

PUBLIC COMPANY ORLEN LIETUVA

APPROVED BY
General Director

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Order No TV1(1.2-1)-144

OCCUPATIONAL HEALTH AND SAFETY PROCEDURE BDS-19 USE OF RUBBER HOSES

I. GENERAL

Purpose and Scope of Application

1. The purpose of this Procedure is to establish occupational health and safety requirements to be observed at Public Company ORLEN Lietuva (hereinafter – the Company) in the selection and use of rubber hoses intended to convey oil products, chemicals, water, gas, air in process facilities.

2. This Procedure is applicable to all employees of the Company as well as employees of other organizations outsourced by the Company who operate rubber hoses.

II. RESPONSIBILITIES

3. The head of organizational unit shall be responsible for:

3.1. Acquisition of rubber hoses suitable for intended application and operating conditions;

3.2. Introduction of the characteristics of rubber hoses, manufacturer's requirements and this Procedure to his/her subordinates;

3.3. Arrangement of maintenance (marking, visual inspection and timely hydro testing) of rubber hoses;

3.4. Installation of proper mating couplings required to attach rubber hoses to the point of their use;

3.5. Removal of faulty hoses from service.

4. Rubber hose operators shall be responsible for:

4.1. Rubber hose external visual inspection prior to each use;

4.2. Reporting any irregularities noticed during external visual inspection due to which the hose should be removed from service to the head of an organizational unit.

III. SELECTION AND MARKING

5. Rubber hoses shall be selected according to intended service and operating conditions:

5.1. According to material conveyed: oil products, chemicals, water, steam, air.

5.2. According to mechanical characteristics: maximum operating pressure P , maximum temperature t^0 of material to be conveyed through the hose and concentration.

6. Parameters recommended for rubber hoses:

6.1. For oil products: $t^0 - 150^0 \text{ } ^\circ\text{C}$; $P - 10 \text{ bar}$;

6.2. For steam, air, water: $t^0 - 200^0 \text{ } ^\circ\text{C}$; $P - 16 \text{ bar}$;

6.3. For chemicals (alkali, acids): $\leq t^0 - \leq 50^0 \text{ } ^\circ\text{C}$; $P - \leq 6 \text{ bar}$. Hose shall be selected according to maximum concentration of chemicals used in the facility.

7. Rubber hoses must be easily identifiable as to the type and application. Hoses may be marked by manufacturer in respective color of the cover of hose or with continuous stripe in full length of hose. If hose is not marked by the manufacturer, prior to use it must be marked with clearly visible transversal color strap. Color straps must be maximum 1 meter from each end of the hose, also on both sides of joint.

8. Color coding of hoses according to material conveyed:

8.1. Black – steam, air, water;

8.2. Red – oil products;

8.3. Yellow – aggressive chemicals (alkali, acids).

9. Prior to use and after hydro testing, tags with the name of organizational/process unit and date of next test must be attached to the rubber hose.

10. Rubber hoses intended for chemicals must be additionally marked with tags specifying the substance (alkali, acid) and concentration it may be used for.

IV. INSPECTION AND TESTING

11. Rubber hoses, connections, couplings must be visually inspected before each use. During inspection:

11.1. Check to ensure this is the correct hose for application (review markings on the hose);

11.2. Look for cuts, gouges, kinks or worn spots in the hose cover that expose textile or wire reinforcement;

11.3. Check for soft spots, bulges or blisters in cover, kinks or permanent deformation of the hose from its original form;

11.4. Look for changes in cover color as this may indicate chemical attack;

11.5. Check couplings for any slippage which is evidenced by misalignment of the coupling or scored/exposed areas on the hose cover next to the coupling which indicates movement of the coupling;

11.6. Check couplings for any worn parts, worn threads, excessive corrosion or rust, or cracks in any part of the coupling.

11.7. In case of any of these symptoms or when in doubt, do not use the hose. Immediately remove it from service.

12. Rubber hoses must be hydro tested at periodicity and procedure prescribed by

manufacturer however maximum period between tests is 12 months. Hydro testing of new hoses is not required.

13. Hoses must be hydro tested in special site outside the territory of process facilities.

14. Hydro testing may be performed by specially trained staff only. Test equipment and control instrumentation must be in good order and visually inspected before each use.

15. Before hydro testing, all air should be removed from the hose by bleeding it through an outlet valve attached to one end of the hose (elevate this end to bleed off air).

