



ATG-Sert Rules

In litigation, the French version applies

1 Purpose and scope

These Specific Rules of the ATG Mark define the specific conditions for the granting and maintenance of the ATG Mark for copper press fittings for use on combustible gas and liquefied hydrocarbon installations in residential buildings and their outbuildings, as well as in livestock buildings and greenhouses.

They also cover intermediate copper-alloy fittings (tube plus threaded fitting) to be crimped with a press fitting which are considered an additional tube grade (see 5.1.3).

These Rules shall apply in addition to the General ATG Certification Rules.

The Decree of 26 September 2006 (JORF of 8 November 2006) amending the amended Decree of 15 July 1980 making mandatory the technical specifications relating to the construction and implementation of gas pipelines inside buildings or their outbuildings makes mandatory the specifications CCH AFG 2004-02 of June 2006 "Copper press fittings for use on gas installations" as of 1 November 2006 and recognises the granting of the ATG Mark by CERTIGAZ as proof of conformity to the specifications of the fittings.

2 Definitions

The definitions contained in CCH 2004-02 (see Part 1, C) shall apply.

3 Marking

The marking rules for products, their packaging and instructions are defined in CCH 2004-02 (see Part 1, F).

In addition, the press fittings shall bear the letters ATG or the ATG logo under the same conditions as the other required markings.

Information required by other markets may incorporate the product marking but it shall not result in confusion and may be explained in the instructions.

By way of derogation, the marking shall be made only on one side instead of two diametrically opposite sides.

The marking on the packaging may include the marking information and shall also specify the batch number.

The instructions and commercial documents relating to the press fittings certified by the ATG Mark may refer to the ATG Mark and bear the ATG logo.

4 Certification criteria

4.1 Obligations

No specific requirements.

4.2 Requirements applicable to copper press fittings

Copper press fittings bearing the ATG Mark shall comply with the following specifications:

- Specifications AFG CCH2004-02 (June 2006): Copper press fittings for use on gas installations.
- The ATG-Sert Certification Rules and its Annex 2.

4.3 Quality management requirements

4.3.1 Quality management system

The minimum provisions in terms of quality assurance that the applicant/holder shall adopt and implement so that the products covered by the ATG-Sert Mark are manufactured and/or distributed at all times in accordance with these certification guidelines are defined below.

By making use of the ATG Mark, the holder makes a commitment regarding the permanent quality of the certified products that it manufactures and/or supplies to its customers. In the context of the ATG-Sert Mark, the applicant/holder shall provide proof of the existence and effectiveness of its quality record.

The objective to be achieved by the applicant/holder shall be process control (as defined in Standard NF EN ISO 9000) and the maintained compliance of its products with the models initially certified.

Achieving this objective requires that the applicant/holder should implement its own means whose performance is assessed during the admission visit and verified during follow-up visits. The quality requirements of this ATG-Sert Mark are defined below and are based on the requirements of NF EN ISO 9001 whose scope is limited to the field of application. The following table summarises these requirements based on the version of the standard.

Note that the 2008 version will not be applicable after October 2018.

Quality requirements	§ NF EN ISO 9001		Requirements *
	2008	2015	
Quality management system	4		
General requirements	4.1	4.1 - 4.2	Required for the product manufacturing processes.
Documentation requirements	4.2	4.4 - 7.5	Required
Management responsibility	5		
Management commitment	5.1	5.1 - 5.2	Required
Responsibility and authority	5.5.1	5.3	Required
Management representative	5.5.2		Required
Management review	5.6	9.3	Required
Resource management	6	7.1 to 7.4	Required
Product development	7		
Product development planning	7.1	8.1	Required
Customer-related processes	7.2	8.2	Required for customer complaint management
Purchasing	7.4	8.4	Required
Control of service production and preparation	7.5.1	8.5.1	Required
Identification and traceability	7.5.3	8.5.2	Required
Product preservation	7.5.5	8.5.4 - 8.5.5	Required
Control of monitoring and measuring equipment	7.6	7.1.5	Required
Measurements, analysis and improvement	8		
Product monitoring and measurement	8.2.4	8.6 - 9.1	Required
Control of non-conforming product	8.3	8.7 - 10.2	Required
Corrective action	8.5.2	10.2	Required

(*) These requirements also apply to subcontractors if any

4.3.2 In-process control plan

4.3.2.1 Raw materials

The characteristics of raw materials used in the manufacture of press fittings (bodies and seals) shall be guaranteed by the manufacturer (raw material certificates or internal controls).

The traceability of batches of raw materials in relation to batches of finished products shall be ensured.

