



**AIR LIQUIDE**  
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STANDARD D.I.

GR.204.41 - d

**SAFETY SPACING REQUIREMENTS AROUND OXYGEN STATION**

**FRONT PAGE**

Rev.	Date	Supervis.	Appr.	Modifications
0	10.09.76	Hezard		Original Issue
a	21.02.78	Hezard		Remade
b	18.11.88	Garcia		Updated
c	03.07.97	Le Goas		Reaffirmed under Microsoft® Word.
d	25.08.98	Sagot Fano Mathey		Remade
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## SAFETY SPACING REQUIREMENTS AROUND OXYGEN STATION

### INTRODUCTION

Depending on the value of the products  $P(\text{in bar}) \times DN^2(\text{in cm}^2)$  and  $P(\text{in bar}) \times V(\text{in m/s})$   
AL considers 3 categories of  $O_2$  stations:

#### 1 CATEGORY NBR 1 - SMALL INSTALLATIONS.

$$PMS_{(\text{bar})} \times DN^2_{(\text{cm})} < 1500 \text{ and } PMS_{(\text{bar})} \times V_{(\text{m/s})} < 300, \text{ or } PMS_{(\text{bar})} < 1 \text{ bar}$$

In this category of station, no specific risk has been identified. Protective walls or screens are not necessary in this case.

For information the maximum allowable flowrates in this category are: 2000 Nm<sup>3</sup>/h in 2", 5000 Nm<sup>3</sup>/h in 3" and 8000 Nm<sup>3</sup>/h in 4" for the optimal pressure of 15 bar.

#### 2 CATEGORY NBR 2 - MEAN INSTALLATIONS

$$PMS_{(\text{bar})} \times DN^2_{(\text{cm})} < 3000 \text{ and } PMS_{(\text{bar})} \times V_{(\text{m/s})} < 600 \text{ and } PMS_{(\text{bar})} = 1 \text{ bar}$$

A "restrictive access" area is defined around the station (fence or marking on ground). Staff protective screens are to be installed for working and normal maintenance purposes.

Protective walls (as per AL-GR.318.10) shall be installed if the safety distances indicated cannot be applied.

For information the maximum allowable flowrates in this category are: 4000 Nm<sup>3</sup>/h in 2", 10000 Nm<sup>3</sup>/h in 3" and 16000 Nm<sup>3</sup>/h in 4" for the optimal pressure of 30 bar.

#### 3 CATEGORY NBR 3 - LARGE INSTALLATIONS.

$$PMS_{(\text{bar})} \times DN^2_{(\text{cm})} = 3000 \text{ and } PMS_{(\text{bar})} = 1 \text{ bar, or } PMS_{(\text{bar})} \times V_{(\text{m/s})} = 600 \text{ and } PMS_{(\text{bar})} = 1 \text{ bar}$$

