



ARROW ELECTRONICS, INC.

Measurement Systems

Quality Reporting

Arrow uses a variety of quality measurement systems in all areas of the Company, especially in the warehouses and value-added centers. "Internal" measures include Statistical Process Control of non-conformances identified during audit processes, inventory accuracy, and same-day shipment percentage. "External" or customer-reported measures include Field Quality Reports, customer returns, on-time delivery, cost of quality, and customer satisfaction surveys. Supplier quality and on-time delivery performance is monitored on the Supplier Rating System.

Quality and service statistics and trends are summarized and distributed to all levels of management on a quarterly basis.

Statistical Process Control

Statistical Process Control (SPC) charts are widely used within Arrow's warehouses and value-added centers to identify problems and initiate corrective actions. The SPC charts prepared are generally "P" charts for attribute data (accept/reject). "Xbar-R" charts may also be used in instances in which variable, or measurable data, is collected.

SPC charts are updated on a daily basis (control limits calculated from historical data) at each predetermined inspection point. SPC data and trends are discussed in regular staff and/or department meetings.

Any points found to be "out of control" are immediately identified and provided an "assignable cause" and corrective action.

Pareto charts are used in conjunction with SPC charts to identify reasons for non-conformances. It is the responsibility of the Quality Manager to implement systematic corrective action plans to continually improve the process. All operators are trained to understand the SPC charts.

Field Quality Reports

Any quality problem communicated to a field location by a customer is reported on a Field Quality Report (FQR). FQRs are available on email and are electronically transferred to the shipping location and Quality Department. All FQRs are logged and analyzed for problem root cause. A response is sent to the FQR initiator. If the customer requires a response, then it is the Quality Manager that responds to the customer. Overall FQR data are analyzed and trended to continually improve efforts.

Supplier Rating System

Supplier performance is tracked and analyzed through Arrow's Supplier Rating System (SRS). The SRS rates suppliers on both quality and delivery performance.

Suppliers are measured on lot acceptance at receiving inspection, on-time delivery, and defective line items shipped to customers. This data is provided to suppliers and is used to identify problem areas and track improvement efforts.

Supplier Corrective Action Reports (SCARs) requesting cause and corrective action are issued to suppliers for poor performance or for recurring receiving errors.

Corrective Action Systems

There are various types of formal corrective action that must be implemented to continuously improve the quality systems.

These corrective actions include:

- **Customer corrective actions**- formal responses to customers on orders in which their requirements were not fully met. These may be thought of as customer complaints.
- **Internal corrective actions** - generated by the quality department and sent to another department requesting a written response. ICARs may be used for corrective actions on FQRs or SPC data.
- **Internal audit corrective actions** - issued to facility management based on internal audits in order to ensure that facility quality systems are in compliance with Arrow quality policies and ISO 9002.
- **Supplier corrective actions** - issued to both franchised suppliers and subcontractors based on supplier rating system data and customer complaints, if applicable. SCARs are used to improve supplier performance.
- **Management review/quality report corrective actions** - summaries of actions taken and status of quality objectives and plans from management review meeting and of recurring quality problems documented in quality review report.

The typical processes involved in implementing corrective actions are:

- Analyze entire process, including quality records and customer complaints in order to pinpoint problem area
- Investigate root cause of problem. Root cause generally must be process-related rather than operator-related
- Initiate corrective action to process to prevent recurrence of problem