TIMKEN

Supplier Requirements Manual

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Forward/Introduction

The goal of the Timken Company's Supplier Requirements Manual is to communicate clearly the conditions for doing business with The Timken Company and to develop systems that drive continual improvement, prevent defects and reduce variation and waste in the entire supply chain. Information presented in this manual takes precedence, unless officially notified by authorized Timken personnel.

Suppliers are responsible for the quality of their products and services.

Our suppliers are expected to have zero incidents and zero disruptions, provide products with zero defectives, and have flawless delivery performance and on time responsiveness to issues.

Type I Materials: are materials that become a part of the products sold by The Timken Company. It also includes services used to produce (in whole or part) product sold by the Timken Company.

This manual applies to all internal and external suppliers of Type I production materials, production or service parts, and manufacturers of machinery and related components.

The original of this manual is a controlled document. Copies of the Timken Supplier Requirements Manual distributed to suppliers, printed or downloaded are considered uncontrolled and will not be automatically updated.

Suppliers to The Timken Company are responsible for obtaining and following this document via The Timken Company supplier website at http://tsn.timken.com. Suppliers are required to check the website periodically for revisions and updates to this document.

Suppliers are responsible for insuring that products and services they supply conform to the latest revision of this document when shown on purchase orders, supply agreements, or as mailed, electronically transmitted or viewed online at http://tsn.timken.com/.

Failure to include reference to The Timken Company Supplier Requirement Manual in a request for quote, purchase order or supply agreement does not excuse Suppliers from conformance.

Standard Requirements – Quality
To be a supplier to The Timken Company any supplier must meet our requirements for quality.

Our standard requirements include:

1. **Advanced Product Quality Planning (APQP):** As requested, the Supplier must have resources available and capable of participating in APQP, including such efforts as Value Engineering/Value Analysis, Feasibility Reviews, FMEA's, Design Reviews, Prototype Production, and Production Part Approval Process.

2. **Corrective Action:** In the event of a quality issue related to a supplier's products, the supplier will be required to provide a written corrective action report, filed electronically using the Global Quality Tracking System (GQTS).

3. **Hazardous Materials**: Suppliers must supply all information related to Hazardous Materials, and satisfy all governmental and safety requirements including OSHA and the Clean Air Act. Suppliers will be required to submit Material Safety Data Sheets (MSDS) for all identified items.

4. **Managing Change:** Suppliers must agree to notify The Timken Company of any intended process change and obtain Timken approval *prior* to implementation. Suppliers must also make this a condition of their own entire supply chain. In some cases, samples and documentation will be required as part of the approval process.

5. **Material and Process Specifications:** Suppliers must produce Timken products to the specific material and process specifications. In certain cases, we will require approval of Timken's sub-suppliers.

6. **Material Source Approval:** When Timken specifies material, Timken must approve all material sources.

7. **Non-Conforming Product:** Suppliers must only ship product that meets specification, or obtains a written deviation *prior* to shipment for any non-conforming product.

8. **Quality System:** Suppliers must have a documented quality system and agree to on-site assessments. Suppliers may be required to be certified to AS, QS 9000 or ISO 9000; with a preference for certification to ISO 9001:2000 or ISO/TS 16949:2002. As appropriate, ISO 14001:2004 registration or conformance may be required.

9. **Records:** Suppliers must maintain certain records for defined periods; Timken will advise suppliers as to what those are.

10. **Shipment and Packaging Requirements:** Suppliers must comply with specifications for shipping and packaging. This includes labeling specifications or requirements.

11. **Supplier Escalation:** An increased level of activity with a supplier resulting from the supplier's continuing failure to perform in the areas of quality, delivery or costs.

12. **Supplier Cost Recovery and Chargeback Process**: A formal process to recover costs associated with a supplier's unacceptable performance.

13. **Supply Chain Management:** Suppliers must be willing to identify and manage their own entire supply chain. It is a supplier's responsibility to ensure that its own suppliers meet Timken requirements.

14. **Traceability:** Product traceability is a requirement. Suppliers must provide unique identification of product batches/lots as required.

