

Share Point Global Supplier Manual – Item 1213 GP-022	
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**SENSORS AND MECHATRONICS  
Supplier Manual GP-022**



# Supplier Handbook

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## Supplier Handbook

### Supplier Development Mission Statement

***The Mission of Supplier Development is to develop active communication between CTS and its supplier base by working jointly with its suppliers for continuous improvement in the areas of Quality and Service.***

#### **This effort will serve to:**

- Increase communication and promote an open relationship between CTS and the supplier.
- Effectively convey requirements and expectations between CTS and the supplier.
- Understand the activities of the supplier and work with the supplier to prevent problems that could impact CTS or the Customer.
- Document the supplier's Continuous Improvement activities.
- Effectively monitor the performance of the supplier.
- Recognize and reward suppliers who consistently meet all expectations.

### Overview of CTS Sensors and Mechatronics

CTS Sensors and Mechatronics is headquartered in Elkhart, Indiana, is a division of CTS Corporation which has its Global Corp Headquarters in Lisle, Illinois. CTS sensors and actuators are noted for their durability, exact match to specifications, appropriate fit of specific function and flexibility. Some sensor applications include pedal and throttle position, suspension, power train, memory seat, clutch/transmission, EGR systems. With facilities located around the globe to serve our customers in the regions where their production facilities are located.

CTS Corporation, founded in 1896, is a leading designer and manufacturer of electronic components and sensors to OEM's in the automotive, communications, medical, industrial, defense, aerospace, industrial and computer markets. CTS Manufactures products in North America, Europe, and Asia. CTS stock is traded on the NYSE under the ticker symbol "CTS".

CTS is proud of its heritage of innovative products and engineering excellence. With an established global footprint, CTS products are manufactured utilizing state-of-the-art technology driven by a highly capable and dedicated staff. CTS products and services can be found in a diverse array of applications worldwide—Everywhere. Everyday

<http://www.ctscorp.com/about/beginnings.htm>

## Supplier Handbook

### Locations and Addresses

#### **CTS Corporation – Corporate Office**

Lisle, IL – USA  
 4925 Indiana Ave  
 Lisle, IL 60532  
 Phone: (630) 577-8800  
 Fax: (630) 577-8896

#### **CTS Sensors and Mechatronics Locations**

##### CTS Sensors and Mechatronics

905 West Blvd North  
 Elkhart, Indiana 46514  
 Phone: (574) 295-3575  
 Fax: (574) 295-3580

##### CTS Corporation U.K., Ltd.

Blantyre Industrial Estate  
 High Blantyre  
 Glasgow, G720 OXA  
 Scotland, United Kingdom  
 Phone: (44) 1-698-505050  
 Fax: (44) 1-698-506050

##### CTS Electro de Matamoros S.A.

*Manufacturing Facility Address*  
 Norte 7 y Avenida Lauro Villar  
 Cd. Industrial de Matamoros  
 H. Matamoros, Tamps., Mexico  
 Phone: (956) 546-5184  
 Fax: (956) 542-7342

##### CTS Components Taiwan, Ltd.

7, Central 6<sup>th</sup> Road  
 P.O. Box 26-20  
 Kaohsiung Export Processing Zone  
 Kaohsiung, Taiwan  
 Republic of China  
 Phone: (886) 7-821-6145  
 Fax: (886) 7-811-0040

##### CTS Zhongshan

East Dong Zhen Road  
 Yat-Sen Science & tech Pk.  
 Nat'l Torch Hi-Tech Dev Zn  
 Zhongshan City, 528436

##### CTS Juarez

Ave. Aerojuarez1 #7850  
 Parque Industrial AeroJuarez  
 Cd. Juarez, Chih., Mexico 32696

##### CTS Czech Republic S.R.O.

CT Park Ostrava  
 NA Rovice 872  
 Ostrava-Hrabova  
 Czech Republic 72000

## Supplier Handbook

### Supplier Evaluation and Selection

**Purpose: To Develop information on potential suppliers.**

**The supplier needs to complete, provide, or participate in the following:**

1. Complete the:
  - a. Supplier Research Form
  - b. Self-Assessment(s) with
    - i. CTS Supplier Assessment and Summary (SAS) Form GF-045.
    - ii. CTS Process Specific (PS) Assessment (If applicable)
  - c. Confidential Disclosure Agreement
2. Provide Certification:
  - a. Suppliers will have at a minimum certification to the current ISO 9001 requirement. Certification to the current ISO/IATF16949 requirements is preferred.
  - b. Suppliers who perform the following processes or purchase materials from suppliers who use any of the following AIAG CQI processes are required to provide documentation to CTS. All applicable assessments should be updated on an annual basis. Updated assessments should be submitted to Corp Supplier Development/Global Supplier Quality Mgr & or any of the plant SQE's that you work with.

### CTS Customer Specific Requirements

Customer	CQI 8	CQI 9	CQI 11	CQI 12	CQI 14	CQI 15	CQI 17	CQI 19	CQI 23	CQI 27
	LPA Process	Heat Treat	Plating	Coating	Warranty Mgmt	Welding	Soldering	Sub-Tier Supplier Mgmt	Molding System	Castings System
Borg Warner		X	X		X	X		X		
Cummins	X	X	X	X	X	X	X	X	X	X
Ford		X						X		
GMCH		X	x	x						
General Motors		X	X	X			X		X	X
Visteon		X	X	X						
Chrysler	X	X	X	X	X	X	X	X	X	X

- c. Minority Supplier – CTS supports diversity in its supply base by using minority suppliers. Minority suppliers are asked to provide certification to document our efforts.
- d. In special cases with CTS upper management approval the minimum requirement can be waived.

