American National Standard

for Support Surfaces –

Volume 1:
Requirements and Test Methods for Full Body Support Surfaces
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for Support Surfaces –

**Volume 1:**
**Requirements and Test Methods for Full Body Support Surfaces**

Secretary
Rehabilitation Engineering and Assistive Technology Society of North America

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American National Standards Institute, Inc.
RESNA American National Standard

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Foreword

This standard covers full body support surfaces which play an integral role in any care plan for the prevention and treatment of pressure injuries. They can make a monumental difference in quality of life for any patient with limited mobility. Since no one full body support surface is best for all patients, a wide variety of surfaces, including mattresses, mattress overlays, and integrated bed systems are available in a broad array of materials. Choosing from this growing list of alternatives has become a daunting task for clinicians, care givers, and patients. Selecting from the available alternatives is further complicated by the lack of consistent information regarding full body support surface characteristics.

Clinicians, manufacturers, vendors, and patients all stand to benefit from the development of standardized procedures to evaluate the characteristics of full body support surfaces. Detailed information provided by standardized testing will help clinicians to objectively match a full body support surface’s characteristics with the needs of individual patients. Testing standards will also aid manufacturers by guiding new product development and in the redesign of existing products. Vendors too, will benefit by being able to clearly describe and compare products from multiple manufacturers. Lastly, patients will benefit by having a full body support surface that truly supports their needs.

These standards are intended to provide means of identifying and measuring clinically meaningful metrics for comparison. However, no performance thresholds have been established to represent specific levels of performance, as performance requirements generally vary from patient to patient. Although actual thresholds may not be known, directional performance of the proposed measurement variables is well-understood. For example, specific thresholds of peak interface pressure have not been identified, but clinical studies have clearly shown that lower pressures are associated with lower levels of tissue damage [1].

RESNA SS Volumes 1 consist of the following sections under the general title Support Surfaces:

**Volume 1: Requirements and Test Methods for Full Body Support Surfaces**

- **Section 1:** Vocabulary
- **Section 2:** Standard Protocol for Measuring Immersion In: Full Body Support Surfaces
- **Section 3:** Standard Protocol for Measuring Heat and Water Vapor Dissipation Characteristics of Full Body Support Surfaces – Body Analog Method
- **Section 4:** Standard Protocol for Measuring Heat and Water Vapor Dissipation Characteristics of Full Body Support Surfaces – Sweating Guarded Hot Plate (SGHP) Method
- **Section 5:** Support Surface Horizontal Stiffness Test
- **Section 6:** Envelopment and Immersion – Hemispherical Indenter Test
- **Section 7:** Envelopment with Dual Semispherical Indenter Test
- **Section 8:** Standard Protocol for Measuring Water Vapor Dissipation Characteristics of Full Body Support Surfaces – Heated Water Bladder Method
RESNA Support Surface Volumes supersede ISO, EN, and other regional documents in the United States by nature of their development by support surface experts who focus directly on these particular medical devices and characteristics.

These standards had their inception in June 2000 when the RESNA Standards Committee on Support Surfaces began creating standards in the United States as a result of the National Pressure Ulcer Advisory Panel’s call for standards in the support surface industry. The standards are test procedures designed to produce objective information about support surface performance characteristics with clinical implications. It is important to note that not all tests are applicable to all surfaces. Any deviation from the standards as written must be documented in the report.

RESNA is accredited as a standards organization and the Assistive Technology Standards Board oversees the work of the RESNA standards committees. RESNA is an interdisciplinary organization that promotes assistive technology for people with disabilities and the development of full body support surfaces for the broad spectrum of patient care environments. The committee has also worked concurrently with other countries as an ANSI member body to the International Organization for Standardization (ISO) to create international standards pertaining to full body support surface standards.