4.3.2.2 Dimensional characteristics

The manufacturer shall set up procedures to ensure that the allowable manufacturing tolerances for the press fittings are in accordance with the declared values drawn from the initial type tests.

The definition of the necessary metrological verifications are left to the discretion of the manufacturer. These verifications shall be carried out at the start and end of the batch and repeated every 4 hours (2 per shift).

If the process is stable with relevant records to prove it, the frequency may be increased to 8 hours.

4.3.2.3 Batch release tests

A batch of press fittings is a set having the same nominal diameter and marking, manufactured on the same machine without modifying the manufacturing parameters, from the same batch of raw materials. The batch shall be defined and identified by the manufacturer.

The test characteristics and minimum frequencies shall correspond to the data in the table below:

Property	Test sample	Article or paragraph specifying the corresponding test	Minimum number of fittings/test	Minimum test frequency if reduction
Axial slipping until rupture for a tube grade	Batch	Based on §E2.2 of CCH2004-02 The manufacturer shall define the operating procedure (tube grade, thickness, etc.) and record the results and comments to carry out the necessary analyses	To be defined by the manufacturer	20% of the batches and at least 1 batch per year

The pressure required to achieve rupture, uncoupling or leakage shall be greater than or equal to the average observed during the type tests for each diameter and weighted tube grade with a coefficient of 0.7 without being less than 40 bar. If the pressure reaches 180 bar without failure, the test shall be stopped and the batch shall be declared compliant.

If the history of the release records of each batch by product demonstrates a good process control (low dispersion and a satisfactory safety margin compared to the limit of 40 bar), the control can be reduced. In other words, for the product concerned, the test shall not be performed for each batch. The frequency shall be determined by the manufacturer based on the history but shall not be lower than the values in the table above. These provisions shall be verified during monitoring audits.

In the event of non-compliance of only one sample in the tested batch, another batch of samples consisting at least twice the original batch of samples, from same production batch, shall be retested; and if one of the new samples is found to be non-compliant, the production batch shall be rejected. If the non-conforming product was subjected to a reduced control, the following 5 batches at least shall be controlled before returning to a reduced control and the corrective actions taken shall have to be documented.

5 ATG certification process

5.1 Admission

5.1.1 Application file

The model application file is given in Annex 1.

5.1.2 Audit(s)

The manufacturing site shall always be audited at admission to ensure the points set out in §4.3 and ATG General Rules. When the manufacturing site is ISO9001 certified, §4, 5 and §6 of Standard ISO 9001:2008 or those equivalent in the 2015 version, specified in Table §4.3.1 may be exempted from audit after analysis of the ISO9001 audit report.

The duration of the audit shall not be less than 1 day.

5.1.3 Tests

The admission tests shall be those defined in CCH 2004-2 with the information in Annex 2.

When so-called “intermediate” copper-alloy fittings consist of a tube end and another threaded end, they shall be considered an additional tube grade and shall meet the requirements of the mechanical batch 1 tests.

The tests shall be carried out by the Nantes CETIM, which is the independent Mark laboratory.

However, any test carried out in a laboratory accredited by a member of the EA (European Cooperation for Accreditation) may be retained after analysis of the report to ensure the test conditions.

A manufacturer’s laboratory may be authorised by CERTIGAZ to perform mechanical type tests or monitoring tests in accordance with Specifications CERTIGAZ SLAB100 and after completing an application form. Verification tests shall then be carried out in the independent Mark laboratory or in the manufacturer’s laboratory in the presence of a person mandated by CERTIGAZ.

These verification tests shall consist in performing at least one test of each type within the scope of certification for the application for admission or the monitoring considered.

After the first certification of the manufacturer’s laboratory, the following annual monitoring test shall be inter-compared with the Mark laboratory. In this case, the number of test specimens sampled shall be 2 per lab instead of 3. CERTIGAZ may apply this provision after a change in the authorised manufacturer’s laboratory.

The applicant shall guarantee the representativeness of the fittings submitted for admission.

The applicant shall prepare the samples for the independent laboratory in agreement with it. This preparation shall consist in supplying the test specimens and crimping the fitting(s) to the recommended copper tube lengths. Otherwise, this operation shall be carried out in the independent laboratory by the applicant.

When the application concerns a modification, the test plan may be reduced. It shall be defined by CERTIGAZ depending on the nature of the modification. The CETIM laboratory may be asked to draw up this test plan. In case of doubt, the Special Committee of the Mark may be called upon to give an opinion. If there is still any doubt, the initial tests shall be performed as a safety and precautionary measure.

5.1.4 Special case

New tools with the same crimping principle:

If a press-fit tool manufacturer is not referenced for a range of fittings, an extension may be requested by the fitting licence holder, who shall ensure compatibility with its fittings. It shall enclose a study file at its request.

