ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 248

[SWH-FRL 3506-9]

Guideline for Procurement of Building Insulation Products Containing Recovered Materials

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) today is issuing a guideline for Federal procurement of building insulation products containing recovered materials. The guideline implements section 6002(e) of the Resource Conservation and Recovery Act of 1976, as amended (RCRA), which requires EPA: (1) To designate items which can be produced with recovered materials and (2) to prepare guidelines to assist procuring agencies in complying with the requirements of section 6002. Once EPA has designated an item, section 6002 requires that any procuring agency using Federal funds to procure that item must revise its specifications and purchase such items containing the highest percentage of recovered materials practicable.

The guideline issued today designates building insulation products as items for which the procurement requirements of RCRA section 6002 apply. The guideline also contains recommendations for implementing the section 6002 requirements with respect to procurement of building insulation products.

DATES: The guideline is effective February 17, 1989. Procuring agencies must implement the requirements of RCRA section 6002 with respect to procurement of building insulation products according to the following schedule:

Completion of specification revisions and development of affirmative procurement programs: February 20, 1990.

Commencement of procurement of building insulation products in accordance with RCRA section 6002: February 20, 1990.

ADDRESS: The public docket is available for viewing in Room LG-100, U.S. EPA, 401 M Street SW., Washington, DC from 9:00 a.m. to 4:00 p.m., Monday through Friday, excluding holidays. To review docket materials, the public must make an appointment by calling (202) 475-9327. Materials may be copied from any regulatory docket at a cost of 15 cents per page. Copying totaling less than $15 is free.

FOR FURTHER INFORMATION CONTACT: RCRA Hotline, toll free, at (800) 424-9346 or at (202) 382-3000. For technical information, contact William Sanjour, Office of Solid Waste, OS-330, U.S. EPA, 401 M Street SW., Washington, DC 20460, telephone: (202) 382-4502.

SUPPLEMENTARY INFORMATION:

Preamble Outline

I. Authority

This guideline is issued under the authority of sections 2002(a) and 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended, 42 U.S.C. 6912(a) and 6962.

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II. INTRODUCTION

A. Purpose and Scope

The Environmental Protection Agency (EPA) today is issuing one in a series of guidelines designed to encourage the use of products containing materials recovered from solid waste. Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (RCRA or the Act), as amended, 42 U.S.C. 6962, states that if a procuring agency purchases certain designated items, such items must be composed of the highest percentage of recovered materials practicable. EPA is required to designate these items and to prepare guidelines to assist procuring agencies in complying with the requirements of section 6002.

EPA issued the first of these guidelines, for cement and concrete containing fly ash, on January 28, 1983 (48 FR 4230; 40 CFR Part 249). After that, EPA issued a final guideline for paper and paper products containing recovered materials on June 22, 1988 (53 FR 23546; 40 CFR Part 250), a final guideline for lubricating oils containing re-refined oil on June 30, 1988 (53 FR 24699; 40 CFR Part 252), and a final guideline for retread tires on November 17, 1988 (53 FR 46558; 40 CFR Part 253). A guideline for building insulation products was proposed on August 2, 1988 (53 FR 29165). Today, EPA is promulgating the final building insulation products guideline.

This preamble describes the requirements of section 6002, explains the basis for designating building insulation products as procurement items subject to section 6002, discusses EPA's recommendations for implementing section 6002 with respect to procurement of building insulation products, and responds to comments on the proposed guideline. It also provides information regarding the price, availability, and performance of building insulation products.

B. Requirements of Section 6002

Section 6002 of RCRA, "Federal Procurement," directs all procuring agencies which use Federal funds to procure items composed of the highest percentage of recovered materials practicable, considering competition, availability, technical performance, and cost. Two factors trigger this requirement. First, EPA must designate the items to which this requirement applies. Second, the requirement only applies when the purchase price of the item exceeds $10,000 or when the quantity of such items, or of functionally equivalent items, purchased or acquired in the course of the preceding fiscal year was $10,000 or more.

In addition, Federal agencies responsible for drafting or reviewing specifications for procurement items were required under section 6002(d)(1) to review and revise the specifications by May 8, 1986 in order to eliminate both exclusions of recovered materials and requirements that items be manufactured from virgin materials. Within one year after the date of publication of a procurement guideline by EPA, the Federal agencies must revise their specifications to require the use of recovered materials in such items to the maximum extent possible without jeopardizing the intended end use of the item.

Furthermore, section 6002(c) requires procuring agencies to obtain from vendors an estimate of and certification regarding the percentage of recovered materials contained in their products.

Section 501 of the Hazardous and Solid Waste Amendments of 1984 (Pub. L. 98-616) (HSWA) then added paragraph (i) to section 6002 of RCRA. This provision requires procuring agencies to develop an affirmative procurement program for procuring items designated by EPA. The program must assure that items composed of recovered materials will be purchased to the maximum extent practicable, be consistent with applicable provisions of Federal procurement law, and contain at least four elements:

(1) A recovered materials preference program;

(2) An agency promotion program;

(3) A program for requiring estimates, certification, and verification of recovered material content; and

(4) Annual review and monitoring of the effectiveness of the procurement program.

Under section 6002(e), EPA is required to issue guidelines for use by procuring agencies in complying with the requirements of section 6002. The EPA guidelines must designate those items which can be produced with recovered materials and whose procurement by procuring agencies will fulfill the objectives of section 6002. They also must provide recommendations for procurement practices and information on availability, relative price, and performance.

Section 6002 is designed to promote materials conservation and thereby to reduce the quantity of materials in the solid waste stream. By using products containing recovered materials, Federal procurement can demonstrate their technical and economic viability. In addition, Federal procurement guidelines can provide guidance to state and local governments interested in procuring products containing recovered materials, and Federal procurement of such products is expected to result in increased procurement by these agencies as well.

C. Criteria for Selection of Procurement Items

In the preamble to the fly ash guideline, EPA established the following four criteria for the selection of procurement items for which guidelines will be prepared (48 FR 4231-4232, January 28, 1983):

(1) The waste material must constitute a significant solid waste management problem due either to volume, degree of hazard, or difficulties in disposal;

(2) Economic methods of separation and recovery must exist;

(3) The material must have technically proven uses; and

(4) The Federal government's ability to affect purchasing or use of the final product or recovered material must be substantial.

These criteria incorporate all of the factors which section 6002(e) requires EPA to consider in designating items subject to the section 6002 procurement requirements.

Section III of this preamble demonstrates that building insulation products made with recovered materials meet the criteria for designation. Industrial byproducts currently used to produce building insulation products are also discussed in more detail.

D. Background Information on Insulation Products Containing Recovered Materials

1. Introduction to Insulation

There are many applications for insulation, including building insulation to provide human comfort, equipment insulation, pipe insulation, and refrigeration or cold storage insulation. Building insulation accounts for by far the largest volume of insulation manufactured and is least likely to require specialty products or materials for special insulation purposes. Moreover, the building insulation market is dominated by products which can, and often do, contain recovered materials.

In this guideline, "building insulation," "building insulation products," and "insulation products" all refer to the insulation uses and product types that follow.

Building insulation refers to a material, primarily designed to resist heat flow, which is installed between

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the conditioned (heated and/or mechanically cooled) volume of a building and adjacent, unconditioned volumes or the outside. This term includes but is not limited to products such as blanket, board, spray-in-place, and loose-fill insulation.

Locations suitable for the installation of building insulation include but are not limited to ceilings, floors, foundations, and walls. Ceiling insulation is used between the conditioned area of a building and an unconditioned attic, in common ceiling floor assemblies between separately conditioned units in multi-unit structures, and between the underside and upperside of the roof where the conditioned area of a building extends to the roofs. Floor insulation is used between the first level conditioned area of a building and an unconditioned basement, a crawl space, or the outside beneath it; and around the perimeter of or on a ground level concrete slab where the first level conditioned area of a building is on a slab. Foundation insulation is used at foundation walls between conditioned volumes and unconditioned volumes and the outside or surrounding earth, at the perimeters of concrete slab-on-grade foundations, and at common foundation wall assemblies between conditioned basement volumes. Wall insulation is used within or on the walls between conditioned areas of a building and unconditioned areas of a building or the outside, and in common wall assemblies between separately conditioned units in multiple unit structures.

The principal categories of insulating materials are fiberglass, plastic rigid foams (polyurethane, polyisocyanurate, glass fiber reinforced polyisocyanurate/polyurethane, polystyrene, and phenolic), rock wool, and cellulose. These materials are sometimes used in combination in composite products. Insulation products made from these materials dominate the insulation market and are the primary focus of this guideline.

There also are specialty materials, principally calcium silicate, vermiculite, and perlite, used for insulation products. These materials are virgin minerals which are not recycled, and they represent a relatively small part of the insulation market. These minerals, as well as other specialty materials, however, can also be mixed in composite products with other materials which can contain recovered materials (e.g., perlite composite board).

The primary factors in the choice of insulating material are thermal resistance (R-value); performance standards; impacts on indoor air quality; price; availability; life-cycle cost considering the installed cost of insulation in relation to the estimated reduction in energy cost over the life of the product in use; flammability; corrosiveness of the insulating materials to metallic building components; ease and cost of installation; durability; resistance to moisture absorption; strength; retention of insulating value with time; the dimensions of, and access to, the space to be insulated; and the thickness of the insulation desired.

The process of selecting appropriate thermal insulation for buildings can be broken down in steps as follows:

1. The building type and function is first established, with a view to local, national or government codes and standards. Of particular importance are fire safety and life safety considerations, which affect necessary insulation characteristics, such as insulation flamespread and potential smoke or off-gassing of ignited or smoldering insulation. Another consideration is off-gassing of installed materials which can affect indoor air quality.

2. The preliminary design of the exterior building envelope is examined, in relation to the appropriate insulation form and the availability of space for the insulation, within the anticipated exterior building assemblies. At this point, a preliminary decision may be made as to whether loose fill, flexible blanket, or rigid materials (or combinations of these) will be finally selected. Thermal resistance (R-value) requirements are then finalized, coordinating these as necessary to dimensions and other considerations such as codes.

3. Installation requirements are then considered. Does the insulation require additional support, installed by other skilled workers? Is some form of facing or covering material required for fire safety? Will the workers normally installing the insulation be familiar with the material specified and how it should be placed? Will scheduling of other workers be affected? What level of supervision or inspection is necessary? Other installation considerations may apply, depending on the size and complexity of the building.

4. The level of material and installation costs to be expected is estimated, both as a flat figure and in relation to anticipated building heating and cooling requirements. Installation costs should include all ancillary costs as outlined above.

5. Material specification compliance with code or owner requirements are checked, and provision of certificates of compliance, as appropriate, is added as a specification clause.

6. Specification sections, covering necessary inspections, clean-up and any other prepayment requirements are added, as desired.

2. Types of Recovered Materials Used

At present, several of the major types of insulation are commercially available with recovered materials content, which is defined by RCRA section 1004(19) as follows:

> Waste material and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original manufacturing process.

Some types of insulation are produced using postconsumer materials as feedstocks. An example of this is cellulose insulation, which is made from old newspaper. Others rely on recovered byproducts as feedstocks, such as rock wool insulation, which is primarily made from slags from smelting processes. Fiberglass manufacturers use waste glass from other industries. Plastic foam insulation is made with chemical byproducts, such as dimethyl terephthalate (DMT), which would otherwise be discarded.

3. The Insulation Industry

The following information puts the insulation industry in perspective. The national energy conservation movement caused the insulation industry to grow substantially until 1984. From 1984 to the present, the insulation industry has shown little or no growth. According to the estimated market share based on dollar volume, fiberglass is the predominant insulation material (68 percent), followed by plastic rigid foams (21 percent), rock wool (3 percent), cellulose (3 percent), and all other types including vermiculite, perlite and other specialties (5 percent). Recently, rock wool and fiberglass have lost the greatest share of the market, while plastic foams have been growing most substantially.

During the energy crunch of the late 70s, producers of fiberglass and mineral wool were not able to meet demand. From the mid-70s to the early 80s, fiberglass slipped from 85 percent of the market to around 70 percent, losing market share to cellulose and foam plastics. Neither fiberglass nor rock wool have recovered their market positions.

Cellulose fiber plants expanded from 98 in 1973 to 750 in 1978, but the industry contracted severely after 1977, losing 60 percent of production capacity by 1984.

An estimate of the 1986 total dollar volume of building insulation at

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manufacturer's net price is $2.9 billion as shown in Table 1.

TABLE 1.—1986 SALES OF INSULATION

Commercial and industrial roofs	$1,150,000,000
Residential building:	
Attic	340,000,000
Cavity	220,000,000
Sheathing	165,000,000
Slab & basement	100,000,000
Residential retrofit	666,090,000
Non-residential building:	
Cavity	225,000,000
Slab & foundation	35,000,000
Total	$2,901,090,000

Source: Hull & Company and A.W. Johnson.

Although there are numerous estimates of relative market share by insulation material, these are not consistently broken down between residential, commercial, and industrial uses. Moreover, because government funds are used for all types of construction, distinctions between uses have not been considered necessary.

III. Rationale for Designating Building Insulation Products

This section of the preamble demonstrates that building insulation products satisfy EPA's criteria for designating items subject to the procurement requirements of RCRA section 6002.

A. Significant Solid Waste Disposal Problem

The first criterion is that the waste material constitutes a significant solid waste management problem. The waste materials of immediate concern in the production of building insulation are postconsumer newspaper, container glass, and plastics. Each material represents a significant fraction of the municipal solid waste stream as shown by the data in Table 2.

TABLE 2.—SELECTED ITEMS IN THE MUNICIPAL SOLID WASTE STREAM

[In percent of total discards and thousands of tons]

	Total discards	Newspaper	Glass containers	Plastic containers
1980	125,700			
Percent of total		6.5%	10.5%	1.7%
Tons per year		8,100	13,200	2,100
1982	124,900			
Percent of total		6.1%	10.2%	1.6%
Tons per year		7,600	12,800	2,000
1984	133,000			
Percent of total		6.7%	8.9%	1.8%
Tons per year		9,000	11,800	2,400
1990	141,400			
Percent of total		6.7%	8.0%	2.1%
Tons per year		9,700	11,300	2,900
1995	149,900			
Percent of total		7.0%	7.4%	2.3%
Tons per year		10,500	11,100	3,400
2000	158,800			
Percent of total		7.2%	6.8%	2.5%
Tons per year		11,400	10,800	3,900

Source: Franklin Associates, Ltd., 1986.

In addition, metallurgical slags and certain chemicals are industrial byproducts which would contribute to the industrial waste stream if they were not used in products like insulation. Some manufacturing wastes, such as plate glass and plastics, raise the same concerns. Although use of these byproducts and manufacturing wastes is already substantial, concerns remain about the contribution of the unrecycled portion to the industrial waste stream because of the large quantity of material involved.

Each of the solid waste categories result from different industries and are used in different insulation materials. Therefore each category is discussed separately.

1. Newspaper

Newspaper is the most easily recycled material in the residential waste stream and therefore is targeted for collection most frequently. Problems of oversupply of recycled old newspaper have appeared in the Eastern states. The number of recycling programs mandated by municipal and State requirements nationwide that are currently in place or in the planning stages suggests that the oversupply problem may become severe nationwide in the near future.

The category "old newspaper" contains overissue newspapers (newspapers unsold to the public which do not always enter the municipal waste stream) and postconsumer newspaper. Old newspaper is primarily consumed by the paper industry for a variety of recycled paper products and by the cellulose insulation industry. Substantial quantities are also exported out of the country.

In 1983, actual demand for old newspaper, including demand from the paper industry, exporters, and the cellulose insulation industry was 3.67 million short tons. Estimated 1984, 1985, 1986 and 1987 demand was 3.93 million, 3.96 million, 4.23 million, and 4.58 million short tons, respectively. The estimated growth in demand from 1983 to 1987 was therefore 915,700 short tons or 24.9 percent.

To compare demand with supply, total United States and Canadian production capacity for newsprint in 1985 was 16.58 million short tons, with consumption of newsprint by United States publishers being 13.1 million short tons in 1986. In 1987, the newsprint industry announced a production capacity expansion of 1.63 million short tons to be in place by 1990, approximately a 10 percent increase, with 338,000 tons of this new capacity to be produced from old newspaper.

In 1986, unused old newspaper supply (total U.S. newsprint consumption less demand for old newspaper) was 8.71 million short tons. Assuming newspaper quickly enters the waste flow, the 1986 national recovery efforts represented just under 33 percent of available supplies. National recovery of a feasible 50 percent of available supplies would recycle an additional 2.32 million tons. Assuming all factors remain the same, this would require an increase in demand for old newspapers of 55

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percent over 1986 levels. This is more than twice the growth in demand for the past four years. The new North American production capacity which is expected to be on line by late 1990 would raise the necessary growth rate in old newspaper use to over 65 percent in order to achieve the same 50 percent recovery rate.

2. Glass

The largest volume of waste glass in the solid waste stream comes from containers. According to industry spokesmen, recycling of glass has increased, with glass container plants currently using an average of 20 to 30 percent of cullet in their mix. Some plants use considerably higher percentages if the cullet is readily available.

U.S. Department of Commerce data on container production shows that 309 million gross containers with a net packed weight of 12.7 million tons were produced in 1982. In 1985 and 1986, production was 273 million and 283 million gross with net packed weight of 11.10 million and 11 million tons, respectively. The increase in container quantities from 1985 to 1986 may be due to the stronger economy or to increased use of glass in microwave, wine cooler and other specialty containers.

According to 1982 Census of Manufacturers data, the glass container industry consumed 1.66 million tons of glass cullet (in-plant, pre-, and post-consumer) and 13.82 million tons of other materials, including 8 million tons of sand. This represents 11 percent cullet to the total feedstocks. If all documented 1982 cullet consumption in the container industry was postconsumer glass, an unlikely assumption, it would have represented only 13 percent of potential postconsumer cullet supplies, which as previously stated, were 12.7 million tons.

Another use of postconsumer bottle cullet, as a substitute aggregate in asphalt paving, has been explored since the 1960s. Experimentation has increased in the 1980s, and this use appears to be very promising. However, no data exist for the quantities of cullet in current use nor for the potential demand if "glassphalt" becomes a common paving practice.

As of January 1988, it was not difficult to find buyers for postconsumer bottle cullet within reasonable transportation radii. The container industry, using existing equipment, is capable and willing to double its consumption. The only limitation is lack of supplies that are consistent in quantity and quality. The market for postconsumer bottle cullet will also increase as "glassphalt" is used more commonly.

Published data on preconsumer or manufacturing waste glass (including flat and window glass, table and cookware and so on) which is brokered to other users is not available. The glass processing industry estimates that approximately 500,000 tons per year changes hands. Such waste glass, with the exception of automotive windshield wastes which are very difficult to process, generally enter the waste disposal system only when consumers of cullet are beyond economic transportation distances. However, both fluctuations in the business cycle and periodic dislocations in supply or demand can cause inventories to be stockpiled and possibly discarded.

3. Plastic

Plastics have increased steadily in the waste stream according to data presented in the EPA waste characterization report. Plastic disposal grew from 0.5 million tons in 1960 to 9.6 million tons in 1984 or 7 percent (by weight) of total residential waste. Plastics are expected to increase to 10 percent of the waste by the year 2000. Although many types of plastic are included in the general trend, polyethylene terephthalate (PET), polystyrene (PS), and manufacturing wastes (DMT and phthalic anhydride bottoms) were analyzed for solid waste management impacts because they are the only recovered plastics apt to be used in insulation products.

Data from the U.S. Department of Commerce's Bureau of Trade indicates that PET use is growing faster than other plastic container resins. From 1985 to 1986, PET use grew 37.5 percent compared with high density polyethylene (12.9 percent), low and medium density polyethylene (25.9 percent), polypropylene (4.8 percent), polyvinyl chloride (9.5 percent), polystyrene and others (29.4 percent). The quantity of PS in containers is small, and miscellaneous other resins are included in the data. The rapid growth in PET use is presented in Table 3.

TABLE 3.— CONSUMPTION OF PET IN PLASTIC BOTTLE MATERIALS

Year	Million lbs.	Tons	Percent growth
1983	420.5	210,250	
1984	452.0	226,000	7%.
1985	480.0	240,000	6% estimate.
1986	660.0	330,000	37.5% estimate.
1987	800.0	400,000	21% forecast.

Source: U.S. Department of Commerce.

There are two types of postconsumer PET easily available, containers and used film stock. Industry sources state that PET production for packaging is approaching 1 billion pounds per year with approximately 150 million pounds (or 15 percent) currently recycled. The industry is targeting 2 billion pounds of PET for packaging by 1990. All film stock, including x-ray, photographic and micrographic, is extruded PET. According to industry sources, approximately 600 million pounds of PET film stock is produced annually. About one third, or 200 million pounds, is x-ray film. While specific data on disposal of used x-ray film is not gathered, one source stated that approximately 200 million pounds of used x-ray film is disposed of annually, of which about 10 percent or 20 million pounds is recycled.

