TOPSIL SUPPLIER HANDBOOK

Creating strong partnerships towards operational excellence

TOPSIL

CONTENT

FOREWORD

Competition on today's global market is fierce. Product quality, competitive cost and a safe delivery are key parameters, when selecting suppliers.

In order for Topsil to be successful and meet the needs of our customers, we must have a process in place that encourages, supports and ensures that any Topsil supplier will meet our quality performance expectations.

To attain this, strong supplier relations is key. It is our sincere goal to build up strong supplier partnerships to drive continuous improvement of our value chain and thus our businesses forward.

The objective of this handbook is to define Topsil's basic system requirements for suppliers to ensure that our joint responsibilities for the product and service quality are well understood and implemented.

This handbook will further ensure alignment of current and potential suppliers because we will strive hard in selecting, cultivating and building partnerships with companies, dedicated to this task.

We look forward to your support and believe that we will mutually benefit from expanding our relations.

October 2016,

Hans Peder Mikkelsen
President

COMPANY PROFILE

Topsil at a glance

Topsil manufactures ultrapure silicon in the form of wafers. Ultrapure silicon wafers contribute to energy-efficient voltage management in advanced electrical components that form part of different end-user applications such as electricity distribution networks, production machines, wind turbines, electric cars and hybrid vehicles and electric trains.

The purity level of silicon is so high that only a handful of companies worldwide have sufficient knowledge and capacity to produce it. Customers are primarily major multinational companies in the semiconductor industry and to a lesser extent universities and other research institutions on a global scale.

Topsil mainly addresses the highest voltage segments in the power market, which constitutes about 10% of the overall silicon market, corresponding to DKK 6.3 billion in 2015. The mega drivers for this market are population growth and a global rise in per capita income. More – and more affluent - people and societies will lead to an increased demand for energy and a functional energy infrastructure, transport investments, green energy and energy effectiveness. Topsil, furthermore, offers a number of specialty products for the space, aviation, medical and consumer goods industries.

Topsil aims to exploit the long-term market potential of the power market. This includes an increase of sales of the type of silicon expected to show the highest growth rates in the coming years and improvement of Topsil's market position in the two strategically important markets, Japan and China. At the same time, Topsil aims to increase the Company's cash flows from operating activities and enhance wafer production efficiency. Topsil strategy builds on previous capacity investments in buildings, technology and equipment.

Topsil is headquartered in Copenhagen Cleantech Park in Denmark. Topsil was founded in 1959, and had an average of 145 employees in 2019. The Company is IATF 16949 and ISO14001 certified.

For more information, go to www.topsil.com.

1. INTRODUCTION

Dear Supplier,

Topsil GlobalWafers is pleased to present our Supplier Handbook. This handbook represents our philosophies and supplier practices. All suppliers of critical production components and wafering subcontractor must comply with the requirements contained in this handbook.

The Supplier Handbook is a tool to foster continuous improvement and clarify communication. Any Topsil supplier must show commitment to the contents of this manual and incorporate it into everyday operations and product development activities to ensure achievement of the highest possible quality.

In case you have any questions after having reviewed this handbook, please do not hesitate to contact Topsil's SCM (Supply Chain Management) department.

1.1 Prospect/Impact

Our prospect for all Topsil's suppliers is to implement and maintain a system that will consistently produce high quality products which will be clearly seen by our customers as superior in performance.

1.2 Goal

The goal of this handbook is to provide a standard method to effectively communicate requirements, expectations and guidelines to the supply chain of Topsil.

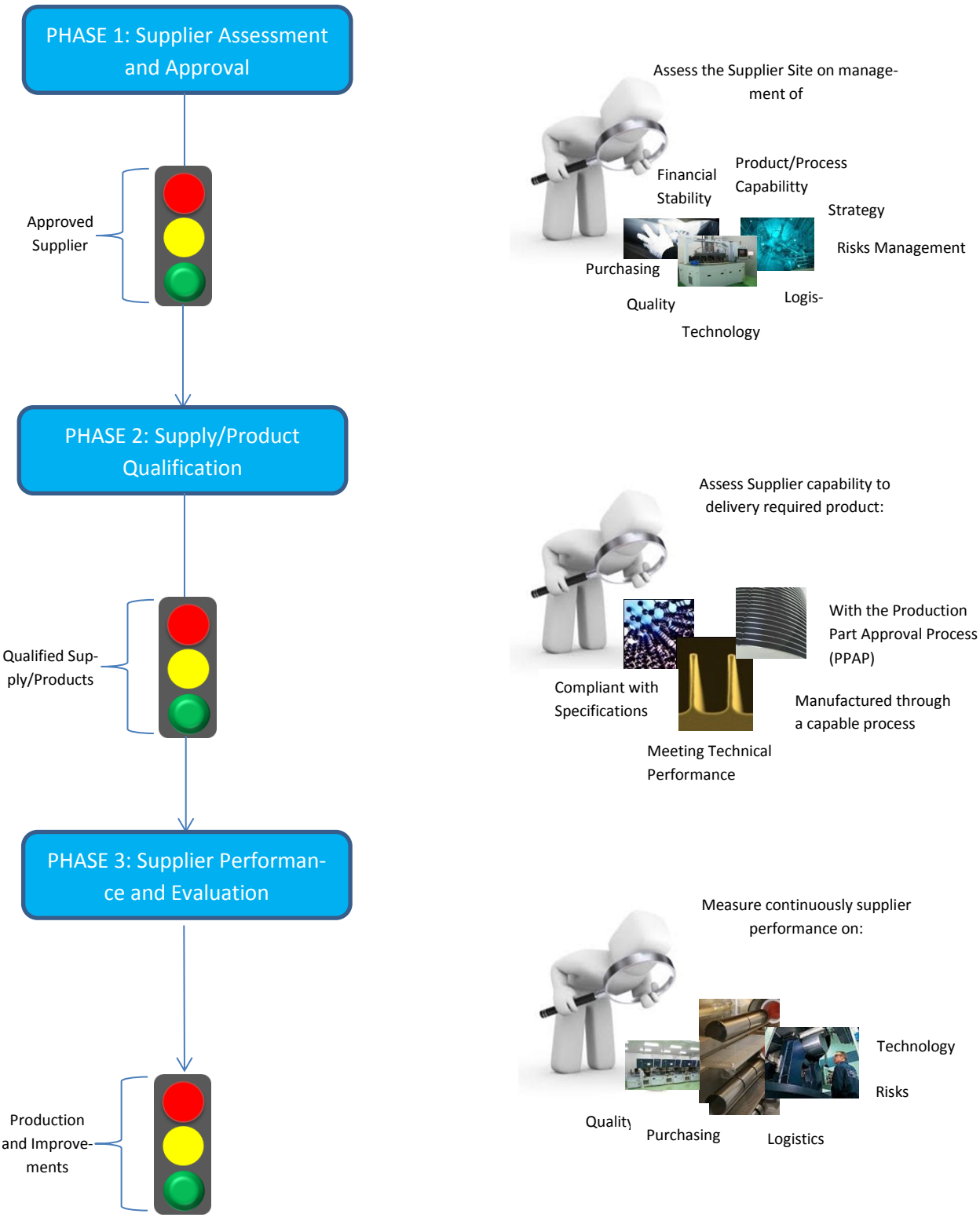
To ensure that we achieve this, Topsil has developed specific strategies that include:

