

NAV 29 FOUNDRY OPERATIONS

<p>1. Does the foundry have a documented quality system?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>a. Are the foundry's employees trained and familiar with portions of the system applicable to their position?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>b. What recognized quality management system does the foundry's quality system comply with? (ISO 9000, MIL-I, MIL-Q)</p>		
<p>c. Does the foundry conduct internal assessments or audits when required by contract or internal quality system?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>i. Does the foundry maintain records of internal review such as schedule, results, and corrective actions?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>2. Has the foundry ever been subjected to a 3rd party quality audit? If so, by whom? (Provide documentation of these audits.)</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>3. Does the foundry have a documented process for evaluation, review and selection of suppliers for their raw material? (i.e., ingot, alloying additions, purchased scrap)?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>a. Does this process include a review for past performance?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>b. Does this process include any onsite review or evaluation of technical capability?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>c. Provide listing of suppliers, noting the type/alloy of material provided?</p>		

<p>4. Is there a documented procedure/process to determine the acceptability of raw materials? (i.e., ingot, alloying additions, purchased scrap)?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>a. Does this include reviewing material certifications and/or re-performing material verification testing to confirm material meets specification requirements?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>b. Does this process include reviewing the traceability of certified material to the paperwork?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>c. Does this procedure/process take into account differences in the source of the material such as, past supplier performance, receiving certified and traceable material with test reports, versus uncertified scrap? (i.e. changing sample sizes or performing additional testing on material before acceptance)</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>5. Does the foundry have a documented procedure for controlling, storing, and issuing raw materials and additives?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>a. Does this procedure require raw materials to be labeled/marked and stored in a manner to preclude mix-up with other similar materials?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>b. Does the foundry control back scrap (revert); re-melt or internal scrap material by alloy and/or heat number?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p>
<p>c. Does the procedure cover the disposition of material that does not meet chemical and/or mechanical requirements?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>
<p>6. Is there a procedure for developing, documenting and controlling the entire casting process, including all foundry engineering, such as gating, risering, pattern design and pour temperature, when a 1st article test is required?</p>	<p>Yes <input type="checkbox"/></p>	<p>No <input type="checkbox"/></p>

a. Does this procedure include a change control process that addresses analyzing any changes to the casting processes for their effect on the end product and whether or not validation and/or re-qualification of the 1 st article test is required?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
b. Once the 1 st article test is accepted by the customer, is the customer notified when there are modifications to the production of a casting that impacts the acceptability of the original 1 st article test?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
7. Does the foundry have a specific melting and pouring procedure for each alloy group the foundry melts?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
a. Do these procedures define what is considered a single heat or lot?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
i. Do the heat/lot definitions comply with the applicable specifications for the alloy?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
b. Do these procedures call for the use of calibrated instrumentation to control the temperature of the melt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
i. Are calibrated instruments being used where required by internal procedure or by the governing specifications? (see checklist #4 for additional guidance on auditing calibration systems)	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
c. Do internal procedures require a chemical check analysis prior to releasing the melt for pouring?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
d. Do these procedures identify when and how many chemical and/or mechanical test coupons are poured?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
i. Do the procedures comply with the applicable specifications for the alloy?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

ii. Are these test coupons marked to maintain traceability to the heat/lot and to the actual production material?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
e. Do the procedures identify the size and shape of the test coupons required?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
i. Does this meet the requirements of the applicable casting specifications, including some heat treatable castings which require the test coupons to represent the thickest portion of the production castings?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
f. Do the melt procedures specifically forbid adding material to the melt after the test coupons used to certify the final product have been poured?	Yes <input type="checkbox"/>		No <input type="checkbox"/>
g. Do the melt procedures have limits on the maximum size or weight of a pour?	Yes <input type="checkbox"/>		No <input type="checkbox"/>
i. Are these limits within the capability of the foundry's equipment?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
h. Do these procedures limit pour time and/or address additions of deoxidants and other additives to maintain chemistry where applicable?	Yes <input type="checkbox"/>		No <input type="checkbox"/>
i. Do procedures require measurement or weighing of these additives before use?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
i. Do the procedures require heat lot traceable records that record the parameters used during the casting process, such as mold #, personnel performing pour, the constituents (additives, certified ingot, backscrap/revert) used in the pour including amounts, and the melt time and temperature?	Yes <input type="checkbox"/>		No <input type="checkbox"/>

