

# SUPPLIER QUALITY SUPPORT



Product Quality

Delivery

Cost Containment

Responsiveness

*Sensing Technology*

***“As a partnering supplier for Airmar, our success means success for your company.***

***The contents of this Supplier Quality Support manual outline requirements and guidance for our suppliers.***

***It is intended to help you grow in this partnership and understand overall Quality expectations of product delivered to Airmar.***

***The primary objective of Airmar’s Purchasing group is the timely acquisition of goods and services at the lowest total cost, highest Quality, and on-time delivery. Elements of total cost in addition to basic price include transportation, storage, service, technical assistance, materials management, and compatible and correct invoicing. Airmar Purchasing will evaluate each of these and other criteria to decide which proposal represents greatest value or lowest total cost to the company.”***

***- Airmar Technology Corporation***

## The following are topics covered in this manual:



### Product Quality

- *Airmar acronyms*
- *How Airmar inspects receipted material*
- *MRB (Material Review Board) Cases*
- *Airmar Inspection Report*
- *Root Cause Analysis*
- *SCAR (Supplier Corrective Action Request)*



### Delivery

- *Documentation*
- *Packaging*
- *Labeling*
- *Environmental regulations*
- *Recording of inspection results*
- *Disaster Recovery*



### Cost Containment

- *First Article Inspection process*



### Responsiveness

- *Notifications to Airmar*

These key process indicators are focus areas to help Airmar determine supplier ratings and sustain a positive relationship with our suppliers. Please contact our Purchasing or Quality Department if you have any questions. All current and new suppliers are strongly encouraged to have their Quality Management Systems Registered to the latest revision of ISO9001 and operated in accordance with and accredited by a third party certification body.



## Product Quality

### ▪ ***Airmar acronyms & Definitions***

These are the most common acronyms used by Airmar in our specifications, correspondence, and reports:

<b>AQL</b>	<i>Acceptable Quality Level</i>
<b>ASL</b>	<i>Approved Supplier List</i>
<b>CofC</b>	<i>Certificate of Compliance</i>
<b>FAI</b>	<i>First Article Inspection</i>
<b>MRB</b>	<i>Material Review Board</i>
<b>NCM</b>	<i>Non-Conforming Material</i>
<b>PO</b>	<i>Purchase Order</i>
<b>RTV</b>	<i>Return To Vendor</i>
<b>REACH</b>	<i>Registration, Evaluation, Authorization and Restriction of Chemicals</i>
<b>RoHS</b>	<i>Restriction of Hazardous Substances</i>
<b>SCAR</b>	<i>Supplier Corrective Action Request</i>
<b>SCIP</b>	<i>Substances of Concern In articles as such or in complex objects (Products) established under the Waste Framework Directive (WFD)</i>
<b>SCN</b>	<i>Supplier Change Notification</i>
<b>SVHC</b>	<i>Substance of Very High Concern</i>
<b>UAI</b>	<i>Use-As-Is</i>

**UAI & Notify Supplier** *Use-As-Is and notify supplier that nonconforming material was found in receipt*

### ▪ ***How Airmar inspects receipted material***

When Airmar receives material:

1. the containers are first inspected for any damage incurred during delivery;
2. Samples are removed for visual/cosmetic nonconformances (AQL =4%);
3. All required documentation is checked for accuracy against the PO requirements;
4. Ten (10) or more pieces are measured against the drawing revision specified in the PO;
5. Nonconformances are recorded on an MRB Report.



## Product Quality (cont'd)

If material supplied to Airmar is found to be nonconforming, either an *MRB Case* or *Inspection Report* may be sent to you:

### ■ MRB (Material Review Board) Cases

What Airmar observed for nonconformances

Airmar's Order No.

