



Contract Review



Rev ORG

Today's Instructor



Agenda

- Our Objective
- Flow Down of Requirements
- What is Contract Review
- Elements of Contract Review



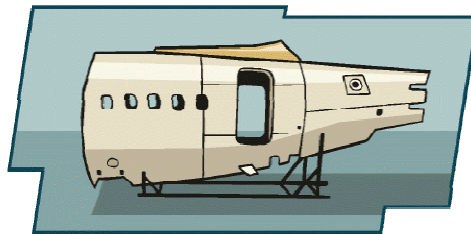
Our Objectives

- To ensure that you understand the essential features and concepts of Contract Review
- To ensure you know how apply the concepts to meet customer requirements



Flow Down of Requirements

- Can be a complex process
- Aerospace manufacturers and suppliers are challenged to accurately understand, implement and comply with product requirements
- The aim is to ensure that the product is manufactured and processed correctly



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Flow Down Issues

- Multi-tier subcontracting
 - Prime contractor down to Raw Material suppliers
 - 5 or more tiers is common
- Numerous requirements contained in various documents
 - Drawings, Process Specs, Material Specs,
- Many types of and assumptions in Specifications
 - Availability, use of old versions
- Drawings
 - Units, Detail or Assembly, CAD data (tolerances)



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Flow Down Issues (cont)

- Purchase orders
 - Special Instructions, Approval requirements, Terms and conditions
- Incomplete purchasing paperwork
 - Missing details (no 'drawing attached', etc)
- Rush orders
 - Parts made, paperwork approved later, certification delays



Poor Flow Down

- Ineffective planning and flow down affects
 - Non conformances internally
 - Returns from customers
 - Product Delays
 - Concessions
 - Product Recall / Service Failures



Problems - Supplier Perspective

- Customer requests a product to be manufactured or a special process performed on a product with:
 - No paperwork
 - Purchase Order (PO) with reference only to a drawing note and the drawing is not supplied
 - PO has missing information:
 - Drawing number but no revision
 - Incomplete Alloy or heat treatment condition
 - Incorrect information (classification, alloy, processing requirements)



Supplier Perspective

- Hardware arrives at facility for processing from an intermediate who is not the final customer or design authority
 - This Sub-Tier may not have all the necessary information:
 - Copies of drawings or specification,
 - including revision levels
 - The Design Authority or prime customer
 - Design Contact for information / clarifications



Why the Problems?

- The immediate customer representative may not understand the need for the requested information
 - Requests can generate some interesting responses
 - Even Design Authority representatives are not exempt:

Email from Prime to Tier 1 supplier about a Tier 2 supplier:

.....She needs to understand that we will process the revised paperwork in a timely manner but until that happens they are able to process and ship the hardware. I'm extremely disappointed with their (Company Name) inability to work with us. The revised paperwork shouldn't hurt them; they are still going to get paid. Over all, I would prefer to finish the parts we have in-house and eventually go to another supplier.....



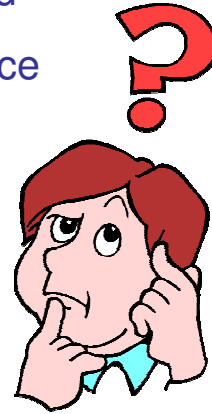
Design Authority Perspective

- 2nd, 3rd, 4th Tier Sub Contracting
 - NDT, Heat Treat, Chemical Processing companies can be far removed from the Design Authority.
 - Hardware arrives from an intermediate who is not the final customer or design authority
 - Information received to the sub-tier can be confusing, contradictory or incomplete
 - Resources allocated to Planning and Contract Review
 - Insufficient resource allocated for contract / specification review on new manufacture and / or repeat orders



Flow Down – Why the Problems

- Many Sub-Tier Suppliers get confused
- They lack of knowledge and experience
 - Poor Contacts
 - Unfamiliar with Specifications
 - Make Assumptions
 - Overestimate Capability



Summary - Flow Down Issues

- Purchase Order –
 - Contents, Requirements, Specification references, Correct Revisions of documents
- Customer –
 - Who is the customer? Who are the contacts?
- Documentation –
 - Copies of the latest drawing, access to specifications and other requirements to complete the order
- Knowledge / Experience –
 - The right people involved – Engineering, Quality, Purchasing.
 - Who needs to be contacted when there is a problem or clarification required



Checkpoint

Any Questions



What is Contract Review?

Contract

- An agreement between two or more parties, especially one that is written and enforceable by law



Review

- An inspection or examination for the purpose of evaluation



Source: The American Heritage® Dictionary of the English Language, Fourth Edition copyright ©2000 by Houghton Mifflin Company

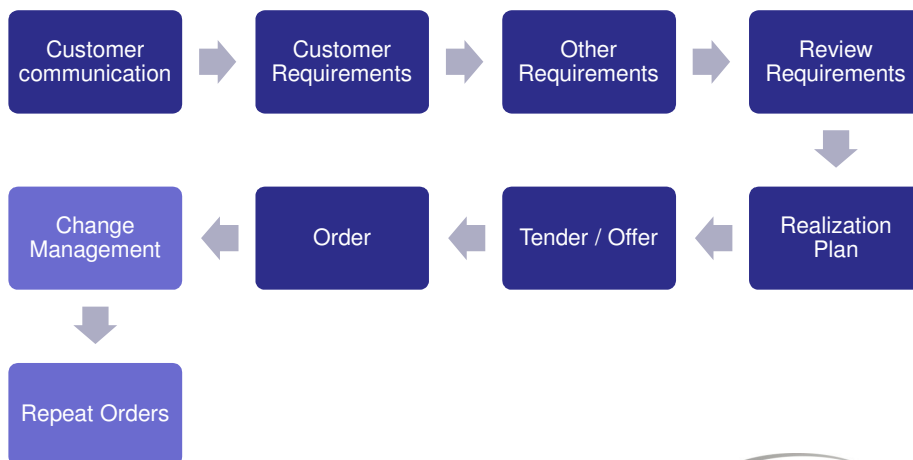


What is Contract Review?

A process for the determination of customer requirements prior to the supply of a product and the proof that the organization has the ability to meet the defined requirements



Contract Review Elements



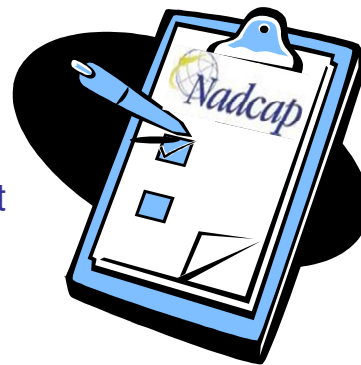
Why do we need CR?

- Because your customers demand:
 - A process for determining their requirements
 - An effective method for implementing a review process to meet those requirements
 - It is a Quality System requirements
- It ensures that:
 - The organization has the ability to meet the defined requirements



Is there a Nadcap requirement?

- Nadcap has no special requirements for contract review
- Nadcap requirements are as part of 'product realization'
- Relating to the control of special products and processes

