



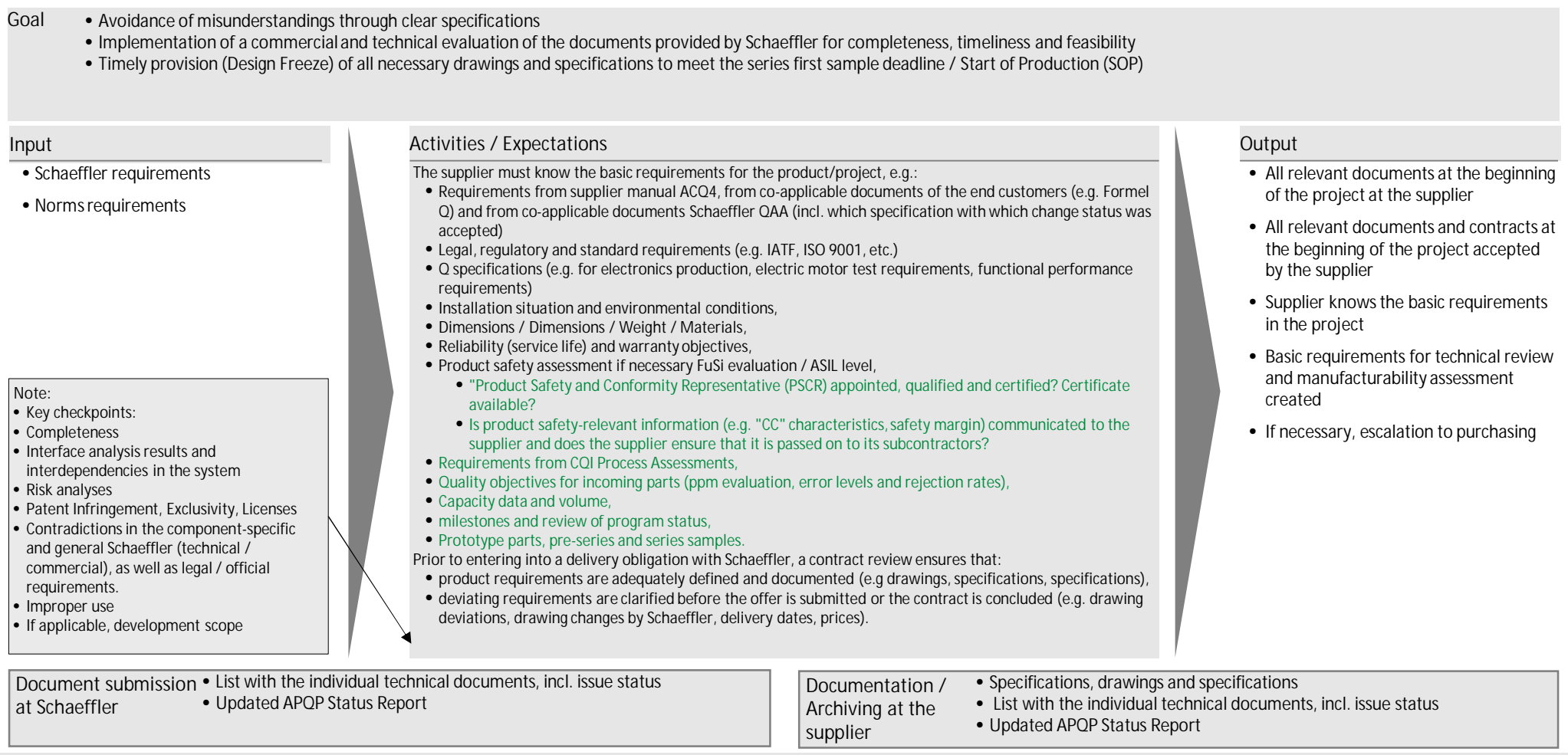
Elements of advance quality planning

Version A / 2022-04

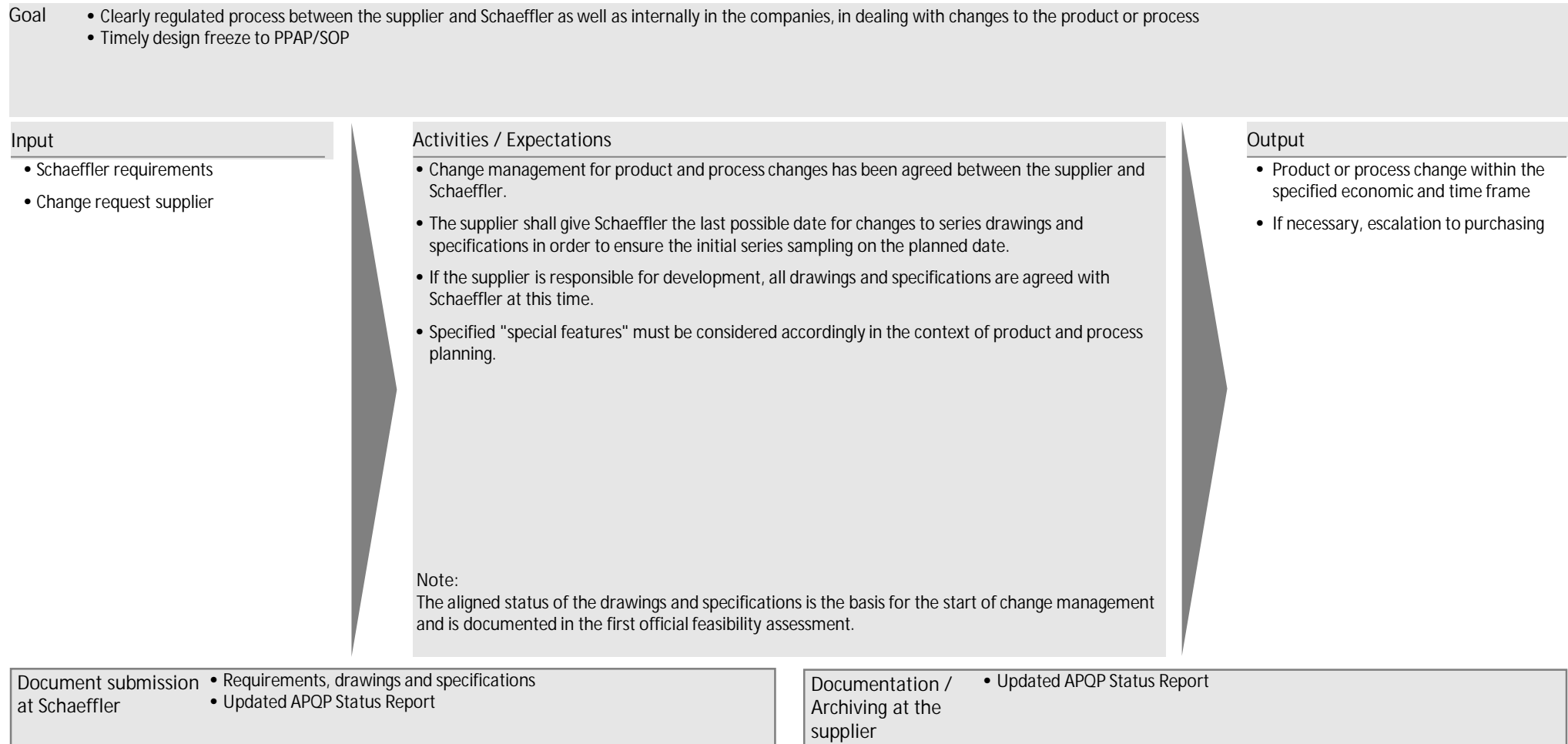
Overview of the elements

1. Customer requirements
2. Change management
3. Communication and escalation matrix
4. Project schedule
5. Feasibility evaluation
6. Capacity confirmation
7. Safe Launch
8. Requalification
9. Technical review and action plan
10. Nomination / Ordering
11. Development interface agreement (DIA)
12. Supplier quality plan
13. Design analysis
14. Design verification plan (DVP)
15. Process verification plan (PVP)
16. Concept for return and damaged part analysis and for Concern Management
17. Appearance / Craftmanship / Limiting sample catalogue
18. List of special characteristics
19. Measurement methods definition
20. Measurement alignment
21. Inspection and measuring equipment capability
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23. Product audit supplier
24. Material declarations and conformity certificates
25. Equipment and tools
26. Process FMEA
27. Prototype control plan
28. Process flowchart & layout
29. Process planning assessment
30. Production and inspection of prototype parts
31. Preliminary process capability study
32. Mass production control plan
33. Process instructions
34. Logistics concept
35. Packaging concept
36. Traceability concept
37. Quality planning subcontractor
38. Process Launch Assessment
39. Capacity trial run
40. Sampling and product release

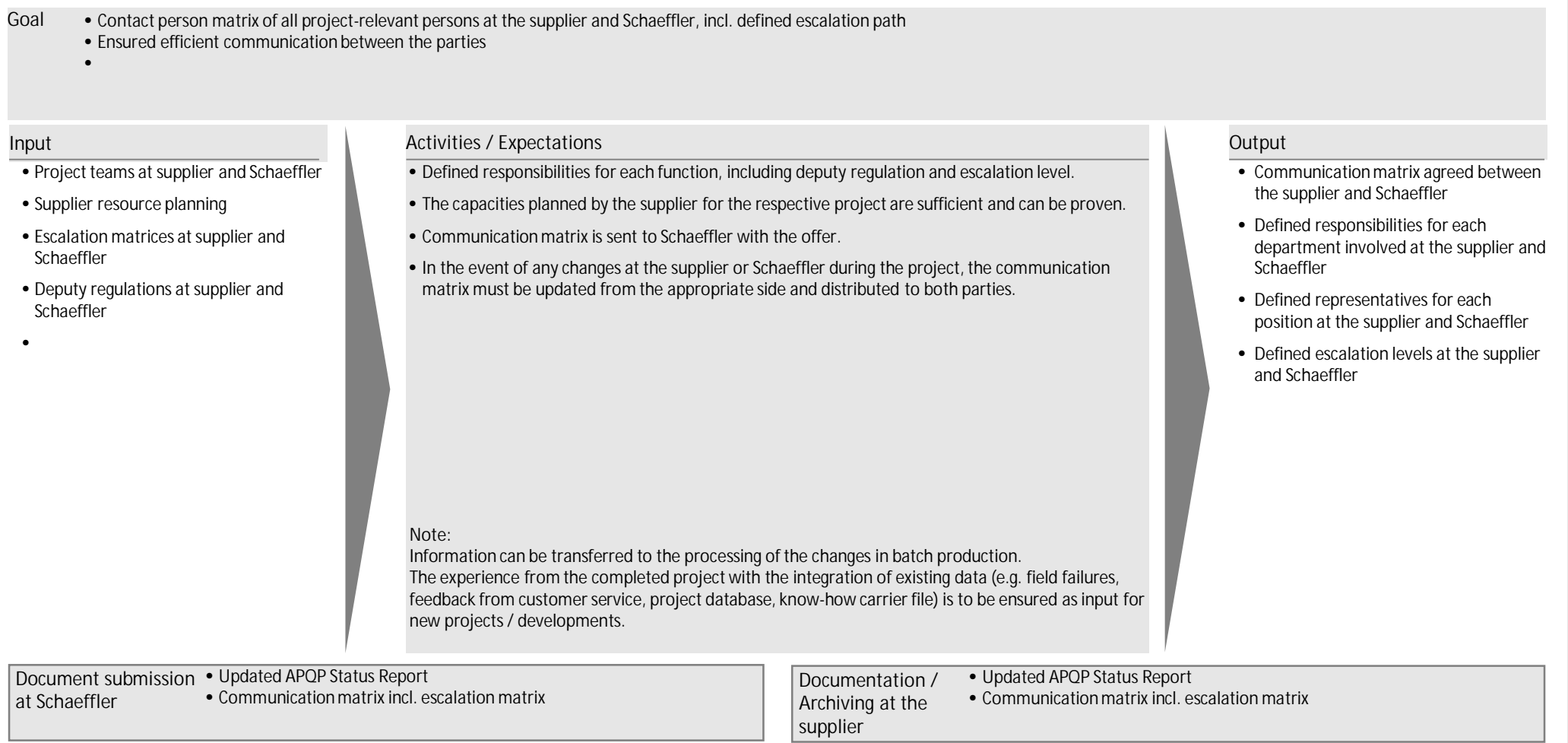
1 Customer requirements



2 Change management



3 Communication and escalation matrix



4 Project schedule

Goal

- Complete advance planning and documentation of the timing of individual work steps, activities and milestones of the supplier (including development services, industrialization activities, etc.) over the entire project and per configuration status / sample delivery

Input

- Project schedule Schaeffler customer (incl. milestones)
- Schaeffler project schedule (incl. milestones)
- Project schedule supplier (incl. milestones)

Activities / Expectations

- Project schedule and milestone setting of the supplier including Schaeffler project milestones.
- Analysis of the prototypes / sample stands planned and used in the project and their degrees of maturity (incl. intended use).
- Project schedule must cover at least the following points:
 - Nomination
 - Q-Gates
 - Quantity Agreement
 - Sample approval
 - Design Freeze
 - Design review incl. consideration of product safety-relevant issues

Note:
Influence and interactions from other projects / scope of supply are analyzed, communicated and evaluated (e.g. identical or carry-over parts).

