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ICS

Descriptors: supplier assessment, escalation process

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Revision history:

Compared to VN 3207 of October 2005, the following alterations were made:

- a) Trend color assessment in Appendix 1/2 on pages 6/7 of lines: 20,22,29,32,35,40
- b) Deletion of line 61 (double) of the table
- c) Updating of addresses of Beuth-Verlag and VDA in Chapter 11

Earlier editions: 2004-06, 2005-03, 2005-10

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1 Application

This Voith standard is valid for the suppliers of Voith Turbo, in particular for the market areas road, rail and industry, as well as all locations and Voith Turbo companies, in conjunction with the applicable order and delivery specifications.

2 Supplier assessment

In order to come closer to the "zero defects target" in delivery quality (product quality and logistics quality) together with our suppliers, the procurement management (purchasing and supplier quality) together with the quality department trusts in the agreement and meeting of demanding ppm intervention limits.

Voith Turbo will in the future use a system that allows the objective determination of the ppm intervention limits.

The ppm values to be newly agreed with the supplier every year are the result of the quantity of defective parts supplied (and/or parts resulting in malfunctions in operation due to the violation of ancillary duties, e.g. logistic errors), which are recorded at the Voith plants using the SAP system and notified in the form of a defect complaint. Technical and logistic errors are recorded separately for specific initiation of defects remedial measures and evaluated every month.

The monitoring process considers the last 3-month period and assigns a trend color (green, yellow, red) to the delivery quality per month. Dependent on the trend color, Voith Turbo defines persons responsible for actions and measures indicated in the escalation processes described below.

Special agreements on individual components/part numbers, e.g. in specifications, are not affected by this model, respectively must be updated together with the supplier when new knowledge is available.

3 Goal of the model

- Objective recording and determination of monthly ppm values for logistic and quality-related defects using the SAP system
- Objective determination of ppm intervention limits (based on the actual values for the past 12 months) as well as the option of coordination / agreement of targets for the delivery quality with the supplier
- Standardized escalation process for:
 - working out effective solutions for the main problems in case of poor delivery quality
 - demonstrate their responsibility for fast and efficient problem solution to all parties involved
 - create a group-wide framework for structured problem solutions
- Defined criterion to support the QA/L departments of the Voith Turbo plants by procurement management / purchasing and the central quality management of Voith Turbo

4 Purpose

ppm agreements have the purpose of achieving zero defects for all supplied parts in the long run. In order to achieve the zero defects target, intermediate goals are defined (ppm intervention limits), which are determined and agreed new every year.

Terms:

| | |
|---------------|--|
| ppm | parts per million for the period under consideration |
| equation | $\frac{\text{faulty quantity under complaint}}{\text{delivered quantity}} \times 1\,000\,000$ |
| ppm agreement | basic agreement to achieve the zero defects target. One basic agreement can be made for several part numbers and or material groups. |
| PQL team | competent operative quality and logistic departments at the plants |

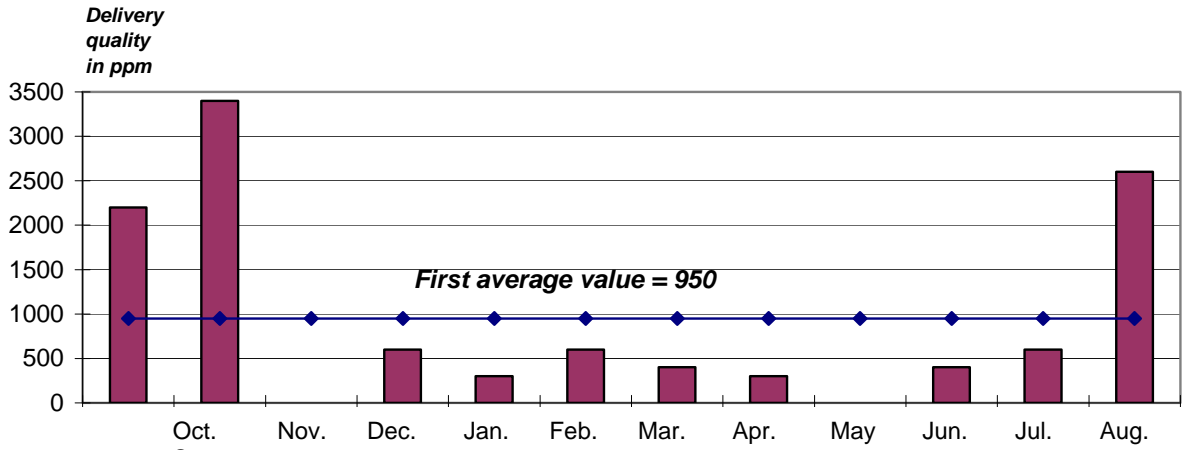
5 Calculation of ppm intervention limits and classification of the color ranges

