BACKGROUND DOCUMENT FOR THE

FINAL COMPREHENSIVE PROCUREMENT GUIDELINE (CPG) IV

AND

FINAL RECOVERED MATERIALS ADVISORY NOTICE (RMAN) IV

U.S. Environmental Protection Agency
Office of Solid Waste
Mailcode 5306W
1200 Pennsylvania Avenue, NW
Washington, DC 20460-0002

April 2004

FINAL CPG IV AND RMAN IV BACKGROUND DOCUMENT

CONTENTS

I. INTRODUCTION 1

A. History 1

B. Contents of This Background Document 3

C. Requirements 6
1. RCRA Section 6002 7
2. Executive Order 13101 8

II. ITEM DESIGNATIONS 9

A. Criteria for Selecting Items for Designation 9
1. Use of Materials Found in Solid Waste 10
2. Economic and Technological Feasibility and Performance 11
3. Impact of Government Procurement 12
4. Availability and Competition 12
5. Other Uses for Recovered Materials 13
6. Other Considerations 13

B. Methodology for Selecting Items for Designation 14
1. Selection of Items for Designation 15

C. Broad Categories Versus Specific Items 17

D. Item Designation Categories 18

III. RECOVERED MATERIALS CONTENT 19

A. Methodology for Recommending Recovered Materials Content Levels 22

B. Use of Minimum Recovered Materials Content Standards 22

C. Preconsumer Versus Postconsumer Recovered Materials 23

D. Recommending 100 Percent Recovered Materials Content Levels 23

E. Calculation of Product Content for Purposes of Certification 24

IV. UPDATES OF THE CPG AND RMAN 25

V. AFFIRMATIVE PROCUREMENT PROGRAMS 25

VI. DEFINITIONS 28

VII. AGENCY'S RESPONSE TO COMMENTS 28

A. Request for Comments 30

B. Other General Comments 30

C. Additional Items for Designation 32

D. Designation of Steel 33

E. Coal Combustion Products 34

VIII. VEHICULAR PRODUCTS 35

A. Tires 35
1. Background 35
2. Summary of Comments and Agency's Response 35

B. Rebuilt Vehicular Parts 36
1. Background 36
2. Summary of Comments and Agency's Response 36
3. Rationale for Designation 37
a. Use of Materials in Solid Waste 38
b. Technically Proven Uses 38
c. Impact of Government Procurement 39
4. Designation 39
5. Preference Program 40
6. Background for Recommendations 40
7. Specifications 41

C. Revision to Retread Tires 41

IX. CONSTRUCTION PRODUCTS 42

A. Cement and Concrete Containing Cenospheres and Silica Fume 42
1. Background 42
2. Summary of Comments and Agency's Response 43
3. Rationale for Designation 46
a. Use of Materials in Solid Waste 46
b. Technically Proven Uses 47
c. Impact of Government Procurement 49

4. Designation 50
5. Preference Program 50
6. Background for Recommendations 51
7. Specifications 52

B. Modular Threshold Ramps 53
1. Background 53
2. Summary of Comments and Agency's Response 54
3. Rationale for Designation 54
a. Use of Materials in Solid Waste 54
b. Technically Proven Uses 55
c. Impact of Government Procurement 56
4. Designation 56
5. Preference Program 57
6. Background for Recommendations 57
7. Specifications 61

C. Nonpressure Pipe 62
1. Background 62
2. Summary of Comments and Agency's Response 63
3. Rationale for Designation 63
a. Use of Materials in Solid Waste 63
b. Technically Proven Uses 63
c. Impact of Government Procurement 64
4. Designation 64
5. Preference Program 64
6. Background for Recommendations 65
7. Specifications 68

D. Nylon Carpet and Nylon Carpet Backing 73
1. Background 73
2. Summary of Comments and Agency's Response 76

E. Revision to Polyester Carpet Designation 76
1. Background 76
2. Summary of Comments and Agency's Response 76
3. Designation 78
a. Preference Program 78
b. Specifications 79

F. Roofing Materials 79
1. Background 79
2. Summary of Comments and Agency's Response 80
3. Rationale for Designation 81
a. Use of Materials in Solid Waste 81
b. Technically Proven Uses 82
c. Impact of Government Procurement 83

4. Designation 83
5. Preference Program 83
6. Background for Recommendations 84
7. Specifications 97

G. Revision to Railroad Grade Crossing Surfaces 97
1. Background 97
2. Summary of Comments and Agency's Response 98
3. Designation 98
a. Preference Program 98
b. Specifications 100

H. Revision to Consolidated and Reprocessed Paint Specification 100

X. NONPAPER OFFICE PRODUCTS 100

A. Office Furniture 100
1. Background 100
2. Summary of Comments and Agency's Response 101
3. Rationale for Designation 103
a. Use of Materials in Solid Waste 103
b. Technically Proven Uses 104
c. Impact of Government Procurement 105
4. Designation 106
5. Preference Program 106
6. Background for Recommendations 107
7. Specifications 118

XI. MISCELLANEOUS PRODUCTS 119

A. Bike Racks 119
1. Background 119
2. Summary of Comments and Agency's Response 120
3. Rationale for Designation 120
a. Use of Materials in Solid Waste 120
b. Technically Proven Uses 121
c. Impact of Government Procurement 121
4. Designation 121
5. Preference Program 122
6. Background for Recommendations 122
7. Specifications 125

B. Blasting Grit 125
1. Background 125
2. Summary of Comments and Agency's Response 126
3. Rationale for Designation 127
a. Use of Materials in Solid Waste 127

b. Technically Proven Uses 128
c. Impact of Government Procurement 129
4. Designation 129
5. Preference Program 129
6. Background for Recommendations 130
7. Specifications 137

XII. DESIGNATED ITEM AVAILABILITY 137

XIII. ECONOMIC IMPACT ANALYSIS 138

APPENDICES

TABLES

Table 1: List of Acronyms 4

Table 2: Recovered Materials Content of Rebuilt Vehicular Parts 41

Table 3: Draft Recovered Materials Content Recommendations for Modular Threshold Ramps . . . 53

Table 4: Final Recovered Materials Content Recommendations for Modular Threshold Ramps Containing Recovered Steel, Aluminum, and Rubber 57

Table 5: Recovered Materials Content of Modular Threshold Ramps 61

Table 6: Draft Recovered Materials Content Recommendations for Nonpressure Pipe Containing Recovered Steel, Plastic, and Concrete 62

Table 7: Final Recovered Materials Content Recommendations for Nonpressure Pipe Containing Recovered Steel, Plastic, or Cement 65

Table 8: Recovered Materials Content of Nonpressure Pipe 68

Table 9: ASTM Plastic Pipe Specifications 69

Table 10: ASTM Concrete Pipe Specifications 70

Table 11: ASTM and AASHTO Specifications for Steel Pipe 71

Table 12: AASHTO Pipe Specifications (1994) 72

Table 13: Draft Recovered Materials Content Recommendations for Nylon Carpet and Nylon Carpet Backing 73

Table 14: Draft Recovered Materials Content Recommendations for Roofing Materials 80

Table 15: Final Recovered Materials Content Recommendations for Roofing Materials Containing Steel, Aluminum, Fiber, Rubber, Plastic or Plastic Composites, or Cement 84

Table 16: Recovered Materials Content of Roofing Materials 96

Table 17: Draft Recovered Materials Content Recommendations for Wood and Plastic Railroad Grade Crossing Surfaces 97

Table 18: Final Recovered Materials Content Recommendations for Railroad Grade Crossing Surfaces (Revised) 99

Table 19: Draft Recovered Materials Content Recommendations for Office Furniture 101

Table 20: Final Recovered Materials Content Recommendations for Office Furniture 107

Table 21: Recovered Materials Content of Office Furniture 118

Table 22: Draft Recovered Materials Content Recommendations for Bike Racks 119

Table 23: Final Recovered Materials Content Recommendations for Bike Racks 122

Table 24: Recovered Materials Content of Bike Racks 124

Table 25: Draft Recovered Materials Content Recommendations for Blasting Grit 125

Table 26: Final Recovered Materials Content Recommendations for Blasting Grit 130

Table 27: Recovered Materials Content of Blasting Grit 137

I. INTRODUCTION

A. History

The U.S. Environmental Protection Agency (EPA or the Agency) published the first Comprehensive Procurement Guideline (CPG) on May 1, 1995 (60 *Federal Register* (FR) 21370). It established 8 product categories, designated 19 new items, and consolidated 5 earlier item designations. EPA published the first CPG update (CPG II) on November 13, 1997 (62 FR 60962), and designated an additional 12 products. On January 18, 2000, EPA published a second CPG update (CPG III), designating an additional 18 items (65 FR 3070).

On August 28, 2001, EPA published a third proposed update to the CPG and a companion draft Recovered Materials Advisory Notice (RMAN). This update, hereafter referred to as the proposed CPG IV, proposed to designate 11 new items that are or can be made of recovered materials (see 66 FR 45256), as follows:

- **Construction Products:**
  - —Cement and Concrete Containing:
    - —Cenospheres
    - —Silica Fume
  - —Modular Threshold Ramps
  - —Nonpressure Pipe
  - —Nylon Carpet and Nylon Carpet Backing
  - —Roofing Materials
- **Nonpaper Office Products:**
  - —Office Furniture
- **Vehicular Products:**
  - —Rebuilt Vehicular Products
  - —Tires
- **Miscellaneous Products:**
  - —Bike Racks
  - —Blasting Grit

EPA now considers that two of the items that it proposed for designation in the CPG IV proposed rule (i.e., cement and concrete containing cenospheres and silica fume) were in actuality proposed revisions to the existing designation for cement and concrete containing coal fly ash and ground granulated blast furnace slag.

The accompanying draft RMAN IV recommended procurement practices for purchasing the 11 items proposed for designation, including recovered materials content levels (see 66 FR 45297, August 28, 2001). Supporting materials and public comments for the above notices are available through EPA's electronic public docket and comment system, EPA Dockets [EDOCKET]. The docket number is RCRA-2001-0047.

The CPG IV final rule designates 7 of the 11 items that were proposed and revises the designations of three items: cement and concrete, railroad grade crossing surfaces, and polyester carpet. The CPG IV final rule does not issue final designations for two of the items proposed in the CPG IV proposed rule: carpet made from nylon fiber facing and/or nylon carpet backing made from recovered materials, and tires containing recovered rubber. The final RMAN IV recommends recovered materials content levels for the seven newly designated items, and it also revises the recommendations for five previously designated items: cement and concrete, railroad grade crossing surfaces, polyester carpet, latex paint, and retread tires. The recommendations are organized into product categories, which correspond with the categories used in CPG IV: vehicular products, construction products, nonpaper office products, and miscellaneous products. The seven items designated in the final CPG IV include:

- **Vehicular Products:**
  —Rebuilt Vehicular Products

- **Construction Products:**
  —Modular Threshold Ramps
  —Nonpressure Pipe
  —Roofing Materials

- **Nonpaper Office Products:**
  —Office Furniture

- **Miscellaneous Products:**
  —Bike Racks
  —Blasting Grit

B. Contents of This Background Document

This document, hereafter referred to as the Final CPG IV/RMAN IV Background Document, provides a comprehensive summary of all the supporting analyses used by the Agency to issue the final CPG IV and the final RMAN IV. This document explains EPA's overall objectives, the process for designating procurement items, and the methodology used in recommending recovered materials content levels for items designated in the final CPG IV. In addition, the Final CPG IV/RMAN IV Background Document lists the recommended procurement practices for the newly designated items, which are also included in the Final RMAN IV, and provides the Agency's detailed response to public comments received on the proposed CPG IV, the draft RMAN IV FR notice, and the Background Document for Proposed CPG IV and Draft RMAN IV. To avoid confusion with the previous CPGs, the final CPG IV and the final RMAN IV will be referred to as CPG IV and RMAN IV, respectively. Appendices I-V are referenced in this document. For the convenience of the reader, they are attached as a separate document.

For the reader's convenience, Table 1 lists acronyms referenced throughout this document.