Output

- Aligned project schedule that complies with Schaeffler milestones

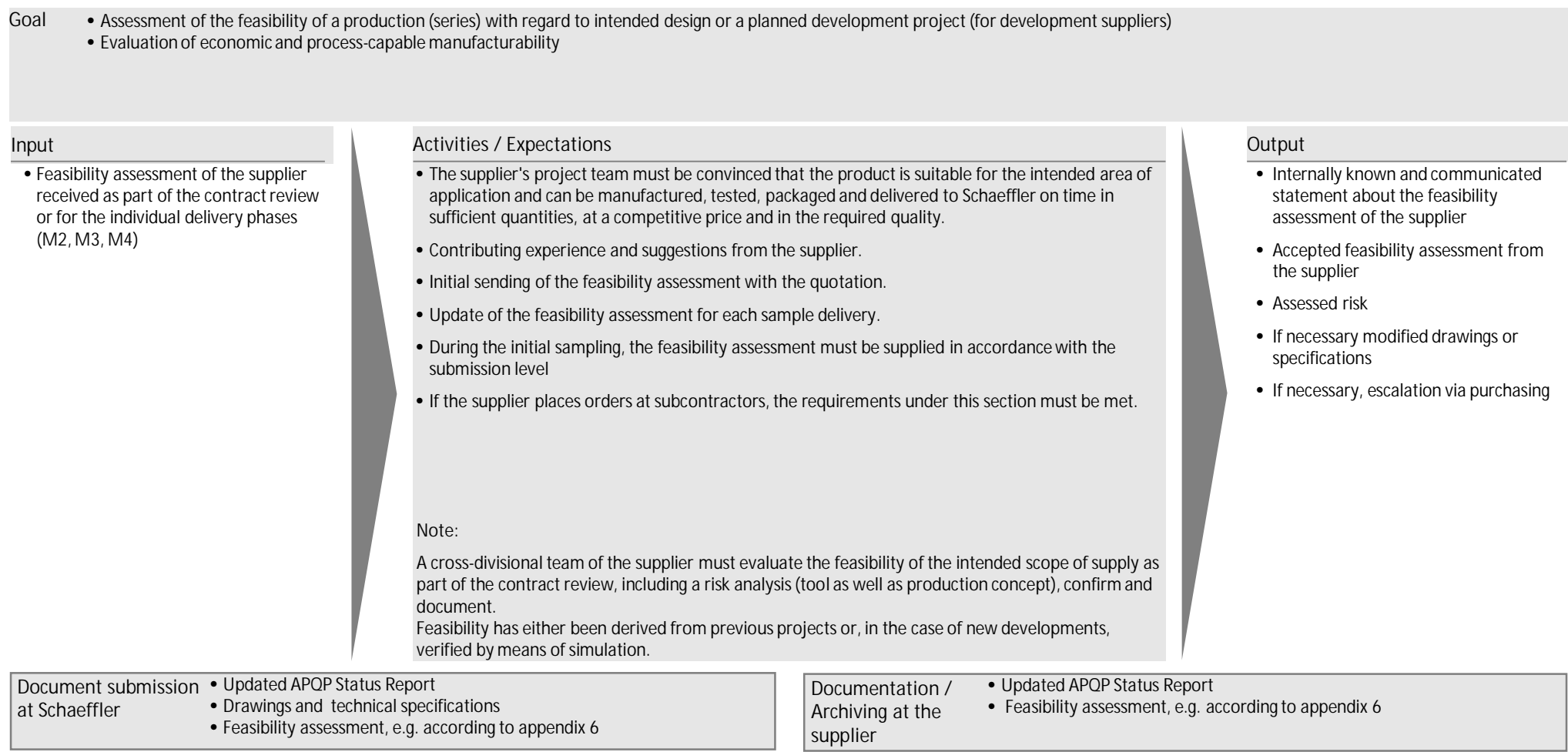
Document submission at Schaeffler

- Updated APQP Status Report
- Project schedule

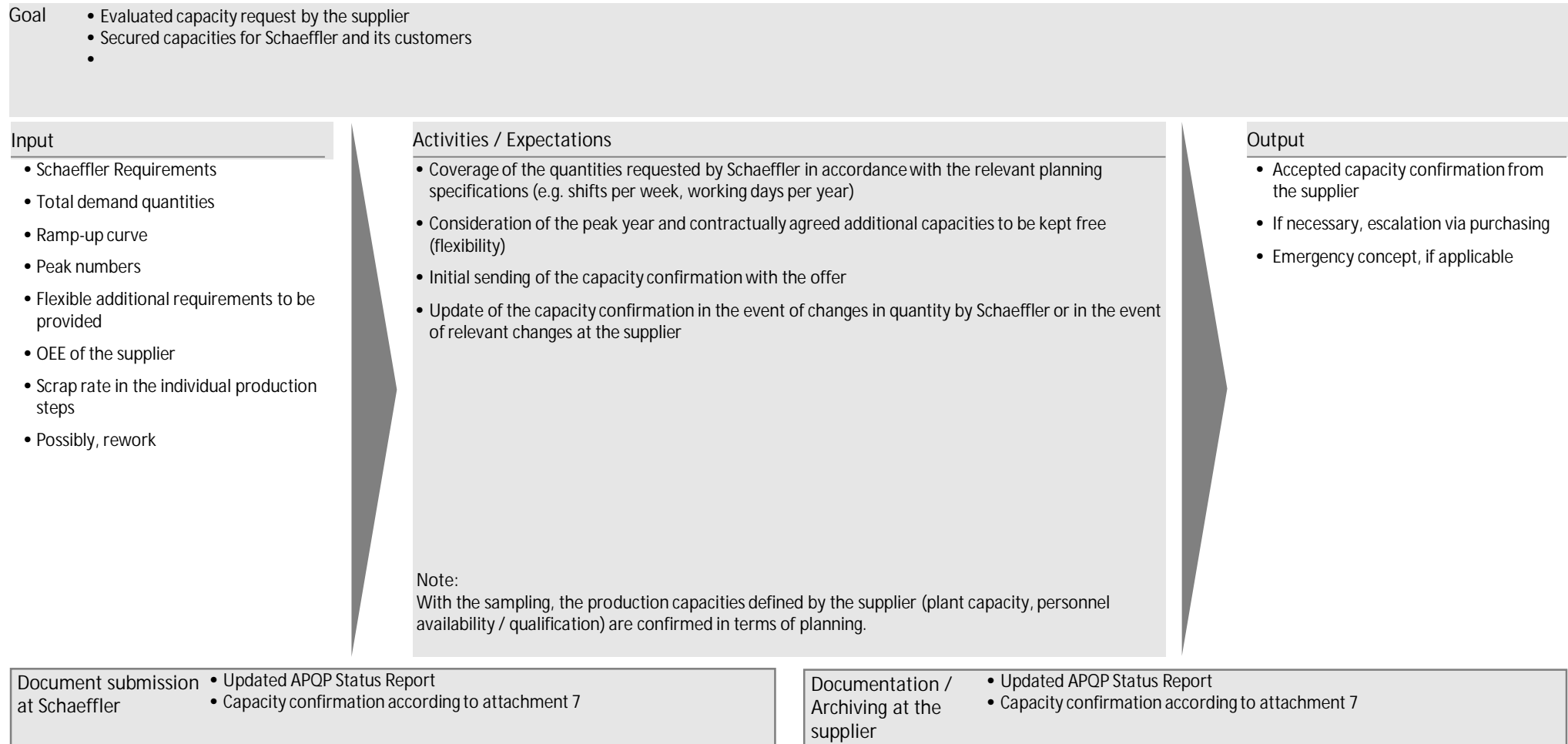
Documentation / Archiving at the supplier

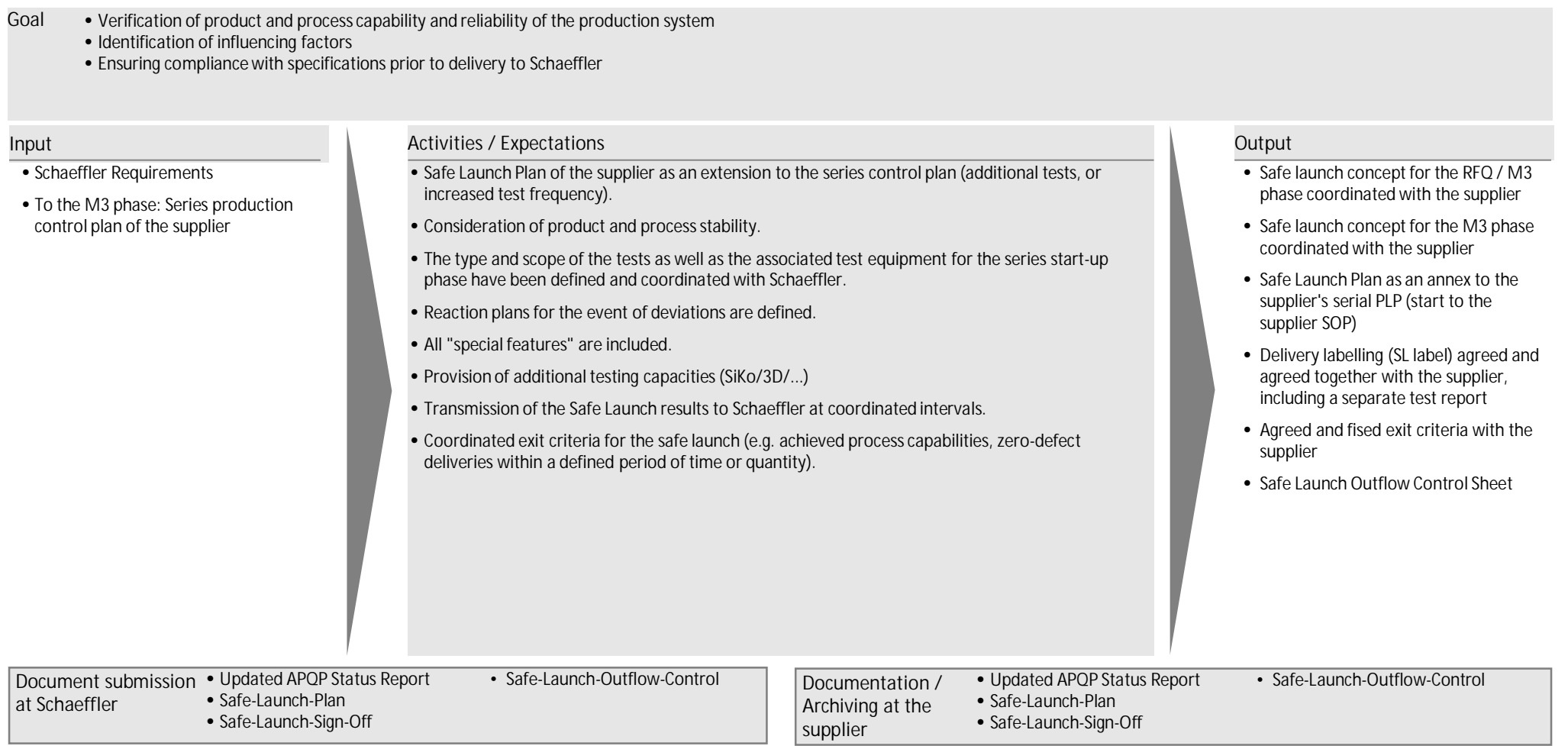
- Updated APQP Status Report
- Project schedule on Schaeffler request

5 Feasibility evaluation



6 Capacity confirmation





8 Requalification

Goal

- Regular dimensional and functional testing in accordance with the production control plan, taking into account the applicable Schaeffler specifications for material and function, in accordance with the requirements of IATF 16949
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Input

- Schaeffler requirements (e.g. Quality Assurance Agreement (QAA))
- Requalification Agreement
- Samples submission level
- PVP
- Norms requirements

Activities / Expectations

- In the case of new parts, the scope of testing and the interval (at least once a year) must already be agreed with Schaeffler as part of the RFQ.
- Additional claims of Schaeffler's customer must be taken into account.
- The requirements for the requalification test must be ensured by the supplier and stored in the production control plan.
- The results of the requalification must be kept at the supplier's premises and submitted to Schaeffler for inspection at any time.

Output

- Agreed minimum requirements for the RFQ phase accepted by Schaeffler and the supplier
- Finally agreed requalification concept for the M3 phase accepted by Schaeffler and the supplier