15. **Verification of Purchased Product:** Suppliers must allow on-site product verification by Timken, its customer, or the customer's representative.

These Standard Requirements are detailed on the following pages.

1.0 Supplier Minimum Requirements

1.1 Introduction

Welcome to the Timken Company Supplier Quality Assurance Manual for Type 1 Suppliers.

Type 1 Suppliers are defined as those that provide products or services that constitute, in part or in whole, the products or services sold by The Timken Company.

Requirements described herein apply to all external Type 1 Suppliers of the Aerospace, Automotive, Industrial, Rail, and Emerging Markets business units of The Timken Company.

We expect The Timken Company quality reputation to be reflected in the products we purchase.

This manual defines the specific processes and information necessary to fulfill the intent of our Quality Policy.

It is expected that our Suppliers will use a continual improvement approach to assist The Timken Company in creating a lean supply chain that minimizes the total cost of ownership for the supplier and The Timken Company through:

- **Customer focused leadership** – Striving to understand and anticipate the needs of The Timken Company, and proactively establishing the infrastructure to meet those needs.
    - This includes innovation, collaboration, speed, inventory management and cost competitiveness.
- **Execution excellence** – Flawless delivery performance with zero disruptions and zero quality issues.

The remainder of this manual provides additional details of how The Timken Company will manage its Supplier relationships.

1.2 Supplier Quality Management System Requirements

Suppliers to The Timken Company are expected to attain and maintain as a minimum ISO 9001:2000, QS-9000 or ISO/TS 16949:2002 registration unless otherwise specified or approved by Timken Supplier Quality Development.

In the event that a supplier to Timken is so small as to not have adequate resources to develop a system according to ISO/TS 16949:2002 or ISO 9001:2000, Timken will conduct audits on site or via the desk audit approach to access gaps, identify risks and take appropriate actions to protect Timken and ultimate customers.

Suppliers are required to notify, on a timely basis, the appropriate Timken SQA if an ISO/TS/QS registered supplier quality management system is notified of special status conditions (such as new business hold – quality, needs improvement status, Q1 revocation) by any of the Big Three automakers or other organizations.

The Timken Company reserves the right to perform an on-site audit as deemed appropriate to verify conformance of supplier Quality Management System or to verify effectiveness regarding corrective or preventive actions related to supplier escalation.

Type 1 suppliers must allow Timken's customer(s), the customer's representative(s), government or regulatory agencies the right to conduct surveillance of the supplier's quality systems at the Supplier's premises. This may include visits extended to sub-contracted suppliers of the supplier.

All such visits will be approved and arranged by The Timken Company.

Type 1 suppliers sub-contracting products or services to suppliers are required to provide to sub-tier suppliers the applicable requirements in the purchasing documents, including key characteristics (however named), material or process requirements where required.

1.3 Inspection of Product

All products provided to The Timken Company shall be inspected by the supplier according to an agreed upon control plan. In the absence of a purchasing or a supply agreement, the supplier must develop, implement and maintain inspection methods necessary to assure the product conforms to the requirements of The Timken Company.

The supplier shall conduct in-process and outgoing audit inspections or tests as defined in the product control plan. Inspection data shall be retained by the supplier and be made available upon request.

Suppliers must allow Timken, its customer(s), its customer's representative(s), government or regulatory agencies the right to verify at the supplier's premises that the purchased product conforms to specified requirements.

The Supplier shall not use such verification as evidence of effective control of quality.

Verification by Timken, its customer(s), or its customer representative(s) shall not absolve the supplier of the responsibility to provide acceptable products, nor shall it preclude subsequent rejection by Timken or its customer(s).

Where applicable, a quality history for the entire product shall be provided to The Timken Company. The quality history shall contain all verification documents generated during manufacturing, processing or fabrication.

1.4 Non-conforming (Discrepant) Product

Non-conforming or discrepant product is defined as deviation from drawing specifications, purchase order requirements, Timken Company product and process specifications or standards and industry product and process specifications and standards, including but not limited to the areas of quantity, appearance, material, metallurgy, packaging, handling, shipping, delivery, cleanliness and dimensions.

