

NUPI S.p.A
Via dell'Artigianato 13
ITALY
K.A. Ms. Roberta Brusi

24.04.2003

FREE TRANSLATION !

Your ref.:	
Our ref.:	
Report n°:	2003.2404.1306.P.002

Dear Sir/Madam,

Re: Alternative system by the terms of art. 5.17.1.4 §2 Vlare II

In response to your request, please find below our report concerning the above-mentioned test.

1. General information

- 1.1 Purchaser: NUPI S.p.A. Via dell'Artigianato 13 40023 Castel Guelfo di Bologna - Italy
- 1.2 Test time: April 2003
- 1.3 Test venue: **NUPI S.p.A. in Italy**
Offices of ANDCO Consult b.v.b.a in B 9800 Deinze

2. Basic applicable law: provisions of art. 5.17.1.4 § 2 Vlare II

Art. 5.17.1.4

§ 2. Non-accessible pipework must be laid in a trench filled with small-sized aggregate material. This trench must be liquid-tight and sloping towards a liquid-tight sump pit.

This system can be replaced by an alternative system which, in the event of soil and/or underground water contamination, offers the same guarantees as the above-mentioned system. Such alternative system must be approved by an environment expert familiar with issues related to containers for gases and other hazardous substances. An approval report must be written and signed by said environment expert. This report must be made available to the supervising inspector for information. A copy of this report must be sent to the Environmental License department manager.

3. Description of the pipework, fittings and leak detection

Double-walled pipes, known as "**Smartcontainment**" pipes, consist of a primary pipe with a "*Y*" barrier made from black, high-density polyethylene and an intermediate layer made from green polyamide, and a secondary pipe consisting of a single layer of black, high-density polyethylene.

Fittings such as corners, elbows and sleeves are made from polyethylene (black on the outside). These fittings are built in such a way as to be able to contain both the inner and the outer piping.

The hollow space between the inside and the outside pipe is used for leak detection. This hollow space capacity is approximately 0.68 litres per metre.

4. Pipe applications and colour-coding

The pipe inner seal colour makes it easier and quicker to identify the various types of pipe.

Fuel flow primary pipe (manufacturer's code **TSMA**). These pipes are coloured **black on the outside**, while their inside (sealing) surface **has been colour-coded green**.

On the outside, two green strips are applied, spaced out by 180°. For marking purposes, these strips have been dotted.

Leak detection secondary pipe (manufacturer's code **TSNAS**). These pipes are black both on the inside and on the outside.

The complete system manufacturer's code is **TSMAD**.

5. Manufacturer

The manufacturers of these pipes and fittings are:

NUPI S.p.A
Via Colombarotto 58
40026 Imola
Italy

GECO SYSTEM S.p.A.
Via Magenta 43
21015 Lonate Pozzolo
Italy

6. Importer for Belgium

The following company is the importer for Belgium:

PETROLTECH N.V.
Font Saint Laundry - Sint Lendriksborre 9
1120 BRUSSELS - BRUXELLES
Tel.: 02 / 263 20 90

Fax: 02 / 267 84 89

7. Quality control system

All the manufacturer's production units have been granted the ISO 9001 quality control system certification issued by IQNet – CISQ.

8. Tests carried out and obtained certifications

The "Smartcontainment" pipe systems have been successfully tested by several certifying bodies among which:

1. ERA Technology Ltd Cleeve Road Leatherhead Surrey KT 22 7SA United Kingdom

According to the following specifications:

"Institute of Petroleum Performance Specifications for Underground Pipework" Systems at Petrol Filling Stations". Second edition, February 2001, ISBN O 85293 323 1 (ERA report: 2002-0469 - Certificate number: BC 62/0469/2002/001 of December 11, 2002)

2. DEUTSCHES INSTITUT FUR BAUTECHNIK (DIBt) Kolonnenstrasse 30L 10829 Berlin

According to the following specifications:

Standard CEN/TC221/SC 2/WG 6 N 50 January 2000 edition "Pipework for underground installation at petrol stations" Report number 2410 99 66 of June 2001

3. UNDERWRITERS LABORATORIES Inc. 333 Pflingsten Road - Northbrook, Illinois 60062-2096 United States

According to the following specifications:

Standard UL 971 "Standard for Nonmetallic Underground Piping For Flammable Liquids"

Report UL MH20383 of October 19, 1999 – Certificate number 020501-Mh20383 of May 2, 2001

4. PUVO - Proving Udvalget for Olie- og Gasindustri Park Allé 2605 BRONDBY - Denmark

According to the following specifications:

Regulation number 829 of the Danish Ministry of Environment

The above-mentioned certifying bodies have carried out, among others, the following tests on prototypes:

- External leaking and hydrostatic strength test;
- Vacuum test;
- Cyclic pressure test;
- Mechanical performance test;
- Fuel compatibility;
- Permeability;
- Swelling due to fuel absorption test;
- Ageing test;
- Marking, quality system and installation instructions test.