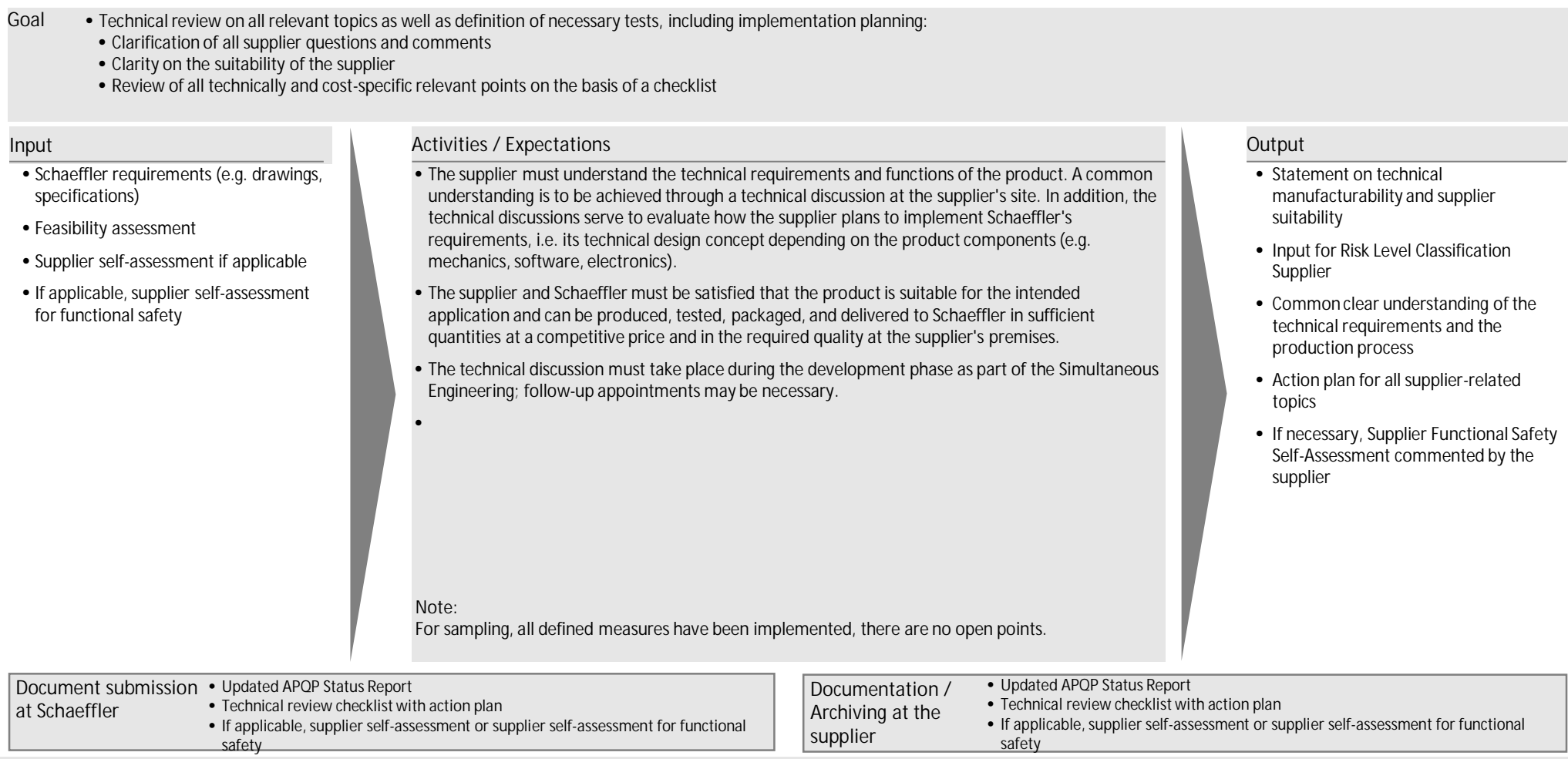
Document submission at Schaeffler

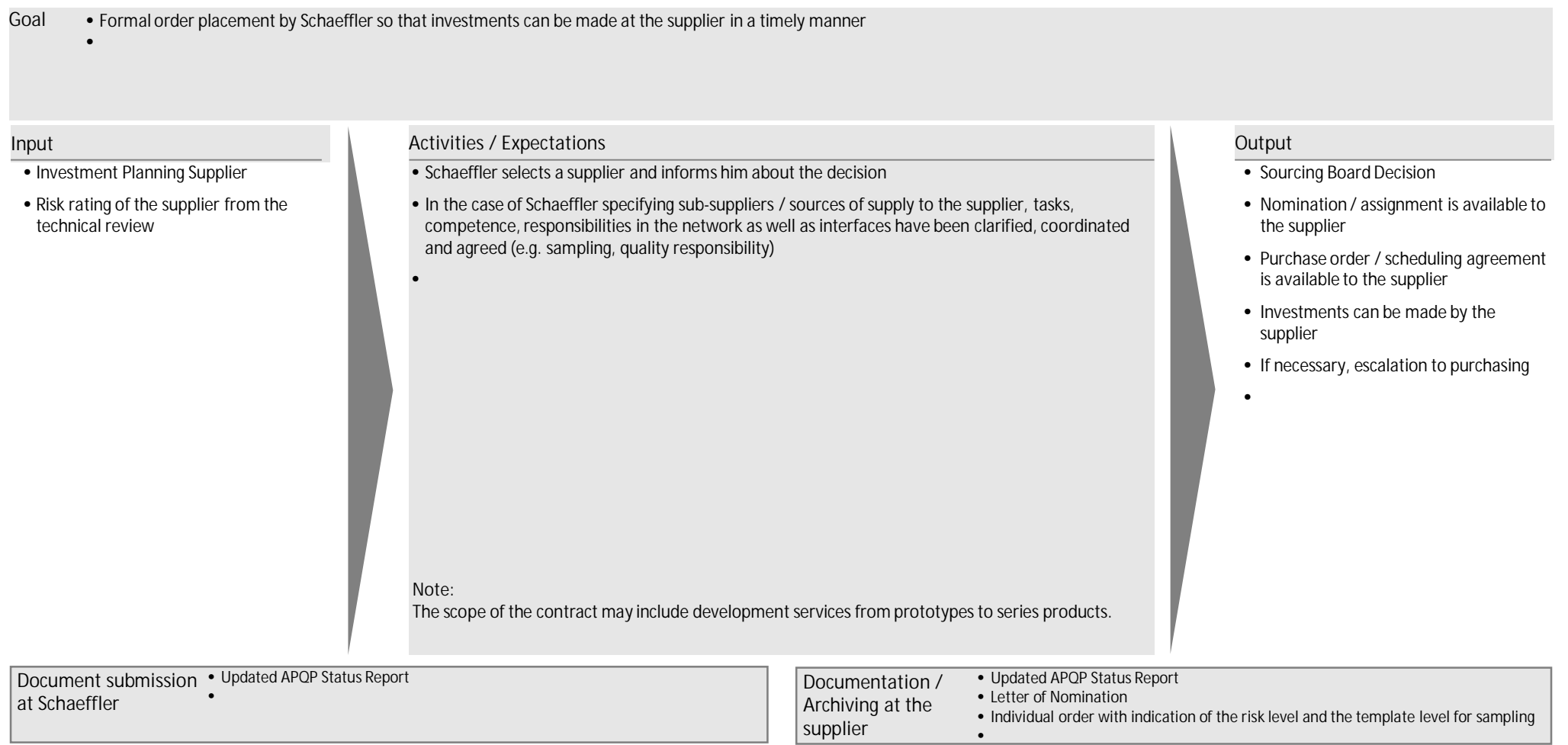
- Updated APQP Status Report
- Accepted requalification concept

Documentation / Archiving at the supplier

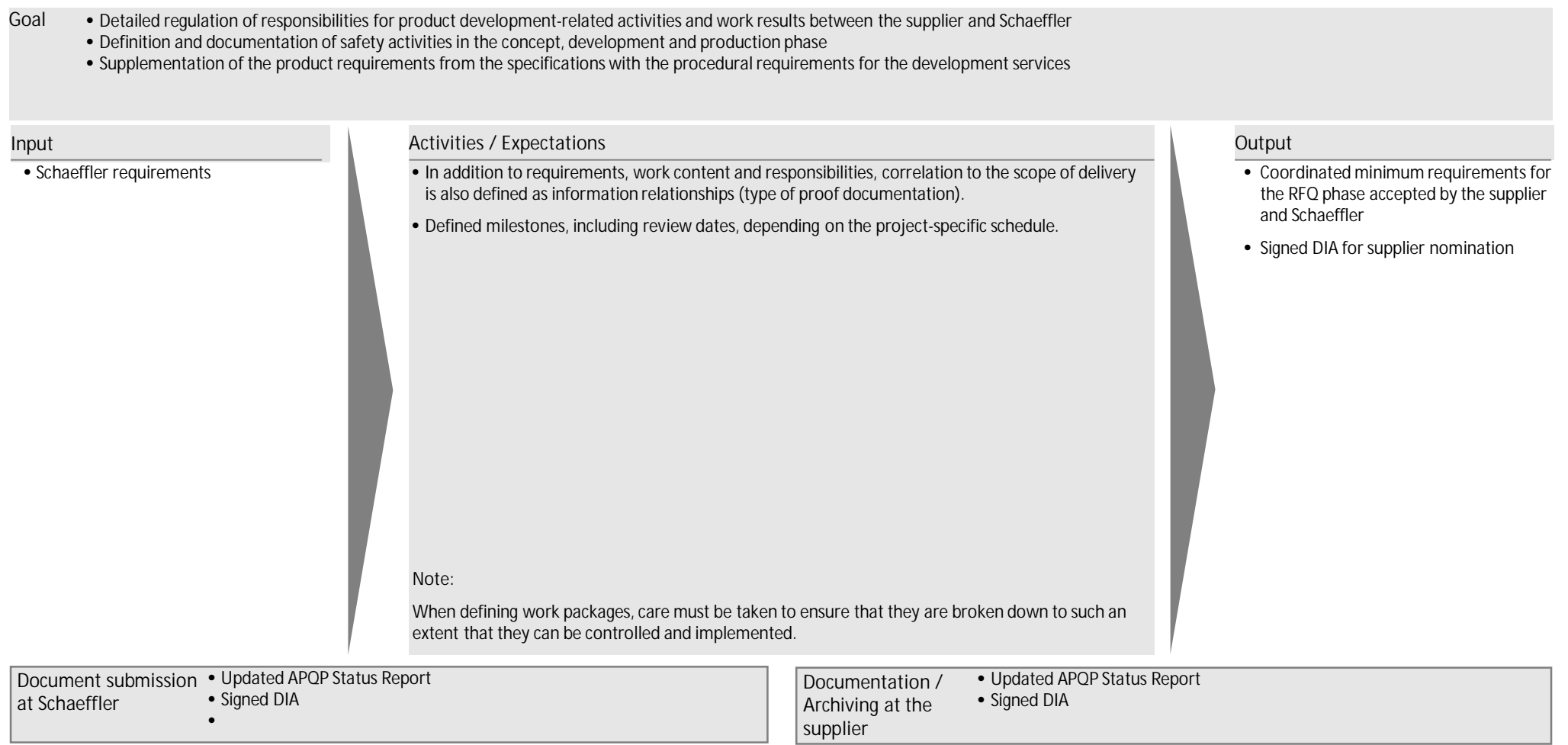
- Updated APQP Status Report
- Accepted requalification concept

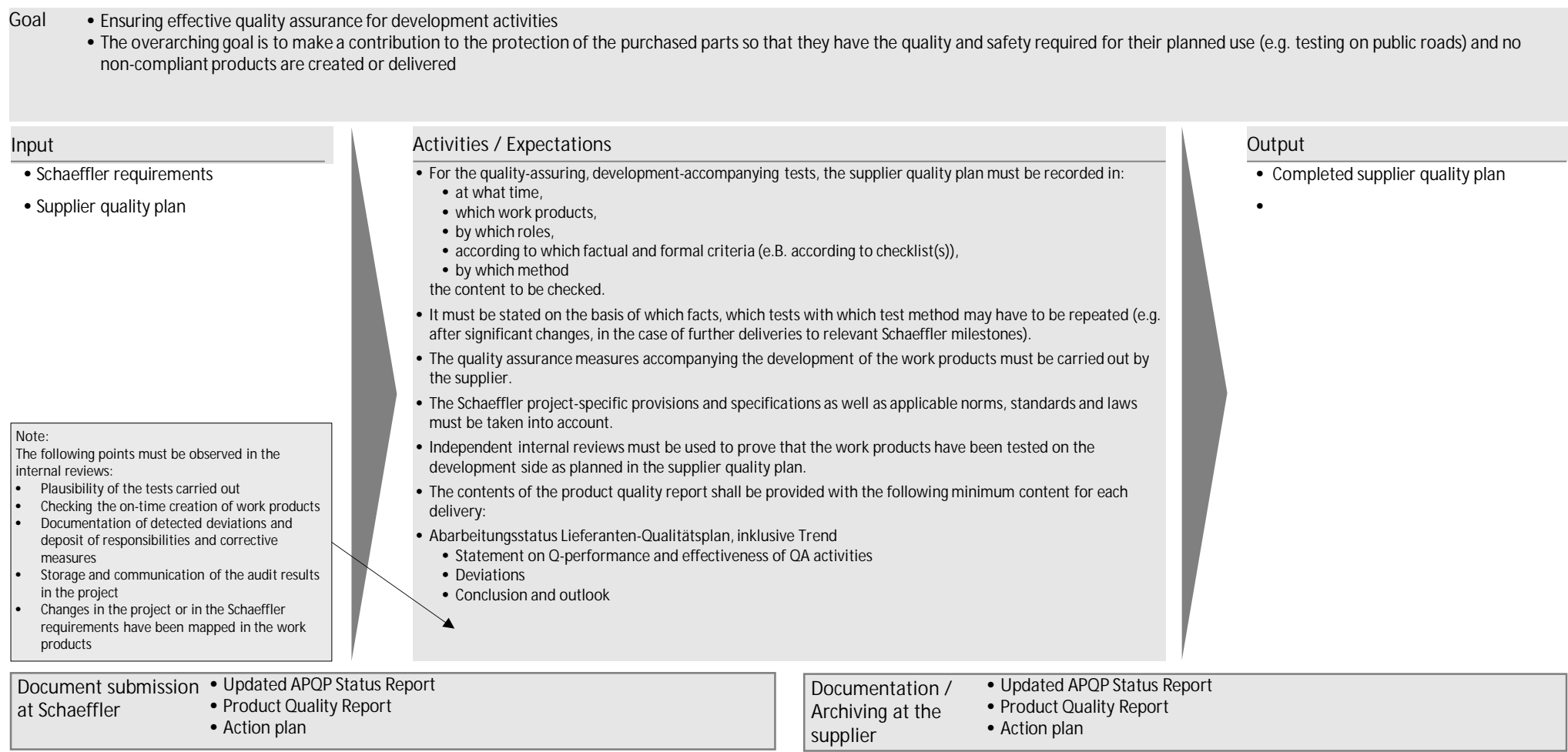
9 Technical review and action plan





11 Development interface agreement (DIA)





- Goal**
- Analysis of the functions of a product, the interactions and interfaces between elements, including functional and error-related dependencies
 - Gaining a product understanding
 - Detection of potential error types, consequences and causes
 - Assessment of planned avoidance and detection measures and, if necessary, recommendation of additional risk-reducing measures

Hint:
In this description, only term FMEA is used. Alternatively, other suitable methods can be used (see note).

- Input**
- Schaeffler requirements
 - Norm requirements
 - Supplier Design FMEA
 - Project plan
 - Project Team Matrix

- Activities / Expectations**
- Team coordinated (all necessary functions integrated)
 - The evaluations of error consequences specified by Schaeffler with regard to their meanings at the interface are to be taken over by the supplier Design FMEA
 - The assessment of the importance severity in the FMEA is to be correlated with the error effects from the VDA band
 - The consistency of importance must also be ensured for downstream suppliers
 - The remaining residual risk (high, medium) from the Design FMEA, especially with regard to product safety, must be communicated to Schaeffler
 - The scope of the Design Verification Plan must be compared with the findings from the Design FMEA and supplemented if necessary
 - The findings gained from findings must be compared with the Design FMEA
 - Description and evaluation of prevention and detection measures
 - If necessary, optimizing measures with deadlines, responsibilities and status must be initiated; the remaining risk shall be reassessed
 - In the case of mechatronic purchased parts with software components, coordination of the implemented diagnostics must be agreed with Schaeffler (possibly use of FMEA-MSR)
 - The implementation status of the Design FMEA must be reported in the APQP status report
 - The supplier requests missing information from Schaeffler
 - Transfer and integration of customer interfaces (functions) and considered in both directions (e.B. at electronics supplier: requirements for parts handling at Schaeffler)
 - In the event of incomplete malfunctions at the interface, findings regarding product behavior or abnormalities, the supplier shall display them directly to Schaeffler so that the interface can be adapted.
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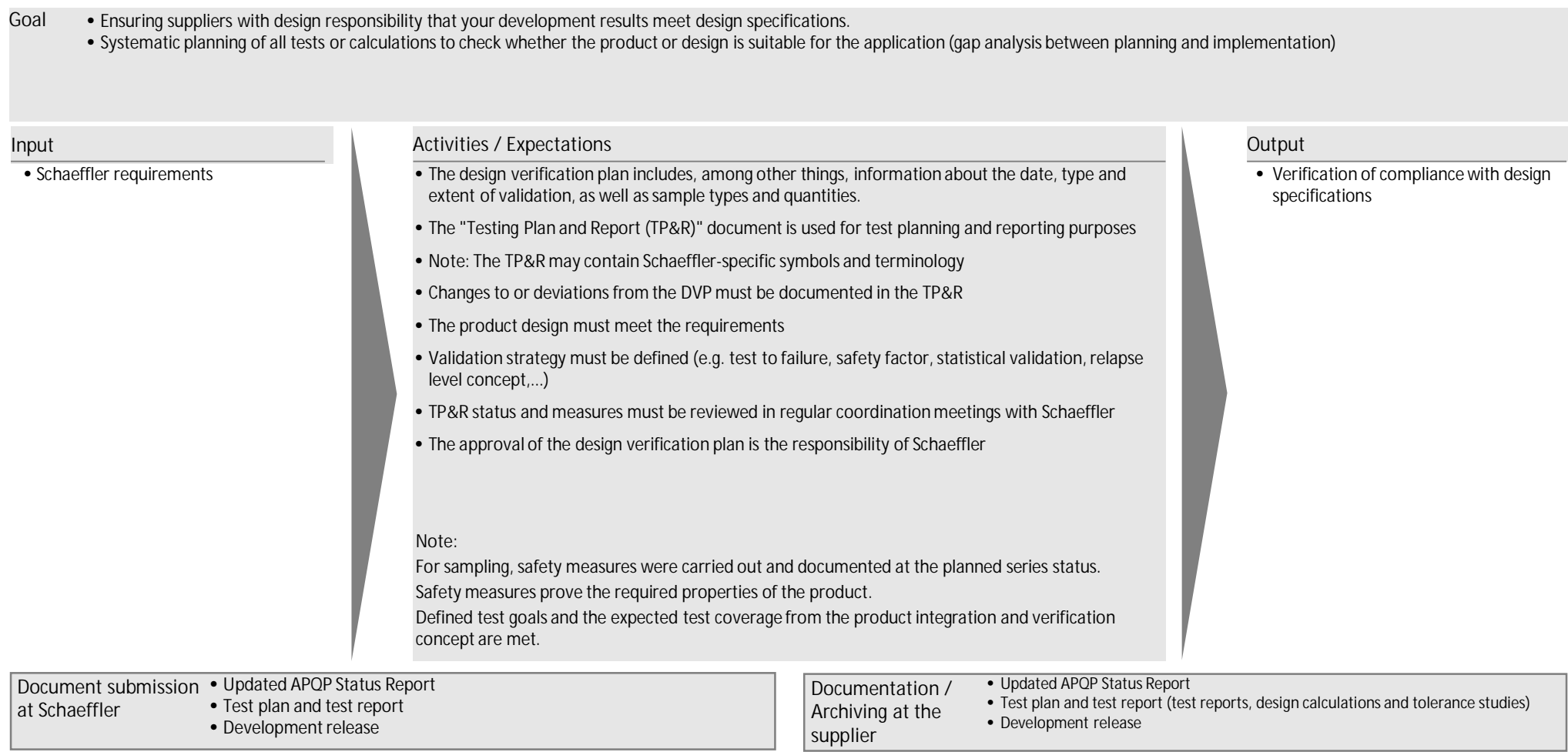
- Output**
- Archived FMEA interface
 - FMEA status report according to sample status

Note:
 Within the framework of independent product development, a methodical approach corresponding to product complexity must be chosen so that sufficient design analysis can be ensured. In the case of safety-relevant functions, separate measures for safety analyses (such as .B FMEDA, FTA) in accordance with ISO 26262 must be taken into account.
 As a minimum of due diligence, a methodical procedure must be carried out in accordance with the AIAG and VDA FMEA Handbook and its objectives.

