RESOURCES FOR THE NUCLEAR INDUSTRY

ASME.ORG

The American Society of Mechanical Engineers®
ASME®

ASME
SETTING THE STANDARD

ASME Customer Care
Phone: 1.800.843.2763 (U.S./Canada, toll free)
001.800.843.2763 (Mexico, toll free)
1.646.616.3100 (outside North America)
Email: CustomerCare@asme.org
Web: www.asme.org

ASME has been addressing real world challenges for over 130 years.

ASME helps the global engineering community develop solutions to real world challenges. Founded in 1880 by a group of leading industrialists, ASME has grown through the decades to include more than 140,000 members in over 150 countries, ranging from college students and early-career engineers to corporate executives, and all levels of engineer in between. ASME is an international not-for-profit professional organization that enables collaboration, knowledge sharing and skill development across all engineering disciplines, while promoting the vital role of the engineer in society.

For over 130 years, ASME codes & standards, conformity assessment programs, certification programs, training & professional development programs, publications, and conferences have provided a foundation for advancing technical knowledge and a safer world.

ASME is proud of its unprecedented contributions to the Nuclear Power Industry:

- Half of the world's nuclear power plants incorporate all or portions of ASME codes and standards in their construction, operation and/or maintenance
- 60 countries recognize and apply the ASME Boiler and Pressure Vessel Codes
- 30 nations purchase their nuclear components to specifications in ASME nuclear codes and standards
- Companies in 20 countries are ASME nuclear certificate holders
- ASME provides training to over 10,000 professionals each year
- We offer a large selection of publications to suit multiple technical and professional needs
- Over 30 technical conferences each year to keep you informed on current trends and new developments

Don't let the "A" in ASME fool you.

Innovation, commerce and the engineering activities that drive it are a global operation...and so is ASME. With offices and activities around the globe, we strive to operate where you do business, ensuring that the myriad of technical interests of our clients, members and the worldwide engineering community are met.

Table of Contents

Setting a Worldwide Standard CODES AND STANDARDS

When ASME's founders – prominent industrialists and technical innovators of the nineteenth century – gathered for the first time in 1880, the main topic of discussion centered on the need for standardized tools and machine parts as well as uniform work practices in the dawning industrial age. Engineering standards, the founders agreed, would ensure safety, reliability and operational efficiency in machine design and mechanical production. ASME issued its first standard, Code for the Conduct of Trials of Steam Boilers, in 1914, starting a development process that has grown to more than 500 codes and standards.

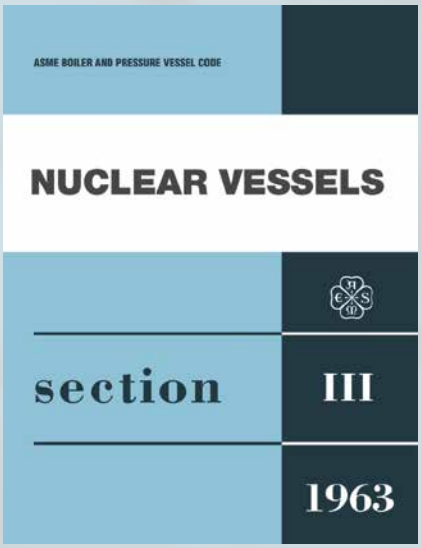
Nuclear Industry Contact

Allyson Byk
S&C Project Engineering Advisor
Nuclear Codes and Standards

Phone: + 1.212.591.8539
Email: byka@asme.org
Web: www.asme.org

We were there at the start of the nuclear power industry.

ASME has played a vital role in supporting the nuclear power industry since its inception, when ASME codes, standards and conformity assessment programs originally developed for fossil fuel fired power plants were applied to nuclear power plant construction. By 1963, ASME had developed its first code and conformity assessment program specifically for nuclear power plants.



Cover of the first ASME nuclear code.

When the U.S. Atomic Energy Commission published its proposal to amend regulations in 1969 – effectively establishing minimum quality standards for nuclear power plant design, fabrication, erection, construction, testing and inspection – ASME subsequently expanded its mechanical and multidisciplinary engineering codes, standards and conformity assessment programs to cover areas such as:

- Rules for Construction of Nuclear Facility Components
- Rules for Inservice Inspection of Nuclear Power Plant Components
- Operations and Maintenance
- Qualification of Mechanical Equipment
- Nuclear Air and Gas Treatment
- Nuclear Quality Assurance
- Nuclear Risk Management
- Cranes for Nuclear Facilities

ASME Nuclear Codes and Standards exist to ensure public safety, support global trade, develop technology and foster knowledge transfer while easing government's regulatory burden.

By uniting technical and quality requirements – enhanced by a time-proven consensus approach to decision making – ASME develops standards which can be adopted, applied and accepted universally.

With offices in Asia, Europe, India and North America, ASME is extremely well positioned to continue its historical support of the nuclear power industry.

ASME Boiler and Pressure Vessel Code Sections

Section I - Power Boilers

Section II - Materials

- Part A - Ferrous Material Specifications
- Part B - Nonferrous Material Specifications
- Part C - Specifications for Welding Rods Electrodes and Filler Metals
- Part D - Properties (Customary)
- Part D - Properties (Metric)

Section III - Rules for Construction of Nuclear Facility Components

Subsection NCA — General Requirements for Division 1 and Division 2

Appendices

Division 1
Subsection NB — Class 1 Components
Subsection NC — Class 2 Components
Subsection ND — Class 3 Components
Subsection NE — Class MC Components
Subsection NF — Supports
Subsection NG — Core Support Structures

Division 2 — Code for Concrete Containments

Division 3 — Containment Systems for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Material

Division 5 — High Temperature Reactors

Section IV - Rules for the Construction of Heating Boilers

Section V - Nondestructive Examination

Section VI - Recommended Rules for the Care and Operation of Heating Boilers

Section VII - Recommended Guidelines for the Care of Power Boilers

Section VIII - Rules for Construction of Pressure Vessels

Division 1
Division 2 — Alternative Rules
Division 3 — Alternative Rules for Construction of High Pressure Vessels

Section IX - Welding, Brazing, and Fusing Qualifications

Section X - Fiber-Reinforced Plastic Pressure Vessels

Section XI - Rules for Inservice Inspection of Nuclear Power Plant Components

Section XII - Rules for Construction and Continued Service of Transport Tanks

Code Cases: Nuclear Components

Code Cases: Boilers and Pressure Vessels

ASME Boiler and Pressure Vessel Code Sections

CONSTRUCTION OF NUCLEAR FACILITY COMPONENTS

Section III – Rules for Construction of Nuclear Facility Components

Provides general requirements which address the material, design, fabrication, examination, testing and overpressure protection of the items specified within each respective Subsection, assuring their structural integrity.

Subsection NCA (Divisions 1 & 2)
Subsection NCA, which is referenced by and is an integral part of Division 1 and Division 2 of Section III, covers requirements for quality assurance, certification, and authorized inspection for Class 1, 2, 3, MC, CS and CC construction.

Division 1, Subsections NB, NC and ND
Subsection NB addresses items which are intended to conform to the requirements for Class 1 construction.

