Autoliv Supplier Manual (ASM)

Product Life Cycle Breakout Session

Autoliv Inc.
May 2013

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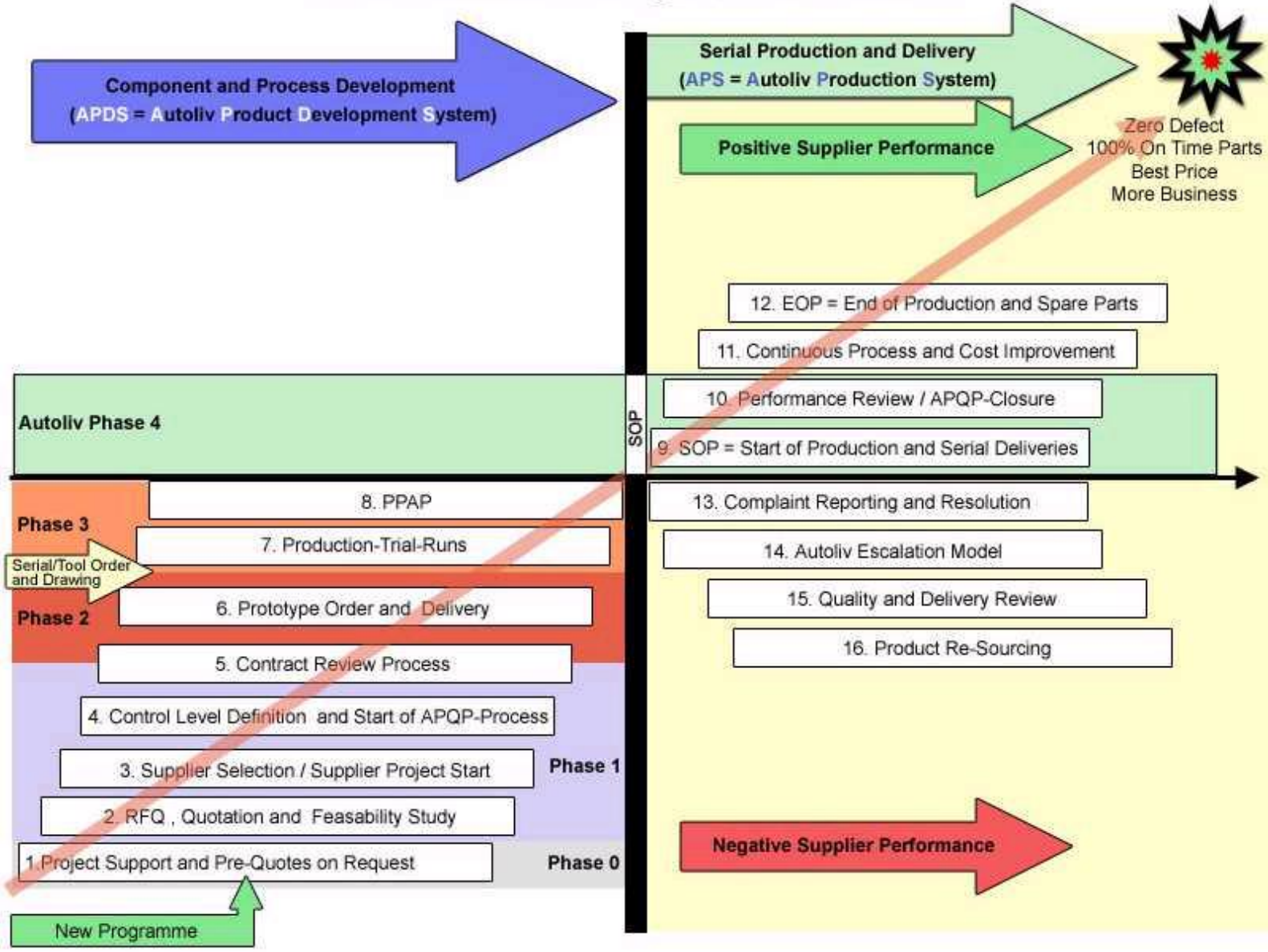

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1. Project Support and Pre-quotes on Request – Phase 0 (focus points)

- On Autoliv request the supplier provides:
- Project and Product Review
- Feasibility Study
- Design and Process Consultation and Expertise
- Pre-Quotes – (Part price, tooling, equipment) on concepts and ideas

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2. RFQ, Quotation and Feasibility Study – Phase 1 (focus points)

(RFQ & Feasibility Study Training Material available in the ASM !)