- Long term relationships with selected suppliers.
- Close interaction between Topsil and Supplier manufacturing, engineering, purchasing and quality personnel
- Deployment of Advanced Product Quality Planning.
- Assurance of compliance with market specific requirements, as a minimum with ISO 9001 and going forward to IATF 16949.
- Becoming part of the strongest supply chain.

Revision List

Issue	Date	Section	Page	Revision Summary	Owner
1	January 26, 2012	All	All	New Issue	Kristy Rasmussen
2	May 9, 2012	3.4	11	Changed QA to SCM in performing QA Audit	Hans Peder Mikkelsen
	May 9, 2012	8.2	22	Changed Local and Global QA to QA only	Theis Leth Sveigaard
3	December 6, 2012	4	12	Changed A Supplier's Technical Audit and Quality Audit to every 3 years	Hans Peder Mikkelsen
4	December 19, 2012	-	5	Updated Company Profile	Christina Fris Bjørling
5	March 27, 2012	-	1,5,28-31	Updated Company Profile New Cover Pages, Contact Information, Appendix A-B	Christina Fris Bjørling
6	October 10, 2013	4	13	Added laboratory services in the description of C supplier	Kristy Rasmussen
7	February 10, 2014	8	23	Corrective Action should be applied if applicable to other related process and product	Kristy Rasmussen
8	February 19, 2014	4	12-13	Frequency of Audit has been updated	Hans Peder Mikkelsen
9	March 5, 2014	-	5	Updated Company Profile	Christina Fris Bjørling
11	June 24, 2016	-	All	General update especially PCN part	Hans Peder Mikkelsen
12	September 30, 2016	-	All	Updated company details	Maciej Sochaczewski
13	September 28, 2018	4	13	Requirements for "Group B Suppliers"	Martin Græsvænge
14	November 04, 2019	2,10	5,10,28	Updated company details Remove ISO 50001	Martin Græsvænge
15	January 02, 2020	4	13	Audit requirement for "Group B Suppliers"	Martin Græsvænge

Framework of Topsil's Supplier Management Handbook



2. GENERAL REQUIREMENTS

The following are mandatory requirements for any Topsil supplier.

2.1 Supplier Quality System Requirements

Topsil requires all suppliers to acknowledge and retain total ownership for the quality of their products and to develop Quality Assurance Systems which ensure that the requirements of the purchase order are fully met.

Many suppliers are currently registered or pursuing compliance to quality standards such as ISO 9001 and IATF 16949. Topsil's Supplier Manual is based on Topsil's Quality Standards, AIAG Core Tool Manuals, Lean Six Sigma and ISO 9001/IATF 16949. Topsil encourages the critical supply chain (see definition on page 10) to be compliant and certified to ISO 9001 at a minimum and going forward to IATF 16949. For some non-critical suppliers or non-approved ISO organizations, we expect you to demonstrate adequate process management and control to satisfy Tospil's minimum requirements.

The development of these systems should provide for continuous improvements and enable us to work in a spirit of trust, openness and teamwork.

Many of the activities referred to in this manual are further explained in the AIAG core tools manuals, such as SPC (Statistical Process Control), MSA (Measurement System Analysis), FMEA (Failure Mode Effect and Analysis), APQP (Advanced Product Quality Planning) and PPAP (Production Part Approval Process). We highly recommend any supplier to obtain copies and read these manuals for more reference.

2.2 Right of Access

By prior notice, suppliers shall provide access to their premises and facilities for Topsil and our customers for cooperation on product, process and business issues. This may include evaluation of parts, processes and documents (i.e FMEA, Control Plan, Instructions, Records etc.)

2.3 Applicability

All critical suppliers need to fully comply with the stated requirements of this manual. Individual waivers on certain elements may be granted at the discretion of Topsil's SCM Department.

Application for dispensation from any element of this manual is to be made in writing and presented to Topsil's SCM Department who will process the request internally with the relevant function.

2.4 Purchase Order Requirements

The supplier shall adhere to all Purchase order Terms and Conditions plus stated special instructions. The Purchase Order (PO) is the controlling document to communicate any deviations to our stated requirement.

2.5 Contingency Plan

The Supplier shall develop a contingency plan for potential bankruptcy or catastrophes that might disrupt product flow to Topsil and advise Topsil without delay in the event of a bankruptcy or actual disaster.

2.6 Corporate Social Responsibility (CSR)

Topsil has committed to a number of principles on human rights, labour standards, the environment and anti-corruption, as expressed in the UN Global Compact. We expect any of our suppliers to share values, similar to those expressed in the Compact. Topsil is registered in the Electronic Industry Citizenship Coalition EICC.

2.7 Information Confidentiality

Any information received by the supplier must be kept confidential and never disclosed to third party without prior written consent of Topsil. The propriety information can include, but is not restricted to all versions of electronic data, documentation and specifications.

2.8 Environmental management

Topsil is ISO 14001 certified and prefer suppliers that have an environmental management system which eventually are certified according to same standard. Environmental and energy aspects are part of our selection of suppliers.