## Supplier Handbook

3. Prepare information for and participate in a Manufacturing Feasibility Review (MFR) for the product(s). The purpose of MFR is to assure the product is properly defined and the supplier's process is capable of manufacturing the product.
4. It is required that the supplier be able to submit information as necessary to the IMDS website. <https://www.mdsystem.com/>
5. Supplier Assessments
  - a. When the high potential candidates have been identified the onsite assessment will be conducted to the requirements of the CTS quality system. This assessment will include any appropriate process specific assessments.
  - b. The selected supplier will respond to any created SCIP (Supplier Continuous Improvement Plan) for improvement to issues detected during the assessment.
  - c. Timely closure of the SCIP is required to move forward with any new business opportunities.
  - d. New business will not be awarded to any supplier that has failed and or has an open SCIP list.
6. All suppliers shall have a current signed & agreed to NDA in place.
7. All suppliers shall have a current signed & agreed to CTS Supplier Code of Conduct on file.

## **Purchase Orders / Contracts**

### **Discrete Purchase Orders**

CTS Sensors and Mechatronics uses, in a limited form, discrete Purchase Orders for very low volume requirements of production materials. A discrete Purchase Order is considered the traditional way of purchasing goods. The Purchase Order has all the terms and conditions, specifications, pricing and delivery or shipment, etc. specified on the document. The next time the same items are required, another Purchase Order will be created when all the same items and conditions apply; however, pricing, quantity, and due date requirements may change.

### **Blanket Purchase Orders**

This is the most commonly used form of a Purchase Order used by CTS Sensors and Mechatronics. By using a Blanket Purchase Order, the same Purchase Order remains open for extended period of time with essentially the same terms and conditions, pricing, specifications, shipment methods etc. What is generally not reflected in the Blanket Purchase Order are changes to the delivery schedule (due dates, quantity requirements, etc.). These requirements are covered by the Supplier Schedule (see section entitled Supplier Schedules). It is the delivery requirement instructions that are most subject to change. As such, the Supplier Schedule is the document that is updated to reflect those changes, and the Blanket Purchase Order is only changed periodically to reflect changes to the contractual relationship.

### **Master Purchase Agreement (MPA)**

It is CTS' intent to enter long-term (3-6 year) strategic alliances with our suppliers that provide material benefits for both parties. Those benefits would include, but not be limited to, known long-term pricing structures and specific defined parameters for doing business. To that end, CTS and the supplier can negotiate and agree to a Master Purchase Agreement (MPA). This agreement formally defines our business relationship and is intended to take our alliance beyond a one-time order basis to one of more strategic significance.

## Supplier Handbook

### **Supplier Schedules**

CTS Sensors and Mechatronics utilizes a supplier scheduling system to advise suppliers of forecasted consumptions of piece parts and raw materials. The supplier schedules are divided into three different commitment zones. Those zones are Fabrication Authorization, Material Authorization and Forecast. A brief description of those zones is as follows:

**Fabrication Authorization:** The Fabrication Authorization is the authorization provided by CTS to the supplier for finished goods to be on the supplier's "shelf" at all times. This authorization is agreed to between CTS and the supplier and is expected to be always available. For example, if we have agreed that two weeks of finished goods are authorized then the first two weeks of requirements in the supplier schedule will show up in the Fabrication Authorization.

If the supplier is on Kanban the supplier must wait for the Kanban release before shipping the material, even if the ship date would be after the date shown on the supplier schedule. If the supplier is not on Kanban the supplier is authorized to ship the product to CTS in such a manner that will allow it to arrive at CTS on the date shown on the supplier schedule.

**Material Authorization:** The Material Authorization is the authorization provided by CTS to the supplier to purchase raw materials only for the items under this section. For example, if we have agreed that two weeks of raw material is authorized, the supplier can purchase the raw materials necessary to fabricate the line items under the Material Authorization section. Any fabrication of this raw material would be done at the supplier's risk.

**Forecast:** All other line items in the supplier schedule will appear under the Forecast section. This data is supplied for information purposes only and is intended to provide the supplier with a "snapshot" of our planned future consumptions. The information is not to be taken as firm. Any purchase of raw materials or fabrication of raw materials for line items in this section will be done at the supplier's risk.

Supplier Schedules are released by CTS to its suppliers on a weekly basis. Pertinent information in each schedule includes contact information for CTS and the supplier (names, phone numbers, fax numbers, etc.) as well as expected quantities and delivery dates. The dates are defined as the date the material is expected at CTS, not the supplier ship date.

The information contained in these schedules is extremely important to the smooth operation of our business. Any questions regarding the information contained within the supplier schedules should be discussed with the CTS Buyer handling your account immediately.

**Changes in Lead-Time & MOQ's:** In recent years, we have seen unprecedented changes in the supply chain in terms of pricing, scheduling and availability of product. Suppliers are expected to clearly communicate in writing on any changes in lead-time and minimum order quantities as soon as you are informed of this information. Meetings are to be scheduled as soon as possible to discuss the immediate, mid-range & long-range risk with your CTS buyer & CTS's Global Purchasing team.

## Supplier Handbook

### Supplier Advanced Product Quality Planning - SAPQP

**Purpose: To define the program development requirements and timing.**

**The supplier needs to:**

1. Comply with the requirements of GP-021 Supplier APQP Procedure.
2. Complete the GF-048 document conforming with procedure requirements.
3. Establish the program timeline compliant to GF-048 including all program milestones.
4. Provide the required deliverables to meet established timeline.