Input: RFQ (Request for Quotation)

Output: Quotation (on RFQ-template) :

- Part and tooling price, lead times etc **(page 1 of RFQ)**
- Cost Analysis **(page 2 of RFQ)**
- Feasibility Study **(page 3 and 4 of RFQ)**
- Packaging and Transport concept **(page 5 of RFQ)**

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3.*Supplier Selection / Supplier Project Start – Phase 1 (focus points)*

Before supplier selection:

- Supplier shall accept ASM
- Not be rated RED on Commodity Flag Panel
- Not have continuously unacceptable AS 51 ratings
- No Major Open issues from AS 2 Audits
- Completed Feasibility Study
- Major Feasibility concerns and Design change requests must be agreed to by Autoliv before selection

After supplier selection:

Autoliv expects the supplier to start an official project supporting the Autoliv milestones by providing the needed resources, services, capital, equipment etc. to meet the Autoliv requirements.

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4.*Control Level Definition & Start of APQP Process – Phase 1 (focus points)*

- Establish S-APQP process & Project plan based on the Synchronized time line
- Problem & Risk Analysis
- Mandatory reporting in writing of problems relative to Timing /Quality with analysis and recovery plan
- Initiate and maintain updates of S-APQP template
- Report APQP progress according to defined frequency

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4. *Control Level Definition & Start of APQP Process – Phase 1*

4.1 The CLD-Standard (Autoliv internal standard)

Minimum requirements related to defined CLD					
No.	Requirements	Comment(s)	CLD 1	CLD 2	CLD 3
1	**S-APQP**	**Reference: ASM-S-APSP-template**	YES	YES	YES
1.1	**-S-APQP-submission**	**According to defined submission frequency.**	YES	YES	YES
	-S-APQP reviews	**Autoliv/Supplier meetings/tel. conf.**	NO	YES	N/A
1.2	**-S-APQP review at supplier**	**Review meetings at supplier site.**	NO	NO	YES
1.3	**-S-APQP-element: AS2-Audit**	**Project specific AS2-Process Audit.**	NO	NO	NO
2	**Contract Review**	**Mandatory use of Contract Review-template. Reference: ASM-Contract Review-template.**	NO	YES	YES
3	**Production-Trial-Runs**	**Reference: ASM-Production-Trial-Run Standard**	YES	YES	YES
3.1	**-Documentation Submission**	**Trial-Run-Documentation on defined templates. Reference: ASM-Production-Trial-Run Standard.**	NO	YES	YES
3.2	**-Autoliv Participation**	**Participation at Production-Trial-Runs at supplier site.**	NO	NO	YES

ASM = Autoliv Supplier Manual

YES = Required

NO = Not Required

N/A = Not Applicable

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4.Control Level Definition & Start of APQP Process – Phase 1 (focus points)

4.2 S-APQP = Supplier Advanced Product Quality Planning

(S-APQP-Training Material available in the ASM !)

S-APQP is a structured method of:

- Defining and establishing the steps and requirements necessary to ensure that the product and process both satisfy the requirements of Autoliv
- This also ensures that all steps of supplier product launch can be completed on time.
- This also defines a Quality Road Map for successful launch.