Timken's Discrepant Material Report (DMR) (Click here for Procedure) is used to notify the supplier of non-conformances, discrepancies and/or rejections. The DMR is sent via e-mail directly to the Supplier contact using Timken's Global Quality Tracking System (GQTS) and can be initiated from any Timken Company facility receiving Type 1 material. A DMR may be initiated upon detection of non-conforming product. Requests for corrective action may be required from the supplier.

The supplier must respond directly to the DMR issuer within the requested timeframe using the Timken Supplier Network (TSN).

Supplier Responsiveness – The Timken Company will monitor speed, timeliness and effectiveness of corrective or preventive actions using the GQTS, and may use it as input for awarding future business and monitoring performance.

Specific timing requirements will be stated on the DMR, if required. The provided general or default requirements are:

- An initial response (team/person assigned, problem description, containment action) for a DMR shall be supplied to the Timken Company within 3 working days.
    - **Automotive Suppliers must respond within 24 hours**.
- If The Timken Company requires an 8D process, the initial 8D report shall be submitted within 15 calendar days.
    - **Automotive suppliers must submit within 5 calendar days.**
- A complete 8D report must be submitted to The Timken Company within 30 calendar days. Complete with a root cause analysis (provided root cause can be determined).
    - **Automotive suppliers must submit within 10 calendar days.**

If a supplier's product is determined to be defective in material and/or workmanship, as defined by the design requirements, product(s) will be immediately contained.

The Timken Company and the Supplier shall determine if the product can be inspected to remove defects from the "lot" that has been contained.

If time does not allow the supplier's personnel to arrive, the supplier shall provide detailed inspection instructions to The Timken Company.

The Timken Company reserves the right to approve all inspection methods.

If it is determined that inspection alone cannot detect the defect, the product(s) will be returned to the supplier or scrapped as agreed.

The Timken Company will identify any costs incurred from these defective parts and will initiate the Supplier Cost Recovery Chargeback procedure with the supplier.

If the purchased product is needed for urgent production at a Timken facility, the supplier shall provide a rapid inspection team to Timken's production facility for inspection, or agree (by providing purchase order to the third party) to the use of a third party inspection service with the cost of service being assumed by the supplier.

In most cases, as appropriate, the supplier shall be given the option regarding sorting methodologies by the effected Timken facility.

The use of a third party to sort defective product does not relieve the supplier of their responsibility for the quality or delivery of product.

The Timken Company shall have the right to perform any, and all, necessary safe, destructive and non-destructive tests to evaluate fully the performance of the supplier's product or services.

The Timken Company shall have the right to utilize the service of an independent ISO 17025 accredited testing laboratory.

The supplier shall reimburse The Timken Company for the expense of said tests only if testing confirms the product or service is defective.

The Timken Company must provide proper accounting of hours for inspection to the Supplier.

If the purchased product is determined to be defective or non-conforming for reasons other than those defined on the design prints, the two parties will discuss and determine if containment action is required.

If containment action is required, inspection criteria will be established. If containment action is not required, the supplier's product will be approved for use in production.

1.5 Management of Design and Process Changes

Suppliers shall not make ***any*** type of change without **PRIOR** written notification and approval from The Timken Company. Suppliers must also make this a condition of their own entire supply chain.

Changes shall be communicated through the Supplier Product/Process Change Request Form. These include changes to part design, material, sub-tier supplier, manufacturing location or process. When in doubt, suppliers are encouraged to contact their respective Corporate SQA or sourcing representative.

The supplier shall notify The Timken Company in advance and obtain approval for all design or process changes affecting the product manufactured, processed or serviced for The Timken Company.

Changes are defined as alteration in the product design; product specification; purchased parts; material, service supplier or provider; manufacturing location; method of manufacturing; processing; testing; storage; packaging; preservation or delivery.

Changes are classified based upon impact or the most adverse effect, either in the subsequent processing of a part, in its handling, or in its intended or foreseeable application.

