ANNEX I

ESSENTIAL SAFETY REQUIREMENTS

1. **Materials**

Materials shall be selected according to the intended use of the vessels and in accordance with points 1.1 to 1.4.

1.1. *Pressurised parts*

The materials used for manufacturing the pressurised parts of the vessels shall be:

(a) capable of being welded;

(b) ductile and tough, so that a rupture at minimum working temperature does not give rise to either fragmentation or brittle-type fracture;

(c) not adversely affected by ageing.

For steel vessels, the materials shall in addition meet the requirements set out in point 1.1.1 and, for aluminium or aluminium alloy vessels, those set out in point 1.1.2.

They shall be accompanied by an inspection slip as defined in point (i) of point 3.1 of Annex III, drawn up by the producer of the materials.

1.1.1. *Steel vessels*

Non-alloy quality steels shall meet the following requirements:

(a) they shall be non-effervescent and supplied after normalisation treatment, or in an equivalent state;

(b) the content per product of carbon shall be less than 0,25 % and that of sulphur and phosphorus shall each be less than 0,05 %;

(c) they shall have the following mechanical properties per product:

(i) the maximum tensile strength $_{Rm,max}$ shall be less than 580 N/mm^2;

(ii) the elongation after fracture shall be:

if test pieces are taken parallel to the direction of rolling:

thickness ≥ 3 mm:	A	≥ 22 %,
thickness < 3 mm:	$A_{80\ mm}$	≥ 17 %,

if test pieces are taken perpendicular to the direction of rolling:

thickness ≥ 3 mm:	A	≥ 20 %,
thickness < 3 mm:	$A_{80\ mm}$	≥ 15 %,

(iii) the average bending rupture energy KCV for three longitudinal test pieces at minimum working temperature shall not be less than 35 J/cm^2. Not more than one of the three figures may be less than 35 J/cm^2, with a minimum of 25 J/cm^2. In the case of steels intended to be used in the manufacture of vessels

the minimum working temperature of which is lower than – 10 °C and the wall thickness of which exceeds 5 mm, this property shall be checked.

1.1.2. *Aluminium vessels*

Non-alloy aluminium shall have an aluminium content of at least 99,5 % and the alloys referred to in point (b) of Article 1(1) shall display adequate resistance to intercrystalline corrosion at maximum working temperature.

Moreover, these materials shall satisfy the following requirements:

(a) they shall be supplied in an annealed state;

(b) they shall have the following mechanical characteristics per product:

— the maximum tensile strength $R_{m,max}$ shall be no more than 350 N/mm^2,

— the elongation after fracture shall be:

— $A \geq 16$ % if the test piece is taken parallel to the direction of rolling,

— $A \geq 14$ % if the test piece is taken perpendicular to the direction of rolling.

1.2. *Welding materials*

The welding materials used to manufacture the welds on or of the vessel shall be appropriate to and compatible with the materials to be welded.

1.3. *Accessories contributing to the strength of the vessel*

These accessories (for example bolts and nuts) shall be made of a material specified in point 1.1 or of other kinds of steel, aluminium or an appropriate aluminium alloy compatible with materials used for the manufacture of pressurised parts.

The latter materials shall at minimum working temperature have an appropriate elongation after fracture and bending rupture energy.

1.4. *Non-pressurised parts*

All unpressurised parts of welded vessels shall be of materials which are compatible with that of the components to which they are welded.

2. **Vessel design**

(a) The manufacturer shall, when designing the vessel, define the use to which it will be put, and select:

(i) the minimum working temperature T_{min};

(ii) the maximum working temperature T_{max};

(iii) the maximum working pressure PS.

However, should a minimum working temperature exceeding – 10 °C be selected, the qualities required of the materials shall be satisfied at – 10 °C.

(b) The manufacturer shall also take account of the following provisions:

(i) it shall be possible to inspect the inside of vessels;

(ii) it shall be possible to drain the vessels;

(iii) the mechanical qualities shall be maintained throughout the period of use of the vessel for the intended purpose;

(iv) the vessels shall, bearing in mind their prescribed use, be adequately protected against corrosion.

