

OUR PRODUCTS

AT A GLANCE CATALOG



Stainless Steels

ARMCO® Pure Iron

About us

AK Steel International and its offices in Europe

AK Steel International is a subsidiary of Cleveland-Cliffs Inc. which is headquartered in Cleveland, Ohio, U.S.A.

AK Steel International markets specialized steel products such as ARMCO® Pure Iron, stainless steel, metal products and composite auxiliary materials for the aerospace, automotive and industrial sectors.

AK Steel International is an AS/EN 9120 certified stockholder and has the capability to provide its customers with cut-to-specification materials in a just-in-time manner through two specialized distribution centers located in Maastricht (NL) and Tortona (IT). These centers are equipped with KASTO precision cutting machines.

For more information on AK Steel International visit www.aksteel.eu.

For more information on Cleveland-Cliffs, visit www.clevelandcliffs.com.

AK Steel International B.V. – Headquarters
Breda, Netherlands (Founded 1996)

AK Steel International B.V.
Stevenage, Great Britain (Founded 1924)

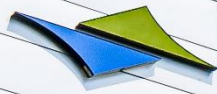
AK Steel International B. V. - Germany Branch
Cologne, Germany (Founded 1927)

AK Steel International B.V.
Puteaux, France (Founded 1934)

AK Steel s.r.l.
Genoa, Italy (Founded 1935)

AK Steel International B.V..
Barcelona, Spain (Founded 1962)

 **CLIFFS**

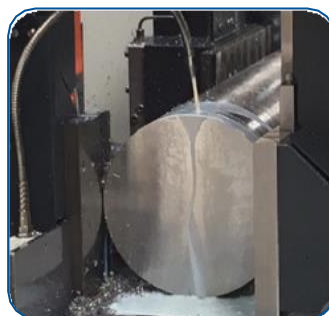


CLIFFS



Our Product Offerings

At a glance



Aluminized Ferritic Chrome Steels

Aluminized 409 and 439 stainless products have been developed to provide the automotive industry with life-of-the-car exhaust materials. The Type 1 hot-dip aluminium coating provides excellent resistance to pitting from muffler condensate and road salt, allowing the exhaust system to resist internal chlorides and retain good external appearance.

Ferritic Stainless Steel for Automotive Trim

Types 430, 436 and 435Mod provides corrosion resistance, functionality and beauty. They are suitable for many roll-formed and stamped automotive trim applications.

Precipitation Hardening Stainless Steels (PH)

17-4 PH[®], 15-5 PH[®], PH 13-8 Mo, 17-7 PH[®], and PH 15-7 Mo[®] are offering varied and unique combinations of high strength and hardness, excellent corrosion resistance, good fabricating characteristics and ease of hardening by heat treatment.

NITRONIC® Stainless Steels

NITRONIC 30, 40, 50 and 60 are austenitic iron-base alloys of chromium, nickel and manganese that are nitrogen strengthened. High strength levels, excellent corrosion resistance and extremely low- magnetic permeability in most of the grades even after severe cold work characterize these specialty stainless steels. In addition, they exhibit excellent cryogenic properties.

ARMCO® Pure Iron (API)

One of the purest grades of iron ever produced and widely used for remelting applications as well as for the production of high-quality galvanizing tanks; also used in electromagnetic applications requiring e.g. excellent electrical conductivity and/or low coercive force. Moreover, used as high purity soft iron for soft metallic gaskets or joint rings, and for sacrificial anodes in cathodic protection systems.



ARMCO® Telar 57

Soft magnetic material variant of ARMCO Pure Iron, which was developed to meet the special requirements of the electrical industry. ARMCO Telar 57 is particularly popular in electromagnetic components which have to show high induction levels during magnetisation outstanding resistance against aging, e.g. relays, electromagnets, pole pieces, magnet frames.

Auxiliary Composite Materials

Vacuum bagging materials and composite tooling materials for prepreg/autoclave, resin infusion, and wet lay-up.

PH

Precipitation Hardening

Precipitation Hardening Stainless Steels like 17-4 PH[®], 15-5 PH[®], PH 13-8 Mo, 17-7 PH[®] and PH 15-7 Mo[®] are offering varied and unique combinations of high strength and hardness, excellent corrosion resistance, good fabricating characteristics, and ease of hardening by heat treatment.