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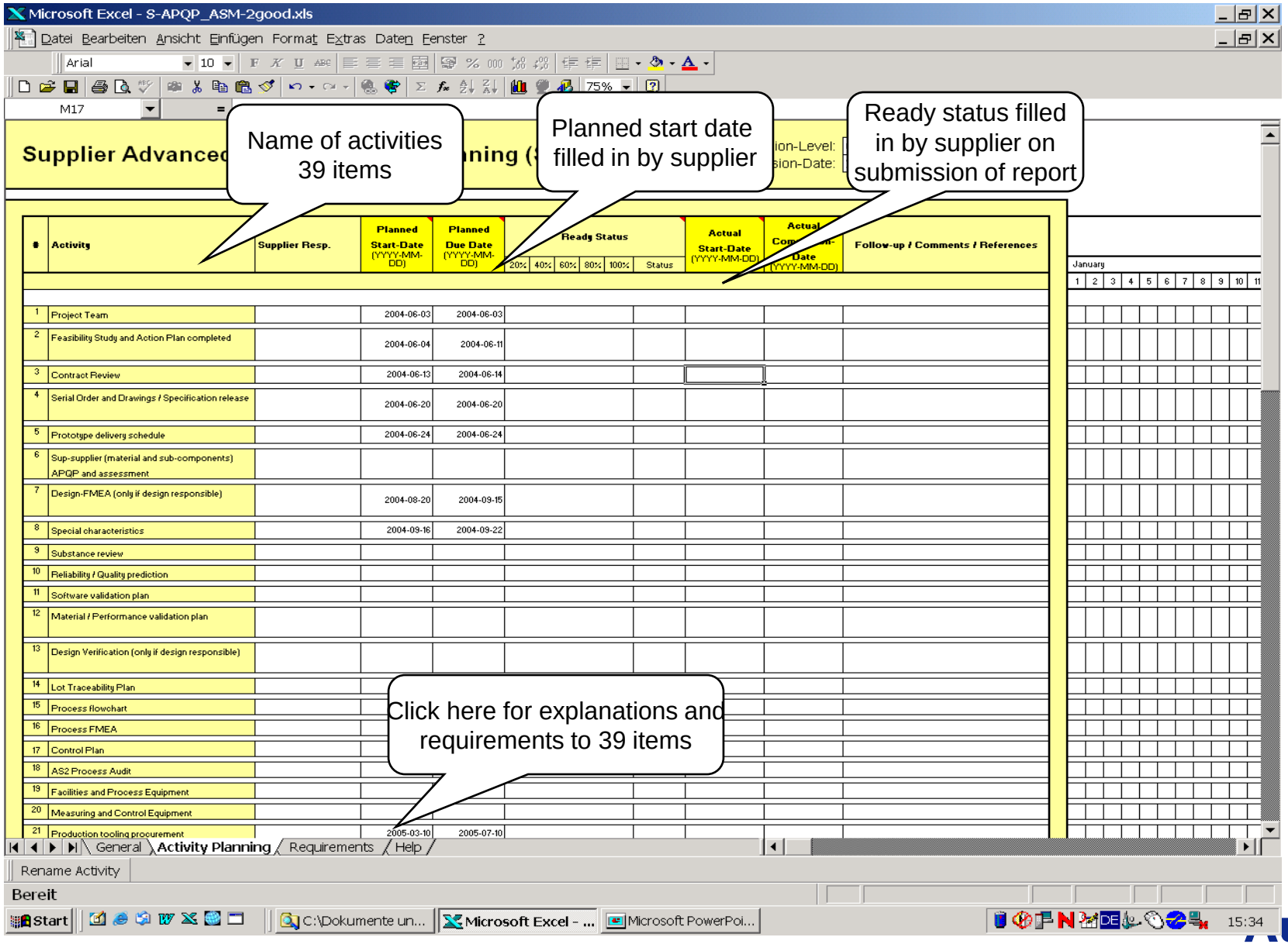
4. 2 The S-APQP-template



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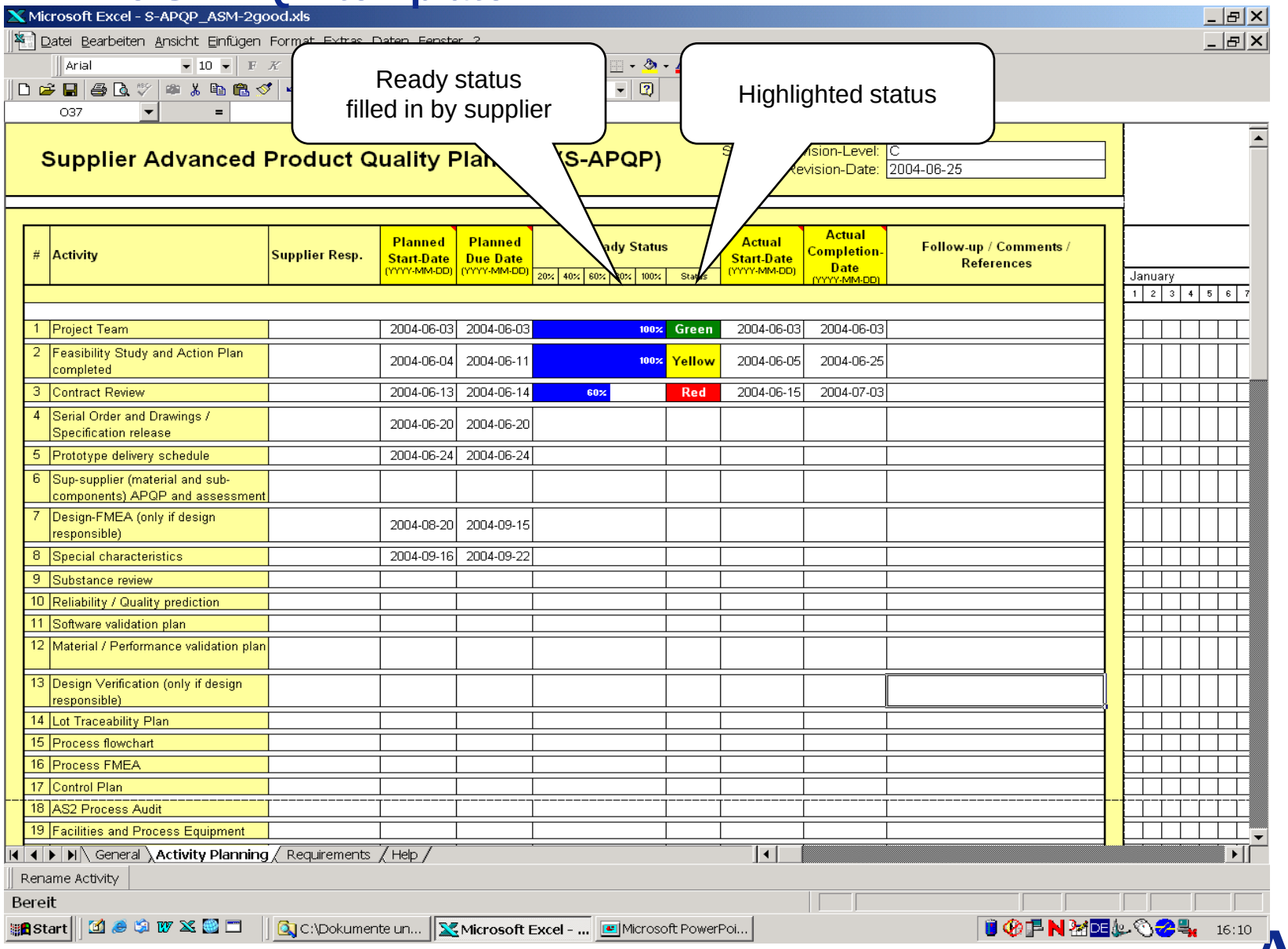

