JOINT CANADA – UNITED STATES NATIONAL STANDARD

ANSI/CAN/UL 3300:2024

STANDARD FOR SAFETY

Service, Communication, Information, Education and Entertainment Robots – SCIEE Robots

Approved American National Standard

ANSI

ANSI/UL 3300-2024

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SCC FOREWORD

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UL Standard for Safety for Service, Communication, Information, Education and Entertainment Robots – SCIEE Robots, ANSI/CAN/UL 3300

First Edition, Dated May 14, 2024

Summary of Topics

The First Edition of ANSI/CAN/UL 3300, Standard for Service, Communication, Information, Education and Entertainment Robots – SCIEE Robots, dated May 14, 2024.

The new requirements are substantially in accordance with Proposal(s) on this subject dated December 1, 2023 and March 15, 2024.

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ANSI/CAN/UL 3300:2024

Standard for Service, Communication, Information, Education and Entertainment Robots – SCIEE Robots

First Edition

May 14, 2024

This ANSI/CAN/UL Safety Standard consists of the First Edition.

The most recent designation of ANSI/UL 3300 as an American National Standard (ANSI) occurred on May 14, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This Standard has been designated as a National Standard of Canada (NSC) on May 14, 2024.

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Preface

This is the First Edition of ANSI/CAN/UL 3300, Standard for Service, Communication, Information, Education and Entertainment Robots – SCIEE Robots.

ULSE is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

This ANSI/CAN/UL 3300 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

Annex A, Annex B, Annex C, and Annex F, identified as Normative, form mandatory parts of this Standard.

Annex D and Annex E, identified as Informative, are for information purposes only.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This joint American National Standard and National Standard of Canada is based on, and now supersedes, the Third Issue of the Outline of Investigation of UL 3300.

Comments or proposals for revisions on any part of the Standard may be submitted at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

This Edition of the Standard has been formally approved by the Technical Committee (TC) on Service, Communication, Information, Entertainment And Education Robots, General Requirements, TC 3300.

This list represents the TC 3300 membership when the final text in this Standard was balloted. Since that time, changes in the membership may have occurred.

TC 3300 Membership

Name	Representing	Interest Category	Region
Arab, Aliasghar	Agile Safe Autonomy by Narranj LLC	Testing & Standards Org.	USA
Callahan, Haley	UL Standards & Engagement	TC Project Manager (Non-Voting)	USA
Dayal, Vineed	U.S. Consumer Product Safety Commission	Non-Voting	USA
George, Agish	Dyson LTD	Producer	United Kingdom

TC 3300 Membership Continued on Next Page

TC 3300 Membership Continued

Name	Representing	Interest Category	Region
Jordan, Bern	University of Maryland	Consumer	USA
Kamble, Sudesh	Intertek Testing Services	Testing & Standards Org.	USA
Kang, Joungwoo	Samsung Electronics CO LTD	Producer	Korea, Republic of
Kim, Joon Young	Sungshin Women's University	General Interest	Korea, Republic of
Kim, Seongmin	LG Electronics, Korea	Producer	Korea, Republic of
Komazaki, Takahiro	Sony Group Corporation	Producer	Japan
Lee, Yu-Chieh	Tairoa	General Interest	Chinese Taipei
Melek, William	University Of Waterloo	General Interest	Canada
Patel, Krupal	Fox Robotics, Inc.	General Interest	USA
Prather, Aaron	ASTM	Testing & Standards Org.	USA
Prince, Deborah	UL Standards & Engagement	TC Chair (Non-Voting)	USA
Quizon, George	Amazon	Producer	USA
Shea, Roberta Nelson	Universal Robots	Producer	USA
Shim, Simon	Hyundai Motor Company	Producer	Korea, Republic of
Sjostrom, Travis	Best Buy Co Inc	Supply Chain	USA
Smith, Jason	UL Solutions	Testing & Standards Org.	USA
Sugiyama, Takashi	Groove X INC	Producer	Japan
Sun, David	SGS	Testing & Standards Org.	China
Xing, Lin	Shanghai Electrical Apparatus Research Institute (SEARI)	Testing & Standards Org.	China
Yang, Shuping	Beijing Research Institute of Automation for Machinery Industry Co. Ltd (BRIA)	Testing & Standards Org.	China
Yuan, Jie	Intellifusion	Supply Chain	China
Zhao, Xin	Hesai Technology	Supply Chain	China

International Classification for Standards (ICS): 97.200.99

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This Standard is intended to be used for conformity assessment.

The intended primary application of this Standard 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.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE

1 Scope

This document establishes the safety requirements for Service, Communication, Information, Education and Entertainment (SCIEE) robots.

These requirements supplement the safety requirements for the intended, non-robotic function as described in the relevant identified standards CSA C22.2 No. 62368-1/UL 62368-1, Audio/Video, Information and Communication Technology Equipment; or CSA C22.2 No. 60335-1/UL 60335-1, Household and Similar Electrical Appliances, including the applicable Part 2. Mobility and/or uncontained manipulation introduce potential for hazard due to the speed and mass of the robot, use environment and other considerations described herein. Where applicable, these requirements cover robotics intended for use in indoor and outdoor locations.

The scope includes SCIEE robots intended for use by, or in close proximity to, the general consumer.