3. SUPPLIER SELECTION AND APPROVAL PROCESS

3.1 Purpose

The purpose of this process is to assess potential suppliers and approve new suppliers. This section will inform potential suppliers of how Topsil selects its suppliers. It provides a general assessment tool to determine the strengths and weaknesses of the supplier though a set of functional evaluations.

3.2 Roles and responsibility

It is Topsil's SCM and Quality Department's responsibility to evaluate the capability of the supplier to work with Topsil. We will provide supplier feedback, including the full results of the evaluation, and request an action plan within 20 business days.

3.3 Topsil's Potential Supplier Assessment

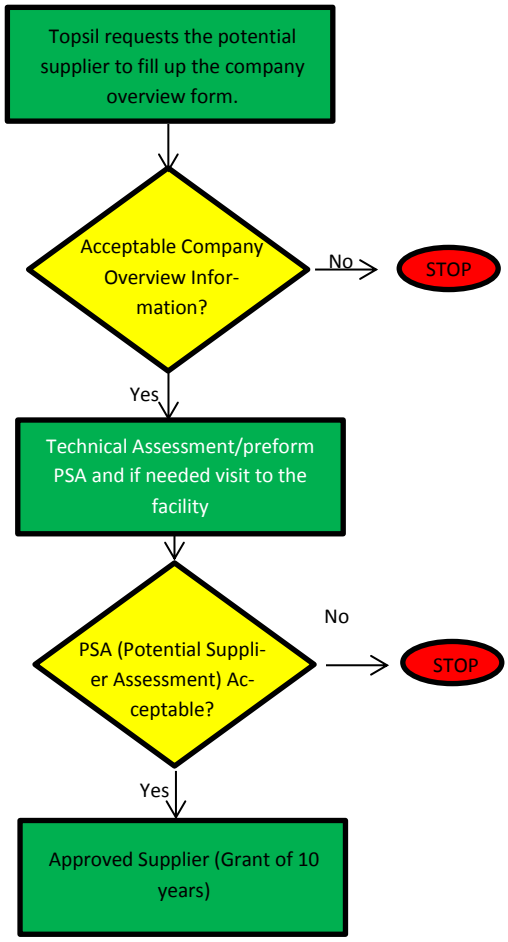
This assessment is a key component in the supplier selection process. The purpose of the Potential Supplier Assessment (PSA) is to obtain a comprehensive view of a company which will indicate whether that company can become a successful supplier to Topsil.

The assessment consists of 8 key business criteria, stated below.

Criteria
Quality
Purchasing
Strategy
Risk Management
Technology
Process/Product Capability
Financial Stability
Logistics

In addition to these business criteria, Topsil prefers to select suppliers who aim at progressing towards a more sustainable existence, see chapter 2.6 on CSR.

3.4 Topsil's Potential Supplier Assessment Process Flow



3.5 Topsil's Potential Supplier Assessment Output

At the end of the Supplier Assessment, the Supplier is placed in one of the following categories:

- **Approved for business**
  The supplier is classified as "green" and will be added to our approved supplier list.
- **Conditionally Approved**
  The supplier satisfies most of the functional requirements, but there are some weaknesses and points to be improved within 6 months. The supplier is classified as "yellow".
- **Rejected**
  No business with this supplier. The supplier will not be included on our approved supplier list.

4 APPROVED SUPPLIER LIST AND CATEGORY

Topsil bases any supplier relation on a controlled "Supplier List" which consists of suppliers, approved to supply product or services to Topsil.

The supplier list includes both manufacturing resource suppliers, subcontractors and general suppliers.

Once approved, each supplier is categorized based on its critical importance to Topsil, regarding strategy and quality. Below is the definition of supplier categories.

- **Group A Suppliers**
  Business and Quality Critical Products
  - Definition:
    A supplier of materials and subcontract processes, typically used in the direct manufacture of finished goods and both critical in strategy and quality.
  - Requirements:
  1. Yearly assessment will be performed by Topsil.
  2. Technical and Quality audit will be performed every 5 years or when necessary.
  3. Compliant to IATF 16949/ Certified ISO 9001.
  4. Ability to perform APQP/ PPAP Process.
- **Group B Suppliers**
  Quality Related Products
  - Definition:
    A supplier of materials, components, subcontract processes and tooling, typically used in the direct manufacturing of finished goods which is critical in quality.
  - Requirements:
    1. Performance assessment will be performed by Topsil if found necessary for a given supplier or type of supplier.
    2. Need for Technical and Quality audit will be evaluated at least every 5 years or when necessary.
    3. Certified to ISO 9001 / certified to ISO 17025 for laboratories.
- **Group C**
  Commercial Products
  - Definition:
    A supplier of indirect service, consumables, maintenance and other items which typically indirectly support the manufacture of finished goods.

Approval is granted for a ten-year period, after which a review will be conducted either by audit or questionnaire and/or previous performance data to assess the basis for continued business.

5 ADVANCED PRODUCT QUALITY PLANNING (A.P.Q.P)

5.1 Purpose

The purpose of this section is to communicate to suppliers a common mandatory Advanced Product Quality Planning set of requirements developed by Topsil.

This handbook provides guidelines designed to aid the supplier in providing the necessary Quality Planning package. It does not give specific instructions on how to arrive at each APQP entry, a task best left to each supplier review team.

All forms are attached in the appendix, but if the supplier is using its own form, prior approval by Topsil's Product Manager is required. Topsil requires contents of the supplier's own form to be equivalent to the forms provided by Topsil.

5.2 APQP

Group A Suppliers and some Group B Suppliers with part design or manufacturing process design responsibility are expected to use the APQP process when launching a new product for Topsil. When requested, suppliers shall provide APQP gate status reports for a product with regard to meeting the program objectives of quality, cost performance, and timing.

5.3 Critical to Quality (CTQs)

The "vital few" characteristics or features of our product that are closely associated with the most important safety and quality aspect is highlighted in Topsil's specification.

We expect the supplier to ensure particular attention during the design and process planning stages to establish process capability and control, and to indicate to the process/service operator the level of importance of the operation they are performing.