In addition to postconsumer plastic bottles and film, an average of 5 percent of every type of plastic resin production becomes manufacturers' or industrial waste plastic annually. Polyester resin production was 6.3 billion pounds in 1985. The amount of manufacturer's polyester waste generated in 1985 was estimated to be 315 million pounds. Total supplies of recyclable PET from bottles, x-ray film, and industrial wastes can be roughly estimated to be 1.25 billion pounds annually.

The Society of the Plastics Industry reported 1986 production of PS resin to be 4.47 billion pounds. Approximately 1.36 billion pounds were produced for packaging and 418 million pounds for building construction. Production

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capacity was reported to be 5.39 billion pounds.

Recycling of postconsumer PS from the municipal waste stream is just being attempted, and data on manufacturers' waste PS is not gathered. For 1986, industrial waste was estimated to be 5 percent of production or 223.5 million pounds. Manufacturing waste PS is regularly brokered.

EPA identified another industrial waste that is used to produce plastic rigid foam insulation, dimethyl terephthalate (DMT) bottoms. Bottoms are the heavy fraction, or residue, of a production process, which may or may not have recoverable materials. An EPA data base of plastic industry waste products suggests that DMT wastes that potentially had value were not recovered for sale in 1981; this data base contained only a partial sample of 1981 data, however. Those DMT wastes with value were recovered for internal use or were burned to extract energy value. DMT wastes without apparent value (e.g., very dilute) did not appear to be recovered at all but were disposed in a variety of ways.

Another industrial waste, phthalic anhydride bottoms may also be used, but this has not been documented nor are quantity data and information on phthalic anhydride wastes currently available from the EPA data base.

4. Slag

Slag is a by-product from blast furnaces and other metal smelting processes. According to the National Slag Association, metallurgical slags from the production of iron and steel do not represent a significant solid waste management problem. Stockpiles are said to be used efficiently in most, though not all, parts of the country. Iron-blast-furnace slag (the general term) sold or used totaled 15.4 million short tons in 1986, of which 88 percent or 13.5 million tons were air-cooled iron blast furnace slag. Road construction materials, such as road base and substitute aggregates in concrete and asphalt, absorbed 81 percent of the total supply. Rock wool manufacturers purchased 519,000 short tons, or 3.8 percent of the air-cooled iron blast furnace slag. According to recent Bureau of Mines data, purchases of slag for rock wool fell from 617,000 short tons in 1985 to 519,000 short tons in 1986.

Based on current data, EPA believes that the major volumes of metallurgical slags are recycled and do not currently represent a nationwide solid waste management problem. However, increased iron and steel production, increasing competition from other recovered materials in roadbuilding, and changes in the national economy could adversely affect the balance of supply and demand for metallurgical slags in the future with a resulting impact on solid waste disposal.

5. Spent Aluminum Potliner

A commenter recommended that EPA add to the guideline mineral wool made with spent aluminum potliner from primary aluminum reduction. Potliner was recently listed as a hazardous waste by EPA because it contains cyanide, so in this instance, toxicity as well as quantity are the management problems of concern.

Primary reduction of aluminum takes place in a "pot," a strongly reinforced steel box lined with an insulating layer and carbon to resist corrosion and abrasion. The lining must be replaced approximately every five years and becomes "spent potliner." The spent potliner is a dark, concrete-like material that contains fluoride, carbon, and cyanides. Approximately 130,000 tons are produced each year by the primary aluminum industry.

EPA listed "spent potliner from primary aluminum reduction" as a hazardous waste on September 13, 1988 (53 FR 35412). The aluminum industry has already pursued recycling/reuse of spent potliner, however. The carbon is a good source of energy as a fuel supplement, while the fluoride values can be used to promote chemical reactions, as a fluxing agent or as part of a chemical feedstock. The industry estimates the 1988 recycling rate to be about 15 percent. Prior to the listing of spent potliner as a hazardous waste, the aluminum industry projected a 1988 recycling rate of 35–40 percent. One of the viable recycling technologies is use as a fuel and fluoride feedstock for mineral wool production.

6. Conclusions

EPA concludes that newspaper and plastics (PET and PS) in the municipal waste stream represent solid waste management problems based on quantity. Current supplies of postconsumer glass are used efficiently, and the container industry is capable of doubling its consumption of postconsumer cullet. Manufacturing wastes (such as plate glass and plastic scrap) as well as industrial byproducts (such as metallurgical slags and chemical bottoms), which qualify under the RCRA definition of recovered materials, would also present solid waste management problems based on quantity if current markets are interrupted. Spent aluminum potliner represents both quantity and toxicity problems, which will persist if efforts to recycle/reuse the material are curtailed due to listing of the material as a hazardous waste.

B. Feasible Methods of Recovery

The second EPA criterion for selection of reclaimed materials for affirmative procurement under RCRA Section 6002 is the existence of economic methods of separation and recovery.

Source separation programs in operation and in the planning stages all target newspaper and container glass, and some target container plastics (particularly PET in bottle bill states). Materials are picked up through curb-side collection programs, drop-off centers, charity drives and so on. There is no national count of such recycling programs, but in some states there are as many as 200 local programs. More programs are being implemented each year. Government-sponsored collection programs are being subsidized because state-sponsored economic analyses have indicated that recycling is less expensive than other disposal options. There also is a healthy system of brokers for materials collected by source separation programs as well as all types of manufacturers' waste materials.

1. Newspaper

Recycling programs mandated by municipal and State laws always target postconsumer newspaper. The waste paper brokerage system handles a large proportion of this postconsumer newspaper as well as the pre-consumer or overissue waste newspaper.

2. Glass

The Glass Packaging Institute reported in 1987 that seventeen non-bottle bill states and the District of Columbia have joined individual state or joint state associations to foster collection of glass containers and publicize redemption centers. For example, the Pennsylvania Glass Recycling Corporation publishes a newsletter that listed forty-three "glass for cash" centers within the state in 1987. Beverage Industry Recycling Programs (BIRPs) serve some of the same non-bottle bill states as well as three others. In addition, ten bottle bill states have developed glass collection and processing systems. The EPA waste characterization report[1] estimated that 1.25 million tons of glass were recycled in 1986, just under ten percent of the available supply. This compares with

[1] *Characterization of Municipal Solid Waste in the United States, 1960 to 2000 (Update 1988)* (Franklin Associates, Ltd., March 30, 1988).

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368,000 tons, or barely three percent, ten years earlier.

Processing centers have been established in both bottle bill and non-bottle bill states to crush and clean glass to market specifications. While national data is not gathered on the numbers of these facilities nor the quantities of cullet they handle, new processing centers, both public and private, are opening in urban areas all around the country.

Three markets for postconsumer glass are the container industry, "glassphalt" producers, and fiberglass manufacturers. The container glass industry requires bottle cullet to be color-sorted, a labor intensive process which either requires citizens to do the color separating or requires hand sorting lines at the processing centers. Mixed-color cullet is suitable for an aggregate substitute in "glassphalt". The fiberglass industry has accepted color-mixed cullet in the past, although the industry claims that fiberglass furnaces are much more sensitive than container furnaces to contaminants such as carbon, plastics, and metals.

Recycling programs are being proposed and implemented that stress quantity over color separation for glass. If sufficient demand develops for color-mixed cullet, it should become available because it is less expensive to collect. The technology has already been developed to prepare cullet for aggregate substitutes. Additional processing to remove contaminants and to prepare color-mixed cullet to fiberglass industry specifications is more complex and therefore more expensive. This technology currently exists at large processors. It is possible that additional processing lines will be developed if supplies of postconsumer cullet are greater than other markets can absorb.

3. Plastic

Postconsumer PET containers are recovered primarily in the bottle bill states, although some additional state and local governments are planning collection for PET and other plastic containers. According to the EPA waste characterization report referenced above, 63,000 tons of soft drink bottles (PET with high density polyethylene (HDPE) base cups) were recovered in 1984 from bottle bill states. This represented 18 percent of national production and 1 percent of gross plastic discards.

Used x-ray film and other film stock is processed to recover silver nitrate and other metals, then is routed for further contaminant removal and sale or to disposal facilities. At least one company has been established to decontaminate x-ray plastics and market clean PET film scrap. In 1987, throughput at this mill was about 6 million pounds per year. The design capacity for the mill is 48 million pounds (or 24,000 short tons) per year. This capacity represents approximately 25 percent of the estimated used x-ray stock.

Postconsumer PS was not being recovered for recycling as of December, 1987. During 1988, the industry began to develop pilot programs to collect foam polystyrene food service materials from fast food restaurants and institutions, but it is still too early to determine how effective these programs will be. Although data is not gathered systematically for manufacturing waste PS, one broker roughly estimated that 200 million pounds of crystalline and foam PS are purchased and sold in some form to other users. If waste PS can be accumulated in 40,000 pound truckloads, and if these wastes meet specifications for contamination, users can be found.

The network of waste plastic brokers will handle any plastic waste for which it can find an economically feasible market. This entails a market value high enough to cover the costs of processing and transportation.

DMT bottoms are in commercial use and therefore are economically feasible to recover. The use of phthalic anhydride bottoms has not yet been documented.

4. Slag

Metallurgical slag is used as an aggregate substitute in road construction and as the raw material for most rock wool insulation made in the United States. Collection and transportation of this industrial byproduct appears to be well established.

5. Spent Aluminum Potliner

The aluminum industry routinely removes spent potliner and stores it prior to disposal. Some purchasers exist for this material, and the aluminum industry is actively exploring additional uses.

6. Conclusions

EPA has concluded that feasible recovery methods exist for postconsumer newspaper, glass, and PET plastics. Postconsumer PS may be recoverable but methods have not yet been proven. The industrial byproducts, slag, DMT bottoms, and spent aluminum potliner, as well as preconsumer (or manufacturing waste) PET, PS and glass cullet, are also recovered efficiently.

C. Technically Proven Uses

The third EPA criterion for selection of reclaimed materials for affirmative procurement under RCRA section 6002 is that the material has technically proven uses in the designated items. Recovered materials currently are commercially acceptable feedstocks in four types of insulating material covered by the guideline issued today: cellulose, composites, the plastic rigid foams, and rock wool.

1. Cellulose

For purposes of this guideline, cellulose is defined as vegetable fiber such as paper, wood, or cane. There are two types of cellulose insulation products—cellulose loosefill and fiberboards made from cellulose.

a. *Cellulose loose-fill and spray-on insulation.* Cellulose insulation is made from approximately 75 percent waste paper; the remaining portion consists of chemicals to retard flammability and to deter insects and pests. While there is some spray-on cellulose insulation made from waste paper, the industry predominately makes loose-fill insulation which is blown into walls and attics.

Cellulose insulation comprises about 3 percent of the insulation market according to a 1987 industry estimate. The cellulose insulation produced in 1984 consumed approximately 480,000 tons of recycled paper. More recent data has not been obtained.

The Department of Commerce listed 371 manufacturers of cellulose insulation in 1983. Four years later, in July 1987, the Cellulose Industry Standards Enforcement Program (CISEP) identified 138 active firms. This indicates continued shrinkage in the cellulose insulation industry. Thirteen of the companies identified by CISEP produced approximately 20 percent of the cellulose insulation manufactured in 1987. Cellulose insulation manufacturers are located all across the country; consequently availability to procurement agencies should present no problems.

b. *Fiberboard made with cellulose.* These fiberboards are made in panels of varying thicknesses from wood, cane or paper fibers. They are often called insulating boards, although they are frequently used for structural reasons rather than for their insulation properties. The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) uses the general term "vegetable fiber board" and includes within the category: sheathing, nail-base sheathing, shingle

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backer, sound deadening board, tile and lay-in boards, laminated paperboard, and homogenous board from repulped paper. The R-value, according to ASHRAE, is about 2.

Fiberboard manufacturers no longer have a trade association, and data regarding market share is not available. The American Paper Institute groups data about "insulating boards" within the construction paper and board category. Estimated production of insulating board for 1986 to 1989 remained flat at 1,178,000 short tons. The entire construction paper and board category was estimated at 2.2 million short tons, with estimated consumption of recovered paper materials growing from 929,000 short tons in 1986 to just over 1 million short tons in 1989. The recovered paper feedstocks were predominantly postconsumer newspaper, mixed paper, and corrugated. There is no estimate of recovered paper consumption for insulating boards alone.

2. Perlite Composite Board

Some composite boards are made with expanded perlite aggregate (a virgin mineral), small amounts of selected binders, and waste newspapers. The materials are mixed together and formed into rigid, flat, rectangular units which may have facings on one or both sides according to the ASTM C-728-82 standard specification. Perlite composite board is primarily used for commercial- and industrial-type roof insulation. Market growth follows growth in the gross national product and is expected to remain at 1987 levels for the next few years.

Approximately 0.2 pounds of newspaper is used per board foot of the finished product. Approximately 500 million board feet were produced in 1987 by the only two known manufacturers, consuming about 50,000 tons of waste newspaper. The percentage of newspaper to other ingredients varies from 23 percent to 30 percent, with the average about 24 percent. The percentage varies according to the technical requirements of different finished products. The paper provides strength while the perlite provides insulating properties. Product availability to government procuring agencies is limited only because it is manufactured by just two companies.

3. Fiberglass Insulation

Fiberglass insulation is primarily made from sand, limestone, soda ash, and boron. There are other materials added to product mixes in small quantities. The materials are melted together and spun into filaments called "batt." Cullet is a substitute for sand, limestone, and soda ash. Boron, the most expensive primary ingredient, is not contained in bottle or plate glass cullet.

Recovered materials used in fiberglass insulation products include pre-consumer waste glass from other manufacturing processes, such as plate glass, container glass, transition cullet (material from glass furnaces produced while mixes are being changed), as well as postconsumer bottle cullet in isolated instances. Home scrap produced in the manufacturing process is called re-feed by the fiberglass industry and is usually consumed by the generator.

Two types of furnaces are used to melt ingredients for fiberglass insulation, electric and gas- or propane-fired. Although both types of furnaces are generally used by each company, a large portion of production uses electric melt. The manufacturers state that the electric furnaces are especially sensitive to organic contaminants. Even trace amounts can cause operational problems and may result in a production line shut down. Electric furnaces are said by the industry to have advantages in environmental emissions control. The gas- or propane-fired furnaces are somewhat more tolerant of contaminants. The manufacturers state, however, that even these furnaces cannot accept cullet as readily as bottle/container furnaces because: (1) The furnaces are smaller in size and refining area, (2) melting temperatures are typically lower and therefore contaminants are not liquified as readily, (3) batch residence times are generally shorter, which results in lower tolerances for non-uniform cullet and, (4) the fiberizing process is very sensitive to variations in batch composition.

The fiberglass industry states that mixed-color waste glass (pre- or postconsumer) can be used if the mixtures are consistent batch to batch. The industry further states however, that green and amber bottle cullet introduce trace metals used to create the colors, which can cause difficulties in fiberglass furnaces. Variations in quantities of the colors change the characteristics of melt, and therefore require costly process adjustments.

Some manufacturers have stated that there are production advantages in using recycled glass. Melting cullet instead of melting virgin materials provides energy savings. In the proposed guideline, EPA stated the energy savings to be 10–15 percent. Commenters from the industry stated that the savings are considerably lower. One producer estimated 0.3 percent per each 1 percent of cullet in the batch; another found 1 percent of energy savings for each 10 percent of cullet used. Cullet use is also said to speed up production lines, increasing the production rate. At least one fiberglass plant intermittently experimented with 40 percent or more cullet, including postconsumer bottle cullet, in 1986. However, this is not common to the industry and was discontinued by the parent company when the plant was closed. Another company, using a European fiberizing process, has been experimenting with using low percentages of cullet; according to the company, however, the expected production advantages have not resulted.

Other manufacturers consider bottle cullet to be an unacceptable feedstock for a number of reasons. First, and most important, it is not consistently available, which would interrupt long term contracts from feedstock suppliers of limestone, soda ash, and sand. Long term contracts for feedstocks tend to stabilize the costs of production and assure preferred customer status in times of raw material scarcity. Second, as discussed above, batches of postconsumer mixed-color bottle cullet do not consistently contain the same percentages of individual colors, which causes processing disruptions. Third, price is a restraint on using bottle cullet. At 1986 costs of production, a price of $.02–.025 per pound ($40–$50 per ton) for green glass cullet was said to be acceptable. The fourth factor is contaminants. While cullet does not have to be color sorted, even minor contamination with metal, plastics, ceramics, or carbon causes problems in fiberglass processing lines.

Fiberglass industry commenters stated that specifications for pre- and postconsumer cullet vary from company to company and plant to plant because different manufacturing processes are used. Size specifications can vary from the consistency of sand (minus #16 mesh—plus #100 mesh) up to half inch chunks. The following contaminant specifications offer general guidance only:

TABLE 4.—FIBERGLASS SPECIFICATIONS

Contaminant	Content
Moisture	Less than 2%.
Organic carbon (e.g., sugars, paper, plastic, milk, residues).	Less than 1%.
Coatings/oxides (e.g., silver, iron oxide, lead oxide, chrome oxide, cobalt oxide, tin oxide).	Less than 1% (usually).
Magnetic materials	0%.

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TABLE 4.—FIBERGLASS SPECIFICATIONS—Continued

Contaminant	Content
Foreign materials (e.g., stones, ceramics, non-magnetic metals).	0%.

In Europe, a French company is said to use substantial proportions of plate and bottle cullet in some of its installations; the same company manufactures the bottles and the plate glass and therefore has the advantage of knowing exactly what is contained in the cullet it uses. According to the European trade association, EURIMA, production of multiple products occurs at other European companies, but it is not common. Companies in Germany and Belgium also use purchased cullet (including bottle cullet) to improve furnace efficiencies and to save energy. All European companies are said to be exploring the use of cullet but the material is not generally available. As in the United States, European furnaces cannot tolerate impurities in cullet.

American glass processors do sell postconsumer bottle cullet to fiberglass manufacturers in some parts of the country, although not in great amounts. The broader category of preconsumer or manufacturing waste cullet is used more commonly. While data is not gathered, knowledgeable sources estimate 175,000 tons of preconsumer cullet is sold to the fiberglass industry annually. Unlike the glass container industry, which favors bottle cullet partly because it contains the key ingredient soda ash, the fiberglass industry obtains much of the needed soda value from other raw materials containing alumina and boron. Therefore, neither soda ash costs nor scarcities have much impact on the costs of producing fiberglass.

Some fiberglass manufacturers indicated interest in using postconsumer cullet if it was available in consistent quantities and quality at competitive prices. These companies believed that cullet processing technology would have to be improved to meet their specifications for consistent color mix and low contaminant levels.

With nearly 70 percent market share, fiberglass dominates the total insulation industry. In 1987, there were six companies producing fiberglass insulation at 26 locations.

4. Plastic Rigid Foams

Plastic rigid foam insulation is made by expanding resins to create cells. Blowing agents are used to enhance the formation of cells and, in some cases, the blowing agent remains trapped within the cells to increase insulating properties. Rigid foam insulations have higher R-values than equivalent thicknesses of other insulations, although they tend to cost more. The higher the R-value, the better the insulating properties.

There are several basic types of plastic rigid foam in general use, including polyurethane, polyisocyanurate, polystyrene, and phenolics. The use of plastic rigid foam insulation appears to be growing the most rapidly of all types of insulation, although data is not consistently published, and information from different sources rarely agrees. However, despite variations in the data, it is established that polyurethane, polyisocyanurate, and polystyrene foams have an important share of the total market, while phenolics represent a very small though growing fraction of the total.

An estimate of total rigid foam boardstock consumption in residential and commercial applications was presented at a Society of the Plastics Industry conference in 1985. Polyurethane foam use was expected to grow from 230 million pounds in 1984 to 249 million pounds and 280 million pounds in 1986 and 1990, respectively. Projected polystyrene growth for the same years was from 285 to 315 to 375 million pounds. Phenolic growth, again for 1984, 1986, and 1990, was estimated at 10 to 11 to 15 million pounds.

a. *Polyurethane and polyisocyanurate insulation.* References to polyurethane (PU) and polyisocyanurate (PIR) insulations tend to be confusing. The term polyurethane foam can also refer to the flexible foams used for cushioning. Data for PU and PIR feedstocks and insulation production quantities are frequently grouped together under the term polyurethane and sometimes are included under the broader term urethane (U). The differences between PU and PIR rigid foam are slight and do not affect the use of recovered materials. For simplification in this guideline, the term polyisocyanurate/polyurethane (PIR/PU) will be used, although the original terms will be preserved in cited data.

PIR/PU insulation is primarily board and laminated board products used to insulate walls, roofing, and doors in residential and commercial buildings. The physical blowing agent is trapped in the cells of PIR/PU rigid foams and contributes to the high R-value.