The tool manufacturer may also apply for a certificate of use of its equipment with a range of fittings certified already. In this case, only batch 1 tests shall be retained according to CCH 2004-02 (see Annex 2).

Several crimping types or principles (crimping geometry: single and double for example) for the same range of fittings:

In this case, the number of samples taken for each admission or monitoring test shall no longer be 3 but 2 per crimping type, except for chemical and temperature cycle tests, which remain unchanged.

5.2 Monitoring

5.2.1 Audit(s)

The monitoring audits shall be carried out every year under the same conditions as the admission audits provided for in §5.1.2.

5.2.2 Tests

Monitoring tests shall be performed every year on fittings taken as samples by CERTIGAZ during audits specified in §5.2.1 or otherwise from retail shops or from the stocks of a reseller.

Once the samples are taken, the products shall be prepared according to the prescriptions of the ATG-Sert Rules and CETIM. They shall then be sent to CETIM, at the expense of the holder, within a maximum of one month

The monitoring tests shall be the same as the admission tests concerned by batch 1 but shall be carried out successively on a single DN for each certified crimping type as defined in CCH 2004-2 (see Annex 2).

The test specimens shall be prepared by the holder or in the laboratory with the participation of the holder for the crimping of the various parts.

When the holder has declared the compatibility of several tools for the DN considered, the tooling shall not be the same each year to ensure monitoring with the various parameters.

5.3 Information

In addition to §6.1 of the ATG General Rules, the list of certified fittings shall also specify the tools recognised as compatible by each holder.

This list is available on the CERTIGAZ website: www.certigaz.fr

6 Approval

These ATG-Sert Specific Rules:

- were approved on 13 June 2016 by the Managing Director of CERTIGAZ after consulting the ATG-Sert Technical Committee;
- are applicable as of 13 June 2016, except for changes subject to a transition period;
- cancel any previous version;
- may be modified by the Managing Director of CERTIGAZ after consulting the ATG-Sert Technical Committee.

7 Summary of changes

Revision no.	Date	Main changes made	Transition period if necessary
Creation	30/06/2008	Creation of ATG-Sert Specific Rules	NA
Rev1	18/03/2013	<ul style="list-style-type: none"> - §4.3.2.3 possibility of reducing batch release tests - §5.1.3 possibility of a reduced test plan in case of modification - §5.1.3 new Specifications SLAB100 for ATG- authorised manufacturer laboratories and inter-comparison tests. - §5.1.4 sampling in the case of different tools for a fitting range - Annex 1, add the seal raw material certificates to the technical file and modify the table of references - Annex 2, details on the tolerances of the tests in CCH2004-02 - Annex 2, details on the impact test and the minimum cross-section - Change of address of CERTIGAZ 	None for all the modifications

Revision no.	Date	Main changes made	Transition period if necessary
Rev2	13/06/2016	<ul style="list-style-type: none"> - Integration of the 2 versions of ISO9001, 2008 and 2015 in §4.3.1 - Details on the frequency of in-process dimensional monitoring - Details on test specimen shipment times for annual monitoring tests - Performing monitoring tests by changing tooling brand each year when multiple brands are declared - Annex 2 adapted to the plan in CCH2004-02 - Details on the press-fit tool and its identification according to Standard NF EN 1775 - Details on possible end fittings (JSC fittings according to NF E 29-536, LPG fittings or conical male/cylindrical female fittings according to EN 10226-1) - Production of test specimens with copper alloy fittings - Integration of Specifications SROB100, Annex 2 for ammonia stress corrosion tests - In extension of Specifications ATG-B524, the DN54 copper tube, R290, 1.5 mm thick is certifiable for the crimping application. - Details on tolerances and implementation of tests - Correction in Annex 2 of the tables of test plans 	<ul style="list-style-type: none"> - Both versions are usable until October 2018; after this, only the 2015 version - No - No - No - No - No - No - No - No - No - Applicable for new applications but mandatory after 31 December 2017 for certified accessories - No - No - No

ANNEX 1

CONSTITUTION OF THE APPLICATION FILE

- Model application letter for admission reproduced on the letterhead of the manufacturer and prepared in accordance with the attached model (Document no. 1)
- General information form (Document no. 2)
- Identification form of the product subject to admission (Document no. 3)
- Technical file: dimensioned drawings of each fitting and seal
- Certificate of conformity to Standards EN549 and EN 682 for the raw material of the seals of the press-fit part
- Certificate of conformity to Rules NF078 for JPG/JPC flat seals
- Certificate of conformity to Standard EN549 for LPG seals

DOCUMENT No. 1
ADMISSION APPLICATION FORM
(to be drawn up on the manufacturer's letterhead)

Letter addressed to:

CERTIGAZ
ftao General Director
8 rue de l'Hôtel de Ville – CS 50102
F – 92200 NEUILLY SUR SEINE

Subject: Application for admission to the ATG Sertissage Mark applicable to copper press fittings for use on gas installations.

