

The Problem

Many devices are constructed with passages that must remain open if the product is to function normally when used.

During the manufacturing process, it is sometimes possible to inadvertently create a blockage in a passage thus affecting the quality and performance of the device.

It is often necessary to test product to make sure pathways are open and have not become blocked or partially obstructed.

This functional evaluation is generally referred to as “occlusion testing.”

When checking products for possible blockage, test engineers are frequently concerned with testing speed and repeatability.

The Solution

Uson testers can conduct occlusion tests by using a pressure drop technique. In this test, the product must drop below a preset pressure (reject level) to pass the test; the opposite of a normal integrity test.

The same basic pneumatic circuit employed in pressure decay testing is used in occlusion testing. Only the programming is different.

Thanks to the commonality of test circuits, it is possible (and quite common) to conduct pressure decay tests followed by occlusion tests. This is easy to accomplish with a Sprint iQ and program linking capability.

How It Works

Sprint iQ tests for occlusion like this:

1. The product is attached to the test port and the open end of the product is placed in the clamping fixture. (Figure 1)
2. The test is started.
3. The open end of the product is sealed off by the clamping device and the product is then pressurized through valve **V1** for the duration set for fill time.
4. At the end of fill time, the fill valve **V1** closes and the seal opens the product to atmosphere. The cycle advances to test time in which the tester looks for a pressure decrease using sensor **S**.
5. Based on setpoints entered into the test program, the tester determines whether the product is accepted or rejected.
6. At the end of test time, valve **V2** opens to vent any remaining pressure to atmosphere.

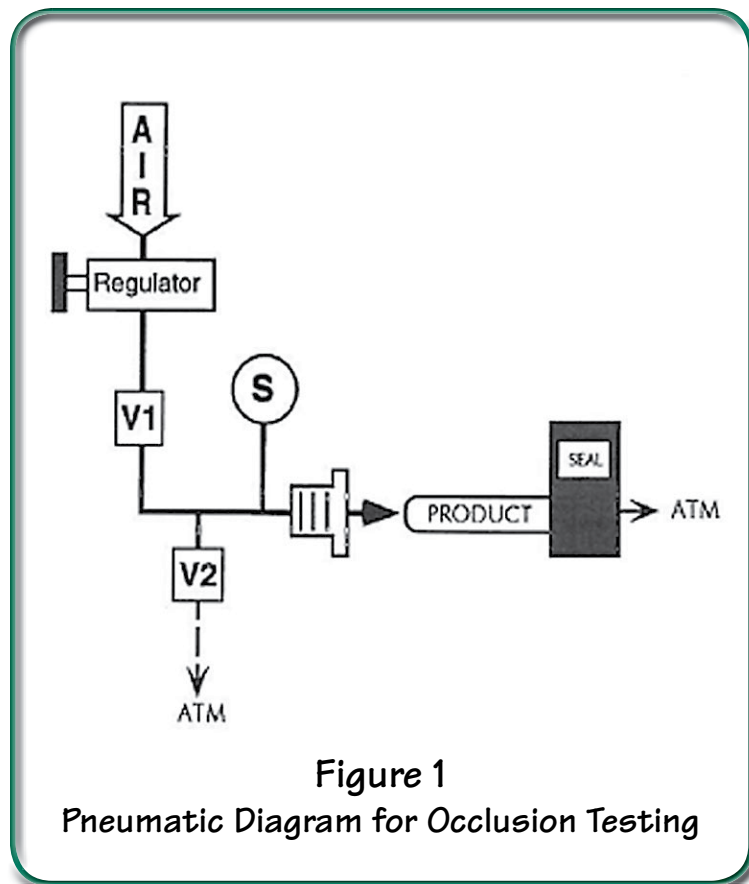


Figure 1
Pneumatic Diagram for Occlusion Testing

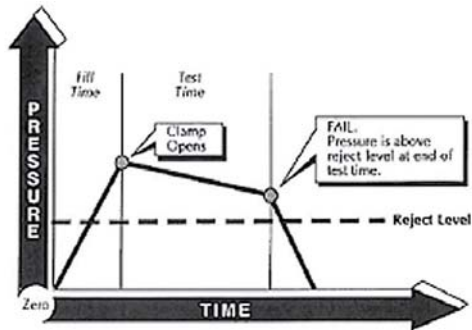


Figure 2
Product Fails an Occlusion Test

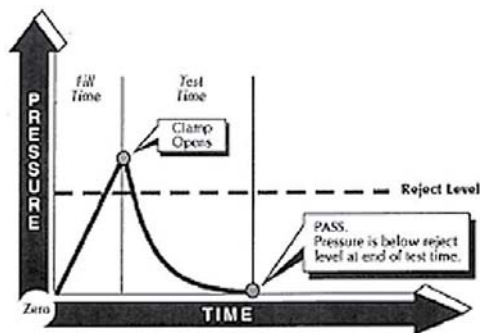


Figure 3
Product Passes an Occlusion Test

Pressure vs. Time Sequence

Figure 2 illustrates a typical occlusion test sequence in which the product under test fails the evaluation.

The product is pressurized while the clamping fixture seals the open end of the product. At the conclusion of fill time, the fill valve closes and traps air in the test circuit. Sprint iQ sequences to test time, the clamp valve opens to atmosphere, and the tester measures the air pressure that escapes from the product.

In this example, the product fails because the air loss from the product was not great enough to drop below the reject level in the allowed test time.

Figure 3 shows a typical occlusion test in which the product passes the evaluation.

The product is pressurized while the clamping fixture seals the open end of the product. As shown in Figure 3, the pressure drops below the reject limit within the established test time after the sealing clamp opens and allows the product to flow to atmosphere.

The significant pressure drop in the product indicates that the device under test flow freely to atmosphere and thus is not blocked.

Applications

Sprint iQ occlusion testers can be used to test tubes, valves, and devices that must flow a minimum volume of air.

Consider using an occlusion test in conjunction with an integrity test. Depending on the product, multiple occlusion tests can be conducted either sequentially or concurrently.

Call Uson to learn how an occlusion test can be used with your particular application.

Features

- Test parameters are easy to program
- All components are in one small enclosure
- Perfect for bench or automation
- High pressure resolution
- Can be combined with other test types

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