What Airmar is requesting to make material conforming

**AIRMAR**  
TECHNOLOGY CORPORATION

**Material Review Board Case**

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**Part Submitted to MRB**

<b>MRB Case ID</b>	EXAMPLE: 63	<b>Description</b>	MRB for Supplier XXXXX / Part XX-XXX-XX
<b>Non-Conformance</b>	EXAMPLE: 39P	<b>Description</b>	EXAMPLE: Purchased Part Does Not Meet Spec-Airmar Airmar Technology Co
<b>Site</b>	AMR	<b>Site Description</b>	PART DESCRIPTION
<b>Part No</b>	XX-XXX-XX	<b>Part Description</b>	EXAMPLE: Aug 20, 2018 12:50:25 PM
<b>Qty Submitted</b>	XX	<b>Created By</b>	
<b>Source Type</b>	EXAMPLE: PURCHASE ORDER RECEIPT	<b>Created Date</b>	
<b>Notes:</b>	Dwg Ref 11: .107 +/- .005 is from .115 to .118. hole dia's. 10 of 10 parts. [UAI]	<b>Part Revision</b>	X
	Dwg Ref 10: 2 x 6-32 holes are not cleanly tapped or finished tapped. Mating screw is hard to start.[100% screen, rework, notify supplier]		
<b>Order No:</b>	XXXXX	<b>PO Buyer</b>	EXAMPLE: SHART
		<b>PO Buyer Name</b>	EXAMPLE: Scott W Hart
		<b>PO Supplier Name</b>	YOUR CO. NAME
		<b>PO Revision</b>	X
		<b>PO Eng Rev No</b>	X
		<b>PO Arrival Date</b>	YEAR-MONTH-DAY, TIME STAMP

<b>Line No:</b>	X
<b>Release No:</b>	X
<b>Receipt No:</b>	X

Serial No	Lot/Batch No	WDR No	Configuration ID	Eng Chg Level	Activity Seq	Quantity
				X	0	XX

<b>Disposition Code</b>	<b>Disposition Description</b>	<b>Quantity</b>	<b>Complete</b>	<b>Date Completed</b>	<b>Completed By</b>
EXAMPLE: REWORK	EXAMPLE: Internal Rework	XX	TRUE	MM/DD/YEAR	RLIGHTHALL
EXAMPLE: Rework required to retap holes.					

### ■ Airmar Inspection Report

! = nonconforming  
✓ = accept

Where Airmar observed nonconformances

**AIRMAR**  
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**Airmar Inspection Report**

Analysis No: EXAMPLE: 16191  
Last Activity Date: MM/DD/YYYY

35 Meadowbrook Drive  
Milford, NH 03055

Supplier: XXXXX

PO Number: XXXXX

Release No: X

Ordered Part Rev: X

Part No: XX-XXX-XX

Phone: 603-673-9570

Supplier Name: XXXXX

Line No: X

Receipt No: X

MRB Case No: XXXX

Part Description: EXAMPLE: HDR.AL 12 & 20 DEG LAM B75

Fax: 603-673-4624

www.airmar.com

**Summary: EXAMPLE**  
- No 4 0.201 thru +/-0.005 10 of 10 reading 0.215 to 0.216

Eng Draw Ref	Norm Type Description	Norm Type	Unit of Measure	Special Characteristic	Result No	Result	Inner Min	Nominal Value	Inner Max	Result Status	Evaluation Meas. Technique	Product Characteristic	Inspection Code
! 004	Diameter in Inches	DIA - IN	in	CD	1	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	2	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	3	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	4	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	5	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	6	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	7	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	8	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	9	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS
! 004	Diameter in Inches	DIA - IN	in	CD	10	.216	.196	.201	.206	Out of Specification	Pin Gage		10 PCS

Eng Drawing	# of Defects Found	# of Defective	Test Operation Description	Norm Type Description	Norm Type	Unit of Measure	Product Characteristic	Special Characteristic	Inspection Code	Inspection Code Description	Sample Size
003	0	0	Verify Note 4	Visual Inspection	VISUAL	*		CD	10 PCS	10 PIECE INSPECTION	10
	0	0	AQL Visual Insp	Visual Inspection	VISUAL	*			AQL VISUAL	AQL Sample Size	1000
020	0	0	Verify Note 4	Visual Inspection	VISUAL	*		CD	10 PCS	10 PIECE INSPECTION	10
	0	0	Metal Analysis	Metal analysis	XRF	*			3 PCS	3 PIECE INSPECTION	3

Note: aluminum B 83.91.86.47.86.61



## Product Quality (cont'd)

These reports contain information about the Order, the nonconformance, and our request to replace or rework the material so it conforms to expected quality.

