



SLOVENSKI STANDARD
SIST EN 1092-1:2002
01-november-2002

Df]fcVb]W]b'df]fcVb] b]gdc]Ā'Ē'C_fc[`Y'df]fcVb]W'nUWj]žj Yb]Ĥ`YžZ]h]b[Y]b
XcXUh_Y'n'cnbU_c`DB`!`%`XY.`>Y`YbY'df]fcVb]W

Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges

Flansche und ihre Verbindungen - Runde Flansche für Rohre, Armaturen, Formstücke und Zubehörteile, nach PN bezeichnet - Teil 1: Stahlflansche

iTeh STANDARD PREVIEW

Brides et leurs assemblages - Brides circulaires pour tubes, appareils de robinetterie, raccords et accessoires désignées PN - Partie 1: Brides en acier

[SIST EN 1092-1:2002](https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-0ca2f5ed6bf/sist-en-1092-1-2002)

Ta slovenski standard je istoveten z: EN 1092-1:2001

ICS:

23.040.60 Prirobnice, oglavki in spojni elementi Flanges, couplings and joints

SIST EN 1092-1:2002

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1092-1:2002

<https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002>

ICS 23.040.60

English version

**Flanges and their joints - Circular flanges for pipes, valves,
fittings and accessories, PN designated - Part 1: Steel flanges**

Brides et leurs assemblages - Brides circulaires pour
tubes, appareils de robinetterie, raccords et accessoires
désignées PN - Partie 1: Brides en acier

Flansche und ihre Verbindungen - Runde Flansche für
Rohre, Armaturen, Formstücke und Zubehörteile, nach PN
bezeichnet - Teil 1: Stahlflansche

This European Standard was approved by CEN on 6 July 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

SIST EN 1092-1:2002

<https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword	3
Introduction	4
1 Scope	4
2 Normative references	5
3 Terms and definitions	7
3.1 DN	7
3.2 PN7	7
3.3 maximum allowable pressure, PS	7
3.4 maximum allowable temperature, TS	7
4 Designation	7
5 General requirements	8
5.1 Flange materials	8
5.2 Repairs	9
5.3 Bolting	9
5.4 Gaskets	9
5.6 Dimensions	10
5.8 Spot facing or back facing of flanges	12
5.9 Tolerances	12
5.10 Marking	12
Annex A (normative) Butt weld-end preparation	53
<small>https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002</small>	
Annex B (informative) Material groups	54
Annex C (informative) Approximate masses of flanges and collars	56
Annex D (informative) Additional materials	64
Annex E (informative) Determination of p/T ratings for flanges using EN materials	65
Annex F (informative) Determination of p/T ratings for flanges using ASTM materials	66
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	68
Bibliography	70

ITeH STANDARD PREVIEW
 (standards.iteh.ai)

Foreword

This document (EN 1092-1:2001) has been prepared by Technical Committee CEN/TC 74 "Flanges and their joints", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2002, and conflicting national standards shall be withdrawn at the latest by June 2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard : Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

EN 1092 consists of the following four parts:

- Part 1: Steel flanges; **iTeh STANDARD PREVIEW**
(standards.iteh.ai)
- Part 2: Cast iron flanges;
- Part 3: Copper alloy flanges; [SIST EN 1092-1:2002](https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002)
- Part 4: Aluminium alloy flanges. <https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002>

This standard includes one normative and eight informative annexes.

Introduction

When Technical Committee, CEN/TC 74, commenced its work of producing this European Standard it took as its basis, the International standard, ISO 7005-1, Steel flanges.

In taking this decision, CEN/TC 74, agreed that this standard would differ significantly from the ISO standard in respect of the following:

- a) Whereas ISO 7005-1 included in its scope both the original DIN based flanges and also the original ANSI/ASME based flanges, EN 1092-1 contains only the DIN based flanges. CEN/TC 74 has produced a separate series of standards, prEN 1759-1:2000, prEN 1759-3:1994 and prEN 1759-4:1997, dealing with the ANSI/ASME based flanges in their original Class designations;
- b) The opportunity was taken to revise some of the technical requirements applicable to the DIN origin flanges.