### Advance Product Quality Planning (APQP) and Production Launch

**Purpose: To identify, evaluate, and document the upfront planning and results of the production launch.**

**Have the supplier follow the AIAG (Automotive Industry Action Group) APQP process for the phases:**

#### **1. Product Release**

- a. This phase addresses APQP team kickoff, supplier process review and establishes what if any functional prototype samples or non-functional mockup parts will be required for customer.

#### **2. Development**

- a. The development phase ensures supplier and CTS are in total agreement on design, timing, and have the appropriate systems, documentations and process capabilities in place that support all activities required.

#### **3. Production Release**

- a. In this section CTS reviews final supplier Failure Mode Effects Analysis (FMEA's), Control Plans (CP) must include controls for Significant Characteristics (SC's), Process Flows Diagram (PFD) for approval and reviews all appropriate supplier PPAP documentation to ensure readiness for supplier High Volume Production Trial (HVPT) and Purchased Part Approval Process (PPAP) submission.

#### **4. Production**

- a. Continuous Improvement

#### **5. Exceptions**

Items may be excluded from part or all the APQP process if:

- a. Existing item with no changes.
- b. Standard item supplied through distribution that require no design activities such as Screws, nuts, bolts, o-rings, adhesives, standard off the shelf electronic components.
- c. Packaging and packaging materials including labels except where required by Customer Specific requirements.

#### **6. Reference**

- a. Advanced Product Quality Planning and Control Plan – Reference Manual from AIAG
- b. The CTS APQP Checklist and forms



## Supplier Handbook

### Piece Part and Material Qualification

#### Production Part Approval Process (PPAP)

Product produced by CTS Sensors and Mechatronics divisions is for the automotive industry; therefore, all component piece parts, and raw materials must be fully qualified per AIAG PPAP requirements. Guidelines and requirements for this qualification are outlined in the AIAG Production Part Approval Process (PPAP) Manual.

Suppliers to CTS are responsible to conform to the Customer Specific Requirements of our Customers including applicable CQI's. This information will be provided to the supplier through various methods such as the CTS MFR, Control Plan, Purchase Order, Engineering Specification(s), etc.

The CTS Sensors and Mechatronics default PPAP requirement is a complete Level 3 PPAP as outlined in the AIAG Standard. When a PPAP is required a PPAP submission will be requested by CTS. CTS will provide details of additional requirements, customer specific requirements or part specific requirements; via the electronic PPAP checklist GF-001.

The appropriate CTS Engineer for the project will define or approve any exceptions or deviations to the PPAP if applicable. All deviations or exceptions must be documented in writing and are specific to that particular submission.

The completed PPAP document/package must be submitted and approved before CTS can or will place production quantity orders.

**Significant Characteristics (SC's)** – Significant Characteristics will be noted on CTS documents with the SC designation. Characteristics identified as SC's require identification in the Control Plan (CP) and their control documented. The requirement for short term capability is 1.67 minimum with a goal of 2.0. and a long-term capability of 1.33 minimum with a goal of 1.67. Reference CTS (**GI-050**) **Special Characteristic Process Instruction**.

**Plans to change a product, process, material, supplier, etc. require notification (See Purchase Order Terms and Conditions) to CTS prior to the change using a Permanent Change Request (PCR / GF-058). Approval of the PCR is required prior to any changes actually taking place, & implementation will not happen until CTS fully dispositions and approves & returns the PSW. Any change that requires a PPAP submittal should follow the guidance & adherence as noted in the AIAG PPAP manual.**

**Annual Reverifications of Tools & Processes:** Suppliers are expected to have a robust system in place to detect & identify trends on the components that they mfg. With this being said, suppliers shall conduct an annual layout of each cavity (if applicable) or at least 3 pieces from a single cavity tool. These layouts shall be made available to CTS upon request. Suppliers shall submit an updated PSW & material certificate on an annual basis to CTS. This will allow CTS to make on-going submissions to our customers on additional platforms using the same process at the supplier. This will also allow for us not to have to contact you through out the year and needing this in a rush. Suppliers should also always go through their Core Qlty documents on an annual basis to ensure nothing has changed.

## Supplier Handbook

### Ongoing Management and Continuous Improvement

#### Supplier Performance Measurement

Performance of CTS' approved suppliers will be monitored, quantified, and scored. This measurement will be completed and evaluated at CTS monthly, and a report will be sent to the Supplier on a quarterly basis. CTS Sensors and Mechatronics measures Supplier performance in the areas of Quality and Service.

<b>Metric</b>	<b>Max Score</b>
<b>Quality:</b>	
Ppm	Actual Ppm
Incidents	Actual # of Incidents
<b>Service:</b>	
On-Time Delivery Parts	Actual % of parts on time.
On-Time Delivery Shipments	Actual # of shipments on time.

**The goal is Zero PPM and Zero incidents & 100% On Time Deliveries!**

#### Quality Rating

Quality requirements are defined for the supplier through the appropriate print/material specification and its associated control plan. Suppliers will be responsible for providing product that conforms to requirements 100% of the time. The overall quality of a supplier is comprised of the Supplier's Parts Per Million (Ppm) and the number of incidents for the month.

#### **Quality Requirements:**

1. Quality of shipments will be tracked on a Parts Per Million (PPM) basis with monthly internal reports and quarterly reports to the supplier.
2. 100% compliance to all specified attributes.
3. 100% compliance to providing specified documentation with each shipment.