Subsection NC addresses items which are intended to conform to the requirements for Class 2 construction.

Subsection ND addresses items which are intended to conform to the requirements for Class 3 construction.

Division 1 – Subsection NE

Subsection NE addresses items, which are intended to conform to the requirements for Class MC construction.

Division 1, Subsection NF

Subsection NF addresses the supports, which are intended to conform to the requirements for Classes 1, 2, 3, and
MC construction.

Division 1, Subsection NG
Subsection NG addresses structures, which are designed to provide direct support or restraint of the core (fuel and blanket assemblies) within the reactor pressure vessel.

Division 2
Division 2 (ACI Standard 359) addresses design and construction of reinforced and pre-stressed concrete containment structures with metallic liners. These requirements are applicable only to those components that are designed to provide a pressure retaining or containing barrier.

Division 3
Division 3 addresses the design and construction of the containment systems, including internal support structures, used for the transportation and/or storage of spent nuclear fuel and high-level radioactive material.

Division 5
Division 5 provides rules for the construction of high temperature reactors, including high temperature gas-cooled reactors, liquid metal cooled reactors, and molten salt reactors.

Appendices
Section III Appendices contain both mandatory and non-mandatory appendices referenced by all Divisions of Section III. The mandatory appendices contain requirements for construction (e.g., design and design analysis methods, Data Report Forms), while the non-mandatory appendices provide additional information or guidance for the use of Section III (e.g., guidance on preparing a Design Report).

Referenced BPVC Sections

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-V
Section V, Nondestructive Examination.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

BPVC-XI
Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components.

Referenced ASME Standards

Three Standards from the B1 Series on screw threads.

Eight Standards from the B16 Series on pipe flanges and fittings.

Three Standards from the B18 Series on hex bolts.

B36.10M – Welded and Seamless Wrought Steel Pipe.

B36.19M – Stainless Steel Pipe.

NQA-1 – Quality Assurance Program Requirements for Nuclear Facilities.

QAI-1 – Qualifications for Authorized Inspection.

NUCLEAR INSERVICE

Section XI – Rules for Inservice Inspection of Nuclear Power Plant Components

Provides rules for the examination, inservice testing and inspection, and repair and replacement of components and systems in light water cooled nuclear power plants. Application of Section XI begins when the requirements of the "construction code" (e.g., Section III) have been satisfied.

Section XI constitutes requirements to maintain the nuclear power plant while in operation and to return the plant to service, following plant outages, and repair or replacement activities. These rules require a mandatory program of scheduled examinations, testing, and inspections to evidence adequate safety. The method of nondestructive examination to be used and flaw size characterization are also contained within this Section.

Referenced BPVC Sections

BPVC-II, A, B, C, D
Section II, Materials, Parts A through D.

BPVC-III
Section III, Rules for Construction of Nuclear Facility Components:

Subsection NCA, General Requirements for Division 1 and Division 2.

Subsection NB, Class 1 Components.

Subsection NC, Class 2 Component.

Subsection ND, Class 3 Components.

Subsection NE, Class MC Components.

Subsection NF, Supports.

Subsection NG, Core Support Structures.

Appendices.

Division 2-Code for Concrete Containments.

Division 3-Containment Systems for Transportation and Storage of Spent Nuclear Fuel and High-Level Radioactive Material

Division 5, High Temperature Reactors.

BPVC-V
Section V, Nondestructive Examination.

BPVC-VIII-1-2
Section VIII, Pressure Vessels, Division 1 and Division 2.

BPVC-IX
Section IX, Welding, Brazing, and Fusing Qualifications.

Referenced ASME Standards

NQA-1
Quality Assurance Requirements for Nuclear Facilities Applications (QA).

QAI-1
Qualifications for Authorized Inspection.

RA-S
Standard for Level 1 / Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications.

ASME Boiler and Pressure Vessel Code Sections continued

NQA-1

Quality Assurance Requirements for Nuclear Facility Applications (QA).

Provides requirements and guidelines for the establishment and execution of quality assurance programs during siting, design, construction, operation and decommissioning of nuclear facilities. This Standard reflects industry experience and current understanding of the quality assurance requirements necessary to achieve safe, reliable, and efficient utilization of nuclear energy, and management and processing of radioactive materials.

NQA-1 focuses on the achievement of results, and emphasizes the role of the individual and line management in the achievement of quality. It fosters the application of these requirements in a manner consistent with the relative importance of the item or activity.

SERVICE SECTIONS / CODE CASES

Section II – Materials

Part A covers Ferrous Material; Part B covers Nonferrous Material; Part C covers Welding Rods, Electrodes, and Filler Metals; and Part D covers Material Properties in both Customary and
Metric units of measure.

Together, these four parts of Section II comprise a "service Code" to other BPVC Sections, providing material specifications adequate for safety in the field of pressure equipment. These specifications contain requirements for chemical and mechanical properties, heat treatment, manufacture, heat and product analyses, and methods of testing. Part A and Part B specifications are designated by SA or SB numbers, respectively, and are identical with or similar to those of specifications published by ASTM and other recognized national or international organizations. Part C specifications are designated by SFA numbers and are derived from AWS specifications.

Section V – Nondestructive Examination

Is another "service Code" – containing requirements and methods for nondestructive examination which are referenced and required by other BPVC Sections. It also includes manufacturer's examination responsibilities, duties of authorized inspectors and requirements for qualification of personnel performing inspections and examination. Examination methods are intended to detect surface and internal discontinuities in materials, welds, and fabricated parts and components. A glossary of related terms is included.

Section IX

Welding, Brazing, and Fusing Qualifications

Is another "service Code" – containing rules relating to the qualification of welding, brazing, and fusing procedures as required by other BPVC Sections.
It also covers rules relating to the qualification and requalification of welders, brazers, and welding and brazing operators in order that they
may perform welding or brazing in component manufacture. Welding, brazing and fusing data cover essential and nonessential variables specific
to the welding, brazing or fusing process used.

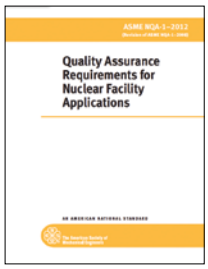
Code Cases – Pressure Technology / Nuclear

The BPVC is revised every two years. But what happens in the interim with new materials or alternative constructions? How does the BPVC keep current with the latest in technology and applications?

Code Cases are approved actions by the BPVC Committees on these alternatives, intended to allow early and urgent implementation of requirements. They are issued four times per year in two categories: Boiler and Pressure Vessels (CC-BPV) and Nuclear (CC-NUC). Users may purchase individual publications at any time. Or they may subscribe to receive full sets of Code Cases as they are published for the duration of that BPVC edition's cycle.

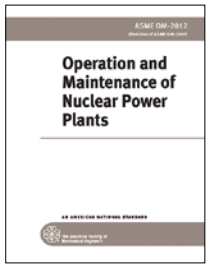
This responsiveness to requests illustrates the unique openness and transparency of ASME's code-development process – striving to reflect best-practices of industry, while contributing to safety for the general public.