Consequently, whilst the mating dimensions, the flange and facing types and designations are compatible with those given in ISO 7005-1, it is important to take account of the following differences which exist in EN 1092-1:

- 1) The p/T ratings of this standard have been reduced in many cases by either limiting the lower temperature ratings which can no longer exceed the PN value, or by increasing the rate at which allowable pressures shall reduce with increase in temperature;
- 2) In addition to the range of PN 2,5 to PN 40 DIN origin flanges contained in the ISO standard, EN 1092-1 also includes PN 63 and PN 100 flanges;
- 3) This standard specifies grades of European steels similar to those specified in ISO 7005-1, but in addition permits the use of those grades of ASTM steels which are specified in the ISO standard for use with the ANSI/ASME based flanges;
- 4) This standard gives an informative annex concerning requirements of EU Directives.

1 Scope

This European Standard for a single series of flanges specifies requirements for circular steel flanges in PN designations PN 2,5 to PN 100 and nominal sizes from DN 10 to DN 4000.

This standard specifies the flange types and their facings, dimensions, tolerances, threading, bolt sizes, flange jointing face surface finish, marking, materials, pressure/ temperature ratings and approximate flange masses.

This standard does not apply to flanges made from bar stock by turning, or to flanges of types 11, 12 and 13 made from plate material.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 764, *Pressure equipment - Terminology and symbols - Pressure, temperature, volume*

EN 1333, *Pipework components - Definition and selection of PN*

EN 1708-1, *Welding - Basic weld joint details in steel - Part 1: Pressurized components*

EN 10025, *Hot rolled products of non-alloy structural steels - Technical delivery conditions*

prEN 10028-2:2000, *Flat products made of steels for pressure purposes - Part 2: Non alloy and alloy steels with specified elevated temperature properties*

prEN 10028-3:2000, *Flat products made of steels for pressure purposes - Part 3: Weldable fine grade steels, normalised*

prEN 10028-4:2000, *Flat products made of steels for pressure purposes - Part 4: Nickel alloy steels with specified low temperature properties*

EN 10028-7, *Flat products made of steels for pressure purposes - Part 7: Stainless steels*

EN 10213-2, *Technical delivery conditions for steel castings for pressure purposes - Part 2: Steel grades for use at room temperature and elevated temperatures*

EN 10213-3, *Technical delivery conditions for steel castings for pressure purposes - Part 3: Steel grades for use at low temperatures*

EN 10213-4, *Technical delivery conditions for steel castings for pressure purposes - Part 4: Austenitic and austenitic-ferritic steel grades*

EN 10222-2, *Steel forgings for pressure purposes - Part 2: Ferritic and martensitic steels with specified elevated temperature properties*

EN 10222-3, *Steel forgings for pressure purposes - Part 3: Nickel steel with specified low temperature properties*

EN 10222-4, *Steel forgings for pressure purposes - Part 4: Weldable fine grain steels with high proof strength*

EN 10222-5, *Steel forgings for pressure purposes - Part 5: Austenitic, martensitic and austenitic-ferritic stainless steels*

prEN ISO 9692-1:2000, *Welding and allied processes - Recommendation for joint preparation - Part 1: Manual metal-arc welding, gas-shielded metal-arc welding and gas welding of steels (ISO/DIS 9692-1:2000)*

EN ISO 9692-2, *Welding and allied processes - Joint preparation - Part 2: Submerged arc welding of steels (ISO 9692-2:1998)*

EN ISO 6708, *Pipe components - Definition of DN (nominal size) (ISO 6708:1995)*

ISO 7-1, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 7-2, *Pipe threads where pressure tight joints are made on the threads – Part 2: Verification by means of limit gauges*

ISO 887, *Plain washers for metric bolts, screws and nuts - General plan*

ASTM A105/A105M, *Forgings, Carbon Steel, for Piping Components*

ASTM A182/A 182M, *Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service*

ASTM A203/A203M, *Pressure Vessel Plates, Alloy Steel, Nickel*

ASTM A204/A204M, *Specification for pressure vessel plates, alloy steel, molybdenum*

ASTM A216/A216M, *Steel Castings, Carbon Suitable for Fusion Welding for High-Temperature Service*

ASTM A217/A217M, *Steel Castings, Martensitic Stainless and Alloy, for Pressure-Containing Parts Suitable for High-Temperature Service*

ASTM A240/A240M, *Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels*

ASTM A325, *High-Strength Bolts for Structural Steel Joints*

ASTM A350/A350M, *Forgings, Carbon and Low-Alloy Steel, Requiring Notch Toughness Testing for Piping Components*

