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Mine Safety Laboratory

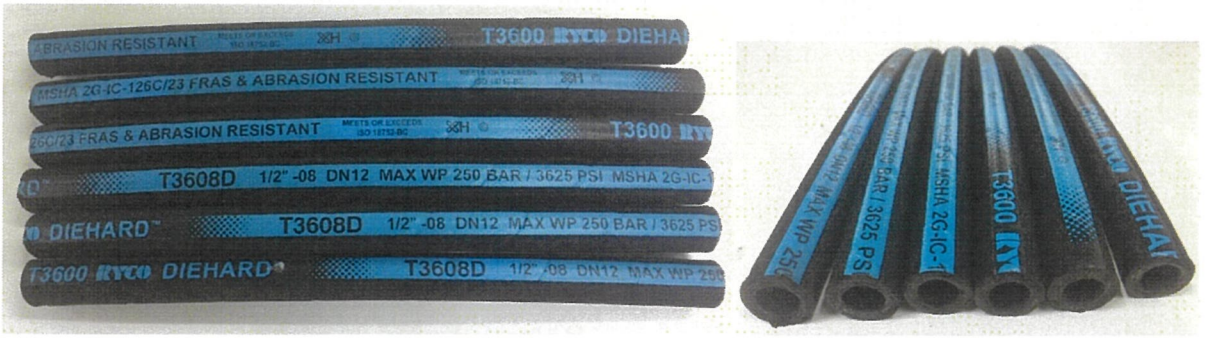
Manuli Hydraulics (Suzhou) Co., Ltd.
No. 85 Xinglin Street, Industrial Park
Suzhou Jiangsu Province CHINA

23 September 2024

TEST REPORT No.: 24-0259/01

Report Version: 1

Customer Advised Sample Description:	*T3600 DIEHARD - T3608D DN12* – approx. 12.5 mm ID, 20.5 mm OD high tensile wire braided hydraulic hose; Max WP 250 bar/3625 PSI; DoM 23/7/2024; Batch # C2024FW3WJ
Customer Advised Usage of Material:	Hydraulic Hose



Figs. 1a & 1b: Supplied samples

SUMMARY

The material **complied** with the Fire resistance performance requirement of *Technical reference guide: Non-metallic materials for underground coal mines & reclaim tunnels in coal mines* (*TRG3608*), 5.2.2.1.

The material **complied** with the Electrical resistance performance requirements of *Technical reference guide: Non-metallic materials for underground coal mines & reclaim tunnels in coal mines* (*TRG3608*), 5.2.2.2.

Analysed by: C. Teasdale

Checked by:

Authorised by:

G. Browning
Laboratory Manager
Mine Safety Laboratory

Independent testing is required to verify conformance to the original design specification whenever a change in the raw materials, formulation or manufacturing process occurs – and when the manufactured product no longer meets the design specifications.

FIRE RESISTANCE

Sample:

T3600 DIEHARD - T3608D DN12

– approx. 12.5 mm ID, 20.5 mm OD high tensile wire braided hydraulic hose; Max WP 250 bar/3625 PSI; DoM 23/7/2024; Batch # C2024FW3WJ

Test Date & Location:

22 September 2024; Mine Safety Laboratory, Thornton

Method of Analysis:

ISO8030 (Rubber and plastics hoses – Method of test for flammability.)

Results:

TABLE 1

Sample	Sample Length (mm)	Flame Persistence (s)	After Glow Persistence (s)
1	301	5	0
2	301	6	0
3	302	28	0
4	301	31	0
5	303	33	0
6	305	34	0
Mean		**23 s**	**0 s**

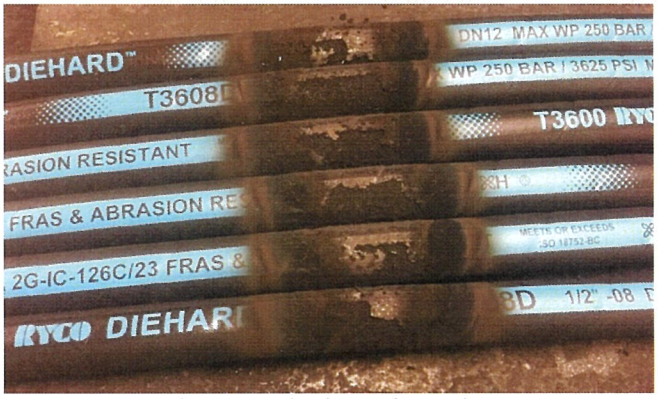


Fig. 2: Sample pieces after testing

Notes:

The results relate only to the behaviour of the test piece under the particular conditions of the test; they shall not be used as a means of assessing the potential fire hazard of the product in use.
This testing has not been independently technically verified.
Flame temperature: (981 – 995)°C.