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H. 422287
17-4PH-A

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PH

17-4 PH[®]

Unique combination of high strength /high hardness /excellent corrosion resistance /easy heat treatment; widely used in the aerospace, chemical, petrochemical, food processing, paper, and general metal-working industries.

Applications include: pump shafts, valve stems, balls, gates, bushings and trims; mixing screws, fasteners, couplings, wear rings, hydraulic actuators, and screws.

15-5 PH[®]

Ferrite-free version of 17-4 PH to improve transverse mechanical properties; widely used in: the aerospace, chemical, petrochemical, food processing, paper, and general metalworking industries.

PH 13-8 Mo

Designed for high performance applications requiring high strength coupled with excellent resistance to corrosion and stress corrosion. Applications include: forgings, cold-headed and machined fasteners, aircraft-parts, nuclear reactor components, landing gear parts, pins and lock washers, high-performance shafting, and petrochemical application requiring stress corrosion resistance combined with high strength.

17-7 PH[®]

Provides valuable property combinations particularly well suited for aerospace applications. This special alloy also provides benefits for other applications requiring formability, high strength and good corrosion resistance, as well as excellent properties for flat springs, bellville washers, eyelets, and strain gauges at temperatures up to 316° C.

PH 15-7 Mo[®]

Particularly beneficial for a wide range of applications that include: retaining rings, springs, aircraft bulkheads, welded and brazed honeycomb panelling, and other aircraft components requiring high strength at elevated temperatures.

Chemical Analysis, wt%

Grade	C (max)	Cr	Ni	Si (max)	Mn (max)	Cu	Mo	Al
17-4 PH [®]	0,07	15,0 - 17,0	3,0 - 5,0	1,0	1,0	3,0 - 5,0	-	-
15-5 PH [®]	0,07	14,0 - 15,5	3,5 - 5,5	1,0	1,0	2,5 - 4,5	-	-
PH 13-8 Mo	0,05	12,0 - 13,3	7,5 - 8,5	0,1	0,1	-	2,0 - 2,5	0,90 - 1,35
17-7 PH [®]	0,09	16,0 - 18,0	6,5 - 7,8	1,0	1,0	-	-	0,75 - 1,50
PH 15-7 Mo [®]	0,09	14,0 - 16,0	6,5 - 7,8	1,0	1,0	-	2,0 - 3,0	0,75 - 1,50

Typical Mechanical Properties

Grade	Condition	UTS, MPa (N/mm ²)	0,2% YS, MPa (N/mm ²)	Elongation, % in 2"	Reduction of Area, %	Hardness	Impact Charpy V-Notch, J
17-4 PH [®]	H 900	1379	1276	14	50	420 HB	20
	H 1025	1172	1138	15	56	352 HB	47
	H 1075	1138	1034	16	58	341 HB	54
	H 1150D	965	758	20	60	302 HB	100
	H 1150M	862	586	22	68	311 HB	135
15-5 PH [®] VAC	H 900	1379	1276	14	50	420 HB	20
	H 1150M	862	586	22	68	277 HB	136
PH 13-8 Mo	RH 950	1620	1482	12	45	48 HRC	27
	H 1150M	896	586	22	70	32 HRC	162
17-7 PH [®] Strip	RH 950	1620	1517	6	-	49 HRC	-
	TH 1050	1379	1276	9	-	43 HRC	-
PH 15-7 Mo [®] Strip	CH 900	1828	1793	2	-	50 HRC	-
	A 1750	1034	372	12	-	85 HRB	-

Note: Other conditions (H925, H1000, H1025, H1150, etc.) are also available.

NITRONIC®

Nitro = Nitrogen, **Nic** = Nickel

NITRONIC Stainless Steels are austenitic iron-base alloys of chromium, nickel, and manganese that are nitrogen strengthened. High strength levels, excellent corrosion resistance and extremely low-magnetic permeability in most of the grades even after severe cold work characterize these special stainless steels. In addition, they exhibit excellent cryogenic properties.

HS

AV
H.