(c) The manufacturer shall take account of the fact that under the conditions of use envisaged:

(i) the vessels shall not be subjected to stresses likely to impair their safety in use;

(ii) internal pressure shall not permanently exceed the maximum working pressure PS. However, it may momentarily do so by up to 10 %.

(d) Circumferential and longitudinal seams shall be made using full penetration welds or welds of equivalent effectiveness. Convex ends other than hemispherical ones shall have a cylindrical edge.

2.1. *Wall thickness*

If the product of PS × V is not more than 3 000 bar.L, the manufacturer shall select one of the methods described in points 2.1.1 and 2.1.2 for determining vessel wall thickness; if the product of PS × V is more than 3 000 bar.L, or if the maximum working temperature exceeds 100 °C, such thickness shall be determined by the method described in point 2.1.1.

The actual wall thickness of the cylindrical section and ends shall, however, be not less than 2 mm in the case of steel vessels and not less than 3 mm in the case of aluminium or aluminium alloy vessels.

2.1.1. *Calculation method*

The minimum thickness of pressurised parts shall be calculated having regard to the intensity of the stresses and to the following provisions:

(a) the calculation pressure to be taken into account shall not be less than the maximum working pressure PS selected;

(b) the permissible general membrane stress shall not exceed the lower of the values 0,6 R_{eT} or 0,3 R_m. The manufacturer shall use the R_{eT} and R_m minimum values guaranteed by the producer of the material in order to determine the permissible stress.

However, where the cylindrical portion of the vessel has one or more longitudinal welds made using a non-automatic welding process, the thickness calculated as referred to in the first paragraph shall be multiplied by the coefficient 1,15.

2.1.2. *Experimental method*

Wall thickness shall be so determined as to enable the vessels to resist at ambient temperature a pressure equal to at least five times the maximum working pressure, with a permanent circumferential deformation factor of no more than 1 %.

3. **Manufacturing processes**

Vessels shall be constructed and subjected to production checks in accordance with points 2, 3 or 4 of Annex II.

3.1. *Preparation of the component parts*

Preparation of the component parts (for example forming and chamfering) shall not give rise to surface defects or cracks or changes in the mechanical characteristics likely to be detrimental to the safety of the vessels.

3.2. *Welds on pressurised parts*

The characteristics of welds and adjacent zones shall be similar to those of the welded materials and shall be free of any surface or internal defects detrimental to the safety of the vessels.

Welds shall be performed by qualified welders or operators possessing the appropriate level of competence, in accordance with approved welding processes. Such approval and qualification tests shall be carried out by notified bodies.

The manufacturer shall also, during manufacture, ensure consistent weld quality by conducting appropriate tests using adequate procedures. These tests shall be the subject of a report.

4. **Putting into service of the vessels**

Vessels shall be accompanied by the instructions drawn up by the manufacturer, as referred to in point 2 of Annex III.

ANNEX II

CONFORMITY ASSESSMENT PROCEDURES

1. **EU-Type examination (Module B)**

1.1. EU-type examination is the part of a conformity assessment procedure in which a notified body examines the technical design of a vessel and verifies and attests that the technical design of the vessel meets the requirements of this Directive that apply to it.

1.2. EU-type examination shall be carried out in either of the following manners in accordance with Article 13:

— assessment of the adequacy of the technical design of the vessel through examination of the technical documentation and supporting evidence referred to in point 1.3, plus examination of a prototype, representative of the production envisaged, of the complete vessel (production type),

— assessment of the adequacy of the technical design of the vessel through examination of the technical documentation and supporting evidence referred to in point 1.3, without examination of a prototype vessel (design type).

1.3. The manufacturer shall lodge an application for EU-type examination with a single notified body of his choice.

The application shall include:

(a) the name and address of the manufacturer and, if the application is lodged by the authorised representative, his name and address as well;

(b) a written declaration that the same application has not been lodged with any other notified body;

(c) the technical documentation. The technical documentation shall make it possible to assess the vessel's conformity with the applicable requirements of this Directive and shall include an adequate analysis and assessment of the risk(s).