ASTM A351/A351M, *Castings, Austenitic, Austenitic-Ferritic (Duplex) for Pressure-Containing Parts*

ASTM A352/A352M, *Steel Castings, Ferritic and Martensitic, for Pressure-Containing Parts Suitable for Low-Temperature Service*

ASTM A387/A387M, *Pressure Vessel Plates, Alloy Steel, Chromium-Molybdenum*

ASTM A515/A515M, *Pressure Vessel Plates, Carbon Steel, for Intermediate and Higher-Temperature Service*

ASTM A516/A516M, *Pressure Vessel Plates, Carbon Steel, for Moderate and Lower-Temperature Service*

ASTM A537/A537M, *Pressure Vessel Plates, Heat-Treated, Carbon-Manganese-Silicon Steel*

3 Terms and definitions

For the purposes of this standard the following terms and definitions apply:

3.1

DN

see EN ISO 6708

3.2

PN

see EN 1333

3.3

maximum allowable pressure, PS

means the maximum pressure for which the equipment is designed, as specified by the equipment manufacturer

3.4

maximum allowable temperature, TS

means the maximum temperature for which the equipment is designed, as specified by the equipment manufacturer

4 Designation

4.1 General

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Table 1 specifies the flange types and ancillary components.

[SIST EN 1092-1:2002](#)

Figures 1 and 2 show flange types and ancillary components with the relevant flange type numbers. Flanges shall be denoted with "flange type" and the "flange number". Ancillary components shall be denoted with ancillary component type and the type number.

Figure 3 shows flange facing types, which may be used with the flanges or components shown in figures 1 and 2. Flange facings shall be denoted with "type" and the relevant symbol.

The range of DN, applicable to each flange type and to each PN, shall be as given in table 3.

4.2 Standard designation

Flanges and ancillary components in accordance with this standard shall be designated with the following:

- a) Designation, e.g. flange, lapped end or collar;
- b) Number of this standard, EN 1092-1;
- c) Number of flange type in accordance with figures 1 and 2;
- d) Type of flange facing in accordance with figure 3;
- e) DN (nominal size);
- f) PN designation;
- g) Neck thickness S (only for types 11 and 34);
- h) For type 13 flanges type of thread (R_p or R_c);
- i) Bore diameter (for sizes greater than DN 600);

B_1 (only for types 01, 12 and 32);

B_2 (only for type 02);

B_3 (only for type 04);

- j) Either the symbol or the number or the grade of the material (see tables 5a and 5b);
- k) any heat treatment required;
- l) material certificate, if required (see 5.1).

EXAMPLE 1

Designation of a flange type 01 with facing type A and nominal size DN 800, of PN 6 with bore diameter $B_1 = 818$ mm, made of material with the symbol S235JR.

Flange EN 1092-1/01 A/DN 800/PN 6/818/S235JR

EXAMPLE 2

Designation of an ancillary component type 32 with facing type A of nominal size DN 400, PN 10 and made of material with the symbol S235JR.

Collar EN 1092-1/32 A/DN 400/PN 10/S235JR

EXAMPLE 3

Designation of a flange type 02 with facing type A of nominal size DN 400, PN 10 and made of material with the number 1.0038.

Flange EN 1092-1/02 A/DN 400/PN 10/1.0038

EXAMPLE 4

Designation of a flange type 11 with facing type B2 of nominal size DN 200, PN 100 and with neck thickness, $S = 10$ mm, made of material with the symbol 13CrMo4-5.

Flange EN 1092-1/11 B2/DN 200/PN 100/10/13CrMo4-5

5 General requirements

5.1 Flange materials

Flanges shall be manufactured from materials given in tables 5a and 5b (see also annex D). For type 11, 12 and 13 flanges, the manufacture shall be from forgings. For type 21 flanges the manufacture shall be from forgings or steel castings.

The flange manufacturer shall provide documentation to ensure traceability of material. An equipment manufacturer may require a certificate in accordance with EN 10204 which is suitable for the category of equipment to which the flange is fitted.

NOTE 1 The materials given in tables 5a and 5b (see also annex D) are tabulated in groups having the same p/T ratings as given in tables 15, 16, 17, 18, 19 and 20 (see annex B).

NOTE 2 The materials of ancillary components are not within the scope of this standard.

5.2 Repairs

Where not otherwise prohibited by the applicable material standard, repairs by welding are permitted when there is a proven method. All welding shall be carried out in accordance with a written procedure.

