



**THE NATIONAL BOARD
BODY OF KNOWLEDGE
FOR**

**AUTHORIZED NUCLEAR
INSPECTORS**

Approved by:

Executive Director

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(date of approval)

*Denotes Revisions

The National Board of Boiler and Pressure Vessel Inspectors

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THE NATIONAL BOARD

BODY OF KNOWLEDGE FOR

AUTHORIZED NUCLEAR INSPECTORS

The National Board has developed this Body of Knowledge to outline duties and responsibilities for individuals performing inspections during the construction phase of nuclear components, parts, and appurtenances fabricated and assembled in accordance with the *ASME Boiler and Pressure Vessel Code*.

OBJECTIVES

An individual responsible for inspection of nuclear components, parts, and appurtenances during the construction phase should have knowledge, and the ability to apply that knowledge, of the following:

- Code Structure and Content
- Classification of Nuclear Items
- Responsibilities and Duties
- Quality Assurance Programs
- Verification of Design Documents
- Material
- Fabrication
- Welding
- Nondestructive Examination
- Pressure Testing and Heat Treatment
- Overpressure Protection
- Calibration of Measurement and Test Equipment
- Stamping and Data Reports
- Record Retention

REFERENCE MATERIAL

The following reference material is required to obtain and apply the knowledge for the listed objectives in this Body of Knowledge.

- ASME Section III, Div. 1 Subsections NCA, NB, NC, ND
- ASME Section V, *Nondestructive Examination*
- ASME Section IX, *Welding and Brazing Qualifications*
- ASME NQA-1, *Quality Assurance Requirements for Nuclear Facility Application*
- ASME QAI-1, *Qualifications for Authorized Inspection*
- ASNT SNT-TC-1A
- *RCI-1, NB-263, *Rules for Commissioned Inspectors*

Approved translations are acceptable.

BODY OF KNOWLEDGE OUTLINE

This outline provides information regarding the listed objectives of this Body of Knowledge, and further describes the duties and responsibilities of the Authorized Nuclear Inspector.

1. Code Structure and Content

Understanding of *ASME Boiler and Pressure Vessel Code* structure and ability to locate the appropriate requirements within the code books and related documents.

2. Classification of Nuclear Items

Ability to identify nuclear components, parts, and appurtenances.

3. Responsibilities and Duties

Understanding of requirements for:

- Authorized Inspection Agencies,
- Authorized Inspectors,
- Authorized Nuclear Inspectors,
- Authorized Nuclear Inspector Supervisors,
- Plant Owners,
- Component and Part Manufacturers, and
- Material Organizations.

4. Quality Assurance Programs

Understanding of quality assurance program elements as defined by:

- ASME NCA-3800,
- ASME NCA-4000, and
- ASME NQA-1.

5. Verification of Design Documents

Familiarity with the preparation, content, and approval of design documents, such as:

- Design specifications,
- Design reports,
- Load capacity data sheets, and
- Design report summaries.

6. Material

Ability to verify compliance of material in accordance with applicable code requirements, such as:

- markings and permitted marking methods,
- material certifications,
- material repairs,
- examinations, tests, and treatments for material, and
- material ordering.

7. *Fabrication*

Ability to verify compliance of fabrication and installation in accordance with applicable code requirements, such as:

- cutting and edge preparation,
- limits on cold forming,
- limits on out of roundness for shells,
- tolerances on heads,
- alignment, and
- penetrations.

8. *Welding*

Ability to verify compliance with welding requirements of the applicable code, such as:

- responsibilities,
- permitted welding processes,
- procedure qualification requirements,
- welder qualification requirements,
- cleaning of weld surfaces,
- alignment tolerances,
- repair of weld defects, and
- surface weld metal buildup.

9. *Nondestructive Examination*

Ability to verify compliance for nondestructive examination (NDE), such as:

- when NDE is required,
- fundamentals of radiographic and ultrasonic methods,
- procedure qualification requirements,
- personnel qualification requirements, and
- NDE reporting requirements.

10. *Pressure Testing and Heat Treatment*

Ability to verify compliance and requirements for the following tests and treatments:

- impact testing,
- Charpy V Notch testing,
- drop weight testing,
- heat treatment, and
- pressure tests.

11. *Overpressure Protection*

Understanding of requirements for overpressure protection, such as:

- types of permitted pressure relief devices;
- capacity certification;
- performance testing;
- installation;
- overpressure protection report; and
- marking, stamping, and data reports.

12. Calibration of Measurement and Test Equipment (M&TE)

Understanding of requirements for the calibration of M&TE which includes working and master standards, such as:

- calibration frequencies,
- calibration methods,
- tolerances,
- master standards,
- identification, and
- records.

13. Stamping and Data Reports

Ability to determine data report and associated stamping requirements which apply for a given type of construction.

14. Record Retention

Ability to determine record retention requirements per ASME Section III.