

Test Report

Codan Rubber A/S
Værkstedsvej 45-49
4600 Køge
Denmark



File No.: 117-32984.c
Date: 2017-09-22
Included Enclosure(s): 1
Page 1 of 1
KKE/SJA/MABT

Introduction

FORCE Technology have on your request tested and examined 3 samples of rubber hoses for the properties related to low temperature flexibility, hydrostatic pressure, and printed markings.

Sample Description

Three samples of rubber hoses delivered to FORCE Technology on 2017-09-18:

Our No.	Designation	Nominal bore	Bacth
(7)	2601	Ø 10 mm	1712-03
(8)	2601	Ø 10 mm	1645-03
(9)	2601	Ø 10 mm	1641-03

All samples were marked with:

"CODAN 2601 LPG EN ISO 3821:2010 (EN 559)/DG 3612 (-30°C)-2 MPa (20 bar)-10.0-2017"

A photo of the samples is seen in enclosure No. 1 of this report.

Testing

According to client specification "170322_Test of CODAN 2601" TEST 3, the samples were subjected to:

Title (parameters)	Test method and requirements
Low temperature flexibility (-30°C)	EN 16436-1:2014 §8.7/A.8 and EN ISO 10619-2:2011 §5 method B
Hydrostatic testing (20 bar)	EN 16436-1:2014 §8.3 and ISO 1402:2009 §7.2/§8.1
Verification of markings	EN 16436-1:2014 §9

Conclusion

The tested rubber hoses withstood the low temperature flexibility test, and the hydrostatic pressure test as described in enclosure No. 1 of this report.

The assessed markings on the rubber hoses did not conform to the requirements stated in EN 16436-1:2014 §9.


Kasper Munk Eliassen
Project Manager

FORCE Technology
Inspection and Testing


Stig Jakobsen
Project Manager

Extracts from the test report may only be reproduced with a written permission from the FORCE Technology. The test results relate only to the items tested.

The "General Conditions" on the reverse page are an integral part of our services. Uncertainty of measurement is assessed not to be relevant for this/these test(s).

Test according to specification "170322_Test of CODAN 2601" TEST 3

Photo of received samples for test:



Approximate length 50 cm.

Test according to specification "170322_Test of CODAN 2601" TEST 3

Low temperature flexibility

Test method: EN 16436-1:2014 §8.7/A.8 (EN ISO 10619-2:2011 §5 method B)

Conditioning temperature: 24 hours at -30°C

Outside diameter of mandrel: 100 mm (equal to 10×nominal bore)

Testing of:	Requirement	Results	Status*
Sample (7)	During the bending, observe the hose for any visible evidence of cracking, breakage or other signs of material damage	No observations	Pass
Sample (8)		No observations	Pass
Sample (9)		No observations	Pass

*) the samples are forwarded for hydrostatic pressure testing as described below.

Hydrostatic pressure test

Test method: EN 16436-1:2014 §8.3 (EN 1402:2009 §7.2/8.1)

Test liquid: water

Target proof pressure: 20 bar

Holding time: 60 sec

The same samples used for low temperature flexibility test (described above) was subjected to the hydrostatic pressure test.

Testing of:	Requirement	Results	Status
Sample (7)	During the pressure test, observe the hose for any visible evidence of leakage, cracking, breakage or other signs of material damage	No observations	Pass
Sample (8)		No observations	Pass
Sample (9)		No observations	Pass

Test according to specification "170322_Test of CODAN 2601" TEST 3

Verification of markings

The markings on the hose are verified against the requirements according to EN 16436-1:2014 §9

Each length of tubing or hose shall be clearly and durably marked in a contrasting colour at intervals of not more than 0,5 m with the information printed in characters at least 3 mm in height, and shall include at least the following information:

- a) manufacturer's registered trade name/mark, e.g. XXX;
- b) "EN 16436" followed by year of publication of EN 16436-1, i.e. 2015;
- c) class of the product, e.g. class 3;
- d) inside diameter in millimetres, e.g. 10 mm;
- e) maximum working pressure in bar, e.g. 30 bar;
- f) the words 'Propane/Butane';
- g) for class 1 the expiry date as follows: "EXP DATE": followed by the year corresponding to 5 years after the manufacturing date;
- h) for classes 2 and 3, the manufacturing date as follows "PROD DATE": followed by the year of manufacturing;

NOTE Requirements relating to expiry date for classes 2 and 3 are given in EN 16436-2.

- i) marking giving a means to ensure the traceability of the batch. This marking is not necessarily printed.

Extract EN 16436-1:2014 §9

Actual marking on recieved samples:

"CODAN 2601 LPG EN ISO 3821:2010 (EN 559)/DG 3612 (-30°C)-2 MPa (20 bar)-10.0-2017 xxxx-03"

- | | |
|----------|---|
| General: | OK. The printed characters are 4 mm in height. |
| a) | OK. Company name "CODAN" stated |
| b) | Not OK. "EN 16436" not stated. |
| c) | Not OK. Class of product not stated. |
| d) | OK. "10.0" stated. |
| e) | OK. "20 bar" stated. |
| f) | Not OK. "Propane/butane" not stated. |
| g) | Not OK. Expiry date not stated. |
| h) | Not OK. Production date not stated. |
| i) | OK. According to information the stated digits "xxxx-03" indicate the batch traceability. |