The supplier change can be initiated by:

- Timken's Design and Development department
- Customer-initiated change communicated to the Timken Supplier Quality Development department by the customer engineers or marketing department
- Timken's Purchasing and Supplier Quality Development departments
- Quality Advancement department
- Timken's manufacturing plant/user
- Supplier

The supplier shall issue the change request using the Supplier Product/Process Change Request Form (Click here for Procedure). Submit the request to The Timken Company for approval to proceed with a defined validation plan. This plan may include or require new PPAP submission.

For permanent changes, the Timken Supplier Quality Development representative determines if a new Production Part Approval Process is required and advises the supplier accordingly.

Following validation and/or Production Part Approval Process (PPAP) approval, the Supplier Product/Process Change Request is granted or denied and the supplier is advised accordingly.

At this stage, the timing to phase in the approved change is established and communicated to the supplier and all interested parties.

1.6 Purchased Product Submission and Approval Process

Purchased Product Submission and Approval Process is implemented to determine if all design and specification requirements of purchased product are properly understood by Timken suppliers and to ensure that the supplier production process is capable of meeting Timken and the Timken customer's technical and quality requirements. The supplier submits documentation, as requested by the Timken Company, using Supplier PPAP/ISIR Submission Request Form (Click here for Procedure).

The submission requirements will typically include initial sample parts; design review; dimensional layout; performance test results; material certifications; capability studies; process flow diagram; design FMEA (Failure Modes and Effects Analysis); process FMEA and supplier control plan.

This process follows Timken's customer and The Timken Company internal requirements in accordance with the latest version ***AIAG-Production Part Approval Process (PPAP) manual*** for all automotive applications.

Non-automotive applications will be defined by the appropriate Supplier Quality representative and associated customer.

Additional customer specific requirements are addressed as defined and required.

The Timken Company follows AIAG Production Part Approval Process notification and submission requirements defined in the AIAG Production Part Approval Process manual, unless otherwise specified by the customer.

Timken-specific requirements related to the initial sample parts and identification include the following:

- Samples must be from production tooling operating under production conditions
- Samples are to be uniquely identified, so that measurement correlation may be performed
- Sample quantity may vary according to the nature of the product and the manufacturing process
- Production material and processes
- Analysis/Development/Validation Documentation (when requested)
- Unless sample quantities are defined in a Timken standard or specification, the following guidelines may be used:
  - a minimum of 5 samples (out of a 300 piece production run) is required from any single part producing tooling
  - a minimum of 1 sample per cavity is required from multiple part tooling

Suppliers are stongly encouraged to work with their Supplier Quality Development representative or designated plant quality personnel to obtain a full approval on time.

Supplier production parts are not to be released for shipment to the Timken user plant until the supplier receives notification from Timken that the PPAP has been approved or interim approved for volume production.

When requested by Supplier Quality Development personnel, the Supplier shall establish an Early Production Containment Process (Click here for procedure). The supplier shall determine a Pre-Launch Control Plan, which will serve to validate the Production Control Plan (PCP) and ensure that all shipped products will meet Timken's expectations.

1.7 Measurement System Analysis

As appropriate and defined by the Supplier Quality representative, the supplier shall perform a measurement system analysis (MSA) in accordance with the latest version of the ***AIAG Measurement System Analysis manual***.

1.8 Prototype Submission Requirements

The intent of the prototype activity is to assemble and test product, processes and assembly systems, and perform conformance/measurement/design validation.

Part approval at Prototype (Click here for Procedure) insures component part problems are identified and corrected to minimize the impact of part variation upon design evaluation, manufacturing and assembly.

Suppliers of prototype parts are required to have completed, documented and available for review the items listed below:

- Timken Supplier Warrant of Material for Prototype
- Design records
- Inspection results and inspection and/or test devices
- Material certification
- Part weight (mass)/Serialization information

1.9 Documentation, Certification and Data Requirements for Proprietary Information

The Timken Company and its customers may review, in the presence of the supplier and on the supplier premises, documentation that contains confidential and proprietary supplier information pertaining to the product manufactured for The Timken Company.

Where applicable, a quality history for the entire product shall be provided to The Timken Company. The quality history shall contain all verification documents generated during fabrication.