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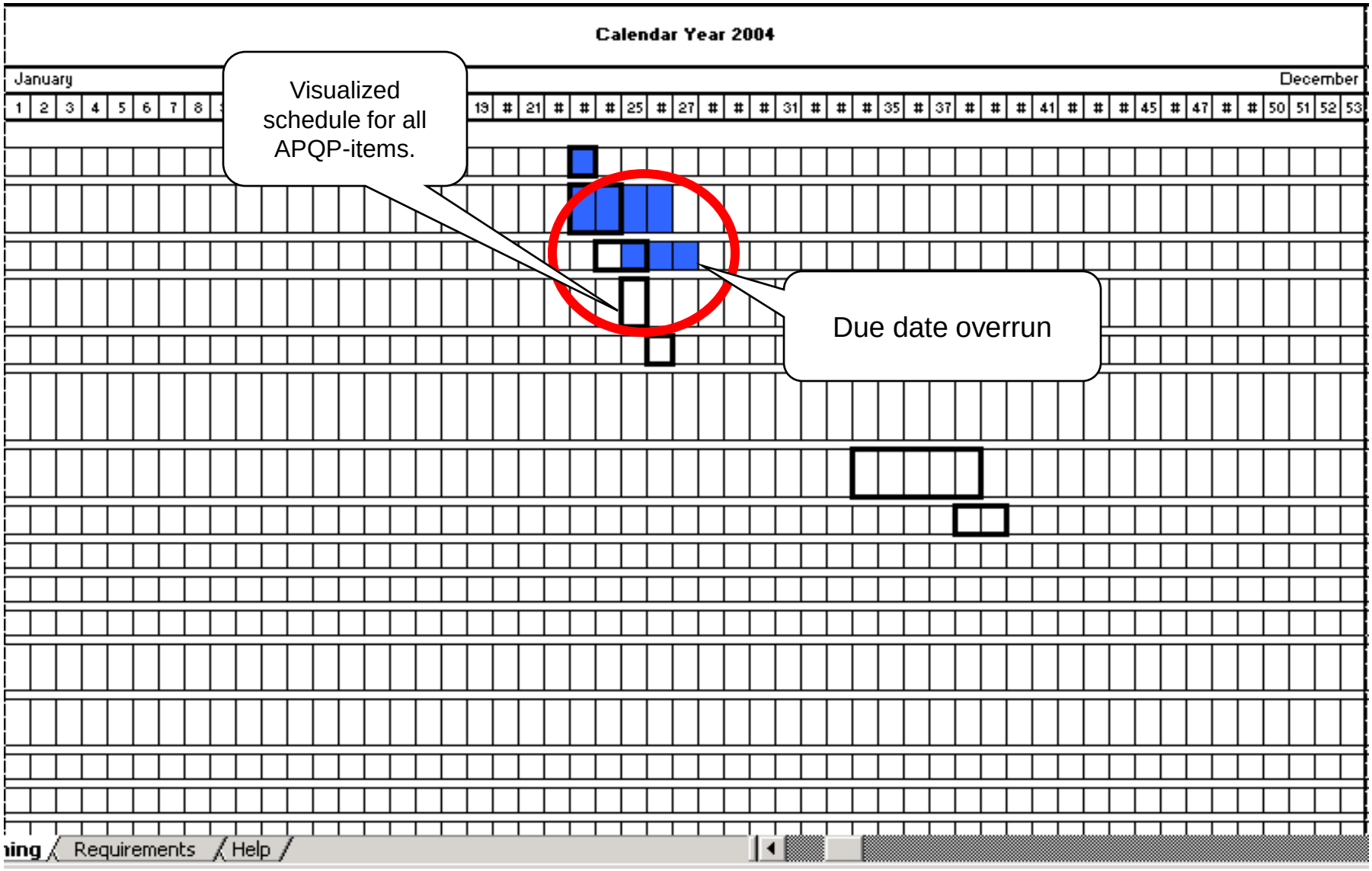

