADE-ABNT-AMBIENTAL
PE 148

THIRD-PARTY VERIFIED EPD
ISO 14025 and EN 15804
Institut Bauen und Umwelt e.V.



The letter "S" engraved after the ArcelorMittal 70 mark indicates weldability; the letters "A" and "R" indicate that it is high-strength steel.

Key advantages

- Less bar congestion, especially at joints;
- Improved concrete placement and consolidation;
- Reduces material consumption;
- Increases productivity on the job site;
- Boosts industrialization;
- Reduces environmental impacts;
- Reduces costs;
- Certified with the ABNT Ecolabel, which attests to ArcelorMittal's commitment to sustainability.

Available Diameters

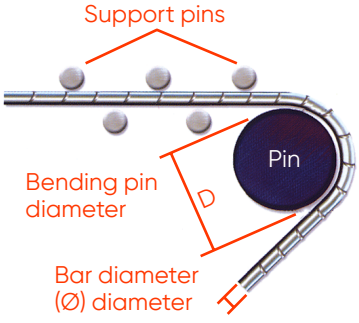
Diameter (mm)	Nominal Mass (kg/m)	Tolerance (%)
16.0	1.578	±5
20.0	2.466	±5
25.0	3.853	±4
32.0	6.313	±4

ArcelorMittal 70 S AR is conventionally supplied in 12-meter bars. Special lengths from 6 to 15 meters can be requested, provided that advance notice is given.

Supply may be provided in Cut and Fold through negotiation of terms with ArcelorMittal service centers.

Steel Bending				
Steel Category	Laboratory Use (NBR 7480)		Use in Construction	
	Pin diameter		Pin diameter	
	Diameter < 20 mm	Diameter ≥ 20 mm	Diameter < 20 mm	Diameter ≥ 20 mm
CA50	3 x Ø	6 x Ø	5 x Ø	8 x Ø
CA70 S AR	3 x Ø	6 x Ø	5 x Ø	8 x Ø

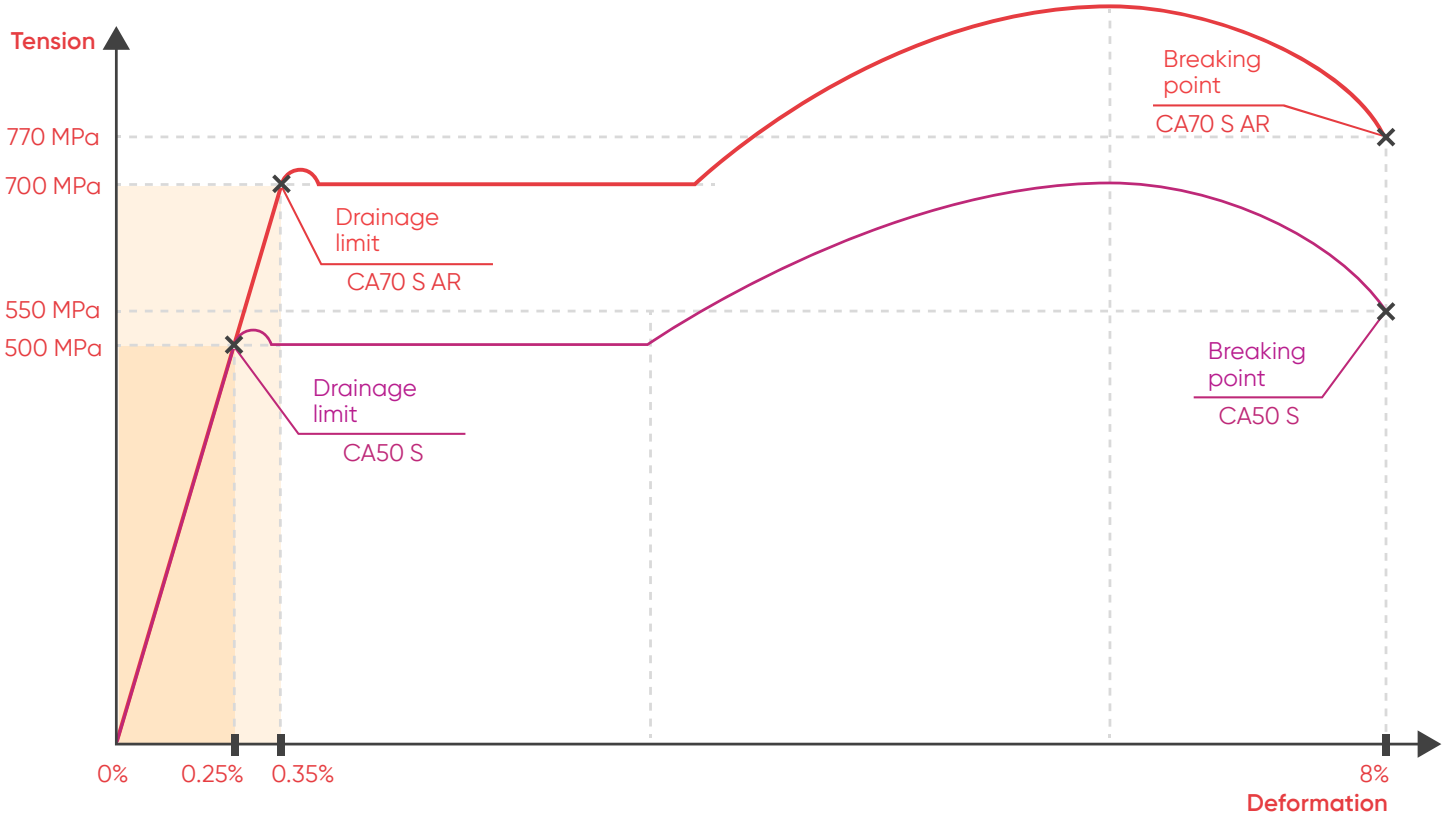
Note: Ø = Diameter.