Table 1

List of Acronyms

Acronym	Term
AASHTO	American Association of State Highway and Transportation Officials
ABA	Architectural Barriers Act
ABS	Acrylonitrile-Butadiene-Styrene
ACAA	American Coal Ash Association
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
ADA	Americans With Disabilities Act
ANSI	American National Standards Institute
APP	Affirmative Procurement Program
APRA	Automotive Parts Rebuilders Association
ARMA	Asphalt Roofing Manufacturers Association
ASTM	American Society for Testing and Materials
BIFMA	Business and Institutional Manufacturers Association
BOF	Basic Oxygen Furnace
BPIA	Business Products Industry Association
C&D	Construction and Demolition Debris
CDA	Copper Development Association
CFR	Code of Federal Regulations
CPG	Comprehensive Procurement Guideline
CRI	Carpet and Rug Institute
DLA	Defense Logistics Agency
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior

Acronym	Term
DOT	U.S. Department of Transportation
DWV	Drain, Waste, Vent (Pipe)
EAF	Electric Arc Furnace
EPA	U.S. Environmental Protection Agency
EPDM	Ethylene Propylene Diene Monomer
FR	Federal Register
FTC	Federal Trade Commission
GGBF	Ground Granulated Blast Furnace Slag
GSA	U.S. General Services Administration
HDPE	High Density Polyethylene
HPC	High Performance Concrete
MDF	Medium Density Fiberboard
MSW	Municipal Solid Waste
NIOSH	National Institute for Occupational Safety and Health
NRCA	National Roofing Contractors Association
OEM	Original Equipment Manufacturer
OFPP	Office of Federal Procurement Policy
OFRF	Office Furniture Recyclers Forum
OSHA	Occupational Safety and Health Administration
PET	Polyethylene Terephthalate
PP	Polypropylene
PVC	Polyvinyl Chloride
RCRA	Resource Conservation and Recovery Act of 1976
RMAN	Recovered Materials Advisory Notice
SFC	Silica Fume Coalition
TWA	Time Weighted Average

Acronym	Term
UFAS	Uniform Federal Accessibility Standards
UNICOR	Federal Prison Industries
USDA	U.S. Department of Agriculture
UV	Ultraviolet

C. Requirements

RCRA Section 6002 and Executive Order 13101 (Executive Order or E.O.) specify requirements for the procurement of products containing recovered materials. The requirements of RCRA Section 6002 apply to "procuring agencies," as defined in RCRA Section 1004(17); the Executive Order applies only to federal "Executive agencies," as defined in Section 202 of the Executive Order.

Section 6002(e) of RCRA (or the Act) requires EPA to designate items that are or can be made with recovered materials and to recommend practices to assist procuring agencies in meeting their obligations with respect to the procurement of designated items under RCRA Section 6002. After EPA designates an item, RCRA requires that each procuring agency, when purchasing a designated item, must purchase that item composed of the highest percentage of recovered materials practicable.

The Executive Order specifies the procedure for EPA to follow in implementing RCRA Section 6002(e). Section 502 of the Executive Order directs EPA to designate items in the CPG and to recommend procurement practices for purchasing designated items, including recovered materials content levels, in a related RMAN. The Executive Order also directs EPA to update the CPG every 2 years and to issue RMANs periodically to reflect changing market conditions.

The following sections provide an overview of RCRA Section 6002 and the Executive Order and explain the basis for designating specific products as procurement items subject to RCRA Section 6002. Appendix II provides a more detailed explanation of the provisions and requirements of RCRA Section

6002. Appendix III provides additional details on the Executive Order, and Appendix IV briefly discusses additional federal procurement policies and requirements.

1. RCRA Section 6002

RCRA Section 6002 requires EPA to designate items that are or can be made with recovered materials and to recommend practices to assist procuring agencies in purchasing the designated items. Once an item is designated by EPA, procuring agencies that use appropriated federal funds to purchase the item are required to purchase it containing the highest percentage of recovered materials practicable (and in the case of paper, the highest percentage of postconsumer recovered materials), taking into consideration the limitations set forth in Section 6002(c)(1)(A) through (C) (i.e., competition, price, availability, and performance). The requirement applies when the purchase price of the item exceeds $10,000 or when the total cost of such items, or of functionally equivalent items, purchased during the preceding fiscal year was $10,000 or more.

RCRA Section 6002(d)(2) requires that, within 1 year after EPA designates an item, federal agencies revise their specifications to require the use of recovered materials to the maximum extent possible without jeopardizing the intended end-use of the item. Section 6002(d)(1) further requires federal agencies responsible for drafting or reviewing specifications to review all of their product specifications to eliminate provisions prohibiting the use of recovered materials and requirements specifying the exclusive use of virgin materials. To comply with Section 6002(d)(2), the revision process for items designated in CPG IV should be completed within 1 year after the CPG IV is published in the FR.

Once EPA designates an item, responsibility for complying with RCRA Section 6002 rests with the procuring agencies. For each item designated by EPA, RCRA Section 6002(i) requires each procuring agency to develop an affirmative procurement program (APP). The APP must ensure that the agency purchases items composed of recovered materials to the maximum extent practicable and that these purchases are made consistent with applicable provisions of federal procurement law. In accordance with RCRA Section 6002(i), the APP must contain at least four elements:

1. A recovered materials preference program.

2. An agency promotion program.

3. A program for requiring vendors to estimate, certify, and reasonably verify the recovered materials content of their products.

4. A program to monitor and annually review the effectiveness of the APP.

Appendix V provides detailed information on APPs.

Finally, RCRA Section 6002(g) requires the Office of Federal Procurement Policy (OFPP) to implement the requirements of RCRA Section 6002 and to coordinate this policy with other federal procurement policies in order to maximize the use of recovered materials. (See Appendix IV for more information.) RCRA further requires OFPP to report to Congress every 2 years on actions taken by federal agencies to implement such policy.

2. Executive Order 13101

Executive Order 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*, replaced Executive Order 12873, *Federal Acquisition, Recycling, and Waste Prevention*. Section 502 of the Executive Order establishes a two-part process for EPA to use when developing and issuing the procurement guidelines for products containing recovered materials, as required by RCRA Section 6002(e). The first part of the process, issuing the CPG, involves designating items that are or can be made with recovered materials. The CPG is developed using formal notice-and-comment rulemaking procedures and is codified in the Code of Federal Regulations (CFR) at 40 CFR Part 247. The Executive Order requires EPA to update the CPG every 2 years.

The second part of the process is the publication of the RMAN, which provides recommendations to procuring agencies on purchasing the items designated in the CPG. The Executive

Order directs EPA to publish the RMAN in the FR for public comment. The RMAN, however, is not codified in the CFR, because the recommendations are guidance. RMANs are issued periodically to reflect changes in market conditions and provide procurement recommendations for newly designated items.

Appendix III provides additional information on the provisions and requirements of Executive Order 13101, including requirements for procuring agencies to comply with EPA's guidelines.

II. ITEM DESIGNATIONS

A. Criteria for Selecting Items for Designation

While not limiting consideration to these criteria, RCRA Section 6002(e) requires EPA to consider the following when determining which items it will designate:

1. Availability of the item.

2. Potential impact on the solid waste stream of item procurement.

3. Economic and technological feasibility of producing the item.

4. Other uses for the recovered materials used to produce the item.

EPA also consulted with federal procurement officials to identify other criteria to consider when selecting items for designation. Based on these discussions, the Agency concluded that the limitations set forth in RCRA Section 6002(c) should also be factored into its selection decisions. This provision requires each procuring agency to procure the item composed of the highest percentage of recovered materials practicable, while maintaining a satisfactory level of competition. A procuring agency, however, may decide not to procure an EPA-designated item containing recovered materials if it determines: (1) the item is not reasonably available within a reasonable period of time; (2) the item fails

to meet the performance standards set forth in the agency's specification; or (3) the item is available only at an unreasonable price. EPA recognized that these limitations could restrict procuring agencies from purchasing EPA-designated items with recovered materials content, and, thereby, could limit the potential impact of an individual item designation. (The limitations of Section 6002(c) also effectively describe the circumstances in which a designated item is "available" for purposes of the statute.) For this reason, EPA also takes into account the limitations cited in RCRA Section 6002(c) in its selection of items for designation.

The Agency developed the following criteria for use in selecting items for designation: use of materials found in solid waste, economic and technological feasibility and performance, impact of government procurement, availability and competition, and other uses for recovered materials. The items designated in the CPG IV have all been evaluated with respect to the EPA's criteria. Details of these evaluations are discussed in Sections VIII through XI of this document.

1. Use of Materials Found in Solid Waste

All items designated in the CPG IV are manufactured with materials recovered or diverted from the solid waste stream. These include both materials recovered or diverted from municipal solid waste (MSW) and materials recovered or diverted from other solid waste streams, such as construction and demolition (C&D) debris and other nonhazardous industrial waste streams. Once recovered or diverted, these materials are reclaimed and refined, disassembled and remanufactured, or separated and processed for use as feedstock to manufacture a new product. Appendix I provides an overview of the materials in MSW in the United States and provides a more detailed explanation of the materials used in the products designated in CPG IV.

The potential impact that procuring agencies may have on the solid waste stream by procuring EPA-designated items varies depending on the sophistication of the process used to recover or refine the materials and on the recovered materials content of the final product. Additionally, although designating a single item might not have a significant impact on the amount of solid waste recovered or diverted from

the waste stream, EPA believes that designating several items made from the same recovered material can lead to the diversion of substantial quantities of that material from the waste stream.

Information on the recovered materials used to produce items designated by EPA is presented in subsection 3.a., "Use of Materials in Solid Waste," within the individual item designation discussions in Sections VIII through XI of this document.

2. Economic and Technological Feasibility and Performance

Before selecting an item for designation, EPA determines that, based on its market research, it is economically and technologically feasible to use recovered materials to produce the item. EPA uses several indicators in making this determination. The availability of the item in the marketplace and procurement of the item by federal and/or other procuring agencies are primary indicators that it is economically and technologically feasible to manufacture the product with recovered materials content. Other indicators include the ability of the item to meet performance specifications, the general acceptance of the item by consumers and purchasers, and the use of recovered feedstock by manufacturers.

RCRA directs EPA to "designate items that are or can be produced with recovered materials and whose procurement by procuring agencies will carry out the objectives of RCRA Section 6002." This being the case, there may be instances where a particular item is not currently made with recovered materials content, but a similar item is. In those cases where the Agency believes that there are no technical reasons that prevent an item from being manufactured with recovered materials, and there is a demonstrated use of recovered materials in a similar item, EPA also may consider designation of the item that currently does not contain recovered materials.

Prior to selecting an item for designation, EPA also considers the ability of the item to meet the standards, specifications, or commercial item descriptions set forth by federal agencies or national standard-setting organizations.

Information on the economic and technological feasibility of producing items designated by EPA, including the availability of the item and the number of manufacturers that produce the item, the ability of the item to meet federal or national specifications, the recovered materials content levels used by manufacturers to produce the item, and other information relevant to the economic and technical feasibility of producing and using the item, is discussed in subsection 3.b., "Technically Proven Uses," in the individual item designation discussions in Sections VIII through XI of this document.

3. Impact of Government Procurement

The impact of government procurement of products containing recovered materials is a combination of: (1) direct purchases by federal agencies, (2) purchases made by state and local agencies using federal monies, and (3) purchases made by contractors to these government agencies. When considering items for designation, EPA examines whether government agencies and their contractors purchase the items.

Government procurement also has an impact that extends far beyond the federal, state, and local levels. As noted in RCRA, the federal government often serves as a model for private and other public institutions. Because of this secondary effect, EPA includes items that are not unique to or primarily used by government agencies. Many of the items that EPA selects for designation are selected because they have broad application in both the government and private sectors.

Information on the potential impact of government procurement for each new item designated in the CPG IV is presented in subsection 3.c., "Impact of Government Procurement," in the individual item designation discussions in Sections VIII through XI of this document.

4. Availability and Competition

The items EPA selects for designation are available from national, regional, or local sources. The relative availability of an item influences the ability of a procuring agency to secure an adequate level of

competition when procuring it. In the event that a satisfactory level of competition is unattainable, a procuring agency may elect to waive the requirement to purchase an EPA-designated item based on the limitations listed in RCRA Section 6002(c).

Information on the availability of each item EPA has designated, including the number of manufacturers that produce the item, is presented in subsection 3.b., "Technically Proven Uses," in the individual item designation discussions in Sections VIII through XI of this document.