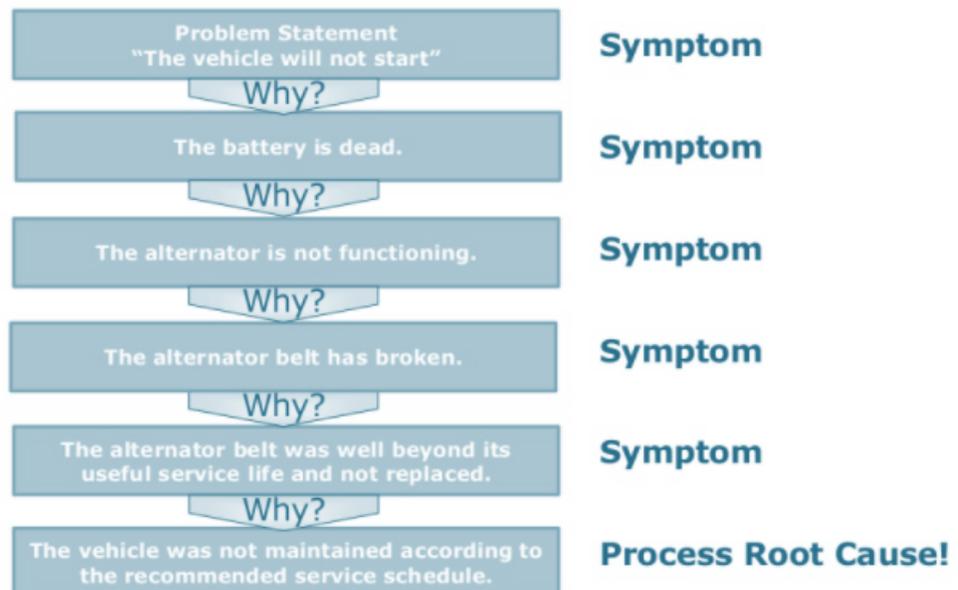
### ▪ **Root Cause Analysis**

When material is dispositioned as nonconforming, Airmar’s MRB team may request a root cause analysis be performed by the supplier. It is important that your evaluation identifies a **process-related issue** that resulted in the nonconformance(s). [Please note: “re-training” or termination/change of an employee is not an acceptable root cause.]

Airmar recommends that you follow the 5-WHY problem solving approach to determine root cause. An example 5-Why follows:

### The 5-WHY approach

This technique is a simple and effective tool for solving problems. Its primary goal is to find the exact reason that causes a given problem by asking a sequence of “Why” questions. The 5-Why method helps your team focus on finding the root cause of any problem.



*Refer to Figure 1 in the Appendix of this Manual for a 5-WHY template. There are numerous sources online to help you with applying this problem solving technique.*



## Product Quality (cont'd)

In some instances it may help to view the sequence of asking reiterative “why’s” when constructed in this way:



- The first W is What.*
- The second W is Where.*
- The third is When.*
- The fourth is Who.*
- The fifth is How and a final Why.*

The **objective** is always to determine a **process-related** issue that is the root cause. (Process, not people.)

### ▪ **SCAR (Supplier Corrective Action Request)**

The SCAR form (*Appendix, Figure 2*) should be used to document your determination of root cause. Please access this form from the Airmar website [airmar.com](http://airmar.com). **Expected turn-around time for SCAR completion is two weeks.**



## Delivery

### ▪ **Documentation**

#### **Incoming documents:**

Reference Airmar’s PO for specific documentation requirements. This could include CofC’s, test data, inspection data, etc.. It is the supplier’s responsibility to review all PO’s issued to them from Airmar.





## Delivery (cont'd)

### Documentation

#### Revisions

Suppliers must review PO's to ensure that the revision on the supplier's copy matches Airmar's current part drawing revision.