The supplier shall provide The Timken Company with appropriate documentation during the course of design, manufacturing, inspection and testing. Documents shall include (where applicable) design records such as:

- Design Failure Mode and Effects Analysis (DFMEA)
- Design Validation Plan and Report (DVP&R)
- Advanced Product Quality Planning (APQP) Status Report

1.10 Hazardous Materials - Material Safety Data Sheet (MSDS)

All materials used in, or incorporated into Timken Company products shall satisfy current governmental and safety constraints on restricted, toxic, and hazardous materials; as well as environmental, electrical, and electromagnetic considerations applicable to the country of manufacture and sale. A Material Safety Data Sheet (MSDS) must be submitted for all items as defined under the Clean Air Act, OSHA, or any other applicable regulations. Material Safety Data Sheet(s) must be submitted to the receiving location.

A Material Safety Data Sheet(s), with full disclosure, must be submitted to the receiving

location for approval as soon as possible following the feasibility meeting and/or receipt of a Purchase Order. At the latest, applicable MSDS sheets must be provided to the using Timken plant ***prior*** to first shipment / PPAP submission of any component, raw materials, or product.

Approval of each MSDS should be obtained as early as possible in the product launch. The Timken using plant will notify the supplier if the MSDS sheets are not acceptable. If MSDS information is not submitted, or approval is not obtained, the first shipment PPAP submission may not be approved.

1.11 Shipment and Packaging Requirements

In some cases The Timken Co. designates 'S'-Specifications to define shipping and packaging requirements.

Requirements in any 'S' specification shall be considered an extension of the purchase order and /or product drawing / agreement.

Unless alternate methods have been agreed upon in writing with the receiving location, all production shipments must include or be preceded by the following:

- Material certifications as specified in all applicable material specifications.
- Applicable SPC data (for all print designated special or critical characteristics) unless instructed differently otherwise from the receiving location.
- Labeling, or bar code labeling, must be in accordance with appropriate AIAG guidelines or plant specific requirements.

Shipment and packaging requirements discussions should begin during APQP activities or Feasibility. All requirements shall be finalized prior to PPAP submission.

1.12 Supply Chain Management

Suppliers must be willing to identify and manage their entire supply chain. This includes raw material suppliers or manufacturers and any suppliers of components or processing used for products supplied to The Timken Company.

As appropriate, suppliers shall impose all of The Timken Company quality requirements on the entire supply chain used to produce the items supplied to The Timken Company.

1.13 Supplier Material Traceability

As required, suppliers shall be able to demonstrate adequate product traceability. Specific traceability requirements are identified and reviewed at initial feasibility or APQP meetings.

Suppliers to The Timken Company shall establish and maintain documented methods for unique identification of product, batches or lots, including product marking as necessary for identification or traceability purposes.

Lot numbers, as identified on shipping labels, must provide traceability from receipt and during all stages of production by the supplier, including shipment to Timken.

The Timken Company reserves the right to perform an on-site audit or request appropriate, timely documentation to verify conformance to traceability requirements.

Traceability information must include, and begin with an individual raw material heat/batch number, or equivalent.

A lot cannot contain more than one material heat / batch number.

1.14 Control Item (∇) Part and Special Product or Process Characteristics

Control Item Parts are products with characteristics normally identified on drawings by an inverted delta (∇) preceding the part and/or raw material code number. Control Item parts may affect the safe motor vehicle operation and/or compliance with government regulations.

Special characteristics are those product or process requirements for which reasonably anticipated variation is likely to affect a fit, function or the ability to process or build the product.

Special characteristics will be designated on the Timken print, or specification. 'KPC' or a diamond placed near the characteristic typically designates special characteristics. Alternate designations may be used. Timken specific characteristics are indicted appropriately being placed near the characteristic.