The supplier must identify the special characteristics in the FMEA and Control Plan to ensure that appropriate controls are in place. The existence of CTQs will require more elements in the PPAP-process such as Capability Studies and Measurement System Analysis Studies (GR&R).

Note: Not all Topsil Specification have a highlight for CTQ. In these situations, the identification of CTQs must be based on a specific agreement between the supplier and Topsil's Quality or SCM.

6 PRODUCTION PART APPROVAL PROCESS (PPAP)

For APQP Process verification, Topsil requires a completed PPAP-Package. This is only applicable for new products and other special cases as defined by Topsil. The default required PPAP level is 3 as defined in the AIAG PPAP Fourth Edition.

PPAP- part shall be taken from a significant run. This production run shall total a minimum of 100 consecutive parts, unless otherwise specifically agreed with Topsil, and be manufactured at the production site, using the production tooling, gauging, process, materials and operators. Parts from each unique production process stream shall be measured and representative parts tested.

Any results that are outside specification are cause for the supplier not to ship products. Every effort shall be made to correct the process so that all design record requirements are met. If the supplier is unable to meet any of these requirements, Topsil shall be contacted for determination of appropriate corrective action.

6.1 PPAP Elements

A PPAP-package consists of the PPAP elements displayed below. All items or records may not necessarily apply to every product number. The Topsil Supplier Base Document (SBD) Template provides a guideline for which PPAP elements need to be provided, based on the type of reason for submission.

Note: In cases when specifications and other requirements cannot be met, this should be clearly noted both in the specific template and in the PSW (Part Submission Warrant).

It will be the decision of Topsil whether to reject the PPAP and require resubmittal with satisfactory results, prior to production shipment, or to grant conditional approval while the corrective action plan for the discrepant condition is performed.

Level 3 Default Requirements

- ✓ Design Record
- ✓ Engineering Change Documents
- ✓ Customer Engineering Approval
- ✓ Design FMEA
- ✓ Process Flow Diagram
- ✓ Process FMEA
- ✓ Control Plan
- ✓ Measurement System Analysis Studies
- ✓ Dimensional Results
- ✓ Material, Performance Test Results
- ✓ Initial Process Studies (Capability Studies)
- ✓ Appearance Approval Report
- ✓ Sample Production Parts
- ✓ Master Sample
- ✓ Customer-Specific Requirements
- ✓ PSW (Part Submission Warrant)

The requirements for each element will be briefly described but we encourage our suppliers to refer to AIAG PPAP Manual. The whole PPAP package should be delivered in English.

Design Record

The organisation shall have the design record for the saleable product, including design records for product or details of the saleable product. If design record is in electronic format, a hard copy (ex: specification, drawing & pictorial) should be included to identify measurements taken.

Engineering Change Documents

The supplier shall have any authorized engineering change documents, not yet recorded in the design record but incorporated in the product or tooling, in an engineering change management system.

Customer Engineering Approval

When required by Topsil, suppliers shall have evidence of Topsil engineering approval.

Design FMEA

The supplier shall have a design FMEA for products or materials for which they are design responsible. Whether submitted or retained, the FMEA must be prepared prior to PPAP submission and made available for Topsil review.

Process Flow Diagram

The Process Flow Chart is a schematic representation of the process flow. It can be used to analyse sources of variation of machines, materials, methods, and manpower from the beginning to the end of a manufacturing or assembly process.

The supplier shall have a process flow diagram that clearly describes the production process steps and sequence.

Process FMEA

A PFMEA should be conducted during product quality planning and before commencement of production. It is a disciplined review and analysis of a new/revised process and is conducted to anticipate, resolve or monitor potential process problems for a new/revised product program.

The supplier shall produce a complete process FMEA with the same processes written in the Process Flow Diagram. We highly recommend use of the AIAG grading guide, and if the supplier has its own grading system, approval from Topsil must be obtained.

Topsil expects to see that FMEA is a living document that needs to be reviewed and updated when a SCAR (Supplier Corrective Action Request) is issued by Topsil.

Control Plan

A control plan is a comprehensive documentation of product or process characteristics, process controls, test and measurement systems that will occur during production.

The supplier shall produce a Quality Control Plan for all products to be supplied to Topsil. The plan will be used to obtain agreement on quality planning between Topsil and the supplier prior to commencement of production.

- Characteristics identified as significant by Topsil (CTQs)
- Characteristics identified by the supplier as significant base on the knowledge of the process.
- All Characteristics to which SPC may be applied.

The Quality Control Plan should be submitted to Topsil well in advance of the initial samples to enable review and approval.

Assessment of plan may involve audit requirement conducted on the site of the supplier.

Measurement Systems Analysis Studies

The measurement system analysis study assesses the variation of the measurement system and determines whether the measurement system is acceptable for monitoring the process.

The supplier shall perform MSA Studies for all gauges and equipment used for processes that have a high impact on CTQs or special characteristics and equipment or tools that are used to measure a CTQ.

Attribute GR&R and Variable GR&R are available in our Supplier Base Document.

Dimensional Results

The supplier shall provide evidence that dimensional verifications required by the design record have been completed and results indicate compliance or noncompliance with specified requirements. Topsil requires all results to be compliant.

Material, Performance Test Results

The supplier shall have records or materials and/or performance test results for tests specified on the design record or Control Plan. All tests required by the design record and related specifications should be listed in Topsil's format along with the quantity tested and the actual results of each test.

Initial Process Studies (Capability)

The key to Topsil's product assurance is the use of statistical methods in establishing and maintaining control in the manufacturing process.

The use of Statistical Process Control (SPC) is the most essential aspect of the defect prevention process and ongoing process capability control is a long- term measure of process performance relative to specification.

Since ongoing process capability utilizes data collected over a long period of time, it includes all common causes of variation such as raw material, personnel, machinery and environmental variations. The time period required to collect the necessary data will vary depending on the process.

Capability is determined using data from control charts. The charts must indicate stability before capability calculations can be made. When analysis shows a stable process and

normal distribution, Cp and Cpk indices can be calculated.

The following are acceptance requirement for process capability set by Topsil. Suppliers that do not meet the target value of Cpk > 1.67 will be required to develop improvement action plans to reduce process variation and meet required target.