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5. *Contract Review Process – Phase 1 and 2 (focus points)*

(Contract Review-Training Material available in the ASM !)

- The contract review is used as a tool for both Autoliv and the Supplier to ensure that the process and the design have been reviewed and established

- The contract review clearly communicates Autoliv's project milestones, (ie: PPAP, Run@Rate, etc) establishing an agreement between both Autoliv and the chosen Supplier.

- Contract review is also used to finalize commercial negotiation.

The Contract Review-template:

Contract Review

General

Issue			Yes	No	N/A	Action Item / Comment	Responsibility	Due Date
1.0	**General**							
1.1	Can supplier make recommendations on cost and design?	j	◉	○	○			
2.0	**Project Milestones**							
2.1	Prototype delivery schedule?		○	○	◉	**6 days for rapid prototyping**		
2.2	Supplier Design Verification (DV)	Date			○			
2.3	Tool order	Date			○	As soon as Autoliv receives the	Autoliv	w24
2.4	Serial contract	Date			○	Pending; need to be clarified with BKI		w24
2.5	Serial drawing	Date			○	Pending	Bordas	w23
2.6	First-Production-Trial-Run	Date	w30		○	after homologation	Bordas / Autoliv	w30
2.7	PPAP-Production-Trial-Run	Date	w37		○			w37
2.8	Supplier Product & Process Validation (PV)	Date			○		Bordas / Autoliv	w40
2.9	PPAP submission	Date	w37		○		Bordas	w37
2.10	Run @ Rate	Date			○			w40
2.11	Start of Production Autoliv	Date	w43		○			
2.12	End of Production	Date	2010		○			
2.13	Other milestones	Date			○			
2.14	Supplier project time plan	Date	Done		○	attached timing project	Bordas	w23
2.15	Have all timing updates been introduced into the S-APQP?	j	◉	○	○	downloadable from APP	Bordas	w23
3.0	**PPAP Submission Agreement**							
								w23
4.0	**Feasibility**							

Front page | General | Commodity specific

Contract Meeting | A. General | D. Appendix Plastic Part | F. Appendix Assembly

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6. *Prototype Order and Delivery – Phase 2*

(focus points)

- **Supplier shall submit Prototype documents according to ASM and Prototype order**
- **The Prototype process should be covered by a Prototype Control Plan**
- **Further requirements should be defined at the time of the Prototype order**

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7. Production Trial Runs – Phase 3

(Production-Trial-Run Training Material available in the ASM!)

Why does Autoliv require Production Trial Runs ?

- Verify & confirm information on actual part / process
  - Evaluate performance as early as possible by First Trial Runs
  - Check against specifications (PPAP Trial Runs)
  - Ensure PPAP samples are run under serial conditions (PPAP Trial Runs)
  - Measure actual cycle times / capacities by Run@Rate

What may happen if PTRs are not performed ?