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NITRONIC 50 HS
H. 425604
AV MR

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NITRONIC 50 HS
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NITRONIC 50 HS
H. 425604
AV MR

NITRONIC®

NITRONIC 30

Developed for applications requiring good level of aqueous corrosion resistance combined with good resistance to abrasive and metal-to-metal wear like: automotive hose clamps, flat ware, springs, mixing tanks, mining equipment, conveyor belt pins, bushings, well screens, coal screens, chute liners, and wear plates.

NITRONIC 40

One of the most versatile austenitic stainless steels combining high yield strength with good corrosion resistance. Because of its high strength and fabricability extensively used in a wide variety of aircraft applications, providing substantial weight savings for parts such as: ducting or bellow springs, tailpipes and exhaust systems, clamps, flanges, and hydraulic tubing.

NITRONIC 50

Effective alloy for components using the combination of excellent corrosion resistance and high strength, such as: pumps, valves, fittings, fasteners, cables, chains, screens and wire cloth, marine hardware, boat shafting, heat exchanger parts, and springs. This alloy is included in the NACE MR0175 / ISO 15156 "Petroleum and natural gas industries - Materials for use in H₂S-containing Environments in oil and gas production".

NITRONIC 60

Economical galling and wear resistant austenitic stainless steel at both ambient and elevated temperatures for applications like valve stems, seats and trim, fastening systems including nuts and bolts; screening, chain-drive systems; pin, bushings, and roller bearings.

NITRONIC® Chemical Analysis,

Grade	C (max)	Cr	Ni	Mn	Mo	N	Si
NITRONIC 30	0,03	15,0 - 17,0	1,5 - 3,0	7,0 - 9,0	-	0,15 - 0,30	max. 1,0
NITRONIC 40	0,08	19,0 - 21,5	5,5 - 7,5	8,0 - 10,0	-	0,15 - 0,40	max. 1,0
NITRONIC 50	0,06	20,5 - 23,5	11,5 - 13,5	4,0 - 6,0	1,5 - 3,0	0,20 - 0,40	max. 1,0
NITRONIC 60	0,10	16,0 - 18,0	8,0 - 9,0	7,0 - 9,0	-	0,08 - 0,18	3,5 - 4,5

Typical Mechanical Properties

Grade	Condition	UTS, MPa (N/mm ²)	0,2% YS, MPa (N/mm ²)	Elongation, % in 2 ⁱⁿ (50,8 mm)	Reduction of Area, %	Permeability, H = 500
NITRONIC 30	Strip 3,15 mm	811	372	52	-	1,0014
NITRONIC 40	Bar – annealed	683	448	48	70	1,0020
NITRONIC 50	Bar – annealed	827	414	50	70	1,0040
	Bar – HS	937	731	33	66	1,0040
	Bar – Super HS	1009	830	27	63	1,0040
NITRONIC 60	Bar – annealed	696	414	60	76	1,0030

Bar material in as supplied condition at room temperature. The mechanical values are depending on diameter and grade of transformation.

ARMCO® Pure Iron

High Purity Iron

ARMCO Pure Iron is a steelworks product unique in its purity, with a minimum iron content of 99.85%. All natural impurities have been largely removed.

Developed in 1909 in the U.S.A., ARMCO Pure Iron was first produced in Germany in 1927. Even after a century of technical progress, ARMCO Pure Iron, now more highly refined, is still an important product because of its flexible application possibilities.

ARMCO® Telar 57

Soft Magnetic Iron

ARMCO Telar 57 is a material variant of ARMCO Pure Iron and was developed to meet the special requirements of the electrical industry.

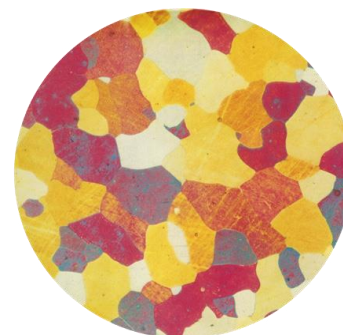
ARMCO Telar 57 is particularly popular in electromagnetic components which have to show high induction levels during magnetization.



ARMCO® Pure Iron

Produced to meet the highest quality requirements. After purification and solidification, it has a homogenous composition with regard to the distribution of the accompanying elements, a very low oxygen content and very good slag purity. Due to the low carbon content, the microstructure consists of 100% ferrite.