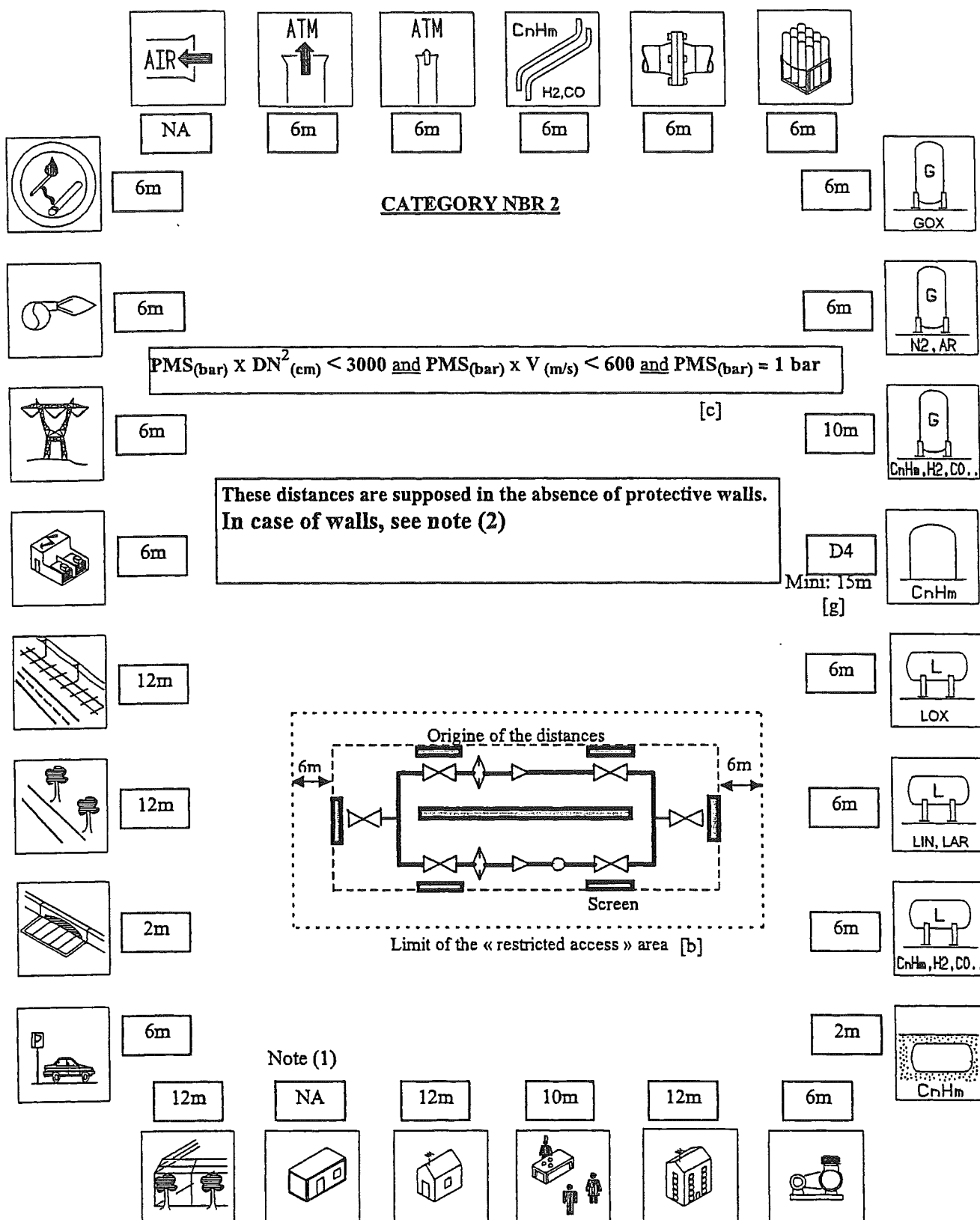
Same dispositions than per category nbr 2, except than safety distances are more important.

Remark:

Piping  $< \text{ or } =$  to 25 mm are not concerned.

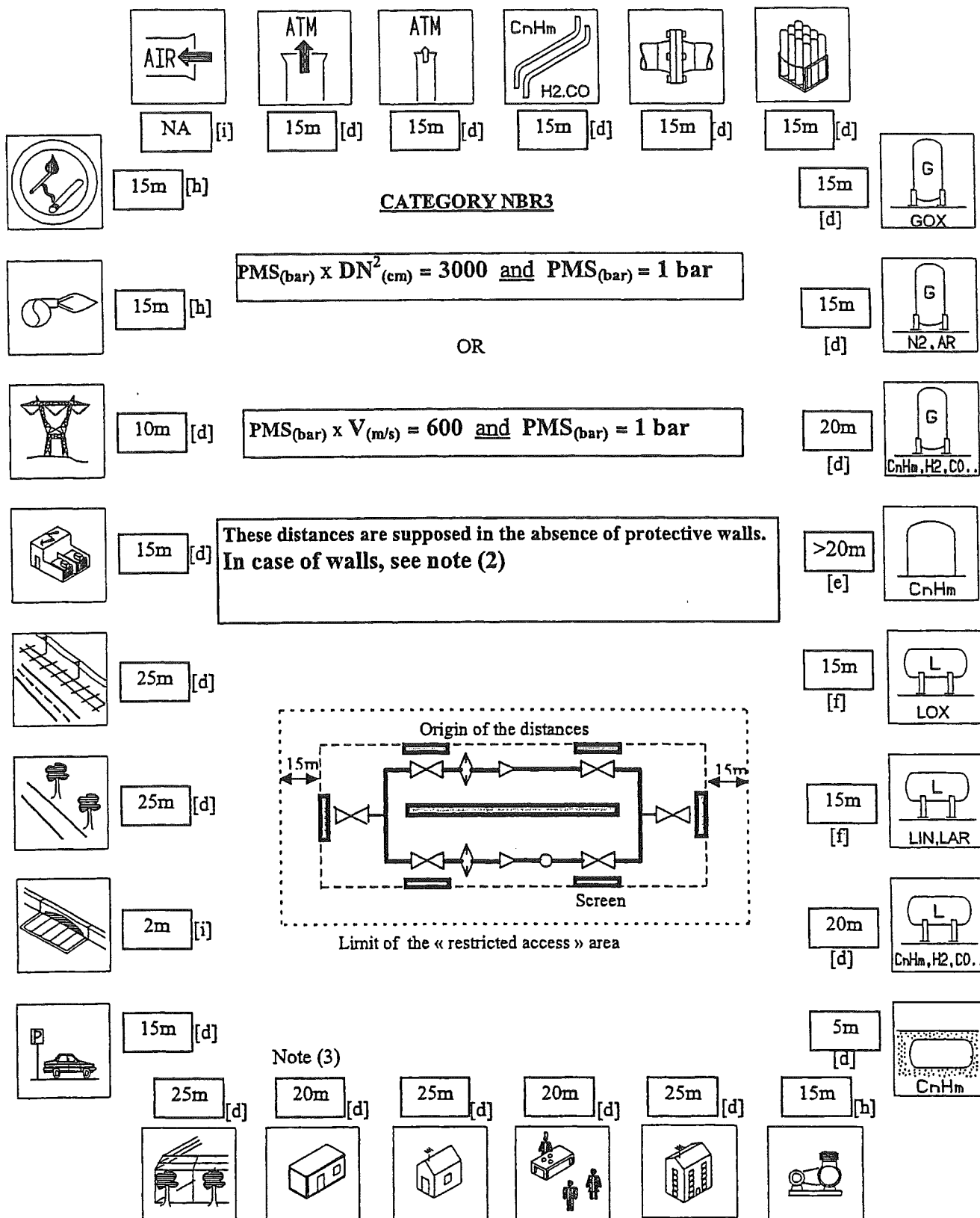
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## SAFETY SPACING REQUIREMENTS AROUND OXYGEN STATION