The technical documentation shall specify the applicable requirements and cover, as far as relevant for the assessment, the design, manufacture and operation of the vessel. The technical documentation shall contain, wherever applicable, at least the following elements:

(i) a general description of the vessel;

(ii) conceptual design and manufacturing drawings and schemes of components, etc.;

(iii) descriptions and explanations necessary for the understanding of those drawings and schemes and the operation of the vessel;

(iv) a list of the harmonised standards applied in full or in part, the references of which have been published in the *Official Journal of the European Union*, and, where those harmonised standards have not been applied, descriptions of the solutions adopted to meet the essential safety requirements of this Directive, including a list of other relevant technical specifications applied. In the event of partly applied harmonised standards, the technical documentation shall specify the parts which have been applied;

(v) results of design calculations made, examinations carried out, etc.;

(vi) test reports;

(vii) the instructions and safety information referred to in point 2 of Annex III;

(viii) a document describing:
— the materials selected,
— the welding processes selected,
— the checks selected,
— any pertinent details as to the vessel design;

(d) where applicable, the prototype vessels representative of the production envisaged. The notified body may request further prototype vessels if needed for carrying out the test programme;

(e) the supporting evidence for the adequacy of the technical design solution. This supporting evidence shall mention any documents that have been used, in particular where the relevant harmonised standards have not been applied in full. The supporting evidence shall include, where necessary, the results of tests carried out in accordance with other relevant technical specifications by the appropriate laboratory of the manufacturer, or by another testing laboratory on his behalf and under his responsibility.

When a prototype vessel is examined, the technical documentation shall also include:
— the certificates relating to the suitable qualification of the welding operations and of the welders or welding operators,
— the inspection slip for the materials used in the manufacture of parts and components contributing to the strength of the vessel,
— a report on the examinations and tests performed or a description of the proposed checks.

1.4. The notified body shall:

For the vessel:

1.4.1. examine the technical documentation and supporting evidence to assess the adequacy of the technical design of the vessel.

For the prototype vessel(s):

1.4.2. verify that the prototype vessel(s) has/have been manufactured in conformity with the technical documentation, that it may safely be used under its intended working conditions and identify the elements which have been designed in accordance with the applicable provisions of the relevant harmonised standards, as well as the elements which have been designed in accordance with other relevant technical specifications;

1.4.3. carry out appropriate examinations and tests, or have them carried out, to check whether, where the manufacturer has chosen to apply the solutions in the relevant harmonised standards, these have been applied correctly;

1.4.4. carry out appropriate examinations and tests, or have them carried out, to check whether, where the solutions in the relevant harmonised standards have not been applied, the solutions adopted by the manufacturer applying other relevant technical specifications meet the corresponding essential safety requirements of this Directive;

1.4.5. agree with the manufacturer on a location where the examinations and tests will be carried out.

1.5. The notified body shall draw up an evaluation report that records the activities undertaken in accordance with point 1.4 and their outcomes. Without prejudice to its obligations vis-à-vis the notifying authorities, the notified body shall release the content of that report, in full or in part, only with the agreement of the manufacturer.

1.6. Where the type meets the requirements of this Directive, the notified body shall issue an EU-type examination certificate to the manufacturer. That certificate shall contain the name and address of the manufacturer, the conclusions of the examination, the conditions (if any) for its validity and the necessary data for identification of the approved type. The EU-type examination certificate may have one or more annexes attached.

The EU-type examination certificate and its annexes shall contain all relevant information to allow the conformity of manufactured vessels with the examined type to be evaluated and to allow for in-service control. It shall also indicate any conditions to which its issue may be subject and be accompanied by the descriptions and drawings necessary for identification of the approved type.

Where the type does not satisfy the applicable requirements of this Directive, the notified body shall refuse to issue an EU-type examination certificate and shall inform the applicant accordingly, giving detailed reasons for its refusal.

1.7. The notified body shall keep itself apprised of any changes in the generally acknowledged state of the art which indicate that the approved type may no longer comply with the applicable requirements of this Directive, and shall determine whether such changes require further investigation. If so, the notified body shall inform the manufacturer accordingly.

