



# Installation Instructions

## For Flange Mounted Rupture Disks

Rupture Disk Series: ARD, FD

### 1) **WARNING**

- a) Read the complete instructions before attempting to install the rupture disk assembly.
- b) It is the user's responsibility for the design of adequate venting and installation of adequate vent piping or directional flow after rupture occurs with the rupture disk as intended. When size is specified, ZOOK Enterprises, LLC, ZOOK Europe Ltd. or ZOOK Canada Inc. assumes that adequate provisions have been made by the purchaser and/or user for proper venting of a system to relieve the specific pressure. Locate the rupture disk where people or property will not be exposed to the system discharge in the event of rupture. Vent toxic or flammable fumes to a safe location to prevent personnel injury or property damage.
- c) It is the user's responsibility to specify the burst pressure rating at the coincident temperature at which the rupture disk is to be used. A rupture disk is a temperature sensitive device. The burst pressure of the rupture disk is directly affected by its exposure to the coincident temperature. Failure to utilize a rupture disk at the specified coincident temperature could cause premature failure or overpressurization of the system.
- d) Particles may discharge when the rupture disk ruptures. These particles may be part of the rupture disk itself, or other environmental matter in the system. It is the user's responsibility to ensure that the particles are directed to a safe area to prevent personnel injury or property damage.
- e) Rupture disk service life is affected by corrosion, creep and fatigue, and physical damage. These conditions will derate the rupture disk to a lower pressure. The user should be prepared to handle a premature failure of the rupture disk. The media or other environmental conditions should not allow for any build-up or solidification of media on the rupture disk. This may increase the burst rating of the rupture disk.
- f) ZOOK rupture disks, when installed correctly, will provide a very good seal for liquids and most gases or vapors. However, ZOOK Enterprises, LLC, ZOOK Europe Ltd., or ZOOK Canada Inc. cannot guarantee the leakage rate of the disk seal without prior knowledge of the requirement and details of the piping layout. Consult ZOOK Enterprises, LLC, ZOOK Europe Ltd., or ZOOK Canada Inc. for guidance if leakage is critical to the installation.
- g) The customer and/or its installer shall be responsible for the proper installation of rupture disk device into a system. Recommended torque values do not consider piping stress or alignment.
- h) Customer and/or its installers shall be responsible for improper installation and physical damage resulting therefrom, including, but not limited to, damage resulting from leakage, improper torquing, and/or failure to follow installation instructions.
- i) ZOOK Enterprises, LLC, ZOOK Europe Ltd. or ZOOK Canada Inc. standard Terms and Conditions of Sale apply unless otherwise stated in writing by the manufacturer.

### 2) **Assembly of the Rupture Disk**

- a) **CAUTION:** Rupture disks are precision instruments and must be handled with extreme care. Rupture disks should be installed only by qualified personnel familiar with rupture disks and proper piping practice.
- b) Carefully remove the disk from its package.
- c) Verify that the installation flanges are in compliance with the flange specifications indicated on the disk tag. **DO NOT INSTALL IF THEY DO NOT MATCH.**
- d) Examine the disk carefully before installation. **DO NOT USE IF THERE IS ANY INDICATION OF DAMAGE** as it may result in premature failure. Handle with extreme care.
- e) To achieve a high degree of success in attaining accurate burst pressures and a leak-free joint, several steps are required. **It is imperative that a regimented bolt-up procedure is applied.**
  - 1) Inspect the Companion Flanges:
    - (1) Before installing the disk into the system, ensure that the companion flange gasket surfaces are clean and free from all rust, corrosion, and foreign material. The allowable imperfections in the flange gasket surface should not exceed the depth of the surface finish grooves, and that the radial marks are no deeper than the depth of the flange surface finish and less than 50% in length of the overall gasket sealing surface width.
    - (2) To assure proper sealing of the assembly and flange gaskets parallelism, flatness, and waviness should be within 0.008" (0.2mm) or better.
  - 2) Place the Disk on the inlet companion flange centered inside the bolt holes insuring that ALL FLOW ARROWS POINTING IN THE PROPER DIRECTION.
  - 3) Lower the outlet companion flange carefully onto the rupture disk making sure the rupture disk stays centered inside the bolt holes.
  - 4) For disks shipped without integral gaskets - Install new top and bottom gaskets between the Disk and the companion flanges. We recommend compressed fiber gasket no greater than 1/16" (1.6mm) thick. The user is cautioned to select a gasket material that is suitable for the intended service and will resist "cold flow". In the event of cold flowing of the gaskets, the assembly torque will relax in non-pretorqueable holders, which can result in erratic bursting of the rupture disk and/or leakage.
  - 5) Do not apply any compounds to the gasket or seating surfaces.

- 6) Reinstall companion flange studs and nuts, making sure they are free of any foreign matter, and well lubricated. Lubricate the nut bearing surfaces as well. Lubrication is not required if PTFE coated fasteners are used.
- 7) **WARNING:** The disk tag is designed to provide critical information about the Rupture Disk only and should NOT be used as a hand hold to lift or adjust the Disk during installation. This practice can damage the disk resulting in failure of the disk below its marked burst pressure.
- 8) Run-up all nuts finger tight while maintaining parallelism in accordance with 2.e.1.2.
- 9) Using a torque wrench, develop the required torque incrementally in a minimum of four (4) steps in a crisscross pattern. The initial torque should be no more than 30% of the final required torque listed in table 1. After following this sequence, a final tightening should be performed bolt-to-bolt to ensure that all bolts have been evenly torqued.
  - (1) The use of hardened washers will enhance the installation by reducing the friction due to possible galling of the nut bearing surfaces.
- 10) Verify parallelism is in accordance with 2.e.1.2.
- 11) Companion flange torque values should be verified periodically at the system temperature.

TABLE 1 - RECOMMENDED TORQUE VALUES					
ANSI Bolting			DIN Bolting		
Nominal Diameter of Bolt (inches)	Number of Threads (per Inch)	Torque Ft/Lbs	Thread Designation	Number of Threads (per mm)	Torque N·M
1/2	13	30	M10	1.5	21
5/8	11	59	M12	1.75	37
3/4	10	105	M14	2	58
7/8	9	170	M16	2	91
1	8	255	M18	2.5	126
1 1/8	8	377	M20	2.5	178
1 1/4	8	532	M22	2.5	246
1 3/8	8	724	M24	3	304
1 1/2	8	960	M27	3	457
1 5/8	8	1,241	M30	3.5	613
1 3/4	8	1,570	M33	3.5	843
1 7/8	8	1,958	M36	4	1,072
2	8	2,399	M39	4	1,402
2 1/4	8	3,467	M42	4.5	1,722
2 1/2	8	4,814	M45	4.5	2,166
2 3/4	8	6,470	M48	5	2,606
3	8	8,485	M52	5	3,385
3 1/2	8	13,665	M56	5.5	4,158
Friction coefficient = 0.180 $\mu$					
Minimum stud bolt material yield strength of 724 N·M (105,000 psi)					
Torque required to produce 30,000 psi bolt stress					