5. Other Uses for Recovered Materials

In selecting items for designation, EPA also considers the following: (1) the possibility of one recovered material displacing another recovered material as feedstock, thereby resulting in no net reduction in materials requiring disposal; (2) the diversion of recovered materials from one product to another, possibly creating shortages in feedstocks for one or both products; and (3) the ability of manufacturers to obtain recovered materials in sufficient quantity to produce the item under consideration.

While other uses for recovered materials are a consideration, they are not a determining factor when selecting items for designation because there is a need for additional markets for all recovered materials used to manufacture the designated items.

6. Other Considerations

EPA also considers price as a factor affecting the availability of an item. The price of products, whether made from virgin raw materials or recovered materials, is affected by many variables, including the availability and costs of material feedstocks, energy costs, labor costs, rate of return on capital, transportation charges, and the quantity of the item ordered. In addition, price may vary depending on whether the product is a common stock item or whether it requires a special order. Price also can be affected by the geographical location of the purchaser, because some products are not uniformly

available throughout the United States. The best sources of current price information, therefore, are the manufacturers and vendors of the recycled products.

Relative prices of recycled products compared to prices of comparable virgin products also vary. In many cases, recycled products may be less expensive than their virgin counterparts. In other cases, virgin products may have lower prices than recycled products. Other factors also affect the price of virgin products. For example, temporary fluctuations in the overall economy can create oversupplies of virgin products, leading to a decrease in prices for these items. Therefore, while price is a consideration, in most cases, it is not a determining factor when selecting items for designation. It becomes a determining factor only when EPA obtains evidence that the relative price of an item with recovered materials content is significantly higher than the relative price of a comparable virgin product. For this reason, EPA did not address price in the individual item designation discussions in Sections VIII through XI of this document.

EPA has also considered the feasibility of designating experimental or developmental products containing recovered materials. In the Agency's experience, such designations do not result in federal procurement of products containing recovered materials, because the items are not reasonably available, or only one source exists, leading to an unsatisfactory level of competition. For this reason, EPA does not intend to designate experimental or developmental products until it can be shown that they meet all of EPA's selection criteria, as described above.

B. Methodology for Selecting Items for Designation

As described in Section I.C.2, E.O. 13101 directs EPA to propose a CPG and related RMAN. This section explains the methodology EPA used to select items for designation, including a description of the process used to obtain information on prospective items.

1. Selection of Items for Designation

EPA began its efforts to develop the CPG and RMAN by first creating an interagency working group consisting of technical, research and development, environmental, and procurement officials from several of the major federal purchasing agencies. This working group, initiated in 1993, continues to perform a review function for all CPG-related designations.

In general, the Agency compiles a broad list of potential products made from recovered materials. In developing this list, EPA consults publicly available sources of information including the "Official Recycled Products Guide," the General Services Administration's (GSA's) "Recycled Products Guide," and over 50 other information sources, including the Internet. In addition, on September 20, 1995, the Agency issued an FR notice describing a process by which interested parties could suggest items for designation. That notice detailed the specific types of information EPA needed to evaluate potential items for designation. (See 60 FR 48714 - 48715.) EPA has, and continues to receive, requests for designation of items in response to this notice. EPA next distributes its broad list of candidate items to the working group for review and evaluation. Working group representatives, based on their experiences in setting product specifications and their knowledge of the marketplace and the procurement practices of their respective agencies, may identify other items to be added to the candidate list of products. Finally, based on a review of publicly available information, EPA's own product research, and input from the working group, EPA develops and maintains a candidate list.

Next, for each item on the candidate list, EPA considers the following questions that relate to the key criteria described previously in Section II.A:

a. Use of Materials in Solid Waste

- Is the item made using a material that represents a significant portion of the solid waste stream or presents a solid waste disposal problem?

b. Economic and Technological Feasibility and Performance

- Does the item perform as well as necessary to meet a procuring agency's needs?

- Are there standards or specifications that would enable a procuring agency to buy the item containing recovered materials?

- Is the item available at a reasonable price considering normal market fluctuations?

c. Impact of Government Procurement

- Is the item purchased in appreciable quantities by the federal government or by State and local governments?

d. Availability and Competition

- Is the item available from an adequate number of sources to ensure competition?

- Is the item generally available, rather than available in a limited market area?

For each item meeting one or more of these key criteria, EPA sought additional information and conducted further analyses to determine whether the item met all or most of the remaining criteria. For some items, EPA was unable to obtain sufficient information to determine if all or most of the criteria were met. These items will undergo further research and may be designated at a later date. The items for which EPA completed its review and which the Agency believes meets all of the evaluation criteria were proposed for designation in the CPG. Based on the research conducted, EPA proposed designating 11 items in CPG IV in the FR on August 28, 2001, (66 FR 45256) and solicited public comments on the proposed designations. The 11 items EPA proposed for designation in the proposed CPG IV were: cement and concrete containing cenospheres; cement and concrete containing silica fume; modular threshold ramps; nonpressure pipe; nylon carpet and nylon carpet backing; roofing materials; office furniture; rebuilt vehicular parts; tires; bike racks; and blasting grit. EPA now considers that two of the items that it proposed for designation (cement and concrete containing cenospheres and silica fume) were in actuality proposed revisions to the existing designation for cement and concrete containing coal fly ash and ground granulated blast furnace slag. Consequently, EPA is publishing recommendations for seven of the eleven originally proposed items: modular threshold ramps; nonpressure pipe; roofing materials; office furniture; rebuilt vehicular parts; bike racks; and blasting grit. At the same time, EPA is also

revising its recommendations for five items: cement and concrete; polyester carpet; railroad grade crossing surfaces; latex paint, and retread tires. As for the latex paint recommendations, as previously discussed in the draft RMAN IV notice, EPA is deleting reference to specification TT-P-2846, which was cancelled by the U.S. General Services Administration (GSA), and recommends that procuring agencies refer to commercial item description (CID) A-A-3185 instead when purchasing recycled paint. (A copy of this CID has been placed in the docket for the final RMAN IV.) Regarding the retread tire recommendations, although not previously discussed in the draft RMAN IV, EPA has recently learned that the GSA Federal Tire Program's Quality Assurance Facility Inspection Program (QAFIP) is defunct. Therefore, EPA is revising the retread tire recommendations by deleting reference to the GSA QAFIP. EPA is not designating tires or nylon carpet and nylon carpet backing at this time and, therefore, is not issuing final recommendations for purchasing these items. All comments received on the proposed designations are summarized and addressed in the final CPG IV FR notice or are presented in Sections VIII through XI of this document.

C. Broad Categories Versus Specific Items

EPA has adopted two approaches in its designation of items that are made with recovered materials. For some items, such as parking stops, the Agency designated *broad* categories of items and provided information in the RMAN as to their appropriate applications or uses. For other items, such as plastic envelopes, EPA designated *specific* items, and, in some instances, included in the designation the specific types of recovered materials or applications to which the designation applies. The Agency provided the following explanation for these approaches to designating items in the preamble to the first CPG (60 FR 21369, May 1, 1995):

> "*EPA sometimes had information on the availability of a particular item made with a specific recovered material (e.g., plastic), but no information on the availability of the item made from a different recovered material or any indication that it is possible to make the item with a different recovered material. In these instances, EPA concluded that it was appropriate to include the specific material in the item designation in order to provide vital information to procuring agencies as they seek to fulfill their obligations to purchase designated items composed of the highest percentage of recovered materials practicable. This information enables the agencies to focus their efforts on products that are currently available for purchase, reducing their administrative burden. EPA also included*

information in the proposed CPG, as well as in the draft RMAN that accompanied the proposed CPG, that advised procuring agencies that EPA is not recommending the purchase of an item made from one particular material over a similar item made from another material.

The Agency understands that some procuring agencies may believe the designation of a broad category of items in the CPG requires them to: (1) procure all items included in such category with recovered materials content and (2) to establish an affirmative procurement program for the entire category of items, even where specific items within the category may not meet current performance standards. This is clearly not required under RCRA as implemented through the CPG and the RMAN. RCRA Section 6002 does not require a procuring agency to purchase items with recovered materials content that are not available or that do not meet a procuring agency's specifications or reasonable performance standards for the contemplated use. Further, RCRA Section 6002 does not require a procuring agency to purchase such items if the item with recovered materials content is only available at an unreasonable price or the purchase of such item is inconsistent with maintaining a reasonable level of competition. However, EPA stresses that, when procuring any product for which a recovered materials alternative is available that meets the procuring agency's performance needs, if all other factors are equal, the procuring agency should seek to purchase the product made with highest percentage of recovered materials practicable.

D. Item Designation Categories

Items designated in the CPG are organized in the following product categories: paper and paper products, vehicular products, construction products, transportation products, park and recreation products, landscaping products, non-paper office products, and miscellaneous products. The categories were developed to describe the application of each designated item.

- **Paper and Paper Products:** includes printing and writing papers, newsprint, tissue products, paperboard products, and packaging. This category does not include paper and paper products used in construction applications. A final RMAN for paper and paper products containing recovered materials was issued on May 29, 1996, at 61 FR 26985, and an updated RMAN (Paper Products RMAN II) was issued on June 8, 1998, at 63 FR 31214. No paper products are included in the final CPG IV.

- **Vehicular Products:** products used in repairing and maintaining automobiles, trucks, and other vehicles. Examples include re-refined lubricating oils, retread tires, and engine coolants. In CPG IV, EPA designates rebuilt vehicular parts in the vehicular products category. In addition, EPA revises the recommendation for retread tires.

- **Construction Products:** products used in constructing roads and the interior and exterior components of commercial and residential buildings. Examples include building materials and paint. In CPG IV, EPA designates modular threshold ramps, nonpressure pipe, and roofing materials in the construction products category. In addition, EPA revises the recommendations for cement and concrete, polyester carpet, railroad grade crossing surfaces, and latex paint.

- **Transportation Products:** products used for directing traffic, alerting drivers, and containing roadway noise and pollution. Examples include parking stops and traffic control devices. No additional transportation products are designated in the final CPG IV.

- **Park and Recreation Products:** products used in operating and maintaining parks and recreational areas. Examples include playground surfaces and running tracks. No additional park and recreational products are designated in the final CPG IV.

- **Landscaping Products:** products used to contain, maintain, or enhance decorative and protective vegetation or areas surrounding buildings and roadways. Examples include compost and hydraulic mulch. No additional landscaping products are designated in the final CPG IV..

- **Nonpaper Office Products:** equipment and accessories used by government agencies and businesses to perform daily operational and administrative functions of an office. Examples include toner cartridges, desktop accessories, and waste receptacles. In CPG IV, EPA designates office furniture in the nonpaper office products category.

- **Miscellaneous Products:** includes all other products not covered by the categories listed above. In CPG IV, EPA designates bike racks and blasting grit in the miscellaneous products category.

III. RECOVERED MATERIALS CONTENT

Under RCRA Section 6002 and Executive Order 13101, EPA is required to make recommendations to procuring agencies for purchasing the EPA-designated items containing recovered

materials. EPA's recommendations typically include the ranges of recovered materials content levels within which the items are currently available, relevant specifications, and other information pertinent to purchasing the items containing recovered materials. The purpose of the recommendations is to assist procuring agencies in fulfilling their obligations under RCRA Section 6002 and the Executive Order to purchase designated items containing the highest percentages of recovered materials practicable.

In providing guidance in the RMAN, the Executive Order directs EPA to present "the range of recovered materials content levels within which the designated recycled items are currently available." Based on the information available to the Agency, EPA recommends ranges that encourage manufacturers to incorporate the maximum amount of recovered materials into their products without compromising competition or product performance and availability. EPA recommends that procuring agencies use these ranges, in conjunction with their own research, to establish their minimum content standards. In some instances, EPA recommends that procuring agencies establish a specific level (e.g., 100 percent recovered materials), rather than a range, because the item is universally available at that recommended level.

While EPA understands that specific minimum recovered content standards might be easier for procuring agencies to administer than a content range, which necessitates developing their own minimum content standards, EPA recommends ranges rather than minimum standards for several reasons.

First, the Executive Order directs EPA to develop ranges, not minimum content standards or specific recovered materials levels.