PIR/PU board insulation is made with various formulas depending on the requirements of the final product. Ingredients are used in the following ranges:

- Isocyanate, 53–57%
- Aromatic polyester polyol, 20–30%
- Blowing agent, 15–20%
- Surfactants and catalysts, 2–3%.

PIR/PU foam-in-place insulation (with two sub-categories, spray-in-place and pour-in-place) is a smaller segment of the market. It is used primarily for roofing insulation and injection into cavities, with some used in wall insulation. PIR/PU foam-in-place ingredients are combined on site and injected into position where the mixture expands and hardens in place. An estimate of the size of the PIR/PU foam-in-place market was developed for the Department of Energy. In 1982, approximately 65 million pounds of foam were used, primarily in roofs, expanding to approximately 88 million pounds in 1986.

The formulation percentages of PIR/PU foam-in-place are basically 40 percent isocyanate to 40 percent polyol to 20 percent blowing agent and other ingredients. Unlike boardstock, where the ingredients are mixed as they are used, PIR/PU foam-in-place is premixed and sold to installers in drums. Shelf-life of six months is the industry standard. According to the industry, formulations with more than 30 percent polyester in the polyol fraction break down in less than six months, and viscosity is seriously impaired.

Polyol is the component in all types of PIR/PU rigid foam insulation that can contain recovered materials. ASTM defines polyol in cellular plastic usage to "include compounds containing alcoholic hydroxyl groups such as polyethers, glycols, polyesters, and castor oil used in urethane foam." Industry sources have stated that the foam insulation market for polyol is approximately 100 million to 120 million pounds per year. Two types of polyol are used by the PIR/PU industry, aromatic polyester polyol and polyether polyol:

Aromatic polyester polyol can be derived from recycled pre- and postconsumer PET or from the chemicals DMT and phthalic anhydride. The polyol is made by reacting glycol with the other ingredients. In some cases, waste DMT bottoms are used; phthalic anhydride bottoms are possibly used as well. Various manufacturers contacted between 1986 and 1988 suggested that DMT bottoms and possibly phthalic anhydride bottoms were commonly recovered to produce feedstock resins for plastic rigid foam insulation products. PET polyols are 45 percent

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PET to 55 percent glycol. DMT polyols are 50 percent DMT to 50 percent glycol.

Polyether polyol is derived from polypropylene oxide, a virgin material process. The insulation industry has switched almost entirely from polyether polyols to the less expensive polyester polyols for boardstock. Premixed foam-in-place insulation uses about 70 percent polyether and 30 percent polyester to avoid loss of viscosity in storage.

At least one company is marketing polyols made from both postconsumer and manufacturing waste PET bottles as well as x-ray and other films. Other companies are marketing polyols derived from chemical bottoms.

Twenty manufacturers of PIR/PU board have been identified with production facilities in 36 locations. Distribution across the country is fairly good in the northwest and mid-northern states. Although it was not determined how many of these insulation manufacturers use polyols derived from recovered materials, nor exactly how many polyol producers are using recovered materials rather than virgin feedstocks, one third of the polyols currently marketed for PIR/PU rigid foam insulation are said to be derived from recovered materials.

b. *Glass fiber reinforced PIR/PU foam.* A special type of PIR/PU board is reinforced with glass fibers and is designed to improve fire retardancy. The feedstocks are similar to the other types of PIR/PU foams but the formulation ratio differs. More isocyanate is used in relation to aromatic polyester polyol. The formulation ratios are 15 percent polyol, 67 percent isocyanate and 18 percent fiberglass, blowing agents, surfactants and catalysts. This product is produced by only one company to date which may or may not limit availability.

c. *Polystyrene insulation.* Polystyrene insulation for building construction is produced by two processes. Expanded polystyrene foams incorporate a blowing agent, usually pentane, with polystyrene beads which are expanded with steam or hot air. The resulting "prepuff" is aged for six to twenty-four hours before the final product is made in a heated mold. The product is then cooled in the mold to assure uniformity and good quality.

Extruded polystyrene is made by combining polystyrene base resin with a blowing agent in one extruder, feeding the melt through a cooling extruder then through a die for the desired shape. Flame retardants are also added to the product mix. Like the PIR/PU foams, blowing agents are generally retained within the cellular structure to improve R-values.

Representatives from several manufacturers of polystyrene insulation indicated that use of recovered material content is technically feasible. However, one source stated that polystyrene with flame retardants could not be reused, which would appear to restrict the use of home scrap in polystyrene insulation manufacture. Despite indications that research and development efforts may be underway, current use of recovered materials could not be documented.

EPA identified 77 manufacturers of polystyrene insulation. These include producers of both extruded polystyrene and expanded polystyrene products. Numerous other small companies are said to be in business around the country. Geographically, the identified polystyrene insulation manufacturers are spread as widely as the producers of other types of insulation products.

d. *Phenolic insulation.* Phenolic rigid foam insulation is said to have very high R-values per inch, good fire retardation, and potentially low cost, among other characteristics. It is a fairly new product, but the relative market share is expected to grow rapidly from its current small base. Phenolic foam production is similar to PIR/PU foam, although the ingredients differ. Aromatic polyester polyols are used in small quantities as a plasticizer. The product formulations vary according to the specific product. Product mixes are also guarded competitive secrets because the product is new. Therefore, the following list of ingredients do not add to 100 percent.

- Phenolic resin—65%–85%.
- Blowing agent—5%–15%.
- Catalyst and surfactants—5.5%–21.5%.
- Polyester polyol—3%–10%.

Unlike the approximate 1 to 1 ratio of glycol to other ingredients in PIR/PU polyols, aromatic polyester polyol in phenolic foam manufacture uses 10 percent glycol to other ingredients. The 90 percent fraction of the polyol contains the recovered material. However, one manufacturer stated that larger percentages of polyol used as a plasticizer produce an end product that is too soft for commercial application with mechanized roofing equipment, and therefore a higher percentage of recovered material is technically impracticable.

Few manufacturers of phenolic foam were identified by EPA. A commenter informed EPA that the phenolic foam also is available under four private label and joint venture agreements with the principal manufacturer. This is the only limit on availability for government procurement.

5. Rock Wool

Rock wool is used as loose-fill insulation and also is sold in batts and blankets, although production of batts and blankets is phasing out. While rock wool and fiberglass insulation manufacturers are not necessarily the same companies, they all belong to the same trade associations and the two products are usually tracked together under the general heading mineral fibers.

Rock wool insulation is most frequently made from metallurgical slag, such as slag from steel mills. Approximately 70 percent of the rock wool produced in 1980 was primarily made from blast furnace slag, the other 30 percent was primarily made from steel and copper slag. Not all rock wool manufacturers depend entirely on slag for their feedstock needs, however. Some use trap rock or basaltic rock. Use of slag or alternatives depends on the availability and costs of the materials and their location to production facilities. The rock wool industry is shrinking, and data is no longer consistently gathered. However, conversations with manufacturers in 1988 indicated that more companies are using higher percentages of natural rock than were in 1980.

Natural rock is said to have a lower comparative yield. Slag has a higher melting alumina silicate than natural rock, which makes slag-based insulation attractive in commercial and residential installations where fire protection is important. For comparative purposes, fiberglass is affected by heat at 1,200–1,300 degrees Fahrenheit, compared to rock wool, where temperatures must exceed 1,800–2,000 degrees Fahrenheit before the wool is affected.

There are no sources of postconsumer recovered material for rock wool insulation. The manufacture of this type of insulation is linked to the metal smelting industries, which provide the principal feedstocks. Smelting in the United States is decreasing, and there is strong demand for metallurgical slags as aggregate substitutes in asphalt and concrete for road construction. Slag for rock wool must be of higher quality and contain fewer contaminants than slag for substitute aggregates. Although rock wool manufacturers are said to pay premium prices, some slag suppliers are said to prefer volume to specialty customers.

Some rock wool manufacturers have also begun to use spent aluminum potliner as a fuel substitute and fluoride source. The potliner replaces a portion of the more expensive coke used as fuel

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to melt the slag or rock. The proportions are determined by chemical composition of the slag. The fluoride in the spent potliner serves as a flux and also improves the viscosity of the molten material which, in turn, improves the fiber spinning process. In addition, potliner has very low sulfur content which reduces sulfur in stack emissions.

Rock wool insulation's market share has been decreasing in recent years. One estimate based on data gathered in 1985 was 9–10 percent of the total market; the percentage dropped to 3 percent in another estimate in 1987. Changes in the industry and in trade associations have made it difficult to make a more accurate assessment. The most recent data cited was for 1982, when U.S. production of rock wool was estimated to be 1.0 billion pounds (453,500 metric tons). Ten manufacturers of rock wool insulation were identified, with plants in 18 locations. Trade association representatives stated that a number of small companies do not belong to the associations and therefore may not be included in this total. Rock wool insulation manufacturers are primarily located in the mid-west and the southern states, with a few companies located in the northeast.

6. Conclusions

EPA concludes that six of the principal insulation products used in the United States are commercially available with recovered materials content: Cellulose, fiberboard made with cellulose, perlite composite boards, PIR/PU rigid foam, phenolic rigid foam, and rock wool. A specialty product, glass fiber reinforced PIR/PU rigid foam, also uses recovered materials. Industry sources have suggested that polystyrene insulation containing recovered materials is technically feasible; however, commercial use has not yet begun.

EPA further concludes that the technology exists to manufacture fiberglass insulation using preconsumer cullet and possibly postconsumer bottle cullet. For a variety of reasons, however, no American fiberglass manufacturing plant routinely uses either pre- or postconsumer bottle cullet.

Based on the evidence reviewed above, EPA notes that insulation meeting a wide range of construction design applications is available with recovered materials content. EPA did not evaluate the potential for recovered materials usage in specialty types of insulation made with virgin materials because they represent such a small portion of the insulation market.

D. Federal Purchasing Power

The fourth EPA criterion for selection of a procurement item for affirmative procurement under RCRA Section 6002 is that the Federal government's ability to affect purchasing or use of the item, when it contains recovered materials, be substantial.

The dollar volume of the building insulation industry was estimated by Hull & Company in 1986 to be $2.24 billion excluding retrofit of residential buildings. A.W. Johnson estimated the 1986 residential retrofit insulation market to be $6.7 million. The total 1986 building insulation market, at manufacturer's net price is estimated to be $2.9 billion. Other industry spokesmen estimated the total market to be $3 billion in 1985. The same sources stated that the industry was holding even, with neither major growth nor shrinkage.

1. Federal Government

Government agencies purchase, or finance purchases with appropriated Federal funds, residential, industrial, and commercial types of insulation products. Expenditures for insulation purchased with appropriated Federal dollars is conservatively estimated to be $148 million. This figure represents only those expenditures that could be estimated based on assured insulation use by an agency. Open market expenditures at the local level may be considerable but could not be estimated because centralized records are not currently maintained. Based on 1986 estimates of market size and identified government purchases, the Federal government accounts for approximately 5.1 percent of the insulation market. Procurements by individual agencies are summarized in Table 5.

TABLE 5.—SUMMARY OF ESTIMATED GOVERNMENT EXPENDITURES FOR INSULATION

Department of Energy (1985):	
Weatherization	$38,000,000
Institutional Conservation	4,593,000
Total DOE	42,593,000
Health & Human Services (1985):	
Low Income Home Energy Assistance Program	45,750,000
Housing and Urban Development (1986):	
Public Housing Modernization Fund	14,000,000
Housing for Elderly and Handicapped	3,800,000
Community Development Block Grants	5,700,000
Indian Housing Program	2,392,000
Total HUD	25,892,000
General Services Administration (1986):	
Direct purchases	487,300
New construction, repairs, and alterations	12,344,600
Total GSA	12,831,900
Department of Defense (1986):	
Direct purchases	Nominal
New construction and rehabilitation	20,983,600
Total Estimated Government Purchases	148,050,500

The value of Federal insulation purchases was estimated as conservatively as possible, using lowest percentages or lowest range when there was a choice. It is probable that appropriated Federal dollars account for a considerably higher percentage of market share. Insulation is rarely tracked as a line item in any budget. In the one case that EPA knows of, the data are not yet available.

The Department of Energy (DOE) estimates that 20 percent of its expenditures for the Weatherization Program is spent for insulation. Funds are distributed through state agencies, which in turn use a variety of methods to distribute monies through local housing authorities and local grantees. The Institutional Conservation program roughly estimated total insulation expenditures from which an average annual expenditure was computed.

The Department of Health and Human Services (HHS) distributes Low Income Home Energy Assistance Program (LIHEAP) funds. Under this program, states are allowed to spend up to 15 percent of their allocation on weatherization. As these funds are distributed by the same state agencies as DOE funds, the same 20 percent estimate for insulation was used.

Many Department of Housing and Urban Development (HUD) programs provide funds for building construction and/or rehabilitation. Insulation expenditures are not tracked at the national level. HUD funds are distributed many ways, for instance through the ten regional HUD offices, through local housing authorities or through block grants to states where priorities are determined locally. Most HUD funds that are dispersed where

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they could be used to purchase insulation are considered loans. However, loans are repaid through Federal funds and subsidies, not from the private sector. In addition, HUD mortgage insurance programs range from $30 to $100 billion per year, and energy efficiency remains a high priority. The insulation component would be $228 to $760 million. This estimate derived from mortgage insurance was not included in the estimate of Federal purchases of insulation because it could not be established that direct or indirect expenditures of appropriated Federal funds actually take place in insurance programs.

At the General Services Administration (GSA), insulation is purchased directly for use by government agencies and is also purchased through construction contracts. The entire direct purchase program is being revised from warehoused purchases to requirement contracts which allow agencies to buy what they need directly from suppliers under annual contract. Direct expenditures were determined as available. All GSA expenditures for insulation are direct use of Federal funds.

Divisions of the Department of Defense (DOD), the Army, Navy and the Air Force, do not track direct purchases of insulation. Construction projects which would include insulation were estimated from the general construction budget (which includes non-insulated items like bridges). All DOD expenditures for insulation are direct use of Federal funds.

2. Impact on State and Local Governments

A significant number of the Federal programs disperse their funds through state, local and non-profit agencies. Funds are not specifically earmarked for insulation purchases; rather monies are used for weatherization, building construction, rehabilitation and so on, usually through construction contracts.

State and local agencies are required to comply with EPA procurement guidelines under the conditions described in Section IV.C. of this preamble. EPA believes that once affirmative procurement programs are established by state and local agencies in compliance with their obligations when using Federal funds, the same provisions that favor the use of recovered material content will be used for other insulation purchases.

3. Conclusions

EPA concludes that the expenditure of Federal funds for insulation would have a significant impact on the insulation market. EPA believes not only that direct Federal government agency purchases would have an impact, but also that a considerable ripple effect would develop through state and local governments that use local funds as well as Federal funds for major programs.

E. Other Considerations

There is an additional factor affecting insulation which EPA included in its development of the guideline issued today. Both pre- and postconsumer waste materials (e.g., newspaper, glass, plastic) and industrial byproducts (e.g., slag, chemical bottoms, potliner) are used in many different types of building insulation products. All these products compete for the same end use. Although most byproducts and some pre-consumer materials used in building insulation are not currently a solid waste management problem, EPA is concerned that these materials could return to the waste stream if preferences were established for products made with only a few pre- and postconsumer materials. Therefore, EPA has intentionally included within the scope of the guideline insulation products made with all pre-consumer materials and industrial byproducts that qualify as recovered materials under the RCRA definition.

In the proposed guideline, EPA requested comments on including this range of recovered materials for insulation products in the scope. No comments challenged the basic conclusion. In fact, only the use of glass cullet in fiberglass insulation was addressed in the comments received.

A fiberglass manufacturer recommended that EPA state unequivocally that only postconsumer cullet be addressed because preconsumer cullet is not a significant solid waste management problem. EPA disagrees. In some parts of the country where preconsumer plate glass cullet was previously sold to the glass container industry, it has become more difficult to find buyers. Therefore, there is a potential solid waste management problem.

A fiberglass trade association commented that EPA should recognize the successful use of internal scrap ("re-feed") as "a responsible activity in response to the spirit and intent of RCRA" by including it as recycled content in fiberglass. EPA again disagrees. The RCRA definition of recovered materials specifically excludes "material and by-products generated from, and commonly reused within, an original manufacturing process." Thus, while EPA encourages this type of recycling, "re-feed" materials used in fiberglass manufacture do not qualify as recovered materials for purposes of RCRA.

A recycling center commented that additional markets (such as fiberglass) are needed for mixed-color postconsumer cullet because prices in California dropped to $0 per ton in September 1988. EPA agrees in principal but cannot currently recommend a minimum content standard for fiberglass (as discussed in Section IV.G.1.d. of the preamble). EPA sought information from cullet brokers and recycling operations around the country regarding unsold supplies of postconsumer cullet. Not one indicated a current or future concern with selling current and potential supplies of clean, color-sorted bottle cullet.

F. Conclusions Regarding the Designation of Building Insulation Products

Based on the analysis above and comments received on the proposed guideline, including economic and environmental considerations, EPA has determined that building insulation products containing "recovered materials" as defined by RCRA meet the criteria for designation as a procurement item under the provisions of section 6002.

IV. Contents of the Guideline

This portion of the preamble explains each section of the final guideline, including EPA's response to comments. Of the comments EPA received on the proposed guideline, half simply expressed support based on the need for markets for recyclable materials or primarily urged EPA to maximize the use of recovered materials in insulation products. Although the remaining comments recommended various improvements which are addressed in the relevant sections, no commenters advised against issuing the guideline.

A. Purposes

The purposes of this guideline are (1) to designate building insulation products, as described below, as items subject to the procurement requirements of section 6002 of RCRA; and (2) to recommend procedures for complying with section 6002.

Insulation products are not fungible items and consequently do not compete in the marketplace on the basis of price alone. Technical performance

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considerations may dictate use of one type of insulation material rather than another. EPA believes that the intent of RCRA would best be served by identifying and increasing the use of recovered materials content in as many different types of insulation products as possible. Competition between product type (e.g., loose-fill, blanket, board, or spray-in-place) or material type (e.g., cellulose, fiberglass, rock wool, rigid plastic foam, and specialty materials) would therefore continue, while use of recovered materials would increase. Consequently, EPA has sought to include all the major types of insulation in commercial use within the final guideline. EPA received several favorable comments and no negative comments on this approach.

B. Scope

This guideline applies to building insulation products. This term includes but is not limited to insulation products used in residential, commercial, and industrial type applications and includes blanket, board, spray-in-place, and loose-fill insulations. As explained in section II.D. of this preamble, building insulation is used in four locations: ceilings, floors, foundations, and walls. The types of materials from which these products are made include, but are not limited to, cellulose fiber, fiberglass, rock wool, plastic rigid foams, and specialty materials. Composite products made from more than one material are also included within the scope of this guideline.

All of the predominant application types of building insulation are included within the scope of the guideline, and all contain, or have the technical potential to contain, recovered materials. In addition, specialty materials for all types of building insulation or insulation ingredients where recovered material content use may not have been documented (e.g., vermiculite and polystyrene) *are* included within the scope of this guideline.

1. Facers and Bindings

In this guideline, recommendations for minimum content standards and any references to recovered material content refer only to the core material of an insulation product and do not include any facings, bindings, or other materials applied to the surfaces of the core materials. In the case of composite products made from more than one material, proposed minimum content standards apply to the respective materials used in the core unless the product is specifically addressed.

Several commenters questioned the decision to exclude facers, binders, and other materials applied to core materials on the basis that they could contain recovered materials. Examples include asphalt saturated felt, fibrous glass, aluminum foil and sheet, vinyl (various thicknesses, formulations and reinforcements), cork, burlap, laminates of aluminum, paper and various polymers, kraft paper, vinyl reinforced kraft, woven mesh, woven and non-woven organic and non-organic mats, glass fiber mats, latex coatings, neoprene coatings, and a wide variety of water base and hot-melt adhesives. These applied materials can be and are used in a wide range of combinations; they are often laminated in four or more variations depending on the final product specifications, and any or all of the applied materials can be used with all the different core materials.

This diversity makes it difficult for EPA to recommend meaningful minimum content standards and could discourage purchasing officials from using products containing recovered materials. Thus, the probability of increasing recovered material use in these applied materials is significantly outweighed by the probability that complex minimum content standards would discourage compliance with the guideline.

2. Postconsumer Recovered Paper

EPA has included insulation made with postconsumer recovered paper in the scope of this guideline, as well as stressed its use in building insulation products. Section 501 of HSWA amended RCRA section 6002(c)(1) to stress the maximum practicable use, in the case of paper, of postconsumer recovered materials. These postconsumer paper materials are defined in RCRA section 6002(h) as:

(A) Paper, paperboard, and fibrous wastes from retail stores, office buildings, homes, and so forth, after they have passed through their end-usage as a consumer item, including: used corrugated boxes, old newspapers, old magazines, mixed waste paper, tabulating cards, and used cordage, and

(B) All paper, paperboard, and fibrous wastes that enter and are collected from municipal solid waste.

