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Standard Terminology Relating to Rigid Wall Relocatable Shelters¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This terminology covers terms and their definitions relevant to the materials and processes associated with the construction of rigid wall relocatable shelters.

2. Referenced Documents

2.1 ASTM Standards:²

- B547/B547M Specification for Aluminum and Aluminum-Alloy Formed and Arc-Welded Round Tube
- C273 Test Method for Shear Properties of Sandwich Core Materials
- C274 Terminology of Structural Sandwich Constructions
- C364 Test Method for Edgewise Compressive Strength of Sandwich Constructions
- C393 Test Method for Flexural Properties of Sandwich Constructions
- C460 Terminology for Asbestos-Cement (Withdrawn 2001)³
- C582 Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment
- D123 Terminology Relating to Textiles
- D883 Terminology Relating to Plastics
- D907 Terminology of Adhesives
- D1079 Terminology Relating to Roofing and Waterproofing
- D1356 Terminology Relating to Sampling and Analysis of Atmospheres
- D1566 Terminology Relating to Rubber
- D1781 Test Method for Climbing Drum Peel for Adhesives
- D2240 Test Method for Rubber Property—Durometer Hardness
- D2730 Test Method for Sag Flow of Highly Viscous Mate-

rials (Withdrawn 1986)³

- D3167 Test Method for Floating Roller Peel Resistance of Adhesives
- E492 Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
- E864 Practice for Surface Preparation of Aluminum Alloys to Be Adhesively Bonded in Honeycomb Shelter Panels
- E874 Practice for Adhesive Bonding of Aluminum Facings to Nonmetallic Honeycomb Core for Shelter Panels
- E1925 Specification for Engineering and Design Criteria for Rigid Wall Relocatable Structures
- F412 Terminology Relating to Plastic Piping Systems
- G15 Terminology Relating to Corrosion and Corrosion Testing (Withdrawn 2010)³

3. Terminology

absolute sealing—a level of sealing that requires all seams, slots, holes, and fasteners passing through the seal plane to be sealed.

accelerated test—See **test, accelerated**.

adhesive—a substance capable of holding materials together by means of surface attachment. **D907**

cold setting adhesive—an adhesive which sets at temperatures below 20°C (68°F). **D907**

contact pressure adhesive—a resinous adhesive which is aggressively and permanently tacky at room temperature and adheres to a variety of surfaces upon contact with a minimum of pressure required. (Syn. **pressure-sensitive adhesives**.)

core splice adhesive—a film adhesive, capable of expansion of at least 175 % of its original thickness, used primarily to join or splice together two or more separate sections of core material in sandwich constructions.

foamed adhesive—an adhesive, the apparent density of which has been decreased substantially by the presence of numerous gaseous cells dispersed throughout its mass. **D907**

supported film adhesive—an adhesive material incorporating a carrier that remains in the bond when the adhesive is employed; carrier support material is usually composed of organic/inorganic fibers which may be in woven (knit) or nonwoven (mat) form.

¹ This terminology is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.53 on Materials and Processes for Durable Rigidwall Relocatable Structures.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

unsupported film adhesive—an adhesive material in film form without a carrier support.

adhesive, contact—an adhesive that is apparently dry to the touch and that will adhere to itself instantaneously upon contact.

alclad sheet and plate—composite sheet (and plate) having on both surfaces a metallurgically bonded aluminum or aluminum alloy coating that is anodic to the core alloy to which it is bonded, thus electrolytically protecting the core alloy against corrosion. **B547/B547M**

angle ply—any filamentary lamina orientated in a direction other than that specified as 0° (that is, the reference axis) within a composite assembly.

anisotropic—not isotropic; having mechanical or physical properties, or both, that vary with direction relative to natural reference axes in a material.

A-stage—an early stage in the reaction of certain thermosetting resins in which the material is fusible and still soluble in certain liquids. (Syn. *resol.*) (Compare with **B-stage** and **C-stage**.)

autoclave—a closed vessel for producing an environment of fluid pressure, with or without heat, to an enclosed object undergoing a chemical reaction or other operation.

autoclave molding—a process where the lay-up or other assembly is covered by a vacuum bag and placed in an autoclave capable of providing heat and pressure for curing the part.