Dear Sir,

I request permission to affix the ATG-Sert Mark on the products that I manufacture, in accordance with the applicable specifications.

I declare that I have read the aforementioned texts, the ATG-Sert Certification Rules.

I agree:

- to comply fully with the requirements of the Certification Rules, as well as with the decisions taken or to be taken, in execution of said requirements;
- to sell products bearing the ATG-Sertissage Mark only after taking all the precautions to ensure their compliance with standards and specifications;
- to reserve the Mark and the reference of the products submitted to the ATG-Sertissage Mark only to the fittings conforming to those certified;
- to take all measures to protect the trademark submitted to the ATG-Sertissage Mark in order to have an exclusive right to this Mark under the industrial property legislation;
- to affix the Mark, unequivocally, on the certified products and only on them;
- to carry out the in-process controls required under the Rules of Certification of the Mark;
- to report without delay to CERTIGAZ any incident, any modification to the manufacturing method or organisation, and more generally, any fact likely to cause a variation from the conditions in which the Mark was granted;
- to facilitate the task of auditors mandated by CERTIGAZ within the framework of their missions;

DOCUMENT No. 1

- to provide any supporting documents required for the application of a penalty;
- to provide free of charge the products designated by CERTIGAZ for verifications and send them at my expense and under my responsibility to the laboratory designated by CERTIGAZ;
- to pay the amount of the costs of examining the application laid down in the financial framework of the Mark, and to make any subsequent payments that may be claimed in accordance with the rules of the Mark;
- not to indicate on all the printed advertisements or catalogues, characteristics other than those which are confirmed by the tests and which will be communicated.

(2) I also authorise the company (3) represented by Mr..... (name and capacity) to represent me on French territory for all issues relating to the use of the ATG-Sertissage Mark.

(2) I consequently request that the expenses that are to be borne by me be invoiced directly to the said representative. This agent will ensure immediate settlement of invoices upon receipt on my behalf as bound so to do in accepting to represent me.

I undertake to inform CERTIGAZ immediately of any appointment of a new agent replacing the above-mentioned agent.

Yours faithfully,

Date

*Seal and signature of **the representative** (4)(5)*

*Seal and signature of **the manufacturer** (4)(5)*

Enclosures : General information form;
 Product identification form;
 Technical file(s).

-
- (2) Optional. This paragraph only concerns applicants located outside European territory.
 - (3) The designation of the agent company shall include: corporate name, form of the company, registered office, trade register number, to be entered on Document no. 2
 - (4) The signatures of the manufacturer and its representative in France must be preceded by the handwritten words "*Approved for representation*" and "*Approved for acceptance of representation*", respectively
 - (5) Signature preceded by the handwritten words "*Read and approved*"

DOCUMENT No. 2
GENERAL INFORMATION FORM

• **Company name and address of the applicant:**

.....
.....
Contact person: Telephone: Fax:
Email:
Information for billing (VAT no., SIRET):

• Where applicable, **name and address of the agent in France:**

.....
.....
Contact person: Telephone: Fax:
Email:
Information for billing (VAT no., SIRET):

• **Company name(s) and address(es) of the manufacturing unit(s):**

.....
.....
Contact person: Telephone: Fax:
Email:

• **Company name and address of the packaging unit (if ≠ from the manufacturer):**

.....
.....
Contact person: Telephone: Fax:
Email:

• **Company name and address of the fitting supplier (if resold):**

.....
.....
Contact person: Telephone: Fax:
Email:

• **Company name and address of the site performing the release tests:**

.....
.....
Contact person: Telephone: Fax:
Email:

DOCUMENT No. 3**FITTING IDENTIFICATION FORM**
(To be attached to the technical file)

▪ **Trademark:**

▪ **Trade reference:**

▪ **Types and sizes of fittings:**

Insert or attach a table as shown in the model below, duly completed

▪ **Specification of copper tubes (grade R220 - R250 - R290, thickness and diameter):**

In the unshaded cells, Mark with a cross the copper tubes compatible according to Standard NF EN 1057 and Specifications ATG B.524 in accordance with the ATG-Sert Rules. These tubes are NF certified according to the NF090 Mark.