The manufacturer shall inform the notified body that holds the technical documentation relating to the EU-type examination certificate of all modifications to the approved type that may affect the conformity of the vessel with the essential safety requirements of this Directive or the

conditions for validity of that certificate. Such modifications shall require additional approval in the form of an addition to the original EU-type examination certificate.

1.8. Each notified body shall inform its notifying authority concerning the EU-type examination certificates and/or any additions thereto which it has issued or withdrawn, and shall, periodically or upon request, make available to its notifying authority the list of such certificates and/or any additions thereto refused, suspended or otherwise restricted.

Each notified body shall inform the other notified bodies concerning the EU-type examination certificates and/or any additions thereto which it has refused, withdrawn, suspended or otherwise restricted, and, upon request, concerning such certificates and/or additions thereto which it has issued.

The Commission, the Member States and the other notified bodies may, on request, obtain a copy of the EU-type examination certificates and/or additions thereto. On request, the Commission and the Member States may obtain a copy of the technical documentation and the results of the examinations carried out by the notified body. The notified body shall keep a copy of the EU-type examination certificate, its annexes and additions, as well as the technical file including the documentation submitted by the manufacturer, until the expiry of the validity of that certificate.

1.9. The manufacturer shall keep a copy of the EU-type examination certificate, its annexes and additions together with the technical documentation at the disposal of the national authorities for 10 years after the vessel has been placed on the market.

1.10. The manufacturer's authorised representative may lodge the application referred to in point 1.3 and fulfil the obligations set out in points 1.7 and 1.9, provided that they are specified in the mandate.

2. **Conformity to type based on internal production control plus supervised vessel testing (Module C1)**

2.1. Conformity to type based on internal production control plus supervised vessel testing is the part of a conformity assessment procedure whereby the manufacturer fulfils the obligations laid down in points 2.2, 2.3 and 2.4, and ensures and declares on his sole responsibility that the vessels concerned are in conformity with the type described in the EU-type examination certificate and satisfy the requirements of this Directive that apply to them.

2.2. *Manufacturing*

The manufacturer shall take all measures necessary so that the manufacturing process and its monitoring ensure conformity of the manufactured vessels with the type described in the EU-type examination certificate and with the requirements of this Directive that apply to them.

Before commencing manufacture, the manufacturer shall provide a notified body of his choice with all necessary information, and in particular:

(a) the technical documentation, which shall also include:
- — the certificates relating to the suitable qualification of the welding operations and of the welders or welding operators,
- — the inspection slip for the materials used in the manufacture of parts and components contributing to the strength of the vessel,
- — a report on the examinations and tests performed;

(b) the inspection document, describing the appropriate examinations and tests to be carried out during manufacture, together with the procedures in respect thereof and the frequency with which they are to be performed;

(c) the EU-type examination certificate.

2.3. *Vessel checks*

2.3.1. For each individual vessel manufactured, the notified body shall carry out the appropriate examinations and tests in order to verify the conformity of the vessel with the type described in the EU-type examination certificate and with the corresponding requirements of this Directive in accordance with the following points:

(a) The manufacturer shall present his vessels in the form of uniform batches and shall take all necessary measures in order that the manufacturing process ensures the uniformity of each batch produced.

(b) When a batch is examined, the notified body shall ensure that the vessels have been manufactured and checked in accordance with the technical documentation, and shall perform a hydrostatic test or a pneumatic test of equivalent effect on each vessel in the batch at a pressure Ph equal to 1,5 times the vessel's design pressure in order to check its strength. The pneumatic test shall be subject to acceptance of the test safety procedures by the Member State in which the test is performed.

(c) Moreover, the notified body shall carry out tests on test-pieces taken from a representative production test-piece or from a vessel, as the manufacturer chooses, in order to examine the weld quality. The tests shall be carried out on longitudinal welds. However, where differing weld techniques are used for longitudinal and circumferential welds, the tests shall be repeated on the circumferential welds.

(d) For the vessels subject to the experimental method referred to in point 2.1.2 of Annex I, these tests on test-pieces shall be replaced by a hydrostatic test on five vessels taken at random from each batch in order to check that they conform to the essential safety requirements set out in point 2.1.2 of Annex I.

