TRANSLATION FOR GUIDANCE



**Application of the French Order dated 12/12/2005 on Nuclear Pressure Equipment**

**GUIDE No. 19**

**Version dated 21/02/2013**

**GUIDE No. 19**

**Version dated 21/02/2013**

**FRENCH NUCLEAR SAFETY AUTHORITY (ASN) GUIDELINES**







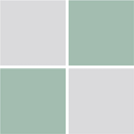












**Foreword**

*The collection of ASN guides consists of documents for*

*professionals with an interest in nuclear safety and radiation protection regulations*

*(operators, users and transporters of ionising radiation sources, and health professionals).*

*These guides may also be disseminated amongst various stakeholders,*

*such as Local Information Committees.*

*The aim of each guide, in the form of recommendations, is to:*

*- explain a regulation and the rights and obligations of the persons concerned by the regulation;*

*- explain the regulatory objectives and describe, as applicable, the practices that the French Nuclear Safety Authority deems satisfactory;*

*- provide practical and useful information on*

*nuclear safety and radiation protection.*

****

**Table of Contents**

**1. INTRODUCTION ..............................................................................................................................4**

**1.1. REGULATORY REFERENCES ....................................................................................................4**

**1.2. PURPOSE OF THE GUIDE ..........................................................................................................4**

**1.3. STATUS OF THE GUIDE ..............................................................................................................4**

**1.4. SCOPE OF THE GUIDE.................................................................................................................4**

**1.5. STRUCTURE OF THE GUIDE .....................................................................................................4**

**2. ASN RECOMMENDATIONS FOR THE APPLICATION OF THE FRENCH ORDER ON NUCLEAR PRESSURE EQUIPMENT ............................................................................................4**

**2.1. ASN RECOMMENDATIONS FOR THE APPLICATION OF ARTICLES 1 TO 16 OF THE FRENCH ORDER ON NUCLEAR PRESSURE EQUIPMENT ................................................................................4**

**2.2. ASN RECOMMENDATIONS FOR THE APPLICATION OF APPENDIX 1 OF THE FRENCH ORDER ON NUCLEAR PRESSURE EQUIPMENT ................................................................................7**

**2.3. ASN RECOMMENDATIONS FOR THE APPLICATION OF APPENDICES 2 and 3 OF THE FRENCH ORDER ON NUCLEAR PRESSURE EQUIPMENT ..............................................................12**

**2.4. ASN RECOMMENDATIONS FOR THE APPLICATION OF APPENDIX 5 OF THE FRENCH ORDER ON NUCLEAR PRESSURE EQUIPMENT ............................................................................... 12**

**2.5. ASN RECOMMENDATIONS FOR THE APPLICATION OF APPENDIX 6 OF THE FRENCH ORDER ON NUCLEAR PRESSURE EQUIPMENT ................................................................................14**

**1. Introduction**

**1.1. Regulatory references**

[1] French Decree No. 99-1046 dated 13 December 1999 (amended) on pressure equipment; [2] French Order dated 12 December 2005 on nuclear pressure equipment;

[3] Directive 97/23/EC of the European Parliament and Council dated 29 May 1997 on the approximation of the laws of Member States concerning pressure equipment;

[4] French Order dated 10 November 1999 on monitoring the operations of the main primary system and main secondary systems of pressurised water nuclear reactors.

**1.2. Purpose of the guide**

The purpose of the guide, in response to the requirements expressed by manufacturers, operators and notified bodies, is to present the implementing procedures for achieving the objectives set by the Order in reference [2]. However, this guide does not address the conformity assessment, which is the subject of a specific guide.

Other procedures may be substituted for those specified therein if they make it possible to achieve the corresponding objectives.

**1.3. Status of the guide**

ASN Guide No. 19 reflects the insight gained from the first years of application of the Order in reference [2] and incorporates the most important sheets addressed by the offices of the Nuclear Pressure Equipment Liaison Committee (COLEN). It has been drawn up on the basis of a draft presented to the Permanent Nuclear Section (SPN) of the Central Pressure Vessel Committee (CCAP) on 11 September 2008 and is the result of joint work carried out with operators, manufacturers and notified bodies.

**1.4. Scope of the guide**

The guide is applicable to all parties (manufacturers, operators, agencies, notified bodies, etc.) concerned by the design, manufacture, conformity assessment and operation of nuclear pressure equipment, irrespective of the level and category of said equipment, as well as all assemblies that include at least one of said items of nuclear pressure equipment.