#### **Quality Criteria:**

1. Any shipment totally consumed with no quality issues will be rated 0 PPM.
2. Any shipment used through the Material Review Board (MRB – sorted by CTS or the supplier) will be rated according to the percentage non-conforming.
3. Any shipment that cannot be used for production, but is within specification, will not be charged against the supplier's rating.
4. Administrative errors – (Shipments with incorrect or missing required documentation, wrong labels, incorrect packaging, etc.) will be charged as 100% non-conforming (final rating in Ppm).

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5. Non-conforming product found on the production floor or in the field will be charged as the percent non-conforming (final rating in Ppm).
6. Any shipment rejected and dispositioned "Return" or "Scrap" will be rated as 100% non-conforming.
7. Notification to CTS by the supplier of shipments in route to CTS with quality concerns but not yet received by CTS will not be charged as Ppm to the supplier.

## **Service Rating**

### **On-Time Delivery (OTD)**

On-Time Delivery (OTD) is the percent of on-time shipments a supplier delivers to CTS in a one-month period. Suppliers to CTS are expected to be 100% On-Time, every time. Early/Late shipments are summarized and reported monthly with Corrective Action (8D's) required for suppliers with chronic early/late shipments. Chronic OTD issues are determined by discussion between Supplier Development and the affected CTS facility.

### **On-Time Delivery requirements for the Automotive SBU include:**

1. On-Time Delivery is defined as 3 days early and 0 days late from the Expected Date.
2. The Expected Date or Promised Date is the date that the Supplier and CTS mutually agree upon as the receipt date.
3. When the supplier cannot meet the Expected or Promised date, proactive communication must be made by the supplier – CTS must be contacted.
4. The On-Time Delivery quantity requirement is +/- 5% of the expected quantity.
5. A Corrective Action (8D) will be required from the supplier if 3 shipments are early/late within a three-month period.
6. To assist suppliers in meeting the "On-Time" delivery expectations, CTS will provide planning information and purchasing commitments through Supplier Schedules.
7. CTS will define appropriate shipping agencies.
8. If a Shipment requires premium freight as a result of supplier internal issues, the supplier will be required to pay that freight cost.
9. If a shipment requires premium freight as a result of CTS action, CTS will pay that freight cost.

### **Score for Service**

The % On time delivery (OTD) is calculated by the number of delivered shipments on time divided by the total number of shipments.

**Example:** 10 shipments were scheduled for the month.  
 1 shipment was 5 days early and 1 shipment was 1 day late.  
 The score would be 8 divided by 10 or 80%.

## Supplier Handbook

### **Traffic light indicators**

The score cards have a traffic light system on them which provides a very quick indication of how the supplier is performing over the previous 12 months. These indicators are used by the CTS Sourcing Council when considering suppliers for potential new business. Supplier should make all attempts to remain green in order to be considered for new business. If a suppliers slips into either yellow or red, this would be an indication that the supplier is under performing and typically the plant SQE will be contacting and working with the supplier to close out any open items and work with the supplier for improvements. If a supplier feels that the scoring is incorrect, they should contact the plant SQE right away to clarify and understand the reason for the scoring.

Suppliers who have maintained a Red scorecard for the entire year will be requested to submit and quality improvement plan to address the systemic improvements needed and will be provided target improvements numbers for the upcoming year. If a supplier has a red score because of a single quality incident & their shipping numbers do not allow the score to change with a given 12 month period, may not have to submit a formal quality systemic improvement plan. The final decision will lie with the Global Supplier Quality Mgr & the Corp Supplier Development Mgr.

Suppliers who have submitted a quality improvement plan will be provided incremental targets for hitting throughout the year to track against. Suppliers who are on an improvement plan will typically have visits to their plants throughout the year for assessing how the improvement plans are being implemented and determine the effectiveness of the plans.

### **Escalation**

There will be times that issues may need to be escalated to support the responsiveness, closure, & cost recovery processes to have the supplier fulfill CTS's requirements. If the plant is having troubles reaching agreement and getting closure to any issues, they should escalate the concerns to the global quality team & regional purchasing team for support. If further escalation is required, the concern with all background details will for forwarded to the Corp Purchasing & Supplier Development Teams to address.

### **New Business Hold**

New business hold is the last step in the process of working with a troubled/distress suppliers. CTS will only use this as a last resort in the overall continuous improvement process, after all attempts have failed to improve the supplier's situation to have them meet CTS's quality, delivery, & commercial agreements, standards & expectation. The Corp Purchasing Team maintains & meets regularly on High Risk & New Business Hold Suppliers to determine actions needed to address the open issues.

# Score Card Example

## CTS Sensors and Mechatronics - Elkhart, Indiana. USA

Supplier Score - Supplier Score Card  
Your CTS Elkhart Buyer is: B. Martin

CTS is committed to developing partnerships with all its suppliers.

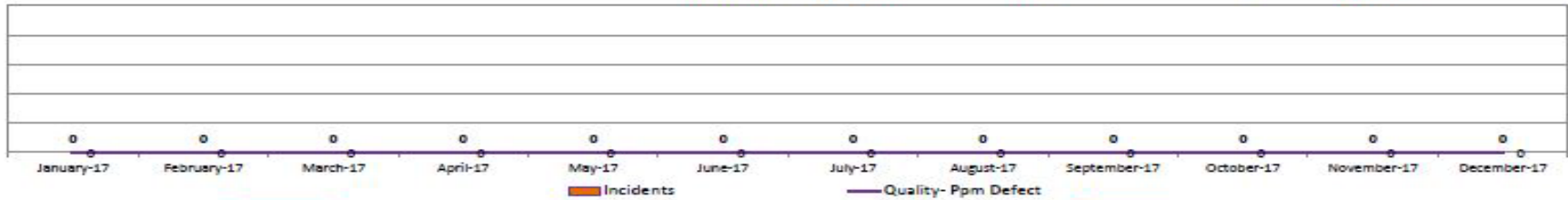
CTS expects 100% on time shipments and 100% good quality parts or services- Each Time and Every Time.