(e) In the case of accepted batches, the notified body shall affix its identification number, or cause that number to be affixed, to each vessel and shall draw up a written certificate of conformity relating to the tests carried out. All vessels in the batch may be placed on the market except for those which have not successfully undergone a hydrostatic test or a pneumatic test.

(f) If a batch is rejected, the notified body shall take appropriate measures to prevent the placing on the market of that batch. In the event of frequent rejection of batches, the notified body may suspend the statistical verification.

(g) The manufacturer shall be able to supply on request by the relevant authorities the notified body's certificates of conformity referred to in point (e).

2.3.2. The notified body shall supply the Member State which notified it and, on request, the other notified bodies, the other Member States and the Commission, with a copy of the inspection report issued by it.

2.3.3. The manufacturer shall, under the responsibility of the notified body, affix the notified body's identification number during the manufacturing process.

2.4. *CE marking and EU declaration of conformity*

2.4.1. The manufacturer shall affix the CE marking to each individual vessel that is in conformity with the type described in the EU-type examination certificate and satisfies the applicable requirements of this Directive.

2.4.2. The manufacturer shall draw up a written EU declaration of conformity for each vessel model and keep it at the disposal of the national authorities for 10 years after the vessel has been placed on the market. The EU declaration of conformity shall identify the vessel model for which it has been drawn up.

2.4.3. A copy of the EU declaration of conformity shall be made available to the relevant authorities upon request.

2.5. *Authorised representative*

The manufacturer's obligations set out in point 2.4 may be fulfilled by his authorised representative, on his behalf and under his responsibility, provided that they are specified in the mandate.

3. **Conformity to type based on internal production control plus supervised vessel checks at random intervals (Module C2)**

3.1. Conformity to type based on internal production control plus supervised vessel checks at random intervals is the part of a conformity assessment procedure whereby the manufacturer fulfils the obligations laid down in points 3.2, 3.3 and 3.4, and ensures and declares on his sole responsibility that the vessels concerned are in conformity with the type described in the EU-type examination certificate and satisfy the requirements of this Directive that apply to them.

3.2. *Manufacturing*

3.2.1. The manufacturer shall take all measures necessary so that the manufacturing process and its monitoring ensure conformity of the manufactured vessels with the type described in the EU-type examination certificate and with the requirements of this Directive that apply to them.

3.2.2. Before commencing manufacture, the manufacturer shall provide a notified body of his choice with all necessary information, and in particular:

(a) the technical documentation, which shall also include:
- — the certificates relating to the suitable qualification of the welding operations and of the welders or welding operators,
- — the inspection slip for the materials used in the manufacture of parts and components contributing to the strength of the vessel,
- — a report on the examinations and tests performed;

(b) the EU-type examination certificate;

(c) a document describing the manufacturing processes and all of the predetermined systematic measures taken to ensure conformity of the vessels with the type described in the EU-type examination certificate.

The notified body shall, before the date on which any manufacture begins, examine those documents in order to certify their conformity with the EU-type examination certificate.

3.2.3. The document referred to in point (c) of point 3.2.2 shall include:

(a) a description of the means of manufacture and checking appropriate to the construction of the vessels;

(b) an inspection document describing the appropriate examinations and tests to be carried out during manufacture, together with the procedures in respect thereof and the frequency with which they are to be performed;

(c) an undertaking to carry out the examinations and tests in accordance with the inspection document and to have a hydrostatic test or, subject to the agreement of the Member State, a pneumatic test carried out on each vessel manufactured at a test pressure equal to 1,5 times the design pressure; those examinations and tests shall be carried out under the responsibility of qualified staff who are independent from production personnel, and shall be the subject of a report;

(d) the addresses of the places of manufacture and storage and the date on which manufacture is to commence.

3.3. *Vessel checks*

The notified body shall carry out vessel checks or have them carried out on random samples at random intervals determined by the body, in order to verify the quality of the internal checks on the vessel, taking into account, inter alia, the technological complexity of the vessels and the quantity of production. An adequate sample of the final vessels, taken on site by the notified body before the placing on the market, shall be examined and appropriate tests as identified by the relevant parts of the harmonised standards and/or equivalent tests set out in other relevant technical specifications, shall be carried out to check the conformity of the vessel with the type described in the EU-type examination certificate and with the relevant requirements of this Directive.