Cpk Value	Action
Cpk < 1.33	100 % Inspection Required
Cpk 1.33 to 1.67	Sample Inspection
Cpk > 1.67	Accept Product

Appearance Approval Report

A separate Appearance Approval Report shall be completed for each product/part or series of products/parts for which a submission is required, if the product has appearance requirements on the design record.

In general, AAR will only be performed when specifically requested by Topsil.

Sample Production Product/Part

The supplier shall provide a number of sample products/parts as requested by Topsil and as defined in the Extent of Documentation Submission Request.

Customer-Specific Requirements

Suppliers shall keep records of compliance to all applicable customer specific requirements.

PSW

The Production Part Approval Process is the documented verification that the supplier meets all engineering design requirements and that the process is capable of meeting these requirements during an actual production run.

Upon satisfactory completion of all required measurements and test, as indicated in the PPAP Extent of Documentation, the supplier shall record the required information on the PSW template.

A separate PSW shall be completed for each part number unless otherwise agreed to by Topsil. This should be signed by Topsil's representive.

Master Sample

The purpose of the master sample is to provide a reference point to the initial product/process status. This can be especially valuable when something changes sometime after product launch and the characteristics involved are not easily measurable.

Suppliers may retain a master sample for the same period as the production part approval records, or 1. until a new master sample is produced for the same customer part number for customer approval, or 2. where a master sample is required in the design record, control plan or inspection criteria as a reference or standard to be used.

6.2 Submission and Notification to Topsil

Submission to Topsil

Suppliers shall submit for PPAP approval prior to the first production shipment as indicated in the table below. Suppliers shall review and update, as necessary, all applicable items in the PPAP file to reflect the production process.

PPAP

Requirement	Clarification or Examples
1. A new part or product (ex. A specific part or material not previously supplied to the customer)	Submission is required for initial release of a new product. A new product or material added to a family may use appropriate PPAP documentation from a previously fully approved part within the same product family.
2. Correction of a discrepancy on a previously submitted part.	Submission is required to correct any discrepancies on previously submitted part. A "discrepancy" can be related to: • The product performance against the customer requirement. • Dimensional, capability or GR&R issues • Subcontractor issues • Full approval of a part replacing an interim approval • Testing, including material, performance, engineering validation issues.
3. Engineering change to design records, specifications, or materials for production product/ part number(s)	Submission is required on any engineering change to production product design records, specification or materials.
4. Process technology new to the organisation, not previously used for this product.	

Notification to Topsil (Product/Process Change Notification)

In general, suppliers shall notify Topsil of any design and process changes to impact on the product's fit, form and function. A PCN (Product/ Process Change Notification) should be submitted to Topsil's QA dept.

Note: Description

Form: Visual appearance including shape, color, marking and surface finish of the product.

Fit*:* External dimensions and associated tolerances of the product.

Function: Electrical, mechanical and performance characteristics of the product.

The levels of changes are categorized to three levels, major change, minor change with customer notification and minor change without customer notification. A notification is only required for the first two categories.

Note: Description of Changes

Major Change: this type of change refers to a process/product change.

a. With impact on (i) agreements and (ii) technical interface/ manufacturability (processing) **and/or**

b. Identified remaining risks on the supply chain due to its impact on fit, form, function, and reliability.

Minor Change with customer Information: This type of minor change refers to a product/process change.

a. With impact on the visual appearance (form) of the product but which does not affect fit, function, processing, and reliability of the product and/or agreed upon contractual agreements **and**

b. Where no remaining risks on the supply chain are identified due to its impact on form.

Minor Change without customer information: this type of change has no impact on form, fit, function, processing, and reliability of the product or agreed upon contractual agreements. It is handled and documented within the suppliers change management system only and requires no customer notification.

Notification is further mandatory for any of the requirements in the table at the next page.

Modification	Announcement to purchaser before scheduled change of the product	Minimum Availability of unmodified product after provision of sample	Obligation of report and approval
New production site or relocation to a different plant	90 days	12 months	Acceptance in writing
Changes of production to a new production technology	90 days	12 months	Acceptance in writing
New or modified production process incl. process flow and process parameters.	90 days	12 months	Acceptance in writing
New or modified production process for raw material	90 days	12 months	Acceptance in writing
Changes in tools, parts or systems relevant to the product or process	90 days	12 months	Acceptance in writing
Changes of raw material and crucible or raw material supplier	90 days	12 months	Acceptance in writing
Change in auxiliary materials, relevant to process/product.	90 days	12 months	Acceptance in writing
Changes in crystal pulling, wafering, polishing, cleaning, annealing, epitaxy and backside process	90 days	12 months	Acceptance in writing
Changes in installation and equipment, if in contact with the product.	90 days	6 months	
Changes in analytical methodology (e.g. new type, different sample preparation)	90 days	6 months	
Change of the quality conformance procedure, control plan.	90 days	6 months	
Changes of dispatch note, CoC/CoA	90 days	None	Acceptance in writing
Changes of labeling, outer packaging, waferboxes incl. inner foil and moisture barrier bag	60 days	None	Acceptance in writing

If the product qualification at Topsil is finalized in less than the timeframe mentioned in column "Minimum Availability…", then Topsil aims to switch to the new material in agreement with the supplier as soon as possible.

Unmodified material which is already in production at the supplier when reaching full qualification of the new/changed material at Topsil will be used. Exceptions have to be agreed by both parties.

In case of product discontinuation the supplier shall provide notice to Topsil, allowing a minimum of 6 months from the notice to place final orders, and 12 months from the notice for final shipments. The discontinuation notice shall be sent in writing or electronically. The notice shall contain as a minimum: Effective date for placing the last purchase order.

Timeline - Announcement to purchaser before introduction

We strongly require to all our suppliers to discuss with Topsil as early as possible all upcoming process/product changes to clarify the classification of the change and of resulting consequences.

The qualification within Topsil can go on for several months.

