

# AMC

AMERICAN METALCASTING CONSORTIUM

## WEB-BASED SPECIFICATION HANDBOOK HELPS DLA PROCUREMENT FOR FLANGED ELBOW



**Program Overview and Objectives:** Steel Founders' Society of America is developing the Steel Castings Handbook Supplement 2 into a web-based tool under AMC's Innovative Casting Technologies (ICT) Program. Supplement 2 (available for download as a pdf file on SFSA's website) currently depends on the user to know what specification is of interest. Transforming Supplement 2 into an online database allows the user to easily search and cross reference steel casting alloys by any category such as chemistry, heat treatment, and mechanical properties (Figure 1 on reverse). This web-based tool will allow designers and purchasers of steel castings, who may not have any familiarity with this product form, to find the specification that best suits their needs based on wrought or forged steels that they have used.

## SUCCESS STORY

**Problem:** DLA Land & Maritime procures and supplies steel 90° elbows per the military specification MS20762. The elbow has an internal hole that needs to be machined. This 90° elbow is an ideal part to make as a casting; however, the specification only allows for this elbow to be made as a forging. Current forgings are non-compliant due to machinability issues. Cast steel grades with chemistry and properties similar to the forging steel grade (ASTM A108 1137) needs to be identified in order to determine if converting this forging into a casting is feasible.

**Solution:** The web-based Supplement 2 identifies ASTM A732 Grade 6N as an opportunity based on similar chemistry. ASTM A732 is for pressure vessel applications made as investment castings, which would be ideal for this part given the size, quantity, and surface finish. The DLA is currently working on updating the spec sheet to include a casting option.

**Benefits:** Designers and purchasers of components that are currently forged, rolled, welded, or machined, but are best suited to be cast, will be empowered with this searchable tool to quickly and easily find the appropriate specification for their part. The result will be significant reductions in administrative lead time (ALT).

*"The web-based Handbook Supplement 2 will be beneficial to foundries and our customers by providing the capability to conveniently search and compare cast steel grades by chemistry, alloy designation, and mechanical properties."*

Bret Enslin

Metallurgical Engineer, Metaltek International – Wisconsin Centrifugal Division



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## Standards and Specifications for Steel Castings

Description of how to search here

Properties/Chemistry  By Standard

Hardness

BHN  HBW  HRC

Mechanical

Minimum elongation%  Reduction in area

Impact minimum Foot-pounds  or Joules

Tensile strength ksi  or MPa

Yield strength ksi  or MPa

100 hour rupture test MPa  at temperature in °C

Stress rupture test ksi  or MPa

Chemistry

A%  As%  Ba%  Bi%  B%  C%  Co%  Cr%  Cu%  Mn%  Mo%

N%  Nb%  Ni%  P%  S%  Sb%  Se%  Si%  Sn%  Ta%  Ti%

V%  W%  Zr%

27 results found that match the specified search criteria

Specification	Alloy Grade	Heat Treatment	UNS	C	Mn	Yield Strength ksi min.	Yield Strength MPa min.
<a href="#">ASTM A297/A297M-14</a>	HD		J93005	0.5	1.5	35	240
<a href="#">ASTM A297/A297M-14</a>	HE		J93403	0.2 0.5	2	40	275
<a href="#">ASTM A297/A297M-14</a>	HF		J92603	0.2 0.4	2	35	240
<a href="#">ASTM A297/A297M-14</a>	HH		J93503	0.2 0.5	2	35	240
<a href="#">ASTM A297/A297M-14</a>	HI		J94003	0.2 0.5	2	35	240
<a href="#">ASTM A297/A297M-14</a>	HK		J94224	0.2 0.5	2	35	240
<a href="#">ASTM A297/A297M-14</a>	HL		N08604	0.03	0.1	100	688
<a href="#">ASTM A351/A351M-16</a>	HK30	as cast	J94203	0.03	0.1	100	688
<a href="#">ASTM A351/A351M-16</a>	HT30	as cast	N08030	0.03	0.1	100	688
<a href="#">ASTM A494/A494M-15</a>	CY40	as cast or ST	N06040	0.03	0.1	100	688
<a href="#">ASTM A494/A494M-15</a>	CZ100	as cast	N02100	0.03	0.1	100	688
<a href="#">ASTM A494/A494M-15</a>	M30C	as cast	N24130	0.03	0.1	100	688
<a href="#">ASTM A494/A494M-15</a>	M35-1	as cast	N24135	0.03	0.1	100	688
<a href="#">ASTM A494/A494M-15</a>	M35-2	as cast	N04020	0.03	0.1	100	688
<a href="#">ASTM A743/A743M-13a</a>	CE30	ST	J93423	0.03	0.1	100	688

Specification	Alloy Grade	Heat Treatment <sup>A</sup>	UNS
ASTM A351/A351M-16	HK30	as cast	J94203

### Castings, Austenitic, Austenitic-Ferritic, For Pressure-Containing Parts

This specification covers austenitic and austenitic-ferritic (duplex) steel castings for valves, flanges, fittings, and other pressure-containing parts.

C	C	Cr	Cr	Cu	Mn	Mo	Nb	Ni	Ni	N	P	Si	S	V
max	min	max	min	max	max	max	max	max	min	max	max	max	max	max
0.35	0.25	27	23	...	1.5	0.5	...	22	19	...	0.04	1.75	0.04	...

Elong min% <sup>C</sup>	Tensile Strength ksi min	Tensile Strength MPa min	Yield Strength ksi min <sup>B</sup>	Yield Strength MPa min <sup>B</sup>
10	65	450	30	240

<sup>A</sup> ST = to be solution treated. Refer to original specification for additional information on heat treatment requirements.

<sup>B</sup> Determine by the 0.2% offset method.

<sup>C</sup> When ICI test bars are used in tensile tests as provided for in this specification, the gage length to reduced section diameter ratio shall be 4:1.

Figure 1: An example of a query. A list of specifications is outputted based on input parameters (highlighted in red). Each specification is hyperlinked.