Some Airmar drawings may have a Revision for the Part No. and a separate Revision for the Doc. No. on the same drawing – as shown on the right: Rev 03 and Rev 06

PART NUMBER	MATERIAL	REVISION
02-136-01	316 STAINLESS STEEL	0BS
02-136-02	BRONZE UNS C92200	03
02-136-03	SUPER DUPLEX STAINLESS STEEL A1/ASTM CE3MN (UNS J93404)	02

UNLESS SPECIFIED ARE IN INCHES ON	SIGNATURE DRAWN: A. BAIRAMOV	DATE 10/03/05	 AIRMAR TECHNOLOGY CORPORATION 35 MEADOWBROOK DR MILFORD NH 03055-4613 USA TEL: 603-673-9570 FAX: 603-673-4624
LS ±0.03 LS ±0.010 1/16 250	CHECKED: R. CULLEN	11/14/05	
SEE TABLE			TITLE NUT, 3 3/4-4 UNC SIZE B SCALE: 1/22 NUMBER 02-136-XX REV 06 SHEET 1 OF 1
ANYONE WITHOUT THE PERMISSION OF AIRMAR			(CRITICAL DIMENSIONS) DO NOT SCALE DRAWING

Other Airmar drawings will have both a *Part No.* Rev and *Doc. No.* Rev, as shown on the right:

PART NUMBER		P/N REV	
100868		I	
 AIRMAR TECHNOLOGY CORPORATION 35 MEADOWBROOK DR MILFORD NH 03055-4613 USA TEL: 603-673-9570 FAX: 603-673-4624			
TITLE			
BAR AL STDF SPRT			
SIZE	SCALE: 1/2	DOC NUMBER	DOC REV
B	SHEET 1 OF 1	D-18365	I
(CRITICAL DIMENSIONS)		(REF)	DO NOT SCALE DRAWING

A **packing list** must be included with every shipment. The packing list will indicate the Airmar PO No., Airmar Part No. and Description, Terms of Delivery, Packing List No., and quantity shipped. (Multiple containers are to be marked *Box X of Y shipped.*) Suppliers must ensure that the correct Part Number, Revision level, process, or raw material(s) are shipped as directed on the PO, or any other defined requirements.



## Delivery (cont'd)

### ▪ Packaging

Your packaging is expected to prevent damage to product due to handling and transportation and environment.

Each unit needs to be protected from damaging other units in the same container. Segregated compartments can minimize damage but depending on placement, the material is still prone to movement and contact with other material during handling by the carriers.

**PCBAs packed one per smaller section (LEFT), and two per larger section.**



Smaller sections with a SINGLE unit per section offers the *better* protection. Larger sections with two or more units per section are much more prone to material movement and subsequent damage during delivery.

**ENSURE THAT MATERIAL CANNOT CONTACT CONTAINER WALL**

**Loose fitting dividers** are never sufficient to prevent movement during delivery.

Units in contact with the shipping container wall are prone to damage:





## Delivery (cont'd)

### *Packaging* (cont'd)

Metal products are another example of material prone to damage during delivery when packed inadequately.



Besides the container damage, the internal divider used here was not able to prevent metal housings from contacting and then damaging each other. The blue fishnet material did not prevent damage.

Packaging must give consideration for minimal effort and time required to UNPACK the units after receipt at Airmar.

Your product and packaging and all the materials used in the manufacture of the product and packaging must conform to all governmental, safety and environmental regulations applicable to the country of manufacture, sale, and delivery.

All electro-static sensitive devices (ESD) shall be properly packaged to provide protection from electrostatic discharge. All ESD sensitive products shall be clearly identified with an ESD warning on each tray, tube, or tape/reel within the shipment.

We will inform you of any other specific packaging requirements on our PO.



## Delivery (cont'd)

### ▪ Labeling:

Labeling needs to be protected from the elements during transport and delivery to Airmar. (3.5" x 5" labels are recommended (ex. Avery Dennison 5168)). Please note that Airmar may specify labeling requirements on our PO.