The notified body shall also ensure that the manufacturer actually checks series-produced vessels in accordance with point (c) of point 3.2.3.

Where a sample does not conform to the acceptable quality level, the notified body shall take appropriate measures.

The acceptance sampling procedure to be applied is intended to determine whether the manufacturing process of the vessel performs within acceptable limits, with a view to ensuring conformity of the vessel.

The notified body shall supply the Member State which notified it and, on request, the other notified bodies, the other Member States and the Commission, with a copy of the inspection report issued by it.

The manufacturer shall, under the responsibility of the notified body, affix the notified body's identification number during the manufacturing process.

3.4. *CE marking and EU declaration of conformity*

3.4.1. The manufacturer shall affix the CE marking to each individual vessel that is in conformity with the type described in the EU-type examination certificate and satisfies the applicable requirements of this Directive.

3.4.2. The manufacturer shall draw up a written EU declaration of conformity for each vessel model and keep it at the disposal of the national authorities for 10 years after the vessel has been placed on the market. The EU declaration of conformity shall identify the vessel model for which it has been drawn up.

3.4.3. A copy of the EU declaration of conformity shall be made available to the relevant authorities upon request.

3.5. *Authorised representative*

The manufacturer's obligations set out in point 3.4 may be fulfilled by his authorised representative, on his behalf and under his responsibility, provided that they are specified in the mandate.

4. **Conformity to type based on internal production control (Module C)**

4.1. Conformity to type based on internal production control is the part of a conformity assessment procedure whereby the manufacturer fulfils the obligations laid down in points 4.2 and 4.3, and ensures and declares that the vessels concerned are in conformity with the type described in the EU-type examination certificate and satisfy the requirements of this Directive that apply to them.

4.2. *Manufacturing*

The manufacturer shall take all measures necessary so that the manufacturing process and its monitoring ensure conformity of the manufactured vessels with the approved type described in the EU-type examination certificate and with the requirements of this Directive that apply to them.

Before commencing manufacture, the manufacturer shall provide the notified body which issued the EU-type examination certificate with all necessary information, and in particular:

(a) the certificates relating to the suitable qualification of the welding operations and of the welders or welding operators;

(b) the inspection slip for the materials used in the manufacture of parts and components contributing to the strength of the vessel;

(c) a report on the examinations and tests performed;

(d) a document describing the manufacturing processes and all of the predetermined systematic measures taken to ensure conformity of the vessels with the type described in the EU-type examination certificate.

That document shall include:

(i) a description of the means of manufacture and checking appropriate to the construction of the vessels;

(ii) an inspection document describing the appropriate examinations and tests to be carried out during manufacture, together with the procedures in respect thereof and the frequency with which they are to be performed;

(iii) an undertaking to carry out the examinations and tests in accordance with the inspection document and to have a hydrostatic test or, subject to the agreement of the Member State, a pneumatic test carried out on each vessel manufactured at a test pressure equal to 1,5 times the design pressure; those examinations and tests shall be carried out under the responsibility of qualified staff who are independent from production personnel, and shall be the subject of a report;

(iv) the addresses of the places of manufacture and storage and the date on which manufacture is to commence.

The notified body shall, before the date on which any manufacture begins, examine those documents in order to certify their conformity with the EU-type examination certificate.

4.3. *CE marking and EU declaration of conformity*

4.3.1. The manufacturer shall affix the CE marking to each individual vessel that is in conformity with the type described in the EU-type examination certificate and satisfies the applicable requirements of this Directive.

4.3.2. The manufacturer shall draw up a written EU declaration of conformity for each vessel model and keep it at the disposal of the national authorities for 10 years after the vessel has been placed on the market. The EU declaration of conformity shall identify the vessel model for which it has been drawn up.

4.3.3. A copy of the EU declaration of conformity shall be made available to the relevant authorities upon request.

4.4. *Authorised representative*

The manufacturer's obligations set out in point 4.3 may be fulfilled by his authorised representative, on his behalf and under his responsibility, provided that they are specified in the mandate.