The following checks on the Electrostatic safety of "Smartflex" piping have also been carried out:

- ◆ by PTB - "*Physikalisch-technische Bundesanstalt*" according to:
 - *Technische Regeln für brennbare Flüssigkeiten* TRbF 40 , Ausgabe 6.97
 - *Directives "Statische Elektrizität"* ZH 1/200
 - *Cenelec report R044-001:1999 "Guidance and recommendations for the avoidance of hazard due to static electricity"* Abschnitt 5.5.4
 - *H.L Walmsley - The electrostatic fields and potentials generated by the flow of liquid through plastic pipes* 1996
 - *PrEN xxx:2000 (TC221/SC2/WG6) "Underground pipework for petrol filling stations"* Abschnitt 5.6 "Static Electricity".
- ◆ by "*Wolfson Electrostatics*" of the University of Southampton in England, in their report 257/GLH dated November 13, 2000

9. Installation and use requirements

9.1 General information:

- The manufacturer/importer directions for installation and part welding must always be followed and all the necessary tests and checks must be carried out.
- The manufacturer or the importer should specifically train the installers and welders and grant them a qualification certificate;
- Only applicable to the above-described "Smartcontainment" pipes with their respective fittings and leak detection system;
- Only for use in motor vehicle fuel filling systems;
- For underground pipework only;
- The inside of the pipes must always be protected against UV rays;
- No aggressive materials or unsuitable filling materials should be used in the containment bed which might alter or affect the characteristics of the construction materials used;
- Container filling is only allowed by gravitation;
- The filling pump suction pipe must always be equipped with a nonreturn valve located immediately downstream from the pump, at an accessible position in the filling column;
- All the pipes must be sloping by a sufficient angle towards the storage container(s);
- Always ensure that the pipes, fittings, taps and accessories are tight;
- Pipes should not be used under overpressure conditions;

- Should the petrol station attendants notice any faults in the system or pipes, they are bound to immediately inform the manufacturer or the importer as well as ANDDO Consult b.v.b.a.

9.2 Mandatory tests to be carried out by the installer/welder and the environment expert:

1. During installation and before burying the pipes, the installer/welder must carry out the following checks:

Visual inspection of the welding indicators on the fittings (if found not totally compliant: to be declared unsuitable and then rewelded) by checking in particular:

- that the misalignment between two pipes does not exceed 10°
- that the pipes have been inserted to the required distance into the fitting
- that there are no molten material leaks and that the area where the oxidation layer has been removed is visible
- that no parts of the resistor inserted in the fitting are sticking out
- that the insulating covers of the electric connectors for the welding sleeves are always mounted.

2. After installation, but before burying the pipes, and under the supervision of the environment expert, the following checks should be carried out

- Checking the installer's document;
- Checking that all the pipes to the storage container(s) are sloping by a sufficient angle;
- Primary pipe pressure test before burying at maximum 5 bars for at least 10 minutes by checking all the fittings and making sure that they are not strained.
- Secondary pipe tightness test before burying at minimum 0.3 bars for 1 hour;
- Checking the skilled installer/welder qualifications;
- Checking the welding equipment setting certificate;

3. After installation and after pipe burying, the following tests should be carried out by - or under the supervision of - the environment expert:

- Standard pipe tightness test according to the applicable regulations and permanent leak detection system check.

4. Periodical leak detection system check

The leak detection system must always be in a good state of repair and must be submitted to regular checks according to the applicable regulations.

9.3 Other conditions:

The installer shall sign a document to confirm that the delivered system has been built according to the directions provided by the manufacturer and that the checks that he was responsible for have been carried out. This document shall be delivered to the system owner which must make it available for the supervising officers and the authorised environment experts in charge of conducting the tests.