### ▪ **Environmental regulations**

Airmar ships product worldwide and adheres to a number of international regulatory requirements. The material you provide is incorporated into our product and as a result, Airmar requires that you comply with the following environmental regulations:

- *RoHS (EU latest revision)*
- *REACH (EU latest revision)*
- *Prop65*
- *Conflict Minerals*
- *SCIP Waste Framework Directive*
- *Ozone Depleting Chemicals*

*Airmar uses Assent Compliance, Inc. to support our compliance with these Directives. Our suppliers will be requested to update their environmental position via Assent, every year or when a regulation is updated (i.e. REACH typical updates every Jan and July), or if their previous submission was incomplete. Since our products go to global markets, your support here is necessary for us to use your material in our products.*



Airmar expects our suppliers will operate in an environmentally responsible manner and scrutinize its manufacturing processes, identify potential hazards, and use preventive measures to reduce or eliminate potential hazards. All waste material that is generated is to be disposed of in compliance with applicable laws.



## Delivery (cont'd)

### ▪ **Recording of inspection results**

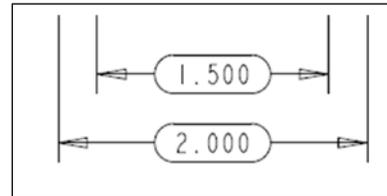
Dimensional/variable data points require an *actual measurement* to indicate pass/fail – these cannot be recorded as “Visual OK” or similar.

Inspection records should record actual data where there is a specification for variable data; not check marks. Check marks *are* allowed for attribute data.

Any data that is outside specification must be clearly marked as nonconforming.

Entries may NOT be left blank, nor recorded as “N/A”.

**IMPORTANT:** *Critical dimensions* are designated on Airmar drawings by an oval and must be measured and recorded during your inspection process and maintained



as quality records. **These critical dimension measurements are the responsibility of Suppliers’ Outgoing Inspection, not Airmar’s Incoming Inspection.** Supplier records that capture these inspection results by our suppliers must be available for Airmar review.

An **Airmar-approved** go-nogo gage, mating part, or reference standard is acceptable for determining conformance. Using such a gage still requires that inspection/data sheets record conformity to the part drawing. You may use a check mark or “OK” in this instance but please reference the specific standard/gage used. **This equipment must be included on your equipment Calibration schedule.** A supplier is expected to protect and make periodic checks of a go-nogo gage, mating part, or reference standard used and account for normal wear over time that will adversely affect inspection results.



## Delivery (cont'd)

- **Disaster Recovery** Suppliers to Airmar shall have a disaster recovery and business contingency plan in place that minimizes the risk to Airmar in the event of a natural disaster, labor dispute, or other disturbances in the supply chain. Evidence of the process shall be made available for review upon request.



## Cost Containment

Airmar does not require its suppliers to submit cost containment proposals or reports but it is expected that processes within your Quality Management System have proactive measures to contain costs of supplied material/product/service to Airmar.

- **FAI (First Article Inspection)**

It is important that Airmar be informed immediately of any changes to Supplier process, material, or supply chain. (Also see *Required Notifications* within the **Responsiveness** section of this Manual).



Ref. **Supplier Change Notification form** (Appendix, Figure 3)

- **FAI process:**

FAI re-submissions apply when:

- Product is modified by an Airmar Engineering change to its drawing(s) or material(s);
- Use of other material or manufacture method than previously approved, or a change of source for sub-contracted parts, materials or services;
- Product supplied following any change in process or methods of manufacture, control plan, or change to the print dimensions/characteristics, including any change to the revision of material or technical specification;
- Product from replaced, modified, refurbished or rearranged existing tooling or equipment, including transfer to another facility.



## Responsiveness

### ▪ *Notifications to Airmar*

#### **Required notifications:**

- Notify Airmar of any changes are made to: raw materials, methods, machinery, equipment used to measure/monitor, design, supplier, storage conditions/location, or manufacture location.
- Notify Airmar of shipments with nonconformances and the analysis of why material cannot be made conforming to specifications.
- If nonconformances were not questioned or authorized by Airmar in the past, this is not a reason to continue to accept those parameters during your future outgoing inspections. Suppliers must receive explicit allowances from Airmar for material delivered with deviations from requirements.