These requirements do not apply to:

– On- or off-road transport of persons;

– Use in industrial environments, including training simulators for industrial applications;

– Use in hazardous locations;

– Use as personnel protective equipment;

– Agricultural use;

– Use in food preparation;

– Use to treat, alleviate instability, or move individuals in hospitals, care facilities or in the home;

– Use as medical devices or in medical environments;

– Robotic functions that have no safety dependencies (i.e., non-safety-related functions, e.g., accuracy of AI query responses, efficacy of a security alarm); or

– Robotic functions described in the relevant end-product safety standard.

Examples of such standards include:

– Commercial floor cleaning machines covered by CSA C22.2 No. 336, Particular requirements for rechargeable battery-operated commercial robotic floor treatment machines with traction drives;

– Portable battery-operated automatic vacuums covered by UL 1017, Standard for Vacuum Cleaners, Blower Cleaners, and Household Floor Finishing Machines;

– Outdoor commercial drones – UL 3030, Standard for Unmanned Aerial Vehicles; and

– Robots identified as a toy by the manufacturer and intended for play only by children covered by the Standard for Electric Toys, UL 696 and/or ASTM F963, Standard Consumer Safety Specification for Toy Safety.

NOTE The requirements of UL 3300 can be applied to robots with multiple use cases, some of which are not specifically covered.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

AATCC 20, *Test Methods for Fiber Analysis: Qualitative*

AATCC 20A, *Test Methods for Fiber Analysis: Quantitative*

ASTM F963, *Standard Consumer Safety Specification for Toy Safety*

Code of Federal Regulations, 16 CFR Part 24, *Guides for Select Leather and Imitation Leather Products*

Code of Federal Regulations, 16 CFR Part 303.15, *Required label and method of affixing*

Code of Federal Regulations, 16 CFR Part 303.4, *English language requirements*

Code of Federal Regulations, 16 CFR Part 303.43, *Fiber Content tolerances*

Code of Federal Regulations, 16 CFR Part 423, *Care Labelling of Textile Wearing Apparel and Certain Piece Goods*

Code of Federal Regulations, 16 CFR Part 1500.49, *Technical requirements for determining a sharp metal or glass edge in toys and other articles intended for use by children under 8 years of age*

Code of Federal Regulations, 16 CFR Part 1610, *Standard for the Flammability of Clothing Textiles*

Code of Federal Regulations, 167 CFR Part 205.100, *National Organic Program*

CSA C22.2 No. 94.2:20, *Enclosures for electrical equipment, environmental considerations*

CSA C22.2 No. 62368-1, *Audio/Video, information and communication technology equipment – Part 1: Safety requirements*

CSA C22.2 No. 60335-1, *Safety of household and similar appliances – Part 1: General requirements*

CSA C22.2 No. 60335-2-29, *Household and similar electrical appliances – Safety – Part 2-29: Particular requirements for battery chargers*

IEC 60068-2-6, *Environmental Testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14, *Environmental Testing – Part 2-14: Tests – Test N: Change of Temperature*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61508, *Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems (all parts)*

IEC 62061, *Safety of Machinery – Functional Safety Of Safety-Related Control Systems*

IEC/TS 62998-1, *Safety of Machinery – Safety-Related Sensors Used For The Protection Of Persons*

ISO 12405-4, *Electrically propelled road vehicles – Test specification for lithium-ion traction battery packs and systems – Part 4: Performance testing*

ISO 13849, *Safety of machinery – Safety-related parts of control systems (all parts)*

ISO 13850, *Safety of machinery – Emergency stop function – Principles for design*

ISO TS 15066, *Robots and Robotic devices, Collaborative Robots*

UL 50E, *Enclosures for Electrical Equipment, Environmental Considerations*

UL 62, *Flexible Cords and Cables*

UL/ULC 2271, *Batteries for Use in Light Electric Vehicle (LEV) Applications*

UL/ULC 2580, *Batteries for Use in Electric Vehicles*

UL 2595, *General Requirements for Battery-Powered Appliances*

UL 5500, *Remote Software Updates*

UL 60335-1, *Household and Similar Electrical Appliances, Part 1: General Requirements*

UL 60335-2-29, *Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements For Battery Chargers*

UL 60730-1, *Automatic Electrical Controls – Part 1: General Requirements*

UL 62368-1, *Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements*

15 USC 45, *Unfair methods of competition unlawful; prevention by Commission*

3 Terms, Definitions and Abbreviated Terms

3.1 Abbreviations

Abbreviations are summarized alphabetically in Table 1.

Table 1
Abbreviations

ODD	Operational Design Domain
OTS	Off the Shelf
PL	Performance Level
SCIEE robot	Service, Communication, Information, Education and Entertainment Robot
SIL	Safety Integrity Level

3.2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/

– ISO Online browsing platform: available at https://www.iso.org/obp

3.3 Function terms

3.3.1
collision avoidance
safety function involving non-contact sensing (e.g., lidar) plus a predetermined action (e.g., stopping, braking, decelerating) to avoid impact with a person.

3.3.2
emergency stop
safety function which is intended to avert arising or reduce existing hazards to persons, damage to machinery or to work in progress, and be initiated by a single human action.

[SOURCE: ISO 12100]

3.3.3
fail-safe routine
routine intended to bring the robot, including its manipulator(s), end-effector(s), and/or payloads into a safe, controlled state in response to a condition that could compromise safety, such as detection of a hardware fault, loss of communications with the docking station, or excessive battery discharge.

3.3.4
non-robotic function
function of a robot that consists of energy sources that can be identified as electrical, mechanical, thermal, chemical and/or radiation which are needed for the normal operation and performance of the robot.