Suggestions for the improvement of this standard are welcome. They should be sent to the following address:

RESNA Assistive Technology Standards Board
1560 Wilson Blvd., Suite 850
Arlington, VA  22209

This standard was approved by the RESNA Standards Committee on Support Surfaces and the RESNA Assistive Technology Standards Board for submittal to ANSI. Committee approval of the standard does not necessarily imply that all the committee members voted for its approval or the approval of every test method or requirement in the standard. The RESNA Standards Committee on Support Surfaces consisted of the following members:

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<td>Chair, Evan Call</td>
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<td>Wellsense</td>
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<td>HoverTech International</td>
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NPUAP ............................................................................................................................. Ann Tescher, Virginia Capasso
Permobil / ROHO, Inc.................................................................................................. Kara Kopplin
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Scope of Volume 1

Volume 1: Requirements and Test Methods for Full Body Support Surfaces are test methods for characterization of full body support surfaces used in the home care, long term care, long term acute care, acute care, and critical care environments. These standards have the potential to be applied to other full body support surfaces that may be used for patient transport, transfer, and conveyance. The evaluation of support surfaces utilizing these methods is intended to provide performance characteristics. The clinical relevance of these characteristics can then be evaluated via laboratory and clinical study.

It should also be noted that not all tests are appropriate for all surfaces, and these standards will need to continue to evolve with technology.

This standard specifies terms, required equipment, and test methods for determining clinically relevant full body support surface performance characteristics. It also specifies requirements for the disclosure of the test results. However, no pass/fail or minimum performance values are listed or implied.

These test methods can be used to verify manufacturers’ claims of product performance.

WARNING: This RESNA Standard calls for the use of procedures that may be injurious to the testing technician if adequate precautions are not taken. Lifting tools, aids, or fixtures should be used to prevent mechanical injury when lifting or moving test mannequins and supporting equipment.
Bibliography

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Section 1 Introduction

There are no tracked changes in this section as this document stands by itself. If ISO completes the development of a new standard, this RESNA standard shall supersede the ISO version.

The development and application of full body support systems standards is particularly dependent upon clear and consistent terms and definitions. The major proportion of this section of RESNA SS-1 includes terms and definitions used in more than one or more sections of the RESNA standards specifically related to full body support systems. These include: RESNA SS-1, Sec 2, Sec 3, Sec 4, Sec 5, Sec 6, Sec 7, and Sec 8.

Full body support systems will cite this document for definition of terms wherever possible thus facilitating the consistent use of a common vocabulary.

This section of RESNA SS-1 is intended purely as a means of specifying terms and definitions. It does not attempt to classify full body support surfaces.
Section 1:
Vocabulary

1 Scope

This section of RESNA SS-1 specifies a vocabulary consisting of terms and definitions used in the field of full body support surfaces (e.g., mattresses, mattress overlays, and integrated bed systems). This section of RESNA SS-1 includes, but is not limited to, the preferred terms used in one or more sections of the RESNA SS-1 standards. It does not include terms considered to be adequately defined in everyday English.

2 Rules and elements used in vocabulary

Most terms defined are used in more than one section of the RESNA standard relating specifically to full body support surfaces. Terms specific to only one of these sections are defined in the terms and definitions clause of that section.

3 Terms and definitions

For the purposes of this section of RESNA SS-1, the terms and definitions below apply:

3.1 active support surface
a powered support surface with the capability to change its load distribution properties with or without applied load

3.2 air
a low-density fluid with minimal resistance to flow

3.3 air fluidized
a feature of a support surface that provides pressure redistribution by forcing air through a granular medium (e.g., beads) producing a fluid state

3.4 alternating pressure
a feature of a support surface that provides pressure redistribution via cyclic changes in loading and unloading as characterized by frequency, duration, amplitude, and rate of change parameters

3.5 basic/standard hospital mattress
A term used to describe the mattress provided within a facility and generally used as the comparative intervention in research trials investigating the effectiveness of pressure redistribution support surfaces. As such, the qualities of a standard hospital mattress vary according to historical and clinical context and are rarely reported in detail in clinical trials. In most cases it is assumed that a standard hospital mattress is a non-powered foam or spring-based mattress.

NOTE The term “Standard hospital mattress” should not be used without a full description. Commonly used mattresses have changed over time and no ‘standard’ exists. Any reference, notation or