Companion Nuclear Codes and Standards



NQA-1 - Quality Assurance Requirements for Nuclear Facility Applications

This Standard provides requirements and guidelines for the establishment and execution of quality assurance programs during siting, design, construction, operation and decommissioning of nuclear facilities. The Standard focuses on the achievement of results, emphasizes the role of the individual and line management in the achievement of quality, and fosters the application of these requirements in a manner consistent with the relative importance of the item or activity.

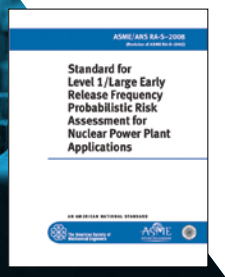


OM - Operation and Maintenance of Nuclear Power Plants

Establishes the requirements for preservice and inservice testing and examination of certain components to assess their operational readiness in light-water reactor power plants. It identifies the components subject to test or examination, responsibilities, methods, intervals, parameters to be measured and evaluated, criteria for evaluating the results, corrective action, personnel qualification, and record keeping.

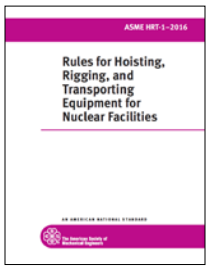
QME-1 - Qualification of Active Mechanical Equipment used in Nuclear Power Plants

Describes the requirements and guidelines for qualifying mechanical equipment, such as pumps, valves, and dynamic restraints whose function is required to ensure the safe operation or safe shutdown of a nuclear facility. The requirements and guidelines presented include the principles, procedures, and methods of qualification.



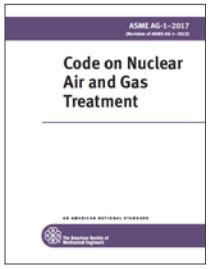
RA-S - Probabilistic Risk Assessment for Nuclear Power Plant Applications (PRA)

This Standard sets forth requirements for probabilistic risk assessments (PRAs) used to support risk-informed decisions for commercial nuclear power plants, and prescribes a method for applying these requirements for specific applications.



HRT-1

"This Standard provides requirements for the design and use of hoisting, rigging, and transporting equipment used in the delivery of nuclear facility components to a nuclear facility's point of receipt and the handling of such components until the start of the facility's operating phase, defined as the point of initial fuel load. The requirements of this Standard are also applicable to the design and use of hoisting, rigging, and transporting equipment for modification at operating nuclear facilities when such equipment is not already controlled by existing facility procedures."



AG-1 - Code on Nuclear Air and Gas Treatment

Provides requirements for the performance, design, construction, acceptance testing, and quality assurance of equipment used as components in nuclear safety-related air and gas treatment systems in nuclear facilities.

N509 - Nuclear Power Plant Air-Cleaning Units and Components

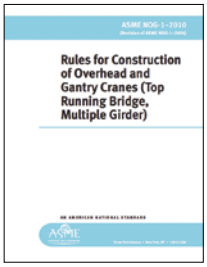
This Standard covers requirements for the design, construction, and qualification and acceptance testing of the air-cleaning units and components which make up Engineered Safety Feature (ESF) and other high efficiency air and gas treatment systems used in nuclear power plants.

N510 - Testing of Nuclear Air-Treatment Systems

This Standard covers field testing of ASME N509 1989 high efficiency air treatment systems for nuclear power plants.

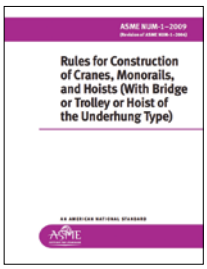
N511 - In-Service Testing of Nuclear Air Treatment, Heating, Ventilating, and Air-Conditioning Systems

This standard covers the requirements for in-service testing of nuclear safety-related air treatment, heating, ventilating, and air conditioning systems in nuclear facilities.



NOG-1 - Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)

This Standard covers electric overhead and gantry multiple girder cranes with top running bridge and trolley used at nuclear facilities and components of cranes at nuclear facilities.



NUM-1 - Rules for Construction of Cranes, Monorails, and Hoists (with Bridge or Trolley or Hoist of the Underhung Type)

This Standard covers underhung cranes, top-running bridge and gantry cranes with underhung trolleys, traveling wall cranes, jib cranes, monorail systems, overhead hoists, and hoists with integral trolleys used in nuclear facilities.

Your Company's Access to the Global Supply Chain ASME CERTIFICATION

their government safety regulations.

The quality systems of more than 7,000 companies in more than 70 countries are currently certified by ASME. Whether or not an ASME Code Symbol Stamp is legally required, it provides users with a high degree of confidence that the stamped items conform to established safety standards.

Core Courses: Nuclear Power Industry Learning Matrix

Explore the wide range of learning solutions that will help you and your colleagues meet the demands of today's increasingly challenging environment, presented in training formats that best fit your business needs and meet your budget and time constraints:

- Public Courses – Discover more than 150 courses ranging from

go.asme.org/certifications

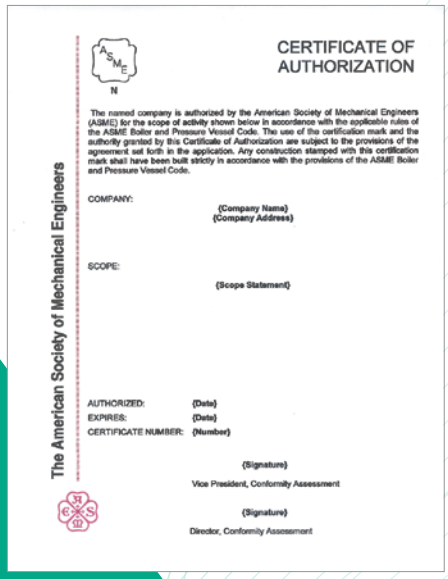
Nuclear Component Certification Program (N, OWN)

The ASME Nuclear Certification Program commenced in 1968.

Certificates Offered:

N-type Certificates of Authorization issued by ASME verify the adequacy of an organization's quality assurance program and allow the Certificate Holder to design, fabricate, and install components and supports used in nuclear power plants and other nuclear facilities. These components will be certified and stamped with the Certification Mark in accordance with Section III of the ASME BPVC. The Society issues six different N-type certificates, and an owner's certificate that authorizes the following scope of activities:

- N – Vessels, pumps, valves, piping systems, storage tanks, core support structures, concrete containments, and transport packaging
- NA – Field installation and shop assembly of all items
- NPT – Parts, appurtenances, welded tubular products, and piping subassemblies
- NS – Supports
- NV – Pressure relief valves
- N3 – Transportation containments, storage containments and their internal support structure
- OWN – Nuclear power plant owner



CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:
{Company Name}
{Company Address}

SCOPE:
{Scope Statement}

AUTHORIZED: {Date}
EXPIRES: {Date}
CERTIFICATE NUMBER: {Number}

{Signature}
Vice President, Conformity Assessment

{Signature}
Director, Conformity Assessment

The American Society of Mechanical Engineers

Nuclear Material Organization Certification Program (QSC)

The Nuclear Material Organization Certification Program certifies organizations that provide materials and services to the nuclear power industry. The rules for this certification program were first introduced in 1973.