The ppm intervention limits are calculated one every year on the basis of the actual ppm of a supplier for the past 12 months. The following description is based on the so-called "double average cost method" separately for technical and logistic defects.

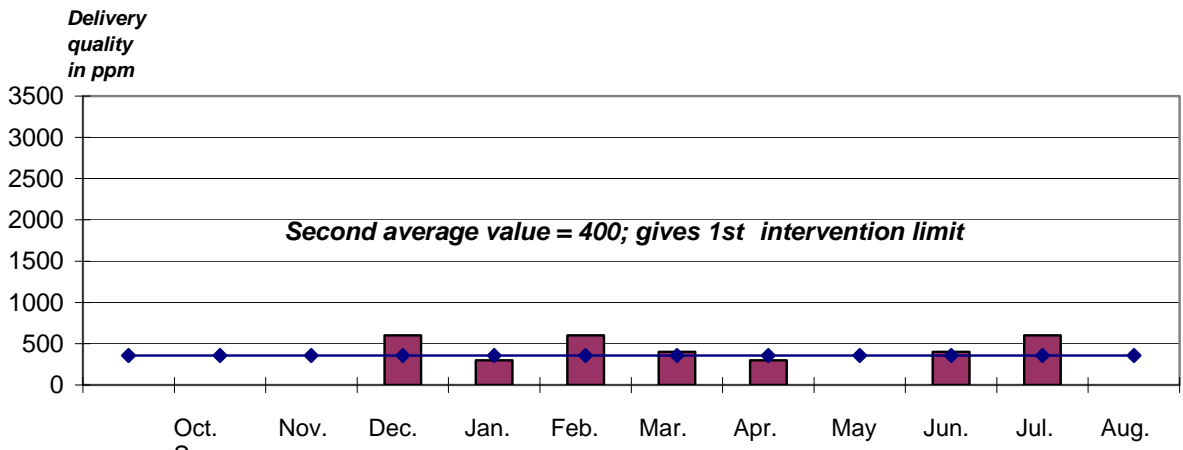
The assessment is based on defective parts relative to supplied parts from SAP, where defective parts from a quality point of view are all parts under complaints with a Voith internal quality report and/or defect complaint, and the defective parts from a logistics point of view are all parts with quantity and delivery date variations.

5.1 Example

Average value for the past 12 months



Elimination of all monthly values above the first average and determination of the second average value

