

Air Power

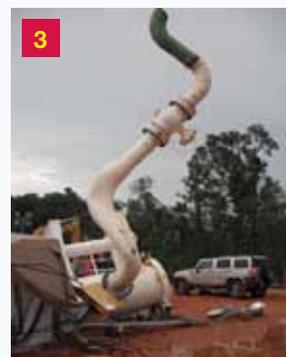
Air is always all around us, and the oxygen it contains is necessary for life. But, compressed air (or any other compressed gas) contains a lot of energy and can cause major damage if a vessel or pipe fails.

The pictures show the consequences of three explosions resulting from failure during pneumatic pressure-testing of pipes and vessels.

1. A flange failed during pressure-testing of a 36-in.-dia. (~1 m) pipe at about 1,800 psig (12.41 MPa, or ~125 bar) compressed air pressure. One person was killed, 15 were injured, and there was significant damage to the equipment.

2. Pipes connected to a tank were pressure-tested using compressed air. The tank was isolated from the pipes by closing valves, and there was no blind or other positive isolation. A valve leaked, allowing air to pressurize the tank. It took off like a rocket and landed on top of the process rack. (See the October 2007 Beacon.)

3. In this incident, the compressed gas was nitrogen (not air), but the consequences of the explosion are similar. A pipeline failed during the compressed-nitrogen pressure test, killing one worker and seriously injuring three others.



What Can You Do?

- Whenever possible, pressure-test equipment using water (hydrostatic test) or another nonhazardous liquid. Water is a noncompressible fluid, and water at a given pressure contains a lot less energy than a compressed gas such as air. Think about the difference in the sound of bursting a balloon filled with water compared to one filled with air. The air-filled balloon “pops,” but the water-filled balloon does not make much noise.
- Before you start a pressure test, think about the consequences should a failure occur. Take precautions so that people are not at risk during the test. Remember that it is a test. What happens if the equipment fails the test?

- Do not rely on valves only to isolate equipment being tested from other equipment that is not strong enough to withstand the test pressure. Provide positive isolation with blinds or physically disconnected piping.
- Use an approved written pressure-testing procedure, and follow it rigorously.
- Post warning signs and restrict access to places where pressure-testing is being done.
- Make sure that people who are not directly involved in the test are not allowed in the area for any reason.
- If you must use pressurized gas for a test, do a thorough safety review before conducting the test.

Think about what could happen if your equipment fails to pass the pressure test.

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