EPA believes that increasing the use of postconsumer recovered paper is a key goal of RCRA section 6002. Therefore, EPA is recommending minimum postconsumer recovered paper content standards for those insulation products which are capable of being made with paper fibers. (As previously discussed, EPA is not including fiberboard in the final guideline issued today although some manufacturers use postconsumer recovered paper to produce fiberboards. Instead, EPA will continue to consider various issues pertaining to fiberboards, including whether a minimum content standard for postconsumer recovered paper for fiberboard would have a positive net impact on solid waste volumes.)

3. Other Types of Insulating Products

There are other types of insulating products, such as air handling, acoustic, pipe, and cold storage insulation. Building insulation was designated because it is by far the largest volume of insulation manufactured, is least likely to require virgin specialty materials for specialty purposes, and is dominated by the types of insulation products that for physical or chemical reasons can contain recovered materials. Government purchases of insulation products would also tend to have the greatest impact on this category.

These other types of insulation products must meet different and frequently more stringent specifications and are believed to be less easily adapted to manufacture with recovered materials. EPA requested comments on the use of recovered materials in non-building types of insulation and whether they should be included in this guideline. Several commenters recommended that EPA investigate the feasibility of including these products within the scope of the guideline but offered no details. Another stated that these products should not be included because they do not meet the definition of "building insulation." Another commenter stated they should not be included because they must meet unique specifications, they are often used in applications where they are required to give structural support, resistance to flaking or fiber erosion, and acoustical insulation. EPA acknowledges that these products deserve further study and therefore is not including them within the scope of the guideline issued today.

C. Applicability

Many of the requirements of section 6002 apply to "procuring agencies," which is defined in RCRA section 1004(17) as "any Federal agency, or any State agency or agency of a political subdivision of a State which is using appropriated Federal funds for such procurement, or any person contracting with any such agency with respect to work performed under such contract." Under section 6002(a), the procurement requirements apply to any purchase by a procuring agency of an item costing more than $10,000 or when the procuring agency purchased $10,000 worth of the item or of functionally equivalent items

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during the preceding fiscal year. Both direct and indirect purchases are covered.

1. Procuring Agencies

In its other procurement guidelines, EPA discussed the applicability of section 6002 to procuring agencies. Because this discussion is germane to this guideline as well, EPA is including it in the final guideline today.

The statutory definition of procuring agency identifies three types of agencies: (1) Federal agencies, (2) State or local agencies using appropriated Federal funds, and (3) contractors. Federal agencies should note that under this definition, the requirements of section 6002 apply to them whether or not *appropriated* Federal funds are used for procurement of items designated by EPA. Section 248.3(a)(2) has been added to the final guideline to clarify this point.

In addition, the requirements of section 6002 apply to each Federal agency as a whole. This point is particularly important in determining whether the $10,000 threshold has been reached. For example, the Department of Housing and Urban Development (HUD) as a whole, purchases, or causes the purchase of, more than $10,000 worth of building insulation products during each fiscal year. Therefore, the requirements of section 6002 will apply to all procurements of building insulation products by HUD, its regions, and subagencies.

One commenter stated that EPA should make it clear that section 6002 requirements apply to private contractors as well as to government purchasing agencies. EPA agrees. The statutory definition of procuring agencies includes any person contracting with the defined Federal, state, or local agencies. Clearly, contractors must comply with the guideline when installing insulation on projects for Federal agencies or for state and local agencies where appropriated Federal funds are used.

2. Direct Purchases

For the purposes of this guideline, purchases made as a result of a solicitation by a procuring agency for its own general use or that of other agencies (for example, GSA purchases) are considered "direct." Building insulation purchased as part of a construction contract is also considered a "direct purchase."

3. Indirect Purchases

The definition of "procuring agency" in RCRA section 1004(17) makes it clear that the requirements of section 6002 apply to "indirect purchases," i.e., purchases by a State or local agency using appropriated Federal funds or, in some instances, its contractors. Thus, the guideline may apply to building insulation purchases meeting the $10,000 threshold made by States, political subdivisions of states, or their contractors.

In the proposed guideline, EPA stated that the guideline does not apply to such purchases if they are unrelated to or incidental to the Federal funding, i.e., not the direct result of the grant, loan, or funds disbursement. Several commenters disagreed with EPA's interpretation, noting that RCRA section 6002(a) states simply that section 6002 applies to "*any* purchase or acquisition of a procurement item" (emphasis added) when the $10,000 threshold is reached. These commenters raise an issue of general applicability to all the procurement guidelines. The Agency plans further review and consideration of this issue and will publish detailed guidance on this subject within the near term. However, at this time, EPA is retaining the proposed language, which provided that the guideline does not apply to purchases that are not the direct result of a funds disbursement to a procuring agency.

EPA requested comments on whether this guideline should exempt block grants from the section 6002 procurement requirements or exempt block grants only when it is not possible to account separately for such funds. Commenters stated that there should not be an exemption, which would circumvent the intent of section 6002. EPA agrees and therefore, there is no exemption for block grants in the final guideline. EPA believes that the guideline should apply whenever Federal monies, including block grants, are used, whether or not they are commingled with non-Federal funds.

4. The $10,000 Threshold

RCRA section 6002(a) provides that the requirements of section 6002 apply: (1) When the purchase price of an item exceeds $10,000 or (2) when the quantity of such items or of functionally equivalent items purchased during the preceding fiscal year was $10,000 or more. Thus, section 6002 clearly sets out a two-step procedure for determining whether the $10,000 threshold has been reached. First, a procuring agency must determine whether it purchased $10,000 worth of building insulation products during the preceding fiscal year. If so, the requirements of section 6002 apply to all building insulation purchases occurring in the current fiscal year. Second, if a procuring agency did not procure $10,000 worth of building insulation products during the preceding fiscal year, it is not subject to section 6002 unless it makes a purchase of building insulation products, during the current fiscal year, exceeding $10,000. The requirements of section 6002 then apply to the $10,000 purchase of building insulation products; to all subsequent purchases of building insulation products made during the current fiscal year, regardless of size; and to all procurements of building insulation products made in the following fiscal year.

Section 6002(a) does not provide that the procurement requirements are triggered when the quantity of items purchased during the *current* fiscal year is $10,000 or more. EPA does not believe that Congress intended to require procuring agencies to keep a running tally of procurements of items designated by EPA. Maintaining such a running tally would be very burdensome. Rather, procuring agencies only need to compute their total procurements of building insulation products once at the end of the fiscal year and only if they intend to claim an exemption from the requirements of section 6002 in the following fiscal year.

Note that the text of § 248.3(a)(1) in the final guideline differs slightly from the proposed text. The proposed text did not reflect the statutory provision that section 6002 applies when an agency makes a purchase exceeding $10,000 in the current year. The text in the final guideline has been corrected accordingly.

5. Functionally Equivalent Items

In common usage, the term "insulation" covers many items manufactured to meet different uses and performance standards. EPA believes that restricting the applicability of section 6002 based on a very narrow, technical definition of functional equivalency would limit the effectiveness of the guideline in meeting the objectives of RCRA, because an agency may purchase less than $10,000 of each type of building insulation product.

EPA has concluded that, in the case of building insulation, "functionally equivalent" items should be defined as a category of items having substantially the same or similar end use. This category, "building insulation," will assure broad applicability of this guideline. Further, building insulation types defined by design (such as loose-fill, blanket, board, and spray-in-place) and building insulation products defined by material content (such as fiberglass, cellulose, rock wool, plastic rigid foams,

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composites, and specialty materials) can be used almost interchangeably in ceilings, floors, foundations and walls. The choice of building insulation type and material content is based on technical considerations that are site specific.

Government procuring agencies rarely track building insulation purchases as a line item and certainly do not distinguish between material types or design types of building insulation products. EPA believes that the guideline will be more easily implemented by procuring agencies if all types of insulation used to resist heat flow within a building are included within the single category of building insulation.

Under § 248.3(a)(1) of the guideline, all of the following types of insulation are encompassed by the term "building insulation" and therefore are "functionally equivalent" for purposes of the $10,000 threshold:

- Loose-fill insulation, including but not limited to cellulose fiber, fiberglass, rock wool, vermiculite, and perlite;
- Blanket and batt insulation, including but not limited to fiberglass and rock wool;
- Board (sheathing, roof decking, wall panel) insulation, including but not limited to cellulose fiber fiberboard, perlite composite board, glass fiberboard, foam glass, perlite, polyurethane, polyisocyanurate, polystyrene, phenolics, and composites; and
- Spray-in-place insulation, including but not limited to polyurethane, polyisocyanurate and spray-on cellulose.

6. Miscellaneous Comments

A commenter strongly supported EPA's position that the $10,000 threshold applies to each Federal agency as a whole (§ 248.3(a)(3)) and to all types of building insulation as "functionally equivalent items" (§ 248.2(a)(2)).

D. Definitions

Most of the definitions used in the final guideline are used in RCRA and therefore need no further explanation. Others are standard industry or purchasing definitions. A few are discussed in more detail in this section of the preamble to clarify the information that follows.

1. Practicable

Section 6002 requires procuring agencies to procure items composed of the highest percentage of recovered materials *practicable* and to develop programs to assure that recovered materials are purchased to the maximum extent *practicable* (emphasis added). EPA defined the term "practicable" in the final paper guideline, 52 FR 37297 (October 6, 1987) and is including the definition in the final guideline issued today.

EPA's definition of "practicable" combines the dictionary definition with certain statutory criteria for determining practicability. The dictionary definition of practicable is "capable of being used," and EPA believes that Congress intended the term to be defined in this way. Congress also provided four criteria for determining the maximum amount practicable: (1) Performance in accordance with applicable specifications; (2) availability at a reasonable price; (3) availability within a reasonable period of time; and (4) maintenance of a satisfactory level of competition. EPA's definition of "practicable" incorporates these criteria.

2. Building Insulation

"Building insulation" is defined as a material, primarily designed to resist heat flow, which is installed between the conditioned (heated and/or mechanically cooled) volume of a building and adjacent, unconditioned volumes or the outside. This term includes but is not limited to insulation products such as blanket, board, spray-in-place, and loose-fill. "Building insulation" is intended to cover all thermal insulation products used in all types of structures with the exception of cold storage and pipe insulation. The phrase "including but not limited to" in the insulation definitions is intended to insure that new types of products will be included within the scope of the guideline as they are developed.

3. Procurement Terms

To simplify the Federal purchasing process, "commercial item descriptions" (CIDs), which reference industry standards, have generally replaced the multitude of individual insulation specifications previously used by Federal procuring agencies. In issuing procurement solicitations, procuring agencies can stipulate special terms and conditions (such as minimum content standards for recovered material content), in the "invitation to bid" or "request for proposal" documents. These phrases have been defined by the National Institute of Governmental Purchasing as follows:

- *"Commercial Item Descriptions"* are series of simplified item descriptions under the Federal specifications-and-standards program used in the acquisition of commercial off-the-shelf and commercial type products.
- *"Invitation For Bids (IFB)"* is the solicitation for prospective suppliers by a purchaser requesting their competitive price quotations.
- *"Request for Proposal (RFP)"* is a request for an offer by one party to another of terms and conditions with references to some work or undertaking; the initial overture or preliminary statement for consideration by the other party to a proposed agreement.

4. Insulation Terms

Definitions for terms relating to insulation are directly quoted or have been adapted from the Association of Testing and Materials (ASTM), the Department of Energy's Residential Conservation Service definitions, and Federal specifications, as they were available. When necessary, EPA has developed terms and definitions for purposes of this guideline.

EPA requested comments on the term and definition "cellulose fiberboard," and whether the industry term "cellulosic fiberboard" referred to fiberboards containing postconsumer recovered paper. Responses were inconclusive. EPA has determined that fiberboards made with postconsumer recovered newspaper are covered by the term cellulosic fiberboard but related products made with laminations derived from pre- and postconsumer corrugated are not. EPA will re-examine the term and definition.

E. Requirements vs. Recommendations

RCRA section 6002 requires procuring agencies and contracting officers to perform certain activities, such as revising specifications for procurement items. It also requires EPA to prepare "guidelines for the use of procuring agencies in complying with" section 6002. EPA has incorporated the section 6002 requirements into the final guideline for the benefit of procuring agencies. As a result, the guideline contains two types of provisions: requirements (mandated by Congress in section 6002) and recommendations (EPA's guidance for complying with the requirements of section 6002). As used in this guideline, the verbs "shall" and "must" indicate section 6002 requirements, while verbs such as "recommend," "should," and "suggest" indicate recommendations for complying with those requirements.

Procuring agencies must comply with the requirements of section 6002, whereas EPA's recommendations are only advisory in nature. Procuring agencies may choose to use other approaches which satisfy the section 6002 requirements. However, EPA believes that if a procuring agency chooses to follow EPA's

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recommendations, that agency will be in compliance with the section 6002 requirements.

F. Specifications

Subpart B of the guideline, Specifications, contains two sections, Revisions and Recommendations.

1. Revisions

a. *Federal agencies.* RCRA section 6002(d) contains two requirements for revising specifications for procurement items. First, Federal agencies that have the responsibility for drafting or reviewing specifications for procurement items procured by Federal agencies were required to revise their specifications, by May 8, 1988, to eliminate exclusions of recovered materials and requirements that items be manufactured from virgin materials (section 6002(d)(1)).

Second, within one year after the date of publication of a guideline as a final rule, Federal agencies must assure that their specifications for designated items require the use of recovered materials to the maximum extent possible without jeopardizing the intended end use of the item (section 6002(d)(2)). EPA believes that this second requirement is more extensive than the first requirement. Simply eliminating discriminatory provisions, as required by section 6002(d)(1), is not sufficient to meet all the obligations of section 6002(d). EPA believes, however, that compliance with the affirmative procurement requirements of section 6002(i) fulfills the section 6002(d)(2) requirements because an affirmative procurement program should result in procurement of building insulation products containing recovered materials to the maximum extent practicable.

b. *Procuring agencies.* Non-Federal procuring agencies will also be required to revise their specifications for building insulation products. These agencies are required, by section 6002(c)(1) of the Act, to procure building insulation products composed of the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition. Section 6002(c)(1) requires that any decision not to purchase building insulation products composed of the highest percentage of recovered materials practicable be based on a determination that such products (1) are not available within a reasonable period of time, (2) are not available at a reasonable price, or (3) fail to meet reasonable performance standards set forth in the applicable specifications.

Under section 6002(c)(1), a procuring agency cannot choose to purchase building insulation products produced with virgin material simply because the agency's existing specifications for building insulation products require the use of virgin materials or prohibit the use of recovered materials. To be consistent with the requirements of the Act, any such discrimination in an agency's specifications must relate directly to an inability of the building insulation to satisfy reasonable, established performance requirements. Consequently, any procuring agency that now uses a specification that precludes the use of recovered materials in building insulation products must revise its building insulation specifications to eliminate that discriminatory provision.

In previously issued guidelines, EPA addressed the obligation of non-Federal procuring agencies to revise their specifications as a requirement of section 6002(d)(2). That section, by its terms, applies only to Federal agencies. EPA believes, however, that the requirements imposed upon non-Federal procuring agencies by section 6002(c)(1) of the Act are co-extensive with the requirements placed upon Federal procuring agencies by section 6002(d)(2). Accordingly, in previous guidelines, EPA drew no distinction between Federal and non-Federal agencies as concerns the statutory sources of the requirement that discriminatory specifications be revised. The distinction is drawn at this time not to indicate a change in the EPA's position, but to answer concerns that the Agency's prior discussion of section 6002(d)(2) may be construed as an unjustifiable expansion of the applicability of that section.

2. Recommendations

In the early 1980s, the Federal government began to use CIDs for insulation purchases, as they are available, rather than specifications written by each individual agency. CIDs are functional in nature and as generic as possible to permit the maximum number of suppliers to bid for contracts. In general, ASTM and ASHRAE specifications are referenced.

EPA has reviewed the materials requirements of the ASTM specifications and finds that they neither allow nor disallow recovered material content. ASHRAE specifications tend to be test and performance standards and thus do not refer to specific material content. EPA has also reviewed specifications used by Federal agencies. HUD programs list certain Federal specifications and reference minimum property standards, which currently refer to local building codes. Local building codes reference the ASTM and ASHRAE specifications. DOE weatherization program specifications that deal with material content require conformance with equivalent ASTM specifications. GSA referenced ASTM and DOD military specifications and commercial item descriptions in 1986 procurements.

The military specifications address the issue of recycled content in one of two ways, depending on the specification. Either recycled content was neither allowed nor disallowed in the material description or there was a special clause requiring that recovered materials be used to the maximum extent practicable. Recovered materials was defined to mean "materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed."

As previously discussed, all procuring agencies must assure that their specifications for items designated by EPA are revised, as necessary, to allow the use of recovered materials to the maximum extent practicable. If the use of CIDs and standard specifications over which procuring agencies have no direct control continues, another method to assure maximum use of recovered material content in building insulation products must be employed.

a. *Use of commercial item descriptions.* EPA believes that the use of industry standards and CIDs is an efficient procurement practice and therefore recommends in § 248.11(a) of the final guideline that Commercial Item Descriptions and equivalent standards continue to be used whenever possible. However, the use of CIDs and industry standards does not absolve procuring agencies of the requirement to review specifications to assure that recovered materials are used to the maximum extent possible without jeopardizing the end use of the item. As CIDs or industry standards are adopted, procuring agencies must review them thoroughly to be certain that no discrimination against recovered materials exists.

b. *Use of invitations for bids and requests for proposals.* Contractors buy a large portion of the insulation purchased with appropriated Federal dollars as part of their work to build or renovate structures. Therefore, to fulfill their obligations regarding procurement of building insulation products containing recovered materials to the maximum extent practicable, EPA recommends in § 248.11(b) of the guideline that procuring agencies insert minimum content standards or

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equivalent preferences for recovered materials content in building insulation in their contract solicitations.

A commenter questioned EPA's recommendation to use CIDs whenever possible and stated that RCRA requires procuring agencies to use specifications that affirmatively require the use of recovered materials "to the maximum extent practicable." EPA believes that returning to the use of separate specifications for government procurements would be burdensome, expensive, and time consuming for procuring agencies and their contractors. Further, EPA believes that inserting minimum content standards in IFBs and RFPs is the most efficient way to assure use of recovered materials to the maximum extent practicable.

However, EPA is aware that architects, designers, engineers, and building contractors refer to commercial item descriptions, national standards, and local building codes when preparing their solicitation documents. Therefore, EPA recommends that the entities responsible for drafting such codes and standards consider incorporating the recommended minimum content standards.

Another commenter agreed that minimum content standards should be inserted in IFBs and RFPs but stated more was needed. The commenter recommended that procuring agencies include such information in pre-bid conferences and notices about bids; the commenter further recommended that EPA sponsor seminars for Federal and state agencies and their contractors to explain how the section 6002 requirements are to be incorporated into bids and bid solicitations. EPA notes that the first suggestion is already covered under the promotion program requirements discussed below. With respect to the second suggestion, regional seminars regarding section 6002 requirements are currently being planned.

c. *Exclusion of products that do not meet performance standards.* Certain building insulation products cannot be made with recovered materials content without jeopardizing performance standards. In general, this situation applies to specialty materials and insulation items that must meet very stringent performance requirements. In most cases, EPA does not believe that such items will be offered to procuring agencies with recovered materials content. If such items are offered and found to fail performance tests, § 248.11(c) recommends that an agency document any finding that, for a particular end-use, an item containing recovered materials content will not meet reasonable performance standards. The documentation should reference the particular tests used to judge performance. Procuring agencies should also reference such documentation in subsequent solicitations for the specific item to avoid repetition of previously documented findings.

d. *New and adapted products.* EPA believes that as new building insulation products enter the marketplace and as recycling technologies advance for feedstocks used in insulation manufacture, additional types of building insulation with recovered content will become available. EPA recommends in § 248.11(d) of the guideline that procuring agencies assure that language in new specifications for new building insulation products allows recovered materials content. EPA further recommends that as new building insulation products containing recovered materials are identified, the same approaches to procurement recommended in this guideline for existing products be inserted in invitations for bids and requests for proposals whenever the new products could be offered.

The annual review procedure detailed in § 248.24 of this guideline, the certification and estimation process detailed in § 248.23, and the case-by-case procurement approach detailed in § 248.21 provide methods to monitor the introduction of recovered materials content in building insulation products where such use may be developing.

G. Affirmative Procurement Program

RCRA section 6002(i) requires procuring agencies to adopt an affirmative procurement program to ensure that building insulation products containing recovered materials are purchased to the maximum extent practicable. The program must contain four elements: (1) A recovered materials preference program; (2) a promotion program; (3) procedures for estimation, certification, and verification of recovered materials content; and (4) procedures for annual review and monitoring of the program's effectiveness. The program must be established within one year of the date of publication of this guideline as a final rule.