- Late PPAP approval
- Endanger SOP
- Increase amount of waste / scrap

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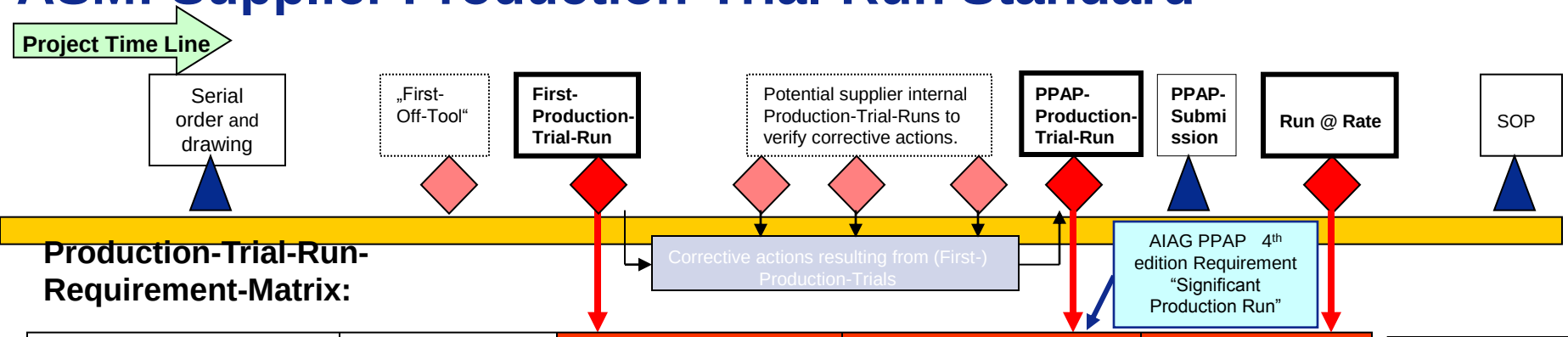
7. Production Trial Runs – Phase 3

CLD	PTR Requirements
1	documentation to be retained at supplier
2	documentation to be submitted to Autoliv
3	Autoliv participation at supplier, documents to be submitted to Autoliv

ASM: Supplier Production-Trial-Run Standard



Production-Trial-Run-Requirement-Matrix:

Trial-Run-Modules	Forms / Templates	First-Production-Trial-Run	PPAP-Production-Trial-Run	Run @ Rate
1. Dimensional, Material, Test Result Report	AIAG-Manual PPAP	X	(X)	
2. Capability Study	-	X	(X)	
3. Process-Quality-Audit*	Production-Trial-Run-Checklist	X		(X)
4. Capacity / Efficiency Audit*	Production-Trial-Capacity Report	X		(X)
Trial-Run-Conditions				
Full Production Speed			●	●
Serial Production Equipment / Site			●	●
Trial-Run Minimum Durance		Not specified	1 hour	4 -8 **
Minimum No. of parts produced		Not specified	300	Tbd **
All Shifts considered in Trial-Run(s)				●
Change-Over Procedures considered				●
Trained Operators			●	●
PPAP-ed Sub-Components			●	●
Control Plan		Pre-Launch	Serial Production ***	Serial Production ***

X : Analysis and evaluation; “out of specification” results allowed

(X) : Final verification; “out of specification” results NOT allowed

● Demanded Trial-Run Condition;

* : The whole, inhouse process chain must be considered for the audits. For capacity audit all potential bottle-neck processes must be investigated.
** : The trial‘s durance and the amount of parts produced must be representative of the process‘s serial conditions.
***: Serial Production Control Plan might be intensified (according to AS 412).

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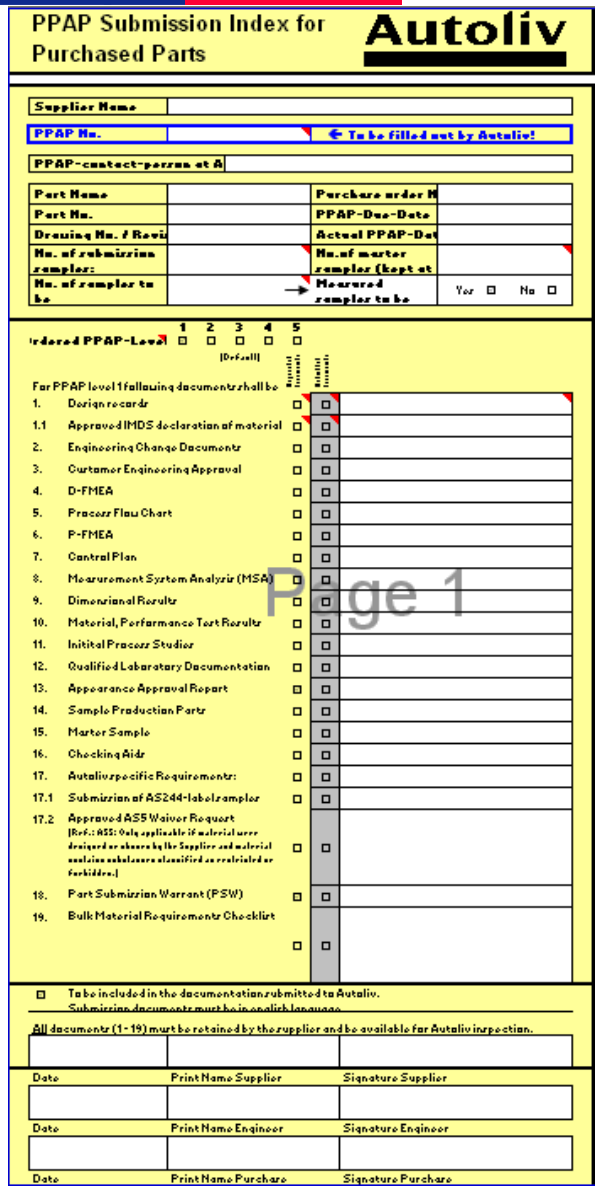
8. *Production Part Approval Process (PPAP) – Phase 3*