Standard PCN (process change notification) information:

- Subject of change
- Products affected
- Reason for change
- Description of change
- Timeline with information on
    - Qualification report
    - Samples available
    - Production release
    - Start of delivery
- Customer Information Package:
    - Delta FMEA: Risk evaluation of failure modes coming from this change.
    - Test results from the tests made to migrate the imposed risks discovered by making the DFEMA.
    - Process flow and control plan comparison before/after change
    - Product performance test results comparison before/after change
    - Sample product: Sample product of supplier for inspection and/or test runs

7 PSW (PART SUBMISSION WARRANT) PROCEDURE & GUIDELINES

Topsil has classified all suppliers to PPAP Compliant, Partially Compliant and PPAP Non Compliant. PPAP Compliant Suppliers require support in providing the PPAP Documentation and Product, PPAP Partially Compliant Supplier requires support in providing PPAP Documentation and Parts/Products and PPAP Non Compliant Suppliers require significant external support in providing PPAP Documentation and Parts.

Topsil will assist any supplier in preparation of these steps. Topsil provides the appropriate PPAP Extent of Documentation. The supplier is required to use these forms, unless the supplier's forms and resulting information are equivalent to the forms provided by Topsil.

Assessment of the Supplier PSW

- Upon completion of the APQP and fulfilling the PPAP Extent of Documentations, the supplier should communicate with Topsil's representative. Topsil's representative will review and audit the product and PPAP and will be assessed one of the following.

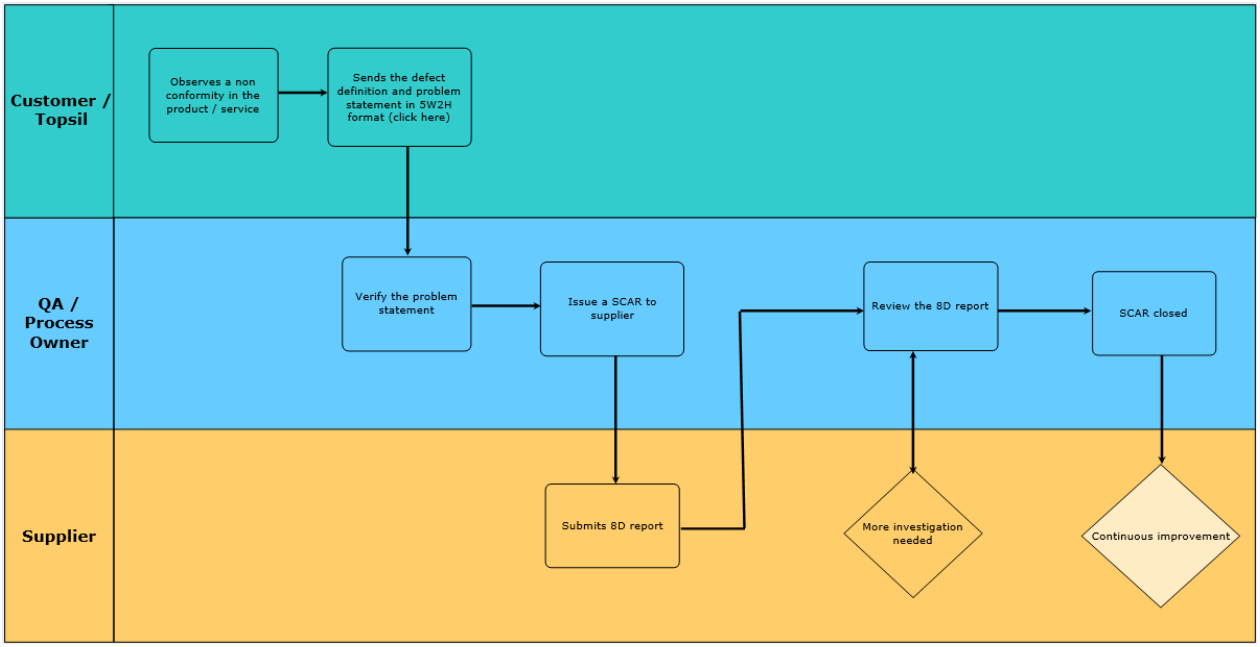
- **Approved for Production**
  Approval will be granted if all applicable requirements are met and permanent corrective actions are implemented for all non-conforming requirements. Samples must meet all form, fit, function, visual, and any reliability test requirements.
- **Conditional Approval**
  If dimensional specification, test result, material specification, or any other PPAP requirement has not been met, a Conditional Approval may be granted as long as sample meet minimum form, fit, function and reliability requirements.
  To attain a conditional approval, corrective action should be in place for the non-conforming requirements and an action plan must be evident.
- **Rejected**
  A rejection will be issued to the supplier if samples do not meet all form, fit, function, applicable reliability requirements and documentations.

8 SUPPLIER NON CONFORMANCE

8.1 Purpose

This section will direct actions of Topsil and Supplier Personnel in the coordination of corrective actions for supplier responsible non-conformance. This section applies to any non-conformance, found on production parts or service which is suspected to be supplier's responsibility.

8.2 Supplier Non Conformance Swim Lane Diagram



8.3 SCAR (Supplier Corrective Action Report)

Based on the character of the observed incident, Topsil requests the supplier to provide one of the following possible actions.

- Commercial Response - In case the described incident can be accepted by the supplier as a non-conformance incident, please issue a credit note covering the damaged goods.
- Attention Response - The purpose of this approach is to draw the attention of the supplier to an issue where a change/improvement is needed. Topsil does not request a Corrective Action Report.

- Quality Response – When issued with this, the supplier must provide an initial containment action response to our Quality Assurance Department (QA@topsil.com) within 3 working days. Response information on when a final Correction Action Report will be submitted must be included. When addressing corrective actions, the 8-D Problem Solving Method must be used.

8.4 8-D Problem Solving Method

Depending on the type, extent and severity of the supplier quality problem, Topsil requests the supplier to document action in a formal deviation report. Topsil uses the 8-D problem solving method to investigate, eliminate and communicate the process or product root causes of non-conformities and defective products.

The 8-D Disciplines are:

1-D Use Team Approach – Form a small group of people with the knowledge, time, authority and skill to solve the problem and implement corrective actions. The group must select a team leader.

2-D Describe the Problem – Describe the problem in measurable terms. Specify the internal or external customer problem by describing it in specific terms.

3-D Implement and Verify Containment Actions – Define and implement those intermediate actions that will protect the customer from the problem until permanent corrective action is implemented. Verify with data the effectiveness of these actions.