The following sections explain EPA's recommendations for each element of the affirmative procurement program.

1. Recovered Materials Preference Program

Under section 6002(i), procuring agencies have three options for implementing the preference program. They can employ a case-by-case approach, adopt minimum content standards, or choose an approach that is "substantially equivalent" to the preceding approaches. The guideline recommends that procuring agencies adopt minimum content standards for those building insulation products commercially available with recovered materials content. A list of products and recommended minimum content standards is provided. The guideline further recommends a procedure for implementing the minimum content standards approach when contracting for building design, construction, alteration, or repair. For individual procurements of a type of insulation for which the procuring agency has not established a minimum content standard, EPA recommends that the procuring agency use the case-by-case approach and recommends methods for implementing this approach when using sealed bidding or competitive negotiation.

EPA notes that these approaches are *recommended*, not required. Procuring agencies may adopt "substantially equivalent" alternatives. However, EPA believes that if a procuring agency follows the recommendations, it will meet the requirements of RCRA. Procuring agencies that adopt other approaches must ensure that their preference programs achieve the procurement of building insulation products "with the maximum percentage of recovered materials practicable."

The following sections provide a detailed discussion of the basis for the recommended minimum content standards, including legal and technical considerations; the recommended procedure for implementing the minimum content standards approach when using contractors; and the recommended case-by-case approach.

a. *Background.* Considering the range of building insulation products commercially available with recovered materials content, EPA believes that the use of minimum content standards is the most practical approach for procuring agencies to use. The minimum content standards approach would also be the most effective way to insure that building insulation products are purchased with the maximum percentage of recovered materials practicable, as required by RCRA sections 6002 (c) and (i).

EPA today recommends minimum content standards for most types of building insulation products. EPA believes that these minimum content standards are the highest that are currently practicable, and procuring agencies would therefore meet the

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requirements of section 6002 if the minimum content standards are adopted. These standards are discussed further in section IV.G.1.d. of this preamble.

b. *Alternatives considered.* In addition to minimum content standards and case-by-case procurement, EPA considered two other approaches for a preference program: price preferences and set-asides.

As discussed in the final paper guideline, 53 FR 23553 (June 22, 1988), section 6002(i) requires that any affirmative procurement program be consistent with applicable provisions of Federal procurement law. From time to time, Congress has established preferential procurement programs in order to attain socioeconomic goals. Among those are the Small Business, Labor Surplus Area, and Minority Business procurement programs. EPA considered applying either or both of the mechanisms used in those programs—price preferences and set-asides—to this guideline. A price preference allows the procuring agency to pay a higher price, if necessary, for a specified product from preferred vendors. A set-aside requires the procuring agency to award a certain percentage of its contracts to preferred vendors of a product regardless of price. Price preferences and set-asides are currently being used in some state programs for the procurement of paper and paper products containing recovered materials. As of October 1988, eight states and two cities use price preference programs in which products containing recovered materials may cost from 5 to 10 percent more than products made with virgin materials. Three states have set-aside programs, two for paper and paper products, the other for all types of products. Several of these states report that they successfully procure products containing recovered materials.

EPA has considered recommending these programs at the Federal level. In the case of existing Federal preferential procurement programs that allow a price preference or set-aside, the Agency found that each had been established under explicit statutory authority or a specific Executive Order. Neither the statutory language nor the legislative history of section 6002 seems, however, to contemplate the adoption of either price preferences or set-asides, and doing so would conflict with existing Federal procurement regulations. Therefore, rather than recommending price preferences or set-asides, EPA is recommending that procuring agencies use the procurement mechanisms provided in RCRA section 6002(i)(3).

c. *Legal considerations.* RCRA section 6002(i)(1) requires that affirmative procurement programs be "consistent with applicable Federal procurement law." EPA was concerned that minimum content standards might violate the Competition in Contracting Act of 1984 (CICA) (10 U.S.C. Chapter 137) and the Federal Acquisition Regulation (FAR) (48 CFR Ch. 1). Both provide that specifications restricting what can be offered are legally permissible only to the extent that they reflect the Government's minimum needs or are authorized by law. (CICA 2711(a)(2), 48 CFR 10.002(a)(3)(ii).) EPA previously has concluded that RCRA section 6002 provides the necessary authorization. See 52 FR 38844 (October 19, 1987). Section 6002(i)(3)(B) expressly permits agencies to establish specifications which restrict offers to those which meet a minimum content standard. Therefore, minimum content standards are not in violation of general Federal procurement law.

CICA requires agencies to use full and open competitive procedures when procuring property and services. The term "full and open competition" means that all responsible sources must be permitted to submit an offer. In the case of a procurement against a restrictive specification, such as a minimum content standard, "full and open competition" means that all responsible sources who can meet the specification can submit an offer. The preference program recommendation in the guideline is consistent with this requirement, since any person can submit an offer as long as the building insulation products offered contain the minimum recovered content.

d. *The minimum content recommendations.* RCRA provides four criteria for establishing a minimum content standard. Section 6002(i)(3)(B) provides that the minimum content required by a specification must be the maximum available without jeopardizing the intended end use of the item or violating the limitations of section 6002(c)(1)(A) through (C). Thus, the four criteria are (1) the intended end use of the item, (2) availability, (3) technical performance, and (4) price.

For the items designated by this guideline, the criteria are satisfied by setting the minimum content standards at levels which do not interfere with the technical performance of the items and therefore the intended end uses. In general, the use of recovered materials content within the technical limitations is cost-effective in insulation production, regardless of the type. The second criterion, availability, will be the determining factor. There is a possibility, though not a probability, that industries other than insulation may eventually absorb most of the available supplies of recovered materials suitable for certain types of building insulation (e.g., slag used in rock wool production). Should that occur, the case-by-case approach described below can be used until it is certain that market stimulation for the recovered material is no longer needed.

EPA believes that minimum content standards can be set most efficiently by the percentage by weight in relation to other ingredients for each type of building insulation product. While there are variations in the technically acceptable levels of recovered materials content among the myriad types of building insulation products within most material types, they are not wide enough to warrant a separate minimum content standard for each building insulation item.

EPA recommends in § 248.21(a)(4) of the guideline that procuring agencies adopt the minimum content standards listed in Table 6 for all types of building insulation products made with the respective types of material. The standards are based on the core insulation material, disregarding the facings, bindings, or any materials surrounding or attached to the insulation core as discussed above in section IV.B., Scope. The minimum content standards would also apply to the portion(s) of the respective insulation material(s) that is used in composite products.

TABLE 6.—MINIMUM CONTENT STANDARDS FOR RECOVERED MATERIALS IN BUILDING INSULATION PRODUCTS

Material type	Percent by weight
Cellulose loose-fill and spray-on.	75% postconsumer recovered paper.
Perlite composite board	23% postconsumer recovered paper.
Plastic rigid foams:	
Polyisocyanurate/ polyurethane:	
Rigid foam	9% recovered material.
Foam-in-place	5% recovered material.
Glass fiber reinforced.	6% recovered material.
Phenolic rigid foam	5% recovered material.
Rock wool	50% recovered material.

Note: The minimum content standards are based on the weight of material (not volume) in the insulating core only.

Each of the minimum content standards has been set based on technical constraints in the manufacturing processes used in 1988. EPA requested comments on the appropriateness of these standards and

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requested specific alternatives. One commenter questioned "why EPA invariably recommended a minimum content standard at the low end * * * when the purpose of section 6002 is to encourage additional purchases of products containing recovered material by the government." The commenter wanted more research by EPA on average percentages of recovered materials used and the average percentage of manufacturers that regularly meet or exceed the average so EPA could substantiate that its recommended minimum content standards are the highest practicable. EPA reviewed the minimum content standards with the respective industries, revised them upwards when possible, and clarified the limitations as needed. EPA confirmed that recovered materials are usually preferred by insulation manufacturers for economic reasons and that higher percentages would be used if performance standards could still be met. Building insulation products are made in several variations for many material types (e.g., perlite composite boards). In such cases, minimum content standards have been set at the low end of a range to accommodate all variations of a particular product type.

There are cases where percentages of recovered materials vary among manufacturers of the same product (e.g., cellulose loose-fill, where the range is 75–80 percent). EPA notes that technical performance of a given building insulation product is critical to its selection by contractors and architects. Products that do not perform well will not be ordered again. Every building insulation product for which a minimum content standard is recommended holds a comparatively small share of the market. EPA believes that increasing market share for products made with recovered materials will have a much greater impact on consumption of recovered materials than raising individual minimum content standards by a few percentage points. EPA further believes that pushing manufacturers to their technical limitations and therefore risking product failure could easily prove counter-productive to "encouraging additional purchases of products containing recovered material."

EPA notes that a commenter speaking for the plastics industry supported the guideline as proposed in principle, stating that the minimum content standards for the plastic foam insulation products "are all indicative of the technology which is being practiced in the industry today."

The following subsections discuss the minimum content standards and include the comments for each product type.

i. *Cellulose loose-fill and spray-on insulation.* The principal feedstock for cellulose loose-fill and spray-on insulation is waste paper. In the case of spray-on insulation, the minimum content standard is applied to the insulating feedstock prior to the addition of adhesives.

Section 6002(i)(2) states that "in the case of paper, the recovered materials preference program required * * * shall provide for the maximum use of the postconsumer recovered materials * * *." Postconsumer waste paper, primarily old newspaper, is not only technically acceptable in cellulose insulation, it is most frequently used.

A variety of chemical additives are also combined with the fibers to retard flammability and to deter pests. The chemical additives are required to meet the performance standards that have been established for this industry. The range of fiber is 75–80 percent, while the range of chemicals is 20–25 percent. The highest percentage of waste paper fiber could jeopardize the performance of the end use product for many manufacturers. For these reasons, EPA recommends a 75 percent postconsumer recovered paper minimum content standard for cellulose insulation as the highest feasible. No comments were received on this minimum content standard.

ii. *Fiberboard.* The American Society for Testing and Materials (ASTM) defines fiberboards in its specification C208 "Insulating Board (Cellulosic Fiber), Structural and Decorative" as follows: fibrous-felted homogeneous panel made from ligno-cellulosic fibers (usually wood or cane) and having a density less than 31 lb/ft^3 (497 kg/m^3) but more than 10 lb/ft^3 (160 kg/m^3). It is characterized by an integral bond which is produced by interfelting the fibers, but which has not been consolidated under heat and pressure as a separate stage of manufacture. Other materials may be added during manufacture to improve certain properties.

In the proposed guideline, EPA inquired whether or not ASTM specification C208 includes the fiberboards made with paper. A commenter informed EPA that "laminated paperboard" and "homogeneous board from repulped paper" were not covered by C208. However, the commenter continued, a fiberboard made with approximately 20% postconsumer recovered paper and approximately 80% bagasse (waste sugar cane fiber) is covered by ASTM C208. Only one company makes this product; the majority of the fiberboards are made with wood fibers only.

EPA has subsequently learned more about all products from commenters. According to their manufacturers, "homogeneous board from repulped paper" does meet ASTM C208, while the laminated paperboards do not meet the density requirements. At least one company uses nearly 100 percent postconsumer recovered paper material in its homogeneous board from repulped paper. This was not true for the laminated paperboard companies. One company uses a range of 50 percent to 80 percent postconsumer corrugated boxes; other companies primarily use kraft linerboard trimmings which are manufacturing and converting wastes. The companies using only wood fiber state that their feedstocks meet the RCRA definition of recovered materials. The wood fibers consist of scrap from plywood plants, lumberyard wastes, trim, waste fiber from hardwood operations and small chip fines which are not of sufficient quality for paper pulp.

In evaluating information submitted by commenters, EPA has concluded that many issues remain unanswered, and information from commenters is contradictory. Therefore, EPA is not able to define this product nor to recommend minimum content standards at this time. EPA will gather further information and will consider recommending minimum content standards for this product at a later date. In the interim, fiberboards made with cellulose that are purchased for insulation use continue to fall within the scope of this guideline, and EPA recommends that procuring agencies use the case-by-case approach, as set out in § 248.21(b), when purchasing this item. This approach is described below in section IV.G.1.f.

Among the issues being examined by EPA are:

1. How should this product be defined? Two options are being considered:

- Option 1—Use the term, *Recycled Fiber Insulating Board,* defined as fibrous-felted, homogenous pulp, or laminated paperboard fiberboard, with or without facings, primarily composed of recovered material(s) (such as paper, cane or wood fibers) which provides thermal resistance and perhaps other properties.
- Option 2—Use the term, *Cellulosic Fiberboard,* and definition used in ASTM specification C208.

2. What should the minimum content standard be? Should it be for

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postconsumer recovered paper or for the more broadly defined recovered materials which would include waste wood? In either case, what is the highest practicable percentage of recycled content?

3. Some fiberboards contain postconsumer newspaper, which clearly is a solid waste management problem. Other fiberboards are made with manufacturing wood wastes, which meet the RCRA definition "recovered materials." Are manufacturing wood wastes currently a solid waste management problem? If EPA were to limit the scope of the guideline to fiberboards made from postconsumer recovered paper, would manufacturers switch from wood fibers to postconsumer paper fibers? Would such a switch simply result in a change in the composition of the waste stream without a net reduction in volume? Or, will wood wastes be diverted to another use, such as fuel?

4. Should EPA limit the designated item to fiberboard products that meet the ASTM C208 specification, thus eliminating the laminated paperboards?

5. Should fiberboard be excluded from the guideline because it is technically a structural product, rather then an insulation product?

iii. *Perlite composite board.* The range of products in this type of insulation is made with various formulations of expanded perlite aggregate, selected binders, and old newspaper. The newspaper component is 23 percent to 30 percent, depending on the thickness and strength requirements of the finished product. For example, as the perlite fraction increases, R-value increases and strength decreases. According to the industry, although an increase in the newspaper component would be economically advantageous to the manufacturer, it would interfere with performance requirements in individual products. EPA recommends a minimum content standard of 23 percent postconsumer recovered paper to assure that all variations of perlite composite board are covered by the guideline, and to assure that performance is not jeopardized.

iv. *Polyisocyanurate/polyurethane (PIR/PU) rigid foam board insulation.* The minimum recovered materials content standard for the PIR/PU rigid foams applies to the total feedstocks in the core materials. However, only the polyol fraction contains recovered materials; recovered materials are not available for the other components. Therefore, the minimum content standard cannot be very high. Further, a range of formulations, as shown in Table 7, is used within the industry to achieve special characteristics for different end use products.

Table 7

Components of Polyisocyanurate and Polyurethane Rigid Foam

53–57% isocyanate
20–30% aromatic polyester polyol
15–20% blowing agent
2– 3% surfactants and catalysts

As discussed above, there are also two types of recovered materials used in entirely different processes to make polyol, chemical bottoms (DMT and possibly phthalic anhydride) and PET plastic scrap. EPA solicited but received no comments on its conclusion that DMT and phthalic anhydride waste bottoms qualify as recovered materials under the RCRA definition.

The constraints to increasing the minimum content standard are common to both types of recovered materials. The industry asserts that polyols with higher percentages of recovered materials have characteristics that inhibit the flow of the liquid foaming mass prior to the hardening of the mass into rigid cells. This would have adverse effects on the performance characteristics of the finished products. Further, the PIR/PU rigid foam industry, including all the feedstock suppliers, is currently experimenting with blowing agents other than chlorofluorocarbons (CFCs). These substitute blowing agents are not as efficient as CFCs. Larger quantities by weight may be necessary in the product mixes and would therefore change the relative percentage of polyol. EPA has taken the second constraint into consideration in setting the minimum recovered materials content standard at 9 percent, the highest percentage possible for the lowest percentage of PET-based polyol in the range of product formulations. To avoid confusion in terms and the application of minimum content standards to individual products, one minimum content standard, 9 percent, is to be used for all PIR/PU board products. The trade association for the industry has informed EPA that this level is consistent with current technology. EPA believes that this percentage will provide the maximum amount practicable.

A commenter opposed this standard because it excluded a certain formulation, and provided information about a particular product. EPA concluded that there was sufficient reason to consider the product separately rather than drop the standard for all other related products. This additional product is discussed in the following section.

v. *Glass fiber reinforced PIR/PU foam.* As introduced above, the commenter opposing the 9 percent minimum content standard for PIR/PU rigid foam board insulation stated that its fiberglass reinforced PIR board is produced with a lower proportion of polyol and consequently a lower percentage of recovered materials. The proportions are: 67 percent isocyanate; 15 percent aromatic polyester polyol; and 18 percent catalysts, surfactants, blowing agents, and glass fibers.

The proportion of recovered materials (40 percent) in the polyol fraction is the same as other PIR/PU boards. This results in 6 percent recovered materials in the total formulation. The commenter believed the fiberglass was made with recovered materials. However, EPA has learned that the fiberglass reinforcement may be made with "re-feed," but it is not currently made with a recovered material meeting the RCRA definition.

EPA has determined that this product has different characteristics than the other PIR/PU foam boards (according to Federal specification HH–I–1972/1) and that dropping the minimum content standard for all related products would not meet the objectives of Section 6002. EPA has further determined that this is a separate type of PIR/PU board and should therefore have a separate minimum content standard. EPA has established that the minimum content standard for this product is 6 percent based *only* on the recovered material proportion of the polyol. The table of minimum content standards and the preamble have been revised accordingly.

vi. *PIR/PU foam-in-place insulation.* The minimum content standard for PIR/PU foam-in-place insulation applies to the total feedstocks. However, only the polyester polyol fraction contains recovered materials. The percentages of ingredients is shown in Table 8. The other ingredients also vary compared with PIR/PU board.

Table 8

Components of PIR/PU Foam-in-Place

40% isocyanate
40% polyol
  aromatic polyester, 30%
  polyether, 70%
20% blowing agent

As with aromatic polyester polyols for PIR/PU board products, the recovered DMT or PET is reacted with glycol in similar ratios. The same constraints regarding the eventual change from CFC to another blowing agent also apply to the PIR/PU foam-in-place products. EPA therefore recommends a minimum content standard of 5 percent for PIR/

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PU foam-in-place rigid foam. No commenters opposed this standard.

vii. *Phenolic rigid foam insulation.* The only component of phenolic rigid foam insulation that can contain recovered materials is the aromatic polyester polyol which is used in small quantities as a plasticizer. The product formulations vary according to specific product and are expressed in ranges to protect competitive information. The polyol fraction, according to industry spokesmen, was said to be 3 percent to 10 percent of the total. The mixture of glycol to DMT or PET differs from the PIR/PU foams when it is used in phenolics as a plasticizer. The ratio is 10 parts glycol to 90 parts other ingredients.

Industry sources have asserted that there are two technical constraints to setting a higher minimum content standard based on the use of polyol. First, larger percentages of polyol used as a plasticizer produce an end product that is too soft for commercial application with mechanized roofing equipment. Second, manufacturers need leeway in product formulations for different product types and to accommodate potential changes in blowing agents.

A commenter stated that the recommended minimum content standard of 4 percent was acceptable as a minimum but it was probably on the low side. EPA has learned that the product mix for phenolic foam includes slightly more polyol (6 percent) which, according to the glycol/polyol ratio, results in product formulations with 5 percent recovered materials. Therefore, the recommended minimum content standard has been raised to 5 percent recovered materials.

viii. *Rock wool insulation.* The rock wool industry uses either metallurgical slags or natural rock to make rock wool fiber. Although some manufacturers are entirely dependent on slag as feedstock, this is not true in certain parts of the country where good quality metallurgical slags are no longer easily available. EPA believes that the only constraint to setting a higher minimum content standard is the availability of the recovered material feedstock.

As discussed earlier, a commenter recommended that mineral wool produced with spent aluminum potliner be included within the scope of the guideline. EPA has learned that some manufacturers have begun to use spent aluminum potliner in their process lines and that practice may become more common in the future. However, this innovation was not widespread in late 1988 and may be interrupted until hazardous waste issues are resolved. Therefore, EPA has not set a specific minimum content standard for spent aluminum potliner, nor has EPA increased the recommended minimum content standard for rock wool to include the use of potliner. Instead, EPA encourages rock wool manufacturers to include their use of spent aluminum potliner when figuring their recovered material content for purposes of estimation and certification.

EPA also considered geographic availability of rock wool insulation when setting the recommended minimum recovered material content standard at 50 percent. EPA believes that this percentage will provide the maximum amount practicable. No commenters either approved or contested this standard.

ix. *Fiberglass insulation.* Several commenters questioned EPA's decision not to recommend a minimum content standard for fiberglass. One commenter noted "given the mounds of garbage strangling our cities, this is indeed a bizarre position for EPA to take." It was suggested that EPA set a moderate minimum content standard to encourage fiberglass manufacturers to overcome technical problems. While EPA appreciates this point of view, the most immediate technical problem, available supplies of postconsumer glass feedstocks, must still be resolved. Despite mounds of garbage, and a comment that EPA work with public and private agencies to ensure an adequate supply of cullet, neither EPA nor the commenters themselves could discover any current or potential supplies of uncontaminated postconsumer bottle cullet that would not be eagerly absorbed by other industries.

