

IN STRUCTURAL STEEL

SOAR HIGHER. FINISH FASTER.



# NUCOR'S A913 IS NOW

SOAR HIGHER. FINISH FASTER.

### The Aeos Advantage

Elevate your project expectations and efficiency with Nucor Aeos—the optimized A913 that's backed by a team of collaborative experts from Nucor Construction Solutions.

Aeos from Nucor is the next generation of structural steel that combines high strength with superior weldability, toughness, and ductility. It offers the most progressive specification for structural shapes in the market and is available in minimum yield strengths of 50 and 65 ksi.

#### WHAT IT'S USED FOR

Typical uses include columns, beams, and members of long-span trusses. Aeos 65 is often specified to reduce member weight, weld preheat, and time and energy spent on projects. Specifiers can expect to see weight savings of 10% to 25% over A992 for these applications.

Aeos 50 can also be used in seismic applications due to a controlled specified maximum yield strength and a maximum yield-to-tensile strength ratio.

#### HOW IT'S MADE

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Aeos is made in Blytheville, Arkansas, at our Nucor-Yamato facility. An in-line Quenching and Self-Tempering (QST) apparatus installed at the end of our rolling line allows efficient production of Aeos. The QST equipment consists of several bays of water nozzles used to perform an in-line heat treatment and cooling rate control process on our structural shapes. The method includes a regulated cooling (quench) of the section, followed by a reheat using energy retained within the core of the section (self-tempering).

The procedure leads to a refinement of the steel microstructure, which gives the section high yield and tensile strengths while also maintaining good ductility and toughness of the material.



### THE ONLY A913 MADE IN AMERICA

With a capacity of more than 2.5 million tons, Nucor is the only North American steel company capable of producing Aeos.

#### What does this mean for you?

It means that mill order changes, availability, tariffs, and foreign supply chain issues don't even enter the picture for your North American projects. It means you can construct faster and more economically, and do so with fewer headaches. It means you can design and build with more confidence.



### **AEOS SPECIFICATIONS AT A GLANCE**

Comparison of Aeos to A992						
Aeos 50	Aeos 65	A992				
50	65	50				
65	80	65				
65	No Max.	65				
0.85	No Max.	0.85				
Yes*	Yes*	No				
18%	15%	18%				
0.38	0.43	0.47/0.45**				
Yes	Yes	No				
	Comparison of Aeos 50 50 65 65 0.85 Ves* 18% 0.38	Comparison of Aeos to A992   Aeos 50 Aeos 65   50 65   65 80   65 No Max.   0.85 No Max.   Yes* Yes*   0.38 0.43   Yes Yes				

\*Supplement S30 may be requested on the purchase order for Charpy V-notch testing at the alternate core location for shapes with a flange thickness greater than 11/2". CVN impact tests shall be performed according to ASTM A673 to a minimum average absorbed energy for each test of 20 ft-lbf at 70° F unless noted otherwise on the purchase order. \*\*0.47% for section with flange thickness greater than 2" (50 mm), 0.45% for all other shapes.

### FABRICATION, LABOR, AND ENERGY SAVINGS

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Aeos delivers significant savings in fabrication, labor, and energy costs, as well as in field-welded connections. Some savings examples include:

- On average, columns can realize a weight savings of 15% to 25% when switching from A992 to Aeos 65. This translates to significant material cost savings, reduced foundation requirements, and lighter strength cranes. Each ton of steel that is eliminated reduces the overall GHG-equivalent output for the structure. Long span trusses can see a weight savings of 15% to 25% in members. This weight savings reduces the overall truss dead load, which allows for the design of smaller sections throughout the truss.
- When switching from A992 to Aeos 65, you can generally expect to decrease your column sizes by 2 footweights within the same section family.



### AVERAGE COLUMN WEIGHT SAVINGS



**AEOS SAVES** 

20%

A992

Aeos 65

### **AEOS VERSUS CONCRETE**



3.0'

For an axial load of 6,000 kips, a 3' square 10-ksi concrete column is required versus an Aeos 65 W14x398 column.

### SQUARE FOOTAGE USED





CONCRETE

### AEOS



### ENVIRONMENTAL AND SUSTAINABILITY BENEFITS OF GREEN STEEL

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## INVESTMENTS FOR POSITIVE IMPACT

Using one of the cleanest and most energy-efficient steelmaking processes available, Nucor has surpassed all 2030 Paris Climate Agreement benchmarks with an energy intensity that is 75% lower than the global average. Over the last decade, we've invested over \$350 million in environmental process equipment improvements. Part of this investment is seen in our mini-mills, which are powered by electric arc furnaces (EAFs) as opposed to blast furnaces. The use of EAF technology melts recycled scrap and turns it into new steel, which plays a significant part in reducing Nucor's environmental impact. In fact, in 2021, Nucor turned 20 million tons of scrap into new steel products that are infinitely recyclable.

And we aren't stopping there. We continuously work to reduce our GHG emissions and our impact on climate change through our energyefficiency efforts. Nucor's annual GHG savings equates to the global average emissions of 4 million gas-powered cars.

Aeos complements Nucor's environmental commitments by reducing the weight of structural members, which leads to a smaller carbon footprint, the ability to use lighter erection cranes, a reduction in the size of a building's foundations, and fewer architectural finishes encapsulating the structure.



### NUCOR IS COMMITTED TO REDUCING ITS GHG EMISSIONS AND DRIVING SUSTAINABILITY THROUGH INVESTMENT AND INNOVATION.

Currently, Nucor has committed to an additional 35% combined reduction in steel mill Scope 1 and Scope 2 GHG intensity by 2030, using 2015 emissions as a baseline. Investing in renewable energy through virtual power purchase agreements is one of the many tools Nucor is utilizing to lower its carbon footprint.