Features

Steel category	Minimum Flow Limit	Minimum Breakage Limit	Minimum Elastic Ratio	Stretching After Rupture
	(Mpa)	(Mpa)	(Mpa)	(Mpa)
CA50	500	550	1.10	8.0%
CA70 S AR	700	770	1.10	8.0%

Tension x Deformation Graph



Precautions for Use in Structural Projects

To use ArcelorMittal 70 S AR steel safely and take advantage of its characteristics, certain assumptions must be taken into account when dimensioning structural elements.

Shear Reinforcement

In item **17.4.2.2** of **NBR 6118:2014** standard, there is a limitation on the design stress in shear reinforcement to 435 MPa. Therefore, it is not possible to reduce the shear reinforcement of a structural element by using higher-strength steel.

Minimum Reinforcement

In item **17.3.5.2.1 - Tension reinforcement** of **NBR 6118:2023** standard, there is a procedure for finding the minimum bending moment for which the minimum reinforcement of the section must be calculated. The calculation of the minimum reinforcement for this moment takes into account the f_{yk} of the steel used. However, NBR 6118:2014 standard requires that a minimum reinforcement ratio of 0.15% of the concrete section be respected. Thus, **Table 17.3 - Minimum bending reinforcement ratios for beams** with reinforcement ratios for rectangular sections, calculated with 70, would present the following values with the inclusion of ArcelorMittal 70 S AR:

Section Shape	Steel	Values of ρ_{min} ($As,_{min}/A_c$) %														
		20 MPa	25 MPa	30 MPa	35 MPa	40 MPa	45 MPa	50 MPa	55 MPa	60 MPa	65 MPa	70 MPa	75 MPa	80 MPa	85 MPa	90 MPa
Rectangular	CA50	0.150	0.150	0.150	0.164	0.179	0.194	0.208	0.211	0.219	0.226	0.233	0.239	0.245	0.251	0.256
	70 S AR	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.150	0.156	0.161	0.166	0.170	0.175	0.179	0.183
	Reduction	0%	0%	0%	9%	16%	23%	28%	29%	29%	29%	29%	29%	29%	29%	29%

Therefore, the minimum reinforcement of rectangular sections would be reduced with the use of ArcelorMittal High Strength steel and concrete with a minimum strength of 35 MPa.

Pillars

Pillars are structural elements whose main function is to receive the forces acting on the various levels of a building and transfer them to the foundation. When dimensioning columns, axial compression forces prevail, but there are columns that may be subject to tensile and bending forces. For columns subjected to simple compression, the maximum compression deformation of the concrete/steel assembly is limited to 0.2%, which is less than the deformation at which high-strength steel reaches its maximum capacity, resulting in a thin reinforcement equal to, or very close to, that found using conventional CA50 steel. In columns subject to high bending stresses, we can take advantage of the superior strength and elongation of steel in the tensile region, resulting in more economical dimensioning.

Service Limit States (Deformation and Cracking)

Deformations in elements subjected to bending vary with the inertia of the cracked section and the reinforcement in the section. Dimensioning with higher strength steel tends to reduce the total steel area, resulting in lower inertia of the part and increased deformation of the elements. The value of crack opening also depends on the selection of reinforcement in the section. Therefore, it is necessary to calculate the deformations and crack openings, according to items **17.3.2 - Deformation limit state and 17.3.3 - Cracking limit state, of NBR 6118:2023, and verify that they are within the limit values indicated in Tables 13.3 and 13.4, respectively.**

FAQ

Below are the most frequently asked questions about ArcelorMittal 70 S AR, divided by topic:

Product

Does steel become more brittle because it has greater tensile strength?
No, although ArcelorMittal 70 S AR steel has a higher tensile strength than conventional CA50, its other mechanical properties, such as ductility, remain unchanged.

What diameters are available?
Rebar bundles are available in diameters of 16, 20, 25, and 32 mm.

What is the modulus of elasticity of ArcelorMittal 70 S AR?
The elasticity modulus of 200 GPa for CA50 is maintained, as indicated in the standard.

Are there other ArcelorMittal products that use this steel, such as welded mesh and trusses?
There are no welded meshes or trusses with ArcelorMittal 70 S AR in the ArcelorMittal catalog, but through service centers it is possible to supply ready-welded reinforcement elements with high-strength steel as indicated in projects.

