

Revised Copy

RUPTURE DISC/RELIEF VALVE

PRACTICES MANUAL

CONOCO CHEMICALS COMPANY

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RUPTURE DISC/RELIEF VALVE

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I. INTRODUCTION

Section 61.65 (b)(4) of the National Emissions Standards for Hazardous Air Pollutant Sources requires that a rupture disc be installed underneath any emergency relief valve in vinyl chloride service, in order to minimize leakage through the relief valve. In accordance with this requirement, Conoco has installed a large number of rupture discs in vinyl chloride service throughout the plant. Rupture discs also serve the vital function of protecting the relief valve from polymer buildup on the relief valve seat, which could hinder the proper functioning of the relief valve. In either case, proper functioning of the rupture disc/relief valve combination is essential for plant safety.

This program has been developed because of the importance of maintaining the integrity of rupture discs during their handling and installation. Adherence to the procedures outlined in this manual will help to ensure that the chances of rupture disc/relief valve malfunction will be minimized, and that thorough documentation will be available whenever such a malfunction should occur. This documentation may become extremely critical in the event of a vinyl chloride release caused by a premature rupture disc failure or other process upset conditions.

II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT

Administrative Services will be the primary department responsible for carrying out this portion of the rupture disc program.

1. Specification of Rupture Discs

All rupture discs in VCM service are listed on Table 1. These discs are all BS&B S-90 type discs of nickel construction. The SRB-7RS holder must be used with all of these discs. Note that all rupture discs which relieve to the atmosphere are code stamped, with the exception of the initiator charge pot rupture discs. When ordering rupture discs, it must be specified that each disc in any given lot be stamped with an individual serial number; i.e. the first disc in lot 8100777-6 would be stamped 8100777-6-01, the second disc would be stamped 8100777-6-02, etc. This serialization of all rupture discs will enable easy identification of any rupture disc in the plant.

2. Lot Inspection and Pre-Testing

Rupture disc lots received at the plant receiving dock must be thoroughly inspected and tested before they are moved to the store-room. This phase of rupture disc handling will be administered as follows.

II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT (CONTINUED)

2. Lot Inspection and Pre-Testing (Continued)

When a lot of rupture discs arrives at the receiving dock, care must be exercised when unloading the discs from the truck so as not to damage the discs. The receiver will notify the Mechanical Superintendent that there are new rupture discs at receiving, and an engineer or other qualified person will count the number of discs in the lot and inspect each individual disc for flaws. A FLAW IS DEFINED AS ANY KNICK OR SCRATCH WHICH CAUSES DEFORMATION OF THE DOMED PORTION OF THE DISC, OR ANY PINHOLE OR GOUGE WHICH MAY CAUSE THE DISC TO LEAK. Flawed discs must be removed from the lot and returned to the manufacturer.

Rupture discs which are to be installed on the reactors, the sphere or the bullets must have the lot approved before they can be placed in the storeroom. In general, this category of rupture discs includes all 6" and 8" discs and the reactor D-300 condenser rupture disc, which is a 4" disc. One disc will be taken from these lots for destructive testing. These discs must be sent to the maintenance shop and burst using the procedures specified in the destructive testing section of this manual. If any disc does not burst within 5% of its rated burst pressure, the entire lot from which the disc was taken must be returned to the manufacturer. Maintenance must notify receiving that these discs have either passed or failed this test.

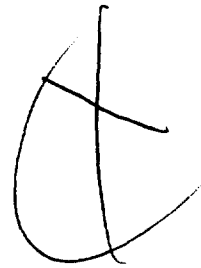
II. RUPTURE DISC ORDERING AND PRE-INSTALLATION CHECKOUT (CONTINUED)

2. Lot Inspection and Pre-Testing (Continued)

Rupture discs which pass inspection and testing are OK'd for placement in the storeroom.

3. Recordkeeping

Administrative Services must keep a record of the data from this section of the rupture disc handling program. The information to be contained in this log is shown on Table 2.



III. RUPTURE DISC INSTALLATION

Maintenance will be the primary department responsible for ensuring that this portion of the rupture disc program is performed correctly.

1. Installation in Holders

All rupture discs must be installed in the holders according to the manufacturer's specifications. Before a disc is placed in the holder, the disc, the holder, and the bolts must be inspected for flaws. If the holder bolts do not turn smoothly and easily when installed in the holder, or if the holder faces are gouged, do not use the holder. The holder faces must be clean of all dirt and debris. If the disc and the holder are acceptable, place the disc in the holder and hand install the bolts. Using a torque wrench, tighten the holder bolts to the torque specified by the manufacturer. This tightening must be performed in at least four passes, i.e. 25%, 50%, 75%, and 100% of the final torque. A criss-cross tightening pattern must be used when torquing the bolts. When the installation of the disc in the holder is complete, visually inspect the disc again to see if it has been distorted or otherwise damaged.

2. Testing

in KM SERVICE
All 3", 4", 6", and 8" rupture discs[✓] are to be tested in the maintenance shop to 90% of their rated burst pressure before being installed in the plant. The following testing procedure must be used when pressure testing rupture discs in the maintenance shop.

III. RUPTURE DISC INSTALLATION (CONTINUED)

2. Testing (Continued)

- a. Clean the top of the testing bench and the face of the rupture disc holder where the two surfaces meet. Use an asbestos gasket between the bench and the holder.

NOTE: Asbestos is a hazardous material and must be handled with caution. When disposing of asbestos or asbestos-containing material, place it in the appropriately labelled waste asbestos drums.

