Training Services

The following catalog is intended to be used as a guide when establishing training needs for your organization. Courses and workshops can be conducted individually, or as part of an overall curriculum. If conducted as part of a curriculum, course hours can be adjusted.

For Example:
Your Company is new to the world of ISO/TS 16949:2009 Automotive Quality Systems. You have a current customer that is requiring you to become compliant and registered (certified) to ISO/TS 16949:2009. After reviewing the following course catalog, you would find the curriculum recommended in meeting the minimum requirements of ISO/TS 16949:2009 training and implementation are as follows:

Course title	**Class hours**	**Intended Audience**
ISO/TS 16949:2002 Management Overview	4 Hours	Top and Middle Management
Implementing ISO/TS 16949:2002	16 Hours	Implementers and Auditors
ISO/TS 16949:2002 Internal Auditor Workshop	24 Hours	Auditors
Core Tools Training (Minimum)		
APQP/PPAP	16 Hours	Implementers and Auditors
FMEA	8 Hours	Implementers and Auditors
SPC	8 Hours	Implementers and Auditors
MSA	8 Hours	Implementers and Auditors
Total Hours	**84 Hours**	

Depending on resources and management support, the following scenario could reduce total course hours by over 30%:

- Included management in the first 4 hours of the Implementing class – **minus 4 hours**
- Included your identified Internal Auditors as part of the implementation team, include them in the Implementing class, and reduce the Internal Auditor workshop to 8 hours – **minus 16 hours**
- Conduct the Core Tools Training as a workshop with all Implementers and Auditors attending all sessions and reduce the Core Tools Training to 32 hours – **minus 8 hours**

Your specific training needs

The example above uses the ISO/TS 16949:2009 curriculum to explain the importance of carefully analyzing your current situation and potential training needs. The example could have been applied to any of the subjects listed in this catalog. SJM Associates would look forward to helping you establish your training needs through a complimentary on-site training needs evaluation, and a review of your customer specific requirements. This will ensure proper implementation for effectiveness, and the best use of your training dollars. All courses include a review of customer specific requirements as they apply to your customer base and industry sector.

On site conducts

All courses are intended to be conducted on-site and specific to the products and/or services you supply. It is important that any existing documentation you have including: business processes, procedures, FMEA's, control plans, product specification, drawings, etc. are made available for used during the sessions. This will ensure that all training courses will be "customized" to meet your specific needs, and may identify opportunities for improvement in your existing system.

Table of contents

ISO 9001:2008 Courses and Workshops

ISO 9001:2008 is considered to be the foundation for any company supplying any product or service to any industry worldwide. It is considered the baseline for companies moving into specific sectors, such as Automotive, Aerospace, Medical Device, etc. It contains the fundamental requirements for:

- Business System Structure
- Company Infrastructure
- Production of Product/Process
- Management Responsibilities
- Planning and Project Management
- Measurement and Auditing
- Documentation Structure
- Purchasing
- Corrective and Preventive Actions
- Human Resource Management
- Product and Process Design
- Continual Improvement

Once your company has become compliant to this standard you may choose to, or your customer may require you to, attain 3rd party registration (certification) to the standard. The following training and workshops will assist your company in attaining this compliance and the resulting registration.

ISO 9001:2008 Management Overview

This course is intended for Top and Middle Management personnel who will be making the initial decisions, and supporting the implementation of ISO 9001. This course is also useful for anyone who wants to gain a general understanding of the standard and its basic requirements.

Coursework covers:

- The history of ISO and International Quality Systems
- The benefits of ISO 9001 compliance
- The fundamental requirements of ISO 9001
- Customer requirements for ISO 9001 compliance
- Discussion on the 3rd party registration process
- Implementation examples, scenarios, timelines, etc.

Course Outcomes:

- Supply Management a fundamental understanding of ISO 9001
- Ensure their understanding of the resources need for implementation
- Explain Top Managements role in the support of a ISO 9001 Quality Management System
- Understand the benefits of ISO 9001 compliance
- Understand why ISO 9001 is the basis for all other sector specific requirements

Course duration:

- 2-4 hours

Materials Provided:

- Copy of the presentation materials

Understanding ISO 9001:2008

This course is intended for those company personnel who need a more in depth understanding of ISO 9001. Typical participants in the course will support the development of the Quality Management System and work within it after it is development. This is what most companies would consider the basic and fundamental education requirement for all employees within the organization, regardless of their involvement in the system.

Coursework covers:

- The history of ISO and International Quality Systems
- The benefits of ISO 9001 compliance
- A detailed review of the requirement of the standard
- Review of the benefits of the process approach to auditing
- Discussion on how companies meet these requirements
- Review of suggested document and system formats
- Review of company's plans for the implementation of ISO 9001
- Discuss the employees roll in the support of the Quality Management System (ISO 9001)

Course Outcomes:

- Supply all participants with a detailed understanding of ISO 9001 and its requirements
- Ensure their understanding of their role in this Quality Management System
- Identify how they may be involved in the development of the Quality Management System
- Understand how their company will proceed in the implementation of the Quality Management System
- Basic understanding of the auditing and registration process which they will be involved in

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- A copy of ISO 9001:2008 for use as reference in the classroom

Note: Published copies of ISO 9001:2008 can be provided for each participant at ISO list prices if required. www.iso.org

ISO 9001:2008 Courses and Workshops (cont.)

Implementing ISO 9001:2008 Workshop

This workshop is intended for those personnel who will be a member of the implementation team for the companies ISO 9001 Quality Management System. This workshop covers all the coursework described in "Understanding ISO 9001:2008" with the addition of workshop activities that begin to identify, document, and develop the actual documented Quality Management System.

Coursework covers:

- "Understanding ISO 9001:2008" coursework material
- Review of recommended document formats
- Outline and initial development of the Quality Manual
- Identification and initial development of processes and procedures required by the standard
- Identify and establish both document and records control procedures
- Identify all needed work instructions, records, etc.
- Documentation of a plan, with required tasks, for continued development

Course Outcomes:

- "Understanding ISO 9001:2008" outcomes
- Identify these participants as the subject matter experts for the companies Quality Management System.
- Established documentation formats for the companies Quality Management System
- Initial development of all manuals and procedures required by the standard
- Development of a plan and a timeline for continued development.