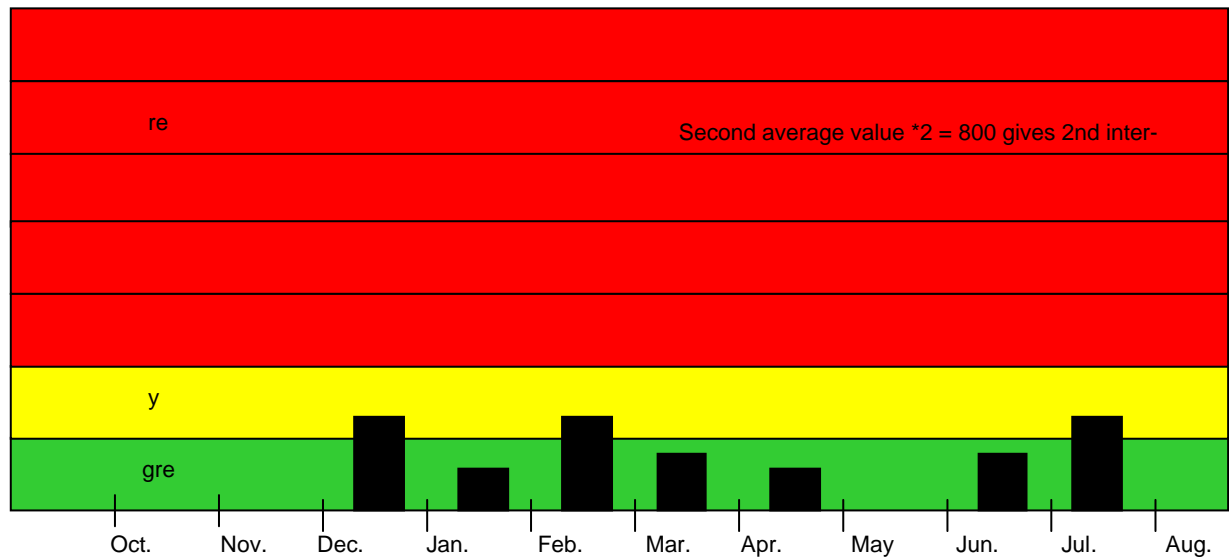


Calculation of the 2nd average value; gives the 1st intervention limit

To calculate the second average value, which simultaneously delimits the yellow area from the green area, the remaining values are added and divided by the number of remaining values.

To calculate the 2nd intervention limit, which simultaneously delimits the yellow area from the red area, the first average value is doubled.

Delivery
Quality
in ppm



A 3-step traffic light classification is used for visualization and starting measures, if required.

"green range"

defined as the range between 0 ppm and the 1st intervention limit calculated or agreed with the supplier

"yellow range"

defined as the range above the "green range" up to the double of the 1st intervention limit calculated or agreed with the supplier

"red range"

defined as the range above the double value of the intervention limit calculated or agreed with the supplier

6 Annual target agreement process

The ppm intervention limits calculated according to the above algorithm are a proposal for the internal Voith Turbo coordination of the intervention limits, which occurs between procurement management / purchasing with the function of supplier quality as process-responsible department and the QA/L teams (PQL) of the plants. Taking into account the defined product groups and the manufacturing technology employees as well as the "benchmark" in the competition with equivalent suppliers, deviating intervention limits can be agreed with the supplier during the target agreement process.

Along with the separate target agreement for technical and logistic defects, it is possible to agree intervention limits on the product group level. This option is reasonable for specific quality work at the suppliers with a wide delivery range and various manufacturing technologies. Furthermore:

- intervention limits of less than 100 ppm are shown as 100 ppm in the system → i.e. 1st limit is 100; 2nd limit is 200
- If 12 monthly values for calculation of the intervention limit are not available (e.g. new supplier/new part), the agreement of the competent quality departments with the supplier is oriented (in coordination with the PQL teams of the plants) on the benchmark for comparable suppliers/technologies

If no history data are available for new parts/suppliers, the target values are coordinated with the supplier within the framework of quality planning (buildability assessment).

7 Monthly monitoring

The defects recorded in the SAP system (actual values) are compared quarterly to the agreed intervention limits and are assigned a color according to the classification described under 5 above. As a working document for supplier quality and the PQL teams of the plants and product groups, a ppm escalation list updated monthly is prepared according to the following scheme:

- ppm actual value for past month in color range green: trend color "**green**"
- ppm actual value for past month in color range yellow/red: trend color "**yellow**"
- ppm actual value for past three – or more – consecutive months in color range red. trend color "**red**"

Consideration of a 3-month window is required for assignment of the relevant trend color. An accurate assignment of possible combinations to the trend color is given in the trend list (Appendix 1 / Appendix 2).

8 Process steps and scheduling

- Calculation of intervention limits for next business year in October (data basis: past 12 months)
- VT internal coordination of intervention limits (supplier quality/PQL teams) middle of October
- Communication of the intervention limits to the supplier in November by supplier quality
- If required, coordinate the intervention limits with the supplier by supplier quality and procurement management at the beginning of the new fiscal year (October).
- New intervention limits become effective at the beginning of the new business year

9 Goals and approach of the escalation process

The escalation process is applied when the supplier quality assessment is yellow or red, and if the problem cannot be solved by the parties involved alone.

The goals of the process are:

- effective solutions for major problems during the supply relationship with the supplier;
- strategic balance between the interests of Voith Turbo and the supplier's responsibility;
- all parties involved know their responsibility for a rapid and efficient problem solution.

It consists of four steps to allow solution of problems with adequate effort.