Requirements for Special / Specific Characteristics are;

- All Special Characteristics must be made in a process having a special control method(s).
- SPC is the most common and preferred special control method.
- To be considered valid, Cpk values cannot be calculated until there is a stable and capable process.
- Cpk is typically calculated based on data from 20 days of production; minimum is 100 individual sample or data points.
- The Cpk value must be noted on control charts.
- If the Cpk value does not meet minimum requirement, 100% sorting must be performed and noted on the chart.
- Reactions to out-of-control signals must be indicated on the chart. Both parts and process must be described.
    - Refer to the AIAG SPC manual for out-of-control signals.
- On occasion, the Special Characteristic designation will be applied to characteristics, such as raw material, hardness, etc., and therefore, typical SPC cannot be applied. In such cases, you must identify the special controls used for these characteristics in your control plan.

Your control plan will require concurrence from Timken prior to PPAP. This discussion should begin at the initial APQP or Feasibility meetings.

1.15 Records

Suppliers shall maintain appropriate records on file according to requirements of the supplier, The Timken Company or regulatory bodies.

Quality performance records, including control charts, inspection and test results retained for one calendar year after the year in which they were created.

1.16 Supplier Evaluation and Performance

The Timken Company's supplier evaluation process is designed to measure supplier performance over time. The evaluation typically focuses on four performance areas:

- Quality
- Delivery
- Cost
- Customer service and innovation

Specific supplier or supplier locations may be evaluated using only delivery and quality performance as determined by the Timken Company.

The evaluation is completed on a periodic basis by a cross-functional team, which typically consists of The Timken Company user plant, purchasing, order fulfillment and Supplier Quality Development personnel.

Explanations of the four performance measures are as follows:

- **Quality** – product quality demands stringent adherence to purchase, transportation, engineering and packaging specifications – including cleanliness, and consistent, reliable service to assure customer satisfaction.
  Examples of measures:
    - Number of DMR's
    - P.P.M. (Parts Per Million)
    - Number of external complaints
    - Overall Cost of Quality
    - Warranty claims and field returns

- **Delivery** – On-time delivery (OTD) is having the correct material in the right quantity at the right place and at mutually agreed upon delivery time and date. The delivery date is considered to be the acknowledged or re-promised date.
  Examples of sources:
    - OTD rate

- Deviation of gross total receipts from total due / Average percent deviation
- Expedited Shipments
- Average percent deviation

Additional requirement: The supplier shall notify, in advance of occurrence, the appropriate local plant contact or contact individual listed on the purchase order, of any actual or potential late delivery conditions.

- **Cost** – examples:
  - Level of prices
  - Contractual agreement
  - Delivery cost
  - Payment terms

- **Customer service and innovation** – examples:
  - Invoicing problems
  - Supplier's ability to respond to requests
  - Supplier's ability to provide correct line and releases, quantities received
  - Continual Improvement activities
  - Cost reduction ideas
  - New product development

1.17 Supplier Escalation Process

The supplier escalation process is an increased level of activity with a supplier resulting from the supplier's continuing failure to perform in the areas of quality, delivery or cost.

Supplier Quality Escalation is the methodology used by Timken SQD personnel to define actions, resolve and improve overall supplier performance.

Escalation stages vary up to and include notification to the supplier's registrar of ongoing systemic quality issues or recognition that it may be in the best interests of The Timken Company and supplier to discontinue doing business for a commodity or entirely.

2.0 Supplier Development and Recommended Best Practices

2.1 Advanced Product Quality Planning and Prevention

When requested, the supplier shall provide The Timken Company with a product quality plan prior to or upon receipt of a purchase agreement.

For each stage of product design and development, process design and development, product and process validation and verification, feedback, assessment and corrective action, the product quality planning process shall include but not be limited to:

- Advanced Product Quality Planning - ***AIAG – APQP reference manual***
- Special characteristics
- Feasibility reviews
- Product safety
- Design/Process Failure Mode and Effects Analysis - ***AIAG – FMEA reference manual***
- Mistake / error proofing
- Control Plan to cover three distinct phases: Prototype, Pre-launch, and Production

Suppliers that use Timken-generated designs are not responsible for Design FMEA activities but may participate in DFMEA planning activities with Timken.

Timken requirements and reference to its technical specification shall be included (documented) in the planning of product manufacturing or processes as a component of the quality plan.