NOTE For approval of welding procedures, see EN 288-1. For approval of welders, see EN 287-1.

5.3 Bolting

Flanges shall be suitable for use with the number and size of bolting as specified in tables 6 to 13. The bolting shall be chosen by the equipment manufacturer according to the pressure, temperature, flange material and gasket so that the flanged joint remains tight under the expected operating conditions. For selection of bolting, see EN 1515-1, for combination of the materials of flanges and bolting see prEN 1515-2:1994, for information.

5.4 Gaskets

The various gasket types, dimensions, design characteristics and materials used are not within the scope of this standard. Dimensions of gaskets are given in EN 1514-1 to EN 1514-4.

5.5 Pressure/temperature (p/T) ratings

The p/T ratings of flanges are given in tables 15, 16, 17, 18, 19 and 20.

The p/T ratings indicate the relationship between the maximum allowable pressure PS and the maximum allowable temperature.

The p/T ratings shall apply only for flange types 05, 11, 12, 13 and 21 having nominal sizes up to and including DN 600. The p/T ratings of all other flanges shall be calculated or subject to special experience.

NOTE 1 The rules for the determination of p/T ratings of the above tables are given in annexes E and F.

NOTE 2 For the material groups 10E0 to 16E0 (austenitic steels) tables 17 and 18 should be used as follows:

- table 17 should be chosen for application in cases where the flange deformation has to be strictly limited;
- table 18 should be chosen in all cases where a small amount of plastic deformation of the flanges can be considered acceptable.

NOTE 3 Linear interpolation is permitted for intermediate temperatures.

For interpolation between (-10 °C to 50 °C) and 100 °C, 20 °C shall be used.

NOTE 4 The relevant pressures and temperatures are those of the fluid in the pipework system.

5.6 Dimensions

5.6.1 Flanges

The dimensions of flanges shall be as given in tables 6 to 13 according to the PN designation. Dimension G_{\max} may be varied from the given value (see NOTE 1) which is a maximum limit. The neck thickness, S is a minimum value, selected according to pipe thicknesses given in ISO 4200 (see NOTE 2).

NOTE 1 The centre portion of the face of a flange type 05 need not be machined provided that the diameter of the unmachined portion does not exceed the recommended diameter for G_{\max} , given in tables 6 to 13.

NOTE 2 When requested by the pressure equipment manufacturer, neck thicknesses, other than those given in the relevant tables, may be supplied by agreement with the flange manufacturer.

NOTE 3 A summary of the various types of flanges specified is given in table 3 showing the nominal sizes applicable to each type and to each PN.

NOTE 4 Diameters N_1 , N_2 and N_3 of flange types 11, 12, 13, 21 and 34 are the theoretical maximum values permitting the use of ring spanners or the application of normal series plain washers without any additional machining, e.g. spot facing (see 5.8).

NOTE 5 The bore diameters of flanges type 21 are not specified in this standard, the effective bore diameters are usually given in the relevant component standard(s).

NOTE 6 Approximate masses of flanges are given in annex C.

NOTE 7 The flange thicknesses for flanges type 05, 11, 12, 13, 21 and PN 6, PN 10, PN 16, PN 25 have an unusual step at DN 600/DN 700. This is based on a change at some flange thicknesses up to and including DN 600 to meet the pressure/temperature ratings (limited to DN 600). The flange thicknesses for flanges DN 700 and above are the same as they are given in the documents of origin (DIN, BS, NFE, IBN etc.). They will be updated in future based on the flange calculation method as far as the corresponding work items of CEN/TC 74/WG 10 gives sufficient results.

NOTE 8 For flanges type 21 dimensions A , N_3 and R_1 are nominal values and are included for guidance only.

5.6.2 Hubs

The hubs of flange types 12 and 13 shall be either:

- a) parallel; or
- b) taper with an angle not exceeding 7° on the outside surface for forging or casting purposes.

Details of the weld end preparation for flanges type 11 and ancillary components type 33 shall be as given in annex A.

5.6.3 Threaded flanges

5.6.3.1 The threads of flanges type 13 shall be parallel (symbol R_p) or tapered (symbol R_c) in accordance with ISO 7-1. Gauging shall be in accordance with ISO 7-2.

NOTE Parallel threads will be supplied unless otherwise requested by the equipment manufacturer.