Order of precedence with respect to quality requirements:

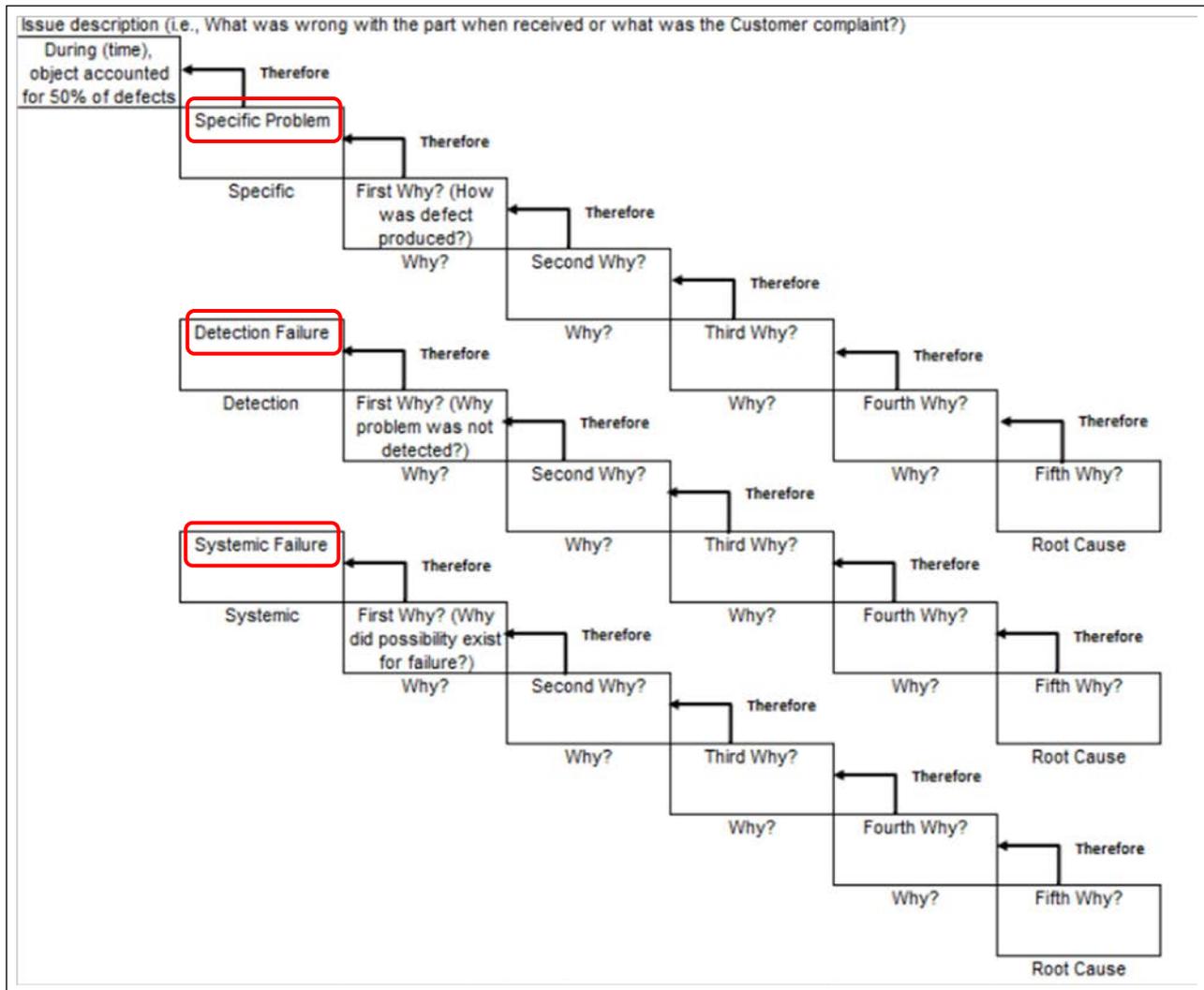
1. Airmar Purchase Order;
2. Approved, documented deviations to Purchase Order, Drawings, Specifications;
3. Engineering drawings;
4. Material specifications.

