



# FLUID POWER TECHNICAL NOTE



## MXT meets FRAS requirements

MDG 41 is a mining design guideline for Fluid Power System Safety at Mines. MDG 41 section 1.5.2 provides flame resistant and antistatic (FRAS) requirements. MDG 3608 section 6.2 provides test methods and criteria for both flame resistance and antistatic properties of Hydraulic hoses. Gates MXT™ is compliant with MDG 41 FRAS requirements per the below tests.

### Flame Resistance:

MDG 3608 references ISO 8030 for test methods, and dictates per ISO 6805:1994 Clause 15 that the flame or glow shall not persist beyond 30 seconds after the removal of the flame for the average of six samples. Gates tested MXT™ hose in all sizes (4, 5, 6, 8, 10, 12, and 16) per ISO 8030:2014. **The testing was conclusive that Gates MXT™ hoses meet the flame resistance criteria.** All tests were conducted at Gates Customer Solutions Center and are documented in our Sample Manager system.

Also note that Gates MXT™ hose also meets Mine Safety Health Administration (MSHA) flame resistance requirements.

### Antistatic:

MDG 3608 references ISO 8031 for test methods, and dictates per ISO 6805:1994 Clause 14 that the electrical resistance must not exceed 2 MΩ/meter on five hose samples. Gates tested MXT hose in all sizes (4, 5, 6, 8, 10, 12, and 16) per ISO 8031:2009 test method 4.5 for hoses with conducting lining as well as test method 4.8 for 'Hose assemblies fitted with metal end fittings'. **The testing was conclusive that Gates MXT™ hoses meet the antistatic criteria.** All tests were conducted at Gates Customer Solutions Center and are documented in our Sample Manager system.

### Conclusion:

**Gates MXT™ hose meets the FRAS requirements per MDG 41.**

Should you have any questions or concerns regarding Gates hydraulic and industrial hose products, please contact **Product Application in Denver, Colorado at (303) 744-5070 or by e-mail at [FPPASUPPORT@gates.com](mailto:FPPASUPPORT@gates.com).**



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## **MXT Passes SAE J1754 Cool Down Tests**

### **Background: Leaks and the Fluid Power Industry**

Eliminating leaks is one of the most critical issues in the fluid power industry. Leaks can have a negative impact on customer satisfaction including downtime, machine performance, human frustration, dirty equipment appearance and environmental costs.

Equipment and machinery OEMs, hose and coupling manufacturers and industry organizations are continually improving products, standards, assembly methods and test programs to eliminate leaks.

### **Evolution of Leak Requirements and Standards**

The earliest test methods to check for leaks were static proof, leak and burst (using water, linear pressure increase, ambient temperature and straight assemblies.)

The more recent test method to check for leaks is impulse testing (using hydraulic fluid, pressure cycles, high temperature and bent assemblies.)

The most current and advanced methods to check for leak resistance combine impulse testing with cool-down cycles. The idea is to better simulate the effects of heat and age on the ability of the hose to maintain a leak-free seal between the stem and ferrule; and the ability of the O-rings to maintain a dry seal between the coupling, adapter and port.

### **SAE J1754 Cool Down Tests (Advanced Leak Tests)**

The SAE J1754-1 standard was issued in 1996 to cover “steel wire reinforced rubber hose assemblies using connectors specified in SAE J516 for use in hydraulic systems using petroleum based hydraulic fluids with maximum working pressures of 1.7 to 42 MPa.” The current SAE J1754-1 revision is JUL2017.

There are five tests in the J1754-1 standard that include leak requirements. The static tests remain the same as J517, but some changes were made to the impulse tests.

1. Proof test (same as J517.)
2. Burst test (same as J517.)
3. Leakage test (same as J517.)
4. Cold Bend test (same as J517.)
5. Impulse test (added Class A, Class B and Class C specifications)



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Three classifications A, B, and C were added to the impulse section to cover a range of application conditions including duty cycle, working pressure, pressure spikes, fluid velocity, flexing, and environmental conditions.

- Class A: High frequency or severity of flexing and/or pressure impulse cycles.
- Class B: Normal frequency or severity of flexing and/or pressure impulse cycles.
- Class C: Meets SAE J517 impulse test requirements.

The test pressures, number of impulse cycles, cool-down cycles and leak requirements vary for each classification of hose per the below table.

	Test Pressure	Impulse Cycles	Cool Down Test	1 <sup>st</sup> Cool Down	2 <sup>nd</sup> Cool Down	Leak Requirement*
Class A	150% WP	300K	J1405 Option III	150K cycles	300K cycles	SAE J1176 Class 0
Class B	133% WP	200K	J1405 Option III	100K cycles	200K cycles	SAE J1176 Class 0
Class C	SAE J517	SAE J517	J1405 Option III	None	None	SAE J517

## **MXT Advanced Performance**

Gates MXT® hose with MegaCrimp® couplings was designed to pass the SAE J1754 class B cool-down requirements. Sizes -4, -5, -6, -8, -10, -12 and -16 have been tested and approved.

## **Additional Information**

Please see Gates Tech Note “FPTN009401 - SAE Leak Test Standards” for additional information about industry standards for leak tests.

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