Quality System Certificates (QSC) issued by ASME verify the adequacy of a Material Organization's quality system program. This quality system program provides assurance that the organization's operations, processes, and services related to the procurement, manufacture, and supply of material, source material, and unqualified source material are performed in accordance with the requirements of the ASME BPVC, Section III, NCA-3800 and NCA-3900.

Quality System Certificates cover manufacturers and suppliers of the following materials:

- Product Forms – bars, plates, tubular products, forgings, castings, fasteners, flanges, fittings
- Welding Material – electrodes, wires, bars, anchorages, couplings
- Prestressing Systems (Div. 2) – strands, wires, bars, anchorages, couplings
- Semi–finished Product Forms – round, billets, ingots, rods, wires, strips
- Concrete Reinforcing Systems (Div. 2) – bars, splice products

ASME Certification continued

Nuclear Quality Assurance Certification Program (NQA-1)

The NQA-1 Certification program is developed, maintained and administered by ASME and industry subject matter experts serving as volunteers on ASME's committees. Under the program, an ASME audit team will assess a company's quality assurance program. It will make an accurate assessment of a supplier's capability in implementing its QA program in compliance with the NQA-1

standard, and will issue a certificate affirming that the company has been found in compliance.

The NQA-1 Certification Program was developed to help suppliers gain entry into the supply chain and to reduce purchasers' risk, time, and cost of evaluating and qualifying suppliers. An ASME NQA-1 Quality Program Certificate would signify to purchasers that suppliers have a nuclear quality assurance culture in place and whether the QA program has been frozen to a specific edition/ addenda of the NQA-1 Standard or updated to continually meet the latest edition.

There are many program benefits afforded an organization that complete an NQA-1 certification audit:

- Creates a level "playing field" by promoting consistent application of NQA-1 standard within the supply chain
- Ability to freeze a QA Program to a specific NQA-1 Edition – suppliers can now operate to one specific edition instead of multiple editions
- Reduce amount of time, effort and resources in determining compliance with the NQA-1 Standard (10CFR830 Subpart A and 10CFR50 Appendix B)
- Assist new suppliers in gaining entry into the supply chain
- Provides confidence to Owners, and suppliers working with other suppliers, of the supplier's commitment to achieve & verify quality

For more information visit: go.asme.org/nqa-1
or contact Christopher Mahler at +1.973.244.2259

Note: An NQA-1 Quality Program Certificate does not apply to or replace the certification requirements to supply, manufacture, construct and fabricate items falling under the scope of the ASME Boiler and Pressure Vessel Code, Section III, Rules for Construction of Nuclear Facility Components and is not available to an organization for activities pertaining to weaponry and for Owners of facilities handling and/or utilizing nuclear material. An NQA-1 Quality Program Certificate does not prequalify or exempt an organization from a qualification audit being performed by the Purchaser of the items or services provided by the organization.

ASME Nondestructive Examination and Quality Control Inspection Personnel Certification (ANDE)

ASME NDE (ANDE) is a certification program for Non-Destructive Examination (NDE) personnel and quality control (QC) inspectors. ANDE Personnel Certification includes features consistent with other ASME Personnel Certification best-practices. ANDE provides independent, third-party centralized certification for NDE & QC inspection personnel as an alternate option to the historical, employer-based NDE & QC certification systems. ANDE focuses on nuclear in-service inspection and new nuclear construction. ANDE will ultimately expand to include pressure-boundary and structural applications in other industries throughout the globe.

For more information visit: go.asme.org/ande

Over 8,000 Professionals Get Their Training From ASME Each Year

LEARNING & DEVELOPMENT

ASME appreciates that a company's most valuable asset is its workforce. As a recognized leader in workforce learning solutions for engineers and technical professionals, our goal is to help individuals expand their knowledge and organizations develop their core assets.

Our guiding principles are reflected in the depth and breadth of quality, highly accessible courses and training programs, specifically developed to boost technical competence and heighten managerial expertise.

For more information visit:
go.asme.org/training
or contact: Jennifer Delda
Manager, Learning & Development
Phone: (212) 591-7108
Email: DeldaJ@asme.org

Learning & Development continued

fundamental to advanced levels, all led by industry experts

- In-Company – Select from any of our courses to create a customized training program delivered at your company's site, anywhere in the world
- eLearning – Browse our comprehensive portfolio of eLearning programs featuring numerous instructor-led courses, self-study online learning – each accessible from a PC anytime, anywhere
- MasterClasses - Aimed at experienced professionals, MasterClasses are practical, case study-driven training sessions that emphasize learning through discussion of real world case studies and practical applications

ASME Training & Development offers a comprehensive range of workforce learning solutions presented by industry experts:

- ASME-approved, eminently qualified faculty that are involved in the nuclear power industry
- Most code courses taught by ASME Code Committee members who develop the codes and standards and understand and communicate their impact on safety, quality and integrity
- ASME Training & Development is accredited by the International Association for Continuing Education and Training (IACET). ASME Training & Development complies with the ANSI/IACET Standard, which is recognized internationally as a standard of excellence in instructional practices. As a result of this accreditation, ASME Training & Development is authorized to issue the IACET CEU.

ASME Training & Development has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET).

ASME Training & Development conducts courses all over the globe that accommodate budgets, schedules and business requirements – each awarding continuing education units (CEUs) or professional development hours (PDHs) where applicable. Small and large companies, as well as government agencies and regulators use ASME to meet their training needs.

Key for Course Type

LC = Live Course

Online IS = Instructor-Supported eLearning

Online SS = Self-study eLearning

A sample of ASME nuclear workforce learning solutions is summarized on the convenient Nuclear Power Industry Learning Matrix – organized by experience level and functional specialty – with detailed course and program descriptions for the most popular courses in the pages immediately following.

For more information visit:
go.asme.org/training

or contact: Jennifer Delda
Manager, Learning & Development
Phone: (212) 591-7108
Email: DeldaJ@asme.org