PPM Score 0  
CTS Corp Vendor # 500211

PPM Greater than 10,000  
 PPM Between 200 and 10,000  
 PPM Between 0 and 200

### Incidents and Ppm

12 Month Ppm 0 Ppm Limit 0



Shipments Score 100%

### Shipments and On Time Delivery

Shipments below 70%  
 Shipment 89% to 70%  
 Shipment 100% to 90%



**Comments:**

- 15-Dec-17
- 15-Nov-17
- 15-Oct-17
- 15-Sep-17
- 15-Aug-17
- 15-Jul-17
- 15-Jun-17
- 15-May-17
- 15-Apr-17
- 15-Mar-17
- 15-Feb-17
- 15-Jan-17

An incident is one occurrence of a defective unit or collection of defective units in a shipment delivered to CTS Corporation.  
Ppm Rating is calculated using the total number of shipped parts or units and the total number of defective parts or units delivered to CTS Corporation.  
On Time Delivery is calculated using scheduled shipments and received shipments. A delivery is considered missed if it is more than 3 days early or 1 day late.

For help in raising your monthly score contact your Purchasing Representative or Supplier Development- We will be glad to assist you.  
If you feel your scores are not correct, you have the right and obligation to question them. We will work with you to provide answers and resolution.  
Supplier Number 507

## Supplier Quality Concerns and Supplier Response

Suppliers should have processes and systems in place to prevent delivery of non-conforming product to CTS. CTS expects all Suppliers to strive for 0 PPM on all delivered product.

However, when a nonconformance is incurred by a CTS facility as the result of a supplier caused launch, incoming inspection, mass production, or warranty Quality issue, a Supplier Quality Concern will be sent to the Supplier requiring containment and Corrective Actions. The SQC process starts with the identification of a non-conformance related to a purchased supplier component and ends when the Corrective Action (8D) is submitted, accepted, closed, and any Supplier Chargeback information is moved to the Supplier Chargeback Procedure.

If the Supplier requires non-conforming samples, the Supplier is to provide an RMA and shipping account / authorization number for the return shipment.

### **CTS will expect to see the following addressed:**

1. **D1: MULTI-FUNCTIONAL TEAM:** An 8D Team Leader and a list of Team members including Name, Phone #, E-mail address, and Position is the minimum requirement.
2. **D2: INCIDENT INFORMATION & PROBLEM STATEMENT:** A contrast of the Actual and Desired conditions including pictures and descriptions. A clear and concise description and details of the incident, problem statement defining the Who, What, When, Where, Why, and How?
3. **D3: CHOOSE AND VERIFY CONTAINMENT ACTION(S):** Action(s) assuring the problem is contained and confirms that additional nonconforming product will not be shipped. Implementation date of the "Clean Point" and pictures of labels or marking method to indicate the "Clean Point" to CTS are required.
4. **D4: DEFINE ROOT CAUSE(S):** Why did the problem happen? The supplier must use a Fishbone and 5-why for Occurrence and Detection. True root cause must be identified. If there are multiple root causes, each will need to be prorated for its respective percentage of contribution to the entire problem. Note: (Systemic 5-Why comes later)
5. **D5: IMPLEMENT CORRECTIVE ACTIONS:** There must be a corrective action for each root cause identified. Dates for implementation are required along with supporting documentation (i.e., revised work instructions, revised control plans, visual standards, and verification of training).
6. **D6: VALIDATE CORRECTIVE ACTIONS:** Confirm the problem was eliminated. What was done to verify that corrective actions are effective in eliminating the non-conformance. This may take an extended period to verify effectiveness.
7. **D7: PREVENT REOCCURENCE:** Systemic 5-Why and Corrective Actions, updates to Control Plan, PFMEA. Read Across all areas.
8. **D8: CLOSE & CELEBRATE:** How was the team's success/lessons shared? Consider congratulating the team in 1) closing meeting, 2) Management Review, 3) individual letters or Newsletters, 4) special awards, or 5) during work area core team meetings.

NOTE: A copy of the CTS Global 8D in PowerPoint is available upon request.



## Supplier Handbook

**Suppliers will be expected to provide responses to Corrective Actions (8D's) in a "timely manner". This will include an initial response through section D3 within 48 hours of receipt to:**

1. Verify the non-conformance
2. Outline a corrective action team
3. Define containment activity.
4. Once the "Clean Point" is established and confirmed, deliveries shall be "Certified" and clearly identified until the permanent corrective action parts are received and accepted. The Supplier shall notify CTS in advance of the method they will use to identify the "Clean Point" stock.
5. Within 10 working days the 8D report shall be completed through section D5 with all documentation and submitted to CTS.
6. To track progress of the 8D's, CTS will track the 8D's in the Supplier Quality Concern Tracker on SharePoint. The supplier must provide evidence of progress as they complete their 8D's and must send periodic updates to their contact.
7. Time to final 8D closure should not exceed 25 working days from the date the SQC was issued unless agreement is received from CTS.
8. CTS expects the Suppliers management to be fully involved and supporting the actions to eliminate the non-conformance.