- b. Clamp the holder down to the bench and tighten the bolts in a criss-cross pattern, making several passes on each bolt.
- c. Put on a face shield and warn nearby personnel that a rupture disc is being tested.
- d. Drain all water out of the accumulator and pressurize the accumulator with plant air. Turn on the water pump and start pumping water into the accumulator.
- e. Slowly open the test valve, and pressurize the space underneath the rupture disc with the air from the accumulator. Increase the pressure to 90% of the rupture disc burst pressure, and then check the disc for pinhole leaks or other signs of damage.
- f. Slowly depressurize the space underneath the rupture disc and remove the assembly from the bench. Flawed or defective discs must not be put into service in the plant.

III. RUPTURE DISC INSTALLATION (CONTINUED)

2. Testing (Continued)

The pressure gauge on the testing machine must be calibrated before each use.

3. Installation in the Plant

Rupture disc assemblies must be installed without causing any damage to the disc or the holder. Before installing the assembled holder between the companion flanges, thoroughly clean the flange faces with a putty knife to remove any solid buildup or debris. Check to see that the flange faces are not gouged or otherwise damaged. Place the rupture disc between the flanges, WITH THE BULGED-OUT SIDE OF THE DISC FACING THE PROCESS. On reactors, use asbestos-based gaskets only. Flexatalik gaskets can be used elsewhere in the plant. When tightening the companion flanges, torque the bolts to the manufacturer's specifications using a criss-cross tightening pattern. Make at least four passes on each bolt.

If the companion flanges do not seal during operation, check to see if the bolts are still torqued correctly. If necessary, overtorque them slightly in an even manner until the leaking stops.

III. RUPTURE DISC INSTALLATION (CONTINUED)

4. Rupture Disc Changeout

Any rupture disc which fails in VCM service must be changed as soon as possible after it is discovered that the disc has failed. All rupture discs in PVC reactor service must be changed at least once every six months. Rupture discs on the sphere, the bullets, and the receivers should be changed every two years. All other rupture discs do not require periodic replacement. New, unused gaskets must be used whenever a rupture disc is changed.

5. Destructive Testing

All rupture discs taken off of reactors must be burst on the test bench in the maintenance shop. When removing the holder assembly from the reactor and when transporting the holder assembly to the maintenance shop, use caution so as not to damage the holder or the disc. Install the holder assembly on the test bench and check the torque on all of the bolts with a torque wrench. The test procedure described in the testing section of this manual must be used to destructively test rupture discs, with the exception that the pressure is increased until the disc bursts.

III. RUPTURE DISC INSTALLATION (CONTINUED)

6. Personnel and Supervision

The maintenance personnel listed on Table 3 are qualified to in-
and test ^{any 3", 4", 6" or 8"} stall any rupture disc in the plant. ^{in VCM} Whenever ~~any~~ rupture disc
~~is tested on the bench and installed or installed in its~~
~~8" rupture disc, or the 4" D-300 condenser rupture disc is pres-~~
~~holder or in the plant,~~
sure tested, installed, or destructively tested, a qualified main-
tenance installation observer must be present to observe the testing
and the installation of the rupture disc. Qualified maintenance
installation observers are listed on Table 3. These lists must be
updated when ^{ever} any changes are made.

7. Recordkeeping

Maintenance must keep a record of all data from this section of
the rupture disc handling program. The information to be contained
in this log is shown on Table 4.

* Whenever any 3", 4", 6" or 8" rupture disc in VCM
service is tested on the bench, installed in its holder
or installed in the plant,



IV. RELIEF VALVES

Relief valves must be periodically checked to make sure that they will operate properly in an emergency situation.

1. New Relief Valves

All new relief valves must be pressure tested in the maintenance shop before they are installed in the plant. The procedure for testing relief valves is identical to the procedure for bursting rupture discs. When the relief valve opens at its setpoint pressure, check to see that it reseats itself after opening. The relief valve should hold a constant pressure after reseating. If the relief valve does not relieve within 5% of its setpoint pressure, or does not reseat properly after relieving, it must not be installed in the plant. Faulty relief valves must be returned to the manufacturer.

2. In-Place Testing

All relief valves in reactor service must be tested every six months; all other relief valves must be tested at least once every two years. This testing can be performed in-place using the nitrogen test apparatus, when the vessel is not in service. When using the nitrogen test apparatus, slowly pressurize the space between the rupture disc and the relief valve until the relief valve relieves. If the relief valve opens at less than 95% of its setpoint pressure, take the relief valve out of service for repair. If the relief valve does not open at ^{105%}~~110%~~ of its setpoint pressure, stop the test and take the relief valve out of service.

IV. RELIEF VALVES (CONTINUED)

2. In-Service Testing (Continued)

Do not overpressure the concave side of the rupture disc when performing this test, since it may damage the disc. If the relief valve opens correctly, check to make sure that it reseats and holds pressure without leaking. Following the test, be sure to slowly depressurize the space between the rupture disc and the relief valve. The pressure gauge on the nitrogen testing apparatus must be calibrated before each use.

3. Recordkeeping

Maintenance must keep a record of all testing and repair done on relief valves. The information to be contained in this log is shown on Table 5.

V. TRAINING

All maintenance and engineering personnel involved in this program are to receive hands-on training in the installation and handling of rupture discs. This training is to consist of an annual classroom type training session, which will be conducted by BS&B representatives. Records of all personnel who attend these meetings must be kept by maintenance.

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