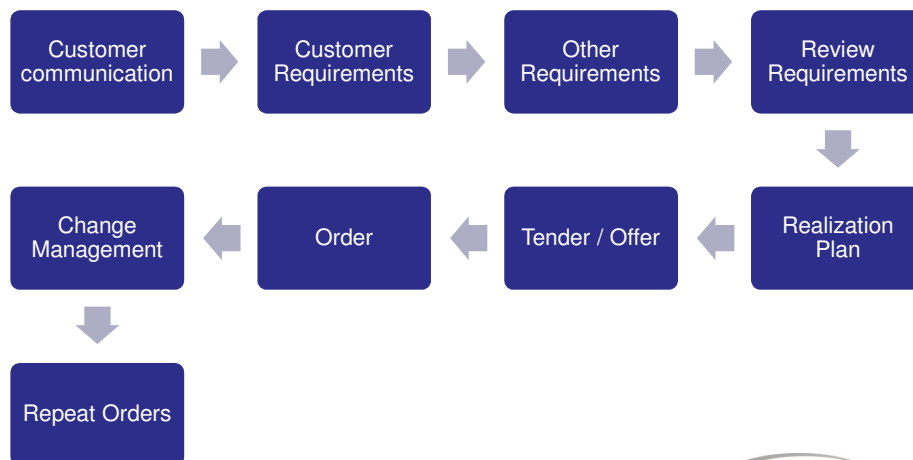


Checkpoint

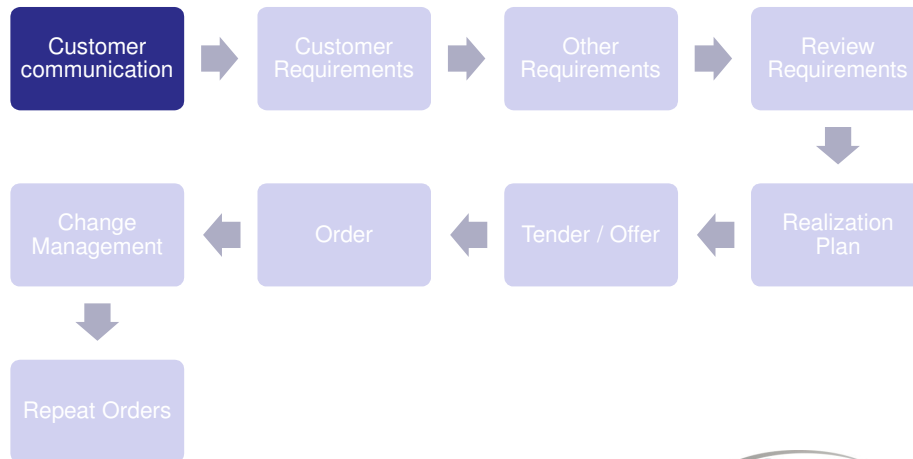
Any Questions



Contract Review Elements



Contract Review Elements



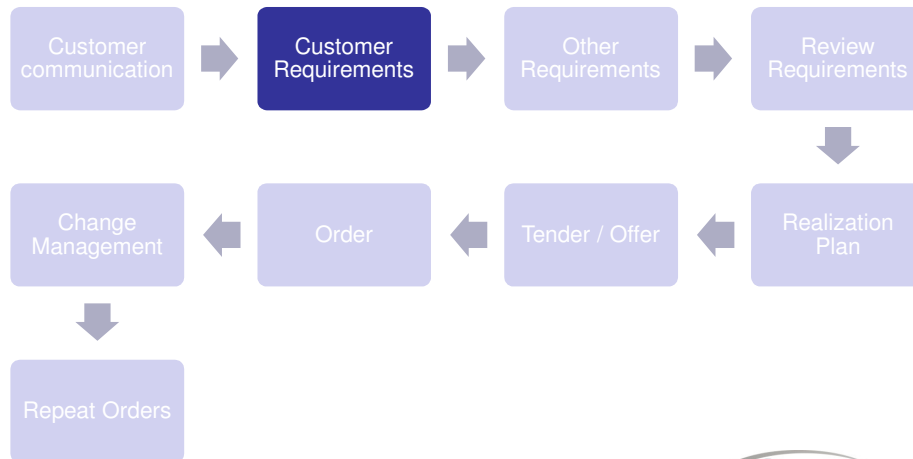
Customer Communication

In general, this means having:

- Product Information
 - What do you make, properties, performance
- Systems for enquiries, contract and order handling
- Plus (later)
 - Feedback, complaint handling
- Who talks for you?
- Who should customers talk to?



Contract Review Elements



Initial Contact

Is it an order or an enquiry?

For orders:

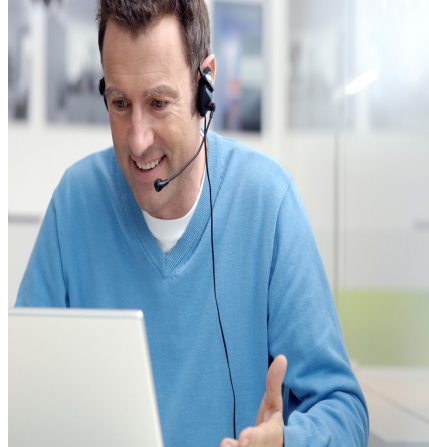
- Acknowledge receipt but do not accept
- Do all that follows
- Then accept if you can

Unsolicited orders are very rare, but do happen



Enquiries

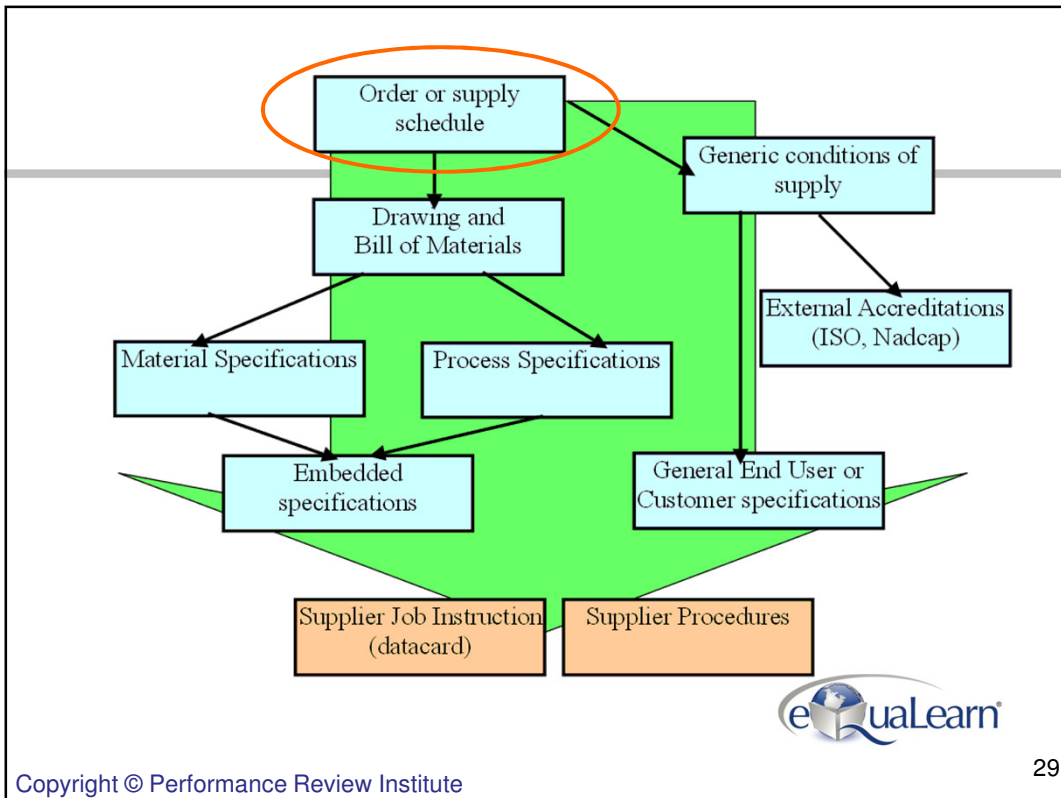
- Acknowledge receipt
 - Find out due date for offers
- Then do all that follows
- Offer a price and delivery
 - Then handle as an order



Interpreting Specifications

- There is a hierarchy of requirements:
 - Legally the order over-rides all other requirements
 - But always confirm differences in writing
 - Then...
 - Drawing
 - Bill of Materials or detail list
 - Referenced specifications
 - General specifications





Backstreet Machining and Aircraft Parts
 "Quality you can bet your life on!"

#2 the Shed
 Back of the Tire Works
 Anytown
 Ok, 52100


Enquiry: # 02345

Details:
 John,
 Please give best price and delivery for the following:
 200 off connectors per drawing ZAK0234-01 rev B
 100 off connectors per drawing ZAK0235-01 rev A
 Material to be used 304 stainless.
 Drawings as attached.
 (PS these are for some airplane company near Seattle, so make sure they are OK)

Not Valid unless signed by Sam:
Samuel Jones (owner)

All orders are subject to our normal terms and conditions. See our website for details www.backstreetMAP.com/extremelysmallprint. If you don't read them, then everything is your problem.