(focus points)

- As per *ASM – Quality Requirements-PPAP*
- All submitted documents must be in English
- PPAP desired format is electronic file
- Use of *PPAP Submission Index*-template
- 100% complete and OK prior to submission



PPAP Submission Index for Purchased Parts

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Supplier Name

PPAP No. ← To be filled out by Autoliv!

PPAP-contact-person at A

Part Name		Purchase order N	
Part No.		PPAP-Due-Date	
Drawing No. / Revi		Actual PPAP-Dat	
No. of submission samples:		No.of master samples (kept at	
No. of samples to be	→	Measured samples to be	Yes ☐ No ☐

Ordered PPAP-Level 1 ☐ 2 ☐ 3 ☐ (Default) 4 ☐ 5 ☐

For PPAP level 1 following documents shall be

1.	Design records	☐	☐
1.1	Approved IMDS declaration of material	☐	☐
2.	Engineering Change Documents	☐	☐
3.	Customer Engineering Approval	☐	☐
4.	D-FMEA	☐	☐
5.	Process Flow Chart	☐	☐
6.	P-FMEA	☐	☐
7.	Control Plan	☐	☐
8.	Measurement System Analysis (MSA)	☐	☐
9.	Dimensional Results	☐	☐
10.	Material, Performance Test Results	☐	☐
11.	Initial Process Studies	☐	☐
12.	Qualified Laboratory Documentation	☐	☐
13.	Appearance Approval Report	☐	☐
14.	Sample Production Parts	☐	☐
15.	Master Sample	☐	☐
16.	Checking Aids	☐	☐
17.	Autoliv specific Requirements:	☐	☐
17.1	Submission of AS9244-label samples	☐	☐
17.2	Approved AS9 Waiver Request (Ref.: AS9: Only applicable if material were designed or chosen by the Supplier and material analysis substances classified as restricted or forbidden.)	☐	☐
18.	Part Submission Warrant (PSW)	☐	☐
19.	Bulk Material Requirements Checklist	☐	☐

Page 1

☐ To be included in the documentation submitted to Autoliv.
Submission documents must be in english language.

All documents (1 - 19) must be retained by the supplier and be available for Autoliv inspection.

Date	Print Name Supplier	Signature Supplier
Date	Print Name Engineer	Signature Engineer
Date	Print Name Purchase	Signature Purchase

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9. *Start of Production (SOP) & Serial Deliveries – Phase 4 (focus points)*

- On time delivery according to the delivery schedule in the right quantity and fulfilling all requirements

- Any deviations must be approved by the using Autoliv Plant

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10. *Performance Review /APQP Closure – Phase 4*

(focus points)

- Perform a Launch and process review
- Follow-up QCD Targets (Quality/ Cost/Delivery)
- Monitor early Production containment (AS 412)
- Closure of APQP.
- Continuous Performance monitoring (AS 51)

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11. *Continuous Cost and Process Improvement*

(focus points)

- Manufacturing process improvements under a program of regular management review.

- Suggestion of design changes to improve the product cost, quality, process and performance.

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12. *EOP = End of Production and Spare Parts*

(focus points)

Supplier shall comply with the

Autoliv Spare Part Standard

Here some focus points:

- **Spare Parts for 15 years after EOP**
- **Delivery latest 30 days after notification**
- **Serial pricing for 5 years after EOP**
- **PPAP-requirements to be respected**

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13. *Complaint Reporting and Resolution*

(focus points)

- After a NCM (Non Conforming Material)-Report was received,the supplier must conduct an immediate investigation :

  - **To locate and contain the potentially defective parts in the supply chain.**
  - **To ensure that the problem will not cause delivery failure or production line stop at Autoliv.**
  - **To specifically mark all deliveries with sorted parts shipped to Autoliv. Certified (100% o.k. parts) deliveries must be marked according to Autoliv instructions.**
  - **To implement a backlog recovery plan.**
  - The supplier must respond in writing (timing is defined in *NCM-Escalation Model*) using the 8D-procedure.