**1.5. Structure of the guide**

The structure of the guide follows that of the Order dated 12 December 2005 and its Appendices.

**2. ASN recommendations for the application of the Order on nuclear pressure equipment**

**2.1. ASN recommendations for the application of Articles 1 to 16 of the Order on nuclear pressure equipment**

The interpretations of Directive 97/23/EC and the French Decree dated 13 December 1999 provided by the guidelines on the application of the directive are applicable to nuclear pressure equipment, except where the Order specifies or supplements the provisions arising from these texts. In the latter case, the provisions of the Order shall prevail. In similar fashion, the application of a harmonised European standard gives the presumption of conformity with the essential safety requirements (EES) that it covers.

The sheets from the Nuclear Pressure Equipment Liaison Committee (COLEN), which are validated by the ASN, are also applicable to nuclear pressure equipment, as are the sheets published by the Pressure Equipment Liaison Committee (CLAP), unless otherwise specified by the ASN.

Art. 2 – I –

The pressure equipment referred to in points a) to r) of paragraph II of Article 2 of the French Decree dated 13 December 1999 is not subject to the provisions of the Order. Nevertheless, the primary motor-driven pumps of pressurised water nuclear steam supply systems are conventionally considered as nuclear pressure equipment, without the need to ensure that pressure is a significant factor in their design and manufacture.

Pressure equipment shall be said to be equipment that directly ensures the containment of radioactive substances under the conditions defined for its operation if its failure, in at least one of the normal operating situations to which the equipment is subject, involves the release of radioactive substances outside the equipment, irrespective of any other means of containing said radioactive substances that could be implemented over and above the pressure equipment, especially in keeping with the safety and radiation protection rules.

Pressure equipment, whose failure could give rise to radioactive emissions, may not be regarded as nuclear pressure equipment on this criterion alone if it does not in itself directly ensure the containment of radioactive substances under the conditions defined for its operation. Thus, for example, equipment that does not ensure the containment of radioactive substances but whose failure could, as a result of external hazard, compromise the integrity of other equipment and thereby result in radioactive emissions, shall not be considered as nuclear pressure equipment.

A permanent assembly, within the meaning of m) of Article 1 of the Decree in reference [1], carried out under the responsibility of the manufacturer on a pressure part of an item of nuclear pressure equipment, is an integral part of this equipment. Such an assembly shall, therefore, be subject to the provisions of the Order, even if the item thus assembled is not intended to remain permanently attached to the equipment (for example, the welding of a temporary handling device).

Art. 2 – II –

The activity taken into account for the classification levels of nuclear pressure equipment corresponds only to the activity of the fluid contained; the possible activation of the equipment itself is not to be considered. An acceptable procedure is to take into account the activity of the fluid contained in normal operating situations within the meaning of EN 13445.

Release of activity as assessed according to the provisions of the Order is conventional and must not be compared to an actual or hypothetical release whatever it may be. The volume to be taken into account is that defined by the Decree. The activity concentration of the fluid contained to be taken into account is specified in the safety report of the basic nuclear installation or in a technical report at the disposal of the ASN. The justifications for the activity are not necessarily based on samples and measurements.

An item of equipment may only have a single level. Where equipment includes several compartments, the release from each compartment may be assessed individually, taking into account the maximum leakage acceptable in operation between the compartments. The level of the equipment is then determined by the total release of activity obtained after adding together the release from each compartment. However, the risk analysis performed by the manufacturer shall take into account the fluid actually contained, including the maximum leakage between the compartments, in the situation studied.

The piping , pressure fittings or safety accessories connected to a compartment may be classified into levels by considering the release of activity from said single compartment if the design of said compartment integrates the following points:

- the pressure design, in normal operating situations, is carried out by considering the maximum pressure for each compartment without taking into account the backpressure in the neighbouring compartment except if the latter is under negative pressure;

- measures for in-service monitoring to ensure that there is no leakage between compartments.

The category of equipment, established according to the provisions of guide sheet 2/27, is determined by the fluid that generates the highest category taking into account the initial fluid, the intermediate fluid and the final fluid that are likely to be obtained under all reasonably foreseeable operating conditions.