State	Thickness	Diameter									
		12	14	15	16	18	22	28	35	42	54
R220	1										
R250	1										
R290	1										
R290	1.2										
R290	1.5										

Dimensions in mm

▪ **Seal characteristics (attach certificates):**

- Nature:
- Reference (standard designation and reference standard):
- Hardness:
- Temperature range:
- Colour:

Note: The TGA characterisation test on the seal according to ISO 9924-2 may be provided.

▪ **Fitting raw materials (standard designation and reference standard):**

▪ **Crimping type:** **Single** **Double**

▪ **Tool(s) recommended for crimping:**

Attach any additional document designating the tool and its use.

Complete the table on the next page for the various tools.

Models of tables to be completed for identifying fittings (this table is filled with examples)

Press fitting (shape and designation to be specified: coupler, elbow, reducer, tee, etc.)	Product family code	Trade reference	Outside diameter of the copper tube in mm or type of joint to be specified			Fitting raw material	Seal raw material	Manufacturing site
			End 1 F or M	End 2 F or M	End 3 F or M			
Straight fitting	AAA	xxxxxxxxxx	F22	JPC swivel nut DN32 NF E 29-532	-	www	xxxx and yyyy	B
Straight fitting	BBB	xxxxxxxxxx	F14	GPL swivel nut M20x150	-	www	xxxx and zzzz	B
Straight fitting	AAA	xxxxxxxxxx	M16	JPC swivel nut DN20 NF E 29-532	-	www	yyyy	B
F plugs	CCC	xxxxxxxxxx	F12	-	-	Cu	xxxx	A & B
FF couplers	DDD	xxxxxxxxxx	F28	F28	-	Cu	xxxx	A & B
Sliding couplers	EEE	xxxxxxxxxx	F18	F18	-	Cu	xxxx	A & B
MF 90° elbows	FFF	xxxxxxxxxx	M14	F14	-	Cu	xxxx	A & B
FF 90° elbows	GGG	xxxxxxxxxx	F16	F16	-	Cu	xxxx	A & B
MF 45° elbows	HHH	xxxxxxxxxx	M15	F15	-	Cu	xxxx	A & B
FF 45° elbows	III	xxxxxxxxxx	F22	F22	-	Cu	xxxx	A & B
F equal tees	JJJ	xxxxxxxxxx	F16	F16	F16	Cu	xxxx	A & B
Reduced tees	JJJ	xxxxxxxxxx	F16	F14	F14	Cu	xxxx	A & B
FF reducer	KKK	xxxxxxxxxx	F22	F18	-	Cu	xxxx	A & B
MF reducer	LLL	xxxxxxxxxx	M35	F22	-	Cu	xxxx	A & B

F or M: female or male fitting

Models of tables to be completed for identifying tools

Holder of fittings	No.	Year of certificate of declaration	Mark	Model	Model year	Force	Energy	One-piece jaws	"Universal" jaws + chain	"Universal" jaws + concentric inserts	"Universal" jaws + non-concentric inserts	"Universal" jaws + inserts offset in the spindle or inclined	Profile	Jaw mark	Identification mark on fitting after crimping	Link to photo of the identification mark

It is recommended to attach these tables which can be supplemented with other information in the form of additional columns, in paper format but also in the form of an Excel file.

ANNEX 2

Supplement to CCH2004-02, by paragraph

PART 1: Characterisation of copper press fittings and their jointing method

C) Specific definitions

In addition, the definitions and recommendations of Standard NF EN 1775 and its Annex D shall apply.

The end of a press fitting is said to be female when it is designed to receive a copper tube or a smooth copper-alloy end of a threaded fitting.

The end of a press fitting is said to be male when it may be considered as a tube (copper tube or smooth copper-alloy end of a threaded fitting).

A press fitting can be provided with male and female ends.

D) Characterisation of fittings

A dimensional measurement shall be performed on 3 samples of each trade reference for the main characteristics (standardised mechanical joint, press-fit part and dimensions).

D1) Specified fitting types

To be connected to existing copper or steel installations as appropriate, end fittings may be:

- A JPC/JPG fitting, compliant with Standard NF E 29-532;
- A JSC fitting, compliant with Standard NF E 29-536;
- A conical male (R)/female cylindrical (Rp) fitting, conforming to Standard NF EN 10226-1, only for gas installations not subject to the amended Decree of 2 August 1977;
- A female fitting with socket and swivel nut, M20x150 or G3/4 ISO228-1, compliant with the respective figures G.8 (type G.36) and G.6 (type G.28) of Standard NF EN 16129.

E) Characterisation of joints

E0) Organisation of tests

When several brands of tools and/or types of jaws are recognised as compatible after analysis of the plans, the tests may be performed with a single type or a mix but the samples shall be identified.