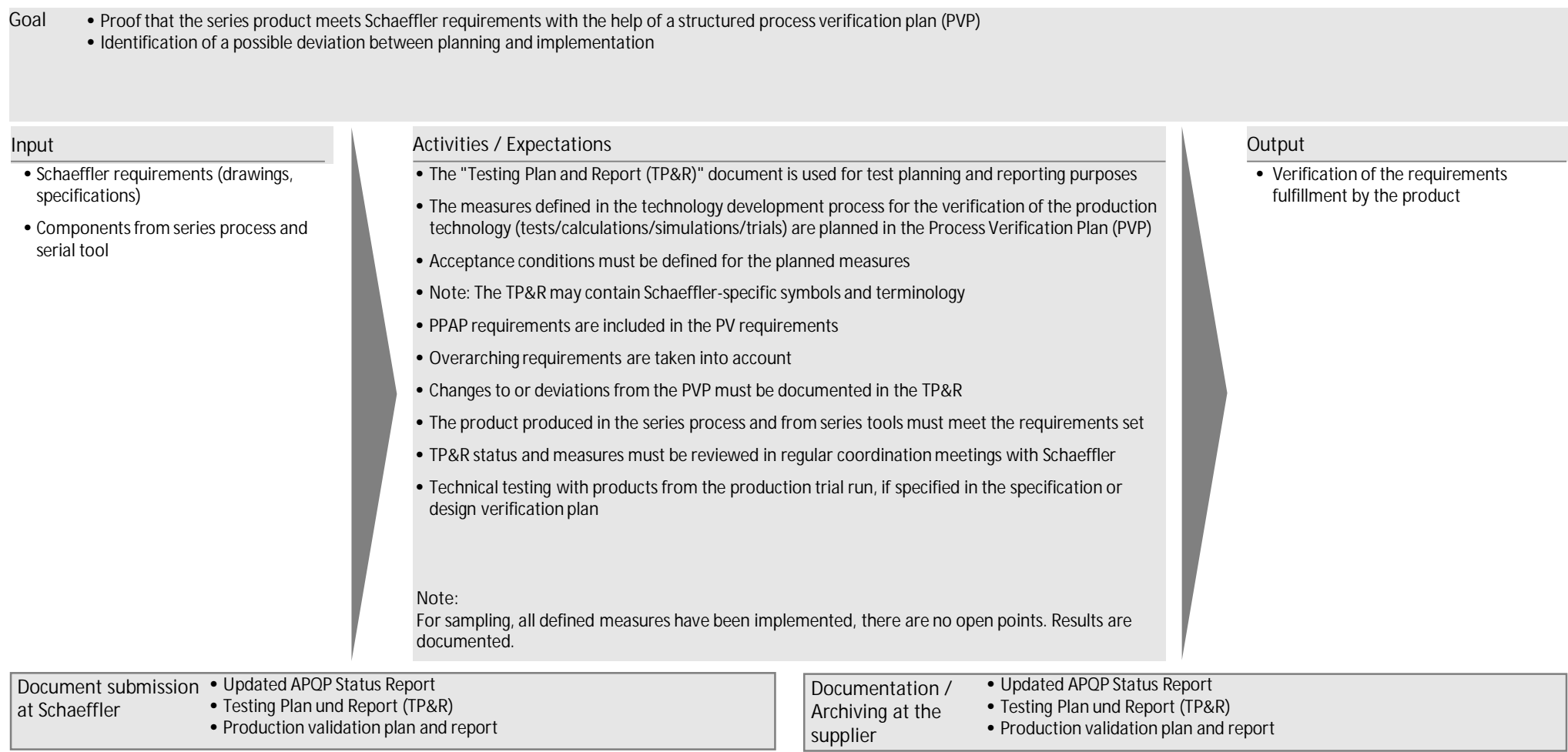
- Document submission at Schaeffler**
- Updated APQP Status Report
 - Cover sheet of the Design FMEA with risk report
 - FMEA Status-Report

- Documentation / Archiving at the supplier**
- Updated APQP Status Report
 - Design FMEA
 - FMEA Status-Report

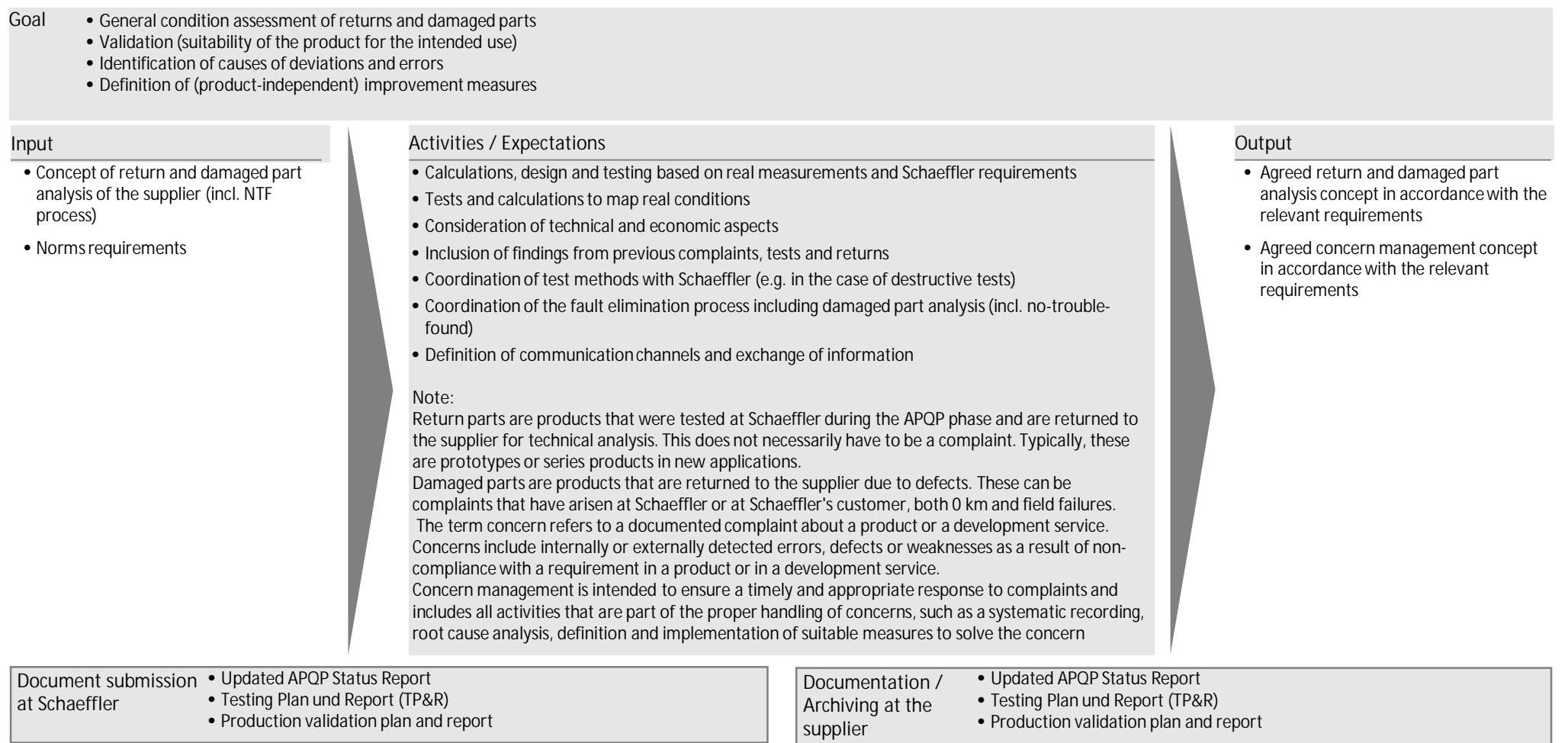
14 Design verification plan (DVP)