16. The hose should be placed in a straight line. The hose to be tested should be completely restrained by enclosing the test area or using tie-down straps at 3 m intervals along the hose length to prevent whipping should a hose end be ejected. The ends of the hose should be anchored to the test structure in such a manner that they do not restrict the ability of the hose to move but insure that should a hose coupling be ejected it remains contained.

17. Pressure in the hose should be increased gradually.

18. Hoses should be hydro tested as prescribed by the manufacturer, at least 1.5 times P_s (rubber hose working pressure). Duration of hydro test should be as prescribed by the manufacturer, in any case 5 minutes at least. After the hose is taken to test pressure and returned to working pressure, hose is checked for leaks, blisters, cracks, loose spots or other permanent deformations.

V. USE

19. Rubber hoses must be attached to facilities using couplings intended for this purpose (e.g. as shown in Fig.1) with one piece of coupling permanently fixed to the facility. Internal diameter of rubber hoses must meet the dimensions of coupling. The hose and couplings must be compatible with fluid in the facility, operating pressure and temperature characteristics.



Fig.1. Rubber hose mating couplings - examples

20. Rubber hoses must be fixed to the couplings with special metal clamps (Fig. 2).



Fig.2. Metal clamps for rubber hoses - examples

21. Satisfactory performance and safety of rubber hoses depends on proper hose installation:

21.1. Under pressure, hose may change in length. Always provide some slack for the hose to move -3 to +5 % (Fig. 3).

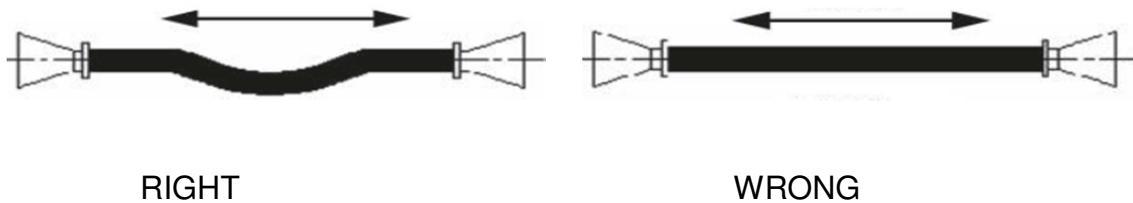


Fig.3. Rubber hose travel

21.2. Sharp hose bends near couplings should be avoided (Fig.4).

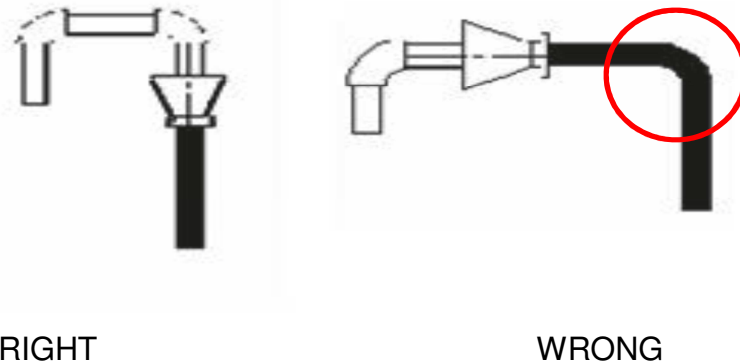


Fig.4. Rubber hose connection

21.3. When in operation, never kink a hose or bend beyond minimum bend radius prescribed by manufacturer as it may deform the tube of the hose. Do not place rubber hoses on sharp edges, hot surfaces, power cables.

22. If rubber hose is connected to process unit under pressure, open and close shutoff valves slowly. The free end of rubber hose under pressure should face the passages of people or vehicles.

23. If rubber hoses in use cross the passages of people or vehicles and areas where the fall, displacement of objects is likely, they must be protected against mechanical damage or enclosed. If not under uninterrupted supervision, the free end of hose in use must be securely fixed to stable structure.

24. After use, hose should be drained and put to storage. Hose should not be piled or stacked to such an extent that the weight of the stack creates distortions on the hose lengths stored at the bottom, should be protected against exposure to aggressive chemicals (Fig. 5).



Fig.5. Fittings used for the storage of rubber hoses - examples

VI. FINAL PROVISIONS

25. Responsibility of the arrangement of periodic review and, where necessary, updating of the present Procedure shall lie with the Director of Quality, Labour Safety and Environmental Control.
