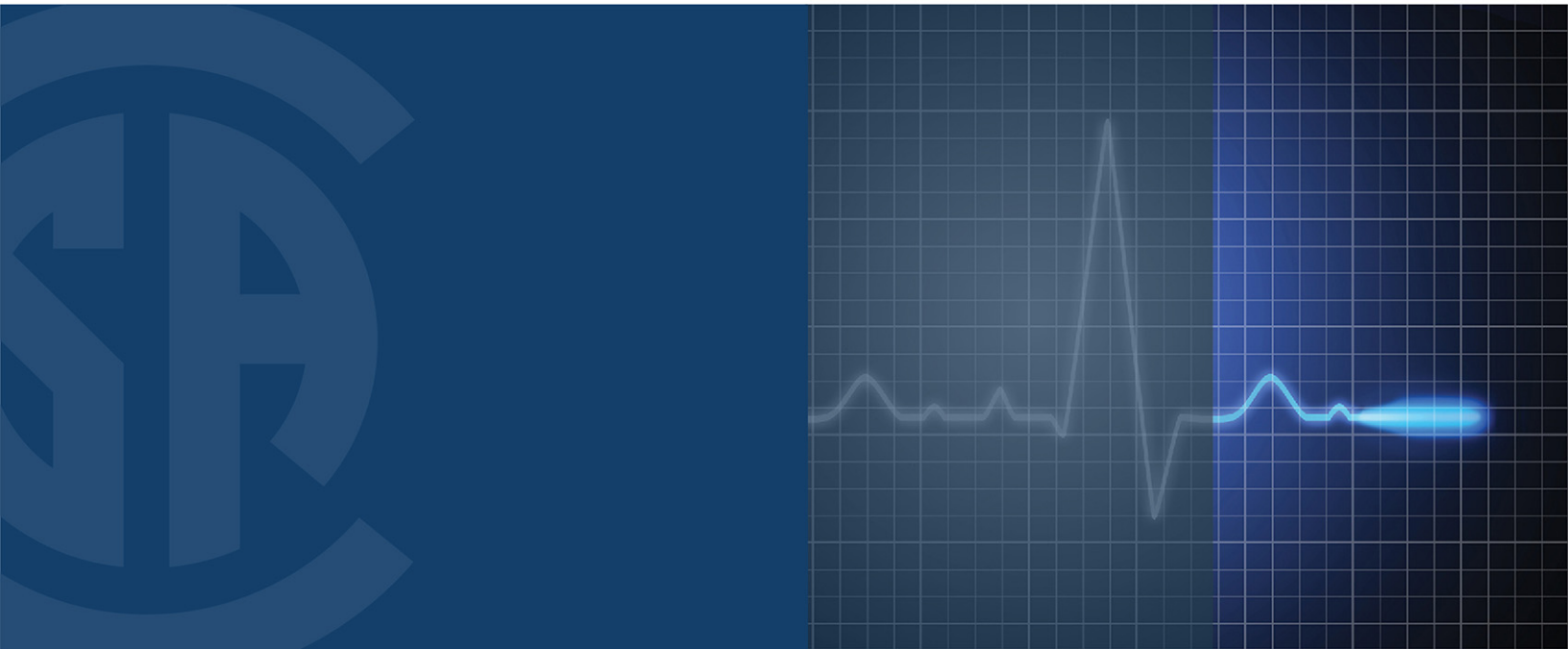




CSA Z305.13:13
(reaffirmed 2020)

Plume scavenging in surgical, diagnostic, therapeutic, and aesthetic settings



Legal Notice for Standards

Canadian Standards Association (operating as "CSA Group") develops standards through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA Group administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document's fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party's intellectual property rights. CSA Group does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA Group makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA GROUP, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA GROUP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA Group is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA Group accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA Group is a private not-for-profit company that publishes voluntary standards and related documents. CSA Group has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA Group and the users of this document (whether it be in printed or electronic form), CSA Group is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA Group's and/or others' intellectual property and may give rise to a right in CSA Group and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA Group reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA Group shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA Group for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:

- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA Group to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to

- alter this document in any way or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA Group; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.