In the case of an application concerning several grades of copper tube:

- The batch 1 tests shall be carried out with the 2 extreme grades of hardness except for the bending test which shall be carried out with the hardest grade.
- The batch 2 tests shall be carried out with the least hard grade.

In the case of a range of fittings with the same dimensional and material characteristics as the crimping part, only one type shall be tested (for example, a copper coupler with the considered diameter shall be tested for copper couplers, elbows, tees and reducers with the same diameter but a brass fitting of the same diameter shall undergo the tests).

If the seal raw material is different in a fitting range, there shall be as many ranges as seal raw materials to determine the tests to be performed.

If several crimping geometries are carried out, the tests shall be performed for each of them with the number of samples required in §5.1.4 except for chemical stress tests which shall be performed with the geometry that maximises the contact between the joint and the aggressive agent.

E0.1) Description of test specimens

When an application concerns the 3 DN's 14, 15 and 16, the admission tests may be performed only on one of the DN's to qualify the three. However, dimensional verifications and axial sliding tests shall be performed on each DN.

For diameters 28 and 35, the batch 1 tests shall be performed for the only tube specified in Specifications ATG B.524.

For the diameters 42 and 54, the batch 1 tests shall be performed for the 2 thicknesses except for the bending test, which shall be performed with the maximum thickness.

For performing the various tests with copper-alloy fittings, the test specimens may be different from those described in CCH2004-02 depending on the type of fittings available with the applicant. Depending on these fittings, CERTIGAZ shall define the production of the test specimens necessary for each test.

E1) Determination of airtightness

For the tightness test at 30 mbar, the tolerance shall be +/- 1 mbar and the upper part of the test specimen shall be immersed under (5 +/- 1) cm of water. The pressure difference applied to the specimen shall therefore be 25 mbar +/- 2 mbar.

For the tightness test at 3 bar, which corresponds to the test pressure, the tolerance shall be +/- 0.2 bar and the test specimen shall be immersed under (20 +/- 1) cm.

E2) Determination of mechanical strength

E2.1) Tensile strength

The tolerances of the forces applied shall be from 0 to + 5% for 30 to 35 min for the T2 phase.

The ramp times T1 and T3 shall be between 1 and 2 min.

E2.2) Axial sliding resistance

The accuracy for the pressure of 35 bar shall be +/- 1 bar.

The ramp times T1 and T3 shall be between 1 and 2 min.

The pressure application time shall be 48 hours 0/+2 h for the admission tests. During the monitoring tests, this time shall be 24 hours minimum.

The axial sliding test shall be repeated to determine the pressure at which the uncoupling, leakage or rupture occurs. This test provides mean values per DN and per tube grade that will serve as reference for the batch release tests.

E2.1) Bending strength

The bending test shall be performed only with the hardest copper tube grade.

The 2 bearing points at the ends and the point of application of the deflection are obtained on an arc of circle of radius 30 mm and by a radius of 5 mm on the point of application of the deflection.

Exceptionally, as in the chemical resistance tests, the samples may be made with a reduced length of tube to limit the size of the baths, without being less than 400 mm.

The bending f is then calculated with the formula: $f = F \times l / L$ where F and L are the values set out in CCH2004-02.

Example with the tolerances:

Initial length: L (mm)	Initial deflection: F (mm)	Deflection f for a length $l = 400$ mm
1,200 +/- 5	20 0/+0.5	6.7 0/+0.1
1,800 +/- 5	20 0/+0.5	4.5 0/+0.1
2,400 +/- 5	20 0/+0.5	3.4 0/+0.1
2,700 +/- 5	20 0/+0.5	3.0 0/+0.1

The value of f is rounded up to 1/10. The test report shall indicate these conditions.

E2.4) Alternating bending strength

The tolerances shall be as follows:

- frequency: 20 +/- 1 Hz,
- amplitude: between [- 1 mm, +1 mm] and [- 1.3 mm, +1.3 mm],
- visible length of tube: 200 +/- 2 mm

As an indication, to determine the moment of a possible failure, the test may be performed with the insulated test specimen at test pressure (3 +/- 0.2 bar). In the event of a pressure failure, the number of cycles before leakage is thus known because the test bench stops.

Note: If the bench stops because of a leak in a non-crimped part, the test shall be continued without pressure until the total number of cycles required. The procedure used (with or without pressure) and the possible uncertainties shall be mentioned in the report.

