General development requirements RESRG Automotive

Project rule communication

1. The supplier shall independently and without further request prepare a detailed schedule with all milestones essential for project execution for the implementation of the required deadlines. The supplier is responsible for updating and the flow of information.
2. The supplier shall appoint at least one contact person for technical matters and quality issues, a product safety officer and a responsible representative. At RESRG's request, a project team with project members for all relevant areas shall be appointed.
3. In coordination with the responsible RESRG contact person, the supplier shall provide regular written reports, which shall be maintained at least until series release by RESRG.
4. Depending on the risk assessment, RESRG shall carry out the corresponding Supplier Readiness Tracking / SRT (form no. 6440) with the supplier. The supplier shall prepare the documentation accordingly before each review.
5. A Quality Tracking Sheet / QTS (form no. 5516) or action plan is to be maintained 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 component maturity level

1. the component supplier supports RESRG during the design phase with regard to special manufacturing features of the requested components and evaluates the respective design statuses via the feasibility assessment (form no. 5487).
2. the supplier confirms the feasibility of the design status for B-release. Deviations from the requested component specifications must be pointed out in advance.
3. production-related or tolerance-related component changes after B-release, which are caused by the supplier, shall be borne by the supplier.
4. deviating drawing requirements of RESRG have priority over the specifications, technical delivery instructions and technical specifications.
5. in the event of non-compliance with defined specifications (e.g. specifications, standards, quality, development and deadline specifications), the supplier shall define measures on his own responsibility and implement them in a cost-neutral manner.
6. necessary optimizations and changes to the component must be carried out by the supplier at short notice, without delay. Corresponding parts must be available to RESRG as soon as possible after receipt of the CAD data. 5 Sets shall be provided by the supplier unsolicited and without an order.
   Notes:
   - Component changes are design changes initiated by the OEM or RESRG.
   - Component optimizations are usually necessary due to dimensional deviations on the component, such as distortion or retainers. These are, for example, adjustments to clips, snap-in hooks, contact surfaces and ribs or the positioning of components that are too close together.
   - Any costs incurred for sampling and, if necessary, re-sampling (PPFs) are to be offered accordingly with the optimization loops or changes.
   - Upon request, the supplier shall provide RESRG with prepared sample parts for this purpose, in which the relevant optimization measures have been readjusted accordingly so that the parts can be installed on the RESRG or Cubing OEM measuring fixture.
7. The place of implementation of optimizations and changes must be communicated before the order is placed.
8. Part life cycles are maintained without being requested and sent to RESRG before the first delivery. Unless otherwise agreed, every change to the process or product must be marked in the part life cycles and in the component by an increase in the component status.
9. The availability of components and flexibility for special call-offs in the pre-series phase must always be ensured.

Internal/external master jig

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 master jig at our RESRG plant or at the OEM must be ensured.

Component-specific equipment

Prior to the procurement of component-specific equipment (tools, gauges, devices, ...), the supplier must obtain written approval from RESRG for the use of the named 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 such that the annual requirement can be covered in accordance with the specifications during the term

and scope of the spare parts service. Maintenance, repair and, if necessary, a new tool shall be borne by the supplier during the term. The supplier must be notified in writing of the manufacturing locations of operating equipment before the order is placed.

Test equipment/measurement technology
Inspection concepts taking into account the special features (safety features (BMS), requirement and functional features (BMF) and approval-relevant features (BMZ)) must be developed by the supplier and agreed with RESRG at an early stage. Test equipment must already be ready for use with the first tool parts (or after coordination with RESRG). 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 pick-up and alignment points must be agreed with RESRG.

System requirements

CAD system:	Current version of CATIA V5 or Siemens NX
Data formats:	CATPART or NX file format
Measurement technology:	VDA file

The development supplier must use a CAD system that is identical or compatible with the system. The supplier must ensure that no loss of data and time occurs during data exchange with RESRG and sub-suppliers. If problems occur during data exchange, these must be rectified at short notice and at the supplier's expense.

Category-specific requirements: Injection molding

1. All plastic injection molded parts 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. With regard to the tool design, a mold flow test must be carried out if this is deemed necessary with regard to the specified tolerances and component quality (no sink marks, weld lines, warpage greater than the permissible tolerance, etc.). The mold flow must be presented to RESRG in advance of tool production.
3. Injection molded parts must be free of section markings in the visible area. The geometry and position of the gates must be coordinated with RESRG and entered in the data record.
4. If, due to tool or material-specific dependencies, there are characteristics that cannot be remedied (e.g. gray haze, color deviation, difference in gloss level), the supplier must urgently carry out an appropriate design of the tool, an independent presentation of the component quality and a coordination of limit samples.
5. The delivery of parts to RESRG must be free of distortion. The degree of distortion must not have any effect on the installation and the dimensional accuracy of the ZSB STF, for example. This must be taken into account in the design and construction of the tool. The supplier shall bear the subsequent costs incurred for the distortion-free or OK part design.

Category-specific requirements: Foaming (EPP)

1. All impact foams must be tested for warpage and shrinkage before tooling is produced. If necessary, shrinkage must be verified using a reference component and tested under near-series boundary conditions.
2. A filling study must be carried out with regard to the tool design if this is required and deemed necessary with regard to the specified tolerances. The supplier must provide information on the design and manufacturability (e.g. wall thicknesses).
3. The delivery of parts to RESRG must be carried out with minimal distortion. The degree of distortion must not have any effect on the installation and the dimensional accuracy, e.g. of the ZSB STF. This must be taken into account in the design and construction of the tool. Subsequent costs incurred for distortion-free or OK part design shall be borne by the supplier.
4. Component optimizations are usually necessary due to dimensional deviations on the component such as warpage or, for example, retained air. These are, for example, adjustments to snap-in hooks, contact surfaces and contact ribs or the elimination of collisions with neighboring components.
5. For SC features, unless otherwise agreed with PRO-X/RESRG-Automotive, process capability or process stability for the marked items must be verified by the supplier. The design of the undercut groove geometry to accommodate the pressure hose must ensure process-safe 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. The measurement must be carried out on a 3D measuring machine.
6. For impact foams with P-Sat hose, the maximum force required to pull the hose out of the clamp of the impact absorber must be determined 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 ensured at all times. In addition, cavity traceability must be incorporated in the tool. A DMC code (coding according to RESRG specifications) must be offered as an option. Any RFID tags used must be deactivated before shipping.