Nuclear Power Industry Learning Matrix

	Fundamental	Intermediate	Advanced
Facility Construction	BPV Code, Section III: Introduction (IS) – EL509	BPV Code, Section III, Division 1: Class 1, 2, & 3 Piping Design (LC) – PD615	Advanced Design & Construction of Nuclear Facility Components per BPVC Code, Section III (LC) – PD644 Also available as online course EL524
	BPVC Code, Section III, Division 1: Rules for Construction of Nuclear Facility Components (LC) – PD184	Design of Buried High Density Polyethylene (HDPE) Piping Systems (LC) – PD617 Also available as online course EL544 (IS)	Design Basis vs. Beyond Design Basis (IS) Considerations in Nuclear Plants (LC) – MC120
	Overview of Codes & Standards for Nuclear Power Plant Construction (LC) – PD633		
	Design in Codes, Standards and Regulations for Nuclear Power Plant Construction (LC) – PD632		
Quality Assurance	NQA-1 Quality Assurance for Nuclear Facility Applications (LC) – PD635	QA Considerations for New Nuclear Facility Construction (LC) – PD523	Real World Application of Commercial Grade Dedication (LC) – MC102
	Add NQA-1 Quality Assurance Requirements for Nuclear Facility Applications (IS) - EL520	ASME NQA-1 Lead Auditor Training (LC) – PD675	Identifying and Preventing the Use of Counterfeit, Fraudulent, and Suspect Items (LC) – MC103
	NQA-1 Requirements for Computer Software Used in Nuclear Facilities (LC) – PD606	Comparison of Global Quality Assurance & Management System Standards Used for Nuclear Applications (IS) – EL526 (Online course ZI360)	Software Dedication Training on Use of Commercial Grade Computer Programs for Design and Analysis in Nuclear Applications (LC) – MC105
		ASME NQA-1 and DOE Quality Assurance Rule 10 CFR 830 (LC) – PD711	
Balance of Plant	BPVC Code, Section VIII, Division 1: Design & Fabrication of Pressure Vessels (IS) – PD442 Also available as online course EL501	Bases and Application of Design Requirements for High Pressure Vessels in Section VIII, Division 3 of the ASME Boiler and Pressure Vessel Code (MC127)	
		How to Predict Thermal-Hydraulic Loads on Pressure Vessels & Piping (LC) – PD382	
	BPVC Code, Section VIII, Division 2: Pressure Vessels (IS) – PD448 Also available as online course EL502	Seismic Design and Retrofit of Equipment and Piping (LC) – PD394	
		Inspection, Repairs and Alterations of Pressure Vessels (IS) – PD441 Also available as online course EL503	Bases and Application of Heat Exchanger Mechanical Design Rules in Section VIII of the ASME Boiler and Pressure Vessel Code (LC) – MC104
	Non-Destructive Examination – Applying ASME Code Requirements (BPV Code, Section V) (LC) – PD389	Flow-Induced Vibration with Applications to Failure Analysis (LC) – PD146	Bases and Application of Piping Flexibility Analysis to ASME B31 Codes (LC) – MC110
	Pressure Relief Devices: Design, Sizing, Construction, Inspection & Maintenance (LC) – PD583		
	B31.1 Power Piping Code (LC) – PD013		Piping Failures - Causes and Prevention (LC) – MC117
Inservice	Developing a 10-Year Pump Inservice Test Program (IS) – PD595 Also available as online course EL523	BPV Code, Section XI: Inservice Inspection of Nuclear Power Plant Components (LC) – PD192	Run-or-Repair Operability Decisions for Pressure Equipment and Piping Systems in Nuclear Plants (LC) – MC115
	Developing a 10-Year Valve IST Program (LC) – PD596	Risk-Informed Inservice Testing Program (LC) – PD597	Life Cycle Management of Pressure Equipment and Piping Integrity (LC) – MC116
	Also available as online course EL521 (IS)	Also available as online course EL527 (IS)	Environmentally-Assisted Fatigue Analysis, Monitoring and Management of Nuclear Plant Components (LC) – MC118
			Corrosion and its Mitigation in Light Water Reactors (LC) – MC119

Nuclear Facility Construction Training Classes

ASME Certificate Program on Codes and Standards for Nuclear Power Plant Construction

Overview of Codes and Standards for Nuclear Power Plant Construction PD633

This course introduces engineers to ASME, its codes and standards,and the ASME Boiler and Pressure Vessels Code as it applies to nuclear facilities. It covers Sections III and XI of the Code, as well as Sections II, V, and IX as they apply to nuclear facilities. It covers the NQA-1 Quality Assurance for Nuclear Facility Applications and the Standards and Guides for the Operation and Maintenance of Nuclear Power Plants. Other topics include a brief history of the ASME Boards and Committees (including the Board on Nuclear Codes and Standards), international activity in the area of nuclear codes, and ASME Nuclear Accreditation.

Design in Codes, Standards and Regulations for Nuclear Power Plant Construction PD632

The course provides details of the ASME Section III Division 1 code requirements and their technical basis for the design of piping, pumps, valves and vessels in nuclear power plants. Topics include overview of the ASME Section III design requirements, methods of analysis and qualification criteria for each type of component, design by rule, design by analysis and qualification by testing, and supplementary requirements imposed by regulation (guides, standard review plan, etc.). It also covers related codes and standards such as B16, QME-1 and OM.

NQA-1 Quality Assurance for Nuclear Facility Applications PD635

In addition to covering the NQA-1 Standard, it also provides a brief overview of sections of Section III Rules for Construction of Nuclear Facility Components of the B&PV Code as they apply to quality assurance for construction of nuclear facilities.

This is an intermediate level course for engineers, managers and quality personnel who are or will be directly or indirectly involved in manufacturing, fabrication and examination of components or structures for nuclear power facilities. Participants should have at least one year of experience in the design, construction, and operation of, or have a supporting-supplier role for, nuclear power facilities and their components.

BPV Code, Section III, Division 1: Rules for Construction of Nuclear Facility Components PD184

A practical yet comprehensive overview of Section III, Division 1, including interfaces with Sections II, V, and IX. While not an in-depth review of design, fabrication, inspection, quality assurance, or other technical requirements, every Subsection in Section III is covered in sufficient detail to provide an understanding of the Code and Accreditation processes and methodology. The course also provides insights into the regulatory significance and application of Section III and other ASME Codes, the regulatory significance of Code Cases and Code Inquiries, and a discussion on the use of Code alternatives. Participants will also learn about the USNRC's reporting requirements.

Nuclear Facility Construction Training Classes continued

BPV Code, Section III, Division 1: Class 1, 2, & 3 Piping Design PD615

This course provides information and instruction on the design, analysis, and qualification of nuclear power plant piping systems that are consistent with the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsections NB/NC/ND, as well as the parallel requirements of ASME B31.1 for nuclear power plants. The methods and criteria described throughout the course, apply to new systems, as well as modifications or repairs to existing systems.

NQA-1 Requirements for Computer Software Used in Nuclear Facilities PD606

This course examines the requirements found in NQA-1 for using computer software in nuclear facilities with a particular emphasis on Subpart 2.7, QA Requirements for Computer Software. Participants learn to apply NQA-1 to the practice of acquiring, developing, operating, maintaining, and retiring software used in nuclear facilities.

Comparison of Global Quality Assurance and Management System Standards Used for Nuclear Application PD634

Following an introduction to the ASME Section III Nuclear Power Code, the course offers an overview of the ASME NQA-1 Nuclear Quality Assurance Standard, the ISO 9001 Quality Management Standard, NSQ-100 Nuclear Safety and Quality Management System Requirements, and the IAEA GS-R-3 Management Systems Standard. It compares the NQA-1 Standard with ISO 9001, NSQ-100 and IAEA GS-R-3, and provides analysis of the areas of their agreement and differences.

Design of Buried High Density Polyethylene (HDPE) Piping Systems PD617

The course covers all aspects of the design of buried HDPE Pipe including pressure design, soil loadings, thermal expansion loads, and seismic design requirements. In addition, the designs of coupled, buried HDPE and above ground steel piping systems are presented.