Standards Update Service

CSA Z305.13:13 December 2013

Title: *Plume scavenging in surgical, diagnostic, therapeutic, and aesthetic settings*

To register for e-mail notification about any updates to this publication

- go to store.csagroup.org
- click on **Product Updates**

The **List ID** that you will need to register for updates to this publication is **2422790**.

If you require assistance, please e-mail techsupport@csagroup.org or call 416-747-2233.

Visit CSA Group's policy on privacy at www.csagroup.org/legal to find out how we protect your personal information.

CSA Z305.13:13
***Plume scavenging in surgical,
diagnostic, therapeutic, and
aesthetic settings***



®A trademark of the Canadian Standards Association, operating as "CSA Group"

*Published in December 2013 by CSA Group
A not-for-profit private sector organization
178 Rexdale Boulevard, Toronto, Ontario, Canada M9W 1R3*

*To purchase standards and related publications, visit our Online Store at store.csagroup.org
or call toll-free 1-800-463-6727 or 416-747-4044.*

ISBN 978-1-77139-415-4

*© 2013 Canadian Standards Association
All rights reserved. No part of this publication may be reproduced in any form whatsoever
without the prior permission of the publisher.*

Contents

Technical Committee on Perioperative Safety	2
Subcommittee on Plume Scavenging	4
Preface	5
0 Introduction	6
1 Scope	6
2 Reference publications	7
3 Definitions	8
4 General requirements	9
4.1 Policies and procedures	9
4.1.1 General	9
4.1.2 Policies	9
4.1.3 Procedures	9
4.2 Plume emission procedures	9
4.3 Protection of patients and clients	10
4.3.1 General	10
4.3.2 Facility responsibility	10
4.4 Equipment	10
4.5 Personnel	11
4.5.1 General	11
4.5.2 Training	11
5 Additional control measures	11
5.1 Ventilation	11
5.2 Personal protective equipment	12
5.3 Routine practices	12
6 Operational requirements	12

Annex A (normative) — Types of plume scavenging systems	13
Annex B (informative) — Typical plume capture devices and transfer tubing	22
Annex C (informative) — Bibliography	23

Technical Committee on Perioperative Safety

S. Taylor	St. Joseph's Health Care, London, Ontario <i>Representing User Management</i>	<i>Chair</i>
M. Armutlu	Jewish General Hospital, Montréal, Québec <i>Representing User Management</i>	
A. Bialachowski	St. Joseph's Healthcare Hamilton, Hamilton, Ontario <i>Representing General Interest</i>	
D.A. Chartrand	Montreal Neurological Hospital, Montréal, Québec <i>Representing Health Care Professional</i>	
J.D. Deslauriers	Health Canada, Ottawa, Ontario <i>Representing Government and/or Regulatory Authority</i>	
N. Dolan	Dräger Medical Canada Inc, Richmond Hill, Ontario	<i>Associate</i>
B. Hunt	Class 1 Inc., Cambridge, Ontario <i>Representing Producer Interest</i>	
C. Landers	Weeneebayko General Hospital, Moose Factory, Ontario <i>Representing General Interest</i>	
K.L. LeDez	Memorial University of Newfoundland, St. John's, Newfoundland and Labrador <i>Representing Health Care Professional</i>	
B.W. McLeod	Maple Ridge, British Columbia <i>Representing Health Care Professional</i>	

G. Mendes	GE Health Care Technologies, Mississauga, Ontario <i>Representing Producer Interest</i>	
P.I. Mendes	3M Canada, London, Ontario	<i>Associate</i>
J. Parker	London Health Sciences Centre University Hospital, London, Ontario <i>Representing General Interest</i>	
D.H. Piper	MAQUET-DYNAMED Inc, Markham, Ontario <i>Representing Producer Interest</i>	
M. Sagar	WorkSafe BC, Vancouver, British Columbia <i>Representing Government and/or Regulatory Authority</i>	
R.C. Shantz	Parkin Architects Limited, Toronto, Ontario <i>Representing General Interest</i>	
P.J. Smalley	Technology Concepts International, Chicago, Illinois, USA <i>Representing General Interest</i>	
C. Stark	London Health Sciences Center, London, Ontario	<i>Associate</i>
H. Thiemann	Medical Device Industry Consultant, Perkasie, Pennsylvania, USA <i>Representing Producer Interest</i>	
K.L. Warcimaga	Selkirk and District General Hospital, Selkirk, Manitoba <i>Representing User Management</i>	
J. Wilding	Dräger Medical Canada Inc, Richmond Hill, Ontario <i>Representing Producer Interest</i>	
C. Cortisoz	CSA Group, Mississauga, Ontario	<i>Project Manager</i>

Subcommittee on Plume Scavenging

D.R. Palmerton	Buffalo Filter, Lancaster, New York, USA	<i>Chair</i>
S. Taylor	St. Joseph's Health Care, London, Ontario	<i>Vice-Chair</i>
A. Bialachowski	St. Joseph's Healthcare Hamilton, Hamilton, Ontario	
R. Bilan	University Health Network, Toronto, Ontario	
G. Bruce	AMT Electrosurgery, Kitchener, Ontario	
B. Hunt	Class 1 Inc., Cambridge, Ontario	
L.W. Ineson	Instrumed Surgical, Mississauga, Ontario	
M.R. Ramirez	The Hospital For Sick Children, Toronto, Ontario	
M. Rosenblitt	LKM Divison of SNC-Lavalin Inc., Toronto, Ontario	
W. Schroeder	Covidien, Saint-Laurent, Québec	
P.J. Smalley	Technology Concepts International, Chicago, Illinois, USA	
D. Kolozsvari	CSA Group, Mississauga, Ontario	<i>Project Manager</i>

Preface

This is the second edition of CSA Z305.13, *Plume scavenging in surgical, diagnostic, therapeutic, and aesthetic settings*. It supersedes the previous edition published in 2009.

This Standard was prepared by the Subcommittee on Plume Scavenging, under the jurisdiction of the Technical Committee on Perioperative Safety and the Strategic Steering Committee on Health Care Technology, and has been formally approved by the Technical Committee.

Notes:

- 1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
- 2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- 3) *This Standard was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*
- 4) *To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include “Request for interpretation” in the subject line:*
 - a) *define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
 - b) *provide an explanation of circumstances surrounding the actual field condition; and*
 - c) *where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.*

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.

- 5) *This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include “Proposal for change” in the subject line:*
 - a) *Standard designation (number);*
 - b) *relevant clause, table, and/or figure number;*
 - c) *wording of the proposed change; and*
 - d) *rationale for the change.*

*Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are published in CSA's periodical *Info Update*, which is available on the CSA Web site at www.csa.ca.*

CSA Z305.13:13

Plume scavenging in surgical, diagnostic, therapeutic, and aesthetic settings

0 Introduction

Certain surgical, diagnostic, therapeutic, and aesthetic techniques can generate noxious airborne contaminants (plume) as by-products, particularly from procedures that rely on the ablation, cauterization, or mechanical manipulation of target tissue by devices such as lasers, electrosurgical generators, broadband light sources, ultrasonic instruments, plasma generators, bone saws, and drills.

Plume can contain a variety of contaminants, including viable bacteria, viruses, cellular debris, particulates, noxious and toxic aerosols, gases, vapours, and fumes (including fumes from metals). The gases can include toxic substances such as benzene, formaldehyde, and hydrogen cyanide. Energy-based contact with articles such as tubing, swabs, and skin preparation solutions will produce additional chemicals.

Plume can also contain aerosolized blood (plasma and blood cells or fragments of cells) and blood-borne pathogens in the form of bacteria and viruses. In vitro studies of bacterial and viral contamination have found viable *Escherichia coli*, *Staphylococcus aureus*, human papillomavirus (HPV), and human immunodeficiency virus (HIV) in plume.

Plume thus poses a hazard to exposed persons and can transmit infection. The contaminants in plume can cause respiratory problems or have mutagenic or carcinogenic effects. They can also cause mucous membrane, ocular, respiratory, and skin irritations and reduce the clinician's ability to visualize the operative field, resulting in unsafe operating conditions.

1 Scope

1.1

This Standard applies to systems and equipment used to capture and evacuate plume. It applies to all settings where such systems and equipment are used, including, but not limited to, the following:

- a) surgical facilities;
- b) dental clinics;
- c) medical offices;
- d) veterinary facilities;
- e) laboratories and other research and testing facilities;
- f) cosmetic treatment facilities;
- g) teaching facilities;
- h) manufacturing facilities; and
- i) professional exhibitions and trade shows.