E2.5) Torsional strength

The tolerances shall be as follows:

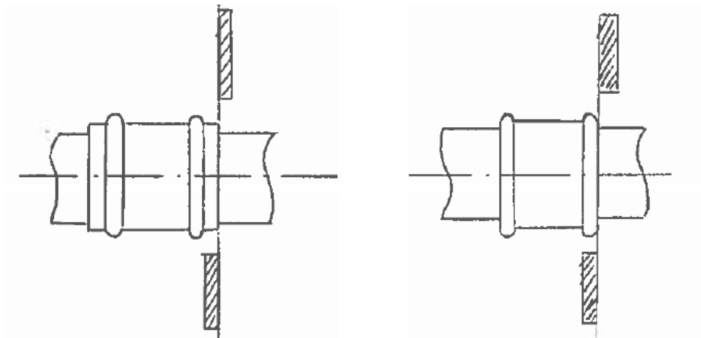
- visible tube length between the clamping jaws and the coupler: 300 +/- 2 mm
- angular position: between [- 5° , +5°] and [- 5.5° , +5.5°]
- angular speed: between 10 s and 1 min for 10°
- dwell time: 60 to 80 s

E2.6) Shear strength

The tolerances shall be as follows:

- Force: 0/+5%
- Blade L: +/- 0.1 mm
- Radius R: 0/+0.1 mm
- Force application time: +/- 6 min
- Ramp time: 1 to 2 min

Position of shearing blades in double and single crimping:



E2.7) Crush resistance

The tolerances shall be as follows:

- Force: 0/+5%
- Force application time: +/- 6 min
- Ramp time: 1 to 2 min

The cross-section shall be checked with the appropriate balls after the crush test. If the cross-section is not respected, the test shall be non-compliant. But if the fitting is leaktight, the test shall be not blocking for certification since safety is ensured. The report shall indicate the maximum ball diameter that can pass into the test specimen.

E2.8) Impact resistance

The radius at the end of the bevel at 45° shall be 0.5 mm.

The impact energy shall have a tolerance of 0/+10%.

The point of impact shall be the part of the fitting deformed by the crimping, more precisely the compression zone of the joint, to be identical between a single or double crimping.

The test specimen being made with a coupler, each crimped part shall be tested according to CCH2004-02:

- 2 impacts, at the same spot on the groove of a seal
- 2 impacts, with a 90° rotation of the test specimen between the 2 impacts.

The report shall specify the results in each case.

The cross-section shall be checked with the appropriate balls after the impact test. If the cross-section is not respected, the test shall be non-compliant. But if the fitting is leaktight, the test shall be not blocking for certification since safety is ensured. The report shall indicate the maximum ball diameter from among the diameters given in §E.4, that can pass into the test specimen.

E3) Chemical resistance

E3.1) Ammonia tests for resistance to stress corrosion (resistance to stress cracking in ammonia) of copper-alloy connecting parts

Specifications SROB100, Annex 2 (pH 13.1 for 120 hours) shall be applicable, instead of ISO 6957 (pH 10 for 24 hours), for:

- 2 DN's of copper-alloy female press fittings, DN's 14 and 22 which correspond to the extreme diameters, the most used for gas installations for livestock;
- 2 crimped samples which form 1 test specimen per DN;
- The test pressure PMS shall be 1.75 bar and the rapid leak test shall be 3 bar for 15 minutes.

For this modification and for accessories already certified, a transition period until 31/12/2017 is provided for each holder to ensure compliance with the specifications for the gas installations for livestock. For new applications, the new specifications shall be applicable upon publication of the Rules.

E3.2) Resistance to external chemical stress

The tests shall be carried out with the largest diameter.

The tolerances shall be as follows:

- Time of exposure to chemicals: 0/+2 h
- Temperatures: +/- 3 °C

E4) Minimum flow cross-section

The flow cross-section shall be checked with the appropriate balls for each DN with couplers.

For other fittings, the dimensions of the crimped area shall be the same and the other non-deformed areas shall be designed to ensure the passage of the appropriate balls. The verification shall be done on the plans.

E5) Resistance to ageing

E5.1) Calculation of the initial average stress exerted on the seal by the crimped fitting

This calculation is not decisive for declaring the certification; it is only indicative.

E6.2) Accelerated ageing test by thermal cycling

The tests shall be carried out with the largest diameter.

The tolerances shall be as follows:

- Temperature: It shall be measured in the thermal chamber and the temperature probe shall not be in contact with the test specimens. The maximum amplitude shall be 50^{0/+5}°C and the minimum amplitudes shall be -10^{0/-5}°C or -20^{0/-5}°C.
- Cycle time: +/-10%.

F- Crimping tool – Marking – Packaging – Instructions for use

F1- Crimping tools

In addition, the recommendations of Standard NF EN 1775 and its Annex D shall apply, in particular the recommendations to ensure the traceability of the jointing means used.

F2- Marking of fittings

The marking shall be affixed only once on each fitting with the ATG logo or the letters ATG.