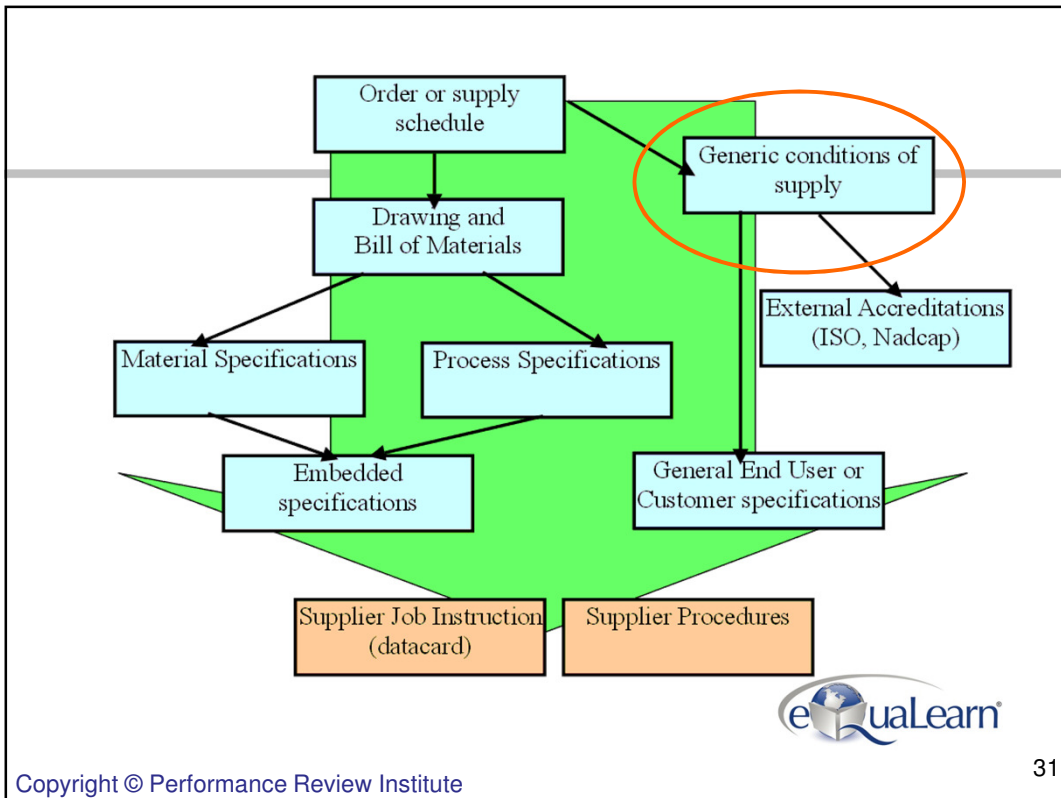
Example



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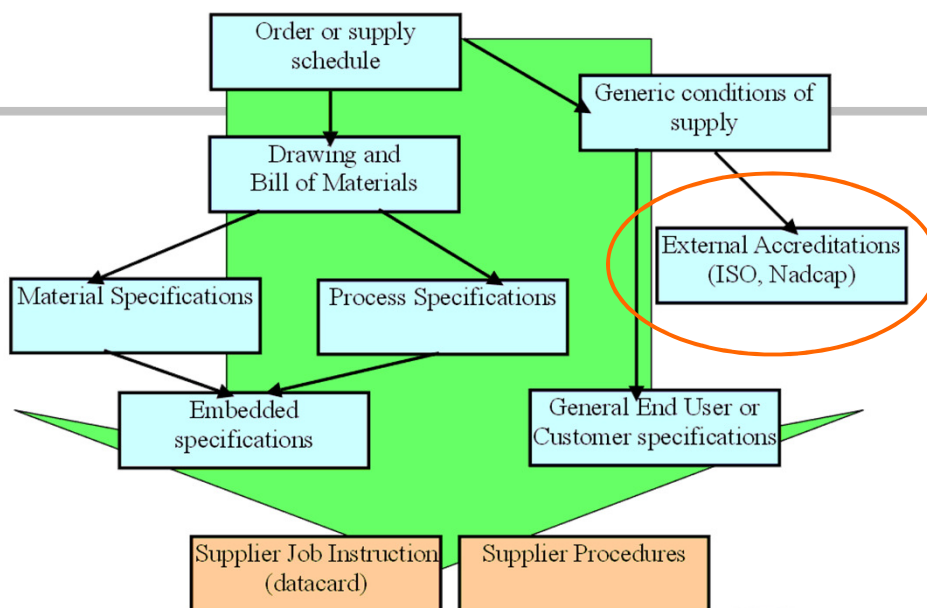
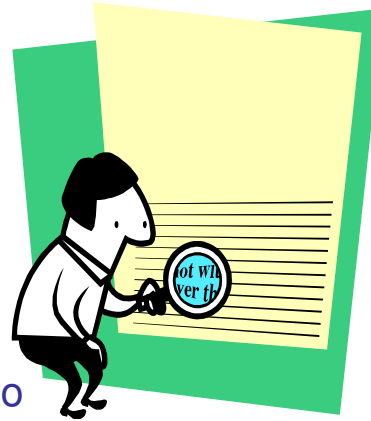


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General Conditions

- Most companies have them
- They can and often do include
 - Legal requirements
 - Financial issues
 - Right of access for inspection etc.
 - Technical issues
- These documents then lead into further general requirements



External Requirements

Includes things like:

- Approvals & Registrations
 - From Prime manufacturers
 - Government Agencies (FAA, CAA)
- Nadcap registration for special processes
- AS/ISO9001 or AS9100 registration (or equivalent)

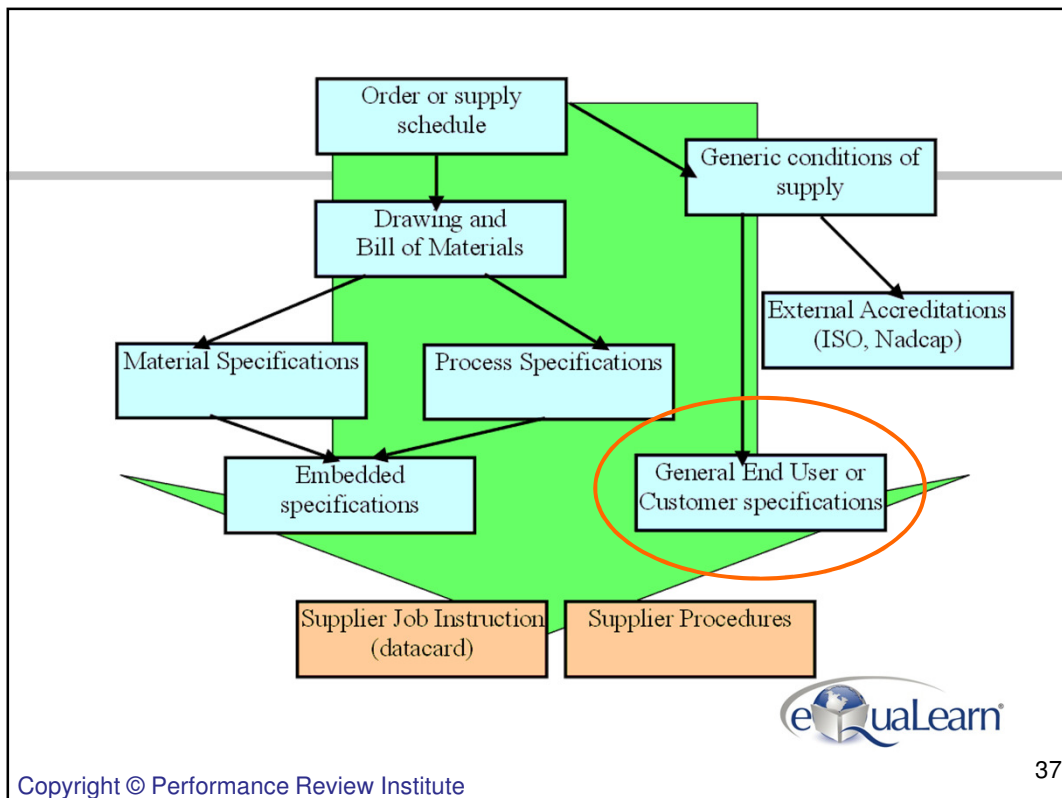


Approval Issues

Key things to check are:

- Am I approved for...
 - This material?
 - This process?
 - The equipment that I wish to use?
 - The required testing?





General End User Specifications

- These define the requirements for different processes
- They may or may not include treatment details
- They may or may not be referenced on order documents
 - Especially when orders are from intermediate suppliers
- Check the end user requirements
 - E.g. see the lists in some Nadcap audit handbooks

Backstreet Machining and Aircraft Parts

"Quality you can bet your life on!"

#2 the Shed
Back of the Tire Works
Anytown
Ok, 52100

Enquiry: # 02345

Details:

John,

Please give best price and delivery for the following:

200 off connectors per drawing ZQK0234-01 rev B

100 off connectors per drawing ZQK0235-01 rev A

Material to be used 304 stainless.