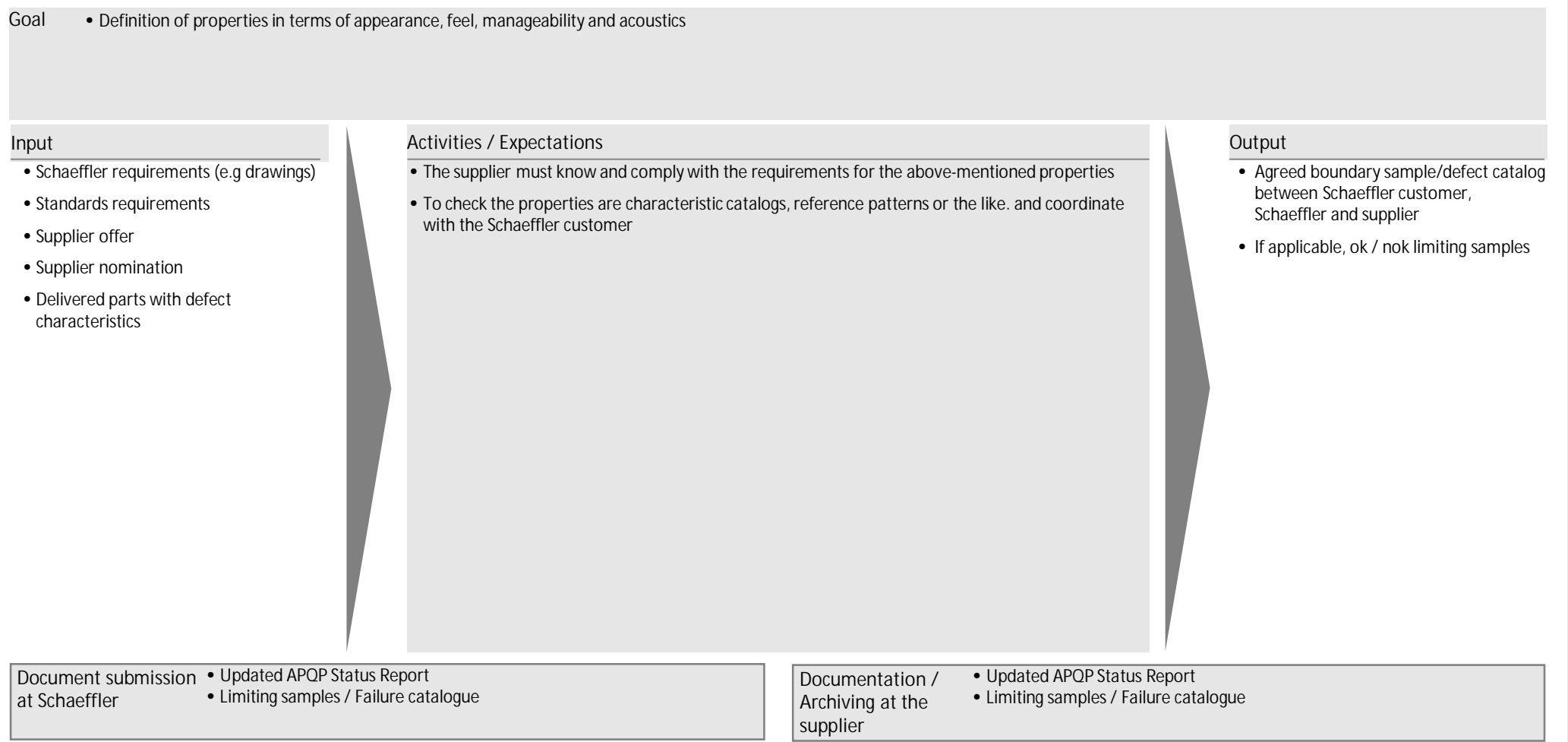


15 Prozess verification plan (PVP)

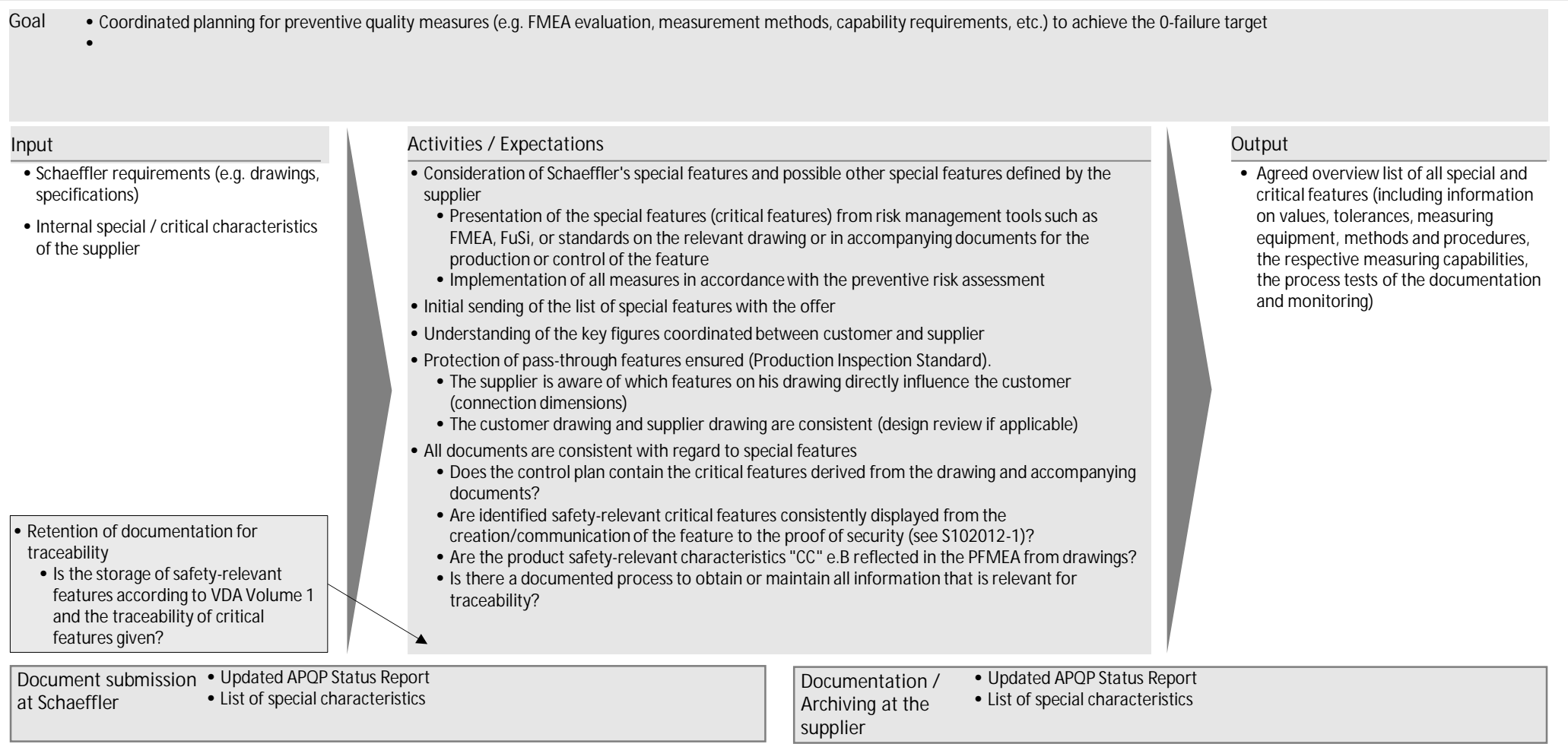


16 Concept for return and damaged part analysis and for concern management

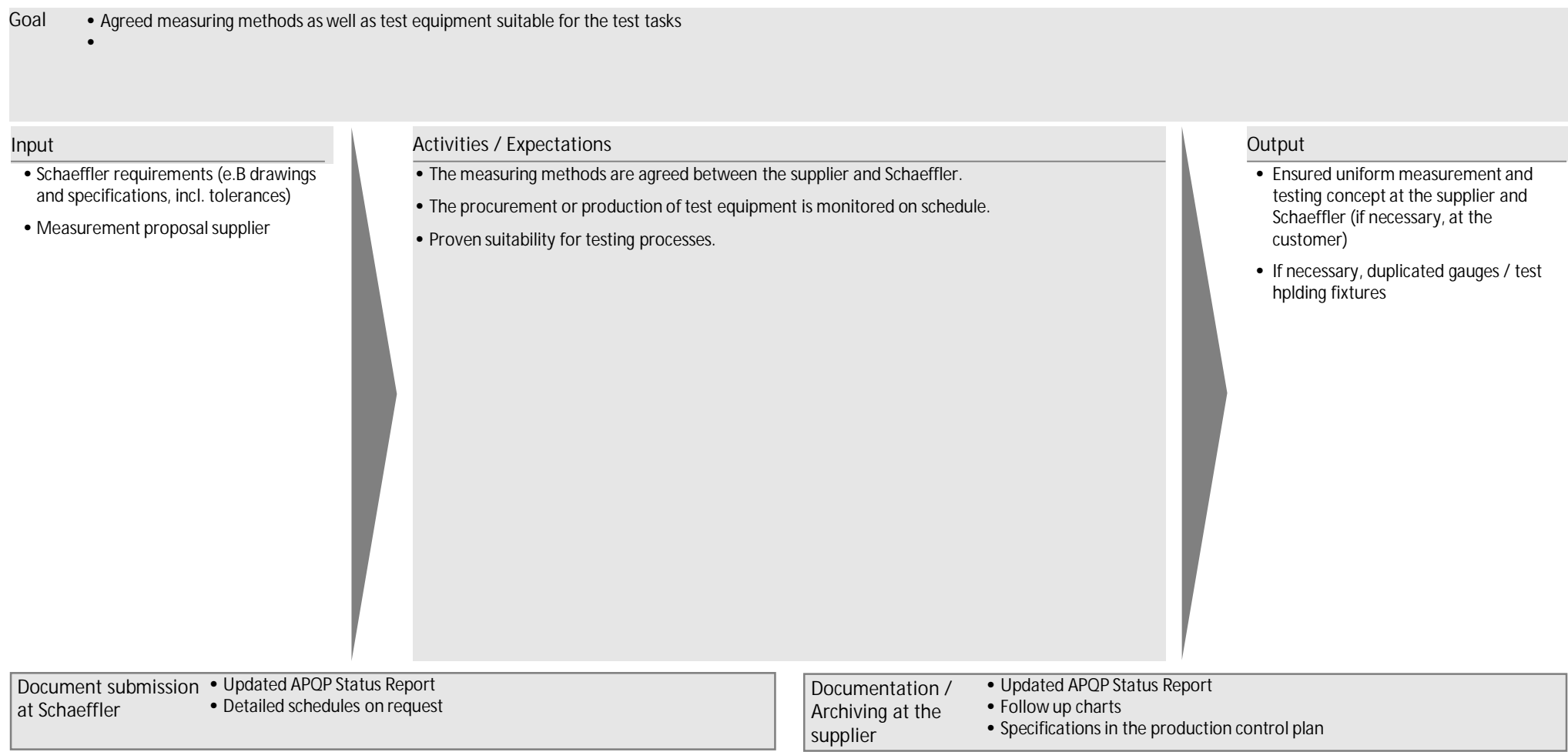


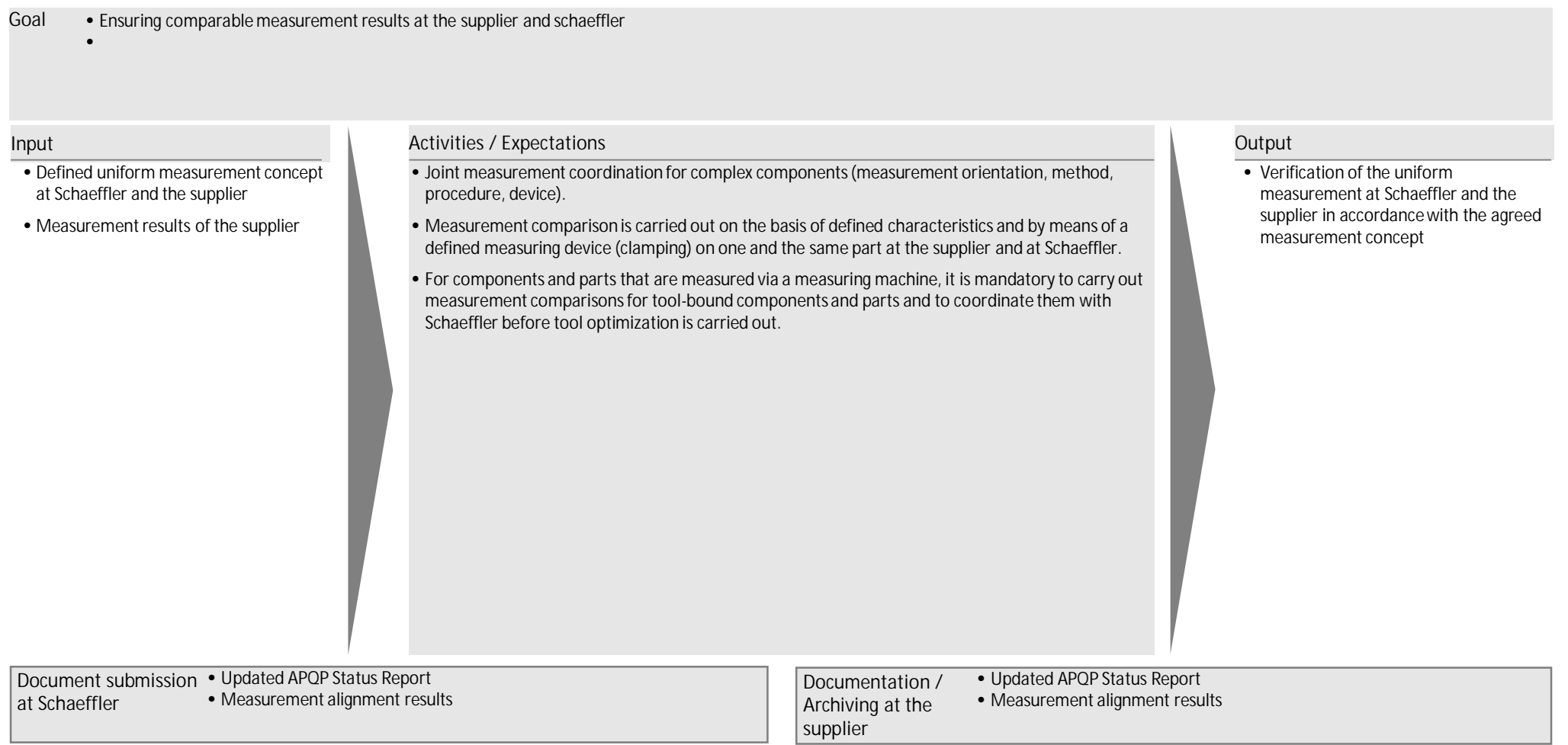


18 List of special characteristics



19 Measuring methods definition





21 Inspection and measuring equipment capability

Goal

- Evaluation of the suitability of the intended test and measuring equipment and test processes by means of capability testing, e.g. according to VDA Volume 5 or MSA procedure of AIAG

Input

- List of test and measuring equipment
- Capabilities measured by the supplier (e.g. MSA method according to AIAG)
- Certificates of proficiency (e.g. printouts of statistical programs)

Activities / Expectations

- In order to check the suitability of the test and measuring equipment, capability tests must be carried out by the supplier
- Schaeffler must be given the opportunity to review the results
- If necessary, test/measurement methods must be agreed with Schaeffler in good time
- In the case of modifications of the test and measuring equipment, the capability tests must be repeated

Output

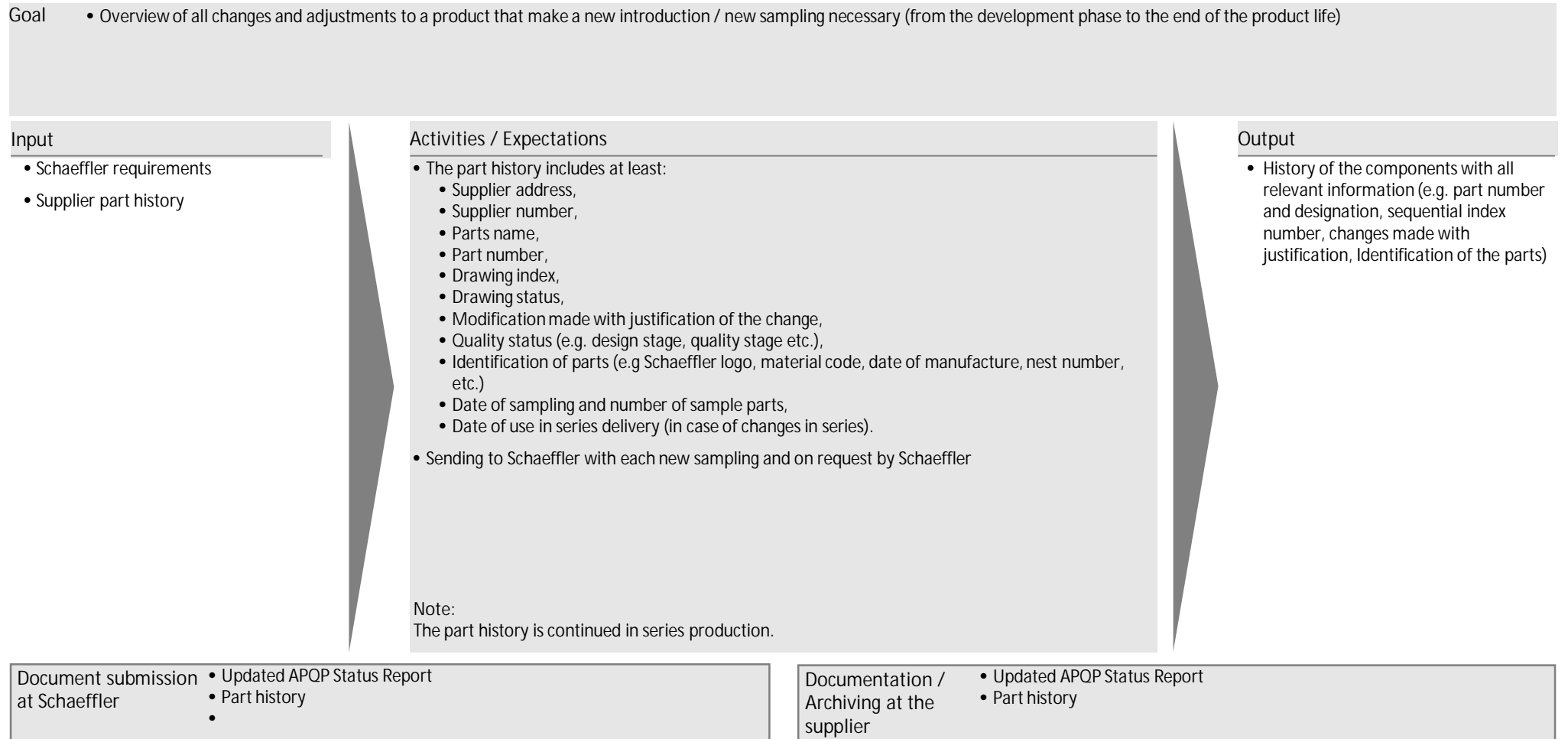
- Proven capability of the inspection and measuring equipment at the supplier

Document submission at Schaeffler

- Updated APQP Status Report
- Proof of ability with individual values in the context of the production process

Documentation / Archiving at the supplier

- Updated APQP Status Report
- Proof of ability with individual values, e.g. printouts of the statistics program used



Goal

- Regular product audit of Schaeffler products, which takes place at least annually and is to be carried out by the supplier in its production
-

Input

- Schaeffler Requirements
- Norms requirements (e.g. VDA 6.5)
- Suppliers internal product/process audit planning

Activities / Expectations

- Inclusion of the Schaeffler product in the product family / product audits
- Verification of product quality with regard to Schaeffler requirements, technical specifications, and the manufacturing and testing methods used
- In the event that the supplier supplies Schaeffler with complete modules consisting of several components, a product audit must be carried out both for individual components manufactured by the supplier itself and for the complete assembly.
Note: Since the module must be disassembled into its components for this, this is also referred to as a so-called dismantling audit

Note:
The product families are to be considered in audit planning.

Output

- Confirmation of supplier product audits in accordance with Schaeffler requirements

Document submission at Schaeffler

- Updated APQP Status Report
- Product audit planning, audit report and action plan on request

Documentation / Archiving at the supplier

- Updated APQP Status Report
- Product audit planning, audit report and action plan

24 Material declarations and conformity certificates

Goal • Collection, maintenance, analysis and archiving of all materials contained in the delivered product (component, semi-finished product or material), including material and chemical composition

Input

- Legal requirements (REACH, ROHS, GADSL, etc.)
- Schaeffler requirements
- Norms requirements
- Substance prohibition standard S 132030-1 and other documents (IMDS entry, BOM check, CADMS entry, etc.)