Isolation, excluding the main primary and main secondary systems of nuclear steam supply systems as defined by the Order dated 10 November 1999, is considered to be safe if it complies with the three criteria below:

 it is normally closed or fail-safe or its actuating device has an architecture for preventing the common mode failures;

 it closes quickly enough so that the activity released during the closure is low compared to the activity contained by the equipment or systems that it isolates;

 its reliability is defined by the requirements of the operator, demonstrated (for example, initially by tests or a qualification, then, when operating, by periodic tests) and maintained.

Safe isolation may be achieved by a single isolation device subject to appropriate specific justifications.

In normal circumstances, a safety accessory may not be considered as safe isolation.

Art. 3. – I –

A safe state is when an installation is in a stable and controlled state regarding, where appropriate, control of the nuclear reaction, power or heat removal and the containment of radioactive substances.

The choice of level N1 classification or the application of the assumption excluding the failure of nuclear pressure equipment cannot justify the absence of the study of its failure in the safety report or related records.

Art. 3. – II –

If subsection II of Article 3 is applied, the limits of the safety importance classes should be considered as safe isolation, irrespective of whether they are attained or not.

Art. 6 – II –

A professional guide is drawn up by one or more operators, one or more manufacturers or any organisation composed of all relevant professionals. It may include nuclear pressure equipment in general or a clearly identified terms of equipment. It may only be used within the scope of application for which it has been drawn up.

The professional guide defining good practice specifies in particular:

 the provisions required to ensure the quality of the equipment;

 the documents related to the equipment (diagrams, calculations, equipment lists, etc.);

 the provisions required for the choice of materials (including filler materials), the heat treatments that they undergo and the inspections to which they are subject;

 all the design rules and the design justification;

 the manufacturing requirements (cutting, forming, welding, etc.) and process control requirements. This guide may make explicit reference to standards or codes that it deems mandatory.

Art. 10 – I –

The declaration of conformity in Appendix 6 of the Decree should be taken as a model but must, however, be modified for nuclear pressure equipment.

Art. 14 – I –

Certain items of nuclear pressure equipment are subject to one or more inspection operations referred to in Article 18 of the French Decree dated 13 December 1999. Apart from the main primary system and main secondary systems of water nuclear steam supply systems, for which the Order dated 10/11/99 specifies said inspection operations, the specific rules for undertaking these inspection operations are defined in Appendix 6 of the Order dated 12/12/2005.

Art. 16 – I –

Manufacturing is started when an operation such as forming, machining, assembly, heat treatment, etc. is performed on a material under the responsibility of the equipment manufacturer.

By way of exception, the manufacture of a component that is subject to a technical qualification due to the risks of heterogeneity related to the development of materials, begins with this creation.

**2.2. ASN recommendations for the application of Appendix 1 of the Order on nuclear pressure equipment**

- 1. Preliminary and general remarks -

The operator provides the manufacturer with a description of all the situations in which the equipment may be found. These conditions include, with reference to the French version of the harmonised standard EN 13445-3:

- Normal operating situations:

o normal operational situations, with the inclusion of transient phases, including start-ups and shutdowns;

o the situations corresponding to common operational incidents.

The maximum allowable pressure is not less than the maximum pressure reached during normal operating situations.

- The situations corresponding to other reasonably foreseeable conditions, within the meaning of 1.1 of Appendix 1 of the French Decree dated 13 December 1999, which may be classified, along the lines of the classification suggested by the French version of standard EN 134454-3:

o exceptional conditions corresponding to very low probability events that require the shutdown and suitable equipment checks;

o test situations for the tests after manufacture.

Situations that involve short-term exceedances of the maximum allowable pressure under the conditions laid down by 2.11.2 of the French Decree dated 13 December 1999 correspond to exceptional situations. Insofar as these situations are taken into account in a suitable manner in the design, shutdown and suitable equipment checks are not required. Suitable design involves providing a system for collecting waste and limiting the general stresses of the membranes caused by the pressure to 110% of the values resulting from the application of point 7 of Appendix 1 of the French Decree dated 13 December 1999.

With regard to damage, other than excessive distortion, the criteria for damage prevention must be respected with the safety margins for common operational incidents which are included in normal operating situations. The pressure level to be taken into account is that which is likely to be achieved in these situations with a maximum of 110 % of PS (maximum acceptable pressure value).

- The other situations known as highly improbable situations.

For these conditions, the essential requirements of the regulations for the design are not suitable. Accordingly, good practice is when the design and manufacturing criteria result from the manufacturer’s risk analysis, taking into account the requirements defined and submitted by the operator, consistent with the safety report supplemented by the related records. These requirements may, for example, apply to the containment guarantee of the contained fluid and the limitation of distortions in order to limit the reduction of the flow of the conveyed fluid or to ensure the operability of the equipment.

