

ContiTech Rubber Industrial Kft.
Hose Technical Department







HANDLING

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INSTRUCTIONS FOR THE USE OF BONDED FLEXIBLE LINES FOR LIVE CRUDE OIL, GAS PRODUCTION AND TRANSPORT

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1. INTRODUCTION

The bonded flexible lines (hose) covered by this instruction is applied for sweet or sour service production of crude oil, included export and injection applications. Products include oil, gas, water and injection chemicals and combinations of these services, as it is specified in the purchase order. On customers request the hose may be designed and manufactured according to API Spec. 17K and API RP 17B.

Hose design can cover topside or subsea applications

The purpose of the short instruction is to inform the users about the most important special knowledge for the use of the hoses. More detailed general publication for the handling, inspection and use TKO AS0 and at the long length and spliced hoses the instructions TKO AS1 – if it is not yet present at the user – can be requested at the following address:

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2. CHECKS PRIOR TO INSTALLATION OF THE HOSES

Before installation the size, pressure range, service requirements, working temperature, bending radius and subsea or topside execution have to be checked whether they are all in accordance with the specification. Cross check to the hose data book and purchase order requirements.

The full implementation of the manufacturer's instructions will extend the lifetime not just of the hose, but of the entire high pressure system including seals of flanges and valves. The control measures themselves intrinsically contribute to the prevention of failures and the records maintenance provide supporting evidence for specific analysis of any failures.

Every individual element of the high-pressure containment structure is sensitive to overloading. Frequent rapid transients in the operational conditions, including pressure, temperature and mechanical loads should be eliminated as a basis of operational philosophy, or limited as much as possible.

The actual working conditions have to be limited to parameters of the manufacturer's design data at all times. Bonded hoses are custom designed and built for the fluid service composition and operating parameters, therefore the buyer should specify the composition of the fluid to be transported and the actual maximum working parameters, accurately as much as possible.

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3. SPECIAL INSTRUCTIONS FOR THE USE OF THE HOSES

Rapid Decompression

Rapid decompression is a necessary operating function of the high pressure system. However it is advantageous to the durability of high pressure gas transport and live crude oil hoses if the rate and frequency of decompression is controlled.

The frequency of decompressions should for normal operation be limited to less than twice per year.

Recommended practice for the decompression rate should be in accordance with the NACE Standard TMO187-2003:

§ 8.7.8.1 The gas pressure may be released at approximately a constant rate, not to exceed 138 kPa (20 psig) per minute.

§ 8.7.8.2 Alternatively, the gas pressure may be released in a stepwise manner in 690 kPa (100 psig) increments. The pressure should be held a minimum of 5 minutes between increments to permit sample degassing.

If the above procedures are not acceptable in terms of the operating requirements, then reference should be made to the "API Bulletin 6J on Testing of Oilfield Elastomers" (1st February 1992) § 5.2.4. which states: ...the pressure can be released more rapidly down to 1000 psi pressure. The maximum velocity of pressure drop is 1000 psi per minute, but this rate should be reduced if there is no emergency.

In the event of an emergency the total decompression from working pressure can be effected at the maximum rate of 1000 psi per minute, but the design of the system for emergency decompression should as far as possible obviate this requirement for other than exceptional infrequent occurrences.



If the hose suffer more then 60 decompressions to a pressure below 1000 psi, a gas leakage test is recommended to perform before recommencing normal operations at working pressure. The test may be implemented using either of two alternative methods:

- a) The hose is isolated by closing the system valves, and pressurised with gas to maximum working pressure. A pressure gauge is required to be included in the isolated section of the line, which includes the hose, allowing the fall in pressure to be monitored. In addition gas temperature should be recorded during the period of the test.

When the hose reached maximum working pressure, a half hour stabilisation period should be allowed, by adding gas as necessary to maintain pressure. At the end of this stabilisation period, with no further addition of gas, the rate of loss of internal pressure at constant temperature must not exceed 2 percent per hour. The pressure is to be monitored and recorded during the whole procedure. If the fall in pressure exceeds 2 percent per hour, potential leak paths at flange seals or valves are to be investigated and rectified, and the test is to be repeated. If pressure still cannot be maintained within the prescribed limit, a hydrostatic test should be performed on the hose.

The hose manufacturer should be advised and consulted on any problems arising from the implementation of this procedure.

- b) A portable gas leak detector can be used to carry out a survey on the external surface of the hose, to ensure that gas concentration levels are within the safe limits allowed on the platform. All data measurements from the tests must be recorded in the log book.

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Temperature

The general rule for the allowed min. working temperature is -30°C. The max. working temperature is 90°C, if the max H₂S content is less than the partial pressure:0.0345 MPa (1000 ppm at 5000psi); and 60°C, if the max. H₂S content is less than the partial pressure 0.1035 MPa (3000 ppm at 5000psi). Other working temperatures are allowed after consultation with the producer of the hoses. E. g. a lower min. working temperature is possible, if the hose is not flexed.

The higher the temperatures and the longer the time of exposure to high temperatures, the degradation of the elastomeric materials in any part of the system is the more likely.

The minimum temperatures for elastomers must also be maintained by the system for applications in an arctic environment, or where the gas may be subject to adiabatic expansion.

Rapid increases in hose temperature should be avoided, in particular where the hose has been saturated with high pressure gas at low temperature for a period of more than eight hours, and it is then subjected to heating. In general the maintenance of lower operating pressures and temperatures prolongs the service life of the hoses and other elastomer components.

Velocity of Transported Material

The maximum allowable transport velocity is limited by erosion and is to be determined by analysis in accordance with the requirements of API RP 14E and DNV RP 0501. The transport of sand should be limited as much as possible, especially in gas transport lines.

There is a general rule for the determination of the max. fluid velocity in a hose; if the fluid has no solid content: for liquid: 15 m/sec; for gas 20 m/sec; for gaseous liquid 8 m/sec.

Composition of Transported Material

It is essential that a hose designed and manufactured for a specified service fluid is not used for other fluids. In the event of any significant deviation from the originally specified composition of the fluid, the manufacturer should be consulted. In particular higher levels of aromatics, higher H₂S content, and the use of unspecified additives such as inhibitors could be dangerous.

4. HIGH PRESSURE HOSE INSPECTION GUIDELINES

In general the hose should be inspected on a regular on-going basis. The frequency and degree of the inspection should follow the guidelines that follow. Hoses should be inspected on a regular on-going basis. The frequency and degree of the inspections, is explained in this guideline.

The guidelines are intended to ensure safe use of the hose and optimise its length of service.

Please see: INSPECTION GUIDELINES FOR HP DRILLING AND PRODUCTION HOSES, doc.no.: ISS-059.