Second, EPA has only limited information on recovered materials content levels for the new items proposed for designation. It would not be appropriate to establish minimum content standards without more detailed information, because the standards may be treated as maximum targets by manufacturers and may stifle innovative approaches for increasing recovered material use. EPA hopes that the use of ranges will encourage manufacturers producing at the low end of the recovered materials range to seek ways of increasing their recovered materials usage. Minimum content standards are less likely to encourage such innovation.

Third, many items are purchased locally rather than centrally. As a result, the recovered materials content of the items are likely to vary from region to region depending on local cost and availability of recovered materials. Minimum content standards are unlikely to be effective given the regional variance in recovered materials content, because minimum content levels that are appropriate for one region may be excessively high or low for other regions. A recovered materials content range gives regional procuring agencies the flexibility to establish their own recovered content standards and to make them as high as possible, consistent with the statute, given local product availability and market conditions.

EPA, once again, wants to stress that the recommendations in the RMAN IV are just that—recommendations and guidance to procuring agencies in fulfilling their obligations under RCRA Section 6002. The designation of an item as one that is or can be produced with recovered materials and the inclusion of recommended content levels for an item in the RMAN does not compel the procurement of an item *when the item is not suitable for its intended purpose*. RCRA Section 6002 is explicit in this regard when it authorizes a procuring agency not to procure a designated item where the item "fails to meet the performance standards set forth in the applicable specification or fails to meet the reasonable performance standards of the procuring agencies." RCRA Section 6002(1)(B), the United States Code (U.S.C.) 42 U.S.C. 6962(c)(B).

Thus, for example, in the final CPG IV, EPA has designated modular threshold ramps as an item that is or can be produced with recovered materials. The Agency's research shows that this item is available in either steel, aluminum, or rubber containing recovered materials. However, the mere fact that this item is available containing recovered materials does not require the procurement of steel, aluminum, or rubber modular threshold ramps in every circumstance. The choice of appropriate materials used may depend on state or local codes. The effect of designation (and RCRA Section 6002) is simply to require the purchase of items with recovered materials when consistent with the purpose for which the item is to be used. Procuring agencies remain free to procure modular threshold ramps made of materials other than steel, aluminum, or rubber where the design specifications call for other materials.

A. Methodology for Recommending Recovered Materials Content Levels

EPA identified and evaluated information regarding the percentages of recovered materials available in the items designated in the CPG IV. EPA also gathered and reviewed publicly available information, information obtained from product manufacturers, and information provided by other federal agencies. Based on this information, EPA established recovered materials content level ranges for each of the designated items. In establishing the ranges, EPA's objective was to ensure the availability of the item, while challenging manufacturers to increase their use of recovered materials. By recommending ranges, EPA believes that sufficient information will be provided to enable procuring agencies to set appropriate procurement specifications when purchasing the newly designated items.

It is EPA's intention to provide procuring agencies with the best and most current information available to assist them in fulfilling their statutory obligations under RCRA Section 6002. To do this, EPA will monitor the progress made by procuring agencies in purchasing designated items with the highest practical recovered materials content level and will adjust the recommended content ranges accordingly. EPA anticipates that the recommended ranges will narrow over time as other items become more available, but for technical reasons, many items may never be available with 100 percent recovered materials content.

B. Use of Minimum Recovered Materials Content Standards

For most designated items, EPA recommends that procuring agencies establish minimum recovered materials content standards. For some items, the use of minimum content standards is inappropriate because the product is remanufactured, reconditioned, or rebuilt (e.g., printer ribbons contained in printer cartridges). In these instances, EPA recommends that procuring agencies use substantially equivalent alternatives to the minimum content standards approach as allowed in Section 6002(i)(3) of RCRA. For example, in the case of printer ribbons, which were designated in CPG II, EPA recommended that procuring agencies adopt one or both of the following approaches: (1) procure ribbon reinking or reloading services or (2) procure reinked or reloaded printer ribbons. Minimum content

standards are inapplicable, because the recovered material is the expended printer ribbon or the ribbon cartridge, rather than individual materials used to produce the new printer ribbon.

Under RCRA Section 6002(i), it is the procuring agency's responsibility to establish minimum content standards, while EPA provides recommendations regarding the levels of recovered materials in the designated items. To make it clear that EPA does not establish minimum content standards for other agencies, EPA refers to its recommendations as "recovered materials content levels," consistent with RCRA Section 6002(e) and the Executive Order.

C. Preconsumer Versus Postconsumer Recovered Materials

Preconsumer recovered materials are often easier to incorporate into production processes than postconsumer recovered materials, because they tend to be more uniform and contain less contamination. For many items, however, EPA recommends that procuring agencies purchase items containing postconsumer recovered materials, because one of the RCRA Section 6002(e) criteria for designating items is the potential impact of the procurement of an item on the solid waste stream. The Agency believes that recommending postconsumer recovered materials content levels for these items will have the most positive impact on reducing the amount of solid waste requiring disposal.

For several items, EPA recommends two-part content levels—a postconsumer recovered materials component and a total recovered materials component. In these instances, EPA found that both types of materials were being used to manufacture a product. Recommending only postconsumer content levels would fail to acknowledge the contribution to solid waste management made by manufacturers using other manufacturers' byproducts or scraps as feedstock.

D. Recommending 100 Percent Recovered Materials Content Levels

EPA recommends 100 percent recovered materials content for some items. Because the RCRA definition of recovered materials excludes internally generated scrap, it might be construed to suggest

that no manufacturer can claim that its product contains 100 percent recovered materials since all manufacturers use some internally generated scrap as feedstock. EPA does not support this interpretation.

There are two types of internally generated scrap (also known as manufacturer's scrap): scrap generated in a manufacturing process using only virgin materials and scrap generated in a manufacturing process using recovered materials as feedstock. EPA believes that scrap generated in a process using recovered materials as feedstock should be considered differently from scrap generated in a manufacturing process using only virgin material feedstocks. The Agency allows scrap to be counted as recovered materials to the extent that the feedstock contains materials that would qualify as recovered materials. Otherwise, there is an illogical and unnecessary obstacle to the manufacture of products using high levels of recovered materials. A manufacturer using 100 percent recovered materials should be able to certify that its product contains 100 percent recovered materials.

E. Calculation of Product Content for Purposes of Certification

RCRA Section 6002(i)(2)(C) requires the affirmative procurement program to include procedures for estimating, certifying, and, where appropriate, reasonably verifying the amount of recovered materials content utilized in the performance of a contract. In addition, RCRA Section 6002 requires contracting officers to obtain from vendors a certification "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." The Federal Acquisition Streamlining Act (Pub. L. 103-355) amended RCRA Section 6002(c) to require estimates only for contracts in amounts greater than $100,000.

Because each product is different, EPA recommends that procuring agencies discuss certification with product vendors to ascertain the appropriate period for certifying recovered materials content. EPA recommends that consistent with federal procurement law requirements, whenever feasible, the recovered materials content of a product be certified on a batch-by-batch basis or as an average over a calendar quarter or some other appropriate averaging period as determined by the procuring agencies.

IV. UPDATES OF THE CPG AND RMAN

Section 502 of the Executive Order directs EPA to update the CPG every 2 years and issue RMANs periodically to reflect changes in market conditions. As previously discussed, on September 20, 1995, EPA published a notice in the FR establishing a process for the public to suggest items for consideration and to provide information on products made from recovered materials (see 60 FR 48714). That notice also requested information on items that the Agency should consider for designation. EPA will continue to accept information from interested parties in response to the September 1995 request for information and will continue to conduct its own research to identify prospective items for designation as discussed in Section II.B of this document. The Agency may, at its discretion, propose updates to the CPG at earlier intervals than every 2 years as required in the Executive Order. Updates to the RMAN will be made periodically to reflect changes in market conditions with respect to the use of recovered materials in designated items. Interested parties should, from time to time, access the CPG Web site at <www.epa.gov/cpg> for the latest information on the procurement guidelines program.

V. AFFIRMATIVE PROCUREMENT PROGRAMS

An APP is an agency's strategy for maximizing its purchases of an EPA-designated item. RCRA Section 6002(I) requires that an APP consist of a minimum of four elements: (1) a preference program; (2) a promotion program; (3) procedures for obtaining estimates and certifications of recovered materials content and, where appropriate, reasonably verifying those estimates and certifications; and (4) procedures for monitoring and annually reviewing the effectiveness of the program.

The information provided in this section was previously provided in CPG/RMAN I, CPG/RMAN II, and CPG/RMAN III. It is included here for the convenience of the reader. In CPG IV, EPA did not revise the recommendations for APPs.

Preference programs are discussed in detail in Section B of Appendix V. This section of the document discusses promotion and monitoring. Certification is discussed in Section III.E of this document.

EPA recommends actions be taken by requesting officials, contracting officials, contracting officers, architects, and engineers when purchasing designated items. In order to provide maximum flexibility to procuring agencies when implementing the requirements of RCRA Section 6002, EPA recommends the Environmental Executive within each procuring agency take the lead in developing the agency's APP and in implementing the recommendations set forth in the RMAN IV.

The basic responsibilities of an Agency Environmental Executive are described in Sections 302 and 402 of the Executive Order. Section 302 of the Executive Order charges each agency's Environmental Executive with coordinating all environmental programs in the areas of acquisition, standard and specification revision, facilities management, waste prevention, recycling, and logistics. Section 302 also requires each agency's Environmental Executive to track and report, to the Federal Environmental Executive, agency purchases of EPA-designated items. In the absence of an agency's Environmental Executive, EPA recommends that the head of the implementing agency appoint an individual who will be responsible for ensuring the agency's compliance with RCRA Section 6002 and the Executive Order.

RCRA Section 6002 and the Executive Order require procuring agencies to establish APPs for each EPA-designated item. EPA recommends that each agency develop a single, comprehensive APP with a structure that allows for the integration of new items as they are designated. EPA encourages agencies to implement preference programs for nonguideline items as well, in order to maximize their purchases of recycled content products and foster markets for recovered materials.

RCRA Section 6002(I)(2)(B) requires each procuring agency to adopt a program to promote its preference to buy EPA-designated items with recovered materials content. The promotion component of the APP should educate agency staff and notify an agency's current and potential vendors, suppliers, and contractors of the agency's intention to buy recycled content products. Therefore, EPA believes that an

agency's promotion program should consist of two components: an internal promotion program and an external promotion program.

There are several methods that procuring agencies can use to educate employees about their APPs. These methods include:

- Preparing and distributing agency affirmative procurement policies through in-house publications and electronic mail.
- Publishing articles in agency newsletters and on the agency's Web site.
- Including APP requirements in agency staff manuals.
- Conducting workshops and training sessions to educate employees about their responsibilities under agency APPs.

Methods for educating existing contractors and potential bidders of an agency's preference to purchase products containing recovered materials include publishing articles in appropriate trade publications, participating in vendor shows and trade fairs, placing statements in solicitations, and discussing an agency's APP at bidders' conferences.

Procuring agencies should monitor their APPs to ensure that they are fulfilling their requirements to purchase items composed of recovered materials to the maximum extent practicable. RCRA Section 6002(I)(2)(D) requires the APP to include procedures for annually reviewing and monitoring the effectiveness of agency APPs. Section 302 of the Executive Order requires the Environmental Executive of each federal Executive agency to track and report on agency purchases of EPA-designated items. Additionally, RCRA Section 6002(g) requires OFPP to submit a report to Congress every 2 years on actions taken by federal agencies to implement the affirmative procurement requirements of the statute. Also, Section 301 of the Executive Order requires the Federal Environmental Executive to submit a biennial report to the President on federal compliance with the Executive Order. In order to fulfill its responsibilities, the Office of the Federal Environmental Executive requests information from federal

agencies on their affirmative procurement practices. Therefore, it is important for agencies to maintain adequate records of procurements that may be affected by Executive Order and RCRA requirements.

In order to comply with the Executive Order, federal agencies will need to track their purchases of products made with recovered materials content. This will also allow them to establish benchmarks from which progress can be assessed. To maintain adequate records on procurement of products containing recovered materials, procuring agencies may choose to collect data on the following:

- The minimum percentages of recovered materials content in the items procured or offered.
- Comparative price information on competitive procurements.
- The quantity of each item procured over a fiscal year.
- The availability of each item with recovered materials content.
- Performance information related to recovered materials content of an item.