The safety margins taken into account for the exceptional and test situations may be different from those taken into account for normal operating situations.

The classification of situations and the requirements regarding the maximum acceptable pressure and temperature limits of level N1 nuclear pressure equipment, excluding main primary and main secondary systems, are presented in Table 1.

The operator also provides the earthquake loads to be considered and the procedures for taking them into account, as specified in the safety report.

It is essential not to confuse the operating conditions of the basic nuclear installation with the situations of the nuclear pressure equipment. The case of equipment that comprises the backup systems (a system that needs to be operational during an accident or post-accident operating condition of the basic nuclear installation) is, in this respect, particularly explicit since the conditions defined for its operation include those that appear during the accident operating conditions of the basic nuclear installation.

The operator provides the manufacturer with the description of all the situations - normal operating situations, exceptional situations, test situations and highly improbable situations - that must be defined in line with the safety report, and all the loads to be taken into account for every situation. Good practice is when the safety report supplemented by the related records explains, in sufficient detail, the approach for drawing up the list of situations for all the nuclear pressure equipment from all the operating conditions of the basic nuclear installation. It may also explain the types of loads to be taken into account and their combinations for all equipment situations. The situations and loads may be defined by the operator so that the equipment may be allocated several allocations.

The equipment conformity assessment focuses on all the requirements corresponding to all the situations of the equipment question. In practice, these are:

 for normal operating situations, exceptional situations and test situations, conformity with the essential safety requirements defined in Appendix 1 of the French Decree No. 99-1046 dated 13 December 1999, specified and supplemented by the essential safety requirements defined in Appendices 1 to 3, depending on the level of equipment, in the Order dated 12 December 2005, consistent with the risk analysis;

 for highly improbable situations, conformity with the requirements provided to the manufacturer by the operator, consistent with the safety report supplemented by the related records and those arising from the risk analysis. These requirements focus in particular on prevention regarding plastic instability damage and abrupt fracture, deferred by creep.

Special case of nuclear pressure equipment constituting the main primary system and main secondary systems of PWRs:

 Exceedances of the maximum allowable pressure of equipment constituting the main primary and secondary systems of pressurised water reactors are possible under the conditions laid down in paragraph 2.11.2 of Appendix 1 of the French Decree of 1999 and Article 4-II-c of the Order dated 10/11/1999.

 The classification of situations and all the regulatory requirements on the maximum acceptable pressure and temperature limits for pressure equipment constituting the main primary and main secondary systems are presented in Table 2.

- 2. Design -

In order to take account of the effects of irradiation on the materials, the manufacturer shall ensure that, during the intended service life of the equipment, its characteristics are adapted to the intended use of the equipment.

- 3. Manufacture -

*- 3.1. Forging and foundry operations -*

Inclusion cleanliness is more particularly required for thin-walled equipment and when the direction of the inclusions might cause a loss of resistance for the equipment.

*- 3.2. Technical qualification -*

When a technical qualification is required, the manufacturer must demonstrate that the manufacturing operations selected for the component subject to technical qualification will ensure that the risks of heterogeneity among its characteristics are controlled. The manufacturer must therefore identify:

 the causes of possible heterogeneities and the influencing parameters;

 the parts on the component where they may occur;

 the means for detecting them;

 the manufacturing processes for avoiding said heterogeneities;

 the practical measures for implementing the means of detection on the component (where, when, how, how many);

 the acceptability criteria of the results of the detection;

 the procedures for controlling the influencing parameters during manufacture.

Good practice is to identify as essential and to confine those parameters that need to be controlled in order to limit the heterogeneity risks for the part if the effects are not measurable after the qualified operation.

Parameters are identified within the limits of industry expertise.

*- 3.3. Permanent assemblies and welded linings -*

Irradiation should be considered significant of it substantially affects the properties of materials and their development over time.

*- 3.4. Non-destructive tests -*

The manufacturer is expected to specify the manufacturing defects that are unacceptable with regard to the process, possibly on the basis of relevant standards, in particular by their own characteristics (type, size, orientation, etc.) or by criteria on the indications (raw data that includes all findings) arising from non-destructive tests. It is also expected that the selected inspection techniques be adapted to the detection of the defects sought, given the nature of the materials, the location and the type of defects sought.

