

St. George Steel supplies AL-6XN® alloy ductwork for the Jeffrey Energy Center flue gas desulfurization upgrade



Specifications

UNS: N08367 **ASTM:** B 688, A 240, B 675, A 312, B 676, A 249, B 804, B 691, A 479, B 462, A 182, B 564, B 366, B 472
ASME: SB-688, SA-240, SB-6 75, SA-312, SB-276, SA-249, SB-691, SA-479, SB-462, SA-182, SB-564, SB-366 Code Case N-438-3, B-31.1 Case 155-1

Chemical Composition, %

	Ni	Cr	Mo	Mn	Cu	Si	C	N	S	P	Fe
MIN	23.5	20.0	6.0	—	—	—	—	0.18	—	—	—
MAX	25.5	22.0	7.0	2.0	0.75	1.0	0.03	0.25	0.03	0.04	balance

Case History

Investments of about \$465 million are being made to upgrade the pollution control equipment at the Westar Jeffrey Energy Center. Modifications to the existing flue gas desulfurization (FGD) equipment, commonly referred to as scrubbers, are a significant part of this investment.

The Jeffrey Energy Center is the largest power plant in the state of Kansas and has three boilers generating 1,857 MW of power. Each fires powder river basin (PRB) coal and had an existing wet FGD scrubber tower to reduce sulfur dioxide (SO₂) emissions. Sulfur dioxide is one of the byproducts produced from the combustion of coal and is a component of acid rain. Modifications are being made to these scrubbers to increase the SO₂ removal to 95%. As part of this scrubber modification, new ductwork was required to link the scrubber towers to one another and to the exhaust stacks. St. George Steel was selected to fabricate the duct modules, which utilized AL-6XN alloy along with alloy C-276 and mild steel depending on the conditions.

In areas, where temperatures are warm enough that condensation is not expected to occur carbon steel was acceptable. When condensation of flue gases was possible, AL-6XN alloy and C-276 were required. Moisture, sulfuric acid, and chlorides would be expected in the condensing liquid. Due to the acid-chloride environment, alloys high in molybdenum were required to resist localized pitting corrosion and ensure low maintenance operation.

In total, the ducting systems required 2,600 tons of plate material for the duct walls, external stiffening and flanged connections. Roughly 500 tons or 88,000 square feet of ¼ inch AL-6XN alloy plate was used for the duct walls. All of the AL-6XN alloy plate was supplied to St. George Steel by Rolled Alloys®.



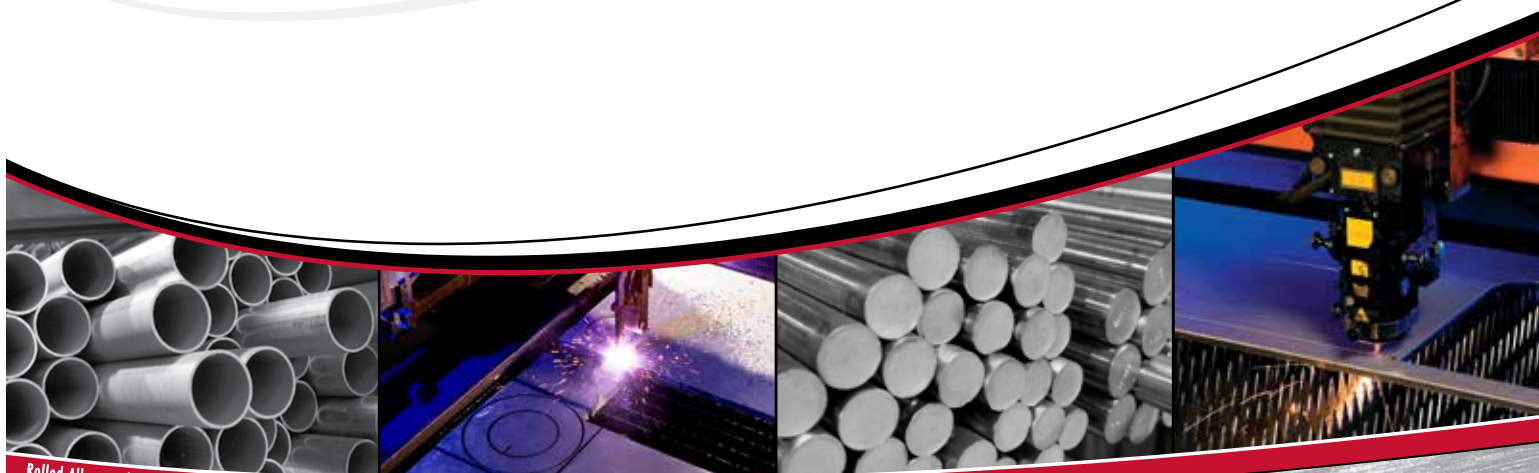
Case History, Continued

St. George Steel, a division of Express Metal Fabricators Inc., is a steel fabricator located in St. George, Utah servicing the power and mining industries. St. George Steel specializes in large fabrications such as ductwork, conveyor systems and structural assemblies along with API Tanks and ASME code vessels. St. George Steel operates two fabrication shops with a total of 134,000 square feet of enclosed fabrication space capable of working with nickel alloys along with mild and stainless steels. AL-6XN alloy is a 6% molybdenum super austenitic stainless steel with a nitrogen addition. As a result of these additions, AL-6XN alloy offers superior corrosion resistance in acid-chloride environments to both 300 series and duplex stainless steels.

Temperature for Initiation of Crevice Corrosion in 10% Ferric Chloride ($\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$) Solution*

Alloy	UNS	% Mo	°F	PRE _n
316L	S31603	2.1	27	23
317L	S31703	3.2	35	29
317LMN	S31726	4.4	68	34
2205	S32205	3.1	68	38
AL-6XN Alloy	N08367	6.2	110	48
625	N06625	9.0	113	51
C-276	N10276	15.4	130	66

ASTM G 48 Practice B, $\text{PRE}_n = \text{Cr} + 3.3\text{Mo} + 30\text{N}$



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