DISCUSSION—The vacuum bag is normally vented to the outside of the autoclave.

bag molding—a method of molding or bonding involving the application of fluid pressure, usually by means of air, steam, water, or vacuum, to a flexible cover which, sometimes in conjunction with a rigid die, completely encloses the material to be bonded. (Compare with **vacuum bag molding**.)

balanced laminate—a composite laminate in which all laminae occur in pairs symmetric about the midplane (but not necessarily adjacent to each other). See **symmetrical laminate**.

batch—the quantity of material that has been formulated in a single continuous operation and subjected to chemical processing or physical mixing to produce a homogeneous material.

beam shear—a term describing the stresses developed in planes parallel to facing planes of flat sandwich constructions when subjected to flatwise flexure in such a manner that the applied moments produce curvature of the plane of a sheet of the sandwich construction (see Test Method **C393**).

bleeder cloth—a nonstructural layer of material used in the manufacture of composite assemblies to allow the escape of excess gas and resin during cure.

DISCUSSION—The bleeder cloth absorbs much of the excess resin and is removed after the curing process and is not part of the final composite.

block—*in a honeycomb core material*, a single production unit of honeycomb before slicing.

block flow—the distance an adhesive, sealant, or coating will sag on a vertical surface in a given period of time. Also referred to as *slump*.

breakout—fiber separation or break on surface plies at drilled, machined, etc., edges.

breather—a loosely woven cloth (such as glass fabric) which serves as a continuous vacuum path over a part but does not come in contact with the resin.

bridging—spanning a feature without full contact, such as tape or fabric spanning a radius, step, core edge, etc., or vacuum bagging material spanning tool or part surfaces.

brittleness—the tendency of a material to break at a very low strain, elongation, or deflection, and to exhibit a clean fracture surface with no indications of plastic deformation.

broadgoods—non-preimpregnated or uncured preimpregnated materials wider than 12 in. (300 mm).

DISCUSSION—These include unidirectional tape (precollimated) and woven cloths or fabrics of various constructions.

brush coat—*in sealants*, a thin layer of Class A curing type sealant used alone or in conjunction with a Type B sealant.

B-stage—an intermediate stage, in the reaction of certain thermosetting resins in which the material softens when heated and swells in contact with certain liquids, but may not entirely fuse or dissolve. The resin in an uncured thermosetting adhesive is usually in this stage. Sometimes referred to as *resitol*. **D907**

burn rate—the rate at which a material burns after removal of the ignition heat source.

button sample—*in sealants*, an identified small amount of sealant extruded from a mixed sealant cartridge.

carrier—See **scrim**.

catalyst—a substance that increases the rate of a chemical reaction; used extensively in polymerization reactions.

caul—a sheet of material employed singly or in pairs in hot or cold pressing of assemblies being bonded. **D907**

DISCUSSION—A caul is used to protect either the faces of the assembly or the press platens, or both, against marring and staining; to prevent sticking; to facilitate press loading; to impart a desired texture or finish; and to provide uniform pressure distribution.

A caul may be made of any suitable material such as aluminum, stainless steel, hardboard, fiberboard, or plastic; the length and width dimensions being generally the same as those of the plates of the press where it is used.

CBR—an abbreviation for *chemical, biological, radiological*.

chemical resistance—the ability to resist chemical attack. **F412**

DISCUSSION—The attack is dependent on the method of test, and its severity is measured by determining the changes in physical properties. Time, temperature, stress, and reagents may all be factors that affect chemical resistance.

CIAP—an abbreviation for *corrosion inhibiting adhesive primer*.

climbing drum peel test— See **test, climbing drum peel**.

close out—enclosure of honeycomb or other core material within a structure that may contain hard edges or attachment points, or both.

cocuring—the act of curing a composite laminate and simultaneously bonding it to some other hard detail during the same cure cycle (for example, curing a skin laminate and bonding it to honeycomb core simultaneously).

cold setting adhesive— See **adhesive, cold setting**.

collimate—to render fibers parallel.

compacting—See **debulking**.

composite, filamentary—a major form of advanced composites in which the fiber constituent consists of continuous filaments.

