General development requirements REHAU Automotive

Project regular communication

1. The supplier independently creates a detailed **schedule** with all essential milestones for project execution to meet the required deadlines, without further prompting. The supplier is responsible for updating and maintaining the flow of information.
2. The supplier designates at least one **contact person** for technical matters and quality issues, a product safety officer, and a responsible representative. Upon request from REHAU, a project team with members for all relevant areas must be appointed.
3. The supplier, in coordination with the responsible REHAU contact person, provides regular **written reports**, which are maintained at least until series approval by REHAU.
4. Depending on the risk assessment, REHAU conducts the corresponding **Supplier Readiness Tracking / SRT** (DrNr 6440) with the supplier. The supplier prepares the documentation before each review.
5. A **Quality Tracking Sheet / QTS** (DrNr 5516) or **action plan** is maintained by the supplier. The presentation method is freely selectable by the supplier. The use of the QTS or action plan must be coordinated with the SQE.

Development of the part maturity level

1. The component supplier supports REHAU during the design phase regarding manufacturing-specific features of the requested components and actively evaluates and presents constructive improvements to confirm the respective design statuses through the manufacturability assessment (DrNr 5487). This includes, in particular, the optimization of the installation situation and interfaces of the components themselves or in the assembly.
2. The supplier confirms the feasibility of the design status for B-release. Deviations from the requested component specifications must be indicated in advance.
3. Manufacturing or tolerance-related component changes after B-release, which are caused by the supplier, are at the supplier's expense.
4. Deviating drawing requirements from REHAU take precedence over specifications, technical delivery conditions, and technical specifications.
5. In case of non-compliance with defined requirements (e.g., specifications, standards, quality, development, and deadline requirements), the supplier must independently define and implement measures at no cost. The current state of the art must always be applied.
6. Necessary optimizations and changes to the component must be communicated by the supplier promptly and implemented after approval. Corresponding parts must be made available to REHAU as soon as possible after receiving the CAD data. 5 sets of sample parts must be provided by the supplier unsolicited and without order.

   Notes:
   - Component changes are constructive changes initiated by the OEM or REHAU.
   - Component optimizations are usually necessary due to dimensional deviations on the component, such as warping or allowances. This includes adjustments to clips, snap hooks, contact surfaces and ribs, or corrections to adjacent components. (The necessary number of adjustment loops in total are specified in the request document)
   - Any costs incurred for sampling and possibly re-sampling (PPAs) must be offered accordingly with the optimization loops or changes.
   - Upon request, the supplier provides REHAU with prepared sample parts, where the relevant optimization measures are appropriately replicated, so that the parts can be installed in the REHAU measuring fixture or OEM cubing. (Presentation of Min.-Max parts – CHROM-BT)
7. The implementation location of optimizations and changes must be communicated before order placement.
8. Part history sheets (TLL) are maintained unsolicited and sent to REHAU before the first delivery. Any change in the process or product must, unless otherwise agreed, be marked in the TLL and on the component by increasing the component status.
9. The availability of components and flexibility in special requests during the pre-series phase must always be ensured.
10. Process parameters and their defined tolerance limits must be validated and verified by the producer independently regarding their influence on dimensions, function, and appearance. A corresponding test plan must be provided and made available to REHAU upon request. Changes to the relevant parameters outside the validated tolerances must be proactively coordinated with REHAU and documented traceably through change history.

Internal / external maturity meeting / Cubing
A cost-neutral provision of 3 sets of measured sample parts with a detailed 3D measurement report (or after consultation) is assumed. If necessary, participation in the master jig / cubing at our REHAU plant or at the OEM must be ensured.

Part-specific equipment
Prior to the procurement of component-specific equipment (tools, gauges, devices, ...), the supplier must obtain written approval from REHAU for the use of the specified data set. The same applies to the design and milling approval. Proof of ownership and procurement must be provided by the supplier. The offer confirms that the design of the operating equipment is enough that the annual demand can be covered in accordance with the specifications during the term and scope and spare parts service. Maintenance, repair and, if necessary, a new tool shall be at the expense of the supplier during the term. The supplier must give written notification of the manufacturing locations of operating equipment before the order is placed.

Test equipment / measurement equipment
Inspection concepts considering special characteristics (safety features (BMS), requirement and functional features (BMF), and approval-relevant features (BMZ)) must be developed by the supplier and coordinated with REHAU at an early stage. Inspection equipment must be operational with the first tool-produced parts (or as agreed with REHAU). Alignment during 3D measurement is carried out according to the reference point system (RPS) specified in the drawing. If no system is specified, the mounting and alignment points must be coordinated with REHAU.

System requirements
CAD-System: Aktuelle Version von CATIA V5 bzw. Siemens NX (aktuelle Versionen)
Data format: CATPART bzw. NX-Dateiformat
Measurement file: VDA-File
The development supplier must use a CAD equipment that is identical or equivalent. The supplier must ensure that no loss of data and time occurs during data exchange with REHAU and sub-suppliers. If problems occur during data exchange, these must be promptly corrected at the supplier's expense.

