



## **D1-4426, *Approved Process Sources***

### **Purchase Order Flow Down Requirements**

Common Commodity Requirements

Unique Commodity Additional Requirements

- Chemical Processes
- Heat Treat
- Materials Testing Laboratories
- Nondestructive Testing
- Surface Enhancement (Shot Peen)
- Welding

*Purchasers are required to adequately define and document the statement of work, where appropriate: specification, specification revision, specification departures, Type, Class, Grade, program number, design authority, pre/post processing steps, as applicable. The organization shall ensure the adequacy of specified purchase requirements prior to their communication to the processor.*

# Common Commodity Requirements

## Purchase Order Processing Information Flow Down

### I - Required Information (Always)

<b>1</b>	<p><b>Purchase order number and date issued</b></p> <p>The purchase order shall have a unique number that has been assigned to this specific shipment and shall be dated. Any revisions or amendments to the purchase order shall also have a unique identity, such as a revision letter or a revision date as part of the purchase order number. Either the purchase order shall accompany the parts, or the paper work accompanying the parts shall have all the details required.</p> <p>NOTE: D1-4426 REQUIREMENT: Processor/Suppliers are required to adequately define and document prior to accepting an order, including but not limited to: specification, specification revision, Type, Class, Grade, program number, design authority, pre/post processing steps, as applicable.</p>
<b>2</b>	<p><b>Purchase order originator name and address</b></p> <p>Complete mailing and shipping addresses are necessary.</p> <p>Shipping Location: If different from the address on the purchase order, the "Ship- To" location shall be stated on the purchase order.</p>
<b>3</b>	<p><b>Purchase order originator contact person and method of contact</b></p> <p>Include the phone number, cell phone number, fax number, title, and/or the e-mail address of the person or persons to be contacted for purchase order and/or technical questions.</p>
<b>4</b>	<p><b>Processor name and address</b></p>
<b>5</b>	<p><b>Part number and part name, or product form description of each item</b></p> <p><u>Part I.D.:</u> Each item on the purchase order shall be identified by a unique number, a part number or part number/serial number.</p> <p><u>Material/Alloy Designation or Specification:</u> Use standard alloy designations, such as 7075 Aluminum, 4130 alloy steel, 304L stainless steel or AMS. Aluminum sheet shall be listed as clad or bare. Trade names or generic material designations can be misleading and are not accurate. Example: Air harden tool steel, low carbon steel, 7000 series, chrome-moly, and 300 series all cover many different alloys with different heat treat designations.</p>
<b>6</b>	<p><b>Quantity (of each item)</b></p> <p>Each unique line item shall be quantified, including all test samples.</p>
<b>7</b>	<p><b>Boeing program or site</b></p> <p>Specification departures and/or processing options can vary by <u>Boeing Division</u>. Boeing requires this information to be flowed down and listed on the purchase order in order for the processor to know which PSD's or other changes apply to the products being processed.</p>
<b>8</b>	<p><b>Model of craft</b></p> <p>Specification departures and/or processing options can vary by <u>Model or Craft</u>. Boeing requires this information to be flowed down and listed on the purchase order in order for the processor to know which PSD's or other changes apply to the products being processed.</p>
<b>9</b>	<p><b>Processing specification, specific revision level, and all applicable engineering departures (such as PSDs &amp; SPEOs)</b></p> <p><i>Note: Applies to purchase orders requesting processing (for example, does <u>not</u> apply to procurement of part numbers)</i></p> <p><i>Note: Applies to top level process specification (for example, does <u>not</u> apply to lower level referenced specifications)</i></p> <p>Processing requirements shall be stated in terms of the specifications to be processed (type, class, and grade as applicable), specific revision level, and all applicable engineering departures (such as PSDs &amp; SPEOs). Unique requirements shall be stated verbatim from the specific originating applicable drawings or specifications.</p>

## Common Commodity Requirements

### Purchase Order Processing Information Flow Down

<b>10</b>	<p><b>Present material condition (Examples: as machined and deburred, as cast, as straightened, as machined and etched, stress relief status or need, etc.)</b></p> <p>Identification of the material condition must be clear. Example: Normalized, 1/2 H, solution treated and cold worked/stretched, stress relieved, etc. Important: Any processing performed after purchasing the material shall be noted clearly. Operations incorporated for manufacturing purposes can have a significant effect on the properties of the material after heat treat. Example: Hot forming, bending, in-process stress relieving, welding etc.</p>
<b>11</b>	<p><b>Processor must be, and/or use D1-4426 approved sources (<a href="http://www.boeingsuppliers.com/d14426/">http://www.boeingsuppliers.com/d14426/</a>)</b></p> <p>It is the responsibility of the company issuing the purchase order to verify that all Processors are approved and listed in D1-4426 for those processes contracted. These requirements must be flowed down to all sub-tiers/processors utilized.</p>