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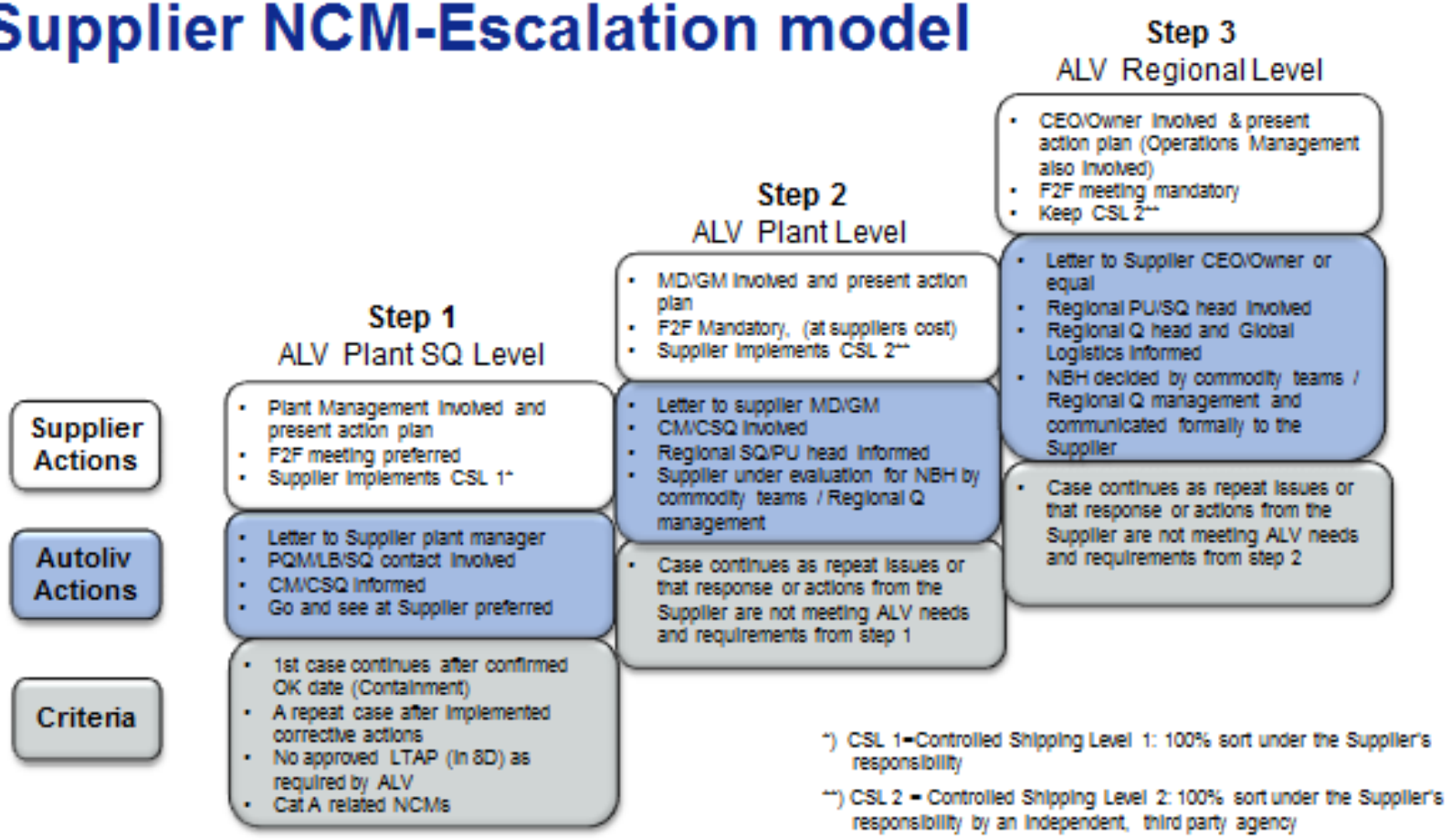
14. *Autoliv Escalation Model*

Supplier NCM-Escalation model



Normal Problem Solving Process:

- First NCM of a certain part number
- NCM and 8D request sent to contact person at the Supplier. (Copy to LB and SQ contact if applicable)
- Immediate containment plan to be advised within 2h
- Short term action plan to Autoliv within 24h (8D: step 1-3)
- Long term action plan to Autoliv within 5 days (8D: step 4-5)
- Verification of corrective actions within 3 weeks (8D: step 6-8)

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15. *Quality and Delivery Review*

(focus points)

- For Suppliers with repeat problems or unacceptable AS 51 performance Autoliv starts a *Quality and Delivery Review Process*.

- Attendance of appropriate supplier senior management is required.

- The meetings follow the Autoliv standard *Supplier Quality/Delivery Review Process,* available in the ASM.

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16. *Product Resourcing*

- After all other previous corrective actions with the current supplier have failed.

- Result: The product is re-sourced to another supplier and the commodity sourcing strategy is revised.