8. Are heat/lot traceability markings cast into final product or marked immediately after cooling and removal from the molds? Or is a process in place to assure traceability is maintained until markings are applied?	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
9. Is foundry equipment that may come in contact with molten product, such as ladles, crucibles, stirrers, skimmers and thermal blankets, controlled for use in a single alloy or family of alloys where cross contamination is not a concern?	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
10. Where foundry equipment is used on multiple alloy types are precautions such as "wash heats" or other cleaning processes used to prevent or limit cross contamination of different alloys?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>		
11. Does the foundry have any process to limit surface contamination of the final product from shot blasting or other final cleaning process?	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
12. Is the remaining metal after each pour (gates, risers and other scrap) labeled, sorted and stored in accordance with the foundries material control process?	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
13. Are the chemistry and mechanical properties of each heat/pour of metal verified after melting and/or casting even where pre-certified ingot is used?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>		
14. Does the foundry use a documented procedure for performing and evaluating NDT on the final product? (see checklist #3 for additional guidance on auditing NDT)	Yes <input type="checkbox"/>	No <input type="checkbox"/>			
a. Where required by contract has the foundry or their sub contractor received approval from an authorized activity for their NDT procedures?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>		
15. NDT Performed in house					
a. Mark NDT performed	MT <input type="checkbox"/>	PT <input type="checkbox"/>	VT <input type="checkbox"/>	RT <input type="checkbox"/>	UT <input type="checkbox"/>

<p>b. Is NDT used as certification of the final product being performed by a NDT examiner certified in the applicable discipline?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
<p>c. Are records kept that detail the size and location of any rejectable defects noted during the inspections?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
<p>16. Subcontracted NDT</p>	
<p>a. Mark NDT subcontracted and list subcontractors used.</p>	<p>MT PT VT RT UT <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>b. Is any oversight or evaluation performed on subcontractors performing NDT?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
<p>c. Does the foundry receive reports detailing the size and location of any rejectable defects noted during the inspections?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
<p>17. Does the foundry have a process for reviewing repetitive casting defects in order make improvements to their casting process and foundry engineering which will improve the acceptability of the final product?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p>
<p>18. Does the foundry use documented qualified procedures for performing welding repair on their castings? (See Checklist #22 for additional guidance on auditing welding)</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p>
<p>a. Are the welders trained and qualified to the welding procedures they are asked to perform?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p>
<p>b. Does the foundry maintain records showing the training and qualification of the welders?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p>
<p>c. Where required by contract has the foundry or their subcontractor received approval from an authorized activity for their welding procedures?</p>	<p>Yes <input type="checkbox"/></p> <p>No <input type="checkbox"/></p> <p>N/A <input type="checkbox"/></p>

19.	Are records maintained when welding repairs are performed?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
	a. Do these records contain the information required by the applicable welding or casting specification (e.g. MIL-STD-278 or MIL-STD-1688) such as location of the repair, welder performing the repair, welding procedure used, welding consumables used, and results of follow-up NDT?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
20.	Are MILSPEC welding consumables used when required by the welding procedure, contract or governing specification?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
21.	Are the welding consumables used to perform weld repairs certified to the applicable MILSPEC, AWS, or other commercial specification?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
22.	Does the foundry subcontract the testing of any of its material, such as chemical, mechanical or weldability testing?	Yes <input type="checkbox"/>		No <input type="checkbox"/>
	a. Does the foundry use a documented procedure to select/evaluate subcontracted test lab(s) performing mechanical and chemistry testing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
	b. Are test labs required to be certified through a 3 rd party such as A2LA or NADCAP?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
	c. Is a list of qualified testing labs, along with their capabilities, maintained?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
	d. Does the foundry perform any oversight or confirmation testing to provide assurance that the testing lab is performing properly?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
23.	Is a documented procedure used for preparing the test coupons and accomplishing the chemical analysis?	Yes <input type="checkbox"/>		No <input type="checkbox"/>

a. Is this procedure available at the working level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
b. Is there a documented training plan, including training records, for this procedure?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
c. List type, brand, and model of equipment used to perform chemical analysis.			
i. Is the equipment used for the chemical analysis calibrated in accordance with the applicable specification (ANSI Z-540.1) or manufacturer's recommendations?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
d. Are the standards used to calibrate the test equipment traceable to a NIST standard or other recognized organization?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
i. Are the standards used representative of the full range of alloys produced by the facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
e. Is the testing equipment capable of reporting full quantitative values, including trace elements, for the alloys produced by the foundry?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
f. Does the procedure define rounding and use of significant digits when reporting the results of the chemical analysis?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
24. Is a documented procedure used for preparing the test coupons and accomplishing the mechanical property testing?	Yes <input type="checkbox"/>		No <input type="checkbox"/>
a. Is this procedure available at the working level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

b. Is there a documented training plan, including training records, for this procedure?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
c. List type, brand, and model of equipment used to perform mechanical testing.			
i. Is the equipment used for mechanical testing calibrated in accordance with the applicable specification (ANSI Z-540.1) or manufacturer's recommendations?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
d. Are the standards used to calibrate the test equipment traceable to a NIST standard or other recognized organization?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
i. Are the standards used representative of the full range of alloys produced by the facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
e. Does the procedure define rounding and use of significant digits when reporting the results of the chemical analysis?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
25. Is a documented procedure used for preparing and testing the weldability test coupons?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	
a. Is this procedure available at the working level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>
b. Is there a documented training plan, including training records, for this procedure?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

Additional concerns/comments: