



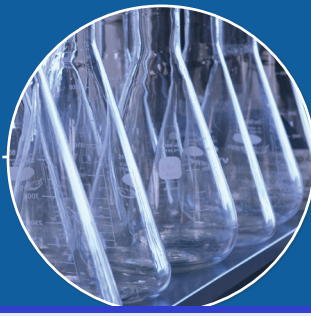
Standards Council of Canada
Conseil canadien des normes



*NSF International Standard /
American National Standard /
National Standard of Canada*

NSF/ANSI/CAN 50 - 2019

Equipment and Chemicals for
Swimming Pools, Spas, Hot Tubs, and
Other Recreational Water Facilities



This is a preview. [Click here to purchase the full publication.](#)

NSF International, an independent, not-for-profit, nongovernmental organization, is dedicated to being the leading global provider of public health and safety-based risk management solutions while serving the interests of all stakeholders.

This Standard is subject to revision.
Contact NSF to confirm this revision is current.

Users of this Standard may request clarifications and interpretations, or propose revisions by contacting:

Chair, Joint Committee on Recreational Water Facilities
c/o NSF International
789 North Dixboro Road, PO Box 130140
Ann Arbor, Michigan 48113-0140 USA
Phone: (734) 769-8010 Fax: (734) 769-0109
Email: info@nsf.org
Web: www.nsf.org

NSF International Standard /
American National Standard /
National Standard of Canada
for Recreational Water Facilities—

Equipment and Chemicals for Swimming Pools, Spas Hot Tubs, and Other Recreational Water Facilities

Standard Developer
NSF International

ICS 13.060.01; 71.100.80

Designated as an ANSI Standard
June 10, 2019
American National Standards Institute

Designated as a National Standard of Canada
February 14, 2020
Standards Council of Canada

Prepared by
The NSF Joint Committee on Recreational Water Facilities

Recommended for adoption by
The NSF Council of Public Health Consultants

Adopted by
NSF International
May 1977

Revised May 1979
Revised May 1992
Revised May 2001
Revised April 2007
Revised May 2009
Addendum November 2011
Revised June 2014
Revised June 2017

Revised June 1984
Revised July 1996
Revised March 2004
Revised October 2007
Revised August 2010
Revised September 2012
Revised July 2015
Revised March 2018

Revised November 1985
Revised January 2000
Revised October 2005
Revised February 2009
Revised August 2011
Revised December 2013
Revised August 2016
Revised December 2019

Published by
NSF International
PO Box 130140, Ann Arbor, Michigan 48113-0140, USA

For ordering copies or for making inquiries with regard to this Standard, please reference the designation "NSF/ANSI/CAN 50 – 2019".

Cette Norme Nationale du Canada est disponible en versions Française et Anglaise.

Copyright 2019 NSF International

Previous editions © 2018, 2017, 2016, 2015, 2014, 2013, 2011, 2010, 2009, 2008, 2007, 2005, 2004, 2001, 2000, 1996, 1992, 1985, 1984, 1979

Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from NSF International.

Printed in the United States of America.

Disclaimers¹

NSF International (NSF), in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of NSF represent its professional judgment. NSF shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. NSF shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard. It is the responsibility of the user of this standard to judge the suitability of the ANS/NSC for the user's purpose.

NSF Standards provide basic criteria to promote sanitation and protection of public health and the environment. Provisions for mechanical and electrical safety have not been included in this Standard because governmental agencies or other national standards-setting organizations provide safety requirements.

Participation in NSF Standards development activities by regulatory agency representatives (federal, state, or local) shall not constitute their agency's endorsement of NSF or any of its Standards.

Preference is given to the use of performance criteria measurable by examination or testing in NSF Standards development when such performance criteria may reasonably be used in lieu of design, materials, or construction criteria.

The illustrations, if provided, are intended to assist in understanding their adjacent standard requirements. However, the illustrations may not include all requirements for a specific product or unit, nor do they show the only method of fabricating such arrangements. Such partial drawings shall not be used to justify improper or incomplete design and construction.

At the time of this publication, examples of programs and processes were provided for general guidance. This information is given for the convenience of users of this standard and does not constitute an endorsement by NSF International. Equivalent programs and processes may be used.

Unless otherwise referenced, the annexes are not considered an integral part of NSF Standards. The annexes are provided as general guidelines to the manufacturer, regulatory agency, user, or certifying organization.

¹ The information contained in this Disclaimer is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. Therefore, this Disclaimer may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

This page is intentionally left blank.

Contents

1	General	1
1.1	Scope	1
1.2	Variations in design and operation	1
1.3	Alternate materials	1
1.4	Standard review	1
2	Normative references	1
3	Definitions	5
4	Swimming pool water contact materials and swimming pool treatment chemicals	15
4.1	Swimming pool water contact materials	15
4.2	Swimming pool treatment chemicals	15
4.3	Corrosion resistance	16
4.4	Dissimilar metals	17
4.5	Insulating fittings	17
4.6	Piping materials	17
5	Design and construction	17
5.1	Installation of piping, valves, and fittings	17
5.2	Assembly	17
5.3	Closing and sealing devices	17
5.4	Suction fittings	17
5.5	PVC hose	18
5.6	Safety vacuum release systems (SVRS)	18
5.7	Pool and spa covers	18
5.8	Pool alarms	18
5.9	Barriers and fencing	18
5.10	Vacuum port fitting cover	18
6	Filters	19
6.1	General	19
6.2	Precoat media-type filters	20
6.3	Sand-type filters	22
6.4	Cartridge-type and high-permeability-type filters	25
7	Centrifugal pumps	27
7.1	General	27
7.2	Hydrostatic pressure test	27
7.3	Strainers	27
7.4	Drain plugs	28
7.5	Shaft seals	28
7.6	Pump performance curve	28
7.7	Operation and installation instructions	28
7.8	Self-priming pumps	29
7.9	Data plate	29
7.10	Motors	29
8	Nonintegral strainers	30
8.1	Nonintegral strainer basket	30
8.2	Nonintegral strainer cover	30
8.3	Drain plug	30
8.4	Head loss	31
8.5	Hydrostatic pressure test	31

8.6	Operation and installation instructions.....	31
8.7	Data plate.....	31
9	Valves.....	31
9.1	General.....	31
9.2	Positive indexing.....	31
9.3	Design pressure.....	32
9.4	Pressure service.....	32
9.5	Valve leakage.....	32
9.6	Head loss curve.....	32
9.7	Waste port seal.....	32
9.8	Vacuum service.....	32
9.9	Installation and operating instructions.....	33
9.10	Identification.....	33
10	Recessed automatic surface skimmers.....	33
10.1	Housing.....	33
10.2	Weir.....	33
10.3	Strainer basket.....	34
10.4	Equalizer line.....	34
10.5	Cover and mounting ring.....	35
10.6	Trimmer valves.....	35
10.7	Vacuum cleaner connections.....	35
10.8	Head loss.....	35
10.9	Operation and installation instructions.....	36
10.10	Data plate.....	36
11	Mechanical chemical feeding equipment.....	37
11.1	General.....	37
11.2	Erosion resistance.....	37
11.3	Chemical resistance.....	37
11.4	Output rate.....	38
11.5	Hydrostatic pressure.....	38
11.6	Life test.....	38
11.7	Shielding.....	38
11.8	Motors.....	38
11.9	Suction lift.....	38
11.10	Protection against overdosing.....	38
11.11	Operation and installation instructions.....	39
11.12	Data plate.....	39
12	Flow-through chemical feeding equipment.....	40
12.1	General.....	40
12.2	Chemical resistance.....	40
12.3	Hydrostatic pressure.....	40
12.4	Motors.....	40
12.5	Output rate.....	40
12.6	Protection against overdosing.....	40
12.7	Flow-indicating device.....	41
12.8	Operation and installation instructions.....	41
12.9	Data plate.....	41
13	Filtration media.....	42
13.1	Precoat filter media.....	42
13.2	Sand and alternate sand-type filter media.....	42

14	Ozone generation process equipment	43
14.1	General	43
14.2	Ozone components	43
14.3	Ozone generator.....	44
14.4	Injection methods	44
14.5	Gas flow meter.....	44
14.6	Valve and component identification	44
14.7	Cleanability	44
14.8	Ozone resistant materials	44
14.9	Compatible materials for operation	44
14.10	Design pressure (pressure vessels)	46
14.11	Head loss.....	46
14.12	Water flow meter	46
14.13	Oxidation-reduction potential (ORP) monitoring.....	46
14.14	Warning devices	46
14.15	Operational protection	47
14.16	Ozone destruct	47
14.17	Ozone output	47
14.18	Life test	47
14.19	Disinfection efficacy.....	47
14.20	<i>Cryptosporidium</i> reduction.....	48
14.21	Operation and installation instructions	48
14.22	Information on ozone off-gassing and removal devices	48
14.23	Data plate	49
15	Ultraviolet (UV) light process equipment	49
15.1	General	49
15.2	Cleanability	49
15.3	Design pressure (pressure vessels)	49
15.4	Flow metering device.....	50
15.5	Performance indication	50
15.6	Operation and installation instructions	50
15.7	Data plate	51
15.8	Disinfection efficacy.....	51
15.9	Valve and component identification.....	52
15.10	Operating temperatures.....	52
15.11	Operational protection	52
15.12	Life test	52
15.13	Cleaning.....	52
15.14	Ultraviolet (UV) lamps.....	53
15.15	Chemical resistant materials	53
15.16	Head loss.....	53
15.17	Hydrostatic pressure requirements.....	53
15.18	UV <i>Cryptosporidium</i> inactivation and dose determination	53
16	In-line electrolytic chlorinator or brominator process equipment.....	54
16.1	General	54
16.2	Cleanability	54
16.3	Design pressure (pressure vessels)	54
16.4	Flow metering device.....	54
16.5	Performance indication.....	54
16.6	Operation and installation instructions	54
16.7	Data plate	55
16.8	Valve and component identification.....	55
16.9	Operating temperatures and pressures.....	55
16.10	Operational protection	55

16.11	Warning devices	55
16.12	Chemical-resistant materials	55
16.13	Output rate	56
16.14	Pressure requirements	56
16.15	Life test	56
16.16	Salt level	56
16.17	Head loss	56
17	Brine (batch) type electrolytic chlorine or bromine generators	56
17.1	General	56
17.2	Cleanability	56
17.3	Design pressure (pressure vessels)	56
17.4	Flow metering device	56
17.5	Performance indication	57
17.6	Operation and installation instructions	57
17.7	Data plate	57
17.8	Valve and component identification	57
17.9	Operating conditions	57
17.10	Injection methods	58
17.11	Operational protection	58
17.12	Chemical-resistant materials	58
17.13	Output rate	58
17.14	Life test	58
18	Copper / silver and copper ion generators	59
18.1	General	59
18.2	Cleanability	59
18.3	Design pressure (pressure vessels)	59
18.4	Flow metering device	59
18.5	Performance indication	59
18.6	Operation and installation instructions	59
18.7	Data plate	60
18.8	Disinfection efficacy	61
18.9	Valve and component identification	61
18.10	Operating temperatures and pressures	61
18.11	Warning devices	61
18.12	Chemical-resistant materials	61
18.13	Output rate	61
18.14	Life test	61
18.15	Uniformity of output	62
18.16	Head loss	62
19	Automated controllers	62
19.1	Scope	62
19.2	Chemical resistant materials	62
19.3	Monitor display	62
19.4	Life test	62
19.5	Performance	63
19.6	Failure sensing and signaling devices	63
19.7	Operational protection	63
19.8	Operation and installation instructions	64
19.9	Data plate	64
20	Water quality testing devices (WQTD)	65
20.1	General	65
20.2	Testing	65

20.3	Operation and use instructions.....	66
20.4	WQTD marking / identification.....	67
21	Spas and hot tubs.....	67
21.1	General.....	67
21.2	Materials.....	67
21.3	Electrical components.....	67
21.4	Design and construction.....	67
21.5	Circulation system.....	70
21.6	Air blower and air induction systems.....	73
21.7	Temperature control systems, heaters, and controls.....	74
21.8	Sanitation and treatment systems.....	75
21.9	Data plate.....	76
21.10	Owner's manual.....	76
22	Fittings for water-park, spray-pad, pool, or spa.....	78
22.1	Water inlet or water return fittings.....	78
22.2	Surface or deck drain fittings.....	79
22.3	Overflow fittings and perimeter grating.....	80
22.4	Fittings for water circulation and treatment.....	81
23	Heat exchangers, heaters, coolers, and solar water heating systems.....	82
23.1	General.....	82
23.2	Performance.....	83
23.3	Operation and installation instructions.....	83
23.4	Marking and product identification.....	84
24	Flow metering device.....	84
24.1	Scope.....	84
24.2	Performance testing.....	84
24.3	Evaluation and testing criteria.....	84
24.4	Design, construction and performance requirements.....	85
24.5	Fastener evaluation.....	85
24.6	Working pressure and pressure testing.....	85
24.7	Head loss.....	86
24.8	Flow rate measurement accuracy.....	86
24.9	Flow metering device testing and accuracy levels.....	86
24.10	Display flow rate scale range.....	87
24.11	Display resolution.....	87
24.12	Life testing.....	87
24.13	Product marking or data plate.....	88
24.14	Installation and operation manual.....	88
25	Water conditioning devices.....	89
25.1	General design and construction.....	89
25.2	Head loss.....	89
25.3	Hydrostatic pressure.....	89
25.4	Valve and component identification.....	89
25.5	Performance indication.....	89
25.6	Operational protection.....	90
25.7	Performance validation.....	90
25.8	Operation and installation instructions.....	90
25.9	Data plate.....	90
25.10	Ultraviolet light conditioners.....	91
25.11	Test method for water conditioning device performance validation.....	91