Course duration:

- 16+ hours

In many cases the company will work with the instructor to schedule follow up visits for continued coaching as the system is developed

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- Hard copy of ISO 9001:2008 is recommended

Note:
Published copies of ISO 9001:2008 are recommended for each participant at ISO list prices. www.iso.org

ISO 9001:2008 Internal Auditor Workshop

This workshop is intended for those personnel who have been identified as Internal Auditors for the companies ISO 9001 Quality Management System. This workshop covers all the coursework described in "Understanding ISO 9001:2008" with the addition of workshop and activities centered on the ISO 19011:2002 guideline for Management System Auditing. Using the company's existing Quality Management System participants will learn the process approach to effective auditing. Workshop activities include the development of an audit schedule, audit checklist and practice audits. If time permits, and the companies schedule allows, participants will finish the workshop by conducting actual audits of the Quality Management System, write audit reports, and present these to management.

Coursework covers:

- "Understanding ISO 9001:2008" coursework material
- Review of ISO 19011:2002 guideline
- Detail discussion, with activities, of the process approach to auditing
- Development of an audit plan
- Development of audit checklist
- Recommended methods and techniques for identifying, and ascertaining, objective evidence
- Writing effective audit reports, summaries and reporting to top management
- Effective follow-up of prior audit non-conformities

Course Outcomes:

- "Understanding ISO 9001:2008" outcomes
- Understand how to use the techniques and audit process as described in ISO 19011:2002
- Be able to explain the process approach to effective auditing
- Understand how develop an audit check list and audit plan
- Know how to write and present audit reports and summaries
- Explain how to perform effective follow-up auditing
- Be able to conduct actual audits, and write reports, on the company's Quality Management System

Course duration:

- 24 hours

Materials Provided:

- Copy of the presentation and course materials
- Examples of audit checklist, objective evidence, etc.
- Reference copy of ISO 19011:2002
- Reference copy of ISO 9001:2008

Notes:
If participants in this course have already completed "Understanding ISO 9001:2008" or equivalent, course duration could be reduced to 16 hours.

Published copies of ISO 9001:2008 are recommended for each participant at ISO list prices. www.iso.org

ISO 14001:2004 Courses and Workshops

ISO 14001:2004 is the International Environmental Standard and can be applied by all companies that produce products, materials, or services. The standard is based on ISO 9001:2008 and contains most of the same requirements with the addition of Environmental Impacts and Aspects. Although companies can become compliant and registered (certified) to this standard alone most companies attain compliance to ISO 9001:2008 first, then implement the additional requirements of ISO 14001:2004. The additional requirements of ISO 14001:2004 are the identification of environmental aspects, identification of the environmental impact of those aspects, and the management of those impacts

If your company is already compliant to ISO 9001:2008 the following course duration times can be reduced by as much as 50%.

ISO 14001:2004 Management Overview

This course is intended for Top and Middle Management personnel who will be making the initial decisions, and supporting the implementation of ISO 14001. This course is also useful for anyone who wants to gain a general understanding of the standard and its basic requirements.

Coursework covers:

- The history of ISO and International Environmental Systems
- The benefits of ISO 14001 compliance
- The fundamental requirements of ISO 14001
- Customer requirements for ISO 14001 compliance
- Discussion on the 3rd party registration process
- Implementation examples, scenarios, timelines, etc.

Course Outcomes:

- Supply Management a fundamental understanding of ISO 14001
- Ensure their understanding of the resources need for implementation
- Explain Top Managements role in the support of a ISO 14001 Environmental Management System
- Understand the benefits of ISO 14001 compliance

Course duration:

- 2-4 hours

Materials Provided:

- Copy of the presentation materials

Implementing ISO 14001:2004 Workshop

This workshop is intended for those personnel who will be a member of the implementation team for the companies ISO 14001 Environmental Management System. This workshop covers all the coursework described in "ISO 14001:2004 Management Overview" with the addition of workshop activities that begin to identify, document, and develop the actual documented Environmental Management System.

Coursework covers:

- " ISO 14001:2004 Management Overview" coursework material
- Review of recommended document formats
- Outline and initial development of the Environmental Manual
- Identification and initial development of processes and procedures required by the standard
- Identify and establish both document and records control procedures
- Identify all needed work instructions, records, etc.
- Documentation of a plan, with required tasks, for continued development

Course Outcomes:

- "ISO 14001:2004 Management Overview" outcomes
- Identify these participants as the subject matter experts for the companies Environmental Management System.
- Established documentation formats for the companies Environmental Management System
- Initial development of all manuals and procedures required by the standard
- Development of a plan and a timeline for continued development

Course duration:

- 16+ hours

In many cases the company will work with the instructor to schedule follow up visits for continued coaching as the system is developed

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- Reference copy of ISO 14001:2004

Note: Published copies of ISO 14001:2004 are recommended for each participant at ISO list prices. www.iso.org

ISO 14001:2004 Courses and Workshops (cont.)

ISO 14001:2004 Internal Auditor Workshop

This workshop is intended for those personnel who have been identified as Internal Auditors for the companies ISO 14001 Environmental Management System. This workshop covers all the coursework described in "Implementing ISO 14001:2004" with the addition of workshop and activities centered on the ISO 19011:2002 guideline for Management System Auditing. Using the company's existing Environmental Management System participants will learn the process approach to effective auditing. Workshop activities include the development of an audit schedule, audit checklist and practice audits. If time permits, and the companies schedule allows, participants will finish the workshop by conducting actual audits of the Environmental Management System, write audit reports, and present these to management.

Coursework covers:

- "Implementing ISO 14001:2004" coursework material
- Review of ISO 19011:2002 guideline
- Detail discussion, with activities, of the process approach to auditing
- Development of an audit plan and checklist
- Recommended methods and techniques for identifying, and ascertaining, objective evidence
- Writing effective audit reports, summaries and reporting to top management
- Effective follow-up of prior audit non-conformities

Course Outcomes:

- "Implementing ISO 14001:2004" outcomes
- Understand how to use the techniques and audit process as described in ISO 19011:2002
- Be able to explain the process approach to effective auditing
- Understand how develop audit check list, audit plans, and reports
- Explain how to perform effective follow-up auditing
- Be able to conduct actual audits, and write reports, on the company's Environmental Management System

Course duration:

- 24 hours

Materials Provided:

- Copy of the presentation and course materials
- Examples of audit checklist, objective evidence, etc.
- Reference copy of ISO 19011:2002
- Reference copy of ISO 14001:2004

Notes:

If participants in this course have already completed "Understanding ISO 9001:2008" or equivalent, course duration could be reduced to 16 hours.