Step 1 – Problem: defect notice due to GRI and problem analysis by the supplier

Step 2 - Accumulation of problems

Step 3 - Problem situation on site

Step 4 - Supplier block

Generally, each step is as follows:

- Description of the problem (fact collection)
- analysis of causes
- agreement of an action plan to eliminate the causes
- agreement of an action plan to return the project to correspondence with the goals
- implementation of the action plans including monitoring

Dependent on the result of measures: Continue to the next step or end of the process.

On each step, suitable problem-solving methods are applied and resources are used as required.

10 The individual steps of the escalation process

Step 1 – Defect notice due to GRI and problem analysis by the supplier

Step 1 is triggered when a supplier receives a defect notice from goods receiving inspection, triggered by:

- complaint from production, assembly and testing
- 0-km complaints or warranty claims

The suppliers carries out a problem description and analysis of the causes, and it prepares an action plan to eliminate the problem (e.g. by an 8-D plan for quality problems). The responsibility is that of the PQL teams (planning, quality, logistics) of the plants.

If the supplier action is successful, the escalation process is completed. If the problem cannot be solved in this manner, the process is continued with step 2.

Step 2 – Accumulation of problems

Step 2 is triggered if the supplier received the assessment status "yellow" for the ppm assessment.

The supplier receives a so-called letter of criticism, in which it is informed about the assessment result.

Dependent on the severity and/or impact of the problem on the supply flow of production, the QA/logistics departments of the plants trigger a Q discussion, in which series technology or additional departments are involved, if required.

The responsibility is that of supplier quality who coordinates with the operative quality teams of the plants.

The supplier is to prepare and implement an efficient action plan to return the supply quality to compliance with the targets.

Step 3 - Problem situation on site

The step is triggered if the supplier received the assessment status "red" for the ppm assessment.

Step 3 initially entails an analysis by Voith Turbo as to why the desired goal was achieved neither during the ongoing supply quality assessment nor the steps this far. Based on this analysis, and taking into account the main requirements, an action plan is prepared which allows expectation of an effective and efficient problem solution. Changes of the targets or problem analysis by means of suitable Voith Turbo tools on site may be part for the problem solution. The results of the on-site analysis are compiled in an action plan implemented under the supervision of supplier quality, the competent Voith purchaser, and the Product Group person responsible for QM. Progress of the problem solution is monitored on the basis of the project goals.

If this step also cannot be completed successfully, the process is continued with step 4.

Step 4 - Supplier block

If the problems between Voith Turbo and the supplier could not be solved up to this step in a time frame of six months, and if the cause is the supplier, a supplier block is issued. Responsibility for this rests with purchasing and procurement management of Voith Turbo. Within step 4, the following measures may be initiated by the competent purchaser:

- Movement of supply quota
- Block on part number or product group level
- Block of supplier on Product Group, plant and/or market area level

Appendix 1

Combinations of results from the past three months and presentation of the trend color per assessment period

| Combination | three months ago | two months ago | past month | trend color |
|-------------|------------------|----------------|------------|-------------|
| 1 | red | red | red | red |
| 2 | yellow | red | red | red |
| 3 | green | red | red | yellow |
| 4 | red | yellow | red | yellow |
| 5 | yellow | yellow | red | yellow |
| 6 | green | yellow | red | yellow |
| 7 | red | green | red | yellow |
| 8 | yellow | green | red | yellow |
| 9 | green | green | red | yellow |
| 10 | red | red | yellow | yellow |
| 11 | yellow | red | yellow | yellow |
| 12 | green | red | yellow | yellow |
| 13 | red | yellow | yellow | yellow |
| 14 | yellow | yellow | yellow | yellow |
| 15 | green | yellow | yellow | yellow |
| 16 | red | green | yellow | yellow |
| 17 | yellow | green | yellow | yellow |
| 18 | green | green | yellow | yellow |
| 19 | red | red | green | yellow |
| 20 | yellow | red | green | yellow |
| 21 | green | red | green | yellow |
| 22 | red | yellow | green | yellow |
| 23 | yellow | yellow | green | green |
| 24 | green | yellow | green | green |
| 25 | red | green | green | yellow |
| 26 | yellow | green | green | green |
| 27 | green | green | green | green |