Several other commenters offered another approach to encourage the fiberglass industry to consume additional recovered glass cullet. They suggested including fiberglass in the table of recommended minimum content standards, but with an asterisk rather than a percentage value. The asterisk would note that "no value is established until such time as recovered materials are readily available," or "not practical to establish minimum percentage by weight at this time."

Because the purpose of the guideline is to promote the procurement of products made with materials recovered from the solid waste stream and because fiberglass insulation is not being made routinely with such materials, EPA sees no point in listing it in the table of recommended minimum content standards. EPA believes that use of the case-by-case approach, as recommended in § 248.21(b), is appropriate for fiberglass insulation and will be the most efficient method to implement the preference for recovered materials.

Another commenter suggested that EPA monitor agencies to assure that they are procuring fiberglass with recovered material content and use information from the agencies to revise the guideline. This comment applies equally to all building insulation types. As part of a program to assist procuring agencies to implement the various procurement guidelines, EPA plans to monitor procuring agencies' activities and to review the results of their annual reviews of their programs.

Another commenter stated that fiberglass companies could establish long term contracts with communities that have aggressive curb-side collection programs. EPA considers this a good approach and encourages fiberglass manufacturers to do so.

x. *Polystyrene rigid foam.* In the proposed guideline, EPA stated that polystyrene insulation containing recovered materials is technically feasible but not yet commercially available. For this reason, EPA proposed to recommend that procuring agencies use the case-by-case approach when procuring this product.

A company commented that it produced a polystyrene foam building insulation product that used "a minimum of 25 percent polystyrene that was deemed unusable in food service products due to color or other specification deviations." The commenter proposed a minimum content standard of 25 percent for polystyrene foam ¼ inch and ⅜ inch protection and underlayment boards. EPA learned that in-plant scrap previously sold to outside scrap processors is the only material in current use. Although purchased or postconsumer polystyrene will probably be used if it can be obtained in the future, no materials representing a solid waste management problem are currently being used. Further, the industry trade association has informed EPA that polystyrene products containing recovered materials are not commercially available. EPA therefore concludes that it is premature to set a minimum content standard for this product, or for any polystyrene foam building insulation product, and is retaining in the final guideline the recommendation to use the case-by-case approach when procuring these products.

e. *Recommended procedures for implementing the minimum content standards approach.* Building insulation products are procured directly by (1) government agencies and (2) agency contractors as part of contracts for

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building construction, alteration, or repair. Selection of building insulation products thus can be made by agency personnel or by contractors.

EPA believes that the selection of the appropriate building insulation products should be made by the procuring agency architect or contractor architect and should not be left to the supplier or to the construction contractor, who can be expected to select the least expensive product available. In that circumstance, the cheaper price will become the justification for the purchase, because availability only at an unreasonable price is one of the statutorily provided limitations on the requirement to procure building insulation products containing recovered materials to the maximum extent practicable. Therefore, new § 248.21(a)(6) has been added to the final guideline. EPA recommends that procuring agencies which have established minimum content standards for building insulation implement those standards both in the design phase and in procurement of building insulation products or building construction, alteration, and repair services.

EPA is recommending that during the design phase of a building project (1) the designing architect, whether a procuring agency employee or a contractor, be given the responsibility for selecting building insulation products, (2) the designing architect incorporate the procuring agency's minimum content standards into their insulation selection criteria, (3) if more than one type of insulation will satisfy the procuring agency's needs and meet the procuring agency's minimum content standards, then the type with the highest minimum content standard should be preferred, (4) the architect determine whether building insulation products containing the procuring agency's minimum recovered materials content are available, (5) the architect advise the procuring agency in writing when such products are not available and as to the recovered materials content that is available, (6) the architect justify in writing selection of a building insulation product that either does not contain recovered materials or contains less than the procuring agency's minimum, and (7) the procuring agency review the justifications to assure that they are consistent with RCRA section 6002(c)(1). When contracting for building insulation or for construction, alteration, or repair services, EPA recommends that the procuring agency specify in solicitations both the type(s) of building insulation products to be used and the recovered materials content that the products must have.

As explained above under the discussion of the minimum content standard recommendations, it is not possible to set minimum content standards for some types of insulation at this time because they are not commercially available containing recovered materials. For example, industry sources have suggested that polystyrene insulation containing recovered materials is technically feasible, and research and development efforts are underway. Similarly, while fiberglass insulation containing recovered materials is technically feasible, American manufacturers do not routinely produce it. In addition, new types of insulation or insulation products may be introduced, which might or might not contain recovered materials. Thus, there will be instances when the designing architect selects a type of insulation for which the procuring agency has not yet established a minimum content standard. Assuming that the selection otherwise satisfies the requirements of RCRA section 6002, EPA recommends that procuring agencies use the case-by-case approach when procuring these types of insulation.

f. *Case-by-case procurement.* The case-by-case approach means that offers are solicited for the selected type of building insulation with an unspecified percentage of recovered materials content. In other words, offerors may offer building insulation products containing recovered materials ranging from 1 percent to 100 percent of the total product or made entirely with virgin materials. When using sealed bidding, EPA recommends that, in the case of otherwise identical low bids, the procuring agency award the contract to the bidder offering the building insulation product(s) containing the highest percentage of recovered materials.[2] In the case of negotiated procurements, EPA recommends that procuring agencies add to their evaluation criteria a criterion which rewards the offeror for the quantity of recovered materials in the building insulation products offered. In other words, if offeror A offers a building insulation product containing 45 percent recovered materials and offeror B offers a building insulation product containing 50 percent recovered materials, both offerors will receive credit for offering products containing recovered materials, but Offeror B will receive more credit than Offeror A.[3]

One commenter stated that it was unclear whether the case-by-case approach is to be used only within product types of the same material or if it applies across product types (e.g., polyisocyanurate and polystyrene rigid foam boards). It is EPA's intent that the case-by-case approach only be used within a product type of the same material (e.g., two separate bids for fiberglass batt).

g. *Limitations set by RCRA.* As mentioned above, the minimum content standard would be subject to the four limitations provided in RCRA section 6002, namely, not jeopardizing the intended end use of the product, reasonable availability, reasonable price, and ability to meet the performance standards in the specifications. Procuring agencies must also be able to maintain a reasonable level of competition. For example, if a procuring agency determines that it cannot obtain a type of building insulation containing the minimum amount of recovered materials or that it cannot obtain the insulation at a reasonable price, or that an insufficient number of offers can be obtained to meet competition requirements, the procuring agency can re-evaluate the minimum content standard. Lower minimum content standards can be tested for the particular type of insulation product. Section 248.21(c) of the guideline provides that the recommended procurement approaches, or any other approach used by a procuring agency, are subject to the RCRA limitations.

h. *Procurement procedures.* Procuring agencies must examine their procurement policies and procedures and eliminate those which discriminate against recovered materials content in building insulation products. Note that the phrase "procurement policies and procedures" does not include published regulations. Instead, EPA is referring to internal policies and/or procedures which would unjustifiably inhibit or preclude procurement of building insulation products containing recovered materials.

In the proposed guideline, EPA *recommended* that agencies review their procurement practices. A commenter

[2] EPA believes that the recovered materials preference authorized by section 6002 should be incorporated into the equal low bids provision of the Federal Acquisition Regulation (FAR). Therefore, EPA recommends that Federal entities responsible for periodic revision of the FAR consider modifying 48 CFR 14.407-6 to incorporate a preference for vendors offering to provide procurement items which have been designated by EPA under RCRA section 6002(e).

[3] The case-by-case approach differs from the minimum content standards approach in this respect; under the latter approach, offerors must meet the minimum standard but are not rewarded for offering products containing higher percentages of recovered materials.

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stated that procuring agencies *must* eliminate discrimination in purchasing practices to conform with statutory requirements. EPA agrees. All procuring agencies, Federal and non-Federal alike, are required by RCRA sections (c)(1) and (i) to procure items designated by EPA composed of the highest percentage of recovered materials practicable. Even if a procuring agency has nondiscriminatory specifications, if a procurement practice undercuts procurement of products containing recovered materials, the procuring agency has failed to meet the statutory requirements. As discussed above, under RCRA section 6002(c)(1), there are only four reasons for failing to procure items containing recovered materials: the level of competition is unsatisfactory; the items are not reasonably available within a reasonable period of time; the items fail to meet the performance standards set forth in the applicable specifications; or the items are only available at an unreasonable price. Unless the procurement practice that precludes purchase of EPA-designated items containing recovered materials is justified on one of these grounds, it is contrary to section 6002. Therefore, it is implicit in RCRA sections 6002(c)(1) and (i) that procuring agencies must review and revise their practices. EPA has amended § 248.21(d) in the final rule to state that agencies must, rather than should, do so.

EPA notes that in the lubricating oil and retread tires procurement guidelines, it was stated that RCRA section 6002(d) required procuring agencies to review and revise their procurement practices. In those guidelines, EPA concluded that the term "specifications," as used in section 6002(d), should not be viewed in the narrow technical sense of an item specification and that Congress intended to refer to all procurement practices related to specifying what a procuring agency intends to purchase. (See 53 FR 24710, June 30, 1988, and 53 FR 46567, November 17, 1988.) EPA has reconsidered its prior conclusion regarding the meaning of "specifications" in section 6002(d). EPA has now concluded that the bases for the requirement to review and revise procurement practices are section 6002(c)(1) and (i).

A commenter urged that performance characteristics be the primary criterion for choosing a building insulation product to avoid discrimination against products without recovered material content. If all performance characteristics are weighed and several products competing for the same application appear to be equal, the commenter supported procurement based on minimum content standards. Other commenters were concerned that the guideline did not mandate the selection of the product with the highest recovered material content whenever the option to choose between products arises. Similarly, commenters stated that, in situations where two or more products meet a specific need, a product containing recovered materials must be used.

EPA believes that these commenters overstate the intended application of the Act. First, it is clear that Congress understood and intended that section 6002 would discriminate against items produced with virgin materials. This is evidenced in the requirement to develop a preference program for items produced with recovered materials. Moreover, the Act mandates that procuring agencies consider the use of minimum content standards as an approach to implementing this preference. Thus, Congress rejected the notion that performance characteristics of designated procurement items should be the primary criterion for selection as between items produced using recovered materials and those produced with virgin materials.

Conversely, Congress did not require the selection of a particular product simply because that product contains a higher recovered material content than other products of the same type offered in response to a procurement solicitation. The Act specifically limits the preference for recovered materials so as not to subordinate certain other policies pursued through the procurement process. Thus, for example, the policy preferring the procurement of items produced using recovered materials is explicitly subordinated to the policy that a satisfactory level of competition be maintained. Additional limitations are set forth in section 6002(c)(1) (A) through (C). These limitations are carried forward in section 6002(i)(3)(B) and delimit the preference program recommended in the final guideline. Thus, the recommended minimum content standards set forth in § 248.21 describe EPA's judgment as to the current level of recovered materials content that can be required in agency specifications without violating the limitations of section 6002(c)(1) (A) through (C). Accordingly, no additional preference is given to offerors who propose to supply items containing a percentage of recovered materials content higher than the recommended minimum. To do so would render the procurement process unworkable, and would elevate the policy for procurement of recovered materials over the limitations on that policy prescribed by the Congress.

As between two equally suitable *types* of building insulation products for which minimum content standards have been established, however, there is a preference for the use of the *type* of product (e.g., cellulose loose-fill versus perlite composite board) having the higher established minimum content standard. Because the recommended minimum content standards account for the limitations of section 6002(c)(1) (A) through (C), the preference for the type of product having the higher minimum content standard is consistent with the Act. Moreover, since the selection of the type of insulation to be procured will be made prior to issuance of the procurement solicitation, this preference will not complicate the procurement process. It is the responsibility of the procuring agency, rather than EPA, to determine whether more than one type of building insulation is suitable for its needs. The selection of a particular type of building insulation may be governed by architectural considerations, applicable building codes, desired performance characteristics, and other factors. However, in those cases where more than one type of product meets the agency's needs, the product having the highest established minimum content standard should be specified.

2. Promotion Program

The second requirement of the affirmative procurement program is a promotional effort by procuring agencies. Section 248.22 of the guideline recommends several methods for procuring agencies to use for disseminating information about their preference programs, such as placing statements in solicitations, discussing the program at bidders' conferences, informing industry trade associations about the program, providing information about building insulation made with recovered materials in the product information programs sponsored by the Department of Housing and Urban Development, and issuing press releases discussing the affirmative procurement program. In § 248.22(f) of the proposed guideline, EPA recommended press releases to the recycling industry. In response to comments requesting broader promotion of the affirmative procurement program, EPA has included architectural and building trade publications in the final recommendation regarding press releases. This recommendation also will

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serve to inform contractors of their responsibility to comply with the guideline when specifying or supplying building insulation products.

Under section 521 of the National Housing Act, HUD is required to provide product-related services and publications. These should be used as avenues to publicize recovered materials content in insulation. HUD publications include:

- National Building Codes,
- Bulletins,
- Materials releases,
- Engineering bulletins,
- Use of materials information.

EPA recommends that procuring agencies use all such avenues to publicize their requirements for recovered material content in building insulation products.

3. Estimation, Certification, and Verification

The third requirement of the affirmative procurement program set forth in section 6002(i) covers estimation, certification, and verification of recovered material content in procurements. Estimates and certifications of content in an item are most easily expressed as a percentage of total content by weight and can range from 0 percent to 100 percent, depending on the type of product or the feedstocks used in manufacturing the item. Many issues have been raised by commenters on previous guidelines about these requirements, such as when the information should be provided, who is to provide it, and how it is to be obtained. To clarify this subject, it is necessary to review the requirements of the statute.

a. *Estimation.* RCRA section 6002(c)(3)(B) and section 6002(i)(2)(C) require that, after the effective date of a guideline, contracting officers must require vendors to provide an *estimate* of the total percentage of recovered materials utilized in the performance of contracts to supply building insulation products.

EPA believes that this requirement is for the purpose of gathering statistical information on price, quantity, availability, and performance of products made from recovered materials. EPA further believes that this requirement applies regardless of the approach used to acquire building insulation products (i.e., minimum content standards, case-by-case procurement, or an equivalent alternative). Estimates may differ from percentages of minimum recovered content specified in certifications and will provide up-to-date information for the annual review which is required of procuring agencies.

Section 248.23(a) requires that contracting officers require vendors to provide estimates of the total percentage of recovered content in building insulation products supplied under their contracts. Note that the percentage of recovered content refers to the total content of the insulation *core* rather than the entire insulation product, which includes other items such as facings or bindings. EPA recommends that procuring agencies retain these data for three years by type of product, quantity purchased, and price paid.

b. *Certification.* The use of certifications is common in government procurement. It is written assurance that goods or services delivered will conform to the contract specifications. Failure to meet the conditions which have been certified can result in penalties to a vendor. RCRA section 6002(c)(3)(A) requires that after the effective date of this guideline, vendors must "certify that the percentage of recovered materials to be used in the performance of the contract will be at least the amount required by applicable specifications or other contractual requirements." RCRA 6002(i)(2)(C) requires "certification of minimum recovered material content actually utilized * * *."

Together, these sections could be interpreted to mean that multiple certifications will be required: one when offers are submitted, and another with each shipment. This issue was addressed in the paper guideline issued June 22, 1988 (53 FR 23546). EPA concluded that one certification would fulfill both statutory requirements and, by requiring the certification no matter which approach is used, procuring agencies could adapt their purchasing programs most easily. For the same reasons enunciated in the paper guideline, EPA recommends in § 248.23(b) that procuring agencies meet the certification requirement in RCRA sections 6002(c)(3)(A) and 6002(i)(2)(C) by using a single certification prior to delivery or installation.

The final guideline does not require that the contractor certify the actual recovered materials content of the products supplied, but rather that the recovered materials content actually used meets or exceeds the contract minimum. When minimum content standards are used, the contract minimum is the standard specified in the solicitation; see § 248.23(b)(1). When case-by-case procurement is used, the contract minimum is the minimum as specified in the offer provided in response to the solicitation; see § 248.23(b)(2).

Accordingly, EPA recommends that procuring agencies require certification when offers are submitted and, in the case of a contract for construction, alteration, or repair, prior to installation by a contractor, regardless of whether the case-by-case, minimum content standard, or a substantially equivalent approach is used. Also, as previously stated, the successful vendor must estimate the actual recovered content in building insulation products that are supplied. The estimate may or may not be different than the minimum percentage that is certified.

EPA understands that for both estimation and certification, the vendor might not have direct knowledge of recovered materials content. Only the manufacturer that produces the insulation product will have that information. However, there is no direct authority in RCRA section 6002 for the Federal Government to require this information from anyone but the vendor. Therefore, vendors or contractors must make their own arrangements for obtaining this information from manufacturers.

c. *Verification.* Procuring agencies also are required to establish "reasonable verification procedures for estimates and certifications." See RCRA section 6002(i)(2)(C). If these verification procedures include access to manufacturers' records, then the procuring agency must use some authority other than RCRA to inspect these records or must require vendors or contractors to have an agreement with the manufacturer to supply such information or access to the procuring agency.

In general, insulation manufacturers maintain records of the feedstocks used in each "batch" for their own internal quality and specification controls. The optimum mix of recovered and virgin materials often remains the same for each type of insulation though variations may occur in individual batches.

In most cases, manufacturers will be able to provide a certification to vendors or contractors as to the specific feedstock content of the product shipped to a customer. It is not intended that the guideline require any additional records to be kept by the manufacturers; records normally kept should be complete enough to estimate or certify to recovered materials content accurately. However, to simplify the verification procedure and accommodate variations dictated by quality control and supply, the average of recovered materials used in each specific product over a one-month period may be used, if necessary,

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to meet the verification of estimates requirement.

EPA recommends in § 248.23(c)(2) that one-month figures be used for estimates of feedstock percentages. If it is necessary to verify the exact content of a specific batch of insulation, the manufacturers' records for that batch can then be consulted.

However, if the vendor knows that the recovered materials content of an insulation product supplied to procuring agencies differs from the monthly average, then the average cannot be used. For example, if the monthly average is 30 percent recovered materials content but the insulation product supplied contains no recovered materials or conversely contains 60 percent recovered content, then the vendor cannot use the monthly average. Use of the average in such instances will be viewed as an attempt to circumvent the requirements of RCRA in supplying insulation products to the procuring agency.

Monthly *averages* cannot be used for certification. Every shipment may not contain recovered materials content equal to or greater than the average. However, the *minimum* percentage of recovered materials used in insulation products by the manufacturer can be determined from monthly records for certification purposes.

It has been suggested that the various insulation industries are very competitive and that the "recipes" for various insulation products are carefully guarded trade secrets. However, the special ingredients that distinguish one manufacturer's product from another's are used in very small quantities. The volumes of virgin and recovered material feedstocks in question are far larger and are the only feedstocks for which verification procedures would be necessary. EPA recommends in § 248.23(c)(1) that, should it be necessary to consult manufacturers' records for verification, records of other inqredients should not be reviewed in order to protect trade secrets.

A commenter stated that verification of certifications would appear to require special record keeping by manufacturers. Difficulties would be experienced by multi-plant operations because recovered materials are not available in equal quantities to each plant. Products are sold to distributors or wholesalers who then sell to procurement agencies. Certifications are requested after the fact, so it would be difficult to track down recovered materials in such cases.

EPA again acknowledges that the Federal government does not have authority under section 6002 of RCRA to require information from manufacturers. However, there is a relatively simple voluntary method to overcome this difficulty. As products are commonly tracked by batch numbers, manufacturers can routinely provide their distributors with the percentage of recovered materials for each batch. Not only would vendors and contractors have information on hand when preparing their offers, the verification process would become straightforward. When necessary, manufacturers could simply pull their existing records for the batch in question. Therefore, EPA has included this method as a recommendation to procuring agencies in § 248.23(c)(3) of the final guideline.

4. Annual Review and Monitoring

The fourth requirement of the affirmative procurement program is an annual review and monitoring of the effectiveness of the program.

EPA recommends that the review include an estimate of the quantity of building insulation products purchased during the year, an assessment of the effectiveness of the agency promotion program, and an assessment of any remaining barriers to procurement of building insulation containing recovered materials. In assessing barriers to procurement, procuring agencies should determine whether they are internal or external. Internal barriers, such as resistance to use of building insulation products containing recovered materials by agency personnel, without cause, can be corrected by the procuring agencies. External barriers, such as unavailability of building insulation products containing recovered materials, may well be beyond the agencies' control.