Can steel be supplied in rolls?
ArcelorMittal 70 S AR is only available in bars.

What is the length of the bar? Only 12 m like those made of common CA50 steel, or are other lengths available?
The standard length is 12 meters, but it is possible to request bundles of bars with special lengths upon request.

How much does this steel need to be stretched to reach the f_{yk}?
The yield strength of 700 MPa is reached when the steel elongates 0.35%.

Does ArcelorMittal 70 S AR weigh the same as CA50 S?
Yes, both have the same density of 7,850 kg/m^3.

Can steel be supplied cut and bent?
The cutting and bending service is available for 20, 25, and 32 mm diameters.

Can I purchase ready-made welded armor elements with ArcelorMittal 70 S AR?
Yes. ArcelorMittal 70 S AR steel is weldable and can be supplied in ready-made elements such as beams, unidirectional slab modules, foundation blocks, stairs, and other elements as specified in the design.

Business Information

Where can I buy the strongest steel?
ArcelorMittal 70 S AR is an exclusive product and is not available for immediate delivery at ArcelorMittal stores. To purchase, you must request the production of a batch of the desired diameters from our salespeople and Application Engineers.

When is it expected to enter the market?
It is now available for application upon prior request for production with our salespeople and Application Engineers.

Questions About Calculations and Projects

How can engineers design with ArcelorMittal 70 S AR? Are there standards or guidelines that designers can refer to for a roadmap?
ArcelorMittal 70 High Strength Steel complies with NBR 6118 standard as a CA50 because it meets all the minimum requirements demanded by ABNT for steels in this category, but with a 40% increase in tensile strength, which must be considered as such in calculations.
In the analyses, the standard f_{yk} of 500 MPa should be replaced by the value of 700 MPa, the characteristic tensile strength of ArcelorMittal 70 S AR, except in cases where NBR 6118 standard limits the maximum value of f_{yk}. It is very important to check the service limit states, such as deformations and crack openings, for example.

Another alternative is to use international standards that cover steels with higher yield strength. One suggestion is to use ACI 318R-19 or ACI 318R-14 with the help of document ACI 439.6R-19.

Which design software programs have the option to use this steel?
As it is a very new product, it is not yet included natively in design and dimensioning software. It is possible to configure this material in some software with more open code. In other cases, the calculation and replacement processes must be performed manually by the designers.

Would there be changes in the anchorage lengths of steel in concrete? Since they are more in demand, would there be more concrete in the anchorage interaction?
Yes, with the increase in bar demand, it is necessary to increase the contact area between the steel and the concrete to ensure anchorage lengths and overlaps. The anchorage will be around 1.84 times larger. For more information, check ABECE Recommendation 008:2024 of September 2024.

Can I use ArcelorMittal 70 S AR in compressed elements, such as pillars, or only in elements subject to bending?
ArcelorMittal 70 S AR can also be used in compressed elements, but there is no guarantee that there will be a reduction in the steel area in these elements. In compressed elements that are subject to high bending stresses, such as warehouse pillars, there will be a greater reduction as the bending stresses increase.

Application

Can I use higher-strength steel to reduce steel consumption in social housing projects, such as *Minha Casa, Minha Vida* (Brazil's federal low-income housing program)?
Normally, social interest projects have smaller spans and slabs with thin diameters of up to 8.0 mm. Therefore, replacing it with ArcelorMittal 70 S AR is not economically advantageous. However, it is possible to find savings in foundation blocks with two or more piles.

What types of construction projects and elements would benefit from using ArcelorMittal 70 S AR?
Medium and large-scale residential and commercial construction projects, industrial warehouses, construction projects using precast concrete elements, storm water drainage systems, and sewer networks.

The most advantageous elements are foundation blocks and footings, followed by beams and slabs with medium and large spans, columns subjected to high stresses and wind, as well as street lighting poles.

Can this steel be cut and bent on site?
Yes, following the same procedures as for conventional CA50.

Economic Advantages

If higher-strength steel is more expensive, and I need to increase the lengths of overlaps but cannot reduce the minimum reinforcement of the part, will it still be economically viable to use ArcelorMittal 70 S AR?
In some situations, replacing all steel in the project with ArcelorMittal 70 S AR may increase the total cost of steel. In these situations, it is best to use higher-strength steel in elements or floors where the design requires more reinforcement.

Which structural elements offer the greatest savings when using ArcelorMittal 70 S AR?
Foundation elements, such as blocks and footings, offer greater savings when using ArcelorMittal 70 S AR steel, followed by beams, slabs, and finally columns. Shed pillars, which are subjected to high bending stresses, offer greater savings the higher the shed is.

ArcelorMittal 70 High Strength Weldable – 70 S AR – June 2026

Segurança
ABNT Registro
OCP 0005 Compulsório
INMETRO

QUALIDADE-ABNT-AMBIENTAL
PE 148

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EPD
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ISO 9001
ISO 14001
ISO 45001
BUREAU VERITAS Certification

BUREAU VERITAS 1828

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