DISCUSSION—Filamentary composites are defined here as composite materials composed of laminae in which the continuous filaments are nonwoven, parallel, uniaxial arrays. Individual uniaxial laminae are combined into specifically oriented multi-axial laminates for application to specific envelopes of strength and stiffness requirements.

composite material—a material consisting of any combination of high-strength, high-modulus fibers, whiskers, or particles in a homogeneous matrix.

compressive strength— See **strength, compressive**.

conduit—a solid or flexible tube, pipe, or channel through which insulated electrical wires are run or through which water or some other fluid flows.

contact adhesive—See **adhesive, contact**.

contact pressure—an imprecise term denoting the minimum amount of pressure necessary to ensure an essentially void-free area between two mating surfaces.

controlled flow—a characteristic of a resin system with elevated viscosity during cure.

core—a generally centrally located layer or composite component of a sandwich construction, usually low density, which separates and stabilizes the facings and transmits shear between them and provides most of the shear rigidity of the construction. **C274**

core compressive modulus—the ratio of the compressive load (below the proportional limit of the core) per unit of original area to the corresponding deformation per unit of original thickness.

core shear—the shear stress applied to the core material used in sandwich panel construction.

core shear modulus—the ratio of the shear stress to the corresponding shear strain for stresses below the proportional limit in shear of the core.

core splice adhesive— See **adhesive, core splice**.

core stabilization—a process to rigidize honeycomb core materials to prevent distortion during machining or curing.

crazing—the development of a multitude of very fine cracks in a material such as ceramic glaze, varnish, paint, etc., often the result of exposure to sunlight, weathering, or certain solvents.

C-stage—the final stage in the reaction of certain thermosetting resins in which the material is relatively insoluble and infusible. Certain thermosetting resins in a fully cured adhesive layer are in this stage. Sometimes referred to as *resite*. **D907**

cure—to change the properties of a polymeric system into a more stable, usable condition by the use of heat, radiation, or reaction with chemical additives. **D883**

DISCUSSION—Cure may be accomplished, for example, by removal of solvent or crosslinking.

debulking—the application of a temporary vacuum bag, bleeder, vacuum, or pressure, with or without heat, to remove trapped air and possibly some resin, in order to compact a composite lay-up. (Syn. **pre-bleeding, compacting**.)

degradation—damage by weakening or loss of some property, quality, or capability.

delamination—the separation of the layers (lamina) of material in a laminate. **C582, D883**

density—weight per unit volume, usually expressed in pounds per cubic inch, pounds per cubic foot, or kilograms per cubic metre. **C460**

destructive test—See **test, destructive**.

dry strength—See **strength, dry**.

durability—the measure of the ability of a material or structure to endure and maintain its essential and distinctive characteristics of strength, resistance to decay, and appearance, with relation to a specific environment of use.

ECA—an abbreviation for *environmentally controlled area*; an area whose temperature and humidity is controlled within specified limits; the presence of grease, dirt, chemical contaminants, etc., are excluded.

edge closures—structural members framing the periphery of a sandwich panel providing support and a means of attachment to the panel as well as an environmental seal.

edgewise compressive strength—a term describing the load carrying capacity of flat sandwich constructions when a compressive load is applied uniformly to each facing, usually defined in terms of developed facing stresses as compared to the yield stress of the facings (see Test Method **C364**).

electromagnetic interference—See **EMI**.

electromagnetic pulse— See **EMP**.

EMI—an abbreviation for *electromagnetic interference*; caused by electric and magnetic fields that emanate from a wide range of electrical circuitry.