EPA recognizes that a procuring agency may be unable to obtain accurate data for all items designated by EPA. EPA does not believe that this is a problem. Estimated data is likely to be sufficient for determining the effectiveness of an agency's APP.

VI. DEFINITIONS

In the final CPG IV, EPA is adding definitions for the following new item-specific terms: bike racks, blasting grit, cenospheres, modular threshold ramps, nonpressure pipe, office furniture, rebuilt vehicular parts, roofing materials, and silica fume. These definitions are based on industry definitions, such as th American Society of Testing and Materials (ASTM) or other industry standards. Where industry definitions did not exist for the designated items, EPA's definitions describe the scope of items being designated.

This document contains discussions and recommendations on the recovered materials content levels and postconsumer materials content levels at which the designated items are generally available. The terms "postconsumer materials" and "recovered materials" are defined at 40 CFR 247.3. These definitions are included here for the convenience of the reader.

Postconsumer materials means a material or finished product that has served its intended end use and has been diverted or recovered from waste destined for disposal, having completed its life as a consumer item. Postconsumer material is part of the broader category of recovered materials.

Recovered materials means waste materials 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, the original manufacturing process.

VII. AGENCY'S RESPONSE TO COMMENTS

EPA requested information and public comment on the proposed CPG IV and the draft RMAN IV. In general the agency requested comments on: (1) the items selected for designation in the CPG IV; (2) the recommended recovered material content levels for the selected items; (3) the overall accuracy of the information presented in the proposed item designations; (4) and several specific issues pertaining to particular products. Requests for the specific comments and information were included in the narrative discussions for each of the items proposed for designation.

EPA received 29 comments on the proposed CPG IV and draft RMAN IV. EPA carefully considered all of these comments in developing the final CPG IV and the RMAN IV. A summary of the comments, including those on specific item designations, and the Agency's responses are provided in the sections that follow.

A. Request for Comments

In the CPG IV proposed rule and draft RMAN IV notice, EPA requested specific comments on its proposal to revise the polyester carpet designation to reference the new Carpet and Rug Institute (CRI) end-use classifications of moderate- and heavy-wear; whether any specifications exist or are appropriate for passenger tires containing recovered rubber, railroad grade crossing surfaces made from wood or plastic, office furniture, bike racks, or blasting grit; the use of recovered copper in the manufacture of modular threshold ramps; the amount of recovered aluminum that is being used in aluminum pipe; and the use of recovered materials in wood, fiberglass, and asphalt/plastic composite roofing materials. Of these requests, EPA only received comments related to its proposal to revise the polyester carpet designation. These comments and the Agency's responses are summarized in section IX E. of this document.

B. Other General Comments

Comment: The White House Task Force on Recycling requested that EPA include examples of solicitation and contract language used by federal agencies and others to purchase the proposed designated construction products, including cement and concrete containing silica fume, nonpressure pipe, roofing materials, and blasting grit.

Response: The Office of the Federal Environmental Executive (OFEE) has workgroups consisting of federal procuring agencies which focus on a number of issues, such as record keeping and reporting. The purpose of these workgroups is to share information and develop consensus programs. EPA will contact procuring agencies, possibly through the existing workgroups established by OFEE, to help identify contract language that has been used to procure these items and/or to draft model language that could be used in solicitations, as well as to share any sample language developed with the other federal agencies.

Comment: OFEE further requested EPA to provide guidance regarding unintentional barriers to purchasing the proposed designated construction products, and specifically referenced a barrier to the purchase of blasting grit created by inappropriate packaging (volume) requirements.

Response: EPA includes general guidance on the development of affirmative procurement plans in Appendix V of this document. Section A of Appendix V explains that agencies are required to examine their specifications for designated items and should remove any requirements that constitute barriers to their purchase. EPA has enhanced this section to discuss the need to consider unintentional barriers to purchasing designated items, such as packaging, color, or cosmetic requirements that have no bearing on the item's functionality or performance, but that might prevent its purchase with the highest percentage recovered materials practicable. EPA has provided guidance in Appendix V of this document and in the final RMAN IV in the General Recommendations section.

Comment: The U.S. Department of Energy commented that a key problem in implementing the CPG has been finding vendors and manufacturers who have the designated items available with recycled content. DOE believes EPA's vendor list needs to be updated and that a process needs to be developed to provide procuring agencies with current information on the availability of recycled-content products.

Response: During 2002, EPA developed and launched a comprehensive, searchable online vendor database covering all CPG-designated items and more than 2,000 individual vendor entries. This database was beta-tested by a number of procuring agencies through a coordinated effort with OFEE and is fully operational. The database allows a user to search for vendors and suppliers by product category, individual product, or material. The purpose of the database system is to provide buyers with a more accessible and reliable reference source they can use to identify vendors. EPA intends to maintain and update the database on a regular basis to ensure that the information is accurate and current, given the constraints of obtaining this information from the companies themselves.

C. Additional Items for Designation

Comment: The Department of Defense suggested additional items for future CPG designations, including biobased fuels made from recovered cooking oils; roofing shingles (both asphalt and tile) made from recovered vinyl, aluminum, and cellulose fiber; and asphalt mixes made from crumb rubber.

Response: EPA will consider biobased fuels made from cooking oils as potential CPG items and requests that DOD provide additional information, as outlined in EPA's September 20, 1995, Notice and Request for Information entitled "Procedures for Submission of Recycled Content Products" (60 FR 48714). This notice describes the criteria used by EPA to designate items, including purchasing barriers; the solid waste impacts of an item designation; economic and technological feasibility and performance; impact of government purchasing; and suggested recovered material content levels.

With regard to roofing shingles (both asphalt and tile) made from recovered vinyl, aluminum, and cellulose fiber, EPA researched these types of roofing products and is designating roofing products made from recovered aluminum, fiber, and plastic, among various other recovered materials, in today's rulemaking. EPA also considered the designation of roofing shingles made from recovered asphalt, as discussed in the "Recovered Material Product Research for the Comprehensive Procurement Guideline IV: Draft Report," which is available in the docket for this rulemaking. The agency's research indicated that the asphalt used in matting, roll roofing, shingles, coatings, modified bitumen, and built-up roofing is not recovered asphalt. However, EPA did not discount roofing products containing asphalt. EPA has included RMAN recommendations for these products under the category of the recovered material used in the product along with the virgin asphalt. For example, if a product contains both asphalt and recovered fiber, EPA's recommendations can be found under the "Fiber (Felt) or Fiber Composite" material category in the RMAN table, implying that the fiber is the recovered material in the product, not the asphalt.

Finally, regarding asphalt mixes made from crumb rubber, EPA is currently researching the use of various recovered materials, including crumb rubber and recycled asphalt pavement (RAP), in road construction applications for possible future designation.

D. Designation of Steel

Comment: The Office of the Deputy Under Secretary of Defense commented that items manufactured from steel should either not be listed, or listed as a generic category rather than as individual items. The Office contends that virtually all new steel produced today has recovered content, and there is no practical way a purchasing officer could influence the recovered material content in steel items, such as bike racks. In addition, there would be no way of verifying that a particular batch of steel was made from either a basic oxygen furnace or an electric arc furnace. The Office added that designating steel bike racks and furniture does not appear to support the objectives of RCRA Section 6002 because listing individual items would not significantly increase the procurement of products made from recovered material or help develop a market for recyclable waste materials.

Response: The CPG designates individual items because agency requirements are typically expressed in terms of end products rather than raw material inputs. With the exception of large system acquisitions, agencies generally procure individual items. In addition, RCRA 6002(e)(1) requires EPA to designate "items" that are or can be made with recovered materials. For these reasons, the CPG designates items and organizes them by functional category rather than by material type. With regard to verification of the steel manufacturing process used to produce a specific steel item, EPA obtained this information from the steel industry prior to making its recommendations in the RMAN. Therefore, if an item is generally made from steel from an electric arc furnace (EAF), EPA's recommendations reflect the recovered materials content from that particular process. Likewise, EPA's recommendations for items made from steel made in a basic oxygen furnace (BOF) reflect the recovered materials content for that process. Therefore, agencies need not be concerned with verifying the type of steel process used to make the item. EPA's RMAN recommendations already take the type of steel into account. In those cases where a designated item is manufactured using both of the steel processes, the ranges of recovered materials for both of those processes are provided. Therefore, in determining the recovered materials content for any given steel item, procuring agencies may use the RMAN ranges provided for that item. In cases where an item can be made from both steel processes, agencies may use a combination of the ranges of both processes to signify the potential range of recovered materials. Therefore, the recommended recovered materials content ranges would be 25% - 100% total recovered materials and

16% - 67% postconsumer content. (EPA also used this method in the draft RMAN recommendations for blasting grit.)

Furthermore, EPA disagrees that designating bike racks and office furniture does not support the objectives of RCRA. One of the objectives of RCRA is to encourage the procurement of products made with recovered materials. Bike racks and office furniture are items that can be made from recovered steel as well as from other recovered materials. Therefore, designating these items promotes the recovery of steel, as well as these other materials. EPA has concluded that if products are made from more than one type of recovered material, then the procurement guidelines should accurately reflect that fact and promote the procurement of all recovered content products, regardless of the particular recovered material used. Not to include steel products in the CPG could result in a bias against the purchase of steel products when procurement officials are considering a purchase of several functionally equivalent products made from various recovered materials. Furthermore, RCRA requires EPA to make recommendations, including recycled content recommendations, for designated items. Since bike racks and office furniture are made from recovered steel, as well as from other recovered materials, EPA has concluded that it is appropriate to include recovered steel among the recovered materials listed in the designations for bike racks and office furniture.

E. Coal Combustion Products

Comment: The Utility Solid Waste Activities Group (USWAG) c/o Edison Electric Institute and the American Coal Ash Association (ACAA) supports the designation of proposed products with coal combustion products as well as the future designation of additional products. These organizations also believe there are many other beneficial uses of fly ash, bottom ash, and slag that EPA should consider in future designations.

Response: EPA will continue to explore other products that incorporate fly ash, bottom ash, and slag and requests that both USWAG and ACAA provide information to EPA on additional items for future designation.

VIII. VEHICULAR PRODUCTS

A. Tires

1. Background

In §247.11(b), EPA proposed to revise the designation for tires to include tires containing recovered material. In Section B-2 (Revised) of the draft RMAN IV, EPA recommended that, based on the recovered materials content levels stated below, procuring agencies revise their preference program to establish minimum content standards for use in purchasing passenger tires containing recovered rubber.

- EPA recommends that procuring agencies purchase passenger tires containing 5 - 10 % postconsumer recovered rubber.

2. Summary of Comments and Agency's Response

EPA received a comment opposing the proposed designation of tires containing recovered materials. As explained in this section, the Agency has concluded that at this time there is insufficient evidence to support a designation and that more research is required before designation can occur. In the final CPG IV, therefore, EPA is withdrawing the proposed designation of tires containing recovered rubber.

Comment: The Department of Defense commented that the safety, durability, and other environmental impacts of tires containing recovered rubber are not adequately addressed to justify designating them in the CPG. DOD highlighted several assertions in EPA's research regarding tensile strength, heat built-up, tire durability, and decreased tread life. It also argued that a shorter tire life will result in no overall savings in the use of recovered material, producing no net reduction in the amount of solid tire waste produced by the overall system.

Response: At the time of EPA's initial research, the Agency identified at least five major U.S. tire manufacturers that were incorporating some percentage of crumb rubber into some of their tire lines. Based on DOD's comments, however, EPA conducted additional research on tires containing recovered rubber. EPA was not able to verify to what extent recovered rubber is currently being incorporated into tires or obtain answers to any of the safety concerns raised by the commenter. Until such time that EPA can obtain current information on these issues, we have decided it is not appropriate to include tires containing recovered materials as a designated item. EPA will continue to conduct research on tires and monitor the tire-making industry to determine if designation is feasible at a future time.

B. Rebuilt Vehicular Products

1. Background

In §247.11(d), EPA proposed to designate rebuilt vehicular parts. In Section B-4 of the accompanying draft RMAN, EPA recommended that procuring agencies whose vehicles (passenger vehicles as well as medium- and heavy-duty equipment, including trucks, cranes, off-road vehicles, and military vehicles) are serviced by a motor pool or vehicle maintenance facility, establish a program for vehicular parts rebuilding and reuse consisting of either recovering a used vehicular part and rebuilding it, replacing it with a rebuilt part, or contracting to have the part replaced with a rebuilt part.