5.6.3.2 The thread shall be concentric with the axis of the flange and misalignments shall not exceed 5 mm per metre.

Flanges type 13 shall be manufactured without a parallel counterbore, but to protect the thread they shall be chamfered to the major diameter of the thread at the hubbed side of the flange at an angle between 30° and 50° to the axis of the thread. The chamfer shall be concentric with the thread and shall be included in the measurement of the thread length provided that the chamfer does not exceed one pitch in length.

5.6.4 Bolt holes

Bolt holes shall be equally spaced on the pitch circle diameter. In the case of flanges type 21 they shall be positioned such that they are symmetrical to the principal axes and such that no holes fall on these axes i.e. positioned "off-centre", see figures 5 to 12.

5.6.5 Lapped joints

The dimensions of lapped joints to be used with flanges, type 02 and type 04, are specified in tables 7 to 11.

For ancillary component type 33, the thickness of the lapped end at the facing shall be not less than the specified wall thickness of the pipe used.

iTeh STANDARD PREVIEW (standards.iteh.ai)

5.7 Flange facings

5.7.1 Types of facings

The types of flange facings shall be as given in figure 3 and their dimensions shall be as given in figure 4 and table 4.

SIST EN 1092-1:2002

6fca213ed6bf/sist-en-1092-1-2002

For facings types B, D, F and G, the transition from the edge of the raised face to the flange shall be:

- a) radius; or
- b) chamfer

at the choice of the flange manufacturer.

5.7.2 Jointing face finish

5.7.2.1 All flange jointing faces shall be machine finished and shall have a surface finish in accordance with the values given in table 2 when compared with reference specimens by visual or tactile means.

NOTE It is not intended that instrument measurements be taken on the faces themselves; the R_a and R_z values as defined in EN ISO 4287 relate to the reference specimens.

5.7.2.2 For flanges with facing types A, B1, E and F, turning shall be carried out with a round nosed tool in accordance with table 2.

5.7.2.3 Flanges \leq PN 40 shall have type B1 facings and flanges \geq PN 63 shall have type B2 facings, unless otherwise agreed in the order.

5.8 Spot facing or back facing of flanges

Any spot facing or back facing shall not reduce the flange thickness to less than the flange thickness specified. When spot facing is used, the diameter shall be large enough to accommodate the outside diameter of the equivalent normal series of washers in accordance with ISO 887 for the bolt size being fitted. The bearing surfaces for the bolting shall be parallel to the flange face within the limits given in table 14. When a flange is back faced a minimum fillet radius, R_2 (see figure 13) in accordance with table 21 shall be maintained.

5.9 Tolerances

Tolerances on dimensions of flanges shall be as given in table 14.

5.10 Marking

5.10.1 General marking requirements

All flanges, other than type 21 flanges, shall be marked as follows:

- a) Flange manufacturer's name or trade mark, e.g. XXX;
- b) Number of this standard, i.e. EN 1092-1;
- c) Flange type number, e.g. 11;
- d) DN, e.g. DN 150;
- e) PN designation, e.g. PN 40;
- f) Neck thickness (S), if not to this standard;
- g) For EN materials – either the symbol or the number or the grade of the material, e.g. S235JR; <https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002>
For ASTM materials - the material grade, preceded by the specification number where necessary, e.g. WC 4;
- h) Cast number of melt identification or suitable control number traceable to the cast number, e.g. 12345, when test certification is required.

EXAMPLE XXX/EN 1092-1/11/DN 150/PN 40/S235JR/12345

If a flange is too small to enable all the markings required then the minimum marking required shall be:

- a) Flange manufacturer's name or trade mark;
- b) letters "EN";
- e) PN designation e.g. PN 40;
- g) either the symbol or the number or the grade of the material;
- h) cast number or melt identification or suitable control number.

5.10.2 Stamping

Where steel stamps are used, the marking shall be positioned on the outer rim of the flange.

NOTE It should be ensured that steel stamp markings are not liable to cause cracks in the flange material.

5.10.3 Declaration of compliance

The marking EN 1092-1, together with the flange manufacturer's name or trademark on or in relation to a product, represents the flange manufacturer's declaration of compliance to this standard, i.e. a claim by or on behalf of the flange manufacturer that the product meets the requirements of this standard.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 1092-1:2002](https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002)

<https://standards.iteh.ai/catalog/standards/sist/15684276-f527-4add-8a1a-6fca213ed6bf/sist-en-1092-1-2002>