9.4 Specific pipe requirements as far as electrostatic safety and operation and installation requirements are concerned:

1. It is important that all the metal parts included in the system are safely connected to the earthing system, as all isolated metal parts are as many electrostatic striking sources. Whenever earthing is not possible (e.g. in welding connections), these parts should be permanently insulated for resistance against disruptive discharges, e.g. with leak-proof covers or shimming material with sufficiently high disruptive charge resistance.
2. No metal objects may be placed in the inner pipe because they could work as electrodes and trigger discharges.
3. The fuel flow rate must be lower than 3.5 m/s.
4. Contact between the fuel and metal objects or other conductors occurs at several points, which must therefore be earthed.
5. No filters should be installed upstream from or inside pipes made from plastic material (in the flow direction).
6. In all areas, avoid discharges which may cause striking.
7. The personnel working in or in charge of maintaining filling or dispensing stations or tanks must always wear antistatic personal protections and avoid any friction likely to electrically charge the environment.
8. The personnel working in or in charge of maintaining filling or dispensing stations or tanks must always avoid the creation of an explosive atmosphere.
9. The personnel may not enter the filling, dispensing or fuel tank areas nor the underground areas during or immediately after fuel flowing.
10. All isolated metal parts must always be connected to the earthing system.
11. The discharge equipment must always be connected to the general earthing system.

10. Limitations

The following limitations apply:

- This report is only applicable to the use of pipes and fittings mentioned herein and duly marked as produced by:

NUPI S.p.A
Via Dell'Artigianato 13
40023 Castel Guelfo di Bologna
Italy

NUPI S.p.A
Via Colombarotto 58
40026 Imola
Italy

- Throughout the statutory routine checks in accordance with the standard Vlare II, the obligation to check the pipe leak detection system remains effective.
- Always bear in mind all the requirements concerning the installation, use (see attachments) and requested tests, checks and documents mentioned in this report and in the attachments hereto.
- The manufacturer and the importer are bound to immediately report any changes in their production procedures which alter the material properties and characteristics to the environment expert authorised by ANDDO Consult b.v.b.a.
- A copy of the routine checks carried out by acknowledged foreign certifying bodies should always be submitted to us for information.
- Should the existing fuel composition change, new tests must be carried out.
- Should the legislation, regulations, prescriptions and state of the art be modified, the evaluation expressed by foreign certifying bodies should be reconsidered and evaluated by the environment expert authorised by ANDDO Consult b.v.b.a.
- Should any adjustment be required in the future, the environment expert is authorised to carry out new tests with all the relevant expenses to be borne by the manufacturer or the importer.
- The undersigned environment expert may cancel this report/certificate at any time, should it be found that the pipes and fittings making the object hereof are no longer compliant with the requirements based on the current state of the art.
- This report maximum validity is five years. Before the end of this period of time, a new evaluation must be conducted.

11. Decision

In consideration of the fact that:

- These pipes are double-walled pipes with leak detection system;
- Similar systems have already been approved in various countries;
- The pipes have been approved by the following foreign certifying bodies:
 - **ERA Technology Ltd Cleeve Road Leatherhead Surrey KT 22 7SA United Kingdom**
 - **DEUTSCHES INSTITUT FUR BAUTECHNIK (DIBt) Kolonnenstrasse 30L 10829 Berlin**
 - **UNDERWRITERS LABORATORIES Inc. United States**
- The pipes and fittings are produced on ISO-certified production lines;
- The installers will be trained by the manufacturer or the importer to install, use and weld the pipes and fittings;
- The installers/welders must obtain a training certificate by the manufacturer or the importer;
- The installers/welders shall submit a statement to confirm that the delivered system has been built according to the directions provided by the manufacturer and that the checks that he is responsible for have been carried out.
This document shall be delivered to the system owner which must make it available for the supervising officers and the authorised environment experts in charge of conducting the tests.
- The welding equipment must be delivered complete with its instruction manual;
- Full technical assistance must be provided by the importer and the manufacturer;
- All the statutory tests and checks must be carried out by an authorised environment expert, in compliance with the regulations in force,

our opinion is that the pipes making the object hereof represent an alternative by the terms of art. 5.17.1.4 § 2 of the standard Vlare II, subject to the limitations and directions for the installation, use, testing, checks and inspections contained in this report and its attachments.

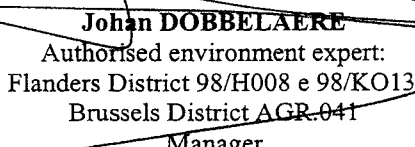
12. Attachments

Instructions and technical specifications and data sheets applicable to all the Smartflex pipes making an integral part of this report.

13. Note

By the terms of art 5.17.1.4 § 2 this certificate must be made available to the appointed supervising officer for his/her information.

A copy of this report must be sent to the Environmental Licences department manager.


Johan DOBBELAERE
Authorised environment expert:
Flanders District 98/H008 e 98/KO13
Brussels District AGR.041
Manager

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Attachments: Manufacturer's instructions and technical data sheets.