Published copies of ISO 14001:2004 are recommended for each participant at ISO list prices. www.iso.org

ISO 13485:2003 Courses and Workshops

ISO 13485:2003 is the International Quality System Standard for Medical Device Manufacturing. Although its main focus is the manufacture and control of "Sterile" products, it can be applied by all companies that produce any product, material, or service for the medical industry. The standard is based on ISO 9001:2008 and contains most of the same requirements. Additional documentation will be required for traceability, product identification, etc., however the requirements for continual improvement, and customer satisfaction have been removed. Although companies can become compliant and registered (certified) to this standard alone most companies attain compliance to ISO 9001:2008, then implement the additional requirements of ISO 13485:2003.

If your company is already compliant to ISO 9001:2008 the following course duration times may be reduced by over 50%.

ISO 13485:2003 Management Overview

This course is intended for Top and Middle Management personnel who will be making the initial decisions, and supporting the implementation of ISO 13485:2003. This course is also useful for anyone who wants to gain a general understanding of the standard and its basic requirements.

Coursework covers:

- The history of ISO and International Environmental Systems
- The benefits of ISO 13485:2003 compliance
- The fundamental requirements of ISO 13485:2003
- Review of the differences between ISO 9001:2008 and ISO 13485:2003
- Customer requirements for ISO 13485:2003 compliance
- Discussion on the 3rd party registration process
- Implementation examples, scenarios, timelines, etc.

Course Outcomes:

- Supply Management with a fundamental understanding of ISO 13485:2003
- Ensure their understanding of the resources need for implementation
- Explain Top Managements role in the support of a ISO 13485:2003 Environmental Management System
- Understand the benefits of ISO 13485:2003 compliance

Course duration:

- 1-2 hours

Materials Provided:

- Copy of the presentation materials

Implementing ISO 13485:2003 Workshop

This workshop is intended for those personnel who will be a member of the implementation team for the companies ISO 13485:2003 Management Systems. This workshop covers all the coursework described in "ISO 13485:2003 Management Overview" with the addition of workshop activities that begin to identify, document, and develop the actual Management System.

Coursework covers:

- " ISO 13485:2003 Management Overview" coursework material
- Review of recommended document formats
- Outline and initial development of the Environmental Manual
- Identification and initial development of processes and procedures required by the standard
- Identify and establish both document and records control procedures
- Identify all needed work instructions, records, etc.

Course Outcomes:

- "ISO 13485:2003 Management Overview" outcomes
- Identify these participants as the subject matter experts for the companies Environmental Management System.
- Established documentation formats for the companies Management System
- Initial development of all manuals and procedures required by the standard
- Development of a plan and a timeline for continued development

Course duration:

- 16+ hours

In many cases the company will work with the instructor to schedule follow up visits for continued coaching as the system is developed

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- Hard copy of ISO 13485:2003 is recommended

Note: Published copies of ISO 13485:2003 are recommended for each participant at ISO list prices. www.iso.org

ISO/TS 16949:2009 Courses and Workshops

ISO/TS 16949:2002 is the international standard for any company supplying production/service parts to the automotive industry. Reviewing the text on the front cover of the document reveals the best explanation of its scope: *"Particular requirements for the application of ISO 9001:2008 for the automotive production and relevant service part organizations."* Using ISO 9001:2008 as its baseline requirement, ISO/TS 16949:2009 contains additional requirements relevant to the automotive industry, such as:

- Planning (APQP)
- SPC
- Product and process measurement
- FMEA
- Measurement Systems Analysis
- Measurement and Auditing
- Control Plans
- Training
- Corrective and Preventive Actions
- PPAP
- Products and process validation
- Continual Improvement

If your organization is already compliant to ISO 9001:2008, course duration times will be reduced. Once your company has become compliant to this standard you may choose to, or your customer may require you to, attain 3rd party registration (certification) to the standard. The following training and workshops will assist your company in attaining this compliance and the resulting registration.

ISO/TS 16949:2009 Management Overview

This course is intended for Top and Middle Management personnel who will be making the initial decisions, and supporting the implementation of ISO/TS 16949:2009. This course is also useful for anyone who wants to gain a general understanding of the standard and its basic requirements.

Coursework covers:

- The fundamental requirements of ISO/TS 16949:2009
- Review of the differences from ISO 9001:2008 and additional requirements of ISO/TS 16949:2002
- Customer requirements for ISO/TS 16949:2002 compliance
- Discussion on the 3rd party registration process
- Implementation examples, scenarios, timelines, etc.

Course Outcomes:

- Supply Management a fundamental understanding of ISO/TS 16949:2009
- Ensure their understanding of the resources need for implementation
- Explain Top Managements role in the support of a ISO/TS 16949:2009 Quality Management System
- Understand the benefits of ISO/TS 16949:2009 compliance

Course duration:

- 2-4 hours

Materials Provided:

- Copy of the presentation materials

Understanding ISO/TS 16949:2009

This course is intended for those company personnel who need a more in depth understanding of ISO/TS 16949:2009. Typical participants in the course will support the development of the Quality Management System and work within it after it is development. This is what most companies would consider the basic and fundamental education requirement for all employees within the organization, regardless of their involvement in the system.

Coursework covers:

- The history of ISO and International Quality Systems including the history or ISO/TS 16949:2009
- The benefits of ISO/TS 16949:2009 compliance
- A detailed review of the requirement of the standard
- Review of the benefits of the process approach to auditing
- Discussion on how companies meet these requirements
- Review of suggested document and system formats
- Review of company's plans for the implementation of ISO/TS 16949:2009
- Discuss the employees roll in the support of the Quality Management System (ISO/TS 16949:2009)

Course Outcomes:

- Supply all participants with a detailed understanding of ISO/TS 16949:2009 and its requirements
- Ensure their understanding of their role in this Quality Management System
- Identify how they may be involved in the development of the Quality Management System
- Understand how their company will proceed in the implementation of the Quality Management System
- Basic understanding of the auditing and registration process which they will be involved in

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- A copy of ISO/TS 16949:2009 for use as reference in the classroom

Note: Published copies of ISO/TS 16949:2009 can be provided for each participant at ISO list prices if required. www.aiag.org

ISO/TS 16949:2009 Courses and Workshops (cont.)