### – Generalities:

Legend of the symbols :AL-GR.204.40.

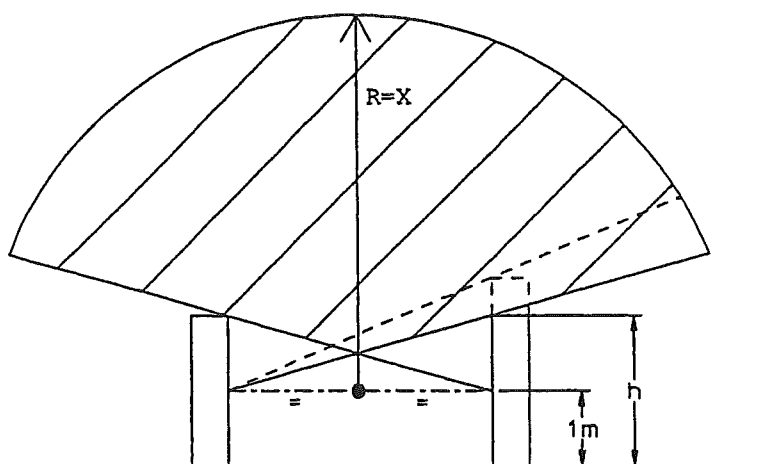
**D4:** Major risks plants. Distances as per national regulations (with mini 15m) and / or conclusions due to a specific risk study.

### – Notes:

(1) For buildings without permanent staff (ex. MODIN): openings and access at the opposite of the station.

(2) In presence of walls, a « non aedificandi » and « no entry » area is to be taken into account, as per hereunder sketch:

The value "x" corresponds to the safety distances indicated in page 4 for the category 2 and page 5 for the category 3.



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The height "h" of the wall can be changed, on one or several sides of the station, to make possible the installation of equipments close to the station ("h"mini = 2m40).

(3) For buildings without permanent staff (ex. MODIN), mini: 3m only if there is no opening in the direction of the station, and if the materials are non-combustible or fire-proof (see AL-GR.318.10). The access is to be "protected" by the building.

### – Justificative notes:

[a] The value 1500 is decided by AL, due to the absence of identified risk, and out of the regulations scope.

The value 300 is in accordance with the CGA G-4.4 (maxi speed in the impact areas).

These values result of the AL experiment on the low pressure stations.

[b] AL decision, in analogy with the standard of O2 reciprocating compressors.



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[c] The value 3000 is from IGC 13/82 (large size stations).

The value 600 is an AL decision, in conformity with the CGA G-4.4 requirements on gaseous O<sub>2</sub> speed.

[d] IGC 13/82

[e] In conformity with IGC 13/82 for flammable gases storages.

[f] In analogy with the liquid storages (IGC 13/82).

[g] The mini 15m is from NFPA 50 for the volumes > 4m<sup>3</sup>, and AL decision to apply it for all the volumes.

[h] AL decision, in analogy with the transformers stations.

[i] AL decision.