The South African Legislative Framework for Pressure Equipment in Nuclear Plants
1. Regulations for Pressure Equipment
2. South African legislative System
3. Health and Safety Standards
4. Conformity Assessment Routes
   4.1 Typical for local Manufacturer
   4.2 Typical for foreign Manufacturer
5. Additional regulatory Requirements
6. Summary
1. Regulations for Pressure Equipment

- **Pressure Equipment Regulation (PER)**
  Specifies DoL requirements to ensure, that all pressure equipment is safe in terms of DoL-regulatory system.

- **Regulation for Nuclear Safety and Regulatory Practices (RSRP)**
  Specifies NNR requirements to ensure, that the nuclear equipment is safe in terms of NNR-regulatory system.
PER applies to nuclear and non-nuclear Equipment.

PER and RSRP apply during design, manufacturing, construction and operation (RSRP applies also during decommissioning).

PER endorses an international approach of Conformity Assessment requirements, which is based on ISO-Standards and IAF-recognition.
• **Conformity Assessment**  
  Activity of a recognized 3rd Party to determine, that an equipment meets a specified requirement.
2. The Legislative System

Legislation with regard to Pressure Equipment

- OHAS-Act 85, 1993
- NNR-Act 47, 1999

Pressure Equipment Regulation (PER)
- SANS 347

Regulation for Nuclear Safety and Regulatory Practise (RSRP)
- SANS 10227
- RD0034, PP0012_{\text{draft}}

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Conformity Requirements in SA
Accreditation, Certification, Categorisation
(ISO 17020 / 17021 / 17024 / 17025)
3. Health and Safety Standards

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Part 1: Technical Requirements:
- Materials
- Design
- Classification
- Fabrication
- Training
- Quality Assurance
- Inspection
- Testing

Part 2: Conformity Requirements
- Assessment (*)
- Accreditation (*)
- AIA / CB (*)
- Marking (*)
- Documentation (*)
- Certification (*)
- Responsibilities (*)
(*) acc. HSS

Conformity Requirements in SA
Accreditation, Certification, Categorisation...
(ISO 17020 / 17021 / 17024 / 17025)

1. Conformity (to technical requirements)
- Assessment acc. SANS 347 / RD0034 / PP0012
- Accreditation, AIA / CB acc. SANS 10227
- Documentation acc. PER

2. Conformity (to regulatory requirements)
- Marking, Responsibilities acc. PER
- Importing, Certification acc. PER
- Other acc. RSRP (..RD- Documents.)
4. Conformity Assessment Routes

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Part 1: Technical Requirements:
- Materials
- Design
- Classification
- Fabrication
- Training
- Quality Assurance
- Inspection
- Testing

Part 2: Conformity Requirements
- Assessment (*)
- Accreditation (*)
- AIA / CB (*)
- Marking(*)
- Documentation(*)
- Certification (*)
- Responsibilities (*)

(*) acc. HSS

Conformity Requirements in SA
....Accreditation, Certification, Categorisation....
(ISO 17020 / 17021 / 17024 / 17025)

1. Conformity (to technical requirements)
- Assessment acc. SANS 347 / RD0034 / PP0012
- Accreditation, AIA / CB acc. SANS 10227
- Documentation acc. PER

2. Conformity (to regulatory requirements)
- Marking, Responsibilities acc. PER
- Importing, Certification acc. PER
- Other acc. RSRP (..RD- Documents.)

R 1+R 2
R 2
R 2
R 1
R 1
R 1+R 2

Compliant
4.1 Typical for local Manufacturer

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Conformity Requirements in SA
….Accreditation, Certification, Categorisation…. (ISO 17020 / 17021 / 17024 / 17025)

Part 1: Technical Requirements:
- Materials
- Design
- Classification
- Fabrication
- Training
- Quality Assurance
- Inspection
- Testing

Part 2: Conformity Requirements
- Assessment (*)
- Accreditation (*)
- AIA / CB (*)
- Marking(*)
- Documentation(*)
- Certification (*)
- Responsibilities (*)
(*) acc. HSS

1. Conformity (to technical requirements)
- Assessment acc. SANS 347 / RD0034 / PP0012
- Accreditation, AIA / CB acc. SANS 10227
- Documentation acc. PER

2. Conformity (to regulatory requirements)
- Marking, Responsibilities acc. PER
- Importing, Certification acc. PER
- Other acc. RSRP (..RD-Documents.)

Compliant
4.1 Typical for local Manufacturer

Assessment according SANS 347 (Category I – IV)
4.1 Typical for local Manufacturer

Integrated Quality- and Safety Management System acc. RD0034

- **Safety Management System**
  - **Level 1**
  - Pressure equipment with **direct influence** on Nuclear Safety Performance
- **General Quality Management System**
  - **Level 2**
  - Pressure Equipment **important** for Nuclear Safety
- **QA/QC Assessment acc. to Manufacturing Code**
  - **Level 3**
  - All Pressure Equipment
4.1 Typical for local Manufacturer

Accreditation and Certification (Level 3 acc. RD0034)

SANAS (accredits), DoL (approves)

ISO 17020 / 21 (scope: HSS)

Schedule of Accreditation

ISO 17024 (scope: HSS)

TC (SCert,..)

