

National Pressure Injury Advisory Panel Support Surface Standards Initiative (S3I)

Terms and Definitions Related to Support Surfaces

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Support surfaces remain an integral component of pressure injury prevention and treatment. Recent research and new technologies coupled with new standards testing created a need for revision of past terms and definitions related to support surfaces. These terms and definitions have been developed to provide a common understanding of terms that refer to basic physical concepts, design considerations, and product characteristics. Thus, the purpose of this document is to provide a glossary of terms and definitions that are specific to the language used within the Support Surface Standards Initiative, and serve as a lexicon to facilitate and provide clarity of understanding regarding performance evaluation and the standardized testing protocols.

Based on the work of the Support Surface Standards Initiative (S3I) of the NPIAP, new terms and definitions were added, and all were compiled into an alphabetical list to facilitate ease of use. While this is a comprehensive and inclusive list, periodic review and revision is required. The bibliography, of necessity, includes classic references for terms for which the definitions have not changed.

The foundational definition of a support surface used in this document is: “A specialized device for pressure redistribution designed for management of tissue loads, micro-climate, and/or other therapeutic functions (e.g. any mattresses, integrated bed system, mattress replacement, overlay, or seat cushion, or seat cushion overlay).”

Term	Definition
ACTIVE SUPPORT SURFACE	A powered support surface, with the capability to change its load distribution properties, with or without applied load.
AIR	A low density fluid with minimal resistance to flow.
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.
ALTERNATING PRESSURE	A feature of a support surface that provides pressure redistribution via cyclic changes in loading <i>and unloading</i> as characterized by frequency, duration, amplitude, and rate of change parameters.
BASIC/STANDARD HOSPITAL MATTRESS	<p>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.</p> <p>*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 category for standard hospital mattress, standard mattress or standard surface should describe the product using consistent and recognizable terms and definitions as listed in this document.</p>
BLADDER	(See Cell/bladder)
BOTTOMING OUT	The state of support surface deformation beyond critical immersion whereby effective pressure redistribution is lost.
CELL/BLADDER	A means of encapsulating a support medium.
CLOSED CELL FOAM	A non-permeable structure in which there is a barrier between cells, preventing gases or liquids from passing through the foam.
COEFFICIENT OF FRICTION	A ratio between the parallel force that is needed to start or maintain motion between two objects in contact with each other and the perpendicular force holding them together.

Term	Definition
CONSTANT/CONTINUOUS LOW PRESSURE	(See Reactive Support Surface)
CRITICAL IMMERSION	The threshold beyond which increased deformation of the support surface has the effect of concentrating and increasing localized pressure.
ELASTIC FOAM	A chemically complex polymeric product having a broad range of load bearing capability and resiliency for comfort and cushioning typically characterized by an interconnected and open cell structure; the elastic nature of this foam causes it to resist deformation and return to its original shape after the stress (external force) that made it deform is removed.
ELASTOMER	Various polymers having the elastic properties of natural rubber, being able to resume its original shape when a deforming force is removed.
ENVELOPMENT	The ability of a support surface to conform, so to fit or mold around irregularities in the body.
FATIGUE	The reduced capacity of a surface or its components to perform as specified. This change may be the result of intended or unintended use and/or prolonged exposure to chemical, thermal, or physical forces.
FORCE	A push or pull vector with magnitude (quantity) and direction (e.g., perpendicular, parallel) that is capable of maintaining or altering the position of a body.
FRICTION (FRICTIONAL FORCE)	The resistance to motion in a parallel direction relative to the common boundary of two surfaces.
FULL BODY SUPPORT SURFACE	A specialized device for pressure redistribution (e.g. mattress, mattress overlay, or integrated bed system) designed for management of tissue loads, microclimate, and/or other therapeutic functions
GEL	A semisolid system consisting of a network of solid aggregates, colloidal dispersions or polymers which may exhibit elastic properties. Gels can range from hard to soft.
HIGH SPECIFICATION FOAM SUPPORT SURFACE / MATTRESS	Deprecated Term. Note: This term potentially limits clinical options because it is based on materials not system performance characteristics.
IMMERSION	Penetration (sinking) into a support surface, measured by depth.
INTEGRATED BED SYSTEM	A bed frame and support surface that are combined into a single unit whereby the surface is unable to function separately.
LIFE EXPECTANCY	The defined period of time during which a product is able to effectively fulfill its designated purpose.