*- 3.5. Final check -*

The direct visual inspection is carried out with the naked eye. The personnel who carry out this inspection may use a magnifying glass. It is not necessary for the personnel to be approved by a notified body for the visual inspection.

- 4. Materials -

In specifying the requirements of points 4.1, 4.2 a) and 4.3 first paragraph of section 4 of Appendix 1 of the Decree, applicable to assembly materials, the requirements for the materials referred to in 4 of Appendix 1 of the Order are, in the same manner, applicable to assembly materials.

**Table. 1 –** Classification of situations. Requirements and related criteria for maximum acceptable pressure and temperature values (PS and TS) for nuclear pressure equipment excluding main primary and main secondary systems.

|  |  |  |  |
| --- | --- | --- | --- |
| Classification of situations with reference to the harmonised standards | | | PS / TS |
| Reasonably foreseeable situations | Normal operating situations | Normal operating situations | - T  TS.  - P  PS. |
| Common operational incident situations |
| Exceptional situations | | - P  110 % PS and short-term exceedance;  - Equipment checks (unless suitable design as defined in the body of the guide).  - adequate protection device when T  TS. |
| Test situations | | - Pressure of resistance test performed for the final check includes service test pressures. |
| Highly improbable situations | | | To avoid the risk of losing integrity if PS and TS are exceeded in relation to the requirements defined in the safety report. |

**Table. 2** - Classification of situations. Requirements and criteria related to the maximum acceptable pressure and temperature values (PS and TS) for nuclear pressure equipment main primary and main secondary systems.

|  |  |  |  |
| --- | --- | --- | --- |
| Classification of situations | | | PS / TS |
| Reasonably foreseeable situations | Normal operating situations (second category situations) | Normal operating situations | - T  TS.  - P  PS. |
| Common operational incident situations. |
| Exceptional situations (third category situations) | | - Art.4-II-c of the Order dated 10/11/1999;  - P 110 % PS with short-term exceedance;  - adequate protection device when T  TS. |
| Test situations | | Pressure of resistance test performed for the final check includes service test pressures. |
| Highly improbable situations  (or fourth category situations) | | | To avoid the risk of losing integrity if PS and TS are exceeded in relation to the requirements defined in the safety report. |

**2.3. ASN recommendations for the application of Appendices 2 and 3 of the Order on nuclear pressure equipment**

The above recommendations for the requirements in Appendix 1 remain valid for the same requirements in Appendices 2 and 3.

In specifying the requirements of points 4.1, 4.2 a) and 4.3 first paragraph of section 4 of Appendix 1 of the Decree, applicable to assembly materials, the requirements for the materials referred to in 4 of Appendix 2 are, in the same manner, applicable to assembly materials.

**2.4. ASN recommendations for the application of Appendix 5 of the Order on nuclear pressure equipment**

- 1. Information about nuclear pressure equipment

The Order requires the establishment of records on the design, manufacture and operation of nuclear pressure equipment according to the requirements of the Order. For equipment made in conformity with the previous regulations, the documents required under said previous regulation must be those gathered.

This nuclear pressure equipment includes newly-subject nuclear pressure equipment. Newly-subject equipment means equipment subject to the provisions of Appendices 5 or 6 of the Order dated 12/12/2005 but which was not subject, during its manufacture, either to all the regulatory requirements defined under French Decrees dated 02/04/1926 and 18/01/1943 or to those of the French Decree dated 13/12/1999.

Although the regulations do not require that the record be re-compiled, in order to enable the repair or periodic requalification of the equipment, the operator must possess the items of the narrative record required for these operations. If the operator does not possess all these items, it is allowed to reconstitute the missing part on the basis of information from the manufacturer.

The documentary material on the neutrality of products used for thermal insulation or for equipment coatings is provided by the manufacturer where these products form part of the equipment. Otherwise, a technical analysis report prepared by a notified body or, where appropriate, by a recognised inspection service may replace them.

The operational incidents to be listed in the operating record include in particular the stresses on safety accessories. This applies to significant and recognised stresses, without it being necessary to systematically instrument the safety accessories.

All the required technical documentation includes the items relating to the manufacture and operation of equipment, such as the records of non-destructive tests. The test results must be kept for the entire service life of the equipment in question.

- 2. Maintenance and monitoring of nuclear pressure equipment

*- 2.2. –*

For level N1 equipment (excluding PWR main primary and main secondary systems), the program of maintenance and monitoring operations must include programs for monitoring the possible degradation modes of materials. The operator may draw on the programs provided for in Article 12 of the Order dated 10 November 1999.