### **Supplier Charge Back Policy**

**Scope:**

**To be used in any combination of the following instances, where responsibility is clearly that of the supplier.**

**Note: All costs are CTS geographic location based and not standard across CTS Sensors and Mechatronics!**

Supplier cost recovery and chargeback could come from the following areas:

- During product launch (APQP)
- During mass production (Quality)
- Warranty related field concerns (Warranty)
- Incoming Inspection (Quality)
- Delivery concern (Delivery)
- Other

## Supplier Handbook

### Items considered for cost recovery:

Additional manpower	Inspection costs until re-certified	Recall costs
Additional set ups	Lab Testing	Replacement of material
Any Additional Labor Costs	Line Disruption (Down)	Rework
Containment costs	Material losses- total unit scrap cost	Salvage Components
CTS paid expediting	Misc. Costs	Sorting CTS Resources
CTS Travel Fees	MRB standard charges	Standard Administrative Fees
Customer charges	N/C Finished Goods	Test Equipment Cost
Downtime	Overtime	Testing at CTS
Equipment Damage	Premium cost to support production	Travel costs
Increased inspection	Product suitability testing	Warranty costs

### Longer term supplier support costs

Supplier Development support expenses – To be agreed to up-front on a case-by-case basis before SD support is given

### Process steps:

1. Supplier Responsibility is determined and confirmed with the Supplier Quality Concern.
2. Suppliers will be advised of potential Supplier Chargeback costs.
3. A Standard Administration fee of \$350 will be applied to each Supplier Chargeback.
4. All costs will be captured in the CTS Supplier Chargeback form and CTS will provide supporting documents to verify the costs.
5. The Issue Champion will then contact the supplier to communicate the Supplier Chargeback Request.
6. The supplier is responsible to review the chargeback and either accepts the cost recovery amount or, a) if the supplier does not acknowledge the request after 7 days, the issue champion will change the Chargeback status to “ACCEPTED” and will authorize the plant finance team to issue a debit memo to the Supplier or, b) an extension may be permitted if requested and the Purchasing representative approves.

### Supplier Disputes

1. In the event the Supplier does not agree to the Chargeback, the supplier may submit a dispute explaining their basis for the disputed claim.
2. A formal “Chargeback Dispute” meeting should be held. If a settlement is not reached the Supplier Chargeback will be escalated for resolution.
3. Once an agreement is reached the Supplier will be notified and the Supplier Chargeback will be ‘debited’ and closed.

## Shipment of Product

### Kanban Shipments

In the vast majority of cases, CTS Sensors and Mechatronics uses a Kanban system to handle incoming piece parts and raw materials. All commercial terms and conditions (i.e., price, payment terms, general terms, and conditions, etc.) for a required piece part or raw material will be negotiated in advance with the supplier and documented in a purchase order and/or a



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Master Purchase Agreement. CTS will authorize a supplier for a certain level of finished goods (Fabrication Authorization) and raw material (Material Authorization) in the Supplier Schedule and our expectation will be the supplier will have adequate inventories to always satisfy those authorizations. Upon reaching a predetermined reorder point CTS will issue a Kanban release (via fax or e-mail) to a supplier for a shipment of goods. The supplier will use that Kanban release as their authorization to ship and bill product (except consigned product – see the “Consignment” section of this Handbook) to CTS. The Kanban release will clearly show the product being ordered, the amount to be delivered, the carrier to be used (also on the Purchase Order) and when the product is expected at CTS. The supplier will receive no other documentation from CTS authorizing a shipment.

### Non-Kanban

In those instances where a Kanban is not in place for a given piece part or raw material, CTS Sensors and Mechatronics will use the Purchase Order or Supplier Schedule as the authorization to ship. As in the case of Kanban's above, the Supplier Schedule defines the authorizations we will allow for finished goods and raw materials. The supplier schedule is typically provided on a weekly or bi-weekly basis. Once a line item moves into the Fabrication Authorization zone, the supplier is released to ship that product so that it arrives at CTS on the date stated in the supplier schedule. When a line item moves into the Material Authorization zone, the supplier is released to purchase adequate raw materials only for that line item. Fabrication of that material would be done at the supplier's risk. Line items appearing in the Forecast zone are for informational purposes only. Any raw material purchases or fabrication of raw material for line items in that zone are done at the supplier's risk.

### Requirements on Skids & Wooden Dunnage:

Pest associated with wood packaging material are known to have negative impacts on forest & biodiversity. Implementation of the proper Phytosanitary standard is required to reduce the risk & spread of pest associated with the movement of international trade of wood packaging. **All wood skids are to be heat treated and bare the proper markings for this treatment on the skids & bare wood dunnage.**

**Please refer to the most recent edition of ISPM-International Standards for Phytosanitary Measures.**

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### Consignment Program

CTS Sensors and Mechatronics expects all suppliers to participate in the CTS Consignment program. This program is designed to eliminate non-value added inventory throughout the entire supply chain, not just at CTS. These benefits include lower costs, higher inventory turns, improved ROA, etc. for CTS and the supplier. Eligible items for consignment include but are not limited to those that are consumed regularly by CTS, are already on Kanban and contain sufficient value to impact the ROA calculation. As a general rule, reorder points and quantities are adjusted to allow for weekly releases, give or take a couple of days.

Once CTS is on Kanban with a supplier for a given product, the consignment program works as follows:

1. A start date for consignment will be agreed to between CTS and the supplier. Beginning on that date, the next shipment sent to CTS via the Kanban authorization is delivered to CTS but not invoiced.
2. CTS will consume product until the next reorder point is reached.
3. When the supplier receives the next Kanban authorization, they are authorized to ship the new release and invoice CTS for the previous release.
4. CTS will enter the invoice for the older release into their payables system and issue payment to the supplier in accordance with the agreed upon payment terms.
5. The cycle continues unbroken from that point on. Assuming the system is working properly the supplier continues to receive a regular flow of payments from CTS for product with the only impact being a delay of invoicing by one shipment.