PART 3: Use of installations with copper crimped fittings

As a further reminder, in accordance with NF DTU 61.1 Part 2, §5.3.3.1.2.8, the gas tubing shall not include any mechanical fitting or accessory inside a crawl space. According to NF DTU 61.1 Part 1, §3.76, a fitting is said to be mechanical when the jointing and sealing are obtained separately; this is therefore the case of press fittings.

ADMISSION			Test plan (see paragraphs of CCH 2004-02 and Annex 2 of the ATG-Sert Rules)											Test family								
			E1.1	E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E3.1	E3.2	E4	E1.2	Batch 1	Batch 2	Number of diameters of the fitting 12 to 54	Tube grade Max. qty	Tube grade A: hard B: hard and annealed depending on DN C: least hard/DN	Fitting type (coupler, elbow, tee, etc.)	GS and crimping form (jaws)
No. of samples	Test	Strain time (h)	Leaktightness 1 h 30 mbar And 1h 3 bar	Tensile	Axial sliding	Bending	Alternate bending	Torsion	Shear	Crush	Impact	Ammonia	Bleach Pentane Acid Salt bath Detergent	Min. cross-section	Leaktightness 10 min 3 bar							
3	Tensile	0.5	①	②											③	X		10	2	B	1	All
3	Axial sliding	48	①		②										③	X		10	2	B	1	All
3	Bending	0.5	①		②										③	X		10	1	A	1	All
3	Alternate bending	14	①and③			②										X		10	2	B	1	All
3	Torsion	1	①				②								③	X		10	2	B	1	All
3	Shear	1	①						②						③		X	2	1	C	1	All only for extreme diameters
3	Crush	1	①							②				④ Note 2	③		X	2	1	C	1	
3	Impact		①								②			④	③		X	2	1	C	1	
3	Stress corrosion	24	①and③									②					X	2 Note 1	1	C	1	
15	Chemical stress 5 baths	72 to 96	①and④			③							②				X	1	1	C	1	
3	Minimum cross-section		-	-	-	-	-	-	-	-	-	-	-	①	-	-	X	10	1	C	1	
0	Initial stress (calculation)																X	10				
3	Accelerated ageing / GS	840															X	1	1	C	1	

GS: crimping geometry (M: single or V: double)

Batch 1: all the diameters of the fittings shall be tested

Batch 2: all extreme diameters (minimum and maximum) of each crimping form shall be tested

Note 1: Refer to §E3.1) of Annex 2 of ATG Rules.

Note 2: The balls are those of Table E2.7) after crushing

MONITORING OR TOOLS (required by a tool manufacturer)				Test plan (see paragraphs of CCH 2004-02 and Annex 2 of the ATG-Sert Rules)											Test family		Number of diameters of the fitting 12 to 54	Tube grade Max. qty	Tube grade A: hard B: hard and annealed depending on DN	Fitting type (coupler, elbow, tee, etc.)	GS and crimping form (jaws)	
				E1.1	E2.1	E2.2	E2.3	E2.4	E2.5	E2.6	E2.7	E2.8	E3.1	E3.2	E4	E1.2						Batch 1
No. of samples	Test	Strain time (h)	Leaktightness 1 h 30 mbar And 1 h 3 bar	Tensile	Axial sliding	Bending	Alternate bending	Torsion	Shear	Crush	Impact	Ammonia	Bleach Pentane Acid Salt bath Detergent	Min. cross-section	Leaktightness 10 min 3 bar	Batch 1	Batch 2	Number of diameters of the fitting 12 to 54	Tube grade Max. qty	Tube grade A: hard B: hard and annealed depending on DN	Fitting type (coupler, elbow, tee, etc.)	GS and crimping form (jaws)
Monitoring	3	Tensile	0.5	①	②										③	X		1	2	B	1	All
	3	Axial sliding	24 min	①	②										③	X		1	2	B	1	All
	3	Bending	0.5	①		②									③	X		1	1	A	1	All
	3	Alternate bending	14	①and③			②									X		1	2	B	1	All
	3	Torsion	1	①				②							③	X		1	2	B	1	All
Tools	3	Tensile	0.5	①	②										③	X		10	2	B	1	All
	3	Axial sliding	48	①	②										③	X		10	2	B	1	All
	3	Bending	0.5	①		②									③	X		10	1	A	1	All
	3	Alternate bending	14	①and③			②									X		10	2	B	1	All
	3	Torsion	1	①				②							③	X		10	2	B	1	All

GS: crimping geometry (M: single or V: double)

Batch 1: all the diameters of the fittings shall be tested

Batch 2: all extreme diameters (minimum and maximum) of each crimping form shall be tested