

**OTHER
RECOGNIZED
DOCUMENT**

ULC/ORD-C536-98

FLEXIBLE METALLIC HOSE



**Underwriters'
Laboratories of Canada®**



Documents

Document Sharing Hub

UNDERWRITERS' LABORATORIES OF CANADA (ULC) is a not-for-profit organization incorporated in 1920 by letters patent issued by the Canadian Government. It maintains and operates laboratories, certification services and a quality system registration program for the examination, testing, and classification of devices, constructions, materials and systems to determine their relation to life, fire and property hazards. Underwriters' Laboratories of Canada also develops and publishes standards, classifications and other recognized documents for products having a bearing on fire, accident, or property hazards.

Underwriters' Laboratories of Canada is accredited by the Standards Council of Canada as a Certification Organization, a Testing Organization, a Quality Systems Registration Organization, and a Standards Development Organization, under the National Standards System of Canada, and is affiliated with Underwriters Laboratories Inc. in the United States of America.

Other Recognized Documents (ORD) developed by Underwriters' Laboratories of Canada are developed in accordance with the procedure outlined in the documents CAN-P-3, "General Requirements for Bodies Operating Product Certification Systems"; and CAN-P-1500, "Additional Requirements for Accreditation of Certification Bodies", published by the Standards Council of Canada.

The headquarters of Underwriters' Laboratories of Canada is located in Toronto, Ontario. In addition, ULC is represented across Canada as well as many countries worldwide.

HEAD OFFICE

Underwriters' Laboratories of Canada
7 Crouse Road
Toronto, Ontario M1R 3A9
Telephone: (416) 757-3611
Fax: (416) 757-8915
e-mail: ulcinfo@ulc.ca
Web site: www.ulc.ca

EASTERN OFFICE

6505, Rte Transcanadienne, bureau 330
St-Laurent, Quebec
H4T 1S3
Téléphone: (514) 363-5941
Télécopieur: (514) 363-7014
C.élec: Montreal.LES@ca.ul.com

The STANDARDS COUNCIL OF CANADA is the coordinating body of the National Standards System, a federation of independent, autonomous organizations working towards the further development and improvement of voluntary standardization in the national interest.

The principal objects of the Council are to foster and promote voluntary standardization as a means of advancing the national economy, benefiting the health, safety and welfare of the public, assisting and protecting the consumer, facilitating domestic and international trade, and furthering international cooperation in the field of standards.

The National Standards System of Canada accepts the use of Other Recognized Documents (ORD) as defined in CAN-P-3, "General Requirements for Bodies Operating Product Certification Systems"; and CAN-P-1500, "Additional Requirements for Accreditation of Certification Bodies", published by the Standards Council of Canada.

The Standards Council of Canada is located at:

270 Albert Street
Suite 200
Ottawa, Ontario
K1P 6N7

WEST TORONTO OFFICE

155 Rexdale Blvd., Suite 306
Toronto, Ontario M9W 5Z8
Telephone: (416) 757-3611
Fax: (416) 744-7309

PACIFIC OFFICE

No. 130 – 13775 Commerce Parkway
Richmond, British Columbia
V6V 2V4
Telephone: (604) 214-9555
Fax: (604) 241-9550
e-mail: Vancouver.LES@ca.ul.com

NOTES:

1. The intended primary application of this Recognized Document is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.
2. Copies of this Recognized Document may be ordered from Underwriters' Laboratories of Canada.

FLEXIBLE METALLIC HOSE

Prepared and Published by
UNDERWRITERS' LABORATORIES OF CANADA



FIRST EDITION..... October, 1998

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior permission of Underwriters' Laboratories of Canada.