ANNEX III

INSCRIPTIONS, INSTRUCTIONS, DEFINITIONS AND SYMBOLS

1. **CE marking and inscriptions**

1.1. Vessels of which the product of PS × V exceeds 50 bar.L must bear the CE marking provided for in Annex II of Regulation (EC) No 765/2008 and the last two digits of the year in which the CE marking was affixed.

1.2. Vessels or their data plates shall bear at least the following information:

(a) the maximum working pressure (PS in bar);

(b) the maximum working temperature (T_{max} in °C);

(c) the minimum working temperature (T_{min} in °C);

(d) the capacity of the vessel (V in L);

(e) the name, registered trade name or registered trade mark and the address of the manufacturer;

(f) the type and serial or batch identification of the vessel.

1.3. Where the data plate is used, it shall be so designed that it cannot be reused and shall include a vacant space to enable other information to be provided.

2. **Instructions and safety information**

The instructions shall contain the following information:

(a) the particulars given in point 1.2 except for the vessel's serial or batch identification;

(b) the intended use of the vessel;

(c) the maintenance and installation requirements for vessel safety.

3. **Definitions and symbols**

3.1. *Definitions*

(a) The design pressure 'P' is the gauge pressure chosen by the manufacturer and used to determine the thickness of the vessel's pressurised parts.

(b) The maximum working pressure 'PS' is the maximum gauge pressure which may be exerted under normal conditions of use of the vessel.

(c) The minimum working temperature T_{min} is the lowest stabilised temperature which the wall of the vessel may attain under normal conditions of use.

(d) The maximum working temperature T_{max} is the highest stabilised temperature which the wall of the vessel may attain under normal conditions of use.

(e) The yield strength 'R_{eT}' is the value at the maximum working temperature T_{max} of any of the following:

(i) the upper yield point R_{eH}, for a material with both a lower and an upper yield point;

(ii) the 0,2 % proof strength $R_{p0,2}$;

(iii) the 1,0 % proof strength $R_{p1,0}$ in the case of non-alloy aluminium.

(f) Families of vessels:

Vessels form part of the same family if they differ from the prototype only in diameter, provided that the permissible requirements referred to in points 2.1.1 and 2.1.2 of Annex I are complied with, and/or in the length of their cylindrical portion within the following limits:

(i) where a prototype has one or more shell rings in addition to the ends, variants shall have at least one shell ring;

(ii) where a prototype has just two dished ends, variants shall have no shell rings.

Variations in length causing the apertures and/or penetrations to be modified shall be shown in the drawing for each variant.

(g) A batch of vessels consists at the most of 3 000 vessels of the model of the same type.

(h) There is series manufacture within the meaning of this Directive if more than one vessel of the same type is manufactured during a given period by a continuous manufacturing process, in accordance with a common design and using the same manufacturing processes.

(i) Inspection slip: document by which the producer of the materials certifies that the products delivered meet the requirements of the order and in which he sets out the results of the routine in-plant inspection test, in particular chemical composition

and mechanical characteristics, performed on products made by the same production process as the supply, but not necessarily on the products delivered.

3.2. *Symbols*

A	elongation after fracture ($L_o = 5{,}65\sqrt{S_o}$)	%
$A_{80\ mm}$	elongation after fracture (L_o = 80 mm)	%
KCV	bending rupture energy	J/cm^2
P	design pressure	Bar
PS	maximum working pressure	Bar
P_h	hydrostatic or pneumatic test pressure	Bar
$R_{p0,2}$	0,2 % proof strength	N/mm^2
R_{eT}	yield strength at maximum working temperature	N/mm^2
R_{eH}	upper yield point	N/mm^2
R_m	tensile strength	N/mm^2
$R_{m,\ max}$	maximum tensile strength	N/mm^2
$R_{p1,0}$	1,0 % proof strength	N/mm^2
T_{max}	maximum working temperature	°C
T_{min}	minimum working temperature	°C
V	capacity of the vessel	L

ANNEX IV

EU DECLARATION OF CONFORMITY (No XXXX)[1]

1. Vessel/vessel model (product, type, batch or serial number):

2. Name and address of the manufacturer and, where applicable, his authorised representative:

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. Object of the declaration (identification of the vessel allowing traceability; it may, where necessary for the identification of the vessel, include an image):