Advanced Design and Construction of Nuclear Facility Components per BPV Code, Section III PD644

From suppliers' shops to construction sites, this advanced course details Code requirements for the design, fabrication, construction and life extension of nuclear power plants. Covering all aspects of the nuclear pressure boundary as well as the application of methods for fabrication of nuclear pressure boundary components, it provides the required skills for applying Code requirements for NDE techniques for radiography, ultrasonic techniques and other forms of NDE. It also outlines the requirements for performing hydro testing and leak testing. Case studies examine real scenarios encountered in the nuclear industry.

Nuclear Inservice Training Classes

BPV Code, Section XI: Inservice Inspection of Nuclear Power Plant Components PD192

This course covers all aspects of Section XI, emphasizing repair, replacement, modification, and maintenance activities; pressure testing; and the relationship between the Code and regulatory and enforcement requirements. It addresses many controversial issues and topics of current concern and presents the broad spectrum of opinions regarding practical application of Code requirements. Discussion includes ways in which you can use recent revisions to Section XI to your advantage. In addition, the course provides invaluable insights regarding how other utilities approach some of the more troublesome issues associated with implementation of Section XI, as well as some ways you can use Section XI to save millions of dollars in plant operating costs. The course also highlights significant changes in the Code requirements in the last 10 to 15 years.

Developing a 10-Year Pump Inservice Testing Program PD595

This course teaches how to develop a Pump-IST (Inservice Test) Program that the NRC will accept and approve. It covers the full range of Pump-IST requirements, including general concepts, the scope of Pump-IST, overviews of ISTA and ISTB, pump testing, program preparation, comprehensive pump test, pump vibration, risk-informed initiatives, performance-based initiatives and two case studies. It focuses specifically on the NRC required 10-year updates of the Pump-IST Program.

Developing a 10-Year Valve Inservice Testing Program PD596

Upon completion of this course, you will be able to develop a Valve-IST (Inservice Test) Program that complies with all NRC requirements. Following an introduction of the subject matter, it goes into general concepts, scope of Valve-IST, overviews of ISTA and ISTC, program requirements and guidance, valve testing, program preparation, condition-monitoring for valve test, risk-informed initiatives, performance based initiatives, and two case studies. It highlights NRC required 10-year updates of the Valve-IST Program.

Risk-Informed Inservice Testing PD597

How to convert a typical IST Program 10-year update to a RI-IST (Risk Informed Inservice Testing) Program that the Nuclear Regulatory Commission will accept and approve is the focus of this course. It provides an overview of ISTE (the subsection of the code referring to Risk Testing Requirements); an overview of ISTA (General Testing Requirements); program requirements, guidance, and preparation; industry risk-informed initiatives; performance-based initiatives; and several case studies.

Serving the Research Needs of the Nuclear Industry

ASME STANDARDS TECHNOLOGY, LLC

ASME Standards Technology, LLC (ASME ST-LLC) is a not-for-profit company established in 2004. ASME ST-LLC bridges the gap between new technology and applicable standards development by managing research projects through all key steps, including: (a) identification of need, (b) proposal creation, (c) project initiation, (d) results review and publication, and (e) initiation of ASME standards actions. ASME ST-LLC's project managers, project engineers, and consultants (e.g., scientists, technical experts) possess the hands-on experience necessary to develop, perform, and manage the most challenging research project. Technology proponents can be confident in the results: every ASME ST-LLC project goes through a rigorous qualification, validation, and peer review process.

ASME ST-LLC has contributed significantly to the advancement of the nuclear industry through its research projects. For example, projects related to high-temperature, gas-cooled reactors (HTGR) have resulted in many standards being updated and subsequent publications being used to reduce or eliminate some of the licensing roadblocks for NGNP and Generation IV Reactors.

For more information, please contact:

Paul D. Cleri, P.E.
Telephone: +1.212.591.8386
Email: CleriP@asme.org
Web: asmestllc.org

Exceed Research Goals with a Team of Hands-On Industry Experts

ASME ST-LLC approaches its projects as well as meets client needs with the following capabilities:

Standards and certification involvement in research projects helps ensure results will be relevant to standards committees.

Collaborative research projects minimize individual investment while maximizing benefits.

International partnerships of government, industry and academia help build consensus leading to technically relevant standards.

Experienced project managers and project engineers successfully coordinate a project to meet stakeholder needs, including meeting project milestones, schedule, and budget as well as providing complete oversight of publishing of final reports.

Commercialization Through Standards Development

The commercialization of new technology is critical to meeting many global challenges, and the role of codes and standards in bringing new technology to market is changing. ASME ST-LLC projects help knowledge make the transition from science to engineering, which allows technology proponents to achieve their vision.

Conducting relevant research is important to getting standards written or updated and approved. ASME ST-LLC has contributed significantly to the advancement of industry through its dozens of published research projects. With new technologies constantly being proposed, the appropriate research plays a critical role in getting standards developed for these technologies.

ASME ST-LLC's Pre-Stressed Concrete Project

"This testing program on full-scale pre-stressed concrete slabs under blast loading was initiated and developed under ASME Section III Division 2 Committee as a part of a joint ASME-ACI effort on the update of design code provisions for nuclear structures under. It will provide currently missing test data related to the behavior of pre-stressed concrete structures under blast loading. Eight pre-stressed concrete slabs, with different design features, will be tested under different blast load conditions. The specificities of design features and targeted structural performance require testing full-scale specimens (16 feet x 16 feet x 11 inches slabs).

"Taking into account the size of the specimens and the magnitude of the blast loading – this testing program is unique in the world. The test results will allow improving our understanding of governing phenomena in order to establish new, performance based, set of design criteria. The ultimate goal of the testing program and ASME-ACI code update is to enhance the safety of existing and new nuclear facility. ...The whole team is very enthusiastic about our project and I am sure that we will get very good results."

— Neb Orbovic, Canadian Nuclear Safety Commission

Published Nuclear Project Work:

ASME STLLC's reports may be published as a Standard Technology Publication (STP), a white paper, or a limited access guidance document. ASME STLLC has prepared dozens of publications, which can be accessed at **stllc.asme.org/News_Announcements.cfm** or accessed through ASME's main website, by searching for STPs, at **www.asme.org**. The following is a sample of nuclear publications resulting from work performed by ASME STLLC:

- STP-NU-019-1: Verification of Allowable Stresses in ASME Section III Suection NH For Grade 91 Steel.
- STP-NU-035: Task 13: Extend Allowable Stress Values for Alloy 800H.
- STP-NU-037: Operating Condition Allowable Stress Values in ASME Sec III Sub Sec NH.
- STP-NU-038: Intermediate Heat Exchanger (IHX)
- STP-NU-072: Small Modular Reactors (SMR) Roadmap.
- STP-NU-069: Analysis of Selected Nondestructive Examination (NDE) Methodologies for the Assessment of Cracking in Concrete Containments.
- STP-NU-062-1: Comprehensive Comparison of International Quality Standards.
- STP-NU-061-1: Comprehensive Evaluation of the NSQ-100 Nuclear Safety and Quality Management System Requirements.
- STP-NU-057: ASME Code Development Roadmap for HDPE Pipe in Nuclear Service.
- STP-NU-051-1: Code Comparison Report for Class 1 Nuclear Power Plant Components.
- STP-NU-045-1: Roadmap to Develop ASME Code Rules for the Construction of HTGRs.
- STP-NU-044: Non Destructive Exam (NDE) and In Service Inspection (ISI) for High Temperature Reactors.
- STP-NU-042: New Materials for ASME Subsection NH.
- STP-NU-041: Alternative Simplified Creep-Fatigue Design Methods.
- STP-NU-040: Simplified Elastic and Inelastic Design Analysis Methods.
- STP-NU-039: Creep and Creep-Fatigue Crack Growth at Structural Discontinuities and Welds.
- STP-NU-020: Verification of Allowable Stresses in ASME Section III Subsection NH for Alloy 800H.