Any variation from Standard/Test Method:

The Analite No T203 burner replaced with a Bunsen type burner in accordance with the annex to *ISO340*; sample lengths as received.

Requirements:

When tested in accordance with *ISO 8030*, the average persistence time of flaming or glow of 6 pieces of hose - after withdrawal of the ignition flame - shall be ≤30 s.
(- per Clause 6.3 of *ISO 6805:2020.*)

Sample Status:

The material **complied** with the Fire resistance performance requirement of *TRG3608*, 5.2.2.1.

Independent testing is required to verify conformance to the original design specification whenever a change in the raw materials, formulation or manufacturing process occurs – and when the manufactured product no longer meets the design specifications.

ELECTRICAL RESISTANCE

Sample: *T3600 DIEHARD T3608D DN12* – approx.12.5 mm ID, 20.5 mm OD high tensile wire braided hydraulic hose; WP 250 bar/3625 PSI; DoM 23/7/2024; Batch # C2024FW3WJ

Test Date & Location: 22 September 2024; Mine Safety Laboratory, Thornton

Method of Analysis: *ISO 8031 (Rubber and plastics hoses and hose assemblies – Determination of electrical resistance and conductivity).*

Results:

TABLE 2

Measurement	Test Piece	Measured Electrical Resistance (MΩ)	Electrode Spacing	CALCULATED Resistance per metre length
Inner Surface	1	< 0.1*	0.25 m	< 0.4 $M\Omega.m^{-1}$
	2	< 0.1*	0.25 m	< 0.4 $M\Omega.m^{-1}$
	3	< 0.1*	0.25 m	< 0.4 $M\Omega.m^{-1}$
	4	< 0.1*	0.25 m	< 0.4 $M\Omega.m^{-1}$
	5	< 0.1*	0.25 m	< 0.4 $M\Omega.m^{-1}$
	Mean Resistance:			**< 0.4 MΩ/m**
Outer Surface	1	< 0.1*	0.10 m	< 1.0 $M\Omega.m^{-1}$
	2	< 0.1*	0.10 m	< 1.0 $M\Omega.m^{-1}$
	3	< 0.1*	0.10 m	< 1.0 $M\Omega.m^{-1}$
	4	< 0.1*	0.10 m	< 1.0 $M\Omega.m^{-1}$
	5	< 0.1*	0.10 m	< 1.0 $M\Omega.m^{-1}$
	Mean Resistance:			**< 1.0 MΩ/m**
Through	1	< 0.1*	0.24 m	< 0.5 $M\Omega.m^{-1}$
	2	< 0.1*	0.24 m	< 0.5 $M\Omega.m^{-1}$
	3	< 0.1*	0.24 m	< 0.5 $M\Omega.m^{-1}$
	4	< 0.1*	0.24 m	< 0.5 $M\Omega.m^{-1}$
	5	< 0.1*	0.24 m	< 0.5 $M\Omega.m^{-1}$
	Mean Resistance:			**< 0.5 MΩ/m**

* indicates the resistance was below the lower limit of measurement of the measurement device

Notes:

a) For 'through' resistance measurements a ring electrode contacted the hose outer cover at one end of the hose, with a plug electrode at the other end of the hose contacting the inner lining.
b) Test specimens placed on wooden blocks on insulating polyethylene plate block during testing.
c) Approx. laboratory ambient conditions during testing: 22°C, 51% relative humidity.
d) This testing has not been independently technically verified.
e) Sample lengths: approx. 301 mm - 303 mm.
f) Samples conditioned in an unrestrained state at (23 ± 2)°C and (50 ± 5)% RH for > 16 hours.
g) No conductive liquid was applied between electrodes and sample surface during testing.
h) Resistance measurements recorded 5 s after the application of 500V d.c.

Any variation from Standard/Test Method: Sample lengths as received.

Requirements:

When 5 hose lengths are tested in accordance with *ISO 8031*, the electrical resistance measured between electrodes as described shall be ≤2 MΩ/m for all hoses (- per Cls 6.2, *ISO 6805:2020*).

Sample Status:

The material **complied** with the Electrical resistance performance requirements of *TRG3608*, 5.2.2.2.

Independent testing is required to verify conformance to the original design specification whenever a change in the raw materials, formulation or manufacturing process occurs – and when the manufactured product no longer meets the design specifications.