EMP—an abbreviation for *electromagnetic pulse*; a sudden intense discharge of electromagnetic energy that occurs naturally as a result of lightning discharge and can be induced by near-surface or high-altitude nuclear explosions.

environmentally controlled area—See **ECA**.

excessive corrosion—corrosion that is not removed by cleaning as described in Practice **E864**.

exotherm—the temperature rise resulting from the liberation of heat by any process of chemical reaction.

facing—the outermost layer or composite component of a sandwich construction, generally thin and of high density, that resists most of the edgewise loads and flatwise bending moments (Syn. *face*; *skin*). **C274**

fairing—a shape that produces a smooth transition from one direction to another. Also referred to as a *feathering*.

fasteners:

self-sealing fastener—a fastener that provides a tight seal without the need for sealant material nor the use of a mechanical seal (for example, an interference fit fastener).

wet-installed fastener—a fastener that is coated on the shank and under the head with a curing-type sealant to provide a corrosion barrier and a secondary seal.

faying surface—the surface that makes contact with another surface.

DISCUSSION—In bonding or sealing applications, faying surfaces have adhesive or sealant applied between.

faying surface seal—a seal installed between two overlapping surfaces.

feathering—See **fairing**.

fiber content—the amount of fiber present in a composite, usually expressed as volume percent of the composite.

fiber orientation—the direction or alignment of the longitudinal axis of the fiber with respect to a stated reference axis.

filament—a variety of fibers characterized by extreme length. Also known as *fibers* and used interchangeably.

DISCUSSION—Filaments are used in filamentary composites and are also used in filament winding processes, which require long continuous strands. There are normally no filament ends within such composites except at geometric discontinuities.

filamentary composites— See **composite, filamentary**.

fillet seal—a seal applied at the juncture of two adjoining parts or surfaces and along the edges of faying surfaces as a continuous bead of sealing material.

film weight—in the classification of *film adhesives*, weight per unit area of film adhesive usually expressed in pounds per square foot, kilograms per square metre, etc.

flame resistance—the property of a material whereby flaming combustion is prevented, terminated, or inhibited following application of a flaming or non-flaming source of ignition,

with or without subsequent removal of the ignition source. **D123**

DISCUSSION—Flame resistance can be an inherent property of the basic material or product, or it may be imparted by specific treatment. The degree of flame resistance exhibited by a specific material during testing may vary with different test conditions.

flash—excess material that forms at the parting line of a mold or die, or the overflow of excess adhesive outside the area of attachment in a bonded assembly.

floating roller peel test— See **test, floating roller peel**.

foam core—a lightweight cellular structure (rigid foam) material used in sandwich panel construction; innermost portion of a multilayer adherend assembly.

foamed adhesive—See **adhesive, foamed**.

forest products laboratory etch—See **FPL etch and sulfochromate etch**.

FPL etch—an abbreviation for *forest products laboratory etch*; an etchant used for preparing the surface of aluminum alloys for adhesive bonding. (Syn. **sulfochromate etch**.)

fungus resistance—the ability of a sandwich construction to withstand fungi growth or their metabolic products, or both, under normal conditions of service or laboratory test simulating such conditions.

fuzz balls—broken or abraded filaments which have collected as loose bundles or balls during the manufacture of impregnated material, occasionally incorporated into the impregnated material.

gage pressure—the difference in pressure existing within a system and that of the atmosphere. Zero gage pressure is equal to atmospheric pressure. **D1356**

galvanic corrosion—accelerated corrosion of a metal because of an electrical contact with a more noble metal or nonmetallic conductor in a corrosive electrolyte. **G15**

gouge—a surface defect in which material has been removed (scooped out by a sharp instrument) that causes a decrease in strength in a highly stressed area. **E874**

hard edge—an edge reinforcement used to either maintain edge integrity under load or at attachment points.

hard points—reinforced points within a sandwich construction to distribute stresses, resist concentrated compression loads, and maintain integrity of an attachment.

heat sealing adhesive tape—a strip of material (usually fabric, metal foil, paper, or plastic film) coated with an adhesive activated with the application of heat.

HOBE—an abbreviation for *honeycomb before expansion*; honeycomb made by layering sheets, usually of thin aluminum or paper, containing adhesive at the cell nodes.

DISCUSSION—HOBES are stacked layer upon layer to form a block that is subsequently expanded to the desired cell configuration by pulling the outer layer perpendicular to the ribbon direction.

honeycomb before expansion— See **HOBE**.