4-D Define and Verify Root Causes – Identify all potential causes which could explain why the problem occurred. Test each potential cause against the problem description and data. Identify alternative corrective actions to eliminate root cause.

5-D Implement Corrective Actions – Confirm that the selected corrective actions will resolve the problem for the customer and will not cause undesirable side effects. Define other actions, if necessary, based on potential severity of problem.

6-D Verify Effectiveness Of Corrective Action – Define and implement the actions to verify the effectivnes. Choose on-going controls to ensure the root cause is eliminated. Once in production, monitor the long-term effects and implement additional controls as necessary. If applicable, apply the action to other related process/es or product/s as well.

7-D Prevent Recurrence – Modify specifications, update training, review work flow, improve practices and procedures to prevent recurrence of this and all similar problems.

8-D Congratulate Your Team – Recognize the collective efforts of your team. Publicize your achievement. Share your knowledge and learning.

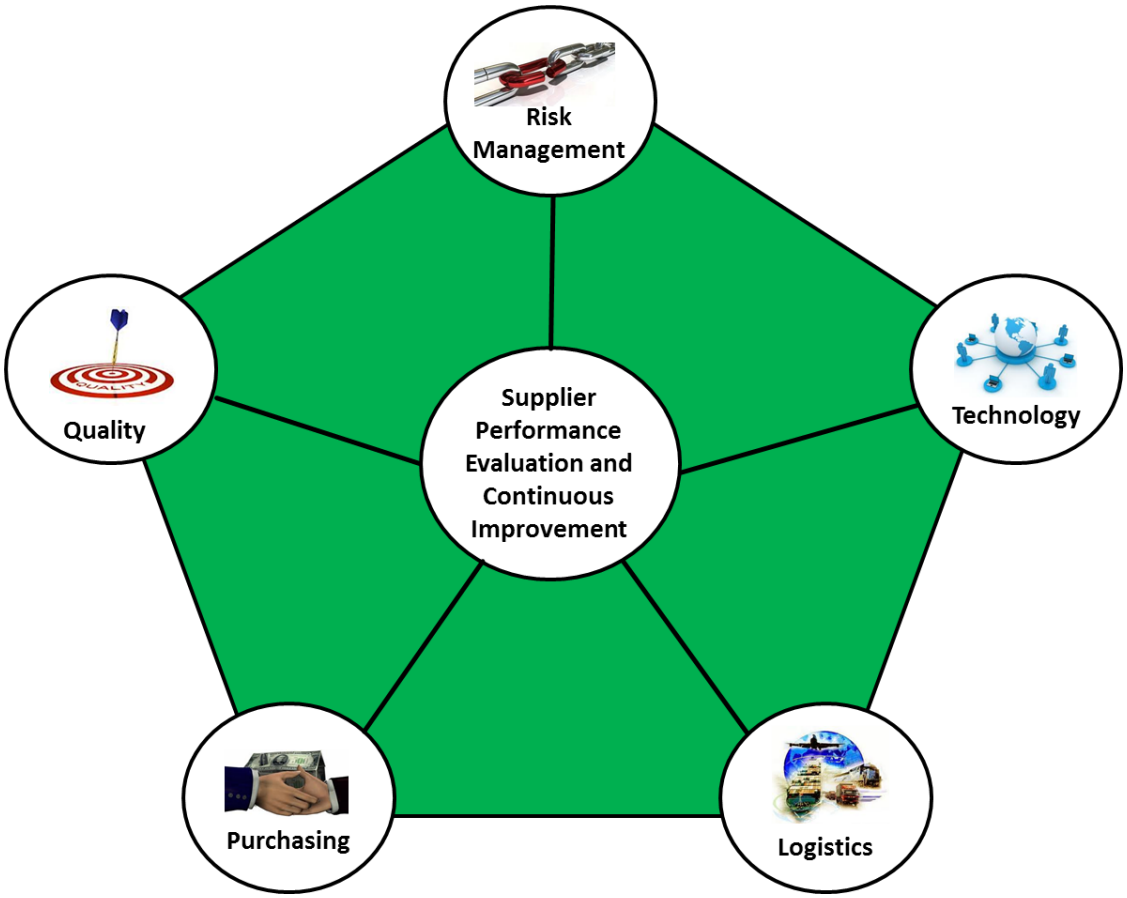
9 SUPPLIER PERFORMANCE EVALUATION

Topsil operates a Supplier Management System to monitor and measure the performance of all manufacturing resource suppliers. The process is an ongoing, comprehensive supplier monitoring and feedback procedure that allows Topsil to communicate with its suppliers, recognizing both high performance suppliers, as well as low performing suppliers.

The frequency of performance review differs depending on supplier category.

9.1 Supplier Performance Evaluation Model

The model provides a vision of how our Supplier Performance Evaluation Model should function. The five external circles are all interconnected as a system. These five areas (risk management, technology, quality, purchasing and logistics) are the five most important aspects that Topsil perceives important in our Supplier Performance Evaluation and Continuous Improvement.



9.2 Supplier Scorecard: Indexes of the Supplier Performance Evaluation

Topsil uses a supplier scorecard to rank supplier performance. This scorecard is also a method to continuously track supplier quality improvements.

Topsil uses the scorecard solely for Category A and B Suppliers. Scoring is based on quantitative and qualitative data as described below.

