

## INSULATION JOINT ON GASEOUS OXYGEN PIPING

## General specification

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Rev.	Date	Supervis.	Appr.	Modifications
0	13.04.88	Garcia		Original issue
a	25.09.88	Garcia		Complete review (following note: DTEC.15-88)
b	21.10.92	Dumont		Entered into VM
c	01.09.96	R Mathé		Reaffirmed in Microsoft™ WORD
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**General specification**

**CONTENTS**

<b>1. SCOPE</b>	<b>3</b>
<b>2. PRINCIPLE AND DESIGN</b>	<b>3</b>
<b>3. DESCRIPTION OF COMPONENTS</b>	<b>3</b>
3.1 Welding-neck flanges ISO NP 100	3
3.2 O ring seals	3
3.3 Bolts & nuts	4
3.4 Sheathes and insulating washers	4
3.5 Enamelled steel insulating ring	5
<b>4. TREATMENTS</b>	<b>5</b>
4.1 Flange phosphatizing	5
4.2 Degreasing	5
4.3 Paints	6
<b>5. INSPECTIONS</b>	<b>6</b>
5.1 Inspection for cleanliness	6
5.2 Inspection of the electrical insulation	6
<b>6. SHIPMENT AND ASSEMBLY</b>	<b>6</b>
6.1 Temporary assembly	6
6.2 Final assembly	7
6.3 In any case	7
<b>7. CERTIFICATES</b>	<b>7</b>
7.1 The insulating joints	7
7.2 A material certificate	8
7.3 An agent of the customer	8

## INSULATION JOINT ON GASEOUS OXYGEN PIPING

### General specification

## 1 SCOPE

This General Specification covers the supply of insulating joints installed on the gaseous oxygen piping and intended for the plants for which L'AIR LIQUIDE provides the engineering works.

This specification is in accordance with the instructions of the Technology Management (AL-DTEC).

## 2 PRINCIPLE AND DESIGN

One enamelled steel ring provided between two flanges secures the electrical insulation preventing the electric current flow along the O<sub>2</sub> piping.

The insulating joint will be in accordance with the drawings and bills of materials of the constructor who received the L'AIR LIQUIDE approval.

These drawings shall be as per the requirements of the present specification.

Any modification of the insulating joint may only be carried out after L'AIR LIQUIDE's prior written approval.

## 3 DESCRIPTION OF COMPONENTS

### 3.1 Welding-neck flanges ISO NP 100

Type 11 according to NF-E.29203 or 600 lbs according to ANSI-B16.5 Material : Carbon steel BF-48.N (NF-E.29204) or ASTM-A.105.

They will be machined in order to secure tightness by means of O Rings R.

Boring according to the tube inside diameter, (the tube thickness is mentioned in the procurement particular specification).

### 3.2 O ring seals

O rings in green Viton coloured in the mass.  
(according to instructions AL-DTEC).

**INSULATION JOINT ON GASEOUS OXYGEN PIPING****General specification**

### 3.3 Bolts & nuts

The flanges can be assembled by means of :

- either bolts and nuts,
- or threaded rods and nuts.

The diameters and mechanical characteristics of the bolts & nuts shall meet the service conditions of the insulating flange specified at the time of the order.

The carbon steel or stainless steel bolts and nuts as per the table hereafter may be used :

Standards	CARBON STEEL		S.S. STEEL	
	Nuts	Bolts or threaded rod	nuts	bolt or H threaded H rod
NF-E.29043	45.D.2 Treated	42.CD.4	Z6-CN.18.09	Z6-CN.18.09
A S T M	A-194 Grad 2 h	A-193 Grad B 7	A-194 Grad 8	A-193 Grad B 8 Class 2

The stainless steel bolts & nuts will be in "overhardened" condition.

The bolts or threaded rods will be coated with a heat shrinkable sheath over all the length, except the useful threading part.

### 3.4 Sheathes and insulating washers

The insulating washers shall be in a dielectric material with a sufficient mechanical strength to permit tightening the bolts. They can be in P.V.C.

Their minimum thickness will be 10 mm.

They shall be separated from the nuts or bolt heads by carbon steel or stainless steel washers.

The external diameter of the insulating washers will be equal to the external diameter of the steel washers.

The sheathes and washers will have a sufficient thickness to withstand a dielectric test under 5 KV.



## **INSULATION JOINT ON GASEOUS OXYGEN PIPING**

### **General specification**

### **3.5 Enamelled steel insulating ring**

The two faces shall be flat, smooth and parallel. Only the external diameter can be coated with an anti-rust paint coat.

Enamelling shall not present any peeling or scratches. The thickness of the insulating ring will be 20 mm.

## **4 TREATMENTS**

### **4.1 Flange phosphatizing**

After machining, the flanges will be carefully degreased (see point § 4.2) and subjected to a phosphate treatment by immersion in a bath of products approved by L'AIR LIQUIDE, (such as PERDOCYL T 45, MAX PERLES Co).