### II -Required Information (When Applicable, defer to spec/drawing)

<b>1</b>	<p><b>Processor certificate of conformity/test data requirements (as required by contract and or specification)</b></p> <p>Any additional information to be certified over and above the specification or test reporting requirements shall be stated.</p>
<b>2</b>	<p><b>Test methods and specimens</b></p> <p>All test samples (specimens, bars, extra parts, coupons, etc.) Provided shall be listed on the purchase order along with their description, quantities, dimensions, test purpose and test requirements. Any special tests required by a customer other than the specification shall be accounted for in the purchase order requirements.</p>
<b>3</b>	<p><b>Test sampling</b></p> <p>Shall conform to the requirements of the referenced specification. Some require 100% of the parts to be tested. However, sampling may be permitted by specification, or sometimes allowed with cognizant engineering and/or quality approval. Any deviations from the specification listed testing requirements must be stated on the purchase order and the sampling requirements stated.</p>
<b>4</b>	<p><b>Test location</b></p> <p>If inspection locations are specified or required for hardness or any other test, this shall be stated on the purchase order, drawing, or other documents. If tests in certain locations are detrimental to the fit, finish, or function of a part (i.e. bearing surfaces, etc.), such detrimental locations shall also be stated.</p>
<b>5</b>	<p><b>Pre and post processing (cleaning, stress relieve, etc.) to be performed by the processor</b></p> <p><b>A. List processing specification, its revision level, and all applicable departures (e.g. PSDs)</b></p> <p style="padding-left: 20px;"><i>(Note: Sub-level specifications and departures do not need to be identified)</i></p> <p style="padding-left: 20px;"><i>(Note: Applicable to P.O.s for processing, not part numbers)</i></p> <p><b>B. Define the processing requirements detail</b></p> <p><u>Prior Processing</u>: Any prior processing that has been accomplished, out of sequence processing, or any rework or repair operations that could affect the outcome of the processing to be accomplished must be clearly stated on the purchase order.</p> <p><u>Post Processing</u>: The purchase order shall specify any post processing that the processor is to perform which are not required by the specification or drawing. Any specifications required for these processes shall be stated.</p>
<b>6</b>	<p><b>Frozen (Fixed) Process Document and Revision (for example D6-1276, SMPP, ...)</b></p> <p>Any fixed process plans shall be provided and include the Frozen Process No., revision and date stated on the purchase order. Certifications shall be written to reflect these exceptions when applicable.</p>

## Common Commodity Requirements

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<b>7</b>	<p><b>Approved exceptions to requirements</b></p> <p>Any other exceptions to the specification, drawing or any other requirements shall be stated clearly on the purchase order. Certifications shall be written to reflect these exceptions when applicable.</p>
<b>8</b>	<p><b>Part serial numbers</b></p> <p>Serialized parts and their associated serial numbers shall be noted on the Purchase order. Any special traceability requirements for the hardware or testing performed shall be clearly stated purchase order. If any special certification statements are need due to these requirements shall be clearly stated.</p>
<b>9</b>	<p><b>Shipping location (if other than originator address)</b></p> <p>If different from the address on the purchase order, the "Ship- To" location shall be stated on the purchase order.</p>
<b>10</b>	<p><b>Special Conditions:</b></p> <p><b>A. Handling (part protection, customer property or tooling)</b></p> <p><b>B. Handling (personnel protection)</b></p> <p><b>C. Surface Condition (Any special surface finish requirements)</b></p> <p><b>D. Engineering instructions</b></p> <p><b>E. Fixturing or Tooling required</b></p> <p><b>F. Dimensional/tolerance requirements and measuring methods</b></p> <p><b>G. Packaging</b></p> <p><b>H. Documentation required with shipment</b></p> <p><u>Special Packaging, Handling and Shipping:</u> Any special packaging, handling, preservation, or shipping requirements shall be stated on the purchase order. Otherwise the parts will be processed and protected normal and returned in the packaging they were received in.</p> <p><u>Tooling:</u> Any fixtures or special inspections tools accompanying the jobs shall be stated on the purchase order. Their identity and revision, if applicable, shall be stated. If they are shipped with the parts they shall be identified. If they are to be returned, it shall be stated. Special instructions for use of the fixtures and tools shall be included.</p> <p><u>Special Documentation:</u> Any additional documentation, such as stamped-off routing sheets, furnace charts, in-process test results (such as plating thicknesses), furnace numbers, processing data, etc. shall be specified on the purchase order.</p>
<b>11</b>	<p><b>Due date</b></p> <p>A due date that has been agreed upon by the processor shall be listed on the purchase order. Note: If receiving inspection discovers extenuating circumstances, such as count problems, re-cleaning, etc. the due date may need to be renegotiated.</p>