5. The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

6. References to the relevant harmonised standards used or references to the other technical specifications in relation to which conformity is declared:

7. The notified body … (name, number) performed … (description of intervention) and issued the certificate:

8. Additional information:

Signed for and on behalf of:

(place and date of issue):

(name, function) (signature):

ANNEX V

PART A

REPEALED DIRECTIVE WITH THE AMENDMENT THERETO

(referred to in Article 43)

Directive 2009/105/EC of the European Parliament and of the Council (OJ L 264, 8.10.2009, p. 12).	
Regulation (EU) No 1025/2012 of the European Parliament and of the Council (OJ L 316, 14.11.2012, p. 12).	Only point (j) of Article 26(1)

PART B

TIME-LIMITS FOR TRANSPOSITION INTO NATIONAL LAW AND DATES OF APPLICATION OF THE DIRECTIVES SET OUT IN PART B OF ANNEX IV TO DIRECTIVE 2009/105/EC

(referred to in Article 43)

Directive	**Time-limits for transposition**	**Date of application**
87/404/EEC	31 December 1989	1 July 1990[a]
90/488/EEC	1 July 1991	—

a In accordance with the third subparagraph of Article 18(2) of Directive 87/404/EEC, Member States shall, for the period up to 1 July 1992, permit the placing on the market and/or in service of vessels conforming to the rules in force in their territories before 1 July 1990.

b In accordance with Article 14(2) of Directive 93/68/EEC, until 1 January 1997 Member States shall allow the placing on the market and the bringing into service of products which comply with the marking arrangements in force before 1 January 1995.

93/68/EEC	30 June 1994	1 January 1995[b]

a In accordance with the third subparagraph of Article 18(2) of Directive 87/404/EEC, Member States shall, for the period up to 1 July 1992, permit the placing on the market and/or in service of vessels conforming to the rules in force in their territories before 1 July 1990.

b In accordance with Article 14(2) of Directive 93/68/EEC, until 1 January 1997 Member States shall allow the placing on the market and the bringing into service of products which comply with the marking arrangements in force before 1 January 1995.

ANNEX VI

CORRELATION TABLE

Directive 2009/105/EC	**This Directive**
Article 1(1)	Article 1(1), introductory wording
Article 1(2)	Article 1(2)
Article 1(3)(a)	Article 1(1), points (a) to (e)
Article 1(3)(b)	—
Article 2	Article 3
—	Article 2
Article 3	Article 4
Article 4	Article 5
—	Article 6
—	Article 7
—	Article 8
—	Article 9
—	Article 10
—	Article 11
—	Article 12
Article 5	—
Article 6	—
Article 7	—
Article 8	—
—	Article 13
Article 9	—
Article 10	—
Article 11(1) and (2)	—
Article 11(3)	Annex II, point 2.3

Article 12	—
Article 13(1)	Annex II, point 3.2.1
Article 13(2)	Annex II, point 3.2.2
Article 13(3)	—
Article 14	—
—	Article 14
—	Article 15
—	Article 16
—	Article 17
—	Article 18
—	Article 19
—	Article 20
—	Article 21
—	Article 22
—	Article 23
—	Article 24
—	Article 25
—	Article 26
—	Article 27
—	Article 28
—	Article 29
—	Article 30
—	Article 31
—	Article 32
—	Article 33
Article 15	—
Article 16	—
Article 17	—
—	Article 34
—	Article 35
—	Article 36
—	Article 37
—	Article 38
—	Article 39

—	Article 40
—	Article 41
Article 18	Article 42(2)
—	Article 42(1)
Article 19	Article 43
Article 20	Article 44
Article 21	Article 45
Annex I	Annex I
—	Annex II
Annex II, points 1, 2 and 4	Annex III
Annex II, point 3	Annex II, points 1.3(c), 2.2, 3.2.2 and 4.2(a)(b)(c)
Annex III	—
—	Annex IV
Annex IV	Annex V
Annex V	Annex VI

(**1**) It is optional for the manufacturer to assign a number to the declaration of conformity.