

ATI's Global Network



CPI / HPI
Chemical & Hydrocarbon
Processing Industries

Alloys for the Most Challenging Environments



The extreme conditions that exist in chemical processing and refining facilities place exceptional demands on systems to stand up to heat, pressure, stress and corrosion over an operating life that can span decades. Since introducing stainless steel to U.S. industry nearly a hundred years ago, ATI has remained at the leading edge in providing these industries with advanced materials and products that solve their most difficult challenges. Our integrated supply chain and certified product quality assure high performance and reliability. ATI's specialty metals are currently used in refineries, chemical and petrochemical facilities around the globe as:

- Seam-welded & Seamless Pipe
 - Seam-welded & Seamless Tubing
 - Solid & Clad Tubesheets
 - Heat Exchanger Shells
 - PFHE Sheets
 - Distillation Towers/Columns
 - Tower/Column Internals
 - Various Process Vessels
 - Reactors
 - Expansion Joints/Bellows
 - Fermentors
- As well as many other applications.

ATI Global Contacts

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ATI Flat Rolled Products
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ATI Specialty Materials
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ATI Specialty Alloys and Components
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ATI Forged Products
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ATI's Alloys for Typical CPI/ HPI Applications (Partial List)

Specialty Stainless	UNS	Alloy Type	Cr	Ni	Mo	Cu	N	Other	PREN ⁺⁺⁺	Properties & Applications
ZERON® 100*	S32760	25Cr Superduplex	25	7	3.5	0.6	0.25	0.6W	42	High strength; Non-oxidizing acid service
ATI 2205™	S32205	22Cr Duplex	22	5.7	3.2		0.17		35	General corrosion and chloride SCC resistance
ATI 2003®	S32003	Lean Duplex	21	3.5	1.7		0.17		30	Economic 316L alternate (enhanced attributes)
ATI 2102®	S82011	Mo Free Lean Duplex	21	1.6	0.2		0.2	3Mn	25	High strength; general corrosion resistance
AL-6XN PLUS®	N08367	7Mo Superaustenitic	22	25	6.8		0.25		48	Crude distillation internals; water treatment
AL-6XN®	N08367	6Mo Superaustenitic	21	24	6.3		0.23		45	Distillation and stripper internals; water treatment
ATI 904L™	N08904	4Mo Austenitic	21	25	4.5	1.5			35	High TAN; naphthenic acid corrosion service
ATI 20™	N08020	Austenitic	20	33	2.2	3.2			27	Sulfuric and reducing acid service
ATI 316L™	S31603	Austenitic	17	10	2.2				24	Diverse refinery and petrochemical usage
ATI Nickel Alloys	UNS	Alloy Type	Ni	Cr	Mo	Cu	Fe	Other	PREN ⁺⁺⁺	Properties & Applications
ATI 59™	N06059	Non Hardenable	59	23	16				76	Severe corrosion and high strength applications
ATI 276™	N10276	Non Hardenable	60	16	16		5	3.5W	75	Excellent versatility in aggressive media
ATI 22™	N06022	Non Hardenable	60	21	14		3	3W	72	Broad CPI service in aggressive media
ATI 35N™	R30035	Age Hardenable	35	20	10			35Co	52	Best strength and corrosion resist. combination
ATI 625™	N06625	Non Hardenable	63	21	9		5	3.7Nb	51	Combination of high temp and corr. resistance
ATI 725™	N07725	Age Hardenable	57	21	9		8	1.5Ti,3.5Nb	51	High strength; high corrosion resist. Components
ATI 825™	N08825	Non Hardenable	41	21	2	2	32	1Ti	31	Severe chloride and naphthenic acid service
ATI 925™	N09925	Age Hardenable	44	21	3	2	28	2Ti	31	Aqueous corrosion; chloride and sour gas service
ATI 400™	N04400	Non Hardenable	67			32	1		N/A	Sulfuric alkylation and effluent piping
ATI K-500™	N05500	Age Hardenable	65			32		2.7Al	N/A	High strength (impellers, pump shafts, valves)
ATI 200/201	N02200/02201	Non Hardenable	99					.02/.15C	N/A	Alkali corrosion resist. (exchangers, valves, vessels)
High Temp Alloys	UNS	Alloy Type	Ni	Cr	Mo	Nb	Fe	Other	PREN ⁺⁺⁺	Properties & Applications
ATI 35N™	R30035	Age Hardenable	35	20	10			35Co	52	Best strength and corrosion resist. combination
ATI 617™	N06617	Non Hardenable	52	22	9		3	12Co	52	High temp resistant chambers, exchangers, comp
ATI 625™	N06625	Non Hardenable	63	21	9	3.7	5		51	Combination of high temp and corr. resistance
ATI 718™	N07718	Age Hardenable	53	19	3	5	19		29	Fatigue and creep resistance (impellers, valves)
ATI 601™	N06601	Non Hardenable	61	23			14	1Al	23	High temp furnace components
ATI 800AT™	N08811	Non Hardenable	32	21			40	Al+Ti	21	High temp CPI (radiant pyrolysis zones)
ATI 600™	N06600	Non Hardenable	72	16			8		16	High temp furnace components
Ti and Zr Alloys	UNS	Alloy Type	Fe	Cr	Mo	V	Z	Al	Other	Properties & Applications
Ti Grade 1	R50250	CP Alpha	0.15						0.12 O	Excellent formability and corrosion resistance
Ti Grade 2	R50400	CP Alpha	0.2						0.15 O	Improved strength (waterside exchangers or pipe)
Ti Grade 7	R52400	CP Alpha	0.25						0.2 Pd	Enhanced crevice corrosion resistance
ATI 425®	R56400/Gr.38	Alpha - Beta	1.5			2.5		4	0.25 O	Continuous formed alloy Ti; High chloride service
ATI 6-4™	R56400/Gr.5	Alpha – Beta	0.15			4		6.3	0.15 O	Heat treatable; high strength and corrosion resist.
Ti Grade 12	R53400	CP Alpha				0.3			0.8 Ni	CPI vessels, exchanges and coolers
ATI 38-644™	R58640/Gr.19	Beta	0.18	6	4	8	4	3.5		High strength and ductility (springs and fasteners)
Zircadyne® 702	R60702	CP Alpha							4Hf	Superior corrosion resistance: acids, alkali and urea
Zircadyne® 705	R60705	CP Alpha							4Hf, 2Nb	Improved strength and formability