Appendix 2

Month = EMPTY; no deliveries were made in this month

| Combination | three months ago | two months ago | past month | trend color |
|-------------|------------------|----------------|------------|---------------|
| 28 | EMPTY | EMPTY | EMPTY | no assignment |
| 29 | EMPTY | EMPTY | red | red |
| 30 | EMPTY | EMPTY | yellow | yellow |
| 31 | EMPTY | EMPTY | green | green |
| 32 | EMPTY | red | EMPTY | red |
| 33 | EMPTY | yellow | EMPTY | yellow |
| 34 | EMPTY | green | EMPTY | green |
| 35 | red | EMPTY | EMPTY | red |
| 36 | yellow | EMPTY | EMPTY | yellow |
| 37 | green | EMPTY | EMPTY | green |
| 38 | EMPTY | red | red | red |
| 39 | EMPTY | red | yellow | yellow |
| 40 | EMPTY | red | green | yellow |
| 41 | EMPTY | yellow | red | red |
| 42 | EMPTY | yellow | yellow | yellow |
| 43 | EMPTY | yellow | green | green |
| 44 | EMPTY | green | green | green |
| 45 | EMPTY | green | yellow | yellow |
| 46 | EMPTY | green | red | yellow |
| 47 | red | red | EMPTY | red |
| 48 | red | yellow | EMPTY | yellow |
| 49 | red | green | EMPTY | yellow |
| 50 | yellow | red | EMPTY | yellow |
| 51 | yellow | yellow | EMPTY | yellow |
| 52 | yellow | green | EMPTY | green |
| 53 | green | green | EMPTY | green |
| 54 | green | yellow | EMPTY | yellow |
| 55 | green | red | EMPTY | yellow |
| 56 | red | EMPTY | red | red |
| 57 | red | EMPTY | yellow | yellow |
| 58 | red | EMPTY | green | yellow |
| 59 | yellow | EMPTY | red | red |
| 60 | yellow | EMPTY | yellow | yellow |
| 62 | yellow | EMPTY | green | green |
| 63 | green | EMPTY | green | green |
| 64 | green | EMPTY | yellow | yellow |
| 65 | green | EMPTY | red | yellow |

Appendix 3

Escalation scenario for supply quality

| Escalation scenario for supply quality | | | |
|--|--|--|---|
| * a rolling 3-month period is considered | | | |
| Trend color * | red | yellow | green |
| Measures Consequences | at least 3 consecutive months red | past month yellow – red | past month green |
| Review of business relationship: • Build up alternate supplier • Mode delivery quota • no new / follow-up order | yes (selective) | no | no |
| Supplier action plan | yes (by management) | yes | no |
| Inclusion of series technology / development and other departments in Q discussion | yes | possible | no |
| Q discussion with supplier | yes | possible | no |
| Letter to supplier | Letter of criticism (review of business relationship) | Letter of criticism | If. Acknowledgement for 12x "green" consecutively |
| Request comment with 8-D from supplier | yes | yes | yes |
| Prepare defects notice (SAP) | yes | yes | yes |
| Action responsibility | Supplier quality with competent purchaser | Supplier quality with QA/L/PQL of plants | Supplier quality with QA/L/PQL of plants |

11 Applicable documents

Source for standards:
Beuth Verlag GmbH
www.beuth.de

| | | |
|----|----------------------|---|
| 01 | DIN EN ISO 9000 | Quality management, terms |
| 02 | DIN EN ISO 9001:2000 | Quality management systems, requirements |
| 03 | DIN EN ISO14001 | Environmental management systems |
| 04 | DIN 55350-11 | Terms of quality assurance and statistics |

Verband der Automobilindustrie e.V. (VDA)

Source:
Verband der Automobilindustrie e.V. (VDA)
Qualitätsmanagement Center (QMC)
www.vda-qmc.de

| | | |
|----|--------------|--|
| 05 | Volume 1 | Bringing evidence |
| 06 | Volume 2 | Quality assurance of supplies in the automotive industry |
| 07 | Volume 4 | Quality assurance prior to series application |
| 08 | ISO/TS 16949 | Quality management systems, special requirements for the application of ISO 9001:2000 for series and spare parts production in the automotive industry |

Voith standards

| | | |
|----|---------|--|
| 09 | VN 3205 | Production process and product approval (master sample approval) |
| 10 | VN 3206 | Quality planning for purchase parts suppliers (QVP) |