Drawings as attached.

(PS these are for some airplane company near Seattle, so make sure they are OK)

You are expected to ask.

Ignorance of a requirement is not an excuse

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Samuel Jones (owner)

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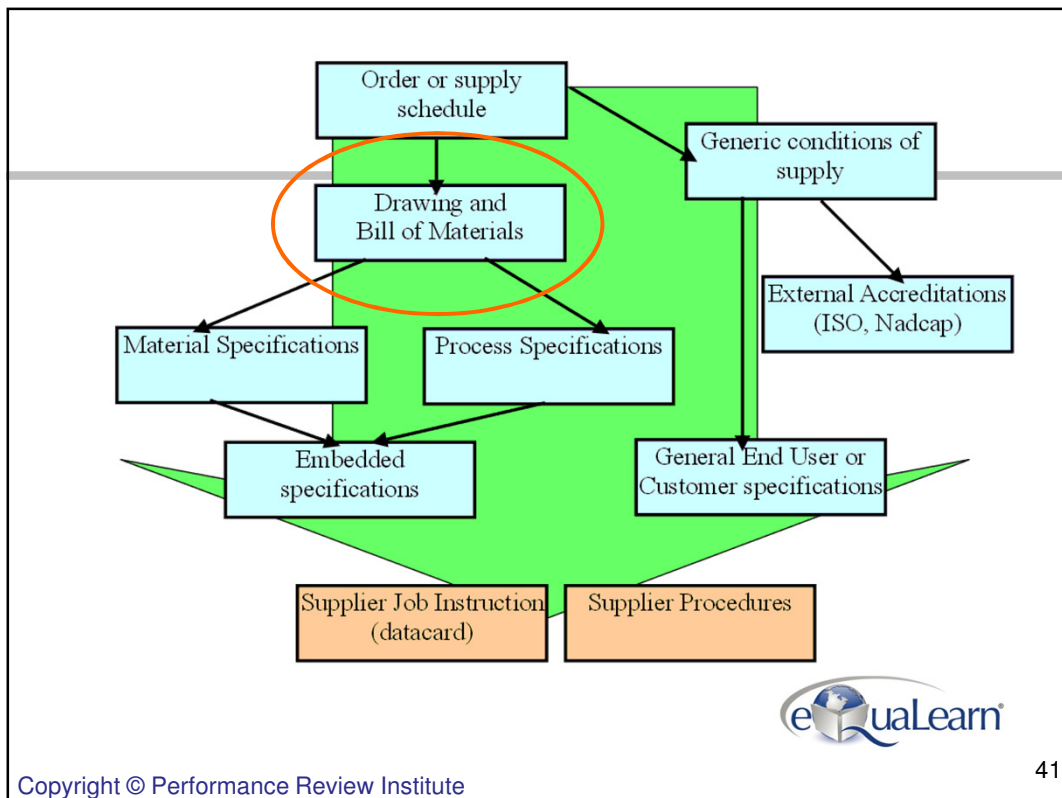
General Specifications

APPENDIX PRIME SPECIFICATION MATRIX

Alloy Specific Heat Treat Specifications

+

Prime	Aluminum HT	Steel HT	Nickel-Based HT	Titanium HT	Magnesium HT	Pyrometry
Airbus (UK)	ABP3-1119	ABP3-1116 ABP3-1115	ABP3-1115	ABP3-1117	N/A	BS M54
Airbus (Germany)	80-T-36-1010	80-T-36-1020 80-T-36-3300	N/A	80-T-36-1015 80-T-36-3400	N/A	QVA-Z-09-10-00 QVA-Z-09-13-00 QVA-Z-09-14-00
Airbus (France)	IPDA61-01	IPDA61-03	IPDA61-03	IPDA61-03	N/A	I&C 04.63.100 I&C 04.63.105
Airbus (Spain)	I+DP-220	I+DP-225 I+DP-226	N/A	I+DP-222	N/A	CASA-1036
Alenia Aeronautica	NTA 71250 NTA 71251 NTA 71252	NTA 71151 NTA 71152 NTA 71153	NA	NTA 71351	NA	NTA 98251 NTA 98252
Bell Helicopter	BPS 4139	BPS 4140	N/A	BPS 4212	MIL-M-8857	BPS 4416
Cessna Aircraft Co.	CSMP003	CSMP004	CSMP010	CSMP049	MIL-M-8857	AMS 2750 & Process Spec
Eurocopter France	MP 61.41.D1 I&C 04.63.111	MP61.31.01 I&C 04.63.110	N/A	ASNA 6100 ASNA 6017	WE43: ECS 2133	I&C 04.63.100 I&C 04.63.105
	MP 61.48.10 MP 61.41.10 MP 61.41.11 I&C 04.24.103	MP 61.31.02 I&C 04.63.122		IFMa 247-50		
	EI 070-09-001 EI 070-09-006 I&C 04.63.130	EI 070-09-001 EI 070-09-006 I&C 04.63.130		EI 070-09-001 EI 070-09-006 I&C 04.63.130		

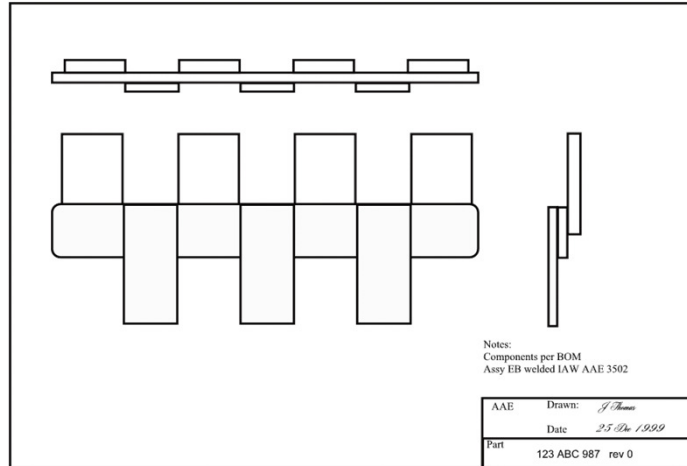


Drawings and BOMs

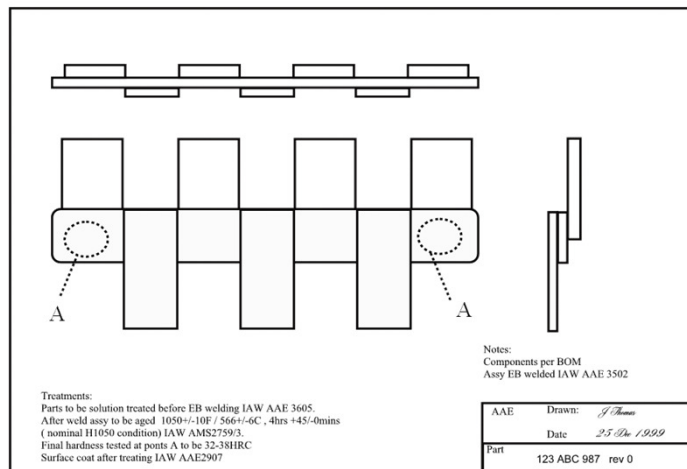
- Drawings define the end product
- They may be a detailed part drawing
 - But are often assembly or sub-assembly drawings, including many parts
- They define the part geometry and end use requirements
- They may include part specific requirements



Drawings & BOM's 1



Drawings & BOM's 2



Drawings & BOM's 3

Bill Of Materials

form AEQA9735/a

Drawing / Part 123 ABC 987

Description

Left Hand Widget

Product SkyTrain

Ref	qty	Part number	material	specification	HT Condition	Surface	-
1	1	123 ABC 987/1	MAT 2005	-	annealed	CP27	
2	4	123 EDF 456	17-4Ph	AMS 5643	H1000	CP28	
3	3	123 ABC 987/3	MAT 2005	-	Solution treated	CP27	

References:

AMS 5643

AMS 2759

AMS 2759/3

AAE specs: 22408, 2907, 3605, 9999



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Important Characteristics

- Some features are more important than others
- Critical Characteristics
 - Parameters which affect the safety of the vehicle
- Key Characteristics
 - The features of a material or part whose variation has a significant influence on product fit, performance, service life or manufacturability

- Definitions from IAQG 9103



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Key vs. Critical

Critical Characteristics

- Diameter of cooling holes in a turbine blade affects equipment performance - Failure would be safety critical

Key Characteristics are:

- Width of a turbine blade root will affect function (fit or not), but may not affect equipment performance or safety



Example

- A KC of a cargo-door actuator is the expected life time
 - MTBF- mean time between failures
- This leads to several part-level KCs, including the case depth and case hardness of a gear within the actuator

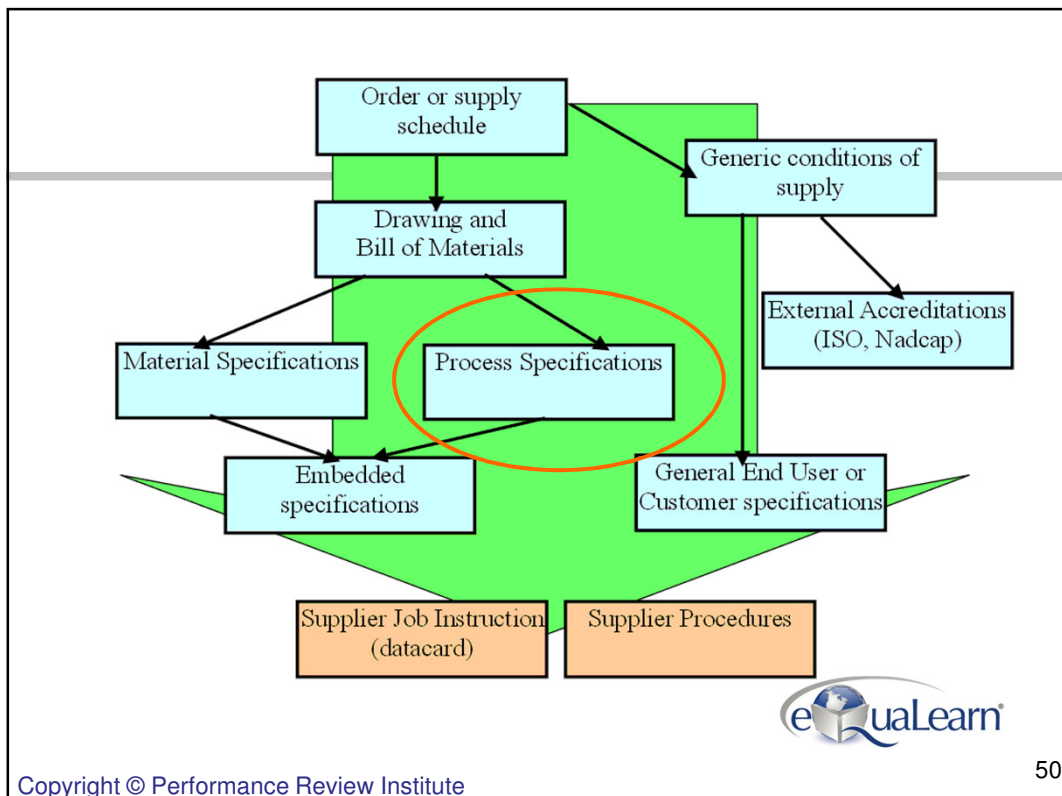
Case depth and hardness are then flowed down to the KCs in the nitriding process, such as

- The nitriding temperature
- The time at temperature
- The disassociation rate of ammonia



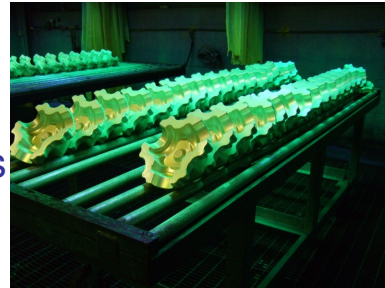
Key Requirements

- Check if any key characteristics are identified
 - There may be Process capability or other special requirements
- Key and critical requirements are normally defined as part of the FAI contract
 - Guidelines for the FAI contracts are described in EN 9102



Process Specifications

- For example
 - Penetrant Testing
 - ASTM 1417
- Some customers have process specifications
 - BSS7039
 - RPS702
 - EMS52309

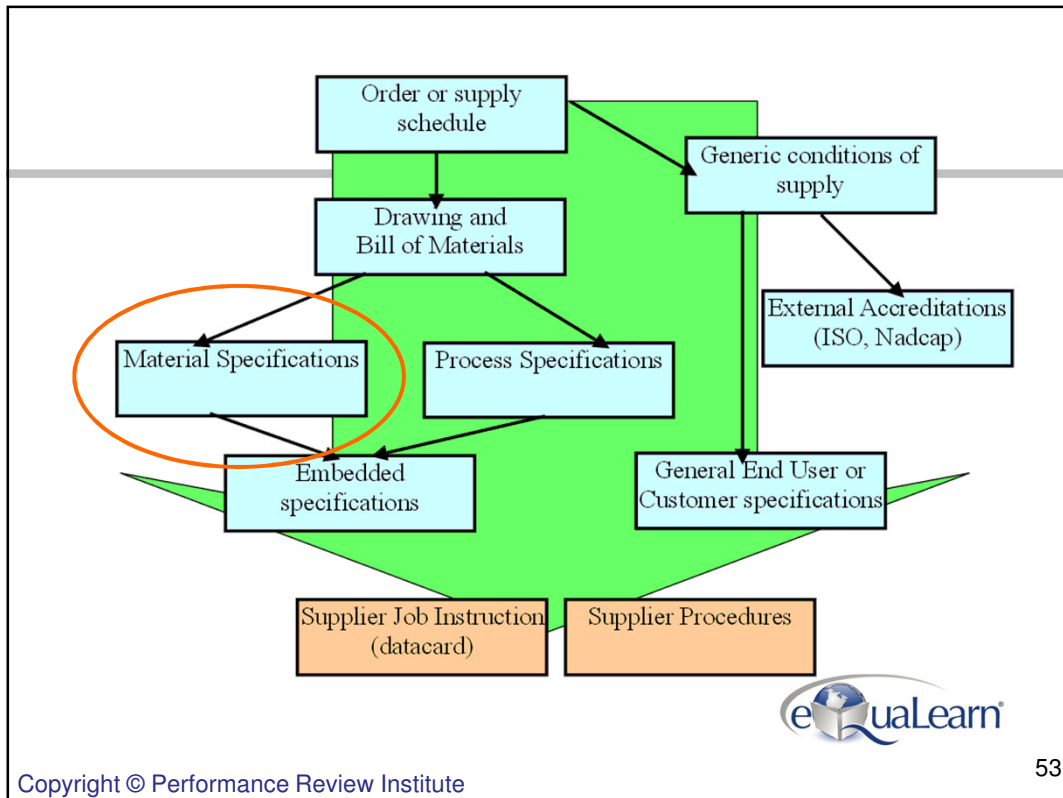


Process Specifications

- Prime Specification examples

Airbus	ABP 6-5230, 6-5229, 6-5346	BAE	R05-6101
Bell	BPS4075, 4089, 4424	Boeing	BSS7039, 7040, 7041
Bombardier	BAPS 176-002, 004, 017	Eurocopter	IGC-04-25-100, 101, 106, 115
GE Aviation	P3TF2, P3TF5, P3TF9	Honeywell	EMS52308, 52309
Pratt & Whitney	NDTQ, XRM, MPM, FPM	Rolls-Royce plc	RPS700, 702, 704
SNECMA	DMC0020, 0050, 0070		