Suppliers shall incorporate lessons learned from previous experiences, process knowledge or other sources into quality planning documentation.

Lesson learned are to be identified as such throughout the entire quality planning documentation process and available to Timken personnel upon request.

2.2 Goal-Setting and Problem Resolution

Timken and its suppliers strive to achieve excellence in manufacturing, and may review certain Timken units and other companies for examples of best practices.

Best practices are business practices, often identified through benchmarking, that produce better results. Suppliers are strongly encouraged to become familiar with these concepts and become effective practitioners of continual improvement. Suppliers shall be able to determine areas that need correction and improvement:

- Quality results (Supplier quality performance indicators - e.g. Ppm, number of Discrepant Material Reports, etc.)
- Delivery (On time delivery, deviations in deliveries, etc.)
- Cost (price reduction, cost of quality, etc.)
- Service and innovation (continual improvement initiative, capacity planning, invoicing problems, responsiveness to change notices, etc.)

The supplier should be able to relate all goals to customer or company requirements and priorities.

It is very important to determine the scope of the issues or processes to be studied. The supplier should identify any gaps between current processes and the requirements, determine severity of the gaps, and prioritize its efforts to minimize and eliminate gaps, using a structured, improvement methodology.

The Timken Company recognizes the **8D PROCESS** problem-solving method, especially in the resolution of a nonconforming (discrepant) product using the Global Quality Tracking System (GQTS).

It is a disciplined eight-step problem-solving process and reported format. This technique is applicable also to continual improvement initiatives.

1. Use the team approach
Establish a key group of people with the process/product knowledge, allocated time, authority, and skill in the required technical disciplines to solve the problem and implement corrective actions. The group must have a designated champion.

2. Describe the problem
Specify the internal/external customer problem by identifying in quantifiable terms the who, what, when, where, why, how, how many (5W, 2H) for the problem.

3. Implement and verify interim (containment) actions
Define and implement containment actions to isolate the effect of problem from any internal/external customer until corrective action is implemented. Verify the effectiveness of the containment action.

4. Define and verify root causes
Identify all potential causes, which could explain why the problem occurred. Isolate and verify the root cause by testing each potential cause against the problem description and test data. Identify alternative corrective actions to eliminate root cause.

5. Verify corrective actions
Quantitatively confirm that the selected corrective actions will resolve the problem for the customer and will not cause undesirable side effects. Define contingency actions, if necessary based on risk assessment.

6. Implement permanent corrective actions
Define and implement the best permanent corrective actions. Choose on-going controls to ensure the root cause is eliminated. Monitor the long-term effects and implement contingency actions if necessary.

7. Prevent recurrence
Modify the management systems, operating systems, practices, and procedures to prevent recurrence of this and all similar problems.

8. Congratulate supplier team
Recognize the collective efforts of the team.

The supplier shall apply to other similar processes, services or products the corrective action, and controls implemented, to eliminate the cause of a potential nonconformance in other areas.

2.3 Cost Reduction Policy

Cost reduction is an integral element of the Timken strategy affecting Timken's Suppliers. To achieve and improve their competitive position in the market, Timken and suppliers must implement focused, systematic methods and tools to reduce the costs of products sold.

Cost reduction goals can be achieved in following ways:

- Cost reductions by Timken through the promotion of long-term agreements with suppliers, new supplier selections, supplier benchmarking and supplier certifications.
- Implementation by suppliers of internal quality improvement programs, value engineering and value analysis methodology.
- Development of Timken supplier joint cost reductions based on a review of both supplier and customer prices, delivery ways and business performance measures.

Cost reduction processes must be beneficial to the supplier and Timken including existing and new products.

Recommended techniques by Timken that could be used to achieve cost reduction:

- 8D problem solving
- Kaizen philosophy
- Value Analysis/Value Engineering
- 5-S Principles
- 5-Why Analysis
- Seven Tools of Quality
- Brainstorming
- Benchmarking
- Cross-functional Teams
- Mistake – Proofing

2.4 Cost Recovery Process

The Timken Company, when appropriate, can recover costs associated with a supplier not meeting defined expectations. The issuance of an 8d DMR in the Global Quality Tracking System (GQTS) initiates the recovery process.