Term	Definition
LOW AIR LOSS	A feature of a support surface that uses a flow of air to assist in managing the heat and humidity (microclimate) of the skin.
MATTRESS	A full body support surface designed to be placed directly on the existing bed frame.
MECHANICAL LOAD	Force distribution acting on a surface.
MICROCLIMATE	The temperature and humidity in a specified location. For purposes of support surfaces, microclimate refers to temperature and humidity at the support surface/body interface.
MULTI-ZONED SURFACE	A surface in which different segments can have different pressure redistribution capabilities.
NON-POWERED	Any support surface not requiring or using external sources of energy for operation. (Energy = DC or AC electrical current)
OPEN CELL FOAM	A permeable structure with interconnection between the cells, the majority of which are open. The interconnectedness of the cellular matrix typically results in permeability to gases and liquids.
OVERLAY	An additional support surface designed to be placed directly on top of an existing surface.
PAD	A cushion-like mass of soft material used for comfort, protection or positioning.
POWERED	Any support surface requiring or using external sources of energy to operate. (Energy = DC or AC electrical current)
PRESSURE	The force per unit area exerted perpendicular to the plane of interest.
PRESSURE REDISTRIBUTION Deprecated Terms: PRESSURE REDUCTION PRESSURE RELIEF	The ability of a support surface to distribute load over the contact areas of the human body. This term replaces prior terminology of pressure reduction and pressure relief surfaces.
PULSATION	A feature of a support surface that provides repeating higher and lower pressures resulting in cyclic changes in stiffness of the surface, typically with shorter duration inflation/deflation, higher frequency and lower amplitude than alternating pressure.
REACTIVE SUPPORT SURFACE	A powered or non-powered support surface with the capability to change its load distribution properties only in response to applied load.
SAFE WORKING LOAD	Maximum external mechanical load (mass) on equipment or an equipment part that is permitted in Normal Use (operation, including routine inspection and adjustments by any operator, and stand-by according to the instructions for use). <i>IEC 60601-1</i>

Term	Definition
SHEAR	A commonly used term encompassing shear strain and shear stress.
SHEAR STRAIN	Distortion or deformation of tissue as a result of shear stress.
SHEAR STRESS	The force per unit area exerted parallel to the perpendicular plane of interest.
SOLID	A substance that does not flow perceptibly under stress. Under ordinary conditions it retains its size and shape.
STANDARD TEMPERATURE AND HUMIDITY ENVIRONMENT	A test environment in which 23 +/- 2°C and 50% +/- 5%RH as specified in ISO 554 can be maintained.
SUPPORT SURFACE	A specialized device for pressure redistribution designed for management of tissue loads, micro-climate, and/or other therapeutic functions. Support surfaces include but are not limited to mattresses, integrated bed systems, mattress replacements or overlays, or seat cushions and seat cushion overlays.
SUPPORT SURFACE LOADING INDENTER	An apparatus that is used to apply indentation forces to a support surface to determine its characteristics. Depending on test method, a partial or full body indenter will be used.
TEST DUMMY – FULL BODY	A physical analog of the human body used during testing.
THERAPEUTIC WORKING LOAD (WEIGHT RANGE)	The rated load range at which the features of a support surface are functioning according to its intended use.
VISCOELASTIC FOAM (MEMORY FOAM)	A type of porous polymer material which conforms in proportion to the applied weight. The material exhibits dampened elastic properties when load is applied.
VISCOUS FLUID	A fluid having a molecular structure which produces sufficient internal friction to resist motion.
ZONE	A segment with a single pressure redistribution capability.

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