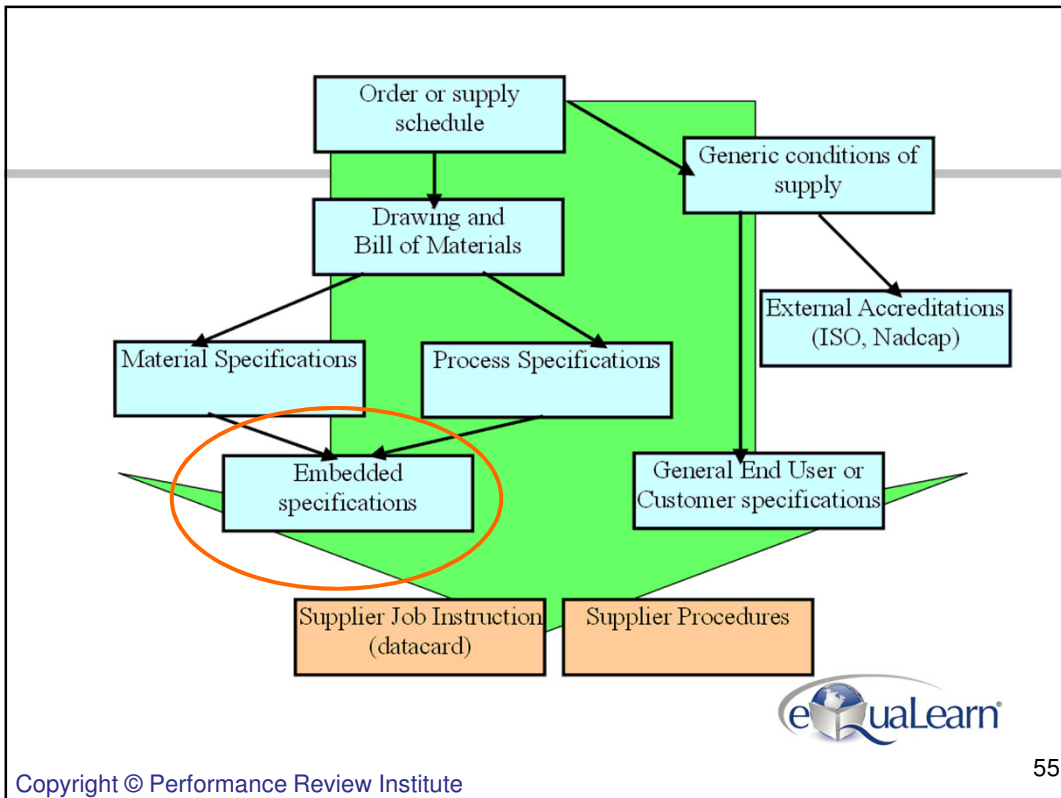




Material Specifications

- For example
 - Some AMS
 - British Standard Aerospace series
 - DIN Werkstoffe series
- Customer specifications
 - Rolls Royce MSRR series





Embedded Specifications

Each specification may assume others:

Ph Steels to AMS2759/3

Requires

AMS2759 (Steel HT)

Requires

ASTM E 18 (Rockwell)

Requires

ASTM E 29 (Precision and Rounding)



Which revision do we use?

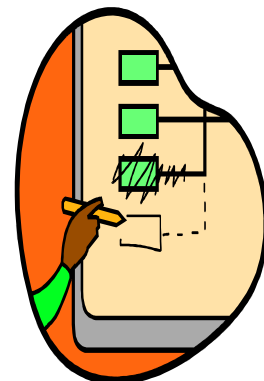
- Many drawings quote old specifications
 - Previous revisions of AMS or ASTM etc.
- You must verify which revision to use
- This is Supersession
 - Has the specification been superseded?

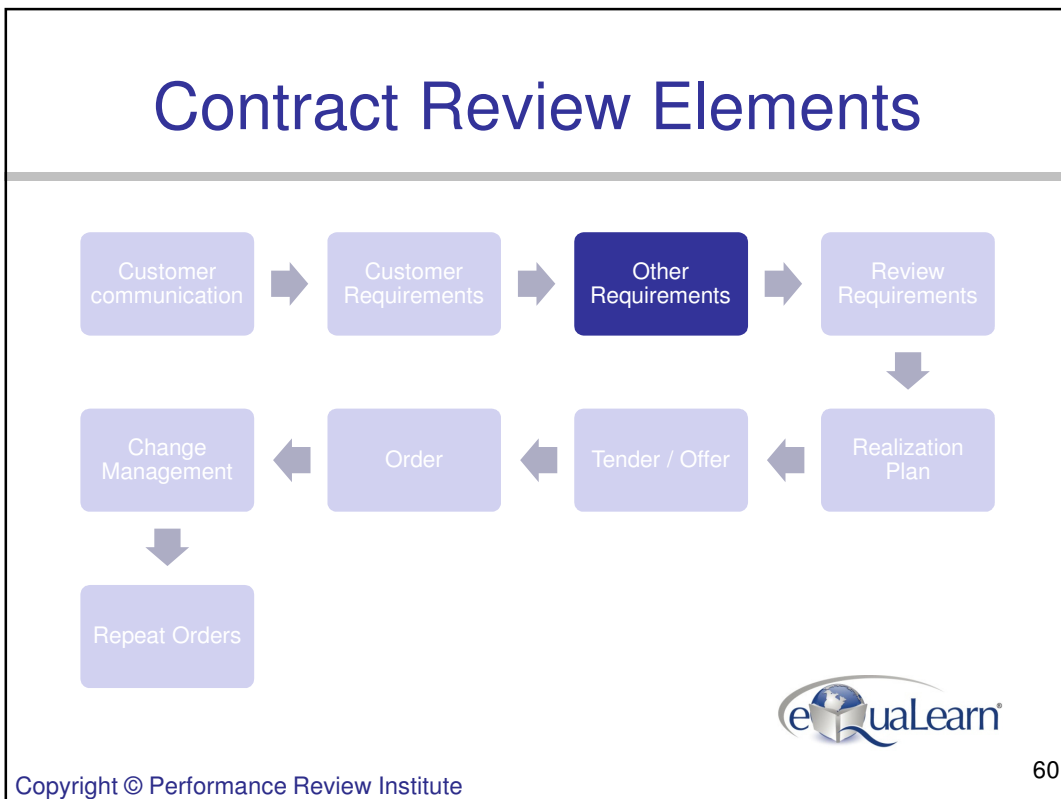
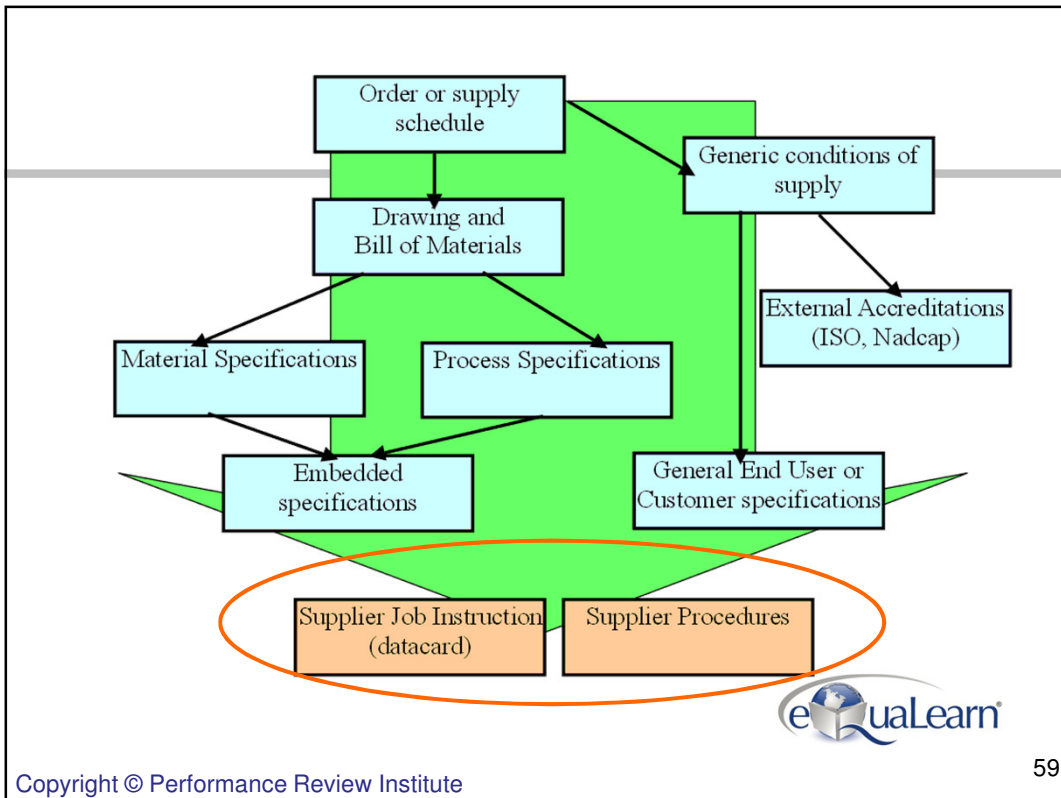
**You must
verify the
supersession
rules**



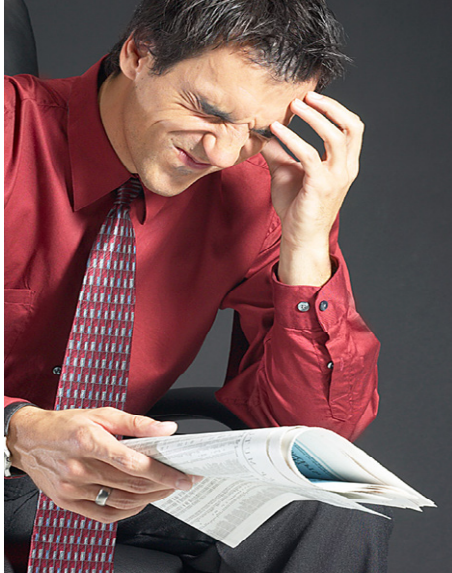
Supersession

- Many end users have different rules:
 - Some use latest version at all times
 - Some use version stated
 - Some use version current at time of order
- Suppliers are expected to have written evidence for any rule applied
- Do not assume current versions apply





Question



What else must be considered before tendering for work?