Implementing ISO/TS 16949:2002 Workshop

This workshop is intended for those personnel who will be a member of the implementation team for the companies ISO/TS 16949:2009 Quality Management System. This workshop covers all the coursework described in "Understanding ISO/TS 16949:2009" with the addition of workshop activities that begin to identify, document, and develop the actual documented Quality Management System.

Coursework covers:

- "Understanding ISO/TS 16949:2009" coursework material
- Review of recommended document formats
- Outline and initial development of the Quality Manual
- Identification and initial development of processes and procedures required by the standard
- Identify and establish both document and records control procedures
- Identify all needed work instructions, records, etc.
- Documentation of a plan, with required tasks, for continued development

Course Outcomes:

- "Understanding ISO/TS 16949:2009" outcomes
- Identify these participants as the subject matter experts for the companies Quality Management System.
- Established documentation formats for the companies Quality Management System
- Initial development of all manuals and procedures required by the standard
- Development of a plan and a timeline for continued development.

Course duration:

- 16+ hours

In many cases the company will work with the instructor to schedule follow up visits for continued coaching as the system is developed

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- Hard copy of ISO/TS 16949:2009 is recommended

Note:
Published copies of ISO/TS 16949:2009 are recommended for each participant at ISO list prices. www.aiag.org

ISO/TS 16949:2002 Internal Auditor Workshop

This workshop is intended for those personnel who have been identified as Internal Auditors for the companies ISO/TS 16949:2009 Quality Management System. This workshop covers all the coursework described in "Understanding ISO/TS 16949:2009" with the addition of workshop and activities centered on the ISO 19011:2002, the guideline for Management System Auditing. Using the company's existing Quality Management System participants will learn the process approach to effective auditing. Workshop activities include the development of an audit schedule, audit checklist and practice audits. If time permits, and the companies schedule allows, participants will finish the workshop by conducting actual audits of the Quality Management System, write audit reports, and present these to management.

Coursework covers:

- "Understanding ISO/TS 16949:2009" coursework material
- Review of ISO 19011:2002 guideline
- Detail discussion, with activities, of the process approach to auditing
- Development of an audit plan
- Development of audit checklist
- Recommended methods and techniques for identifying, and ascertaining, objective evidence
- Writing effective audit reports, summaries and reporting to top management
- Effective follow-up of prior audit non-conformities

Course Outcomes:

- "Understanding ISO/TS 16949:2009" outcomes
- Understand how to use the techniques and audit process as described in ISO 19011:2002
- Be able to explain the process approach to effective auditing
- Understand how develop an audit check list and audit plan
- Know how to write and present audit reports and summaries
- Explain how to perform effective follow-up auditing
- Be able to conduct actual audits, and write reports, on the company's Quality Management System

Course duration:

- 24 hours

Materials Provided:

- Copy of the presentation and course materials
- Examples of audit checklist, objective evidence, etc.
- Hard copy of ISO/TS 16949:2009

Notes:
If participants in this course have already completed "Understanding ISO/TS 16949:2009" or equivalent, course duration could be reduced to 16 hours.

The course meets all the requirements of Chrysler, Ford, and General Motors "Specific Requirements for Internal Auditors"

AS 9100c:2009 Courses and Workshops

AS 9100:2004 is the Quality System Standard developed by the International Aerospace Quality Group (IAQG) for the development and manufacture of Aerospace related products. The standard, published and overseen by the Society of Automotive Engineers (SAE) is based on ISO 9001:2000. It includes requirements necessary to address both civil and military aviation and aerospace needs. The industry-developed common quality management system requirements within the standard will ensure a consistency of approach throughout the supply chain, both nationally and internationally.

Once your company has become compliant to this standard you may choose to, or your customer may require you to, attain 3rd party registration (certification) to the standard. The following training and workshops will assist your company in attaining this compliance and the resulting registration

If your company is already compliant to ISO 9001:2008 the following course duration times may be reduced.

AS 9100c:2009 Management Overview

This course is intended for Top and Middle Management personnel who will be making the initial decisions, and supporting the implementation of AS 9100:2009 This course is also useful for anyone who wants to gain a general understanding of the standard and its basic requirements.

Coursework covers:

- The history of ISO, SAE, IAQG, and International Environmental Systems
- The benefits of AS 9100:2009 compliance
- The fundamental requirements of AS 9100:2004
- Review of the differences between ISO 9001:2008 and AS 9100:2009
- Customer requirements for AS 9100:2009 compliance
- Discussion on the 3rd party registration process
- Implementation examples, scenarios, timelines, etc.

Course Outcomes:

- Supply Management a fundamental understanding of AS 9100:2009
- Ensure their understanding of the resources need for implementation
- Explain Top Managements role in the support of a AS 9100:2009 Environmental Management System
- Understand the benefits of AS 9100:2009 compliance

Course duration:

- 2-4 hours

Materials Provided:

- Copy of the presentation materials

Implementing AS 9100c:2009 Workshop

This workshop is intended for those personnel who will be a member of the implementation team for the companies AS 9100:2009 Environmental Management Systems. This workshop covers all the coursework described in "AS 9100:2009 Management Overview" with the addition of workshop activities that begin to identify, document, and develop the actual documented Environmental Management System.