TABLE OF CONTENTS

PREFACE	1
1. SCOPE	2
2. GLOSSARY	3
3. CONSTRUCTION	3
4. PERFORMANCE	5
4.1 General	5
4.2 Leakage	5
4.3 Hydrostatic Strength	6
4.4 Vibration	6
4.5 Flexure	6
4.6 Tension	6
4.7 Torsion	6
4.8 Temperature	7
4.9 Flame	7
4.10 Compression	7
4.11 Bending	7
4.12 10-Day Moist Ammonia - Air Stress Cracking	8
4.13 Salt Spray Test	8
4.14 Electrical Continuity Test	9
5. TESTS	9
5.1 General	9
5.2 Leakage	9
5.3 Hydrostatic Strength	10
5.4 Vibration	10
5.5 Flexure	11
5.6 Tension	12
5.7 Torsion	14
5.8 Temperature	14
5.9 Flame	15
5.10 Compression	16
5.11 Bending	16
5.12 10-Day Moist Ammonia - Air Stress Cracking	17
5.13 Salt Spray Test	17
5.14 Electrical Continuity Test	17
5.16 Manufacturing and Production Tests	18
6. MARKING	18
6.1 General	18



INCORPORATED 1920

UNDERWRITERS' LABORATORIES OF CANADA

In Reply
Please Refer to

ULC/ORD-C536-1998

FLEXIBLE METALLIC HOSE

PREFACE

This is the First Edition of ULC/ORD-C536-1998, entitled "Flexible Metallic Hose" and replaces and supersedes Guide for the Investigation of Flexible Metallic Hose, ULC Subj. C536-1994.

A product which complies with these requirements will not necessarily be acceptable if, when examined and tested, it is found to have features not covered by this document which may impair the result contemplated by these requirements.

A product employing materials or having forms of construction differing from those detailed in these requirements may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be given recognition.

Units of measurement used in this document are Metric SI.

1 . SCOPE

1.1 These requirements cover flexible metallic hoses having nominal inside diameters of not more than 100 mm, intended for use in piping systems carrying designated liquefied and compressed gases, including anhydrous ammonia, and flammable and combustible liquids, at pressures not exceeding 3 450 kPa and temperatures not greater than 230°C nor lower than minus 40°C.

1.2 These requirements do not apply to gas appliance connectors for handling fuel gases at 35 kPa or less nor to metallic hose intended for use in oil transportation, petroleum refinery, or gas transmission and distribution piping systems.

1.3 Flexible metallic hoses covered by these requirements are intended for aboveground and underground installations in accordance with the applicable sections of the following Codes:

- A National Fire Code of Canada;
- B Installation Code for Oil Burning Equipment, CSA B139;
- C The Environmental Codes of Practice for Aboveground and Underground Storage Tank Systems containing Petroleum and Allied Products;
- D E Natural Gas Installation Code, CAN/CGA-B149.1;
- E Propane Installation Code, CAN/CGA-B149.2; and
- F Regulations of the appropriate Authority Having Jurisdiction.

2 GLOSSARY

2.1 **COMBUSTIBLE LIQUID** - Any liquid having a flash point at or about 37.8°C and below 93.3°C.

2.2 **FLAMMABLE LIQUID** - Any liquid having a flash point below 37.8°C, and a vapor pressure not exceeding 276 kPa (absolute) at 37.8°C.

2.3 **FLAMMABLE GASES AND LIQUIDS** - as used herein, mean gases and liquids which are usually considered flammable or combustible, such as alcohol, fuel oil, gasoline, kerosene, liquefied petroleum gases, and manufactured and natural fuel gases.

3. CONSTRUCTION

3.1 Flexible metallic hose shall be an all-metallic structure, fabricated from materials suitable for their intended use.

3.2 Flexible metallic hose shall be designed to compensate for expansion, contraction and settling of storage tanks and for vibration stresses which may be set up in piping systems during the operation of pumps, other connected machinery or valves.

3.3 Only iron, steel, and non-ferrous alloys shown to be acceptable for ammonia service, shall be used for flexible metallic hose intended for anhydrous ammonia service.

Note: Ammonia containing minimum quantities of water will react rapidly with copper, zinc, tin, and many alloys, especially those of copper base.