ASME Standards Technology, LLC continued

- STP-NU-018: Creep-Fatigue Data and Existing Evaluation Procedures for Grade 91 and Hastelloy XR.
- STP-NU-013: Improvement of ASME NH for Grade 91 Negligible Creep and Creep Fatigue.
- STP-NU-010: Regulatory Safety Issues in Structural Design Criteria of ASME Section III Subsection NH for VHTR and Gen IV Reactors.
- STP-NU-009: Graphite for High Temperature Gas-Cooled Nuclear Reactors.
- STP-NU-001: Risk Initiatives in ASME Nuclear Codes and Standards.
- STP-NU-059 Corrections to Stainless Steel Allowable Stresses
- STP-NU-063 Correct and Extend Allowable Stress Values for 304 and 316 Stainless Steel
- STP-NU-068 Corrosion of A193 Grade B7 Bolt Material in BWR Sodium Pentaborate Solutions
- STP-NU-078 Comparison Report on Welding Qualification and Welding Quality Assurance
- STP-NU-083 Blast Testing of Pre-stressed Concrete under Impulsive Loading (Coming soon!)

Nuclear Industry Partners and Sponsors:

- Canadian Nuclear Safety Commission (CNSC)
- Daewoo Institute of Construction Technology (DICT)
- Electricity of France, Service Studies for Thermal and Nuclear Project (EDF SEPTEN)
- Swiss Federal Nuclear Safety Inspectorate (ENSI)
- French Institute for Radiological Protection and Nuclear Safety (IRSN)
- Finland Radiation and Nuclear Safety Authority (STUK)
- U.S. Nuclear Regulatory Commission (NRC).
- U.S. Department of Energy (DOE).
- National Renewable Energy Laboratory (NREL).
- National Center for Manufacturing Science (NCMS).
- Electric Power Research Institute (EPRI).
- Pressurized Water Reactor Owners Group (PWROG).
- The Welding Institute.
- Idaho National Laboratory

Other Relevant Technology Areas:

ASME STLLC is involved with a wide range of engineering topics and technical disciplines, including pressure technology, piping / pipeline technologies, hydrogen technology, solar, renewables, biofuels, and other emerging energy industries. Benefits to industry have been demonstrated by: the expansion of design methods and available materials for construction; revising codes to eliminate unnecessary expenses and increase efficiencies; improving NDE methods to help identify risks for in-service equipment; and allowance for high-temperature designs.

Nuclear Industry Projects:

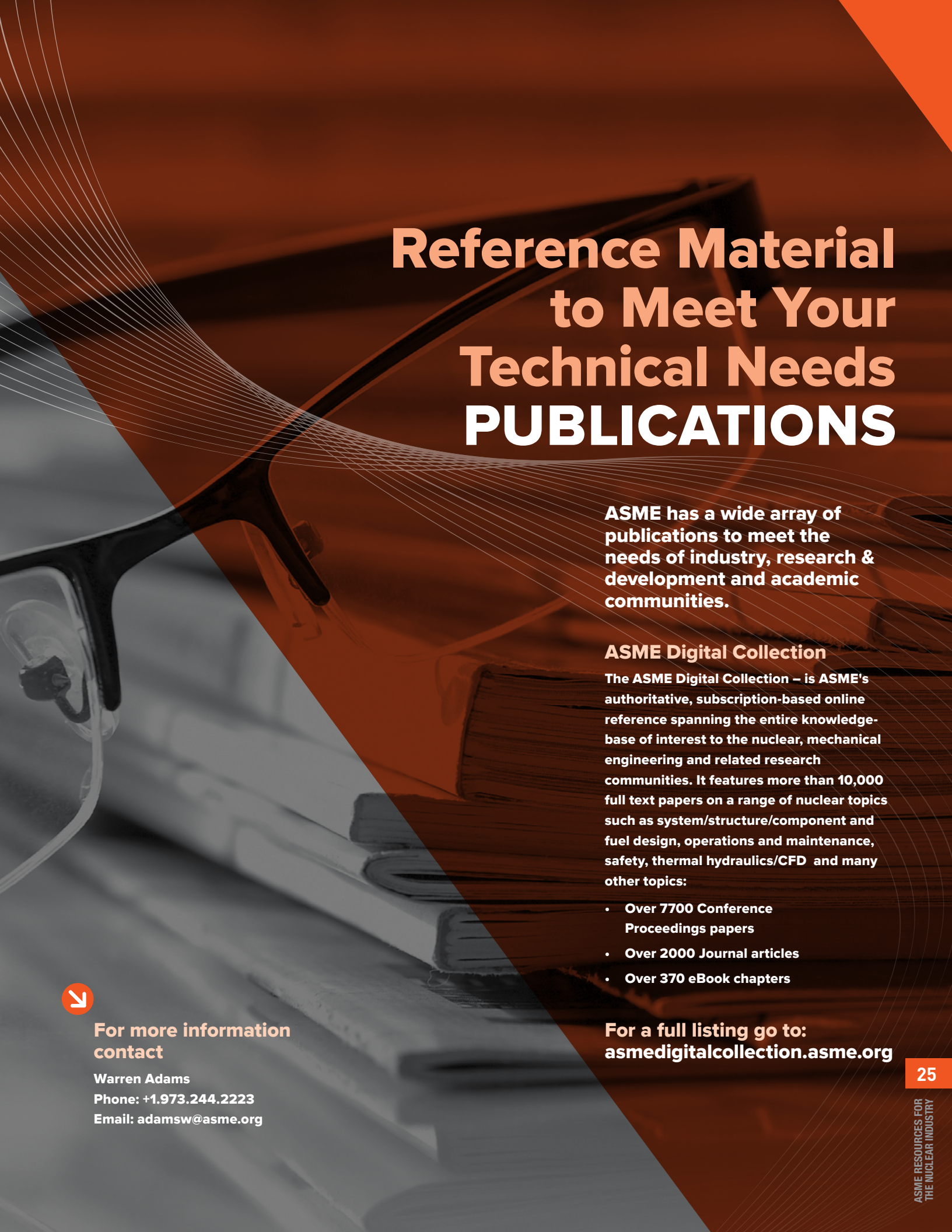
Following summarizes representative nuclear industry ASME STLLC technology projects:

Code Comparison Report for Class 1 Nuclear Power Plant Components: ASME STLLC led a multinational effort of Standards Development Organizations (SDO) from the U.S., France, Japan, Korea, Canada, and Russia to identify and summarize the differences between the major international nuclear codes and standards for Class 1 equipment.