Coursework covers:

- " AS 9100:2009 Management Overview" coursework material
- Review of recommended document formats
- Outline and initial development of the Quality Manual
- Identification and initial development of processes and procedures required by the standard
- Identify and establish both document and records control procedures
- Identify all needed work instructions, records, etc.
- Documentation of a plan, with required tasks, for continued development

Course Outcomes:

- "AS 9100:2009 Management Overview" outcomes
- Identify these participants as the subject matter experts for the companies Environmental Management System.
- Established documentation formats for the companies Environmental Management System
- Initial development of all manuals and procedures required by the standard
- Documentation of a plan and a timeline for continued development

Course duration:

- 16+ hours

In many cases the company will work with the instructor to schedule follow up visits for continued coaching as the system is developed

Materials Provided:

- Copy of the presentation materials
- Example document formats, etc.
- Hard copy of AS 9100:2009 is recommended

Note: Published copies of AS 9100:2009 are recommended for each participant at ISO list prices. www.sae.org

Automotive Core Tools Courses and Workshops

"Automotive Core Tools" is a general title used to describe several tools and methodologies developed, published and required by most automotive OEMs. Implementation and usage of these core tools is required by ISO/TS 16949:2009. Except for PPAP, the associated manuals used in the implementation of these core tools are considered to be "reference" manuals. Although they shall be used by the organization implementing them, they are considered guidance. Organizations have some flexibility in how they use them. This flexibility is discussed in detail during all courses and workshops. The core tools are:

- Advanced Product Quality Planning, (APQP)
- Failure Mode and Effects Analysis (FMEA)
- Statistical Process Control (SPC)
- Measurement Systems Analysis (MSA)
- Production Part Approval Process (PPAP)

Although it is recommended, organizations do not have to be compliant to ISO/TS 16949:2009 to use these core tools. Some OEMs and Tier One suppliers require their suppliers to implement, and use, the core tools regardless of their status of compliance to ISO/TS 16949:2009. Many sectors outside the automotive industry are using these core tools as they realize the benefits of implementation.

All Core Tool workshops, and courses, can be conducted individually or in conjunction with one another. Courses can range from a short 4 hour overview up to a multi day development workshop that may include one, or all, of the core tools. *The duration of courses and workshops is dependent on the needs of your organization and the participants involved*. It is recommended that we discuss your current status with the core tools, and the needs of your organization prior to deciding on course duration and intent.

For Internal Auditors:
ISO/TS 16949:2009 requires that all Internal Auditors have fundamental training in the effective evaluation of all core tools. All courses listed here contain the outcomes that meet those requirements. *If these courses will be for purposes of training Internal Auditors only, all courses listed below can be reformatted into a "Core Tools Workshop" and course duration times can be reduced by as much as 50%.*

APQP Overview

This one day course is intended for those who need a general understanding of the requirements of APQP as they relate to ISO/TS 16949:2009. Participants will review and discuss the implementation techniques, recommended approaches, and the benefits of an effective APQP system. Although this course is not intended to provide a detailed discussion on the remaining core tools, participants will receive a fundamental review of each core tool and its intent.

Coursework covers:

- Review of the requirements of APQP and Control Plans as they relate to ISO/TS 16949:2009
- A detailed review of the APQP reference manual
- Discussion on the 5 phases of APQP
- Review of recommended practices for implementation and sharing of best practices of APQP and Control Plans
- A fundamental discussion on the requirements of the remaining core tools. (FMEA, SPC, MSA, PPAP)

Course Outcomes:

- Supply participants with a understanding of APQP and Control Plans as they relate to ISO/TS 16949:2009
- Be able to explain the format and contents of the APQP reference manual including the 5 phases
- Understand and explain recommended formats for an effective APQP and Control Plan systems
- Have a fundamental understanding of the requirements of the remaining core tools

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials

Note: Published copies of the Advanced Product Quality Planning reference manual are recommended and can be provided for each participant at AIAG member prices. www.aiag.org

APQP How To Workshop

This workshop is intended for those participants who need a detailed understanding of APQP, Control Plans, and the PPAP process. The workshop focuses on the details of the implementation and execution of the APQP process for a new product or major changes to an existing product. The workshop is designed to use an existing product currently supplied to a customer as a case study. During the course participants will use this existing product, and the associated documentation, (FMEAs, PPAPs, etc.) for activities and discussion. A detailed review of the PPAP process, and manual, will also be conducted.

Coursework covers:

- All the course work covered in "APQP Overview"
- A detailed review of implementation formats and techniques
- Activities and a detailed review of each of the remaining core tools
- Development activities based around effective Control Plan development
- Discussion of the importance and benefits of proper identification of special product and process characteristics
- Activities based around the proper linkage of these special product and process characteristics within the APQP document system
- A detailed review of the PPAP manual, and the resulting process
- Review and discussion of customer specific requirements for APQP

Course Outcomes:

- Understand the fundamental requirements of APQP and all remaining Core Tools
- Be able to lead the organization in the proper conduct of the APQP process
- Be able to develop, and explain, effective Control Plans
- Know how to identify, and explain the importance of, special product and process characteristics
- Understand the importance of the proper linkage of APQP documentation
- Be able to conduct, and prepare, a PPAP package for submission to the customer
- Explain the importance of the identification of customer specific requirements during the APQP process

Course duration:

- 16-24 hours

Materials Provided:

- Copy of the presentation materials
- Copies of both the APQP reference manual and PPAP requirements manuals

Note: Published copies of the Advanced Product Quality Planning reference manual and PPAP are provided for each participant at AIAG member prices. www.aiag.org

PPAP Overview

This 4 hour course is intended for those who need a general understanding of the requirements of PPAP as they relate to ISO/TS 16949:2009. Participants will receive a detailed review of the PPAP manual and discuss the proper conduct of the PPAP process. Discussion will also take place on the proper format of the PPAP package, for both electronic, and hard copy submission to the customer. Customer specific requirements for PPAP will also be discussed. Although all the remaining core tools will be discussed, this course is not intended to give participants a detailed understanding of those core tools.

Coursework covers:

- Review of the fundamental requirements of PPAP
- A detailed review of the PPAP requirements manual
- Discussion on the proper conduct of the PPAP process
- Review of best practices for organizing, and submitting a PPAP package to the customer
- Discuss customer specific requirements for the PPAP process

Course Outcomes:

- Understand the fundamental requirements of PPAP
- Be able to explain the PPAP manual format to others
- Explain the PPAP process, and package format to others
- Know how to attain customer specific requirements for PPAP

Course duration:

- 4 hours

Materials Provided:

- Copy of the presentation materials

Note: Published copies of the Production Part Approval Process (PPAP) manual are recommended and can be provided for each participant at AIAG member prices. www.aiag.org

FMEA Workshop

This workshop is intended for those participants who need a detailed understanding of the Potential Failure Mode and Effects Analysis (FMEA) process. The workshop focuses on both DFMEA and PFMEA. Recommended participants should be both Product and Process Designers and Engineers. Others within the organization who will support the process, such as Quality and Management personnel, are encouraged to attend.