2. Summary of Comments and Agency's Response

Comment: The White House Task Force on Recycling–Office of the Federal Environmental Executive questioned what the designation of rebuilt automotive parts will accomplish toward the statutory objectives of reducing solid waste by creating markets for materials recovered from solid waste, since most federal agencies are already purchasing them and are satisfied with their performance. In addition, The Task Force indicated that rebuilt automotive parts are primarily purchased with federal credit cards, so it would be difficult for agencies to track procurement of them and lead to an administrative burden with no appreciable new benefit to the environment.

In addition, the Task Force commented that it is unclear whether EPA's proposed designation is for vehicles serviced by on-site vehicle maintenance facilities or to both on-site facilities and commercial facilities. Since most government vehicles are serviced at commercial facilities, the Task Force believes it is important that EPA clearly state that its recommendations are for both on-site and commercial facilities.

Response: EPA's proposal of rebuilt vehicular parts is consistent with previous designations for other remanufactured or refurbished products, such as reinked printer ribbons and toner cartridges. Motor vehicle part rebuilders recover and reclaim thousands of automotive components made from plastic and metal that could otherwise be landfilled. While EPA realizes that rebuilt vehicular parts may seem to be a common practice in the industry, markets for products containing recovered materials can fluctuate and directly influence the recovery rate of these items in the industry. While the designation of rebuilt vehicular parts may not create "new" markets, it can help ensure market stability, perhaps some market expansion, and continued recovery of these items. By designating these items, EPA also has concluded that increased environmental awareness with respect to procuring vehicular parts and services will contribute positively to an agency's overall effort to purchase more environmentally preferable products and services.

With regard to recordkeeping burden, EPA notes that procuring agencies have been statutorily required to monitor the procurement of designated items, regardless of the method of procurement, since the first guidelines were issued in 1983. Therefore, this requirement is not new. Furthermore, neither RCRA 6002 nor E.O. 13101 requires that the designation of items be based on the relationship between administrative burden and the level of benefit to the environment, as implied in the comments.

3. Rationale for Designation

EPA believes that rebuilt vehicular products satisfy the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

EPA identified five remanufacturers of parts that use between 60 and 95 percent postconsumer materials (i.e., viable components from the used part). One company remanufactures clutches for farm tractors and passenger automobiles with 80 to 85 percent postconsumer materials. Another company rewinds stators and rotors for alternators, and armatures for starters and generators using 60 and 80 percent postconsumer material, respectively. Another company that rebuilds alternators, starters, and generators for cars and trucks uses 80 to 85 percent postconsumer materials. One company remanufactures power and air brakes for passenger, medium-duty, and heavy-duty tractor trailer trucks with 90 to 95 percent postconsumer materials. Still another company remanufactures rack and pinion steering and constant velocity axle units with 85 to 90 percent postconsumer materials. In addition, all automobile manufacturers supply rebuilt parts to their dealerships.

b. Technically Proven Uses

According to the Automotive Parts Rebuilders Association (APRA), rebuilt parts have been routinely used by the general public for more than 50 years. In fact, when a vehicle manufacturer exhausts its supply of new parts for a vehicle, used parts are rebuilt by the original manufacturer itself.

Rebuilt parts are not just cleaned, visually inspected, and resold with little to no repair work done. These parts undergo an extensive remanufacturing and testing process. Rebuilt parts must meet the same industry specifications for performance as new parts. According to APRA, rebuilt parts are comparable in quality to new parts and can be of even better quality than new parts when items are upgraded during the rebuilding process.

c. Impact of Government Procurement

Vehicles are kept for about 3 to 6 years by most government agencies. Some agencies, however, say that vehicles are not usually kept long enough to need many replacement parts. According to APRA, heavy-duty equipment is generally kept longer and is usually almost totally rebuilt.

EPA found that the majority of replacement vehicular parts purchased by the Forest Service are rebuilt parts (for all types of vehicles). Engines for medium- and heavy-duty equipment are always rebuilt. The U.S. Air Force has a written policy stating its preference for rebuilt parts, and the majority of parts for all of their vehicle types are rebuilt.

Many federal agencies use local commercial facilities for maintenance and repair of government-owned or leased vehicles. Many of these agencies simply request the least expensive parts, which usually are rebuilt parts.

During 1999, bills were introduced in California, New York, Connecticut, Missouri, and Texas that would make procurement of remanufactured products by those state governments easier and prevent procurement by them of products that have restrictions on being remanufactured. Bills were ultimately passed and made law in California, Connecticut, and Texas.

4. Designation

EPA is designating rebuilt vehicular parts. This designation requires that a procuring agency, when purchasing vehicular parts, purchase rebuilt parts when they meet applicable specifications and performance requirements. This designation applies to rebuilt vehicular parts used in passenger vehicles as well as medium- and heavy-duty equipment (e.g., trucks, cranes, off-road vehicles, military vehicles).

5. Preference Program

EPA is recommending the draft RMAN recommendations in the final RMAN IV. EPA recommends that procuring agencies whose vehicles (passenger vehicles as well as medium- and heavy-duty equipment, including trucks, cranes, off-road vehicles, and military vehicles) are serviced by a motor pool or vehicle maintenance facility, both onsite and at commercial facilities, establish a program for vehicular parts rebuilding and reuse consisting of either recovering a used vehicular part and rebuilding it, replacing it with a rebuilt part, or contracting to have the part replaced with a rebuilt part.

6. Background for Recommendations

Rebuilt vehicular parts are vehicle parts that have been remanufactured, reusing parts in their original form. For an automotive product to be considered remanufactured or rebuilt under the Federal Trade Commission (FTC) guides, it must be dismantled; all internal and external parts must be cleaned and made free of rust and corrosion; all impaired, defective, or substantially worn parts must be restored to sound condition or replaced with new or rebuilt parts; and all necessary operations must be performed to put the remanufactured product in sound working condition. ("Guides for the Rebuilt, Reconditioned and Other Used Automotive Parts Industry," Federal Trade Commission, 16 CFR Part 20).

Table 2 presents information provided by manufacturers of rebuilt vehicular parts on recovered content.

Table 2

Recovered Materials Content of Rebuilt Vehicular Parts

Product	Postconsumer Content (%)	Total Recovered Materials Content (%)
Rebuilt Vehicular Parts	Company A: 80 to 85	80 to 85
	Company B: 60 to 80	60 to 80
	Company C: 80 to 85	80 to 85
	Company D: 90 to 95	90 to 95
	Company E: 85 to 90	85 to 90

7. Specifications

Rebuilt parts must meet the same industry specifications for performance as new parts. According to APRA, rebuilt parts are comparable in quality to new parts and can be of even better quality than new parts when items are upgraded during the rebuilding process.

C. Revision to Retread Tires

Since the draft RMAN IV was issued, EPA learned that the U.S. General Services Administration (GSA) Federal Tire Program's Quality Assurance Facility Inspection Program (QAFIP) is defunct. Therefore, EPA is revising the retread tire recommendations by deleting reference to the GSA QAFIP. The following are EPA's revised recommendations for procuring retreading services and retread tires. These recommendations replace those issued in RMAN I (60 FR 21386, May 1, 1995).

<u>Procurement of tire retreading services for the agencies' used tire casings:</u>

EPA recommends that procuring agencies specify that tire repair and retread services must conform to Federal Specification ZZ-T-441H (or current version).

Procurement of tires through competition between vendors of new tires and vendors of retread tires:

EPA recommends that procuring agencies specify that retread tires must meet the requirements of Federal Specification ZZ-T-381, "Tires, Pneumatic, Vehicular (Highway) (New and Retreaded).

IX. CONSTRUCTION PRODUCTS

A. Cement and Concrete Containing Cenospheres and Silica Fume

1. Background

In §247.12(c), EPA proposed to revise the existing cement and concrete designation to include cement and concrete containing cenospheres or silica fume. In Section C-3 (Revised), EPA recommended that, based on the recovered materials content levels stated below, procuring agencies revise their preference program to establish minimum content standards for use in purchasing cement and concrete containing cenospheres and silica fume from silicon or ferrosilicon metal production.

- EPA recommends that procuring agencies revise their procurement programs for cement and concrete or for construction projects involving cement and concrete to allow use of cement and concrete containing 10-15% cenospheres (by weight), as appropriate. EPA recommends that procuring agencies specifically include provisions in all construction contracts to allow for the use, as optional or alternate materials, on cement or concrete that contains cenospheres, as appropriate.

- EPA recommends that procuring agencies revise their procurement programs for cement and concrete or for construction projects involving cement and concrete to allow use of cement and concrete containing 5-20% silica fume (by weight), as appropriate. EPA recommends that procuring agencies specifically include provisions in all construction contracts to allow for the use, as optional or alternate materials, on cement or concrete that contains silica fume, as appropriate.

EPA received several comments during the public comment period related to the applications for cement and concrete containing cenospheres and silica fume, as well as on the recommended recovered content levels provided in the draft RMAN IV.

2. Summary of Comments and Agency's Response

Comment: The Department of Energy (DOE) submitted a comment expressing concerns that cenospheres and silica fume additives may not be readily available in all locations. In addition, DOE indicated that, although silica fume can be used to produce a higher-strength concrete, it has inherent problems of placement, workability, and curing, and is considerably more expensive than fly ash. None of DOE's concrete vendors are familiar with the application of cenospheres as a concrete additive.

Response: EPA has stated in the past that it recognizes that some items or materials may not always be readily available. However, EPA's designation simply expands the list of recovered materials recommended to procuring agencies when purchasing cement and concrete. If an application warrants the use of higher-strength concrete, an agency may want to consider the use of cement and concrete with additional recovered materials, such as cenospheres or silica fume. Agencies, however, are not limited to using cement and concrete containing silica fume or cenospheres. EPA's research found that there is a small market for specialty cement containing cenospheres, which is typically used as a patching cement where higher strength is desired.

Comment: The Department of Defense submitted a comment stating that cenospheres appear to be a specialty item costing significantly more than fly ash, and, therefore, the value derived from using cenospheres in concrete will primarily be due to special properties, such as lightness and strength, rather than any societal gains based on diverting waste material.

Response: EPA agrees that cement and concrete containing cenospheres is a specialty item that may cost more than regular cement and concrete. An agency can choose whether cement and concrete with cenospheres suits its needs, application, and/or budget. If not, the agency can use cement and concrete containing one of the other recovered materials recommended in the RMAN. EPA believes the value and benefit of using cement and concrete with cenospheres (or silica fume) will be derived both from its special properties, as well as the diversion of these materials from disposal.

Comment: The American Portland Cement Association (APCA) is a trade association representing virtually all domestic portland cement production. APCA submitted a comment suggesting mostly minor technical and administrative changes to EPA's proposed designation. These recommended changes primarily pertain to citing ASTM specifications and the way to express the recommended range of recovered content of silica fume and cenospheres in cement and concrete.

Response: After reviewing APCA's proposed changes, EPA agrees they should be cited in the RMAN. Although EPA acknowledges that it inadvertently cited ASTM C-618 as applicable to cenospheres used in cement and concrete, it believes there is still justification for designating cement and concrete containing cenospheres, since all suppliers of cenospheres have specifications, including Material Safety Data Sheets, for their cenospheres. In the final RMAN, EPA has changed the information regarding recovered content ranges for silica fume in cement and concrete to "5 to 10 percent of cementitious material on a dry weight basis" and to "a minimum of 10 percent by volume" for cenospheres.

Comment: The National Ready Mixed Concrete Association (NRMCA) submitted a comment indicating that the concrete industry has no history of purchasing cenospheres as an ingredient and that concrete producers have not been buying it as a product separate from fly ash for use in concrete. In addition, ASTM C-618 does not address cenospheres, and there is no technical literature documenting their use in concrete. NRMCA added that the presence of cenospheres in fly ash occurs naturally so the generation facility for fly ash has no control over whether it can be produced. It depends on many factors, including type of coal being used, plant type, and firing conditions. Furthermore, NRMCA indicated that the variety of cenospheres discussed in EPA's proposal are used for applications other than cement and concrete. Moreover, the cenosphere range of 10-15 percent is typically the amount of fly ash used in cement. The cenospheres content would be 1/10th of the fly ash, if at all.