EPA also believes that procuring agencies should review the range of estimates and certifications of recovered materials content provided by vendors or contractors during the year. Significant and repeated variations between the procuring agency's standards and vendor's certifications and estimates would signal whether changes in approach (e.g., from case-by-case to minimum content standards) or different minimum content standards are warranted. EPA further believes that information provided by the estimation requirement will be particularly helpful to procuring agencies when they review their compliance with the requirement to purchase building insulation products with the highest percentage of recovered materials practicable.

EPA has determined that one intent of the requirement that vendors or contractors estimate the total percentage of recovered materials content is to provide information to procuring agencies that can be used in future procurements. Further, procuring agencies need to keep up-to-date on changes in recycling practices and availability of products containing recovered materials content. For these reasons, EPA believes that agencies should keep statistical records of building insulation product procurements to implement properly the intent of Congress in requiring an affirmative procurement program. A summary of these records should be included in the annual review and monitoring of the effectiveness of the program.

A program for gathering statistics need not be elaborate to be effective. However, agencies should monitor their procurements to provide data on the following:

(a) The percentages of recovered materials content in the products procured or offered;

(b) Comparative price information on competitive procurements;

(c) The quantity of each item procured over a fiscal year;

(d) The availability of the insulation products to procuring agencies;

(e) Type of performance tests conducted, together with the categories of building insulation products containing recovered materials content that failed the tests, the percentage of total virgin products and products containing recovered materials content supplied that failed each test, and the nature of the failure;

(f) Agency experience with the performance of the procured products.

Rather than keep records of each test performed, procuring agencies should identify the performance tests used and maintain records, by test, on the percentage of failures by building insulation products containing recovered materials content and on the nature of these failures.

EPA recommends that each procuring agency prepare a report on its annual review and monitoring of the effectiveness of its procurement program. If the agency is using the case-by-case approach, the report should discuss how that approach is maximizing the use of recovered materials content as required by RCRA section 6002. If the minimum content standard approach is used, the agency should discuss whether the standard should be raised, lowered, or remain constant for each item. The discussion should be based on reasonable determinations of price, quality, and availability as well as a comparison of estimates and certifications provided by the vendors or contractors. Agencies

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should also document their review of specifications and list those which are revised each year.

EPA notes that this guideline will apply to state and local procuring agencies, as explained above under "Applicability." Information drawn from the experience of Federal procuring agencies about purchases of building insulation products containing recovered materials would therefore be useful to state and local purchasing officials. Accordingly, EPA encourages Federal procuring agencies to make their reports available to the public.

Several commenters stressed the need for Federal procurement guidelines to provide direction to state and local agencies which are waiting for leadership. Another commenter wondered why EPA encourages procuring agencies to make their reports available to the public when they can already be obtained through the Freedom of Information Act. EPA recognizes that the reports would be available through such means but voluntary distribution by procuring agencies might speed the transfer of information.

A commenter agreed with the proposed annual review and monitoring recommendations and further suggested that procuring agencies provide their reports to the Office of Federal Procurement Policy and to EPA to permit EPA to monitor the program and consider revisions to the guideline. Valuable as these suggestions are, EPA has previously considered both options and concluded that it has no authority under section 6002 to require or recommend that procuring agencies submit their reports to OFPP or to EPA. (EPA does plan to monitor procuring agencies' implementation of the procurement guidelines.)

Finally, EPA notes that while the annual review and monitoring requirements of RCRA section 6002 apply to State and local procuring agencies and to contractors, EPA's recommendation for recordkeeping and reporting is less pertinent for these persons than for Federal agencies. Most EPA recommendations are germane to implementing section 6002. In the case of the recordkeeping and reporting recommendations, however, the recommendations are more germane to the Federal agencies, which are required to report to the Office of Federal Procurement Policy regarding implementation of section 6002. In addition, reports generated by the Federal agencies are available to the public through Freedom of Information Act requests, and the experience of Federal agencies will serve as an important teaching tool for non-Federal agencies trying to implement affirmative procurement programs.

In the case of non-Federal procuring agencies and contractors, there is no reporting requirement in section 6002, and the Freedom of Information Act does not extend to their documents (although there might be a similar state provision). EPA believes that reporting is less relevant when the report is unavailable unless the agency or contractor chooses to make it available. Therefore, EPA continues to recommend recordkeeping and reporting but acknowledges that these recommendations do not apply equally to non-Federal agencies and contractors.

V. Price, Competition, Availability, and Performance

As described above, section 6002(c)(1) of RCRA provides that a procuring agency may decide not to purchase an item designated by EPA if it determines that the item is available only at an unreasonable price, a satisfactory level of competition cannot be maintained, the item is not reasonably available within a reasonable period of time, or the item fails to meet the agency's reasonable performance standards. EPA has considered the effect of these limitations on procurement of building insulation products containing recovered materials.

Commenters asked EPA to compile information on availability, relative price, and performance of building insulation products, including lists of manufacturers, price comparisons by products and regions, and performance tests; to distribute this information to state and local governments; and to sponsor seminars to share this information with interested persons. EPA agrees that further guidance will need to be provided to procuring agencies and vendors regarding the implementation of this as well as the other procurement guidelines. Therefore, the Agency will be developing a plan for educating the various procuring agencies and vendors. EPA also plans to establish informal, highly available mechanisms to disseminate information, such as a telephone hotline.

A. Price

Several factors will affect the market price, or bid price, of the designated building insulation products, including the availability and cost of recovered material feedstocks, transportation costs, and so on. Because these factors can be site specific and are variable, EPA believes the best method of determining the price is through the marketplace. Further, fluctuation in the overall economy affects the prices of individual building insulation products.

In many cases, more that one type of insulation could be selected for a particular installation. The different types of insulation do not compete on pricing alone; otherwise the least expensive insulation product would be used in all instances. There is no purchasing history based on relative prices of building insulation products made with virgin versus recovered material content. The only price comparison EPA could make is by type of insulation made with virgin materials or with recovered materials content at a particular point in time. The price differences may be the result of factors other than recovered material content, such as special additives or features in one product as compared with another.

Further, manufacturers have suggested that the use of recovered materials rather than virgin materials rarely results in price differences. Cellulose and rock wool insulation are rarely available with primarily virgin content. Cellulose fiberboard and the polyisocyanurate/polyurethane rigid foams are commonly, though not always, made with recovered materials. Price differences between similar products are usually the result of factors unrelated to the choice of virgin or recycled feedstocks.

Commenters on several of EPA's procurement guidelines, including the proposed building insulation products guideline, stated that the term "reasonable price" as used in RCRA section 6002 refers to price preferences. EPA disagrees. As previously stated in the paper guideline, 53 FR 23559 (June 22, 1988), RCRA section 6002 does not provide explicit authority to EPA either to authorize or to recommend payment of a price preference or use of set-asides. Therefore, unless an agency has an independent authority to provide a price preference or to create a set-aside, EPA believes that a price is "unreasonable" if it is greater than the price of a competing product made of virgin material.

However, it should be borne in mind that, when product specifications require a recovered material content, there is no way to guarantee that every item procured under those specifications was procured at a price no greater than the price that would have been paid in the absence of those specifications. On the contrary, EPA expects that there will be fluctuations in price in both directions. Therefore, EPA interprets the reasonable price provision of RCRA section 6002(c)(1)(C) for those specifications to mean that there is no

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projected or observed long-term or average increase over the price of comparable virgin items.

A commenter stated that when minimum content standards are used, the product specified by the procuring agency is a different product from one made entirely from virgin materials and that, therefore, any price comparison between the two is irrelevant. EPA does not agree that the price of a virgin product is irrelevant. Since price is one of the factors used in setting minimum content standards, procuring agencies should monitor prices to determine whether the standards should be revised. A long-term (e.g., one year) increase over the price of a comparable virgin product might be an indication that the minimum content standard is inappropriate.

Finally, a commenter disagreed with EPA's interpretation of "unreasonable" and noted that the legislative materials upon which EPA relies for this interpretation post-date by several years the original enactment of RCRA, do not indicate any intention on the part of Congress that section 6002 only apply in the rare situation of a tie bid, and only refer to recycled paper. This commenter raised the same concern in commenting on the proposed retread tires guideline; EPA responded to it in the final retread tires guideline as follows:

> While the commenter has correctly characterized the legislative materials, EPA disagrees that one should thus conclude that Congress intended for procuring agencies to pay a premium price for products procured pursuant to section 6002. EPA believes that if Congress had meant to authorize price premiums, then Congress would have explicitly said so in section 6002 and/or the legislative history. In the absence of this explicit authority, EPA can neither require nor recommend that procuring agencies pay a premium price. 53 FR 46569 (November 17, 1988).

EPA continues to believe that section 6002 does not authorize price premiums.

B. Competition

EPA recommends that determinations of "satisfactory" competition be made in accordance with Federal procurement law. For example, 48 CFR Part 14, Sealed Bidding, allows for award of bids even when a small number of bids have been received; see 48 CFR 14.407-1. In the case of negotiated contracts, 48 CFR 15.804-3(b) provides that, for purposes of waiving the requirement for cost and pricing data, competition exists if offers are solicited; two or more responsible offerors that can satisfy the Government's requirements submit price offers responsive to the solicitations's expressed requirements; and these offerors compete independently for a contract to be awarded to the responsible offeror submitting the lowest evaluated price.

EPA believes that, in most cases, the number of manufacturers for the designated types of building insulation products is sufficient to assure competitive bidding. Further, many vendors are able to offer products from a single manufacturer. In those cases where a building insulation product is made by only one company, there still should be sufficient competition among vendors. EPA does not foresee insufficient competition for building insulation products made with recovered materials content. If a lack of competition results because of the recommended minimum content standards, EPA recommends that procuring agencies re-evaluate the minimum content standards.

C. Availability

EPA believes that the building insulation products designated in the guideline promulgated today are currently available with recovered materials content in each of the following insulation categories: cellulose loose-fill, perlite composite board, rock wool, polyurethane/polyisocyanurate rigid foam-in-place and board, glass fiber reinforced polyisocyanurate/polyurethane rigid foam, and phenolic rigid foam. Although statistics on recovered material feedstock use have not been gathered for any type of building insulation product, both manufacturers and suppliers of recyclable feedstocks have indicated the flow of recovered materials into the insulation industries. Fiberglass insulation made with recovered cullet is not consistently available, and polystyrene insulation made with recovered materials is only in the developmental stages.

If building insulation products containing recovered materials are not available, then procuring agencies are not required to buy them *at that time.* Procuring agencies are required to continue to promote their affirmative procurement programs, however, in order to encourage availability. In addition, as discussed previously, procuring agencies are required to review procurement practices and revise such practices if they discourage the availability of building insulation products containing recovered materials.

Commenters requested that EPA list manufacturers of building insulation made with recovered materials in the guideline. EPA believes that it is inappropriate to do so. Because the list would require constant updating, EPA believes that other, less formal, highly available mechanisms for providing this information should be used. As noted above, EPA plans to establish such mechanisms for disseminating this and other information, including a telephone hotline. In addition, EPA has placed in the docket for this guideline a document entitled *Insulating Material Types and Manufacturers,* which contains lists of manufacturers of building insulation products. This document has been amended to include additional manufacturers that were suggested by commenters. EPA has been informed that a national directory of recycled products will be published shortly which is being designed to keep such lists up-to-date and make them widely available.

Several commenters stated that, if procurement officers conclude that fiberglass insulation products are not included in the guideline, serious material shortages and scheduling delays would result. These commenters appear to refer to supplies of the other competing building insulation products. None of the commenters offered facts to support this position. EPA notes, however, that procuring agencies must base their decision not to procure an item made with recovered materials on the statutory criteria, which include unavailability within a reasonable period of time.

New types of insulation products may become available with recovered materials content. Procuring agencies can identify such new products and adaptations to existing products as they monitor new developments. These additional products must be included in the preference program as they become available.

D. Performance

In general, performance standards for building insulation products have been established without regard to the kind of feedstocks used. Manufacturers have indicated that the use of recovered materials rather than virgin feedstocks does not affect the performance of the insulation product in question. Performance is determined by other factors. Standard industry specifications for all but cellulose loose-fill insulation neither allow nor disallow recovered material content; cellulose loose-fill insulation specifically mentions that the basic material is to be recycled. In many other types of insulation products, recovered material is commonly used. Therefore, EPA does not believe that product performance should be an issue of concern to procuring agencies.

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VI. Implementation

Different parts of section 6002 refer to different dates by which procuring agencies must have completed or initiated a required activity: (1) May 8, 1986 (i.e., 18 months after enactment of HSWA), (2) one year after the date of publication of an EPA guideline, and (3) the date specified in an EPA guideline. As a result, there is some confusion with respect to which activities must be completed or initiated by each date. This section of the preamble explains these requirements.

First, under section 6002(d)(1), Federal agencies that have the responsibility for drafting or reviewing specifications for procurement items were to eliminate from such specifications any exclusion of recovered materials and any requirements that items be manufactured from virgin materials. This activity was to be completed by May 8, 1986.

Second, Federal agencies must assure that their specifications for procurement items designated by EPA require the use of recovered materials to the maximum extent possible without jeopardizing the intended end use of the item (section 6002(d)(2)). In addition, procuring agencies must develop an affirmative procurement program for purchasing designated items, in this instance, building insulation products (section 6002(i)(1)). Both of these activities must be completed within one year after the date of publication of this guideline as a final rule.

Third, procuring agencies which procure items designated by EPA must procure such items containing the highest percentage of recovered materials practicable (section 6002(c)(1)). They also must revise their specifications for building insulation products to assure that they can procure such items containing the highest percentage of recovered materials practicable (section 6002(c)(1)). In addition, contracting officers must require vendors or contractors to submit estimates and certifications of recovered materials content (section 6002(c)(3)). These activities must begin after the date specified by EPA in the applicable guideline. EPA believes that procuring agencies should begin to procure the designated products as soon as the affirmative procurement programs have been developed. Because the programs must be completed within one year after publication of this guideline as a final rule, affirmative procurement should begin no later than one year from publication as well. Section 248.26 specifies this implementation date.

EPA expects cooperation from affected procuring agencies in implementing this guideline. Under section 6002(g) of RCRA, the Office of Federal Procurement Policy (OFPP), in cooperation with EPA, is responsible for overseeing implementation of the requirements of section 6002 and for coordinating it with other Federal procurement policies. OFPP is required to report to Congress on actions taken by Federal agencies to implement section 6002.

VII. Summary of Supporting Analyses

A. General

Four background documents were prepared for EPA and have been placed in the docket: for the proposed guideline: *Feasibility of a Federal Procurement Guideline for Recovered Materials in Insulation Products* (E.H. Pechan & Associates, Inc., February 1988), *Insulating Material Types and Manufacturers* (E.H. Pechan & Associates, Inc., June 1988), *Energy and Economic Impacts of the Proposed Guideline for Procurement of Building Insulation Products Containing Recovered Materials* (E.H. Pechan & Associates, Inc., June 1988), and *Industry and Regulatory Information, Background Document for Final Insulation Procurement Guideline,* (E.H. Pechan & Associates, Inc., February 1989).

B. Environmental Impacts

The principal environmental impacts concern chlorofluorocarbons in plastic rigid foams and the possible risk of durable fibers.

1. Chlorofluorocarbons

Recently, questions have been raised regarding the environmental consequences of use of chlorofluorocarbons (CFCs) in the manufacture of various items. One of the types of insulation covered by the proposed guideline, rigid plastic foams, contain CFCs.

Ozone depletion in the upper atmosphere has created environmental concerns. Fully halogenated CFCs are the primary suspects for causing substantial ozone depletion. EPA published a final rule on Protection of Stratospheric Ozone (40 CFR Part 82) on August 12, 1988 (53 FR 30566). The regulations (1) will reduce consumption of CFCs and halons, (2) are intended to reduce the release of CFCs and halons to the atmosphere, and (3) will implement the Montreal protocols. As of July 1, 1989, manufacture of CFCs are frozen at 1986 production levels.

CFCs are now a key ingredient of PIR/PU, extruded PS, and phenolic rigid foam insulations. PIR/PU rigid foam insulation uses CFC–11 (fluorotrichloromethane). Extruded PS foam insulation is manufactured with CFC–12 (dichlorodifluoromethane). CFCs are used as a supplementary blowing agent and are retained within the closed insulation cells. CFCs have good thermal insulation properties and contribute significantly to the high R-values of the rigid foam insulations. Use of CFCs in closed cell foams has changed the emissions scenario from one of quick release (such as aerosol propellants) to a steady, very long term release. Industry sources have informally suggested that the half lives of CFCs in one-inch thick un-clad polyisocyanurate foam boards range 75 to 150 years.

Expandable foam polystyrene (EPS) is not made with CFCs. Instead, hydrocarbons such as pentane are used as blowing agents. R-values for equivalent thicknesses of EPS when compared with extruded polystyrene are said to be lower.

Insulation, by nature, is installed in the broadest range of building applications and geographies. Therefore, release of CFCs cannot be effectively controlled. Continued, and increasing use of CFCs in PIR/PU and extruded PS insulation as market share grows would effectively create a bank of CFCs slowly being released throughout the environment.

In 1988, a substitute for CFC–11 and CFC–12 was announced, with commercial availability expected in 1991. One commenter stated that the compatibility of new blowing agents with the polyols in current use has not yet been completely evaluated and may have an effect on the aims of the guideline. However, EPA has received no information that a problem will, in fact, arise. As there are already provisions in the guideline that allow procuring agencies to respond when building insulation products become unavailable with recovered material content, EPA believes it is premature to change the minimum content standards at this time.

2. Possible Risk of Durable Fibers

One commenter expressed concern about possible health: effects of man made mineral fibers. The EPA Office of Toxic Substances is examining the hazards and exposures associated with durable fibers in detail. Therefore, as the issues are being addressed elsewhere and do not apply uniquely to products with recovered material

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content, EPA does not believe that it is necessary to address the possible risk of durable fibers in this guideline.

C. Energy Impacts

The primary energy impact of insulation is energy conservation as more buildings are insulated more efficiently. The use of recovered materials in the insulation products would not affect insulation or R-values.

The use of glass cullet rather than virgin materials in fiberglass insulation has been said to reduce energy consumption in fiberglass manufacture. DMT waste bottoms have been said to be burned to recover energy value if they are not recovered to produce products like insulation polyols. Data regarding quantities and potential energy impacts were not available. EPA received comments on the energy savings in theoretical batches of fiberglass insulation which contributed to changes in earlier sections of the guideline. However, no comments were received regarding industry-wide impacts. No comments were received regarding DMT waste bottoms used in polyols. EPA believes that energy consumption will not increase due to this guideline; rather it will decrease though not by significant amounts.

D. Executive Order 12291

Under Executive Order 12291, EPA must determine whether a regulation is major or nonmajor. The proposed guideline is not a major rule because it is unlikely to result in:

(1) An annual effect on the economy of $100 million or more;

(2) A major increase in costs or prices for consumers, individual industries, Federal, state or local government agencies, or geographic regions; or

(3) Significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

EPA does not believe that this guideline will result in higher prices nor that adverse effects throughout the economy will result. In fact, the guideline may stimulate employment, competition, investment, productivity, innovation and United States enterprises may be able to compete more effectively with foreign based counterparts that are importing recovered materials.

This rule was submitted to the Office of Management and Budget for review as required by Executive Order 12291.

E. Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act, 5 U.S.C. 601 et seq., whenever an agency publishes a general notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the impact of the rule on small entities (i.e., small businesses, small organizations, small governmental jurisdictions), unless the Administrator certifies that the rule will not have a significant economic impact on a substantial number of small entities.

As described in the environmental, energy, and economic impact document, the economic impact on both small businesses and small governmental jurisdictions is expected to be in some cases, negligible and in other instances, beneficial. An extremely limited number of business and governmental entities are affected at all by the guideline.

For the above reasons, EPA certifies that the final rule is not expected to have a significant economic impact on a substantial number of small entities. As a result, the guideline does not require a Regulatory Flexibility Analysis.

List of Subjects in 40 CFR Part 248

Commercial item descriptions, Government procurement, Insulation, Military Specifications, Postconsumer materials, Recovered materials, Recycling, Resource recovery.

Dated: February 8, 1989.

Jack Moore,

Acting Administrator.

For the reasons set out in the preamble, Title 40 of the Code of Federal Regulations is amended by adding a new Part 248 reading as follows:

PART 248—GUIDELINE FOR FEDERAL PROCUREMENT OF BUILDING INSULATION PRODUCTS CONTAINING RECOVERED MATERIALS

Subpart A—General

Sec.

Subpart B—Specifications

Subpart C—Affirmative Procurement Program

Authority: 42 U.S.C. 6912(a) and 6962.

Subpart A—General

§ 248.1 Purpose.

(a) The purpose of this guideline is to assist procuring agencies in complying with the requirements of section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA or the Act), as amended, 42 U.S.C. 6962, as that section applies to procurement of building insulation products designated in § 248.2 of this part.

(b) This guideline contains recommendations for use in implementing the requirements of section 6002, including revision of specifications, purchasing activities, and procurement.