The workshop focuses on how FMEAs should be used during product and process development to identify function, potential failure of that function, effect of that failure on the customer(s), current controls in place to prevent that failure, and prioritization of recommended actions during the development/prototype process. Existing FMEAs on current products and processes are recommended for use during the workshop as case studies.

Coursework covers:

- A detailed review of the requirement of DFMEA and PFMEA as it relates to ISO/TS 16949:2009
- A detailed review of the FMEA manual
- Activities and discussion to reinforce that FMEA is the fundamental cornerstone of all product and process development activity
- Activities and discussion on the proper development of FMEAs early in the process
- The use of existing failure mode data on current products and processes for the development of new FMEAs
- Discussion on different FMEA formats that can be used
- A review of customer specific requirements for FMEA

Course Outcomes:

- Understand the fundamental requirements of FMEA as they relate to ISO/TS 16949:2009
- Be able to explain to other the importance of early FMEA development
- Know how to develop, and use, FMEAs for proper identification and control of potential failure modes in both products and processes.
- Understand the different formats that can be used in FMEA development and how they can benefit your organization
- Understand any customer specific requirements for FMEA

Course duration:

- 8-16 hours

Materials Provided:

- Copy of the presentation materials
- Copies of the FMEA reference manual

Note: This course can be customized depending on your organizations design responsibility for DFMEA, PFMEA, or both.

Published copies of the FMEA reference manual are provided for each participant at AIAG member prices. www.aiag.org

Statistical Process Control (SPC)

This 8 hour course is intended for those who need a detailed understanding of the implementation and usage of SPC in the manufacturing process. Recommended participants should be Quality personnel or others that may be responsible for the identification and implementation of product and process control. Through discussion and activities participants will learn the fundamentals of the planning, collection, and analysis of product and process data using variable control charts (Xbar&R) and process capability (Cpk/Ppk) calculations. The course content is based on the SPC reference manual published by AIAG for the automotive industry.

Coursework covers:

- Review of the fundamental requirements of SPC as they relate to automotive production part manufacturing
- Learn how SPC for data collection is identified on the control plan
- Learn how to construct, and use, histograms and Xbar&R charts
- Learn how to calculate, and when to use, Cpk and Ppk data
- Review the fundamentals of attribute control charts
- Discuss customer specific requirements for SPC and the PPAP process

Course Outcomes:

- Understand the fundamental of SPC as they relate to the automotive industry
- Explain how the control plan is used to identify SPC
- Understand and explain how to develop and use Xbar&R charts
- Be able to explain Cpk/Ppk to others and perform the basic calculations
- Know the fundamental usage of attribute control charts
- Be able to identify customer specific requirement for SPC

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials

Note: Published copies of the Statistical Process Control reference manual are recommended and can be provided for each participant at AIAG member prices. www.aiag.org

Measurement Systems Analysis (MSA/GRR)

This 8 hour course is intended for those who need a detailed understanding of the implementation and usage of MSA/GRR in the automotive industry. Recommended participants should be Quality personnel or others that may be responsible for the identification, implementation, and proper conduct of MSA/GRR. Through discussion and activities participants will learn the fundamentals of MSA/GRR in both average, (short) and average range, (long) methods. Other analytical methods for attribute gauges and ANOVA will be discussed. The course content is based on the MSA reference manual published by AIAG for the automotive industry.
It is highly recommended that current parts produced by the organization, and their related gauges, be used for case studies and activities during the course.

Coursework covers:

- Review of the fundamental requirements of MSA as they relate to automotive production part manufacturing
- Be able to explain the benefits of understanding variation in the measurement system
- Learn how MSA requirements are identified during the APQP process
- Learn how to conduct both the average, and average and range, method for variable data
- Discuss the techniques for MSA using attribute data
- Review other customer specific requirements such as ANOVA

Course Outcomes:

- Understand the fundamental of MSA as they relate to the automotive industry
- Know, and explain to other, the benefits of MSA
- Be able to identify MSA requirements during the APQP process
- Be able to conduct both the short and long methods of MSA/GRR
- Understand the fundamentals of attribute MSA/GRR studies and customer specific requirements

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials

Note: Published copies of the Measurement Systems Analysis reference manual are recommended and can be provided for each participant at AIAG member prices. www.aiag.org

Improvement Methodologies for all Business Systems and Core Tools

Even if your organization is not compliant to International Systems such as ISO 9001:2008 or ISO/TS 16949:2002, these Improvement Methodologies can be used to improve your competitive edge. Successful organizations realize that these methodologies are the corner stone for continual improvement which, not only a requirement by customer but, are a requirement for them to become and stay successful.

These Improvement Methodologies can be implemented in conjunction with one another, or individually. They can be used to satisfy both external customer requests and your own needs for improvement. The order in which they appear in this catalog are typically the order that an organization should consider their implementation

Control Planning Workshop

This one day course is intended for those who need a detailed understanding of the requirements of control plans as they relate to ISO/TS 16949:2009, and the automotive industry. Participants will review and discuss the implementation techniques, recommended approaches, and the benefits of an effective control planning system. Quality and auditing personnel are also recommended to attend. Organizations may choose to conduct this in conjunction with Error Proofing. Course duration would be adjusted.

Coursework covers:

- Review of the requirements of APQP and Control Plans as they relate to ISO/TS 16949:2009
- A detailed review of the requirements of control plans for prototype, pre launch and production
- Activities for understanding and development of control plans
- Review of recommended practices for implementation and sharing of best practices of Control Plans
- How control plans relate to the APQP, PPAP and Auditing processes

Course Outcomes:

- Supply participants with a understanding of APQP and Control Plans as they relate to ISO/TS 16949:2009
- Be able to explain the format and contents of the APQP reference manual including the 5 phases
- Understand and explain recommended formats for an effective APQP and Control Plan systems
- Have a fundamental understanding of the requirements of the remaining core tools

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials

Note: Published copies of the Advanced Product Quality Planning reference manual are recommended and can be provided for each participant at AIAG member prices. www.aiag.org

Error Proofing Workshop

This workshop is intended for both product and process engineers who are responsible for making decision on those designs. The workshop covers the basic definitions of error proofing, mistake proofing, and Poka-yoke. Through discussion, examples, and activities, participants will learn effective techniques for identifying error proofing opportunities and implementing those techniques. Also how to identify opportunities for improvement when a product nonconformance has been identified