ARMCO Pure Iron is used in several industrial processes and products. Uses include melt feedstock material to produce a variety of ferrous-bearing products such as: low-carbon steels, stainless steels, acid-resistant steels, heat resistant steel, high nickel-iron alloys, magnetic alloys, and casting alloys for stainless and heat resistant steels. It is also used directly in applications for transportation (aerospace and automotive), energy (chemical/petrochemical equipment, conventional power stations and various nuclear applications), highly corrosive environments (anodes, galvanizing tanks and like uses), magnetic devices (core, pole, yoke and armature magnets and magnetic shielding), and welding (rods and fuse wire).



ARMCO® Telar 57

A soft magnetic material of the High Purity Iron type, particularly favored in D.C. relay applications.

It is used in several industrial processes and products, in applications for: transportation (aerospace and automotive), magnetic devices (core, pole, yoke and armature magnets), automation, and power distribution (circuit breakers).

ARMCO Telar 57 is characterized by the following important features:

- + low coercive force
- + high magnetic induction
- + excellent aging stability

It achieves the values required in accordance with DIN 17405 for RFe grades with advanced soft magnetic properties.

ARMCO® Pure Iron

Chemical Analysis, wt %

Grade	C	Mn	P	S	N	Cu	Co	Sn
Grade 2	0,01	0,1	0,01	0,008	0,006	0,03	0,005	0,01
Grade 4	0,01	0,06	0,005	0,003	0,005	0,03	0,005	0,005

Special properties:

- + Excellent magnetic properties
- + Improved resistance against corrosion and oxidation in comparison to normal steels
- + Good cold forming capability
- + Ideally suitable for welding

Forms of delivery:

- + Slabs
- + Billets and Blooms
- + Roundbars
- + Flat- and Squarebars
- + Wire in Coils
- + Sheets and Plates
- + Coils, flat rolled
- + Forgings

ARMCO® Telar 57

Chemical Analysis, wt %

C	Mn	P	S	N	Cu	Al	Si
Max. 0,020	0,35 - 0,50	Max. 0,020	0,015 - 0,030	0,005	0,07	0,050 - 0,100	Traces

As a variant of ARMCO Pure Iron, ARMCO Telar 57 contains well-defined additions for increased efficiency during decarburization, excellent stability against magnetic aging and for easing machinability.






Forms of delivery:

- + Roundbars, hot rolled and cold drawn
- + Flatbars, cold rolled
- + Wire in coils



Product Data Bulletins

For more in-depth information about our products we have Product Data Bulletins available. Below you can find the URL's and associated QR Codes to the download links:



PH Stainless Steels

Grade	URL	ARMCO® Product Data Bulletins
17-4 PH®	https://aksteel.eu/downloads/#dkey-aWQ2OA	
15-5 PH®	https://aksteel.eu/downloads/#dkey-aWQ3MA	
PH 13-8 Mo	https://aksteel.eu/downloads/#dkey-aWQ3NA	
17-7 PH®	https://aksteel.eu/downloads/#dkey-aWQ3MQ	
PH 15-7 Mo®	https://aksteel.eu/downloads/#dkey-aWQyMjc	

NITRONIC®

		ARMCO® Product Data Bulletins
Grade	URL	
NITRONIC 50	https://aksteel.eu/downloads/#dkey-aWQ3Mg	
NITRONIC 60	https://aksteel.eu/downloads/#dkey-aWQ3Mw	

ARMCO® Pure Iron / ARMCO® Telar 57

		ARMCO® Product Data Bulletins
Grade	URL	
ARMCO Pure Iron	https://aksteel.eu/downloads/#dkey-aWQ2Nw	
ARMCO Telar 57	https://aksteel.eu/downloads/#dkey-aWQ2OQ	

Supply Program

Available from production and/or inventory locations in Europe

Grade	Bar	Wire	Coil	Sheet/Plate
17-4 PH [®] , 15-5 PH [®]	✓		✓	✓
PH 13-8 Mo, NITRONIC [®] 40 & NITRONIC [®] 60	✓			
NITRONIC [®] 50	✓	✓		
PH 15-7 Mo [®] , 17-7 PH [®]			✓	✓
430, 436			✓	
409, 439 & Aluminized Stainless			✓	✓
ARMCO [®] Pure Iron, ARMCO [®] Telar 57	✓	✓	✓	✓