High Temperature Environments

Conditions	Alloy Performance		
	Good	Better	Best
Strength & Creep (Highest Strength)	316, 310	ATI 35N™, 347, ATI 800AT™, 330, ATI 625™**	ATI A286™*, ATI 718™*, ATI 718Plus®*, ATI X-750™*, ATI C-263™*
Strength & Creep (Highest Temp.)	ATI 310™	ATI HX™**, ATI 601™, ATI 625™**, ATI 800AT™	ATI 617™**, ATI 188™**, ATI L-605™**
Oxidation	304, 316	310, E-BRITE®, ATI 600™, ATI 800AT™, 330, ATI 625™**	ATI 601™, ATI 617™**, ATI HX™**, ATI C-263™*, ATI 188™**
Carburization	310	ATI 601™, ATI 617™**, ATI 625™**, ATI HX™, ATI 188™**, ATI 800AT™, 330	ATI 600™, ATI C-263™*, ATI 617™
Sulfidation (SO ₂)	304, 316	310, ATI 617™**, ATI 800™, ATI 800AT™, 330	309, ATI 188™**
Nitridation	304, 316, 310	ATI 625™**, ATI 800H™, ATI HX™**	ATI 600™, ATI 617™**
Hot HCl Gas	310, 316	ATI 600™, ATI 601™	ATI 200/201™
Hydrogen Sulfide (H ₂ S)	304, 316, 347	309, 310, 321, 330	ATI 800™

*Denotes ATI alloys that are precipitation or age hardened. Alloys exhibit very high strength and creep resistance.
 **Denotes solid solution strengthened alloys.

Aqueous Corrosion Environments

Conditions	Alloy Performance		
	Good	Better	Best
Chloride Solution (pitting, crevice corrosion)	ATI 2003®, ATI 2205™	AL-6XN®, ZERON® 100+	ATI 22™, ATI 276™, ATI 625™, Ti, AL-6XN PLUS®
Stress Corrosion Cracking (SCC)	ATI 2003®, ATI 2102®, ATI 2205™	AL-6XN®	ATI 400™, ATI 22™, ATI 276™, ATI 625™, ATI 825™, ATI 59™
Hydrochloric Acid	ZERON® 100+, ATI 200™, ATI 400™	ATI 22™, ATI 825™	ATI 276™, ATI 59™, Zircadyne® 702, Ti
Dilute Sulfuric Acid	ATI 2003®, ATI 2102®, ATI 2205™	AL-6XN®, ATI 276™, ATI 625™, ATI 825™, ATI 59™	ZERON® 100+, ZeCor®**
Concentrated Sulfuric Acid	316	310, ATI 20™	E-BRITE®, ATI 825™, ZERON® 100+
Nitric Acid	ATI 2205™, ZERON® 100+	321, 347	ATI 22™, ATI 59™, ATI 625™, ATI 825™, Ti, Zircadyne® 702
Alkalis (caustics)	ATI 2003®, ATI 2102®, ATI 2205™, ZERON® 100+	AL-6XN®, ATI 400™, ATI K-500™, ATI 600™, ATI 904L™	ATI 200/201™, ATI 276™, ATI 625™, Zircadyne® 702
Hydrogen Sulfide (H ₂ S)	316L	ATI 2003®, ATI 2205, AL-6XN®	ATI 276™, ATI 600™, ATI 625™

+ZERON® 100 Superduplex is a registered trademark of Rolled Alloys
 **ZeCor is a registered trademark of DuPont
 ***PREN = Cr +3.3 (Mo + 0.5W) +16N