# Common Commodity Requirements

## Purchase Order Processing Information Flow Down

### III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform.

These processes have either been performed prior to shipment to the processor,  
or will be performed by the purchaser upon receipt from the processor.

<b>1</b>	<b>Pre and post cleaning/processing (stress relieve, etc.)</b> <u>Pre-Cleaning/Processing:</u> If the Purchase Order Originator or a third party has performed the required cleaning, plating, passivation, or any other processing it shall be so stated on the purchase order. The sub-tier processor will examine the parts for cleanliness and clean or re-clean as necessary, but will also have to perform any steps required by specification unless otherwise directed by purchase order. <u>Stress Relief Operations:</u> If stress relief operations must be accomplished prior to certain processing requirements and have been performed by a facility other than the contracted processing facility, this should be clearly stated on the purchase order. <u>Post Cleaning/Processing:</u> If the Purchase Order Originator or a third party will perform the specification required post cleaning, stripping, passivation, or any other processing it shall be so stated on the purchase order. Otherwise, the supplier is required to perform all processes stated in the specification unless the Purchase Order Originator directs them not to. The certifications will be stated likewise.
<b>2</b>	<b>Visual inspection and/or nondestructive testing</b>
<b>3</b>	<b>Other inspection or testing requirements</b> <u>Dimensions:</u> Any required dimensions and tolerances shall be specifically stated. The method of checking the dimensions and tolerances for compliance shall be stated on the purchase order. The terminology of the requirements shall be compatible with the requirements. Example: Post plating dimension of shaft shall be 1.0035 +.005/-.000.

# Unique Chemical Processing Requirements Purchase Order Processing Information Flow Down

## I - Required Information (Always)

<b>1</b>	<p><b>Material/Alloy Designation/Condition</b></p> <p>Use standard alloy designations, such as 7075 Aluminum, 4130 alloy steel, 304L stainless steel or AMS. Aluminum sheet shall be listed as clad or bare. Temper and or material hardness conditions shall be provided. Note: Trade names or generic material designations can be misleading and are not accurate. <i>Example: Air harden tool steel, low carbon steel, 7000 series, chrome-moly, and 300 series all cover many different alloys with different heat treat designations.</i></p>
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## II -Required Information (When Applicable, defer to spec/drawing)

<b>1</b>	<b>Thermal treatments performed</b>
<b>2</b>	<p><b>Racking instructions</b></p> <p>Only when there are specific engineering racking requirements shall they be specified. Otherwise the specifications and the heat treat supplier's experience will determine how to rack, orient, and space the hardware.</p>
<b>3</b>	<p><b>Masking</b></p> <p>All Engineering Drawing requirements shall be specified. Special Masking requirements shall be clearly stated, and if a sketch or drawing is to be used for these purposes, these shall be uniquely identified and be stated on the purchase order.</p>

## III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform.

These processes have either been performed prior to shipment to the processor,  
or will be performed by the purchaser upon receipt from the processor.

<b>1</b>	<b>No additional requirements</b>
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# Unique Heat Treating Requirements