Activities / Expectations

- Mandatory for products delivered to the automotive division
- Compliance with REACH requirements (registration, evaluation, authorization and restriction of chemicals)

Output

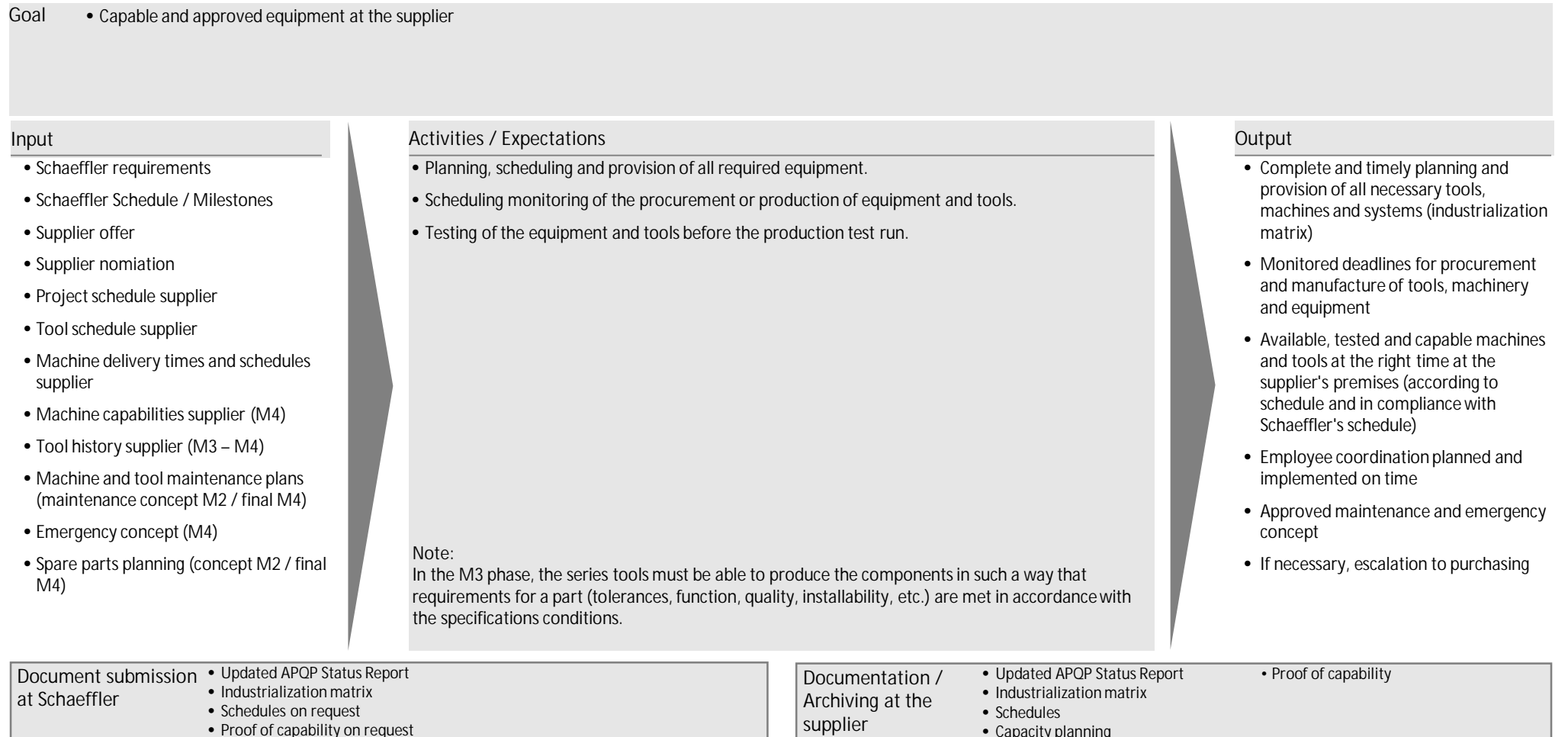
- Complete and correct material data or confirmation of conformity for all delivery products

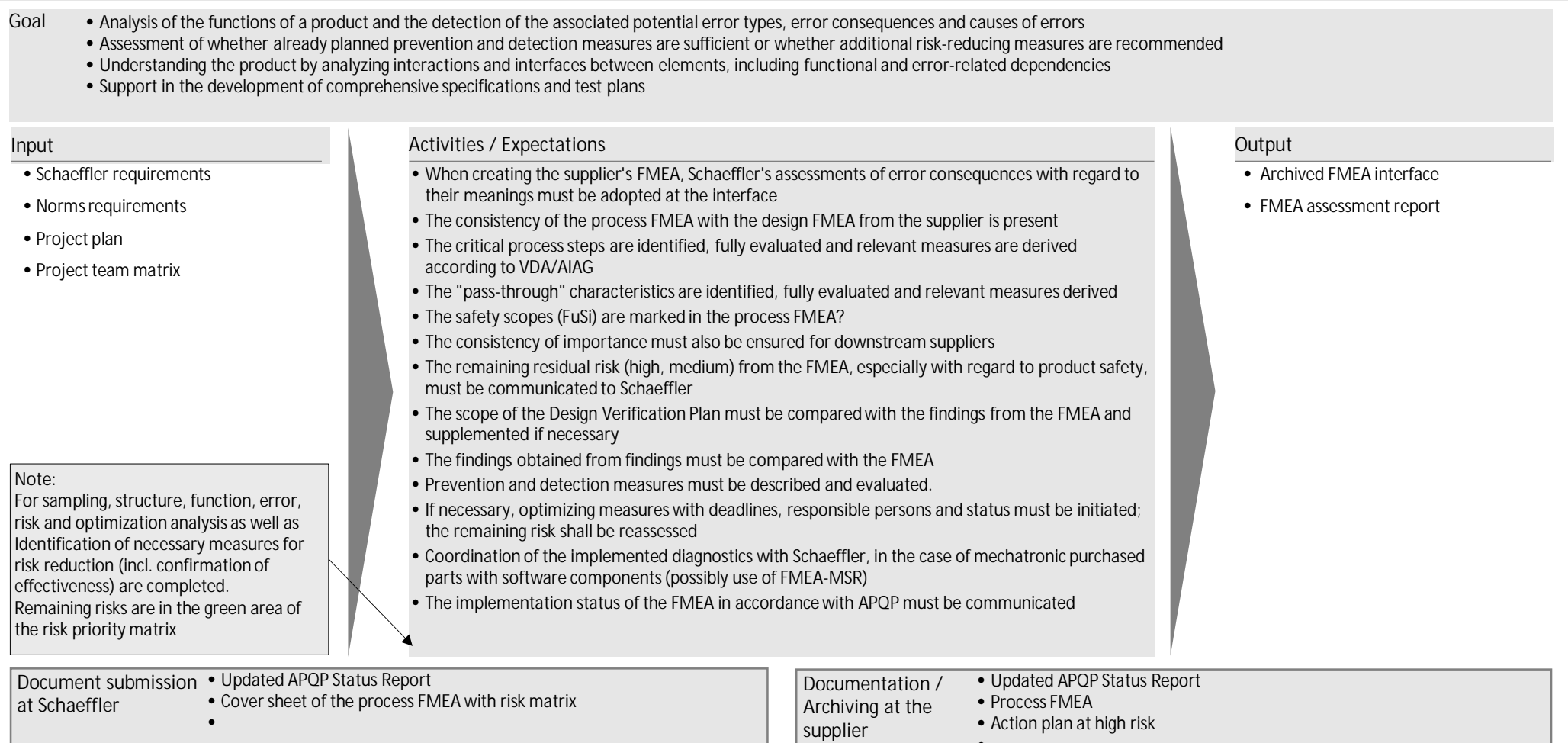
Document submission at Schaeffler

- Updated APQP Status Report
- Confirmed substance prohibition standard S 132030-1
- Access to databases such as IMDS, CADMS, BOM-Check
- Material data sheet

Documentation / Archiving at the supplier

- Updated APQP Status Report
- Confirmed substance prohibition standard S 132030-1
- Access to databases such as IMDS, CADMS, BOM-Check
- Material data sheet







Goal • The flowchart of the series production process (graphical representation of the planned workflow) as a basis for investment planning, process FMEA, production plan, control plan and visual aid

Input

- Supplier's process flow diagram
- Supplier's layout
- Machine and plant planning of the supplier

Activities / Expectations

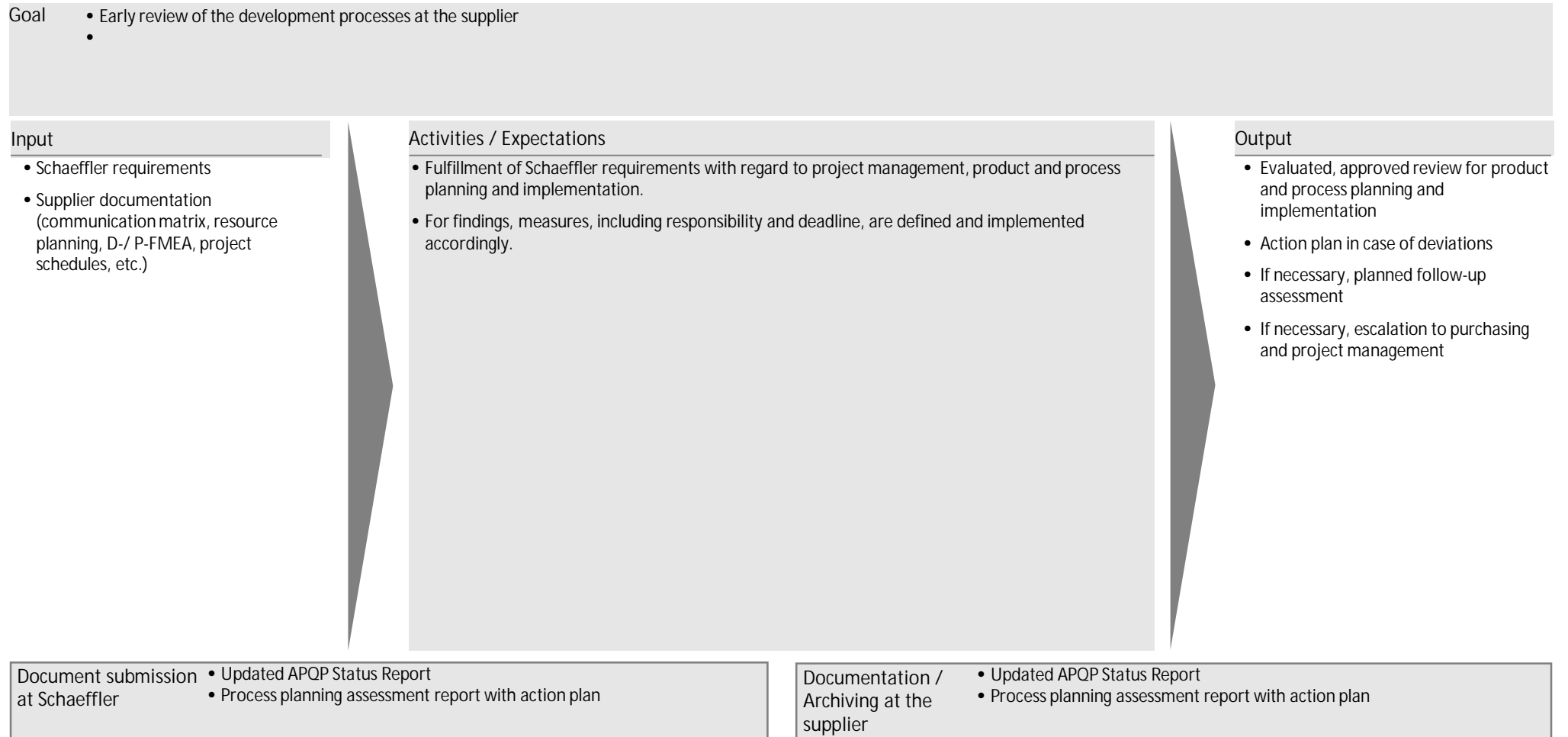
- Planned sequence of all series production and inspection steps from goods receipt to goods issue.
- Designation of areas with special requirements, such as .B ESD or technical cleanliness.
- Early concept for lean processes and optimized logistics routes.
- Special features taken into account

Output

- Coordinated process flow diagram and series layout of the supplier as a basis for process FMEA, production planning and control plan

Document submission at Schaeffler • Updated APQP Status Report
• Process flowchart

Documentation / Archiving at the supplier • Updated APQP Status Report
• Process flowchart
• Machine layout



30 Production and inspection of prototype parts

- Goal
- On-time delivery of cost- and quality-compliant prototype parts
 -

Input

- Prototype order from Schaeffler (fixed price, quantity, deadline)
- Prototype parts from supplier
- Test reports for prototype parts

Activities / Expectations

- Deadlines and quantities for prototype and sample production must be planned, monitored and adhered to.
- Delivery of prototypes / sample parts with test report (see QAA brochure „Production process and product release“.
- For non-compliant prototypes / samples, approval must be obtained from Schaeffler before delivery (see QAA brochure „Special Release and Modification Approval“.
- Product delivery documentation (per sample status) can include, for example the following topics:
 - Product-ID / Schaeffler-Product-ID
 - Product name / Product description
 - Product configuration/ Version Product
 - Product configuration of product components / Version product components
 - Compatibility matrix
 - Implemented changes/ fixed bugs (problems, concerns)
 - Status V&V Measures/ Summary (relevant) V&V results
 - Test coverage
 - Concerns and Actions
 - Unimplemented Functions & Diagnostics
 - Description Deviation(s)
 - Recognition / marking deviation from the ok samples
 - Restriction(s)
 - Intended use (intended use)
 - Recommended regulation for user/ operating personnel (optional)
 - Possible hazards / warnings & precautionary or safety measures
 - Note on service / support

