

# General Development Requirements REHAU Automotive

## Project Rule Communication

1. The supplier shall independently and without further request prepare a detailed **time schedule** with all milestones essential for project execution for the implementation of the required deadlines. The supplier is responsible for updating and the transfer of information.
2. The supplier shall appoint at least one **contact person** for technical matters and quality issues, a Product Safety & Conformity Representative, and a responsible deputy. At REHAU's request, a project team with project members for all relevant areas must be designated.
3. In coordination with the responsible REHAU contact person, the supplier shall carry out regular written **reporting**, which shall be continued at least until series release by REHAU.
4. Depending on the risk assessment, REHAU shall initiate the corresponding **Supplier Readiness Tracking / SRT** (Pr.No 6440) with the supplier. The supplier shall prepare the documentation accordingly before each review.
5. A **Quality Tracking Sheet / QTS** (Pr.No. 5516) or **action plan** is to be managed by the supplier. The supplier is free to choose how it is presented. The use of the QTS or action plan must be agreed with the SQE.

## Development of the Part Maturity Level

1. The part supplier supports REHAU during the design phase with regard to special manufacturing aspects of the requested components and actively evaluates and presents design improvements in order to confirm the respective design status via the feasibility assessment (Pr.No. 5487). This includes in particular the optimization of the mounting situation and interfaces of the components themselves or in the final assembled part.
2. The supplier confirms the feasibility of the design status for purchasing release. Deviations from the requested part specifications must be pointed out in advance.
3. Production-related or tolerance-related part changes after purchasing release, which are caused by the supplier, shall be the responsibility of the supplier.
4. Deviating drawing requirements of REHAU have priority over the specifications, technical delivery instructions and technical specifications.
5. In the case of non-compliance with defined requirements (e.g. specifications, standards, quality, development and timing specifications), the supplier shall define measures on his own responsibility and implement them in a cost-neutral manner. The current state of the art must always be applied.
6. Necessary optimizations and changes to the part must be notified by the supplier at short notice, without delay, and implemented after approval. Corresponding parts must be available to REHAU as soon as possible after receiving the CAD data. 5 Sets shall be provided by the supplier without request and without an order.

### Remark:

- Part changes/modifications are design changes initiated by the OEM or REHAU.
  - Part optimizations are usually necessary due to dimensional deviations on the part, such as distortion or retainers. These are, for example, adjustments to clips, snap-in hooks, contact surfaces and ribs or the adjustment of components that are too close together. (the total number of adjustment loops required is specified in the request document)
  - Any costs resulting from sampling and, if necessary, re-sampling (PPAPs) are to be offered accordingly with the optimization loops or changes.
  - Upon request, the supplier shall provide REHAU with prepared sample parts for this purpose, in which the relevant optimization measures have been adjusted accordingly so that the parts can be installed on the REHAU or Cubing OEM measuring fixture. (Presentation of min. max. parts - CHROM-BT)
6. The location for the implementation of optimizations and changes must be communicated before the order is placed.
  7. Part History Tracking Sheets (PHTS) are updated without being requested and sent to REHAU before the first delivery. Unless otherwise agreed, every change to the process or product must be marked in the PHTS and the part by increasing the part level.
  8. The availability of parts and the flexibility for special call-offs in the pre-series phase must always be ensured.
  9. Process parameters and their defined tolerance limits must be validated and verified by the manufacturer with regard to their influence on dimensions, function and appearance. A corresponding test plan must be provided and made available to Rehau on request.

Changes to the relevant parameters outside the validated tolerances must be proactively coordinated with Rehau and documented in a traceable manner via the change management.

### **Internal/external maturity meeting**

A cost-neutral provision of 3 sets of measured sample parts with a detailed 3D measurement report (or after consultation) is required. If required, participation in the maturity meeting 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 taking into account the special characteristics (safety characteristics (BMS), required and functional characteristics (BMF) and certification-relevant characteristics (BMZ)) must be defined by the supplier and agreed with REHAU at an early stage. Test equipment must already be ready for use with the first of tool parts (or after coordination with REHAU). The alignment for 3D measurement is carried out according to the reference point system (RPS) specification of the drawing. If no system is specified, the fixture and positioning points must be agreed with REHAU.

