



Designation: C1881 – 24

Standard Guide for Closed-Loop Recycling of Scrap Gypsum Panel Products¹

This standard is issued under the fixed designation C1881; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide provides guidance for the handling, physical condition and compositional considerations for selecting scrap gypsum panel products and the recycled gypsum derived from that scrap for recycling into new gypsum panel products.

1.2 This guide applies to material derived from gypsum panel products manufactured in accordance with Specifications C1177/C1177M, C1178/C1178M, C1278/C1278M, C1396/C1396M, and C1658/C1658M.

1.3 This guide does not dictate the minimum amount of recycled gypsum a gypsum panel product manufacturer is required to use in producing new gypsum panel products.

1.4 This guide does not address recycling of gypsum panel products from demolition or renovation projects.

NOTE 1—While these sources are outside the scope, they are not precluded from being recycled. This guide may be used as a basis for determination of basic criteria for any stream, as agreed upon between the contractor, recycler, and the gypsum panel product manufacturer.

1.5 This guide does not address the suitability of recycled gypsum for other uses such as an agricultural amendment, for use in gypsum-based joint compounds or gypsum plaster, as an admixture or other uses of gypsum aside from gypsum panel products.

1.6 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recom-*

mendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 *ASTM Standards:*²

C11 Terminology Relating to Gypsum and Related Building Materials and Systems

C22/C22M Specification for Gypsum

C1177/C1177M Specification for Glass Mat Gypsum Substrate for Use as Sheathing

C1178/C1178M Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel

C1278/C1278M Specification for Fiber-Reinforced Gypsum Panel

C1396/C1396M Specification for Gypsum Board

C1658/C1658M Specification for Glass Mat Gypsum Panels

E2114 Terminology for Sustainability

2.2 *EPA Standard:*³

EPA/600/R-93/116 Method of Determination of Asbestos in Bulk Building Materials

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions relating to gypsum and related building materials and systems, see Terminology C11.

3.1.2 For terms and definitions relating to sustainability, see Terminology E2114.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *closed loop system, n*—system in which materials are recovered or reused by a company or a cooperating group of companies.

3.2.2 *recycled gypsum, n*—the gypsum generated by processing scrap gypsum panel products.

3.2.3 *recycler, n*—the entity who processes scrap gypsum panel products.

¹ This guide is under the jurisdiction of ASTM Committee C11 on Gypsum and Related Building Materials and Systems and is the direct responsibility of Subcommittee C11.01 on Specifications and Test Methods for Gypsum Products.

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

³ Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, <http://www.epa.gov>.

3.2.3.1 *Discussion*—The recycler may be the gypsum panel product manufacturer if they are equipped and have operations to process the scrap or may be a third-party specializing in the collection and processing of scrap.

3.2.4 *scrap gypsum panel products, n*—gypsum panel products or portions thereof that are unused; dunnage; or damaged material.

3.2.4.1 *Discussion*—This may also be referred to as scrap in this guide.

4. Significance and Use

4.1 This guide is intended to provide guidance in determining the acceptability of scrap gypsum panel products and the resultant recycled gypsum.

4.2 This guide is also intended for use by construction waste management teams in establishing the methods for segregating and collecting scrap.

4.3 This guide does not dictate that any manufacturer must accept or use recycled gypsum in manufacturing gypsum panel products, nor does it mandate that scrap must be recycled by way of a closed-loop system.

NOTE 2—Closed-loop recycling is just one means to consider, as there are many pathways for landfill diversion.

5. Job Site Material Requirements—Cleanliness

5.1 Scrap gypsum panel products meeting the following criteria are eligible for recycling. The scrap should be clean enough such that it can be recycled in the recycler's process and the recycled gypsum derived from the scrap can be used in the gypsum panel product manufacturer's process.

NOTE 3—There is variability among what scrap individual recyclers can process into recycled gypsum and the contaminants and unwanted contents they can handle in their processes. There are many techniques specific to the type of contaminant for separating or cleaning the contaminants from the scrap gypsum panel products. Even those facilities that can separate more effectively these contaminants prefer the cleanest material possible to minimize handling and increase process efficiency.

5.1.1 Scrap should not be covered in mud, soot, grime or the like, that may be encountered on a job site.

5.1.2 The scrap should not be covered in plaster, paint, primers, glues, sealants, or other construction chemicals that may be present in job site waste; nor should it be soiled with any hydrocarbons or solvents.

5.1.3 The scrap should not have mold or mildew growth, unless a defined amount is identified as being acceptable by the recycler and the gypsum panel product manufacturer and that limit is not exceeded.

NOTE 4—It is important to minimize the introduction of mold, mildew or spores into the manufacturing process for, and into facilities manufacturing, new gypsum panel products.

5.1.4 The scrap should not contain fasteners, joint tape, or other foreign objects that may be present on the job site, unless otherwise allowed by the recycler.

5.1.5 Recycled gypsum should contain no more gypsum derived from scrap water-resistant gypsum panel products than contractually specified between the recycler and the gypsum panel product manufacturer accepting the recycled gypsum.

Recycled gypsum derived from water-resistant gypsum panel products should be identified as such on the bill of lading.

NOTE 5—Additives used to enhance the water-resistance of these specific gypsum panel products can create significant processing issues when the resultant recycled gypsum is processed into new gypsum panel products, depending upon the manufacturer's processes.

5.1.6 Scrap gypsum panel products not meeting the criteria derived by way of this section may be rejected by the recycler and recycled gypsum derived from scrap not meeting this section may be rejected by the gypsum panel product manufacturer at their discretion.

6. Recycled Gypsum Material Requirements—Chemical and Physical Properties

6.1 General:

6.1.1 All scrap gypsum panel products being considered for recycling should meet the criteria in the appropriate specification(s) in 1.2.

6.1.2 All recycled gypsum should contain a minimum 70 % by mass calcium sulfate dihydrate (dry) as specified in Specification C22/C22M, as determined by thermogravimetric analysis.

6.1.3 All scrap and the recycled gypsum derived from it should not contain more than 10 ppm orthorhombic cyclooctasulfur, as determined by a means acceptable to the recycler and the gypsum panel product manufacturer, in accordance with the criteria of Specification C1396/C1396M.

6.1.4 All scrap and all gypsum derived from it shall have no detectable levels of asbestos after testing the scrap in accordance with EPA/600/R-93/116.

6.1.5 All contaminants in scrap and recycled gypsum shall be at or below levels as dictated by applicable governmental agencies regulating gypsum and gypsum panel products.

6.1.6 Scrap being accepted for recycling and the recycled gypsum derived from it should be verified as to its content by way of one of the three options outlined in 6.2 – 6.4. For the option in 6.4, this may be determined on either the scrap or the recycled gypsum, at the discretion of the recycler and the gypsum panel product manufacturer.

6.2 Option One—Known Source:

6.2.1 If the scrap material is coming from a known source, such as a site to which the gypsum panel product manufacturer has supplied the gypsum panel products themselves, then the gypsum panel product manufacturer and recycler, at their discretion, may assume that the scrap and subsequent recycled gypsum meets the criteria established by way of 6.1.1 – 6.1.5 without additional testing or verification and accept it for their respective processes.

6.3 Option Two—Visible Identification or Source Tracking:

6.3.1 Verification as to the criteria in 6.1.1 – 6.1.5 should be performed by way of either identification marks on the scrap or through source verification following the procedure of chain of custody as follows:

6.3.2 Bills of lading or other similar documentation showing the manufacturer and the specific tradename(s) of the product(s) should be maintained and readily available for examination by the recycler and gypsum panel product manufacturer accepting the recycled gypsum derived from the scrap.