Quality (25% of overall score)

- Audit Report
- Incoming Quality and Reliability in process/field
- Quality Management System
- Quality Assurance Agreement (Product and Process Change Notification)
- Quality Improvement Programs
- Cooperation, Service and Support

Purchasing (25% of overall score)

- Cost of Ownership/Cost Competitiveness
- Price Attitude (including fair market price)
- Cost Reduction Efforts
- Contract Agreements
- Senior Management Attention and Commitment
- Cooperation, Service & Support

Logistics (25% of overall score)

- Supplier Delivery Performance and Reliability
- Early Warning in case of delay
- Quoted Lead Time
- Logistic Strategy and Systems
- Cooperation, Service and Support

Technology (15% of overall score)

- Current Technology
- Fulfilment of Technical Requirements
- Future Technology Position
- Cooperation, Service and Support

Risk Management and Others (10% of overall score)

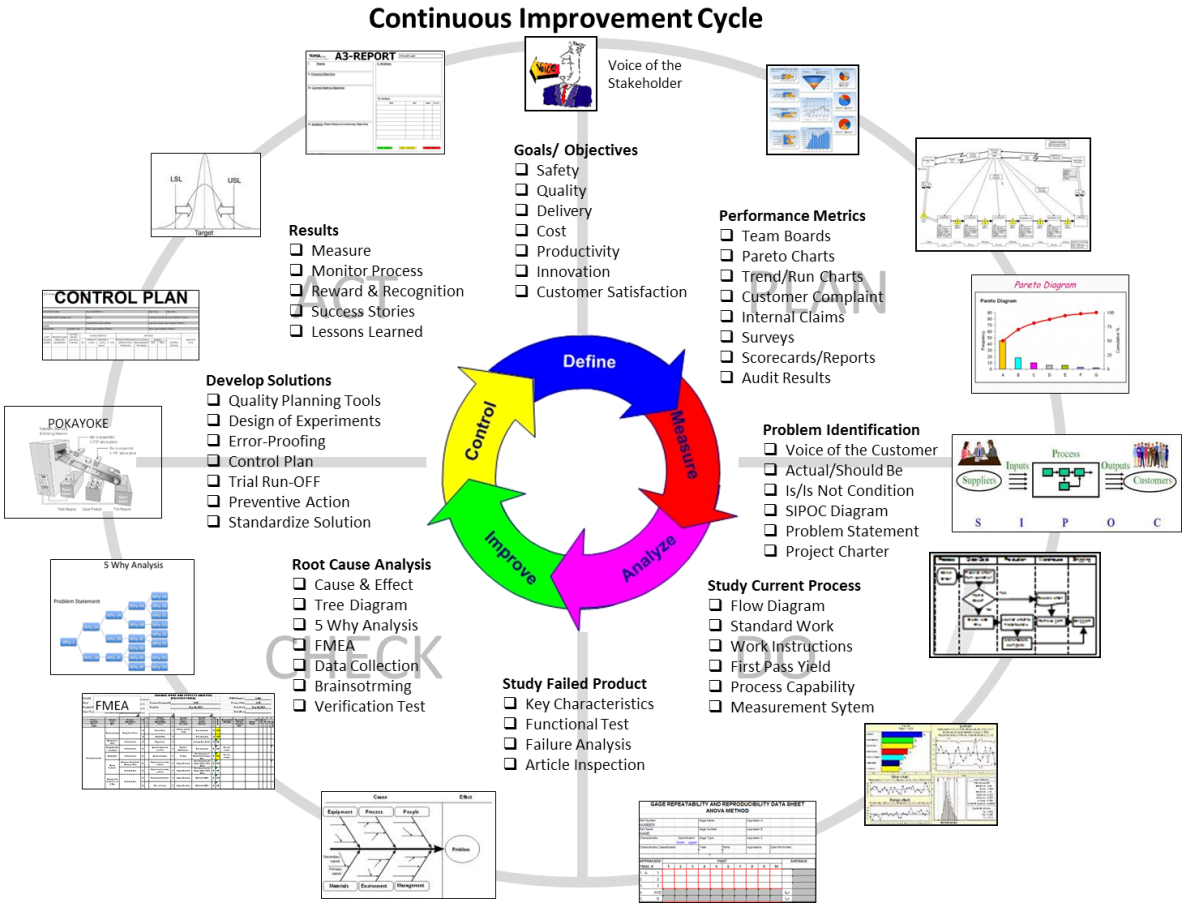
- Environmental and Energy management aspects.

10 CONTINUOUS IMPROVEMENT

Continuous improvement is fundamental to our business. As a minimum, suppliers are required to manage their quality systems to the same IATF 16949 or ISO 9001 and ISO 14001 standards that guide Topsil quality efforts, and to demonstrate continuous improvement in areas that will benefit the customer with regards to quality, cost and delivery.

The supplier shall continuously improve quality, delivery cost and performance. To aid the fulfillment of this requirement, the supplier's organisation shall establish, monitor, prioritise and act upon key performance objectives and targets. As a minimum, the objectives and targets should be established based upon business plans, management systems, product quality, process capability, and customer satisfaction goals. Actions taken to regain previously sustained levels of performance are corrective actions, not continuous improvement.

Topsil may visit any supplier site to assess its continuous improvement programs and lean manufacturing practices, and make recommendations for improvement. In addition, Topsil may deploy personnel to focus on specific improvement issues.



Some common examples of Continuous Improvement programs are:

Cost reduction projects (examples include use of Six Sigma, Lean Enterprise, Value Analysis/Value Engineering)

Waste reduction projects (examples include use of Six Sigma, Standardised Work, Statistical Process Control)

Factory Reorganization projects (examples include use of 5S Program, Single Unit or Cellular Manufacturing, Focused Factory, Kaizen Events)

Inventory reduction projects (examples include use of Kanban system, Single Unit or Cellular Manufacturing, Supermarket Pull)

Yield Improvement Projects (examples include improvements to Equipment Uptime/Downtime, First Pass Yield, Rework reduction, Scrap improvement, On-time Delivery)

Non-manufacturing Process Improvement projects (examples include Customer Service, Accounting, Purchasing, Warranty returns, Quality Control)

APPENDIX A

GLOSSARY

AIAG	Automotive Industry Action Group
APQP	Advanced Product Quality Planning
Cp/Cpk	Process Capability
CSR	Corporate Social Responsibility
CTQ	Critical to Quality. Same as key characteristics/special characteristics.
FMEA	Failure Mode Effect Analysis
MSA	Measurement System Analysis
PCN	Product/Process Change Notification
PPAP	Production Part Approval Process
PSA	Potential Supplier Assessment
PSW	Part Submission Warrant
SCAR	Supplier Corrective Action Report
SPC	Statistical Process Control
8D	8 Disciplines Problem Solving Approach

TOPSIL GLOBALWAFERS A/S
DK-3600 Siliciumvej 1
Tel. +45 47 36 56 00
Fax +45 47 36 56 01