Mine Safety Laboratory

Mines Rescue Pty Limited
Mine Safety Laboratory
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ABN 15 099 078 261

Manuli RYCO Hydraulics Sdn Bhd
Plot 207, Kuala Ketil Industrial Estate
09300 Kuala Ketil, Kedah Darulaman,
MALAYSIA

25 February 2026

TEST REPORT No.: 26-0001/03

Report Version: 1

Customer Advised Sample Description:	*H5000 RYCO® DIEHARD™ H5012D ¾" -12 DN19* – approx. 19 mm ID, 29.5 mm OD isobaric hydraulic hose with spiralled high tensile steel wire reinforcement; MAX WP 350 bar/5100 PSI. [0575/251023 0021720226]
Customer Advised Usage of Material:	Hydraulic Hose [refer *TRG3608*, Sect 5.2]

SUMMARY

The material **complied** with the Fire resistance performance requirements of *TRG3608* (July 2024), 5.2.2.1.

The material **complied** with the Electrical resistance performance requirements of *TRG3608* (July 2024), 5.2.2.2.

Analysed by: C. Teasdale

Checked by: H. Reppert

Authorised by:

Haley Reppert

H. Reppert
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.







Figs 1a – 1c: Supplied samples

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: *H5000 RYCO® DIEHARD™ H5012D ¾" -12 DN19* – approx. 19 mm ID, 29.5 mm OD isobaric hydraulic hose with spiralled high tensile steel wire reinforcement; MAX WP 350 bar/5100 PSI [0575/251023 0021720226]

Test Date & Location: 24 February 2026; 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	0	0
2	304	0	0
3	301	1	0
4	292	1	0
5	300	0	0
6	298	1	0
Mean		**< 1 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.
Flame temperature: (983 – 997)°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*; samples 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* (July 2024), 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: *H5000 RYCO® DIEHARD™ H5012D ¾" -12 DN19* – approx. 19 mm ID, 29.5 mm OD isobaric hydraulic hose with spiralled high tensile steel wire reinforcement; MAX WP 350 bar/5100 PSI [0575/251023 0021720226]

Test Date & Location: 23 February 2026; 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	0.17	0.10 m	1.7 $M\Omega.m^{-1}$
	2	0.19	0.10 m	1.9 $M\Omega.m^{-1}$
	3	0.18	0.10 m	1.8 $M\Omega.m^{-1}$
	4	0.15	0.10 m	1.5 $M\Omega.m^{-1}$
	5	0.13	0.10 m	1.3 $M\Omega.m^{-1}$
	Mean Resistance:			**1.6 MΩ/m**

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

Notes:

a) Test specimens placed on wooden blocks on insulating polyethylene plate block during test.
b) Approx. laboratory ambient conditions during testing: 21.6°C, 54.9% relative humidity.
c) Sample lengths: approx. 292 mm - 304 mm.
d) Samples conditioned in an unrestrained state at (23 ± 2)°C and (50 ± 5)% RH for > 16 hours.
e) No conductive liquid was applied between electrodes and sample surfaces during testing.
f) 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* (July 2024), 5.2.2.2.

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Plot 207, Kuala Ketil Industrial Estate
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MALAYSIA

25 February 2026

TEST REPORT No.: 26-0001/04

Report Version: 1

Customer Advised Sample Description:	*H5000 RYCO® DIEHARD™ H5016D 1" -16 DN25* – approx. 25 mm ID, 37 mm OD isobaric hydraulic hose with spiralled high tensile steel wire reinforcement; MAX WP 350 bar/5100 PSI [0575/251104 0021721095]
Customer Advised Usage of Material:	Hydraulic Hose [refer *TRG3608*, Sect 5.2]

SUMMARY

The material **complied** with the Fire resistance performance requirements of *TRG3608* (July 2024), 5.2.2.1.

The material **complied** with the Electrical resistance performance requirements of *TRG3608* (July 2024), 5.2.2.2.

Analysed by: C. Teasdale

Checked by: H. Reppert

Authorised by:

Haley Reppert

H. Reppert
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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.



Figs 1a – 1c: Supplied samples

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: *H5000 RYCO® DIEHARD™ H5016D 1" -16 DN25* – approx. 25 mm ID, 37 mm OD isobaric hydraulic hose with spiralled high tensile steel wire reinforcement; MAX WP 350 bar/5100 PSI [0575/251104 0021721095]

Test Date & Location: 24 February 2026; 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	298	0	0
2	302	0	0
3	295	0	0
4	298	0	0
5	298	0	0
6	300	0	0
Mean		**0 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.
Flame temperature: (982 – 1001)°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 sizes 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* (July 2024), 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: *H5000 RYCO® DIEHARD™ H5016D 1" -16 DN25* – approx. 25 mm ID, 37 mm OD isobaric hydraulic hose with spiralled high tensile steel wire reinforcement; MAX WP 350 bar/5100 PSI [0575/251104 0021721095]

Test Date & Location: 23 February 2026; 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:			Mean Resistance:
Outer Surface	1	0.14	0.10 m	1.4 $M\Omega.m^{-1}$
	2	0.17	0.10 m	1.7 $M\Omega.m^{-1}$
	3	0.16	0.10 m	1.6 $M\Omega.m^{-1}$
	4	0.18	0.10 m	1.8 $M\Omega.m^{-1}$
	5	0.17	0.10 m	1.7 $M\Omega.m^{-1}$
	Mean Resistance:			**1.6 MΩ/m**

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

Notes:

a) Test specimens placed on wooden blocks on insulating polyethylene plate block during test.
b) Approx. laboratory ambient conditions during testing: 22.2°C, 54.7% relative humidity.
c) Sample lengths: approx. 295 mm - 302 mm.
d) Samples conditioned in an unrestrained state at (23 ± 2)°C and (50 ± 5)% RH for > 16 hours.
e) Conductive liquid was applied between electrodes and sample outer surface during testing.
f) 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* (July 2024), 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.