VALUE THROUGH ALL STAGES





Aeos is a prequalified material per AWS D1.1-2020 for Grades 50 and 65. Aeos 50 and 65 are classified as Category D materials, which do not require preheat for welding at all thicknesses due to the limits on maximum carbon and carbon equivalent values.

When using Aeos 50, E70XX electrodes are sufficient. However, when using higherstrength steel, Aeos 65 requires E80XX electrodes. With regard to weld filler material selection, all Aeos sections must use welding consumables with an H8 or better diffusible hydrogen content.

If Aeos 65 is not selected for a project, specifiers may consider the use of Aeos 50 in place of A992 or A572 Grade 50 due to the savings incurred by eliminating preheat. For example, when fabricating an element that is 2.5 inches thick, the preheat requirement for A992 steel is 225° F. The preheat requirement for an Aeos 50 or Aeos 65 section with the same thickness is 32° F. This differential can lead to significant savings in shop hours, plus energy savings and simplified field welding.

Aeos can be welded to other grades of steel. Referring to Clause 5 in AWS D1.1-2020, different grades of steel from Table 5.3 can be successfully joined by implementing the more stringent preheat and interpass temperature requirements of the grades being welded and the selection of the appropriate filler metal.

\*Note: Labor rates, worker efficiencies, and heating equipment may vary, which can affect these values slightly. Generally, for steel to reach its AWS D1.1 preheat temperatures as noted in the table on the top right of this page, the preheat times in the table below it may be needed.

A992 vs. Aeos Preheat Temp. Comparison (per AWS D1.1)*				
Base Metal Thickness	A992	Aeos		
Up to 3/4" (incl.)	None	None		
Over 3/4" through 11/2" in. (incl.)	50° F	None		
Over 1 1/2" through 2 1/2" (incl.)	150° F	None		
Over 2 1/2" (incl.)	225° F	None		
<b>DEQUIDENENTS</b> Minimum baca material temp. 22° I				

<b>REQUIREMENTS:</b>	- Minimum base material temp. 32°			
•	- Consumable = H8 or better			
	- Low restraint connection			

Approximate Time to Achieve Preheat Temp. for A992 (for each 12″ of weld length)*				
Thickness	Time	Temp (°F)		
1"	4-5 minutes	50°		
11/2"	7-8 minutes	50°		
2"	10-12 minutes	150°		
2 1/2"	15 minutes	150°		
> 2 1/2"	Add 5 minutes for each additional 1/2" of material thickness	225°		



### HOW WILL THE SPECIFICATION OF **AEOS STEEL IN AN ORDER AFFECT THE DELIVERY OF MY MATERIAL?**

Aeos is the only domestically produced A913 material. The rolling schedule for Aeos is no different from A992. You can expect no delays due to steel availability or international supply chain issues.

### WHICH BEAM LENGTHS ARE AVAILABLE FROM NUCOR?

Our standard shipping lengths range from 30 to 60 feet. For other lengths, please contact us.

### WHEN I SPECIFY AEOS FOR AN ORDER, WILL THE QST PROCESS LENGTHEN LEAD TIME?

No. Aeos sections, in any grade, have the same availability as all sections produced at the Nucor facility. The QST process for Aeos is in-line and automated, meaning production is as efficient as possible and will not negatively affect delivery time.

### IF I WOULD LIKE TO GALVANIZE MY **AEOS SECTIONS, SHOULD I MAKE ANY SPECIAL REQUESTS?**

Yes. When Aeos sections are to be galvanized, it is encouraged that the silicon content be limited. Upon request, Nucor can provide Aeos sections with silicon in ranges lighter than those indicated in the specification (0.15 to 0.22, specifically). Please inquire for more information at nucor.com/construction-solutions.

### CAN I ORDER AEOS PLATE MATERIAL?

The ASTM A913 specification does not apply to plate material. However, it may be advantageous to specify connection plate material with an equivalent yield strength. In this case, plate meeting ASTM A572 Grade 65 is available from Nucor.

### CAN AEOS BE PREHEATED?

Yes. You can preheat Aeos steel without experiencing any negative effects.

	Sections										
	W12x	W14x	W18x	W21x	W24x	W27x	W30x	W33x	W36x	W40x	W44x
	65	90	76	101	68	84	90	118	135	149	230
	72	99	86	111	76	94	99	130	150	167	262
	79	109	97	122	84	102	108	141	160	183	290
	87	120	106	132	94	114	116	152	170	199	335
	96	132	119	147	103	129	124	169	182	211	
	106	145	130	166	104	146	132	201	194	215	
	120	159	143	182	117	161	148	221	210	235	
	136	176	158	201	131	178	173	241	231	249	
	152	193	175	223	146	194	191	263	232	264	
_	170	211	192	248	162	217	211	291	247	277	
s (plf)	190	233	211	275	176	235	235	318	256	278	
sights	210	257	234		192	258	261	354	262	294	
otwe	230	283	258		207	281	292	387	282	297	
ц	252	311	283		229	307	326		302	324	
	279	342	311		250	336	357		330	327	
	305	370			279	368	391		361	362	
	336	398			306				395	372	
		426			335				441	397	
		455			370				487	431	
		500							529	503	
		550							652		
		605									
		665									
		730									

Aeos	Section	Avail	lability
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### NUCOR®

### **CONTACT US**

For more information, visit nucor.com/construction-solutions or email construction@nucor.com

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