The treatment duration and procedures shall be defined with the constructor.

### **4.2 Degreasing**

#### **4.2.1 The flanges may be degreased**

The flanges may be degreased by means of a chlorinated solvent approved by L'AIR LIQUIDE, such as :

- trichloroethylene
- trichloroethane
- trifluorotrichloromethane (Forane 113, Flugene 113) See also recommendation IGC-33/86.

#### **4.2.2 The insulating rings, joints and bolts coated**

The insulating rings, joints and bolts coated with the sheath, will only be degreased by means of trifluorotrichloromethane (Forane 113, Flugene 113, etc.)

#### **4.2.3 After degreasing**

After degreasing, all residual traces of the solvent in use shall be eliminated by wiping with a clean, dry and lintfree cloth or by blowing with dry nitrogen (see § 5.2)



**INSULATION JOINT ON GASEOUS OXYGEN PIPING**

**General specification**

### 4.3 Paints

All paints and varnishes are prohibited inside the flanges and on all faces liable to be in contact with pressurized oxygen.

## 5 INSPECTIONS

### 5.1 Inspection for cleanliness

The absence of residues of foreign matters, particles, filings, dusts, textile wastes, etc. will be checked by visual examination with white light. The general cleanliness is judged sufficient if no trace of impurities can be visually detected.

The absence of residues of fatty matters will be checked by means of a high porosity, clean and light paper (for example, make-up remover paper).

After rubbing this paper on the surfaces to be inspected, there shall not be any permanent stain (ring) left on this paper as a result of the presence of oil or grease on the surface. In case of doubt, one will examine the surfaces to be inspected with the ultraviolet light (WOOD lamp) producing radiations of a wave length of between 2 500 and 4 500 angstrom. There shall not be any fluorescence proving the presence of traces of fatty matters or textile fibers.

### 5.2 Inspection of the electrical insulation

After assembling, the insulating flanging shall withstand a dielectric test under 5 kV.

## 6 SHIPMENT AND ASSEMBLY

The insulating joints can be delivered under two packagings indicated in the particular specification :

### 6.1 Temporary assembly

#### 6.1.1 The two flanges

The two flanges will be shipped, assembled by the joint facing with 4 usual bolts. One klingerite flat gasket will be fitted between the two flange facings in order to prevent any ingress of moisture or foreign bodies. The flange extremities will be blanked off by plastic plugs and a dehydrating bag of one half French unit will be affixed inside on one of the plastic plugs.

## INSULATION JOINT ON GASEOUS OXYGEN PIPING

### General specification

#### 6.1.2 The insulating rings, joints and bolts

The insulating rings, joints and bolts will be delivered separately, clean and degreased and placed under a clean and tight plastic package.

The isolating rings shall be packed so as to avoid any shocks, strokes, etc. in order to avoid any deterioration of enamel during transportation.

#### 6.2 Final assembly

In this case, the complete joint is assembled in works, with two welded sleeves (see minimum length on AL-SD.358.11).

The assembly will then be subjected to a tightness test at the works.

#### 6.3 In any case

In any case, the packages will contain dehydrating capsules or bags as well as a tag showing :

- the nominal diameter of the insulating flange and its item (according to the particular specification).
- the assembly precautions and procedures as well as the tightening torque to be applied to the bolts.

The following bilingual inscription shown very conspicuously:


<p><b>ATTENTION</b></p> <p>Matériel pour Service Oxygène Ni huile, ni graisse Ne pas ouvrir avant installation</p>
<p><b>CAUTION</b></p> <p>Equipment for O<sub>2</sub> service No oil, no grease Do not open before setting up</p>

## 7 CERTIFICATES

### 7.1 The insulating joints

The insulating joints will be supplied with the following certificates issued by the constructor :

- certificate of the dielectric test under 5 kV by the constructor,

 <b>AIR LIQUIDE</b> <small>INGENIERIE</small>	57, Ave Camot - B.P. 313 94503 Champigny Cedex (FRANCE)	<b>STANDARD D.I.</b>	<b>GS.358.11 - c</b>
<p align="center"><b>INSULATION JOINT ON GASEOUS OXYGEN PIPING</b></p> <p align="center"><b>General specification</b></p>			

- certificate confirming that the assembly was perfectly degreased and that it was as per the constructor's drawing (with indicated No) and as per the present General Specification.

All these certificates can form the subject of one single document of the constructor.

## 7.2 A material certificate

A material certificate for the flanges and bolts may be supplied as well as a tightness test certificate if the joint is supplied fully assembled (see particular specification).

## 7.3 An agent of the customer

An agent of the customer or any inspection authority appointed by him will carry out an acceptance inspection and will check that the equipment is as per the drawings and the present specification.

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Departm. DI / S06	Archiv. Q:\Standard		Page 8 / 8
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