## Purchase Order Processing Information Flow Down

### I - Required Information (Always)

<b>1</b>	<p><b>Material/Alloy designation, specification (if applicable), and present HT condition/Temper</b></p> <p>Use standard alloy designations, such as 7075 Aluminum, 4130 alloy steel, 304L stainless steel or AMS. Aluminum sheet shall be listed as clad or bare. Trade names or generic material designations can be misleading and are not accurate. <i>Example: Air harden tool steel, low carbon steel, 7000 series, chrome-moly, and 300 series all cover many different alloys with different heat treat requirements.</i></p>
<b>2</b>	<p><b>Heat treat specification, revision, and applicable PSDs</b></p> <p>All heat treating specifications and their current revision shall be listed on the purchase order. Specifications that are listed in the applicable documents section of the heat treating specification do not need to be listed, but associated specifications for cleaning, testing, etc. listed on or embedded in the engineering drawing (Blueprint) or other engineering documentation that are not referenced in the heat treating specifications, shall be listed on the purchase order. Many specifications on Blueprints have been superseded by specifications with different requirements than the original.</p>
<b>3</b>	<p><b>Heat treat requirement</b></p> <p>A specific description of the heat treat processing requirement as described on the purchase requisition, the shop paperwork or the engineering drawing (Blueprint) and the revision letter shall be clearly stated on the purchase order. Processes for non engineering drawing (Blueprint) operations or in- process heat treatments must be clearly and unambiguously stated as such. Reference to an engineering drawing (Blueprint) note is acceptable provided the applicable drawing is available. If a specification is called out on the purchase requisition, shop paper or engineering drawing, the specific temperatures, times and other processing details do not need to be on the purchase order. If the temperature, times, or other processing details are specifically called out on the purchase requisition, shop paper or the engineering drawing (Blueprint), shall be provided or the verbiage shall be on the purchase order verbatim. If they are specifically called out on the purchase requisition, shop paperwork, or engineering drawing (Blueprint) they shall be provided with the purchase order or the verbiage shall be on the purchase order verbatim.</p>

### II -Required Information (When Applicable, defer to spec/drawing)

<b>1</b>	<p><b>Special furnace atmospheres</b></p> <p><b>Surface condition</b></p> <p>Information shall be provided regarding any finish machined surfaces or surfaces with minimal amounts of metal removal after heat treatment. Example: Alloy steels require special furnace atmospheres if less than 0.020 inch is removed from any surface after heat treatment. If surface condition, decarburization, or special furnace atmosphere requirements are stated on the engineering drawing (Blueprint) or other documentation they shall be specified on the purchase order.</p>
<b>2</b>	<p><b>Special Racking instructions</b></p> <p>Only when there are specific engineering racking requirements shall they be specified. Otherwise the specifications and the heat treat supplier's experience will determine how to rack, orient, and space the hardware.</p>

# Unique Heat Treating Requirements

## Purchase Order Processing Information Flow Down

<b>3</b>	<p><b>Surface hardening</b></p> <p><b>A. Requirements (e.g. case depth, etc.)</b></p> <p><b>B. Testing methods</b></p> <p><b>C. Stock removal</b></p> <p>All Engineering Drawing (Blueprint) requirements shall be specified. However, the case depth shall take into account subsequent stock removal. If specific test methods are required they need to be stated on the purchase order. Test samples provided shall be representative of the parts. The method of verifying depth should be stated.</p>
<b>4</b>	<p><b>Hardness/conductivity test sampling (If other than as specified in the referencing Heat Treating specification)</b></p> <p>Shall conform to the requirements of the referenced specification. Some require 100% of the parts to be tested. However, sampling may be permitted by specification, or sometimes allowed with cognizant engineering and/or quality approval. Any deviations from the specification listed testing requirements must be stated on the purchase order and the sampling requirements stated.</p>
<b>5</b>	<p><b>Hardness test location</b></p> <p>If inspection locations are specified or required for hardness or any other test, this shall be stated on the purchase order, drawing, or other documents. If tests in certain locations are detrimental to the fit, finish, or function of a part (i.e. bearing surfaces, etc.), such detrimental locations shall also be stated.</p>
<b>6</b>	<p><b>Other test sampling and test locations</b></p> <p>See 4 and 5 above</p>
<b>7</b>	<p><b>Post heat treat processing (if to be performed by the heat treater)</b></p> <p>The purchase order shall specify any post heat treating process that the heat treater is to perform which are not required by the specification. These might include blasting, chemical cleaning, stripping, straightening, NDT, etc. Any specifications required for these processes shall be denoted.</p>



# Unique Heat Treating Requirements

## Purchase Order Processing Information Flow Down

### III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform.

These processes have either been performed prior to shipment to the processor, or will be performed by the purchaser upon receipt from the processor.

1	<b>The required clean and descale per BAC5651 or BAC5625 following heat treatment per BAC5619</b>
2	<b>Other post heat treat testing</b> Purchase orders need to have a statement which clearly identifies the tests required by the heat treater which are referenced in the process specifications. This statement may be written to either specify only the tests required or list the tests not required. <i>Example: Perform hardness testing only, hardness and tensile testing only, process per XXX-XXXX except tensile, metallography, and magnetic particle inspection not required. If test samples were provided and are to be returned untested this shall be so stated.</i> Only those tests which are performed shall be so stated on the heat treat supplier's certification/test report. Comment: There is still a lot of aerospace heat treating being performed to AMS specifications. They contain more information related to product testing than heat treatments. In these cases the purchase order may specify the tests required by the heat treater than specifying those not required. <i>Example: "hardness testing only", "hardness and conductivity testing only", etc.</i>