Coursework covers:

- The fundamental definitions of error proofing
- A detailed review of implementation formats and techniques
- Review of several examples of error proofing for both products and processes
- Activities centered around case studies to help participants identify opportunities for error proofing
- Error proofing as it relates to both ISO 9001 and ISO/TS 16949
- Discussion on when, and how, error proofing should be implemented during the DFMEA and PFMEA process

Course Outcomes:

- Be able to explain the fundamental differences between error proofing, mistake proofing, and Poka-Yoke
- Discuss how error proofing should be used during the planning process for both product and process design
- Learn how to identify error proofing opportunities during design, and after nonconformances have been identified
- Discuss how error proofing techniques satisfy many requirements of ISO/TS 16949:2009

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials

Effective Problem Solving

Also referred to as:

Corrective Actions, Corrective and Preventive Actions, Root Cause Analysis, 8D, 7 Step, and 5 Why.

This workshop is based on the AIAG published "CQI-10" Effective Problem Solving" guideline. This guideline, published in 2006, is the result of efforts by the automotive industry to establish a common guideline for corrective and preventive actions, and effective problem solving. The guideline meets all the *fundamental requirements* of ISO 9001:2008, ISO 13485:2003, AS 9100c, ISO/TS 16949:2009, and all known OEM requirements such as 8D, 7 Step, 5 Why, etc. Although some of these OEMs may require response to nonconformances in their specific format, this guideline established a baseline process that can be used within your organization.

Coursework covers:

- A detailed review of the CQI-10 manual
- How to conduct a problem solving survey (assessment) in your organization
- Discussion on how to change the culture of problem solving within your organization
- Recommended formats for corrective action response
- Review of tools and techniques for effective root cause identification and analysis
- Group activities based on case studies to reinforce the recommended process

Course Outcomes:

- Explain how CQI-10 is considered the base line for all problem solving activities
- Know how to conduct a survey of your organization to identify the current culture, and recommend improvements
- Understand how best in class companies approach effective problem solving
- Be able to identify the proper tools for effective root cause identification and analysis
- Be able to explain to others how to use the recommended formats

Course duration:

- 8-16 hours depending on need

Materials Provided:

- Copy of the AIAG CQI-10 guideline manual
- Activity packet with case studies

Cost of Quality

This workshop is intended for those participants who need a detailed understanding of the Cost of Quality process. Recommended participants should be those who will identify and assess cost of quality metrics within the organization. Others within the organization who will support the process, such as Quality and Management personnel, are encouraged to attend.

Coursework covers:

- Review of the Quality Cost Model that includes Prevention Costs, Appraisal Costs, Internal Failure Costs and External Failure Costs.
- Where Cost of Quality fits into Quality Management Systems such as ISO 9001 and ISO/TS 16949
- How to identify a listing of the Quality Costs present within your organization across the four cost categories.
- Detailed discussion on how to analyze cost of quality data identified within you organization
- Understand the tools that can be used to support a Cost of Quality program.
- How to implement a effective cost of quality system within your organization

Course Outcomes:

- Be able to explain the cost of quality model to others in your organization
- Understand how an effective cost of quality system meets many requirements of your QMS
- Know how to analyze, and present, cost of quality data to management
- Be able to design, and recommend an effective cost of quality system to work within your organization

Course duration:

- 8 hours

Materials Provided:

- Copy of the presentation materials

Five S

This one day workshop is intended to give participants the fundamental education required to begin their journey to Five S and eventually, Lean Manufacturing. Through lecture and activities participants will learn the basics of Sorting, Simplifying, Systematic Cleaning, Standardizing, and Sustaining. As time, and production, permits participants will form teams and begin to identify potential areas for a Five S project, establish a communications board for that area, start "Sorting" and develop a plan for the remaining 4 S's.

Coursework covers:

- A fundamental review of the basics of Five S
- Discussion and activities on how to identify areas for improvement with Five S
- Review of examples and case study information for each of the Five S's
- Recommended techniques for establishing, and maintaining a effective Five S philosophy within your organization
- Recommended techniques for communicating Five S within your organization
- Initial identification of areas for Five S focus, and initial sorting of that area

Course Outcomes:

- Understand the fundamental of Five S
- Explain to other how Five S is the foundation of Lean Manufacturing
- Be able to identify areas for Five S improvement
- Understand how to begin, and complete, a Five S project
- Be able to explain to other, the benefits or Five S
- Explain how Five S meets many internal and external requirements for Lean, corrective actions, continual improvement, etc.

Course duration:

- 8 hours

Note: Participants may want to schedule a follow up session(s) with the instructor for continued Five S implementation and management support

Lean Manufacturing

This one day workshop is intended to give participants the fundamental awareness to begin their journey down the road of Lean Manufacturing. Through lecture and activities participants will learn the basics of Lean Manufacturing and the tools and techniques used in that journey. Participants will learn the basics of Stability, Continuous Flow, Synchronized Production, value stream mapping and pull systems. *This workshop is intended to be the first step, and sets the foundation, for further more advanced implementation workshops.*

Coursework covers:

- Review of the fundamentals of Lean Manufacturing
- Discussion on many of the lean tools such as Just-In-Time delivery, pull systems, takt time, standardized work, and visual factory
- Discuss techniques for implementation of a lean philosophy and management support of that philosophy
- Review case studies of successful organizations that have implemented the lean philosophy

Course Outcomes:

- Be able to explain to others the fundamentals, and benefits, of lean manufacturing
- Understand how each of the main lean tools are used
- Know the basics on how to identify and select the proper lean tools for further implementation within your organization
- Be able to discuss, and use these tools with further lean workshop events

Course duration:

- 8-16 hours

Materials Provided:

- Copy of the presentation materials

Six Sigma – Green Belt Overview

This one half to one day workshop is intended to give participants a fundamentals understanding of Six Sigma, as it relate to "Green Belt" Status. Management and those who will support the process are also recommended to attend. Through lecture and activities participants will learn how the DMAIC model is used for Six Sigma implementation. A fundamental review of all of the common tools used during the DMAIC process will be learned through activities and review of case study information. *This workshop is intended to be the first step, and sets the foundation, for further more advanced implementation workshops.*

Coursework covers:

- The fundamentals and benefits of a Six Sigma philosophy
- A detailed review and the DMAIC model
- A fundamental review of all tools and techniques recommended by the DMAIC model
- Identification of the right projects for the application of Six Sigma
- Discussion on how companies begin, and continue, the Six Sigma philosophy
- Discussion on recommended next steps in the Six Sigma process

Course Outcomes:

- Understand the fundamental and benefits of Six Sigma
- Be able to explain the DMAIC model, and the techniques contained within it, to others
- Understand how many of the improvement tools currently used within your organization can be used to support the process
- Understand how to select the proper project for Six Sigma
- Explain how Six Sigma meets many internal and external requirements for Lean, corrective actions, continual improvement, etc.