NRMCA also commented on the use of silica fume in cement and concrete. They indicated that silica fume in cement is only used for high performance applications and should only be used when the construction application requires it. In addition, its availability is not as wide as other products, and its cost is much higher. Finally, demand for silica fume is so high that a large percentage is imported from

Europe, which begs the question of whether silica fume would ever be diverted to a landfill in the first place.

Response: With regard to NRMCA's comment about the use of cenospheres, EPA explained in the proposed CPG that cenospheres are a component of fly ash. EPA's research found that cenospheres can be and are separated and removed from fly ash and sold and used as a recovered material. EPA's research also found that there is a market, albeit small, for high-strength cement to which recovered cenospheres, specifically, have been added. EPA has adjusted its recommendations to reflect cement and concrete to which only cenospheres have been added. EPA spoke with several suppliers of cenospheres who indicated that their product is used in producing this type of specialty cement. EPA recognizes that it inadvertently cited ASTM C-618 as applying to cement with cenospheres, when in actuality, it applies to fly ash and raw or calcinated pozzolan for use as an admixture in concrete. As previously stated, although no industry standards exist for cement and concrete containing cenospheres alone, EPA learned that suppliers of cenospheres have specifications available for the cenospheres themselves, including Material Safety Data Sheets. EPA has removed reference to ASTM C-618 in the final RMAN. EPA agrees that in typical cement containing fly ash, the percent of cenospheres would be about 1/10 that of the fly ash. However, in the cases where cenospheres have been specifically added to produce a high-strength specialty cement, the percentage of cenospheres alone can reach 10-40 percent, according to contacts in the industry.

With regard to NRMCA's comment on silica fume in cement, EPA concurs, and its research did find, that cement containing silica fume can be a high-performance product that may cost more than other types of cement. However, in issuing recommendations for silica fume (and cenospheres), EPA is simply expanding the list of recommended recovered materials used in cement in concrete. If an application warrants the use of higher-strength concrete, an agency now has recommendations for procuring cement and concrete containing silica fume. Agencies, however, will not be limited to using cement and concrete containing silica fume, or cenospheres for that matter. Also, it should be noted that EPA's research found that in a recent year 115,000 tons of silica fume were generated and only 67,200 tons were reused. So, regardless of whether silica fume is being imported from other countries, there is obviously a need to encourage more reuse of silica fume that is generated domestically.

3. Rationale for Designation

EPA believes that cement and concrete containing cenospheres and silica fume satisfies the statutory criteria for selecting items for designation.

a. Uses of Materials in Solid Waste

The percentage of cenospheres used in concrete varies depending on the application and desired performance characteristics of the concrete, but according to sources in the industry, the typical content of cenospheres in concrete ranges from 10 percent to 40 percent by volume. Concrete containing cenospheres also often contains fly ash and vice versa, which further increases the recovered materials content percentage of the concrete.

According to data provided by the American Coal Ash Association (ACAA), between 630,000 and 3,150,000 tons of cenospheres were generated in 1998 by metal producers in the United States and 25,000 to 45,000 tons were reclaimed. The total amount of cenospheres reused will be higher because of the cenospheres content of fly ash, which is used as an additive in concrete as well. Cenospheres that are not reused are landfilled with the fly ash from which they are derived. According to ACAA, cenospheres are an inert material that does not leach hazardous pollutants in landfills or during storage. It is estimated that 70 to 80 percent of all cenospheres produced are landfilled.

Assuming a conservative cenosphere production rate of 1 million tons per year, the calculated volume of solid waste this represents is 83 million cubic feet of solid waste based on an average bulk density of 24 pounds per cubic foot. Based on the average U.S. reclamation volume of 35,000 tons annually, this represents a volume reduction of approximately 2.9 million cubic feet per year.

The percentage of silica fume used in HPC varies depending on the application and desired performance characteristics of the concrete, but according to numerous sources in the concrete industry, the typical content of silica fume in concrete ranges from 5 percent to 20 percent on a dry weight basis.

HPC containing silica fume also often contains fly ash, which further increases the recovered materials content percentage of the concrete.

According to SFC, approximately 115,000 tons of silica fume were generated in 1999 by metal producers in the United States and approximately 67,200 tons were reused. SFC estimates, however, that due to increased generation of silica fume, reuse will need to increase 93 percent by the year 2000 to eliminate the need to dispose of silica fume. Other than its use in concrete, no other beneficial uses of silica fume are known. Silica fume that is not reused is either landfilled or stored for future reuse. Silica fume is an inert material and does not leach hazardous pollutants in landfills or during storage.

According to SFC, the United States uses more than 500 million tons of concrete a year, which is more than 2 tons for every person in the United States. Using silica fume in only a small percentage of concrete production could greatly reduce the need to dispose of silica fume.

b. Technically Proven Uses

Cenospheres can be added to traditional concrete mixtures to increase strength and decrease shrinkage and weight. According to a cenosphere supplier, concrete containing cenospheres has increased thermal stability and better overall endurance as compared to traditional concrete. Cenospheres are used as fillers or extenders in place of traditional fillers such as manufactured glass spheres, calcium carbonate, clays, talc, and other various silicas. Cenospheres can be used in concrete in conjunction with other recovered materials such as fly ash and silica fume, or by itself. Cenospheres are 75 percent lighter than other minerals currently used as fillers and 30 percent lighter than most resins.

Silica fume can be added to traditional concrete mixtures, which are composed of cement, aggregate, and water. It increases strength, microstructure density, and electrical resistivity; decreases fluid permeability; and improves the overall endurance of the concrete. As a concrete additive, it is used to replace some of the cement added to concrete. Silica fume is not a cementitious agent. It is categorized as an admixture, an aggregate, a filler, a pozzolanic additive, and other synonymous terms in

specifications for its use in concrete. However, it does enhance the cementitious qualities of the cement. Silica fume can also be used in concrete in conjunction with other recovered materials, including fly ash and GGBF slag.

EPA identified the following national specifications and guidelines, which can be used by procuring agencies to buy HPC containing silica fume of a standard quality: ASTM C1240, AASHTO M840, and ACI 234R-96. ACI 234R-96 describes the properties of silica fume; how silica fume interacts with cement; the effects of silica fume on the properties of fresh and cured concrete; typical applications of silica fume concrete; recommendations on proportions, specifications, and handling of silica fume in the field. Silica fume has been used in HPC primarily to enhance strength and endurance properties, not because it is a recovered material.

Silica fume enhances HPC properties because its small particle size fills the microscopic holes in cement, which increases density and strength. The density of silica fume concrete makes it an appropriate material for bridges, parking decks, docks, and dams because of its strength and its impermeability. Concrete containing silica fume significantly reduces the potential damage from freeze and thaw cycles because it is too dense for water to permeate below the surface of the concrete. According to a contact with the New York Department of Transportation (NYDOT), HPC with silica fume and coal fly ash is used on all NYDOT bridge and deck construction projects as well any other structures that are subjected to salts or chlorides (i.e., deicing salts or salt spray from seawater). The contact indicated that the low permeability of the concrete slows the ingress of salt to internal reinforcements, thus delaying corrosion.

Silicosis is a potentially debilitating lung disorder that results from the inhalation of crystalline silica. While the Occupational Safety and Health Administration (OSHA) has not established specific exposure limits for silica fume, OSHA has established a permissible exposure limit for all inert or nuisance dusts, which includes silica fume, of 5 mg/m^3 based on an 8-hour time weighted average (TWA) (29 CFR 1910.1000, Table Z-3). The American Conference of Governmental Industrial Hygienists (ACGIH), however, has established a threshold limit value for silica fume of 2 mg/m^3 based on an 8-hour TWA. ACGIH's threshold limit values are established so that "nearly all workers may be repeatedly exposed day after day without adverse health effects." Unlike OSHA's permissible exposure limits,

ACGIH's threshold limit values are not legal standards; however, they are used by some companies to establish their own permissible limits.

To reduce the potential risks associated with silica fume particles, suppliers typically slurry with water or compact silica fume to reduce workers' potential exposure to the dust.

c. Impact of Government Procurement

Many government agencies at the federal, state, and local levels purchase cement and concrete for construction-related projects. One vendor indicated that the Tennessee Department of Transportation has used cement containing cenospheres for vertical overhead patching. This same contact indicated that most procuring agencies would not be aware that cement with cenospheres was being utilized for a particular project because the product is not typically advertised as such. According to one large cenosphere supplier, cenospheres are available throughout the United States and are available worldwide. They have been used in Europe in numerous applications for several decades. In fact, one contact indicated that some suppliers are importing cenospheres from Australia for sale in the United States because Australia's recovery infrastructure is more mature. EPA identified seven domestic suppliers of cenospheres, four of which are major suppliers of this item.

Silica fume is available worldwide. It is sold by ready mixed concrete producers and precast concrete producers. There are seven major producers and 10 major suppliers. Distributors are available in all 50 states.

The following state DOTs are known to have used concrete containing silica fume: New York, Ohio, Washington, South Carolina, Pennsylvania, Indiana, and Virginia. A contact with the New York DOT indicated that most states have used concrete containing silica fume at one point or another and that many probably use it routinely.

According to SFC, of the 580,000 bridges in the U.S., approximately 1,900 bridges were built or repaired using concrete containing silica fume by 1999.

4. Designation

Note: Following are EPA's revised recommendations for procuring cement and concrete. EPA previously designated cement and concrete containing coal fly ash and ground granulated blast furnace slag (GGBF) in CPG I and provided information about recovered materials content in RMAN I (60 FR 21386, May 1, 1995). EPA has amended the designation to add cenospheres and silica fume from silicon and ferrosilicon metal production as other recovered materials for use as cement and concrete additives. Procuring agencies should substitute these recommendations for the recommendations found in Section C-3 of RMAN I.

5. Preference Program

EPA recommends that procuring agencies prepare or revise their procurement programs for cement and concrete or for construction projects involving cement and concrete to allow the use of coal fly ash, ground granulated blast furnace slag (GGBF slag), cenospheres, or silica fume, as appropriate. EPA does not recommend that procuring agencies favor one recovered material over the other. Rather, EPA recommends that procuring agencies consider the use of all of these recovered materials and choose the one (or the mixture of them) that meets their performance requirements, consistent with availability and price considerations. EPA also recommends that procuring agencies specifically include provisions in all construction contracts to allow for the use, as optional or alternate materials, of cement or concrete which contains coal fly ash, GGBF slag, cenospheres, or silica fume, where appropriate. Due to variations in cement, strength requirements, costs, and construction practices, EPA is not recommending recovered materials content levels for cement or concrete containing coal fly ash, GGBF slag, cenospheres, or silica fume. However, EPA is providing the following information about recovered materials content.

- Replacement rates of coal fly ash for cement in the production of blended cement generally do not exceed 20-30 percent, although coal fly ash blended cements may range from 0-40 percent coal fly ash by weight, according to ASTM C 595, for cement Types IP and I(PM). Fifteen percent is a more accepted rate when coal fly ash is used as a partial cement replacement as an admixture in concrete.

- According to ASTM C 595, GGBF slag may replace up to 70 percent of the Portland cement in some concrete mixtures. Most GGBF slag concrete mixtures contain between 25 and 50 percent GGBF slag by weight. EPA recommends that procuring agencies refer, at a minimum, to ASTM C 595 for the GGBF slag content appropriate for the intended use of the cement and concrete.

- According to industry sources, cement and concrete containing cenospheres typically contains a minimum of 10 percent cenospheres (by volume).

- According to industry sources, cement and concrete containing silica fume typically contains silica fume that constitutes 5 to 10 percent of cementitious material on a dry weight basis.

6. Background for Recommendations

Cenospheres are very small (10 - 350 microns), inert, lightweight, hollow, "glass" spheres composed of silica and alumina and filled with air or other gases. They are a naturally-occurring component of fly ash, the largest byproduct of coal-fired power plants. Cenospheres are recovered and marketed throughout the world as an aggregate (or "filler") material in a wide variety of products. Unlike some aggregates that compete with cenospheres for certain applications, cenospheres are not manufactured; they are recovered only from fly ash.