### **System requirements**

CAD-System: CATIA V5 or Siemens NX (current versions)  
Data formats: CATPART or NX-data format  
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:**

(parts out of processes – Injection Moulding, Painting, Plating / Chroming and Hot Stamping as well as combinations)

1. With regard to injection molding, a mold flow analysis must be carried out for the mold design. (characteristics/position of sink marks, weld lines, distortions and the influence of shrinkage, necessary closing force, and so on.). The mold flow must be presented to REHAU in advance of tool production.
2. Molded raw parts must be free of cut marks in the visible area. The geometry and position of the cutting areas must be coordinated with REHAU and entered in the data record. Deviations from customer specifications must be reported to REHAU for approval.
3. Simulations (e.g. Elsyca) must be carried out before submitting an offer in order to validate the customer's requirements for the chrome coating process and sent to REHAU with the offer (feasibility assessment).
4. Customer specifications for part surfaces for paint, chrome, MIC parts, hot stamping and possibly graining must be ensured by the supplier. The OEM's specific test equipment/test specifications and accreditation requirements must also be complied with. Test concepts must be agreed with REHAU in the early project phase.
5. Unless otherwise agreed with REHAU Automotive, the supplier shall provide evidence of process capability or process stability for the specified items for special characteristics (SC/CC/SPC).
6. In order to check the effect of process variations in the supplier's production (within the tolerance and process limits) on the Assembly (final part), the supplier must provide min-max process parts for the specified items if requested.
7. Process parameters and their defined tolerance limits are to be validated and verified by the contractor on his own responsibility regarding their influence on dimensions, function and appearance. A corresponding test plan (DVP) must be provided and made available to Rehau on request.

Changes to the relevant parameters outside the validated tolerances must be proactively coordinated with Rehau and documented in a traceable manner in the change management.

### **Category-specific requirements: Foaming (EPP)**

1. All impact foams / absorber must be tested for warpage and shrinkage before the mold is produced. If necessary, shrinkage must be verified using a reference component and tested under near-series boundary conditions.
2. For the Mould Design a mould filling study shall be carried out, if this is required and considered necessary with regard to the specified tolerances. The supplier must provide information on the design and feasibility (e.g. wall thicknesses).
3. The delivery of parts to REHAU must be carried out with minimal distortion. The level of distortion is not allowed to have any effect on the installation and the dimensional accuracy of the ZB Bumper, for example. This must be taken into account in the design and construction of the tool. Any costs subsequently arising for a distortion-free or OK part design shall be covered by the supplier.
4. Part optimizations are usually necessary due to dimensional deviations on the component such as distortion or e.g. held areas. These are, for example, adjustments to locking hooks, contact surfaces and contact ribs or the elimination of collisions with neighbouring components.
5. For Special Characteristics, unless otherwise agreed with REHAU, the supplier must provide evidence of process capability or process stability for the marked positions. The design of the undercut groove geometry to accommodate the pressure tube must ensure process-safe clamping at the time of proper assembly. To ensure this feature by the supplier, the tube pull-off force is defined with a specified lower limit and is relevant for PPAP. Part length and weight must be documented during series production. A gauge must be provided. The measurement must be carried out on a 3D measuring machine.
6. The maximum force required to pull the tube out of the clamp of the impact absorber for impact foams with P-Sat hose must be determined by using a tensile testing machine. The tensile strength value is specified in Newtons (N). The target values to be achieved can be found in the drawing. The tolerances of the groove opening, groove depth and groove width must be observed over the entire groove width (-/+0.6 mm).
7. Traceability of production to the exact day must be always ensured. In addition, cavity traceability must be implemented in the tool. A DMC code (coding according to REHAU specifications) must be offered as an option. If used, RFID tags used must be deactivated before dispatch to REHAU.