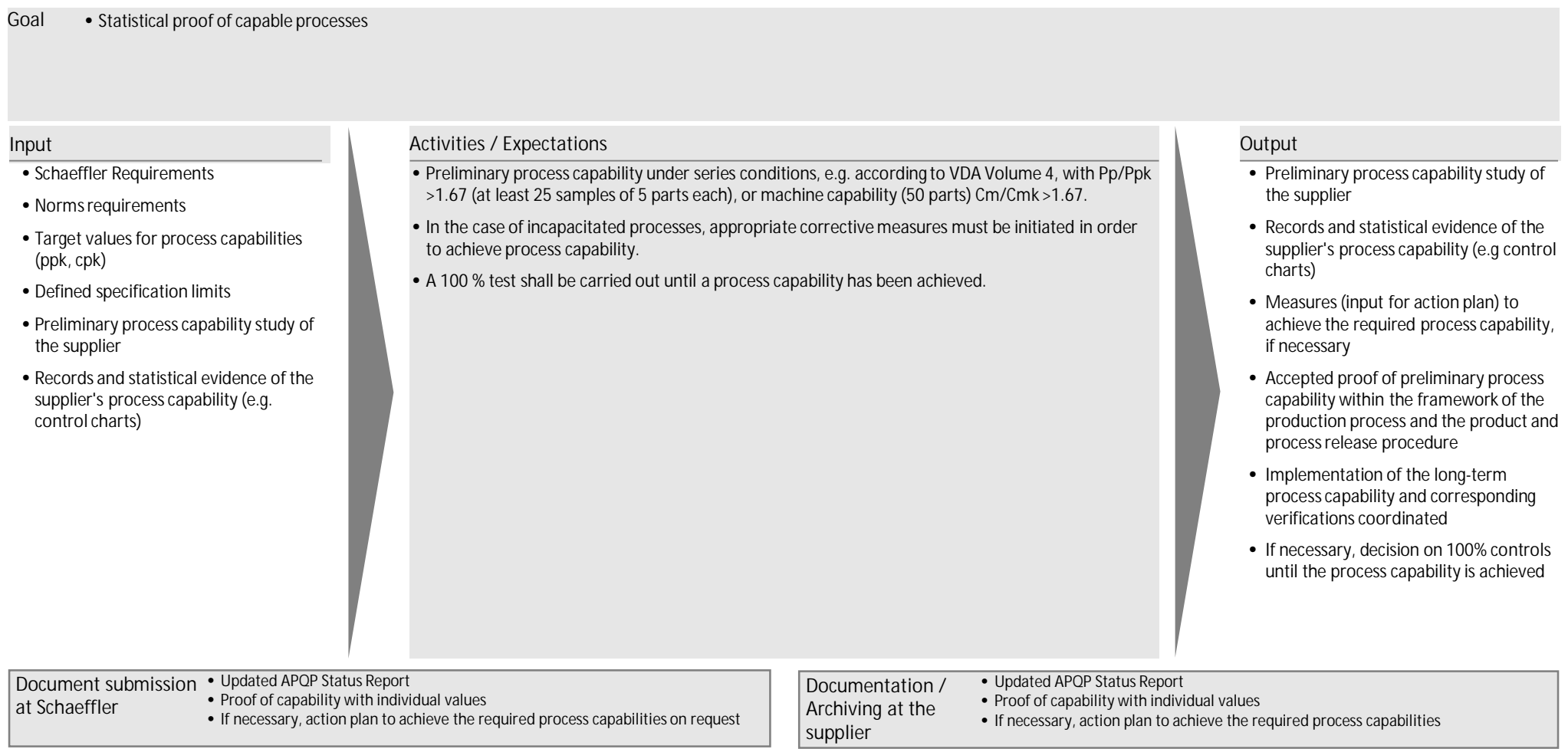
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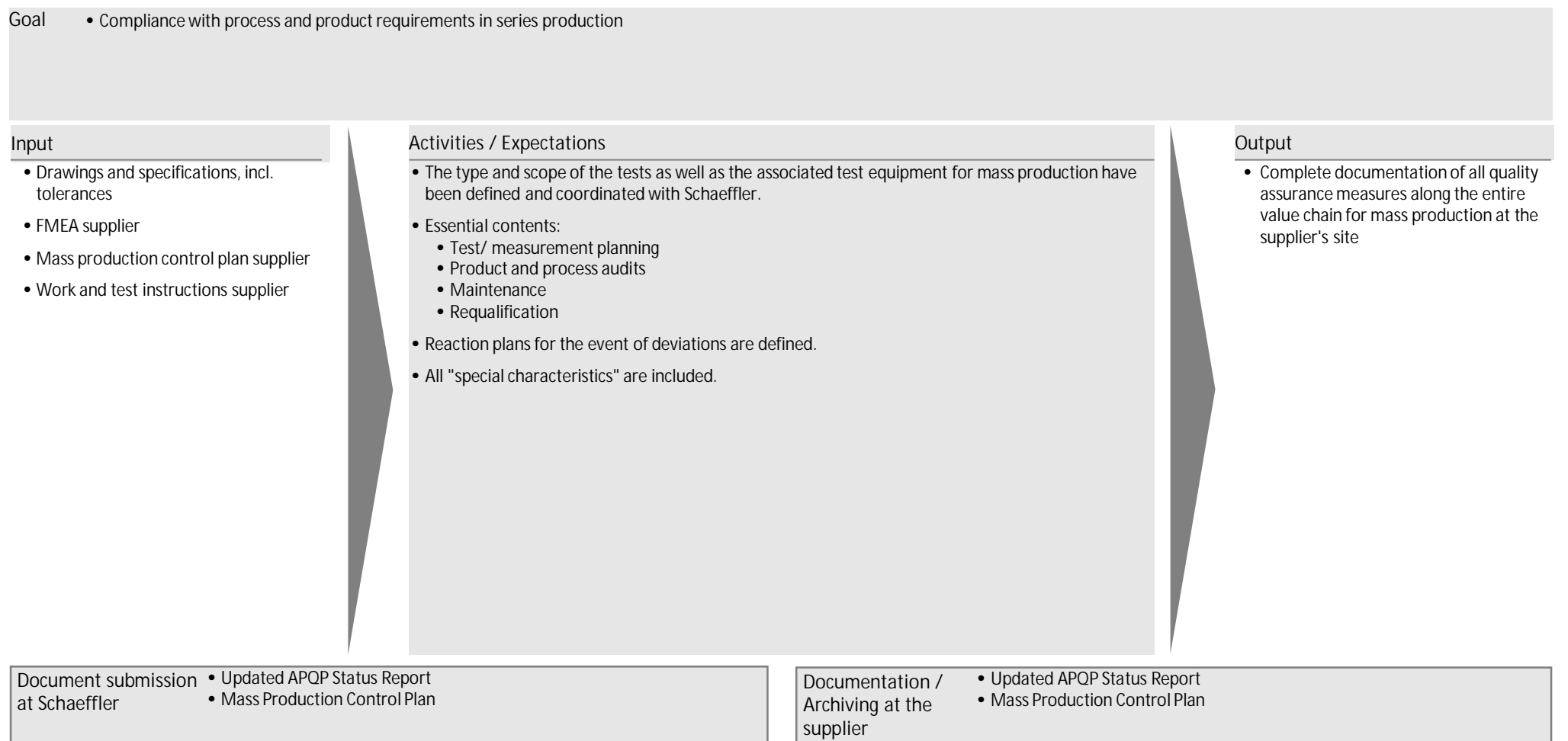
- Prototype parts at Schaeffler, at the right time, in the right quantity and in compliance with price and quality requirements
- Accepted test reports for prototype parts
- Schaeffler approval for non-compliant prototypes before delivery
- If necessary, escalation to purchasing

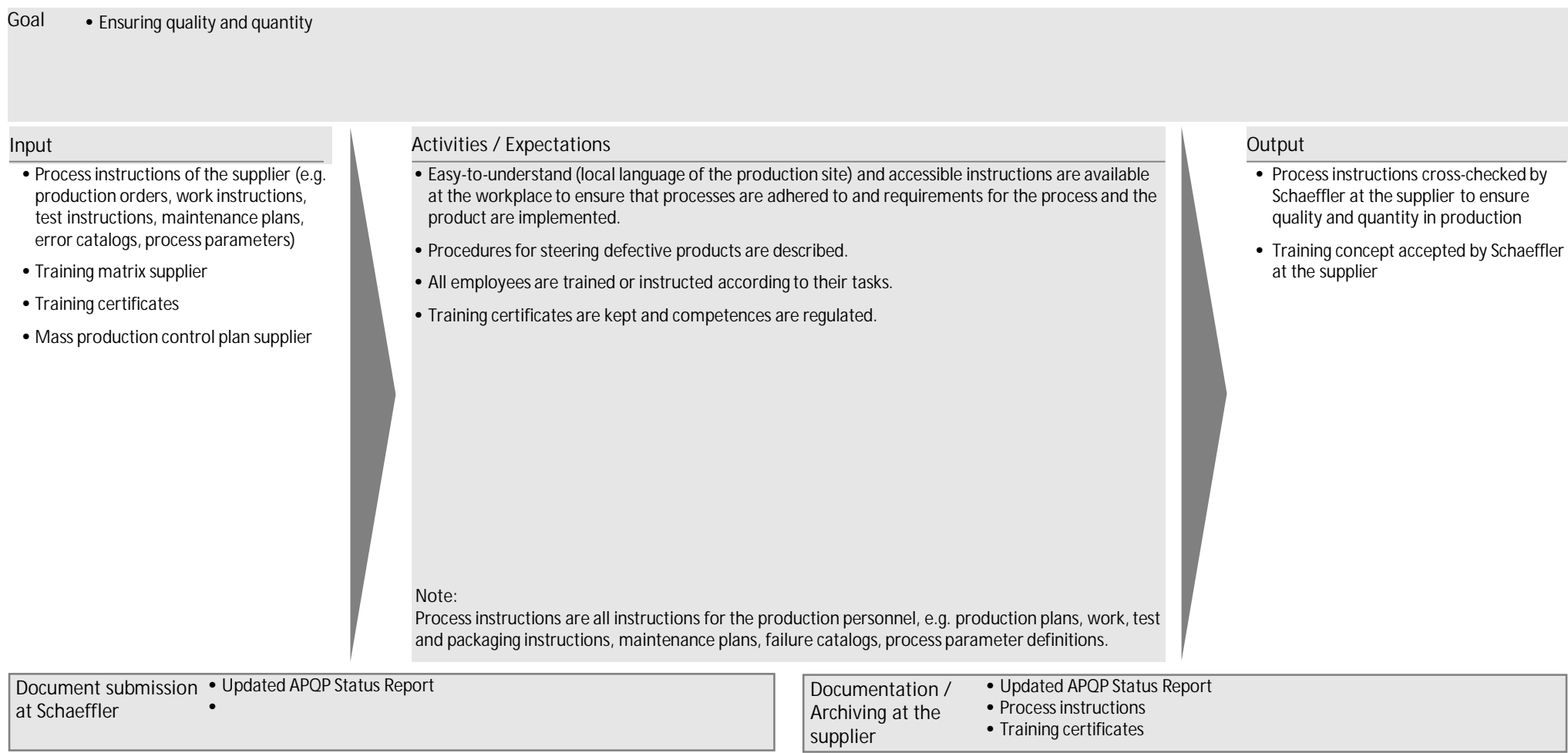
- Document submission at Schaeffler
- Updated APQP Status Report
 - Prototypes and test reports
 -

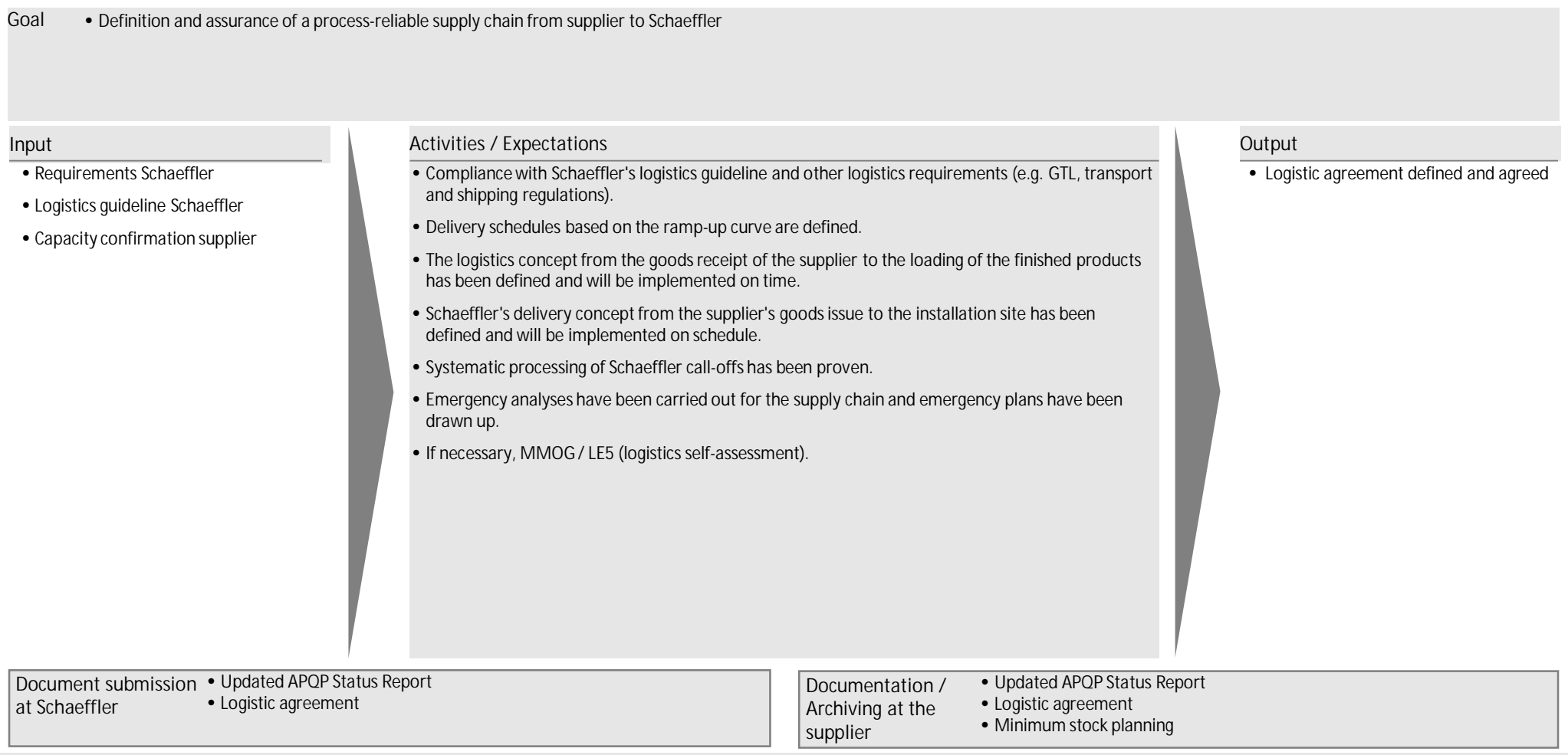
- Documentation / Archiving at the supplier
- Updated APQP Status Report
 - Prototypes and test reports
 -