# Unique Material Test Laboratory Requirements Purchase Order Processing Information Flow Down

## I - Required Information (Always)

1	Specimen preparation requirements
2	Acceptance criteria If 'information only' state as such on PO

## II - Required Information (When Applicable, defer to spec/drawing)

1	Material identification (alloy and temper)
2	Sample return/retention and protection of sample (ex: tensile fracture surfaces)
3	Environmental requirements (elevated temps, humidity, etc.)
4	Specimen identification (such as specific heat/lot coupon)

## III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform. These processes have either been performed prior to shipment to the processor, or will be performed by the purchaser upon receipt from the processor.

1	No additional requirements
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# Unique Nondestructive Testing Requirements Purchase Order Processing Information Flow Down

## I - Required Information (Always)

<b>1</b>	<b>Nondestructive test requirements: Basically as called from the drawing, data set, or specification requiring the inspection</b> <b>A. NDT Method</b> <b>B. NDT acceptance criteria specification - if not contained in the NDT specification callout</b>
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## II -Required Information (When Applicable, defer to spec/drawing)

<b>1</b>	<b>Material/Alloy designation and specification</b>
<b>2</b>	<b>NDT procedure approval by Boeing Level 3 when required (Examples: PS specs for St. Louis, DPS specs for C-17, when inspecting BAC5578/ BAC5657 composite structures per BAC5980 with facility/ equipment approvals reflected in D6-53993 etc.)</b>
<b>3</b>	<b>Etch prior to penetrant inspection or rationale for not etching (Example: Etching not required because: no smearing operations performed; casting class does not require etch; inspection is for forming only; welds only; required cleaning and etching has already been performed by.. etc.)</b>
<b>4</b>	<b>Pre and post processing specifications</b>
<b>5</b>	<b>Defect marking requirements</b>

## III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform.

These processes have either been performed prior to shipment to the processor,  
or will be performed by the purchaser upon receipt from the processor.

<b>1</b>	<b>No additional requirements</b>
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# Unique Surface Enhancement Processing Requirements Purchase Order Processing Information Flow Down

## I - Required Information (Always)

<b>1</b>	<p><b>Material/Alloy designation and specification</b></p> <p>Use standard alloy designations, such as 7075 Aluminum, 4130 alloy steel, 304L stainless steel or AMS. Aluminum sheet shall be listed as clad or bare. Trade names or generic material designations can be misleading and are not accurate. <i>Example: Air harden tool steel, low carbon steel, 7000 series, chrome-moly, and 300 series all cover many different alloys with different heat treat requirements.</i></p>
<b>2</b>	<p><b>Drawing requirements for shot peen (Shot size, intensity, coverage, masking )</b></p>
<b>3</b>	<p><b>Edge and hole preparation condition (e.g. sharp edges have been deburred)</b></p> <p>There shall be no sharp edges on the parts prior to peening. The purchase order shall state this condition being verified.</p>
<b>4</b>	<p><b>Certificate of Conformance statement noting there are limitations of thermal exposure and metal removal after shot peening</b></p>

## II -Required Information (When Applicable, defer to spec/drawing)

<b>1</b>	<p><b>Shot peen technique sheet requiring approval by Boeing Engineering (D6-1276, Program PSD )</b></p>
<b>2</b>	<p><b>Peen Forming or Peen Straightening instructions</b></p> <p>The requirements for forming/ straightening, check fixture and surface finish shall be noted on the purchase order.</p>

## III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform.

These processes have either been performed prior to shipment to the processor,  
or will be performed by the purchaser upon receipt from the processor.

<b>1</b>	<p><b>No additional requirements</b></p>
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# Unique Welding Requirements Purchase Order Processing Information Flow Down

## I - Required Information (Always)

1	Material/Alloy designation and specification
2	Weld Method (Fusion: Gas Tungsten Arc Welding, Electron Beam Welding, etc.; Resistance: RSW, RSEW, etc.)
3	Inspection requirements (visual, nondestructive testing, etc.)
4	Weld acceptance criteria specification

## II -Required Information (When Applicable, defer to spec/drawing)

1	Weld Class - When the weld specification has weld classes, the class shall be specified
2	Special welding conditions (Example: specific filler wire requirements, chamber welding, etc.)

## III - Processes Not Required To Be Performed

Specify the processes the processor will not be required to perform.

These processes have either been performed prior to shipment to the processor,  
or will be performed by the purchaser upon receipt from the processor.

1	No additional requirements
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