(c) EPA believes that adherence to the recommendations in the guideline constitutes compliance with section 6002. However, procuring agencies may adopt other types of procurement programs consistent with section 6002.

§ 248.2 Designation.

EPA designates building insulation products as items which are or can be produced with recovered materials and whose procurement by procuring agencies will carry out the objectives of section 6002 of RCRA.

§ 248.3 Applicability.

(a)(1) This guideline applies to all procuring agencies and to all procurement actions involving building insulation products where the procuring agency purchases in excess of $10,000 worth of one of these items during the course of a fiscal year, or where the cost of such items or of functionally equivalent items purchased during the preceding fiscal year was $10,000 or more. For purposes of the $10,000 threshold, functional equivalency extends to all building insulation products used for ceilings, floors, foundations, and walls. All building insulation products are considered to be functionally equivalent and include the following product types and materials:

(i) Loose-fill insulation, including but not limited to cellulose fiber, mineral fibers (fiberglass and rock wool), vermiculite, and perlite;

(ii) Blanket and batt insulation, including but not limited to mineral fibers (fiberglass and rock wool);

(iii) Board (sheathing, roof decking, wall panel) insulation, including but not limited to cellulose fiber fiberboard, perlite composite board, polyurethane, polyisocyanurate, polystyrene, phenolics, and composites; and

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(iv) Spray-in-place insulation, including but not limited to foam-in-place polyurethane and polyisocyanurate, and spray-on cellulose.

(2) This guideline applies to Federal agencies, to State and local agencies using appropriated Federal funds to procure building insulation products, and to persons contracting with any such agencies with respect to work performed under such contracts. Federal agencies should note that the requirements of RCRA section 6002 apply to them whether or not appropriated Federal funds are used for procurement of items designated by EPA.

(3) The $10,000 threshold applies to procuring agencies as a whole rather than to agency subgroups such as regional offices or subagencies.

(b) The term "procurement actions" includes purchases made directly by a procuring agency and purchases made directly by any person in support of work being performed for a procuring agency (e.g., by a contractor).

(c) This guideline does not apply to purchases which are not the direct result of a contract with or a grant, loan, or funds disbursement to a procuring agency.

§ 248.4 Definitions.

As used in this guideline:

(a) "Act" or "RCRA" means the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 *et seq.*

(b) "Blanket insulation" means relatively flat and flexible insulation in coherent sheet form, furnished in units of substantial area. Batt insulation is included in this term.

(c) "Board insulation" means semi-rigid insulation preformed into rectangular units having a degree of suppleness, particularly related to their geometrical dimensions.

(d) "Building insulation" means a material, primarily designed to resist heat flow, which is installed between the conditioned volume of a building and adjacent unconditioned volumes or the outside. This term includes but is not limited to insulation products such as blanket, board, spray-in-place, and loose-fill that are used as ceiling, floor, foundation, and wall insulation.

(e) "Ceiling Insulation" means a material, primarily designed to resist heat flow, which is installed between the conditioned area of a building and an unconditioned attic as well as common ceiling floor assemblies between separately conditioned units in multi-unit structures. Where the conditioned area of a building extends to the roof, ceiling insulation includes such a material used between the underside and upperside of the roof.

(f) "Cellular polyisocyanurate insulation" means insulation produced principally by the polymerization of polymeric polyisocyanates, usually in the presence of polyhydroxl compounds with the addition of catalysts, cell stabilizers, and blowing agents.

(g) "Cellular polystyrene insulation" means an organic foam composed principally of polymerized styrene resin processed to form a homogenous rigid mass of cells.

(h) "Cellular polyurethane insulation" means insulation composed principally of the catalyzed reaction product of polyisocyanurates and polyhydroxl compounds, processed usually with a blowing agent to form a rigid foam having a predominantly closed cell structure.

(i) "Cellulose" means vegetable fiber such as paper, wood, and cane.

(j) "Cellulose fiber fiberboard" means insulation composed principally of cellulose fibers usually derived from paper, paperboard stock, cane, or wood, with or without binders.

(k) "Cellulose fiber loose-fill" means a basic material of recycled wood-based cellulosic fiber made from selected paper, paperboard stock, or ground wood stock, excluding contaminated materials which may reasonably be expected to be retained in the finished product, with suitable chemicals introduced to provide properties such as flame resistance, processing and handling characteristics. The basic cellulosic material may be processed into a form suitable for installation by pneumatic or pouring methods.

(l) "Commercial Item Descriptions" are a series of simplified item descriptions under the Federal specifications-and-standards program used in the acquisition of commercial off-the-shelf and commercial type products.

(m) "Conditioned" means heated and/or mechanically cooled.

(n) "Federal agency" means any department, agency, or other instrumentality of the Federal government; any independent agency or establishment of the Federal government including any government corporation; and the Government Printing Office.

(o) "Fiberglass insulation" means insulation which is composed principally of glass fibers, with or without binders.

(p) "Floor insulation" means a material, primarily designed to resist heat flow, which is installed between the first level conditioned area of a building and an unconditioned basement, a crawl space, or the outside beneath it. Where the first level conditioned area of a building is on a ground level concrete slab, floor insulation includes such a material installed around the perimeter of or on the slab. In the case of mobile homes, floor insulation also means skirting to enclose the space between the building and the ground.

(q) "Foam-in-place insulation" foam is rigid cellular foam produced by catalyzed chemical reactions that hardens at the site of the work. The term includes spray-applied and injected applications such as spray-in-place foam and pour-in-place.

(r) "Foundation insulation" means a material, primarily designed to resist heat flow, which is installed in foundation walls between conditioned volumes and unconditioned volumes and the outside or surrounding earth, at the perimeters of concrete slab-on-grade foundations, and at common foundation wall assemblies between conditioned basement volumes.

(s) "Glass fiber reinforced polyisocyanurate/polyurethane foam" means cellular polyisocyanurate or cellular polyurethane insulation made with glass fibers within the foam core.

(t) "Invitation For Bids" is the solicitation for prospective suppliers by a purchaser requesting their competitive price quotations.

(u) "Loose-fill insulation" means insulation in granular, nodular, fibrous, powdery, or similar form, designed to be installed by pouring, blowing or hand placement.

(v) "Mineral fiber insulation" means insulation (rock wool or fiberglass) which is composed principally of fibers manufactured from rock, slag or glass, with or without binders.

(w) "Perlite composite board" means insulation board composed of expanded perlite and fibers formed into rigid, flat, rectangular units with a suitable sizing material incorporated in the product. It may have on one or both surfaces a facing or coating to prevent excessive hot bitumen strike-in during roofing installation.

(x) "Person" means an individual, trust, firm, joint stock company, corporation (including a government corporation), partnership, association, Federal agency, State, municipality, commission, political subdivision of a State, or any interstate body.

(y) "Phenolic insulation" means insulation made with phenolic plastics which are plastics based on resins made by the condensation of phenols, such as phenol or cresol, with aldehydes.

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(z) "Plastic rigid foam" means cellular polyurethane insulation, cellular polyisocyanurate insulation, glass fiber reinforced polyisocyanurate/polyurethane foam insulation, cellular polystyrene insulation, phenolic foam insulation, spray-in-place foam and foam-in-place insulation.

(aa) "Postconsumer recovered paper" means:

(1) Paper, paperboard and fibrous wastes from retail stores, office buildings, homes and so forth, after they have passed through their end-usage as a consumer item including: used corrugated boxes; old newspapers; old magazines; mixed waste paper; tabulating cards and used cordage; and

(2) All paper, paperboard and fibrous wastes that enter and are collected from municipal solid waste.

(bb) "Practicable" means capable of being used consistent with: performance in accordance with applicable specifications, availability at a reasonable price, availability within a reasonable period of time, and maintenance of a satisfactory level of competition.

(cc) "Procurement item" means any device, good, substance, material, product, or other item, whether real or personal property, which is the subject of any purchase, barter, or other exchange made to procure such item.

(dd) "Procuring agency" means any Federal agency, or any State agency or agency of a political subdivision of a State which is using appropriated Federal funds for such procurement, or any person contracting with any such agency with respect to work performed under such contract.

(ee) "Purchasing" means the act of and the function of responsibility for the acquisition of equipment, materials, supplies, and services, including: buying, determining the need, selecting the supplier, arriving at a fair and reasonable price and terms and conditions, preparing the contract or purchase order, and follow up.

(ff) "Purchasing activities" means all activities included in the purchasing function.

(gg) "Recovered materials" means waste material and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original manufacturing process.

(hh) "Request for Proposal" is a request for an offer by one party to another of terms and conditions with references to some work or undertaking; the initial overture or preliminary statement for consideration by the other party to a proposed agreement.

(ii) Rock wool insulation" means insulation which is composed principally from fibers manufactured from slag or natural rock, with or without binders.

(jj) "Specification" means a description of the technical requirements for a material, product, or service that includes the criteria for determining whether these requirements are met. In general, specifications are in the form of written commercial designations, industry standards, and other descriptive references.

(kk) "Spray-in-place insulation" means insulation material that is sprayed onto a surface or into cavities and includes cellulose fiber spray-on as well as plastic rigid foam products.

(ll) "Spray-in-place foam" is rigid cellular polyurethane or polyisocyanurate foam produced by catalyzed chemical reactions that hardens at the site of the work. The term includes spray-applied and injected applications.

(mm) "Wall insulation" means a material, primarily designed to resist heat flow, which is installed within or on the walls between conditioned areas of a building and unconditioned areas of a building or the outside, as well as common wall assemblies between separately conditioned units in multiple unit structures.

Subpart B—Specifications

§ 248.10 Revisions.

(a) Federal agencies that have the responsibility for drafting or reviewing specifications for procurement items procured by Federal agencies were required to revise their specifications, by May 8, 1986, to eliminate any exclusion of recovered materials and any requirement that items be manufactured from virgin materials.

(b) Within one year after the effective date of this guideline, each procuring agency must assure that its specifications for building insulation products require the use of recovered materials to the maximum extent possible without jeopardizing the intended end use of these items.

§ 248.11 Recommendations.

(a) Procuring agencies should continue to reference Commercial Item Descriptions or appropriate standards when purchasing building insulation products, after such Commercial Item Descriptions and industry standards (and specifications which are referenced) have been reviewed to be certain that the use of recovered materials is allowed.

(b) Procuring agencies should include minimum content standards or substantially equivalent methods to prefer recovered materials content in their invitations for bids and requests for proposals when purchasing building insulation products or causing the purchase of building insulation products in any contract.

(c) If a procuring agency determines that a building insulation product containing recovered materials cannot meet reasonable performance standards, then the agency can exclude the product on a case-by-case basis. Procuring agencies should document such determinations, and the documentation should reference the particular tests used to judge performance. Procuring agencies should also reference such documentation in subsequent solicitations for the specific item to avoid repetition of previously documented findings.

(d)(1) Procuring agencies should assure that language in new specifications for new building insulation products, and for existing products which are introduced with recovered materials content, allow recovered materials content. Methods to monitor the introduction of new or adapted products are detailed in §§ 248.21 and 248.24 of this part.

(2) As new building insulation products containing or capable of containing recovered materials are identified, minimum content standards or equivalent preferences for recovered material content should be inserted in invitations for bids and requests for proposals whenever such products could be offered.

Subpart C—Affirmative Procurement Program

§ 248.20 General.

Within one year after the date of publication of this guideline as a final rule, each procuring agency which procures building insulation products must establish an affirmative program for procuring such items containing recovered materials to the maximum extent practicable. The program must meet the requirements of section 6002(i) of RCRA, including the establishment of a preference program; a promotion program; procedures for obtaining estimates and certification of recovered materials content and for verifying the estimates and certifications; and an annual review and monitoring program. This subpart provides recommendations for implementing section 6002(i). Note

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that a procuring agency's responsibility to procure building insulation products containing recovered materials to the maximum extent practicable is not negated when the agency contracts with another person to specify or to supply the products.

§ 248.21 Preference program.

(a)(1) EPA recommends that procuring agencies establish minimum recovered material content standards for building insulation products commercially available with recovered materials content, subject to the limitations described in paragraphs (a)(2) and (c) of this section, so as to achieve procurement of building insulation products containing recovered materials to the maximum extent practicable.

(2) In accordance with RCRA section 6002(i), EPA recommends the establishment of minimum postconsumer recovered paper content standards for building insulation products made with cellulose fiber.

(3) EPA recommends that minimum content standards:

(i) Be based on insulation material type,

(ii) Be based on the weight of component parts,

(iii) Refer only to the core insulation material and exclude from consideration any facing, binding, or other materials surrounding or attached to the core, and

(iv) Include any insulation material that is used in composite products.

(4) EPA recommends that the following minimum content standards be used:

TABLE 1.—RECOMMENDED MINIMUM CONTENT STANDARDS FOR INSULATION

Material type	Percent by weight
Cellulose loose-fill and spray-on	75 percent postconsumer recovered paper
Perlite composite board	23 percent postconsumer recovered paper
Plastic rigid foam, polyisocyanurate/polyurethane:	
Rigid foam	9 percent recovered material
Foam-in-place	5 percent recovered material
Glass fiber reinforced	6 percent recovered material
Phenolic rigid foam	5 percent recovered material
Rock wool	50 percent recovered material

Note.—The minimum content standards are based on the weight of material (not volume) in the insulating core only.

(5) EPA recommends that procuring agencies revise their minimum content standards as necessary to reflect current market availability of building insulation containing recovered materials.

(6) EPA recommends that procuring agencies which have established minimum content standards in accordance with paragraph (a)(1) of this section use the following approach in the design phase when it is contemplated that the agency will contract for construction, alteration, or repair of buildings, where the contractor will be required to supply building insulation products:

(i) Place an affirmative responsibility upon the "designing architect" (i.e., the architect or engineer, whether an employee or contractor, who is responsible for project design) to include as a design consideration the public policy preference for the use of building insulation products containing recovered materials.

(ii) Require that the designing architect select the type of building insulation to be procured. If more than one type of insulation which meets the agency's minimum content standards is suitable, the type with the highest minimum content standard should be preferred.

(iii) Require that the designing architect justify in writing the architect's selection of building insulation types not on the procuring agency's minimum content standards list and review these justifications to assure that they are consistent with RCRA section 6002. When the designing architect chooses a type of building insulation for which the procuring agency has not established a minimum content standard, the procuring agency should use the procedures described in paragraph (b) of this section.

(iv) Require that the designing architect determine whether the selected types of building insulation are practicably available in products that meet the procuring agency's minimum content standards and further require that, if the designing architect determines that the selected building insulation products are not practicably available in products that meet the procuring agency's minimum content standards, the architect must advise the procuring agency in writing as to the recovered materials content that is practicably available.

(v) If the selected type of building insulation is available in products that meet the procuring agency's minimum content standards, specify in its solicitation the type(s) of building insulation required and the minimum recovered materials content established by the procuring agency in accordance with paragraph (a)(1) of this section for that type of insulation.

(vi) If the type of building insulation selected is not practicably available in products that meet the procuring agency's minimum content standards, specify in its solicitation the type(s) of insulation required and a minimum recovered materials content for that insulation equal to the percentage of recovered materials content that is practicably available.

(b) EPA recommends that procuring agencies use the case-by-case approach for individual procurements of insulation when the procuring agency has not established a minimum content standard for the type of insulation to be procured. Further, EPA recommends that procuring agencies document any decisions to procure such products to assure that the decision is consistent with RCRA section 6002.

(1) In the case of invitations for bid (IFBs), EPA recommends that procuring agencies give preference to bidders offering to supply building insulation products containing recovered materials; and that all other things being equal, the bidder offering the highest percentage of recovered material be awarded the contract.

(2) In the case of requests for proposal (RFPs), EPA recommends that procuring agencies include as an evaluation factor for award, a criterion which rewards the offeror for the quantity of recovered material in building insulation products offered.

(c) The recommendations in paragraphs (a) and (b) of this section, as well as any other substantially equivalent preference program that an agency may adopt, are subject to the following limitations listed in section 6002(c)(1) of RCRA:

(1) Unsatisfactory level of competition;

(2) Unavailability within a reasonable period of time;

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(3) Inability to meet the performance standards in the applicable specifications;

(4) Unavailability at a reasonable price.

(d) Procuring agencies must examine their procurement policies and procedures (exclusive of published regulations) and eliminate those which would inhibit or preclude the purchase of building insulation products containing recovered materials.

§ 248.22 Promotion program.

EPA recommends that procuring agencies use the following methods, at a minimum, to promote their preference programs:

(a) Place a statement in procurement solicitations, in the *Commerce Business Daily,* or in similar publications describing the preference program.

(b) Describe the preference program in solicitations for or which include building insulation.

(c) Discuss the preference program at bidders' conferences.

(d) Inform industry trade associations about the preference program.

(e) Publicize preferences for building insulation products made with recovered materials in all product-related information services and publications (e.g., Department of Housing and Urban Development publications and product-related services developed in compliance with section 521 of the National Housing Act, such as: National Building Codes, Bulletins, Materials Releases, Engineering Bulletins, and Use of Materials Information).

(f) Issue press releases describing the affirmative procurement program to recycling industry, architectural, and building trade publications.

§ 248.23 Estimates, certification, and verification.

Each procuring agency must develop estimation, certification and verification procedures:

(a) When a vendor supplies a building insulation product, the contracting officer must require the vendor to estimate the total percentage of recovered material contained in that insulation product. EPA recommends that procuring agencies maintain records of these estimates for three years by type of product, quantity purchased, and price paid.

(b)(1) When a procurement solicitation requires a minimum recovered materials content, contracting officers must require that contractors certify, prior to delivery or installation, that the building insulation products supplied under the contract meet or exceed the minimum content standard set forth in the solicitation.

(2) When using the case-by-case approach, contracting officers must require contractors to certify, prior to delivery or installation, that the building insulation products supplied meet or exceed the minimum percentage of recovered materials offered by the contractor in response to the solicitation.

(c)(1) EPA recommends that procuring agencies develop verification procedures for certifications and estimates of recovered materials content in building insulation products that require access only to manufacturers' records of recovered materials and comparable virgin materials used in each batch. Verification need not include review of records of other ingredients, which could include confidential business information.

(2) EPA recommends that the average of recovered materials used in a specific insulation product over a one-month period be used, if necessary, for verification of estimates of recovered materials content actually utilized in insulation products supplied to a procuring agency.

(3) EPA recommends that procuring agencies encourage their contractors to obtain the percentage of recovered material content, by batch number, from the manufacturer on a routine basis.

§ 248.24 Annual review and monitoring.

(a) Each procuring agency must conduct an annual review and monitoring of the effectiveness of its affirmative procurement program.

(b) EPA recommends that the annual review include the following items:

(1) An estimate of the quantity of building insulation with recovered material content purchased and the total quantity of building insulation products purchased.

(2) An assessment of the effectiveness of the promotion program.

(3) An assessment of any remaining barriers to purchase of insulation with recovered content to determine whether they are internal (e.g., resistance to use) or external (e.g., unavailability).

(4) A review of the range of estimates and certifications of recovered materials content in building insulation products provided by vendors during the year to determine whether minimum content standards should be raised or lowered, or whether a change from the case-by-case approach to the minimum content standard approach is necessary.

(5) A program to gather statistics. Procuring agencies should monitor their procurements to provide data on the following:

(i) The percentages of recovered materials content in the products procured or offered;

(ii) Comparative price information on competitive procurements;

(iii) The quantity of each item procured over a fiscal year;

(iv) The availability of the insulation products to procuring agencies;

(v) Type of performance tests conducted, together with the type of building insulation product containing recovered materials content that failed the tests, the percentages of total virgin products and products containing recovered materials content supplied that failed each test, and the nature of the failure;

(vi) Agency experience with the performance of the procured products.

(c) Procuring agencies should prepare a report on their annual review and monitoring of the effectiveness of their procurement programs and make these reports available to the public. The reports should contain the following information:

(1) If the case-by-case approach or a substantially equivalent alternative is being used, a discussion of how the procuring agency's approach procures building insulation products containing recovered materials to the maximum extent practicable. The basis for this discussion should be a review of the data compiled on recovered materials content, price, availability, and performance, as well as a comparison of estimates and certifications provided by the vendors.

(2) If the minimum content standards approach is being used, a discussion of whether the minimum content standards in use should be raised, lowered, or remain constant for each item. The basis for this discussion should be a review of the data compiled on recovered materials content, price, availability, and performance, as well as a comparison of estimates and certifications provided by the vendors.

(3) Documentation of specification revisions made during the year.

§ 248.25 Implementation.

(a) Federal agencies were required to review and revise their specifications for procurement items by May 8, 1986.

(b) Procuring agencies are required to revise their specifications as set forth in § 248.10(b), and to establish affirmative procurement programs within one year of the date of publication of this guideline as a final rule.

(c) Procuring agencies must begin procurement of building insulation products, in compliance with RCRA Section 6002, one year from the date of publication of this guideline as a final rule.

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