Certificate of Competence (IPE, N, NS)

AIA / CB

Inspector

Equipment Assessment (SANS 347/(IV))

Manufacturer
4.1 Typical for local Manufacturer

Accreditation and Certification (Level 1 and Level 2 acc. RD0034)

NNR (approves)

Safety Assessment

Applicant

Approved by NNR

Inspector

Equipment Assessment (SANS 347 / RD0034)

Manufacturer

SANAS (accredits), DoL (approves)

AIA / CB

Inspector

TC (SCert,..)
4.1 Typical for local Manufacturer

Integrated Quality- and Safety Management System acc. RD0034

- **Level 1**: Pressure equipment with direct influence on Nuclear Safety Performance
- **Level 2**: Pressure Equipment important for Nuclear Safety
- **Level 3**: All Pressure Equipment

- Safety Management System
- General Quality Management System (e.g. ISO 9000..)
- QA/QC Assessment acc. to Manufacturing Code
4.1 Typical for local Manufacturer

Typical Assessment Requirements for a Supplier

From (e.g.) ISO 9000:
• Scope (list of components, standards)
• Procedures (Inspection- and Test Plan)
• Subcontracting Control
• Design Control
• …

From the HSS (e.g. NQA-1):
• Design and Classification
• Interfaces of Components
• Qualification of Resources
• Training Requirements
• …
4.2 Typical for foreign Manufacturer

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Part 1: Technical Requirements:
- Materials
- Design
- Classification
- Fabrication
- Training
- Quality Assurance
- Inspection
- Testing

Part 2: Conformity Requirements
- Assessment (*)
- Accreditation (*)
- AIA / CB (*)
- Marking(*)
- Documentation(*)
- Certification (*)
- Responsibilities (*)
*) acc. HSS

Conformity Requirements in SA
....Accreditation, Certification, Categorisation....
(ISO 17020 / 17021 / 17024 / 17025)

1. Conformity (to technical requirements)
- Assessment acc. SANS 347 / RD0034 / PP0012
- Accreditation, AIA / CB acc. SANS 10227
- Documentation acc. PER

2. Conformity (to regulatory requirements)
- Marking, Responsibilities acc. PER
- Importing, Certification acc. PER
- Other acc. RSRP (...)RD- Documents.

Compliant
4.2 Typical for e.g. US Manufacturer

Accreditation and Certification (Level 1 and Level 2 acc. RD0034)

- NNR (approves)
  - Safety Assessment
  - Applicant
    - approved by NNR
  - Inspector
    - Assessment RD0034, PP0012 daft

- ASME (accredits)
  - NCA 5000 (QAI-1)
  - NB-Commissioning
  - AIA
  - Inspector

- National Board (certifies)
  - Certificate (N, NS)
  - Equipment Assessment NCA 4000, (NQA-1)

Manufacturer ("N-Stamp")
5. Additional Regulatory Requirements

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Part 1: Technical Requirements:
- Materials
- Design
- Classification
- Fabrication
- Training
- Quality Assurance
- Inspection
- Testing

Part 2: Conformity Requirements
- Assessment (*)
- Accreditation (*)
- AIA / CB (*)
- Marking(*)
- Documentation(*)
- Certification (*)
- Responsibilities (*)
*) acc. HSS

Conformity Requirements in SA
...Accreditation, Certification, Categorisation....
(ISO 17020 / 17021 / 17024 / 17025)

1. Conformity (to technical requirements)
- Assessment acc. SANS 777 / RD0034 / PP0012
- Accreditation, AIA / CB acc. SANS 10227
- Documentation acc. PER

2. Conformity (to regulatory requirements)
- Marking, Responsibilities acc. PER
- Importing, Certification acc. PER
- Other acc. RSRP (..RD- Documents.)

Compliant
5. Additional Regulatory Requirements

- Certificate of Manufacturer acc PER (s4)
- Duties of Importer acc. PER (s5)
- Equipment Marking acc. PER (s9)
- Repairs acc. PER (s13)
- Essential Documentation acc. PER (s14)
- IAEA recommendations (e.g. RD-Docs, GS-R-3, NDT, DT..)
Compliant!

Health- and Safety Standards (HSS)
Ref. to appendix in SANS 347
(ASME III, VIII, XI, RCC-M...)

Part 1: Technical Requirements:
- Materials
- Design
- Classification
- Fabrication
- Training
- Quality Assurance
- Inspection
- Testing

Part 2: Conformity Requirements
- Assessment (*)
- Accreditation (*)
- AIA / CB (*)
- Marking(*)
- Documentation(*)
- Certification (*)
- Responsibilities (*)
*) acc. HSS

Conformity Requirements in SA
....Accreditation, Certification, Categorisation....
(ISO 17020 / 17021 / 17024 / 17025)

1. Conformity (to technical requirements)
- Assessment acc. SANS 347 / RD0034 / PP0012
- Accreditation, AIA / CB acc. SANS 10227
- Documentation acc. PER

2. Conformity (to regulatory requirements)
- Marking, Responsibilities acc. PER
- Importing, Certification acc. PER
- Other acc. RSRP (..RD Documents.)

Compliant
6. Summary

- Relevant Regulations: PER / RSRP.
- Conformity Assessment Standards: SABS 347, RD0034
- 2 Assessment Routes: local, foreign
- Local Route: accreditation by SANAS (IAF-recognized)
- Foreign Certifications alone (e.g. by US-AI or EU NoB) are not sufficient.