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Other Requirements

Include as minimum:

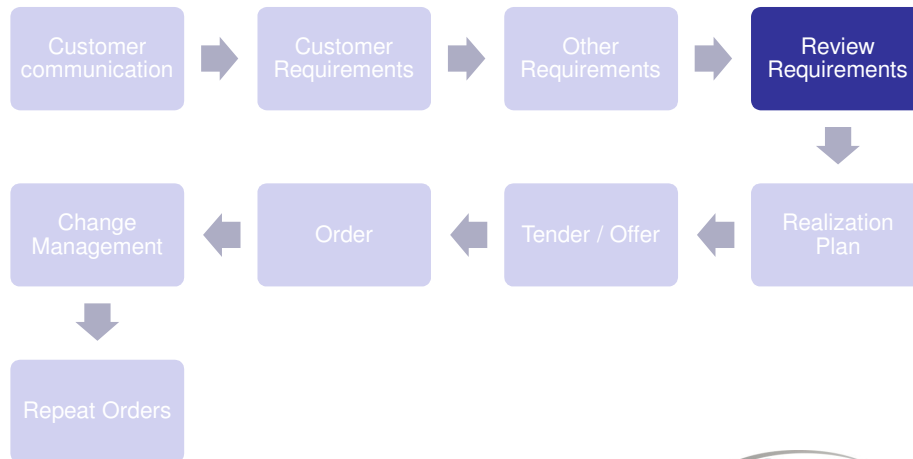
- Protection and Packaging
- Methods of shipment
- Delivery location
- Delivery time
- Certification
- FAIR requirements



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Contract Review Elements



Review of Requirements

- Can we do it?
- What are the risks?
- Requires an item by item confirmation of all the requirements
- Usually done by the different functions

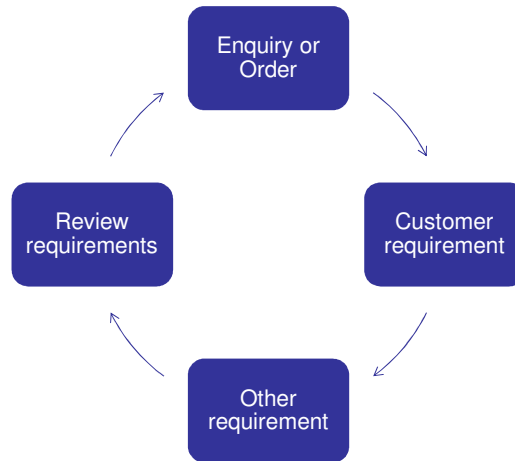


Guidelines for Risk Management are described in ARP 9134 and ISO 17666:2003



Questions and Problems

- Must be resolved
- A system must exist to handle any discrepancies or problems
- Usually by iteration with the customer



Implement and Follow-Up

The contract approval requires multi-disciplinary agreement

- Production
- Quality Management & Assurance
- Design
- Purchasing
- Logistics
- Administration & Management



Tools

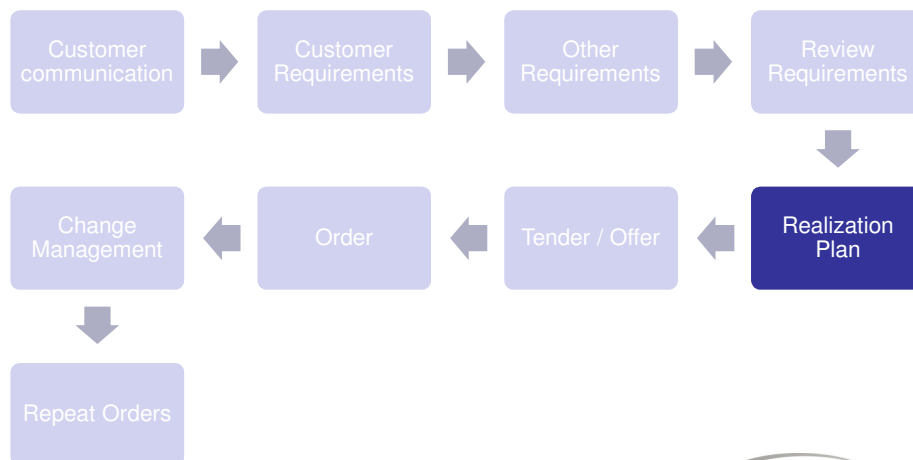
- Checklists
 - Multi function
- Capability Lists
- Approval Matrices
- These also supply objective evidence

Contract Review - Enquiry Record Enq #

Item	Requirement and reference(s)	Local Instruction and reference	Initials & date
<i>Product details (from drawing)</i>			
1			
2			
3			
4			
>>>>999			
<i>Approvals</i>			
<i>Routing steps</i>			
1			
2			



Contract Review Elements



Realization Plan

- Now decide how to supply
- What will the supply process look like?



Realization Review

- Means checking that the proposed route can achieve the aim
- For completely new parts and processes this includes:
 - Identifying and managing risks
 - Including Delivery on Time
 - FMEA may be useful



Process Control System

- Once the process has been defined the controls need to be assessed
- This means identifying all necessary qualification, control checks and any periodic verifications
- Some kind of Process control matrix / record sheet is recommended



Sub-Contracting

- Sub-contractors must be approved
 - By you and (usually) by
 - End-user (Prime)
 - Nadcap
 - Regulatory Agency
- Order terms and conditions must be correct
 - Must include “right of access”



Sub-Contract Flow Down

- Flow down refers to the transfer of requirements down the supply chain
- If process steps are sub-contracted then flow down becomes important
 - Also applies to purchase of raw materials and testing activities
- You must have a flow down system
 - Linked to sub-contract enquiries and orders



Flow Down

- Identify what information needs to be transmitted - have lists for each activity

Part I: Required Purchase Order (P.O.) Information Flowdown for Heat Treatment

Note: Guidelines for Sections A, B, & C listings are in Part II.

Section A: Always Required Information:

1a. Purchase Order Number	6a. Part Number
b. Date	b. Part Name or
2a. Purchase Order Originator Name	c. Product Form
b. Address	7. Quantity of Each Item
3a. Name of Prime (if known)	8. Material / Alloy Designation or Specification
4a. P.O. Originator	9. Present Condition
b. Contact Person (if different)	10a. Heat Treat Specification
c. Method of Contact	b. Revision
5a. Heat Treat Supplier Name	11. Heat Treat Requirement
b. Address	

Section B: State Operations that the Heat Treater is not required to Perform. These operations, required by specification, have either been performed prior to shipment to the Heat Treater, or will be performed by the Customer, or a Third Party after processing by the Heat Treater.

