



AIR LIQUIDE
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STANDARD D.I.

GR.318.10 - e

PROTECTIVE WALLS FOR OXYGEN PIPING

FRONT PAGE

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PROTECTIVE WALLS FOR OXYGEN PIPING

CONTENTS

| | |
|---|----------|
| 1 PURPOSE | 2 |
| 2 CLASSIFICATION OF OXYGEN PLANTS | 2 |
| 3 FONCTIONS OF PROTECTION WALLS | 3 |
| 3.1 Environmental protection | 3 |
| 3.2 Protection of the operators | 3 |
| 3.3 Protection of the maintenance personnel | 3 |
| 4 DESIGN OF THE WALLS | 3 |
| 4.1 Generalities | 3 |
| 4.2 Accidental loads | 4 |
| 4.3 Thickness | 4 |
| 4.4 Height | 4 |
| 4.5 Spacing between walls | 4 |
| 4.6 Roofing | 4 |
| 4.7 Wall crossings | 4 |

1 PURPOSE

These rules refer to protective walls to be erected near oxygen overhead pipes (or stations), immediately downstream a compressor or a device which are liable to be subject of a « fire flash »: for exemple oxygen compressor or relief-valves.see **AL-RTS D 05.03**, and for maximal working pressure upper than or equal to 4 bar g.

They are extracted from IGC-13/82 document, as well as from AL-IT 38 technical Instruction issued by AL Technical Management.

2 CLASSIFICATION OF OXYGEN PLANTS

Plants are classified into 2 categories according to the product:

$PMS * D^2$ where:

| | |
|------------------------------------|-----------------------------|
| PMS = maximum operating pressure | in bars |
| D = Nonimal diameter | in centimeters |
| caterory I : large stations | $PMS * D^2 > 8\ 000$ |
| category II: medium-sized stations | $3000 < PMS * D^2 < 8\ 000$ |

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|----------------------|------------------|--|---------------|
| Departm. DI / S19 | Archiv. METAL | | Page 2 / 5 |
|----------------------|------------------|--|---------------|



PROTECTIVE WALLS FOR OXYGEN PIPING

Note: No protective wall is necessary for « small stations » ($PMS \times D^2 < 3000$).

However when $PMS \times D > 280$, screens are to be added to enable safe handling of the valves.

3 FONCTIONS OF PROTECTION WALLS

3.1 Environmental protection

- To stop projections of melted metal, and eventually of parts, in case of ignition or explosion, when the minimal required distances cannot be obtained (see standard AL-GR.204.41),
- to decrease damages due to violent impacts especially downstream a pressure reduction or downstream any flow trouble, up to the first pipe elbows (see sketch nb 1),
- to avoid fire propagation, if any, to others components.

3.2 Protection of the operators

The purpose is especially to protect people who need to operate manual valves. A wall is placed between operator and valve, and any projection of the wheel or of the stem is avoided by means of an adequate device (see sketch nb 2). This protection is required even when $PMS \times D > 280$.

3.3 Protection of the maintenance personnel

Dividing walls are used mainly in installations comprising parallel systems. They enable work to be carried out on one system while adjacent system remains in service.

NOTE: The same wall may serve several of these functions simultaneously. (ref. to AL-RG.241.31 and IGC-13/82 fig.27 for some exemples).

4 DESIGN OF THE WALLS

4.1 Generalities

- Walls shall be executed in armoured concrete, linked by means of reinforcing bars to a concrete foundation. The spacing of reinforcements should be no more than 25 cm.
- If the ground is covered with concrete flag, this flag shall be armoured and linked to the walls.
- Note: others designs such as an anti-blast casing made of a sandwich panel are possible (see IT 38). Its resistance against projection of melted metal as well as against the impact of piece is to be checked (document pending).

PROTECTIVE WALLS FOR OXYGEN PIPING

4.2 Accidental loads

In addition to conventional loads (wind, seism, weight...) the wall shall be capable of withstanding an exceptional load defined as follows:

- 120 kgf/m² for category I installations
- 80 kgf/m² for category II installations

4.3 Thickness

- 14 to 20 cm for category I installations,
- 12 to 16 cm for category II installations.

4.4 Height

- From 2 m to 2.5. m.

4.5 Spacing between walls

It shall be kept as small as possible, however compatible with equipment space erection and maintenance requirements.

4.6 Roofing

- The « INDOOR » installations shall have a roof made of reinforced concrete.
- In « OUTDOOR » installations it may be necessary to provide a roof above certain delicate components, to protect them from rain or to facilitate maintenance.
- Fragile sheets such as those of fibrociment are prohibited. Use may be made of flexible light materials such as « ONDULAIR » or « BALITHE », fireproof felt covered with aluminium.
- The roof of the control room (if any) within an oxygen station, shall be made of reinforced concrete.

4.7 Wall crossings

Holes or slots in walls for pipework and valve stem extension shall be constructed in accordance with standard AL-SE.318.11.

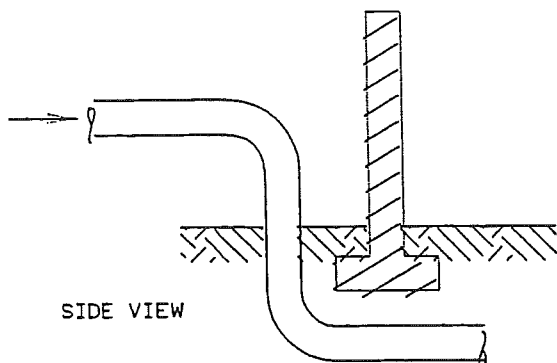


PROTECTIVE WALLS FOR OXYGEN PIPING

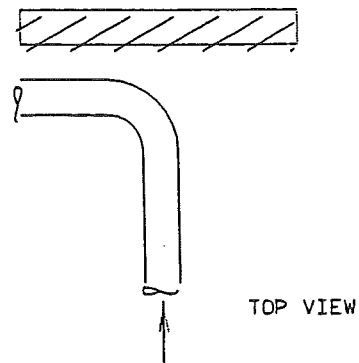
SKETCH N°.1

EXEMPLES OF PROTECTIONS DOWNSTREAM ELBOWS

VERTICAL ELBOW

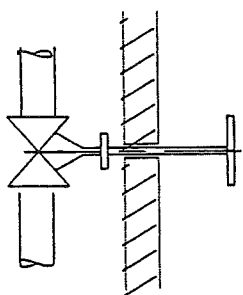


HORIZONTAL ELBOW

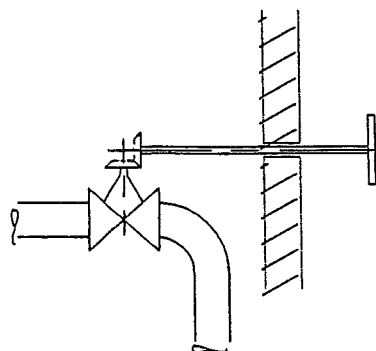


SKETCH N°.2

EXEMPLES OF DEVICES ON MANUAL VALVES



BY A THRUST LINKED TO THE STEM



BY A LEVEL GEAR PAIR