It is the responsibility of the Supplier to contact *Airmar Purchasing* for requirements clarifications if needed.

- Supplier shall maintain a list of qualified suppliers of materials, subcomponents and subcontracted services used in the manufacture of Airmar product and make this information available to Airmar upon request.
- **New suppliers** are required to complete the **Airmar Supplier Questionnaire** accessible on the Airmar website [airmar.com](http://airmar.com) .

**APPENDIX**

**FIGURE 1: 5-WHY template for determining root cause – including *Specific Problem*, *Detection Failure*, and *Systemic Failure***



**PLEASE NOTE: The following are NOT acceptable ROOT CAUSES:**

- We are sorry for the inconvenience and will make sure this doesn't happen again
- We hired new people and this was the cause of the problem.
- We will pay extra attention to this in the future.
- Operators were not trained properly.
- Condition was not questioned by Airmar in previous lots

**APPENDIX**

**FIGURE 2: SCAR** (*Supplier Corrective Action Request*) form  
Please access this form from the Airmar website [airmar.com](http://airmar.com)

**Airmar Supplier Corrective Action Request (SCAR)**

Originator: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

Non-Conformance At Airmar:

Airmar P/N: \_\_\_\_\_ Quantity: \_\_\_\_\_ Airmar PO#: \_\_\_\_\_

**Supplier Evaluation & Analysis**

No fault found    Comments:

Confirmed

**Preliminary Investigation: Results of 5-WHY analysis - why the nonconformance was produced**

**Process Root Cause Analysis: Results of 5-WHY analysis - why the problem was not detected**

**Corrective Action: Steps implemented that will prevent recurrence**    C/A implemented: \_\_\_\_\_

COMPLETED BY AIRMAR:

Accepted    Reviewed by: \_\_\_\_\_    Date: \_\_\_\_\_     See attached

Rejected

D-19862 Rev 1

**APPENDIX**

**FIGURE 3: *Supplier Change Notification* (SCN) form**

Please access this form from the Airmar website [airmar.com](http://airmar.com)



## Airmar Supplier Change Notification

(Please submit to your Airmar Purchasing Buyer)

Date submitted to Airmar \_\_\_\_\_

**Supplier Information**

Supplier Name			
Supplier Site City Country			
Airmar-assigned Supplier Number			
Airmar originator Name/Title			

**Supplier Technical Contact Regarding this Change**

Name/Title			
Phone		Email	

**Scope of Change**  
Affected Part No.'s Sold to Airmar

Part No.	Rev.	Part No.	Rev.

**Reason for change**

<input type="checkbox"/> Material	<input type="checkbox"/> Transfer of Tooling/Equipment
<input type="checkbox"/> Manufacture location	<input type="checkbox"/> Change to test or test inspection method
<input type="checkbox"/> Supplier	<input type="checkbox"/> Change in appearance
<input type="checkbox"/> Process	<input type="checkbox"/> Other _____
<input type="checkbox"/> Design	

Additional description of change:

Airmar Review By: \_\_\_\_\_ Date: \_\_\_\_\_

Airmar Disposition: \_\_\_\_\_  Copy sent to Supplier (Buyer)  Copy uploaded to IFS (Buyer)

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**APPENDIX**

**ACKNOWLEDGMENT**

*(Please return completed form to Airmar Purchasing)*

Please have your Quality Assurance representative sign and date Acknowledgment of receipt and understanding of this Supplier Quality Support manual, and return to your Airmar Purchasing point-of-contact.

\_\_\_\_\_ (company name) will adhere to the requirements outlined in this *Supplier Quality Support* manual for products, material and service provided to Airmar Technology Corporation.

Print name: \_\_\_\_\_

Title: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Effectivity date:



**Airmar Technology Corporation**

35 Meadowbrook Drive  
Milford, NH 03055  
(603) 673-9570  
[www.airmar.com](http://www.airmar.com)

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Ed Durrett (Quality Eng) [edurrett@airmar.com](mailto:edurrett@airmar.com)