Once all terms and conditions of the consignment agreement are in place, the CTS purchase order will be adjusted to reflect the consignment agreement.

### FIFO – First in First Out for materials shipped to CTS.

CTS Sensors and Mechatronics requires suppliers to follow FIFO on all shipments of materials and finished goods to CTS.

### Material identification

Suppliers are required to identify all materials with labels per the CTS packing requirements for traceability and lot control purposes. Refer to CTS's **GF-007 Packaging Plan**

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### Certification

- a. Suppliers will provide to CTS updated certification to the current ISO 9001 requirement or certification to the current ISO/IATF16949 requirements when the certification is renewed.
- b. Suppliers who perform the following processes or purchase materials from suppliers who use any of the following AIAG CQI processes are required to provide documentation to CTS. All applicable assessments should be updated on an annual basis. Updated assessments should be submitted to submitted to Corp Supplier Development/Global Supplier Quality Mgr & or any of the plant SQE's that you work with.

### CTS Customer Specific Requirements

Customer	CQI 8	CQI 9	CQI 11	CQI 12	CQI 14	CQI 15	CQI 17	CQI 19	CQI 23	CQI 27
	LPA Process	Heat Treat	Plating	Coating	Warranty Mgmt.	Welding	Soldering	Sub-Tier Supplier Mgmt	Molding System	Castings System
Borg Warner		X	X		X	X		X		
Cummins	X	X	X	X	X	X	X	X	X	X
Ford		X						X		
GMCH		X	x	x						
General Motors		X	X	X			X		X	X
Visteon		X	X	X						
Chrysler	X	X	X	X	X	X	X	X	X	X

### Supplier Continuous Improvement

#### ***CTS Sensors and Mechatronics will approach supplier continuous improvement as follows:***

1. For all suppliers who are IAFT registered, it is understood that continuous improvement activities are part of their normal operation, to maintain certification. CTS Sensors and Mechatronics can request documentation on continuous improvement activities, as required. Suppliers who are only certified to ISO 9001, should make efforts at conducting continuous improvements & track these activities. CTS can make requests for proof of these activities.
2. When issues arise that require corrective action, the (8D) process documents a supplier's efforts and results to implement systems that will prohibit recurrence of past product defects. While reactive in nature, the 8D process nevertheless tracks the development and implementation of corrective actions, which leads to continuous improvement.

## **Vendor Supplied Verification (VSV)**

Supplied product consistently meeting all Quality, On-Time Delivery, and Documentation requirements may qualify for Vendor Supplied Verification (VSV) status. It is the goal of CTS to qualify all eligible product for VSV status therefore, all suppliers must strive to meet qualification requirements.

### **Vendor Supplied Verification (VSV) Requirements:**

1. VSV is used only for materials utilized in production assemblies (piece parts or raw materials).
2. VSV is part number specific - not supplier specific.
3. A fully approved PPAP must be on file at CTS.
4. A history of conforming product must be established. The minimum requirement is six consecutive shipments with no issues (quality, on-time delivery, documentation).
5. Once qualified for the VSV List, the part number will be subject to random annual verification.
6. A product will be removed from the VSV List for any quality related issue resulting in a Corrective Action (8D).
7. If a part has been removed from the VSV List, probation requalification will require:
8. A fully completed and CTS accepted Corrective Action Report (8D).
9. Once the 8D has been received by CTS, verification of two shipments demonstrating the non-conformance has been resolved is required.

## **Good Business Practices**

Suppliers are expected to follow good business practices. The value of following these practices makes companies more profitable, lowers risks, enhances the ability to attract and motivate employees. Suppliers must strive to continuously improve their practices and systems.

### **The practices should include but are not limited to:**

1. FIFO – First In First Out for materials and finished goods.
2. APQP – Advanced Product Quality Planning.
3. Lean Manufacturing.
4. Supplier management CQI-19
5. AIAG PPAP – Automotive Industry Action Group Piece Part Approval Process.
6. IATF 16949 – Automotive Quality Management System
7. ISO 9001 – Quality Management System
8. TS 16949 – Automotive Quality Management System
9. IATF 16949 - International Automotive Task Force Quality Management System
10. ISO 14001 – Environmental Practices
11. Business Ethics
12. Conflict Materials reporting
13. Accounting and Financial Planning
14. Forecasting
15. Inventory management
16. Benchmarking
17. Contingency Planning and disaster recovery
18. Employee Management
19. Strategic Business planning and performance monitoring
20. Hedging – Materials and currency
21. Sales and Marketing
22. Carbon emissions reduction
23. Ethical treatment of Personnel
24. Work towards Sustainability initiatives

## **Key Contacts & Emergency Availability**

CTS is a global company, and we fully understand that we deal with a global supply base. We also realize that every country celebrates different Holiday's and/or vacations for a multitude of reasons. We also understand that suppliers will occasionally have to shut down their system for these holidays, and for general purpose preventative maintenance, CTS prides itself in working with its suppliers and trying our absolute to respect all of them. With that being said though, every supplier will need to keep an updated Key Contact sheet available that will be submitted to CTS. This sheet should identify at least 1 single person who will be the Key Emergency Contact during shutdown, holidays, and vacations; that CTS will be able to contact in the event of an urgent critical situation either at CTS and or with our customer. A new sheet could be sent to CTS at least once every year, and of more frequently if key contact points change.