*- 2.6. –*

The notified body that delivers the process qualifications for non-destructive tests must be approved by COFRAC (French National Accreditation Body) or any other equivalent recognised accreditation body (for example, a member of the European Co-operation for Accreditation), based on a reference framework that guarantees its independence and expertise. This accreditation may be carried out according to standard NF EN ISO/CEI 17020 on the basis of a suitable program. The approved organisation is not necessarily of type A according to this standard.

3. Periodic inspection of nuclear pressure equipment

*- 3.4. –*

The periodic inspections are carried out on equipment with exposed walls. In order to take account of the very great diversity of situations for insulated piping and the difficulties involved in exposing equipment, especially in terms of the doses received by the workers, it is left to the operator to consider restricting the inspection to sensitive areas. However, this limitation requires the operator to anticipate the type of defect and degradation and where they occur. Although this scenario is often legitimate, it must, for level N2 piping, be validated by similar checks carried out on the other areas, without, however, these checks being systematic in nature. The operator may thus make provision for carrying out these checks on a given percentage of the length of piping in question, at a periodicity that it defines, taking care each time to check areas that have not yet been checked. This is what is meant by the partial external check.

With the exception of specific measures (piping, coated equipment, etc.), the periodic inspection is an internal and external check of the nuclear pressure equipment. This check consists of a visual inspection, the aim of which is to detect the defects and degradations that may occur and to assess their severity. In this context, additional investigations may be necessary.

The internal check of newly-subject equipment which, as a result of its design, has no visible part after all the exposure work has been carried out and all the removable items have been dismantled, focuses on an array of bare parts. This specific point must then be taken into account by the operator in the maintenance and inspection operations program.

The inspection report is signed by the operator, which enables the latter to become acquainted with it and to take responsibility under the Order, whilst being aware of the condition of the pressure equipment pool in its plant. If necessary, the operator then reviews the maintenance and inspection operations programs on the basis of the remarks made by the people who carried out the periodic inspections.

The deadline for the periodic inspection is calculated from the date on which the last periodic inspection operation was carried out under paragraph 3.4 of Appendix 5 and the interval between two periodic inspections specified in paragraph 3.3 of said Appendix. All inspection operations must be performed before the re-commissioning of the equipment.

Newly-subject equipment that was commissioned, according to the definition of Article 1 p) of the French Decree dated 13 December 1999, before 22 January 2011, is subject to a periodic inspection within a period calculated from said date corresponding to the interval between two periodic inspections as defined in paragraph 3.3 of Appendix 5.

When a safety accessory protects several items of nuclear pressure equipment, the operations necessary to ensure point 3.4 of Appendix 5 may only be undertaken during the periodic equipment inspection that has the shortest periodic inspection periodicity. The date on which these operations are first carried out must, however, correspond to the first deadline for the periodic inspection of the protected equipment. The periodic inspection reports for each item of equipment must include the dates and results of the operations performed.

4. Installation and operation of nuclear pressure equipment

*- 4.1. –*

The technical requirements applicable to permanent assemblies undertaken on equipment after it has been marketed are in particular those regarding the design, materials and filler materials, procedures for preparing components, operating methods for permanent assemblies, welders and welding operators, non-destructive tests, heat treatments, traceability and conformity assessment by the notified body or the organisation chosen by the operator. Accordingly, these permanent assemblies are treated as manufacturing operations, under the responsibility of the operator who, in these circumstances, has the same obligations as a manufacturer. As the hydrostatic test for the final check is not required, additional measures, within the context of this check, such as NDT, must have been implemented.

*- 4.2. –*

When the operations for repairing or modifying nuclear pressure equipment are significant, they must be undertaken in accordance with the rules applying to the manufacture of new equipment and thus require the intervention of the notified bodies or inspection organisations as defined in the first Article of the Order.

A component intended for repairing or modifying nuclear pressure equipment may be subject to an assessment of its conformity with the applicable regulatory requirements (French Decrees dated 02/04/1926, 18/01/1943, 3/12/1999, Order dated 12/12/2005 or requirements defined by the operator based on the manufacturer’s data in the context of repaired or modified newly-subject nuclear pressure equipment) and according to the procedures that would have been selected if said component had been manufactured as part of the manufacture of a new item of equipment. The notified body or inspection body may then draw up an attestation of conformity for the component on the basis of which the supplier of the component may draw up a component certificate. These two documents shall be taken into account during the conformity assessment of the repaired or modified item of nuclear pressure equipment or, where appropriate, by the operator if it is an operation that is not significant.