Category-specific requirements: Injection Moulding, Painting, Plating / Chroming and Hot Stamping as well as combinations

1. Regarding injection molding, a Moldflow analysis must be conducted for tool design (formation/location of sink marks, weld lines, warpage, as well as the influence of shrinkage, necessary clamping force, etc.). The Moldflow must be presented to REHAU prior to tool creation.
2. Injection-molded parts must be free of gate marks in the visible area. The geometry and position of the gates must be coordinated with REHAU and included in the data set. Deviations from customer specifications must be indicated to REHAU for approval.
3. To ensure customer requirements for the chrome coating process, simulations (e.g., Elsyca) must be conducted before submitting the offer and transmitted to REHAU with the offer (manufacturability assessment).
4. Customer specifications for component surfaces for paint, chrome, MIC components, hot stamping, and possibly texturing must be ensured by the supplier. OEM-specific testing equipment/testing regulations and accreditation requirements must also be complied with. Testing concepts must be coordinated with REHAU in the early project phase.
5. For SC characteristics, unless otherwise agreed with REHAU Automotive, the supplier must demonstrate process capability or process stability for the specified positions.
6. To check the impact of process fluctuations in production at the supplier (within tolerance/process limits) on the assembly, the supplier must provide Min-Max process parts upon request.
7. Process parameters and their defined tolerance limits must be validated and verified by the contractor independently regarding their influence on dimensions, function, and appearance. A corresponding test plan must be provided and made available to REHAU upon request. Changes to the relevant parameters outside the validated tolerances must be proactively coordinated with REHAU and documented traceably through change history.

Category-specific requirements: Foaming (EPP)

1. All impact foams must be examined for warpage and shrinkage before tool creation. Shrinkage must be verified using a reference part and tested under near-series conditions if necessary.
2. Regarding tool design, a filling study must be conducted if required and deemed necessary concerning the specified tolerances. The supplier must provide notes on design and manufacturability (e.g., wall thicknesses).
3. Parts delivery to REHAU must be low-warp. The degree of warpage must not affect the assembly and dimensional accuracy, e.g., of the ZSB STF. This must be considered in the tool design. Subsequent costs incurred for warp-free or acceptable parts are borne by the supplier.
4. Component optimizations are usually necessary due to dimensional deviations on the component, such as warpage or held air. This includes adjustments to snap hooks, contact surfaces, and ribs or corrections to collisions with adjacent components.
5. For SC characteristics, unless otherwise agreed with REHAU Automotive, the supplier must demonstrate process capability or process stability for the marked positions.
6. The design of the undercut groove geometry for accommodating the pressure hose must ensure a process-secure clamping at the time of proper assembly. To ensure this feature by the supplier, the hose pull-off force is defined with a specified lower limit and is relevant for sampling. Component width and weight must be documented during series production. A gauge must be provided. Measurement must be carried out on a 3D measuring machine.
7. Using a tensile testing machine, the maximum force required to pull the hose out of the clamp of the impact dampers must be determined for impact foams with P-Sat hose. The tensile strength value is given in Newton (N). Target values to be achieved can be found in the drawing. The tolerances of the groove opening, groove depth, and groove width must be maintained over the entire groove width (-/+0.6mm).
8. Daily traceability of production must always be ensured. Additionally, cavity traceability must be incorporated into the tool. A DMC code (coding according to REHAU specifications) is optionally offered. Any RFID tags used must be deactivated before shipping.

Category-specific requirements: Gluing

1. Only materials and material combinations specified or approved by REHAU may be used.
2. A quality plan including materials, procedures, work instructions, and inspection and quality assurance procedures must be created.
3. Adhesive surfaces must be kept free of paint (mist) / paint overspray.
4. Cleaning the adhesive surface with isopropanol is mandatory.
5. The processing instructions of the adhesive tape manufacturers must be observed.
6. Adhesives and adhesive tapes must be stored according to the manufacturer's specifications.
7. The traceability of used adhesives and adhesive tapes must be ensured.
8. The requirements of the specification sheet for adhesive bonds must be met.

The following points apply only to structural (i.e., load-bearing) adhesive bonds according to DIN EN ISO 21368:

9. If adhesive bonds of safety class S3 are carried out, an adhesive supervisor (KAP) with a competence level of at least 3 must be appointed. A deputy regulation must be in place for the KAP. If there is no deputy, it must be ensured that no adhesive-related decisions are made in the absence of the KAP. The executing adhesive personnel must be instructed in the adhesive processes by the KAP. Proof of this instruction must be presented to the vKAP of REHAU. No employees without instruction may carry out adhesive processes.
10. The KAP may not be assigned adhesive work as the executing adhesive person.
11. All adhesive-related documents (e.g., work and inspection instructions, drawings, etc.) must be presented to the vKAP of REHAU.
12. If changes occur in the adhesive process over time (e.g., personnel, process, equipment, etc.), the vKAP of REHAU must be informed to check whether these changes affect quality.