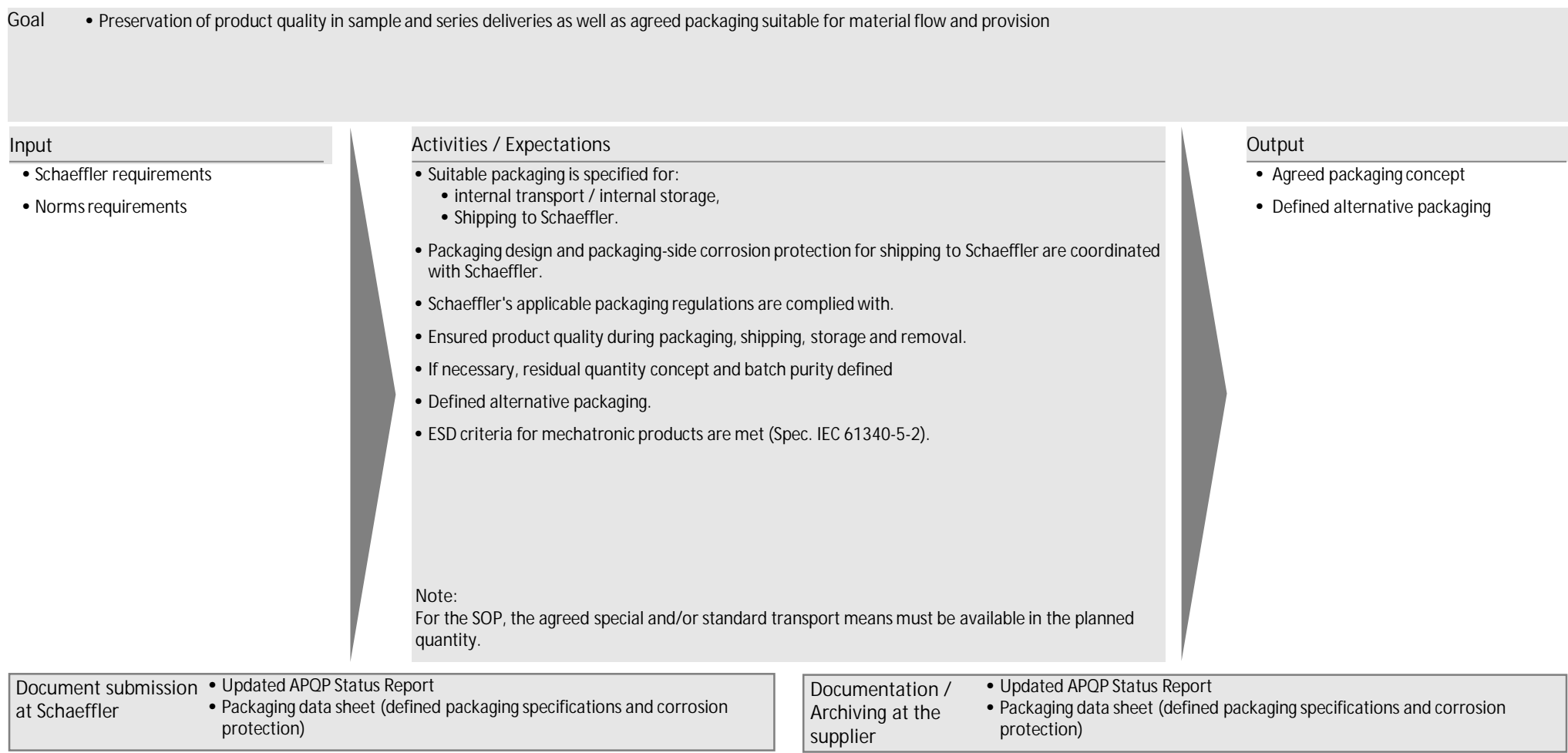
31 Preliminary process capability study





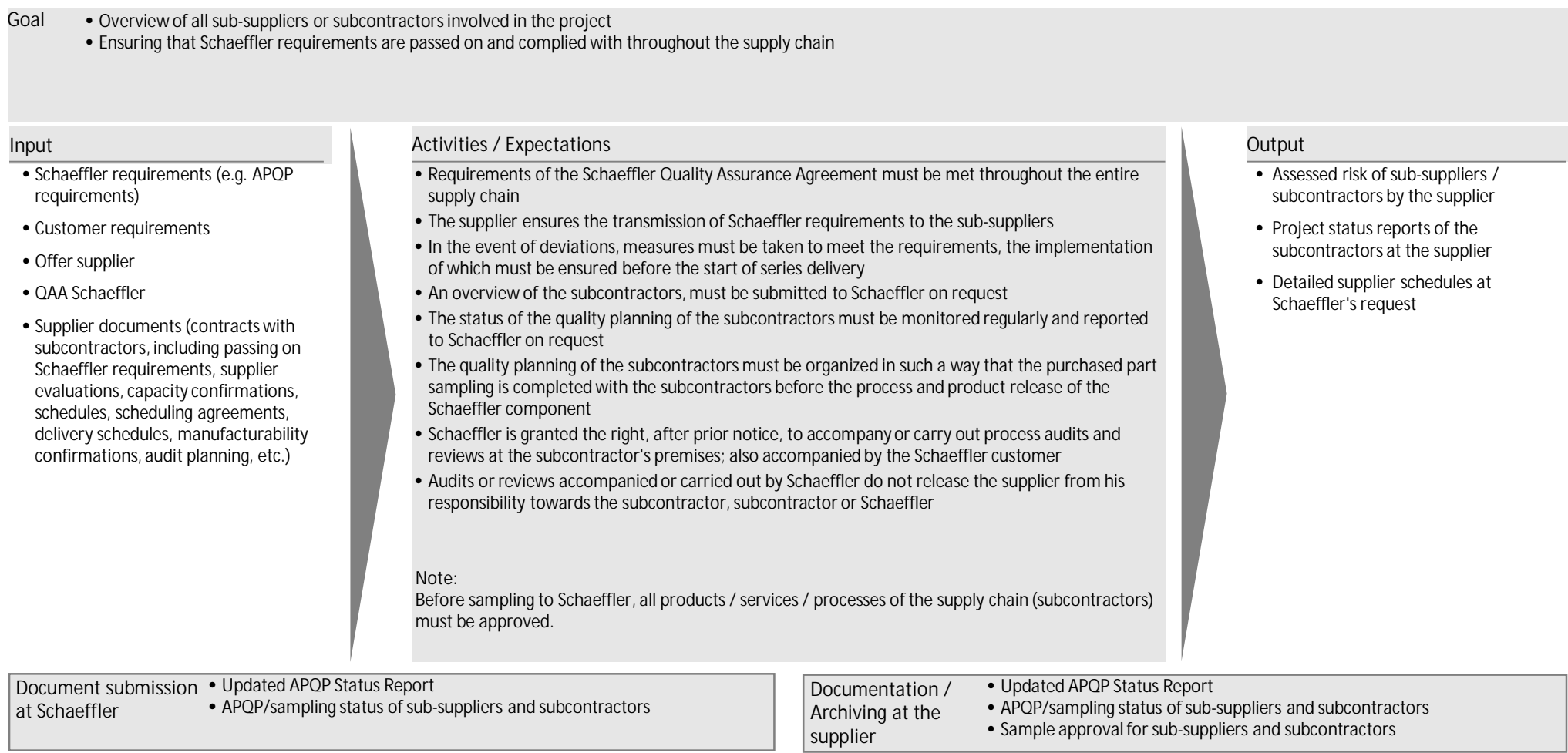


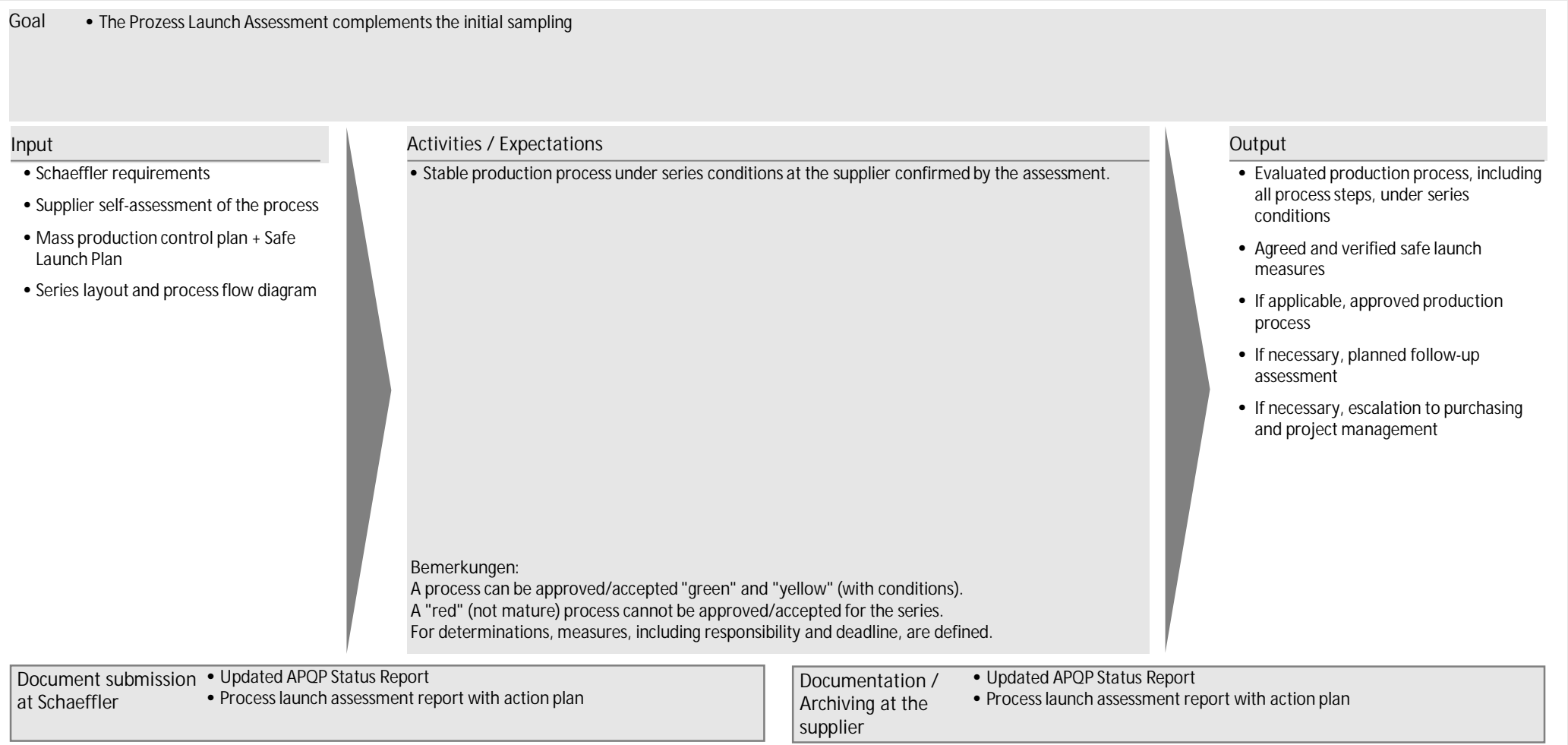


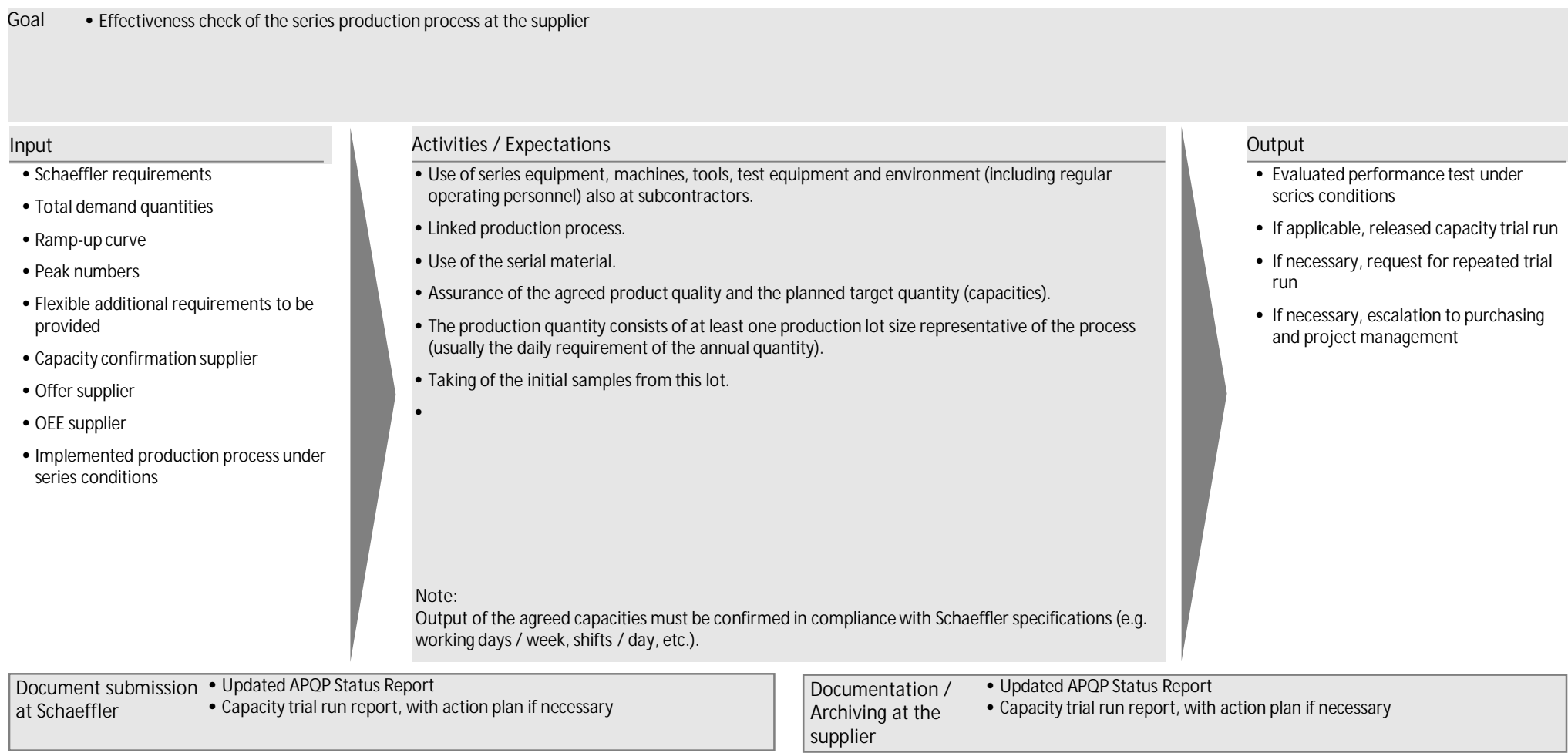




37 Quality planning subcontractor







Goal • Documented proof that the product manufactured under series conditions meets Schaeffler requirements.

Input

- Current specification
- Schaeffler requirements
- Sample parts
- Supplier initial sample documentation
- If applicable, supplier product self-assessment
- If applicable, supplier process self-assessment

Activities / Expectations

- On-time production of the series first samples.
- Preparation of documentation for all elements required by Schaeffler's production process and product release procedure.
- Timely provision of documentation; Scope depending on the specified submission level.

Note:
Serial samples (initial samples) are products and materials that have been manufactured entirely with serial means of production under series conditions.

Output

- Measurement report of the submitted sample parts
- Cross-checked PPAP documents
- Delivery documentation
- Decision on sampling:
 - Approval
 - Conditional approval with time or quantity restriction (re-sampling needed)
 - Rejection and request for new sampling

Document submission at Schaeffler

- Updated APQP Status Report
- Series initial sample with initial sample documentation according to the defined submission level

Documentation / Archiving at the supplier

- Updated APQP Status Report
- Series initial sample with initial sample documentation (all elements required by the production process and product release procedure)