## Supplier Handbook

### **Forms:** (Available by request)

CTS APQP Checklist and Forms  
Confidential Disclosure Agreement - (CDA)  
Manufacturing Feasibility Review - (MFR)  
Request for Quotation (RFQ)  
Supplier Assessment and Summary- (SAS)  
Permanent Change Request - (PCR)  
Supplier Continuous Improvement Plan - (SCIP)  
Supplier Evaluation Form - (SEF)  
Supplier Quality Concern – (SQC)  
Corrective Action - (8D)  
Supplier Request for Engineering Approval – (SREA)  
Supplier Research Form - (SRF)  
3x5 Why analysis

### **Definitions:**

APQP Advanced Product Quality Planning – APQP  
Corrective Action Report – CAR / 8D  
Automotive Industry Action Group – AIAG  
Material Safety Data Sheet – MSDS  
IMDS or MDS  
Vendor Supplied Verification – VSV  
Piece Part Approval Process – PPAP  
Potential Failure Mode Effects Analysis – PFMEA / FMEA  
On Time Delivery – OTD  
Parts Per Million (defects) – PPM  
Material Review Board – MRB  
Master Purchase Agreement - MPA  
New York Stock Exchange - NYSE  
Original Equipment Manufacturer - OEM  
Process Specific Assessment - PS

## Supplier Handbook

### Supplier Reference Documents:

**Host:** <ftp01.ctscorp.com>

User name: us47supplier

Password: auto!5upply

**File name:** Supplier Reference Documents

### Revisions:

<b>Revision History</b>	<b>Date</b>	<b>By</b>
Added CTS Czech and CTS Zhongshan to SBU Locations, Page 5.	10Aug09	S. Costa
Revised Document to be a complete Supplier Handbook. Updated to reflect changes in the quality system.	28Jun2011	C. Congdon
Reformatted the document and added new front-page graphics. Added India location and charge back policy.	17Jan2012	C. Congdon
Removed CTS Supplier Classifications system	09Feb2012	C. Congdon
Updated Charge back flow chart (removed draft and reformatted). Added requirements for SC's to APQP section 3 and Piece Part and Material PPAP requirements	02May2012	C. Congdon
Added file path and link to VSV. Removed comment of suggested improvement that the score cards should be sent to vendors monthly. Added current revision date.	14May2012	C. Congdon
Updated for the new Supplier Score card using actual Ppm and the removal of a Cost rating. Added name and addresses of CTS Carol Stream and CTS Juarez. Updated the table of contents.	18Mar2013	C. Congdon
APQP #5 Part changed to Items, a. Product changed to item. Added c. Packaging and packaging materials including labels except where required by Customer Specific requirements.	10Jul14	C. Congdon
Added Good Business Practices. Changed division name from Automotive Products to Sensors and Mechatronics. Changed corporate address. Removed CTS Carol Stream and Brownsville address for CTS Matamoros. Added Step 8 to 8D outline. Added Supplier Management support to corrective action. Removed link to VSV Elkhart document.	13Aug14	C. Congdon / B. Wasierski
Added FIFO and material identification requirements. Named GP-022 (Global Procedure)	20Aug14	C. Congdon

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Added item 7 to the quality criteria on page 13 about supplier advanced notification of quality issues will not result in Ppm if the shipment has not reached CTS. (qualsys job 1106)	10Dec14	C. Congdon
Added the program requirements for Supplier APQP, Carbon emissions reduction to good business practices, Supplier http site address information and password.	12Jan16	C. Congdon
Supplier Evaluation and Selection 2b - added the requirement for CQI information to be provided to CTS. Supplier Ongoing Management – added the requirement for CQI information to be provided to CTS on a yearly basis.	9May16	C. Congdon
Revised the PPAP and Material Qualification to add: Suppliers to CTS are responsible to conform to the Customer Specific Requirements of our Customers including applicable CQI's. This information will be provided to the supplier through various methods such as the CTS MFR, Control Plan, Purchase Order, Engineering Specification(s), etc Replaced CTS Automotive with Sensors and Mechatronics.	15Aug16	C. Congdon
Added Global routing signature block, Updated Corporate address to be in Lisle. Added CQI 14 & 27 Requirements to CQI charts. Added CQI to Piece Part & Material Qualification section. Added key contact and emergency availability – new SOAR card for vendors	01Mar18	S. McKamey
Pg#4 updated format for HQ Lisle, chng Elkhart address, removed CTS India,/ Pg#5 updated wording on CQI's & updated format of CQI-table & chngd CQI-27 from molding to castings / Pg# 6 added items 5&6 for Current NDA & Supplier Code of Conduct / Pg#7 Added section for Lead-Time & MOQ chngs / Pg#9 Chng SCR to PCR, added ref to new SC characteristics, added section on Annual reverification / Pg#12 Added traffic light refer for score card, added escalation process & new business hold / Pg#15- chng wording on 8-D/5-why, with only CTS approved form to be used / #6, from should to shall for PFMEA & other documents when applicable. / Pg#17 clarified vendor releases & added section on Heat Treat Pallets / Pg#18 added ref to GI-007 Pkg Plan / Pg#20- updated wording on CQI's & updated format of CQI-table & chngd CQI-27 from molding to castings, Pg#22 replcd SCR with PCR, re worded Supplier Cont Improvememtn paragraph for clarification & distinction, added itmes #23 & 24 for Good business practices Change title from Handbook to Manual		D. Palmateer/J. Schuster

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