The Timken Company may recover additional costs using the Timken Supplier Chargeback process.

2.5 Mistake – Proofing

The Timken Company's expectation is zero defects.

Achieving this level of quality requires capable processes combined with statistical process control techniques and the utilization of mistake-proofing methodology.

When potential causes of non-conformance are determined, the supplier shall employ solutions in the process to prevent or detect these non-conformances. These solutions shall be independent of operator's actions.

Solutions shall be designed and installed integral to the process to prevent or detect a wrong setting of an element (e.g. the proper position or inverted), defects in the element, machine, or standard, thereby making further use impossible.

2.6 Statistical Techniques

Suppliers shall monitor process performance using the appropriate statistical techniques in accordance with ***AIAG Statistical Process Control*** manual. The determination of need is based on the ability to control and verify the process capability and product characteristics. The use of quality planning tools such as Design Failure Mode and Effects Analysis (DFMEA) and/or Process Failure Mode and Effects Analysis (PFMEA) is essential. The supplier shall submit capability data for key characteristics when requested by Timken personnel.

Supplier is encouraged to use statistical techniques including:

- Gage R&R study
- Predictive maintenance
- Defect analysis
- Sampling and process analysis
- Process analysis and control charting methods
- Regression analysis - analysis of variance
- Other graphical methods

2.7 Continual Improvement Process

The supplier should promote and implement a continual improvement philosophy that provides a sustained approach to achieving competitively superior performance in those areas critical to business success by rigorously applying proven methodology and processes.

These methods and processes shall be used throughout the Supplier organization to continually improve the quality, delivery, service, and cost of Supplier products to the benefit of its customers and associates.

The Supplier should perform the functions of leading importance to continual improvement by means of:

- Continual improvement of own actions and distribution of resources
- Advising the employees of objectives and tasks
- Providing an environment which encourages open communication
- Supporting every employee and any process improvement efforts covering all employees with a training system.

In order to ensure efficiency of continual improvement actions, the following principles shall be established and applied:

- Principles of identification of problems
- Principles of application of continual improvement techniques
- Principles of planning the continual improvement actions and processes
- Principles of proceeding with capital investments
- Principles of mistake-proofing

Recommended tools of the continual improvement process are:

- Benchmarking
- Brainstorming
- Pareto Analysis
- 5-Why Analysis
- T-charts
- Force Field Analysis
- Affinity Diagram
- Involvement Worksheet
- Decision Tree Charts
- Cost Benefit Analysis
- Cause and Effect
- Process Capability/Performance
- Process Mapping

2.8 Environmental, Health and Safety

Suppliers are expected to adhere fully to all applicable governmental laws and regulations to protect the environment and ensure the health, safety and quality of life within their communities.

In particular, Suppliers must adhere to laws and regulations that apply to the health and safety of their workers.

All materials used in product manufacture shall satisfy current government and safety constraints on restricted, toxic and hazardous materials.

Supplier's shall not supply chemicals detailed on the following list:

Controlled Substances List (Click here for list)

Suppliers are required to comply with appropriate restricted or reportable substance notification on PPAP submissions.

Suppliers are encouraged to define, implement and maintain environmental management systems such as ***ISO 14001***.

Goals of the Supplier environmental management program should be:

- **Commitment to compliance** with all applicable laws, regulations and company policies relating to environmental protection, to prevent pollution at its source by minimizing emissions, effluents, and waste in the design, operation and maintenance of their facilities.

- **Commitment to prevention** including source reduction, recovery, reusing and recycling. Where feasible, eliminating negative environmental impacts associated with Suppliers operations and products.

- **Commitment to continual improvement** to increase the general awareness of environmental requirements among associates, facilitating an understanding of the environmental implications of their day-to-day responsibilities. Developing the capabilities and support mechanism necessary to achieve the Suppliers environmental policy, objectives and targets.

TIMKEN

Order no. 1421

WORLDWIDE LEADER IN BEARINGS AND STEEL