When repairing or modifying newly-subject nuclear pressure equipment, which, although not subject to all the technical provisions of the French Decrees dated 02/04/1926, 18/01/1943 or 13/12/1999, was manufactured according to these provisions, the test is performed with the load factor defined in said Decrees. If not, the test is performed at a pressure defined according to the provisions specified in paragraph 7.4 of the essential safety requirements of the French Decree dated 13 December 1999. If it is found that this factor is not suitable, the operator shall undertake the test with the maximum admissible and justified load, which it justifies and which may not be less than 120% x PS. If not, the conformity of the repaired or modified nuclear pressure equipment cannot be attested to.

**2.5. ASN recommendations for the application of Appendix 6 of the French Order on nuclear pressure equipment**

- 2. Periodic requalification of nuclear pressure equipment

Newly-subject equipment, which according to the provisions of 2.1 of Appendix 6 have to undergo period requalification due its characteristics, undergoes this complete requalification, i.e. without being exempt from a test.

Appendix 6 defines the nuclear pressure equipment which is subject to periodic requalification by distinguishing between level N1 nuclear pressure equipment and N2 and N3 level nuclear pressure equipment.

§ 2.1 of Appendix 6 states that level N1 and category I to IV equipment as defined by the Decree - i.e. containers, piping, pressure fittings and safety accessories - are subject to the provisions of § 2.3 of the periodic requalification. Accordingly, this applies to safety accessories and the other equipment.

The Order specifies, according to the second and third items of § 2.1, that the level N2 and N3 equipment covered by the periodic requalification operations are:

- the II to IV category containers and the safety accessories and pressure fittings that are connected to them or that are associated with them;

- category III piping and the safety accessories and pressure fittings that are connected to it or that are associated with them.

Accordingly, nuclear pressure equipment that consists of containers and piping, and the safety accessories and pressure fittings that are connected to it or that are associated with it, are subject to the requalification operations.

Article 2.3 of Appendix 6 defines the operations included in the periodic requalification:

- a periodic requalification inspection;

- a hydrostatic test;

- a check of the safety accessories that protect the equipment.

The hydrostatic test applies to all level N1 and category I to IV nuclear pressure equipment, irrespective of the type (container, piping, pressure fitting and safety accessory), as well as the containers and piping with the pressure fittings or security accessories that are connected to it or associated with it in levels N2 and N3 and category II to IV or III depending on whether it is a container or piping.

Regarding safety accessories for which there is no pressure risk; subject to said justification, the relevant safety accessories may be exempted from the hydrostatic test (e.g. rupture discs).

When a safety accessory protects several items of nuclear pressure equipment, the operations required to ensure the points listed in 2.6 of Appendix 6 may only be undertaken during the periodic requalification of the equipment that has the shortest periodic requalification periodicity. The date on which these operations are first carried out must, however, correspond to the first deadline of the periodic requalification of the protected nuclear pressure equipment. The reports for the periodic requalification of each item of nuclear pressure equipment must attest to the completion of these operations.

The internal check of newly-subject equipment which, as a result of its design, has no visible part after all the exposure work has been carried out and all the removable items have been dismantled, focuses on an array of bare parts. This specific point must then be taken into account by the notified body and agreed during the periodic requalification of the equipment.

The intervals between the periodic requalification of equipment are calculated from the date of the final check test or, where appropriate, from the date of the prior requalification test. When the equipment is not subject to a periodic requalification test, the requalification intervals are calculated from the dates on which the periodic requalification inspections are carried out.

Regarding newly-subject equipment: equipment commissioned before 22 January 2011 must be subject to a periodic requalification before the deadline calculated from 22 January 2011 and corresponding to the interval between two periodic requalifications as defined at point 2.2 of Appendix 6. Equipment commissioned after 22 January 2011 is subject to periodic requalification before the deadline calculated from the date of commissioning of the equipment and corresponding to the interval between two periodic requalifications as defined at point 2.2 of Appendix 6.



FRENCH NUCLEAR SAFETY AUTHORITY

15-21 rue Louis-Lejeune

92120 Montrouge France

Telephone + 33 (0) 1 46 16 40 16

Fax + 33 (0) 1 46 16 41 47