Course duration:

- 4-8 hours

Materials Provided:

- Copy of the presentation materials

Note: Organizations may want to schedule a follow up session(s) with the instructor for continued Six Sigma implementation.

Six Sigma – Implementation Workshop

This three to five day workshop is intended to give participants the skills needed to identify and conduct a complete Six Sigma Project, as it relates to "Green Belt" Status. Participants will learn the DMAIC model and how it will guide them through a project. During the initial three days participants will identify a green belt project, write a project charter, present it to management for approval, and begin the initial data collection and root cause analysis process. Participants will also identify additional project tasks including a timeline for project completion. Days four and five can be conducted in sequence with the initial three days or delayed to allow participants time to complete the entire data collection process and solution identification on their own. The instructor will coach the participants on day four and five with project implementation and presentation to management. Depending on their depth, some projects may be completed in the five day schedule, others may take additional time. This will depend on business/customer constraints, project costs, etc.

Workshop covers:

- A detailed understanding of the Six Sigma process
- A detailed review and the DMAIC model
- Experience using all the tools in the DMAIC model for green belt projects
- Identification of a six sigma project
- Writing of a project charter including presentation to management for approval
- Identification and collection of data on the existing process
- How to use the DMAIC tools to measure, analyze, improve, and control the new and improved process

Course Outcomes:

- A detailed understanding of the six sigma DMAIC model
- Be able to conduct a six sigma green belt project to completion
- Be able to coach others in the DMAIC green belt process
- Understand how to explain to management the requirements, implementation process, and tasks required to complete a green belt project
- Be able to continue to support the six sigma process in their organizations and train other in the DMAIC model

Course duration:

- 24-40 hours

Materials Provided:

- Copy of all courseware materials including handouts

Special Process Assessment
CQI-9 Heat Treating
CQI-11 Plating
CQI-12 Coating

These one day workshops are based in the current versions of the AIAG Special Process assessment guidelines. They are intended to give auditors and assessors within your organization the skills needed to assess your current special process systems as required by many automotive OEM's. Participants will receive a detailed review of one, or all three of the assessment documents, depending on the needs of your organization

Coursework covers:
- A detailed review of the special process documents
- Discussion and activities on completing a system assessment
- Discussion and activities on completing a Job Audit
- Learn how to complete the assessment checklist and submit them to your customers
- How to use the assessment tools for your suppliers of these special processes

Course Outcomes:
- Understand the background of the special process assessment
- Be able to explain to others how to use the checklist contained within the documents
- Be able to conduct a complete system assessment, Job Audit, and submit them to your customer
- Learn how these assessment fit within your current quality system assessments

Course duration:
- 8 hours

Materials Provided:
- Copy of the presentation and activity materials
- Copy of the CQI 9, CQI-11, and/or CQI-12 documents

Note: If you are a customer, or supplier of two to three of these services, the courses can be conducted as one and the course time will be adjusted.
Copies of the CQI-documents will be provided at AIAG member prices from www.aiag.org

Blue Print Reading

This one day seminar covers the basics of how to read, and interpret blue prints and common product drawings. Recommended participants are those manufacturing and quality personnel that will have to interpret, and use, product drawings. Through lecture, activities, and drawing examples, participants will learn the basics of orthographic projection, identification of primary and section view, line formats, dimensioning and tolerancing, and proper drawing note interpretation. Geometric Dimensioning and Tolerancing symbols are also introduced.

Coursework covers:
- Definitions and examples of both isometric, and orthographic pictorials
- A detailed understanding of third angle projection and it uses
- The sequence of reading, and interpreting an orthographic drawing
- Proper interpretation of section views, general notes, tolerances, and dimensions
- Review of drawing examples supplied by the instructor, and/or your organization (pdf format recommended)

Course Outcomes:
- Understand the differences between isometric and orthographic drawings
- Know how to use third angle projection for the proper interpretation of drawing views
- Be able to identify, and explain to other the proper sequence of reading an engineering drawing
- Know how to interpret lines, title blocks, general notes, dimensions and tolerances

Course duration:
- 8 hours

Materials Provided:
- Copy of the presentation materials

Note: Organizations are encouraged to have examples of their product drawings for use as example and case study during the session

Geometric Dimensioning and Tolerancing (GDT)

This two to three day workshop is intended for those product designers, manufacturing personnel, and quality staff that need to both specify, and interpret GDT. All workshop materials and discussion are based on the American National Standard, ASME Y14.5:1994. Through lecture and activities participants will learn the fundamentals of the 14 GDT symbols and how they are used, datums and datum schemes, feature control frames, maximum material condition, fixed and floating fastener tolerance calculation, etc. *This course should be customized to meet the needs of your organization. A one day session for general information, up to a multi day development workshop using your specific drawings.*

Coursework covers:

- Fundamental review of the ASME Y14.5:1994 GDT standard
- Detailed review of all GDT symbols
- How to properly specify, and interpret each symbol
- The proper methodology for reading and feature control frame
- The proper way to inspect each symbol and the resulting tolerance
- Specifying and interpreting datums
- Detail discussion of maximum material condition, how and when to use it

Course Outcomes:

- Be able to explain the ASME standard and how to use it
- Understand, interpret, and specify the 14 GDT symbols
- Know how to read and interpret the entire feature control frame
- Be able to interpret datums
- Fundamentally understand how to inspect each of the 14 symbols
- Be able to interpret, and use maximum materials condition

Course duration:

- 16-24 hours

Materials Provided:

- Copy of the presentation materials

Notes: Organization are encouraged to have electronic (pdf) copies of their drawings for use in the class.
Copies of the ASME standard can be provided if requested from www.asme.org