Small Modular Reactor (SMR) Roadmap: This project developed a SMR Roadmap to identify any potential ASME code and standards issues that may impact effective and timely SMR licensing.

Graphite for High Temperature Gas-Cooled Nuclear Reactors: This project analyzed information relative to bulk graphite production: structure, chemical properties, physical properties and neutron irradiation behavior.

Regulatory Safety Issues in Structural Design Criteria of ASME Section III Subsection NH for VHTR and Gen IV Reactors: The project was conducted in collaboration with the U.S. Department of Energy to identify safety issues relevant to the ASME Boiler and Pressure Vessel Code (BPVC), including Section II, Section VIII, Section III Subsection NH (Class 1 Components in Elevated Temperature Service), and code cases that must be resolved in order to support licensing of Generation IV Reactors.



Reference Material to Meet Your Technical Needs PUBLICATIONS

ASME has a wide array of publications to meet the needs of industry, research & development and academic communities.

ASME Digital Collection

The ASME Digital Collection – is ASME's authoritative, subscription-based online reference spanning the entire knowledge-base of interest to the nuclear, mechanical engineering and related research communities. It features more than 10,000 full text papers on a range of nuclear topics such as system/structure/component and fuel design, operations and maintenance, safety, thermal hydraulics/CFD and many other topics:

- **Over 7700 Conference Proceedings papers**
- **Over 2000 Journal articles**
- **Over 370 eBook chapters**

For a full listing go to:
asmedigitalcollection.asme.org

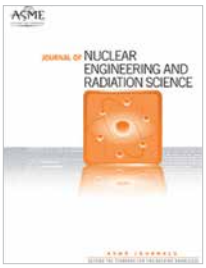
For more information contact

Warren Adams
Phone: +1.973.244.2223
Email: adamsw@asme.org

Publications continued

Journals

Each ASME Journal title publishes the highest quality peer reviewed literature in their respective field, including the history of mechanical engineering research as well as the cutting-edge discoveries being made today.



Journal of Nuclear Engineering and Radiation Science
The Journal of Nuclear Engineering and Radiation Science covers the highest quality R&D on the latest trends on modern theories and applications on nuclear technology and radiation science.

Journal of Pressure Vessel Technology
This Journal contains research and interpretive reports on the design, analysis, fabrication, construction, inspection, nondestructive evaluation, operation, and failure prevention of pressure vessels, piping, pipelines, boilers, pumps, valves, and other pressure-bearing components, as well as discussions of their related codes and standards.

Other Journals include:

- Journal of Engineering for Gas Turbines and Power
- Journal of Energy Resources Technology
- Journal of Heat Transfer
- Journal of Fluids Engineering
- Applied Mechanics Reviews

Conference Proceedings

ASME sponsors more than 30 conferences per year and publishes approximately 100 proceedings volumes annually. Conference topics encompass a wide spectrum of subject areas of interest to nuclear and associated disciplines. ASME Conference Proceedings are available in print and in digital format. Conferences of interest include:

- International Conference on Nuclear Engineering (ICONE)
- International Conference on Radioactive Waste Management and Environmental Remediation (ICEM)
- Small Modular Reactors Symposium (SMR)
- Pressure Vessels and Piping Conference (PVP)

Books/eBooks

These high-quality publications address established and emerging areas of interest to nuclear professionals and allied disciplines.
A sample of titles related to the Nuclear field are below.

To see all our titles, visit: www.asme.org/shop

Companion Guide to the ASME Boiler and Pressure Vessel and Piping Codes, Fourth Edition-Volumes 1 & 2
This guide provides commentary for understanding and applying the principles of the ASME Boiler and Pressure Vessel Code.

Containment Structures of U.S. Nuclear Power Plants
This work addresses containment structures, the underlying codes, regulations, safety significance, design philosophy, operating experience, and application to new design.

Design of Hazardous Mechanical Structures, Systems and Components for Extreme Loads
Addresses the critical issue of safe design of mechanical structures, systems and components belonging to hazardous facilities, in order to withstand the effects of extreme loads, either man-made or due to natural disasters.

Other titles include:

- Yucca Mountain Project: Waste Package Closure Control System
- Spent Nuclear Fuel (SNF) Canister Qualification Support
- Spent Nuclear Fuel (SNF) Canister Welding Concepts
- The Decommissioning Handbook
- Nuclear Energy in the 21st Century: The World Nuclear University Primer

Need to Renew your ASME Membership?

Renew online in minutes at go.asme.org/renew

Not a member? Join online at go.asme.org/jointoday

Join with 140,000 Top Engineers Worldwide PROFESSIONAL MEMBERSHIP


The American Society of Mechanical Engineers
29 West 39th Street, New York

Application for Membership

Henry Ford's application for ASME membership. Note that one of his references is Thomas Edison

ASME Membership includes a wide array of valuable benefits & services to help engineering professionals stay informed and succeed at every step in their careers. From Mechanical Engineering magazine, to ASME SmartBrief e-mail news digests every weekday, to in-person and online events and networking opportunities, ASME Membership is the most important connection a mechanical engineer can make. Receive a special offer to join at go.asme.org/jointoday

ASME WorkSmartSM is the ultimate online reference tool to find the solutions you need, right when you need them. ASME Members enjoy unlimited free access to over 100 volumes on essential technology topics, many with interactive tables, graphs and equations.
Learn more and explore ASME WorkSmart at go.asme.org/WorkSmart

The All-New ASME Job Board + Career Center features targeted job postings and valuable content designed to meet the specialized needs of today's busy mechanical engineers. Whether you're looking to take the next step in your career, or searching for ways to make your current job better, the ASME Job Board + Career Center has filtered through the clutter to provide you with the focused high-quality resources you need. jobboard.asme.org

An ASME Membership Certificate is a great way to display your professional status with pride! Perfect for home or office, three styles are available exclusively for ASME Members.

go.asme.org/MembershipCertificate

ASME Offices

Headquarters

Two Park Avenue
New York, NY 10016-5990 U.S.A.
+ 1.212.591.7000
Web: www.asme.org

Contact: Allyson Byk
S&C Project Engineering Advisor

Nuclear Codes and Standards
Phone: +1.212.591.8539
Email: byka@asme.org

Washington Center

1828 L Street, NW Suite 906
Washington, DC
20036-5104 U.S.A.
+1.202.785.3756

Europe

Avenue DeTervueren, 300
1150 Brussels
Belgium
32.2.743.1543

China

Unit 09A, EF FI, E.
Tower/Twin Towers No. B12
JianGuo MenWai Dajie ChaoYang District
Beijing, 1000022 P.R.C.
86.10.5109.6032

India

335, Udyog Vihar, Phase-IV
Gurgaon-122 015 (Haryana)
91.124.430.8411 or
91.124.430.8413