12. Pre Heat Treat Cleaning/Processing	14. Other Post Heat Treat Testing
13. Final Hardness/Conductivity Testing	15. Post Heat Treat Cleaning/Processing

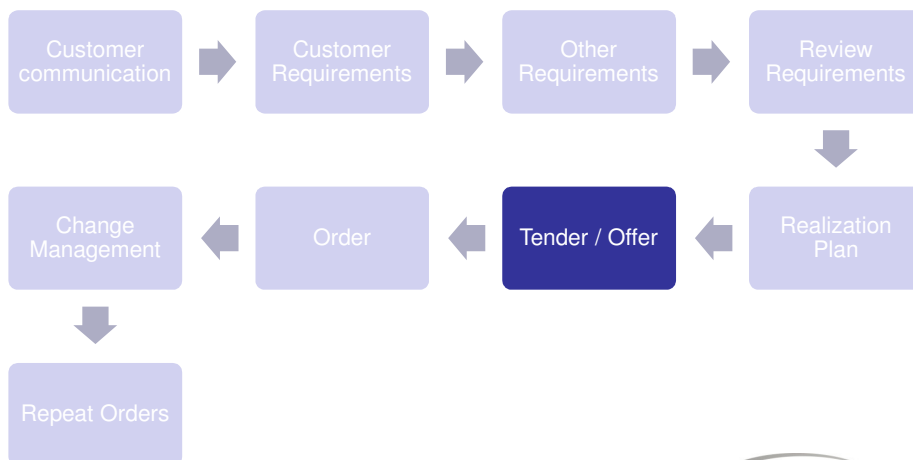


Outcome of the Review

- Further iterations of enquiry / response
 - Items that cannot be achieved
 - Parameters that cannot be measured
 - Non-approved sub-contractors
 - Non-approved processes
- But also agreement of all the players that the requirement can be met



Contract Review Elements



Tenders / Offers

- These are contractual documents
- Need all processes and routings before costs can be calculated
- Requires the agreement of everyone on all measurables
 - Hence sign off at Review stage



Content of the Tender or Offer

- Should include all required details – normally:
 - Routings
 - Sub-contract activities
 - Confirmation of specifications and revisions to be used etc.
- May be further iterations of requirements and responses

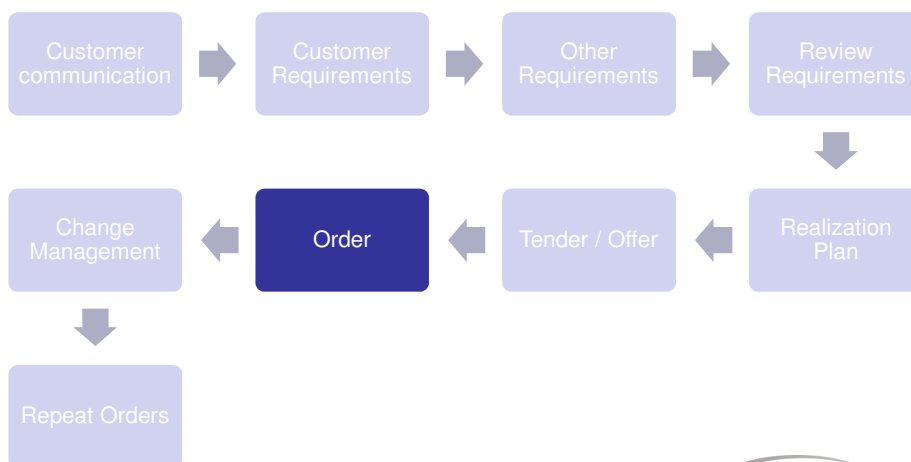


Tender or Offer Acceptance

- Customer reviews the offers
 - Does the offer address all specifications and terms required?
- Customer must make his own risk analysis
 - Likelihood of failure, impact on his operation
 - Is there need for any changes?
- If all OK then an order arrives
- If not OK then back round again



Contract Review Elements

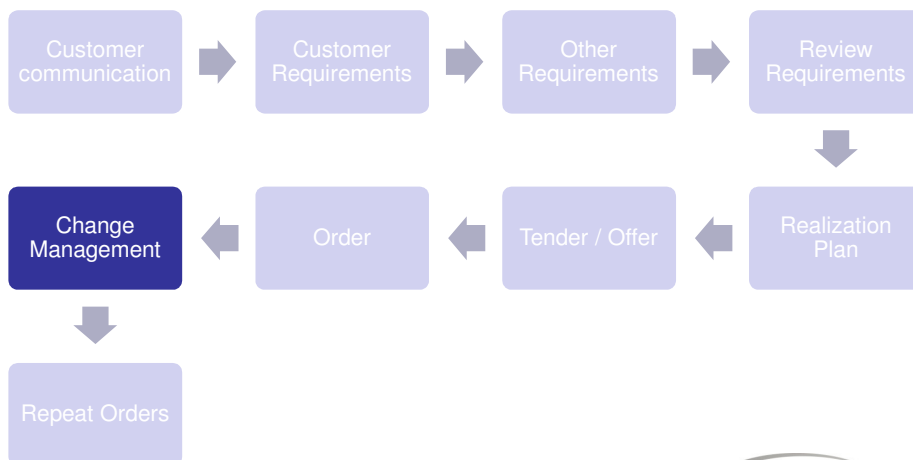


Order Acceptance

- Once an order has been received the process must be repeated
- Orders must be either
 - Reviewed from the start
 - or
 - Compared to the offer
- Differences must be addressed before acceptance
 - Order Acknowledgement vs Acceptance



Contract Review Elements



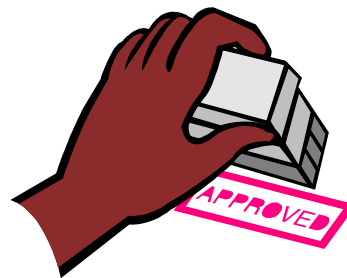
Change Control

- Every job or order should have a review file
- Changes are addressed by comparing with the latest information or system
- All changes require some action
 - Drawing amendments
 - Specification revisions
 - Delivery schedules

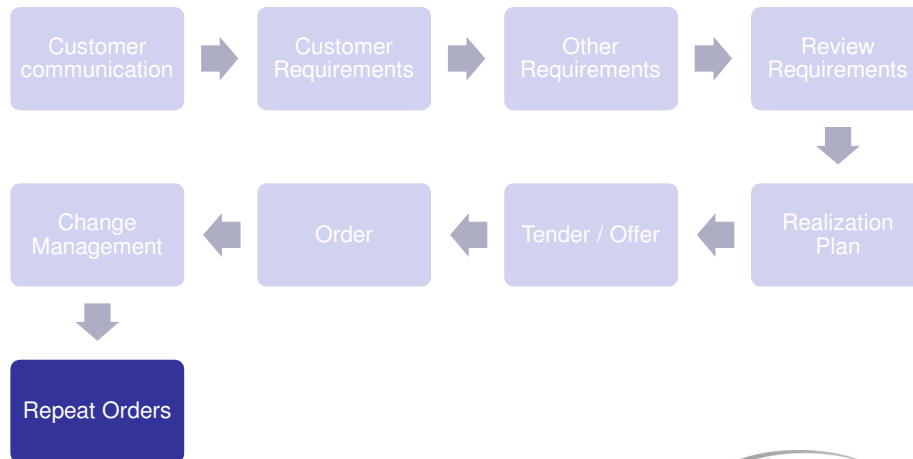


Changes

- Changes need to be handled as new enquiries or orders
 - Determine the impact
 - Negotiate problems
 - Confirm agreements
- Change Management is also impacts on “Configuration Management”
 - see AS/EN 9100 para. 4.3



Contract Review Elements



Repeat Orders

- Handle as for changes
- Review the current requirement against what you did last time
- Arrive at an offer
- Continue as usual



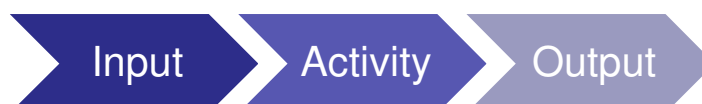
Checkpoint

Any Questions



Contract Review Process

- Contract Review is a required Process under AS9100
- The Process must be defined, although it may be part of a larger process
 - Outputs often form the inputs to the next processes



Process Assessments

These look at

- What is the process trying to achieve?
- Who is the customer?
- Is the process defined?
- Who owns the process?
- How is the process performing?
 - Management Review



Source IAQG guidance AS9101 , 2010



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Procedures

- You will need to write procedures that
- Should match the process
- Cover all the required elements
- Describe
 - who can do what
 - the process inputs, and outputs
 - performance measures (KPI's, etc)
 - records



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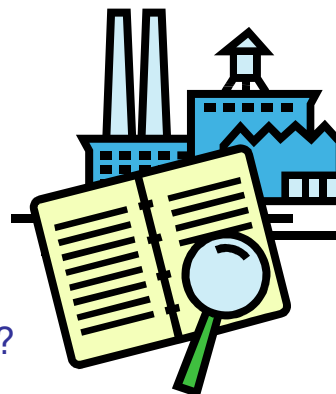
Summary

- Contract Review is a complex process
- Involves many parts of the organization
- There must be a managed process
- With a clear Process description
 - Inputs, outputs, KPI's
- Correlated with the company procedures
 - Responsibilities, qualifications, forms, records



'Keep it simple' Contract Review

- What does the customer want?
- Can we do it?
- How do we know?
- What records do we need?
- How do we describe this process?



Checkpoint

Any Questions



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