Concrete containing cenospheres can be a high performance concrete used in many construction applications including, but not limited to, specialty cements, mortars, grouts, and stucco. It can be used in construction of roads, bridges, buildings, docks, and dams.

Silica fume is a waste material recovered from alloyed metal production—it is the solid waste collected on filters of electric arc furnace stacks. According to the Silica Fume Coalition (SFC), silica fume is a very fine, dust-like material composed primarily of silicon dioxide, the basic component of most rocks and sand. The glassy, spherical particles, approximately 1 micrometer in diameter, are a

byproduct resulting from the reduction of high-purity quartz with coal or coke and wood chips in an electric arc furnace (EAF) during the production of silicon metal or ferrosilicon alloys. For comparison purposes, a grain of sand is about 1,000 times larger than a silica fume particle. Although silica content and particle size of fumes will vary according to the source of the fume, the use of silica fume in concrete has been standardized in specifications published by the American Society for Testing Materials (ASTM), the American Concrete Institute (ACI), the American Association of State Highway and Transportation Officials (AASHTO), and several state departments of transportation (DOTs). Hydrogen gas is released from concrete mixtures containing silica fume with a silicon metal production greater than 2 percent, which can result in a potential hazard. ASTM standards require that silica fume used in concrete be derived from only silicon or ferrosilicon metal production, which yields silica fume having a silicon metal content less than 2 percent, thus eliminating these hazards. Based on this information, EPA has concluded that any designation should be limited to silica fume from silicon and ferrosilicon metal production.

Concrete containing silica fume is a high-performance concrete (HPC) used in construction and maintenance projects including, but not limited to, roads, bridges, buildings, docks, and dams. As defined by ACI, HPC is concrete that meets special requirements not achievable through the use of conventional materials and construction practices. Concrete containing silica fume is sold premixed in bags, similar to concrete with other additives.

7. Specifications

EPA recommends procuring agencies contact cenosphere suppliers to obtain specifications such as material safety data sheets for assisting with use of cenospheres in cement and concrete. In addition, EPA recommends that procuring agencies refer to the following national specifications and guidelines, which enable procuring agencies to buy high-performance concrete containing silica fume of a standard quality, when purchasing cement and concrete with silica fume: ASTM C1240, AASHTO M840, and ACI 234R-96. ACI 234R-96 describes the properties of silica fume; how silica fume interacts with cement; the effects of silica fume on the properties of fresh and cured concrete; typical applications of

silica fume concrete; recommendations on proportions, specifications, and handling of silica fume in the field.

B. Modular Threshold Ramps

1. Background

In Section 247.12(k) of the proposed CPG IV, EPA proposed to designate modular threshold ramps containing recovered steel, aluminum, or rubber.

In Section C-11 of the accompanying draft RMAN IV, EPA recommended that modular threshold ramps contain the levels of recovered materials listed in Table 3.

Table 3
Draft Recovered Materials Content Recommendations for Modular Threshold Ramps

Material	Postconsumer Content (%)	Total Recovered Material Content (%)
Steel	16 - 67	25 - 100
Aluminum	–	10
Rubber	100	100

Notes: A final designation would not preclude a procuring agency from purchasing threshold ramps made from another material. It simply requires that a procuring agency, when purchasing steel, aluminum, or rubber threshold ramps, purchase these items made with recovered materials when they meet applicable specifications and performance requirements.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated items can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which, 67% is postconsumer steel. In addition, threshold ramps can be made from a combination of BOF and EAF steel which, according to industry sources, would result in a steel with 25% - 85% total recovered steel content, of which 16% - 67% would be postconsumer steel.

At the time EPA proposed to designate modular threshold ramps, it was aware that modular threshold ramps can be made with recovered copper. However, the Agency did not have any information related to the amount of recovered copper used in these ramps and therefore, did not include ramps containing recovered copper in its proposed designation. In the proposed CPG IV, EPA requested information on the use of recovered copper in the manufacture of modular threshold ramps. However, EPA did not receive any comments on modular threshold ramps. Therefore, based on the research conducted for the proposed CPG IV and draft RMAN IV, EPA is designating modular threshold ramps in the final CPG IV.

2. Summary of Comments and Agency's Response

As mentioned above, EPA did not receive any public comments related to modular threshold ramps.

3. Rationale for Designation

EPA believes that modular threshold ramps satisfy the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

Rubber modular threshold ramps can be manufactured with up to 100 percent postconsumer recovered materials. Metal ramps are manufactured from aluminum, steel, copper, or copper alloy (brass) containing recovered materials. Aluminum ramps can be composed of up to 40 percent secondary aluminum billet. Secondary aluminum billet contains 35 to 40 percent scrap aluminum, with the balance consisting of primary aluminum (ingot) and alloying ingredients. The end product would contain about 15 percent recovered total material. Steel ramps are made from either or a combination of steel made from the Basic Oxygen Furnace (BOF) and Electric Arc Furnace (EAF). A contact at the Steel Recycling Institute, therefore, indicated that steel threshold ramps can contain between 25 and 85 percent recovered

content including 16 to 67 percent postconsumer material. However, EPA has concluded that since steel ramps can be made from either type of steel, it is possible to make ramps with up to 100 percent total recovered materials if EAF steel is used.

Since concrete and asphalt threshold ramps require construction, they were not included with the modular threshold ramps that were designated. However, since EPA has already designated cement and concrete containing certain recovered materials, procuring agencies should consider requiring cement and concrete used for constructing threshold ramps to contain these recovered materials.

b. Technically Proven Uses

EPA is aware of two producers that use postconsumer recovered rubber and three that use recovered aluminum in threshold ramps. The use of recovered steel and copper in threshold ramps is also technically feasible.

Recycled rubber threshold ramps meeting the ADA and UFAS standards have been available since 1996 and are similar in performance and cost to synthetic rubber ramps. According to a contact with a school district in Florida, the recycled rubber ramp provides a greater static coefficient of friction rating, and is therefore more slip-resistant. The rubber threshold ramps can be used anywhere where there is a change of level landing requiring a ramp of 1:12 slope. The ramps are not limited to door thresholds. Therefore, this product has applicability along any access route, indoors or outdoors.

A limitation to the recycled rubber ramp is that it is only suitable for heights up to 6 inches. At this height the ramp becomes very heavy and expensive to ship. (The standard modular ramp weighs 16 to 18 pounds). For changes in level landing greater than 6 inches, modifications generally require re-pouring concrete or using permanent, custom-built rather than modular ramps.

For many years, aluminum, steel, and copper ramps have been used to provide access for people with disabilities and to eliminate barriers at door thresholds and other changes of level landing.

Aluminum threshold ramps generally involve assembling locking pieces and end flanges onsite with a minimum of nine cement anchors installed to fasten the product to the substrata. Aluminum ramps may have a more slippery cross-traffic surface than rubber threshold ramps, and therefore generally require a nonslip treatment that can wear and must be refurbished over time.

c. Impact of Government Procurement

EPA contacted six manufacturers of modular threshold ramps. Four of these companies manufacture rubber threshold ramps, and two use postconsumer recovered rubber; the other two use virgin (synthetic) rubber. Most have a network of distributors, but one company only sells its rubber threshold ramp to one specific customer.

Three of these suppliers also manufacture aluminum ramps that can contain recovered materials when secondary billet is less expensive than primary billet.

Although exempt from ADA requirements, the federal government is using the 1992 ADA guidelines with regards to accessibility by people with disabilities because they are more current than the much older UFAS. Hence, all government agencies potentially purchase modular threshold ramps. Manufacturers of modular threshold ramps are selling some products to the federal government. Three manufacturers indicated that their distributors have made sales to federal facilities, and, while EPA was not able to quantify purchases of these items, the Agency has concluded that they are purchased in substantial quantities that support the proposed designation of these items.

4. Designation

EPA is designating modular threshold ramps containing recovered steel, rubber, or aluminum as an item whose procurement will carry out the objectives of section 6002 of RCRA.

5. Preference Program

EPA recommends that, based on the recovered materials content levels shown in Table 4, procuring agencies establish minimum content standards for use in purchasing modular threshold ramps containing recovered materials.

Table 4

Final Recovered Materials Content Recommendations for Modular Threshold Ramps Containing Recovered Steel, Aluminum, and Rubber

Material	Postconsumer Content (%)	Total Recovered Material Content (%)
Steel	16 - 67	25 - 100
Aluminum	–	10
Rubber	100	100

Notes: The recommended recovered materials content levels for steel in this table reflect the fact that the designated item may contain steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF), or a combination of both. Steel from the BOF process contains 25% - 30% total recovered steel, of which 16% is postconsumer. Steel from the EAF process contains 100% total recovered steel, of which 67% is postconsumer. According to industry sources, modular threshold ramps containing a combination of BOF and EAF steel would contain 25% - 85% total recovered steel, of which 16% - 67% would be postconsumer. Since there is no way of knowing which type of steel was used in the manufacture of the item, the postconsumer and total recovered material content ranges in this table encompass the whole range of possibilities, i.e., the use of EAF steel only, BOF steel only, or a combination of the two.

These recommendations are for modular threshold ramps. EPA understands that ramps may also be constructed of cement and concrete. For these ramps, procuring agencies should follow the procurement guidelines for cement and concrete containing recovered materials.

6. Background for Recommendations

Threshold ramps are used to modify door thresholds and other small rises to remove barriers that changes in level landing create, particularly with regards to access by people with disabilities. Modular threshold ramps are usually made of metal or rubber. They are typically used for retrofitting buildings to comply with the Architectural Barriers Act (ABA) of 1968, the Rehabilitation Act of 1973, the Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act (ADA) of 1990. The

ADA Accessibility Guidelines cover the construction and alteration of facilities in the private sector (places of public accommodation and commercial facilities) and the public sector (state and local government facilities). The accessibility guidelines issued under ABA primarily address federal sector facilities and other designed, built, altered, or leased with federal funds.

A change of level landing greater than ½ inch, such as at a door threshold, creates a barrier to access by disabled individuals. Whenever possible, therefore, level differentials in thresholds should be eliminated to comply with UFAS and the ADA guidelines, which apply to state and local governments and private facilities of public accommodation. As a result, products have been developed to retrofit door thresholds. These products are also used to improve access by people with disabilities to outdoor recreation areas.

When the change of level landing is greater than 6 inches and where a modular ramp is not suitable, concrete, asphalt, wood, or metal are typically used to create a transition that effectively removes the barrier. A modular rubber ramp for a transition greater than 6 inches becomes very heavy and prohibitively expensive to ship.

Rubber threshold ramps can be manufactured with up to 100 percent postconsumer recovered materials. Metal ramps are manufactured from aluminum, steel, copper, or copper alloy (brass) containing recovered materials. Aluminum ramps can be composed of up to 40 percent secondary aluminum billet. Secondary aluminum billet contains 35 to 40 percent scrap aluminum, with the balance consisting of primary aluminum (ingot) and alloying ingredients. Steel ramps are made from either or a combination of steel made from the Basic Oxygen Furnace (BOF) and Electric Arc Furnace (EAF). A contact at the Steel Recycling Institute, therefore, indicated that a steel threshold ramp could contain between 25 and 85 percent recovered content including 16 to 67 percent postconsumer material. Nearly three-fourths (72 percent) of the copper used by copper and brass mills, ingot makers, foundries, power plants, and other industries comes from recycled copper scrap.

Recycled Rubber

Rubber ramps are made from either recycled or synthetic rubber. One company manufactures a 100 percent recycled threshold ramp and approach mat from 100 percent postconsumer recovered rubber derived from scrap automobile and truck tires. Scrap tires are collected from dealers and the public and ground into crumb rubber at a processing plant.

A company manufacturers recycled rubber flooring material from 80 to 100 percent crumb rubber. The material is extruded and compressed into a resilient interior and exterior flooring material. The company sells the flooring material to manufacturers of metal threshold ramps who use it to cover the metal surface, thus improving accessibility by people with disabilities.

Aluminum

Aluminum products are manufactured from aluminum billet—small ingots of aluminum. (An ingot is a mass of metal shaped for convenience in storage and transportation). There are two types of aluminum billet: primary and secondary. Primary manufacturers make aluminum ingot from bauxite. Secondary plants produce aluminum billet from scrap. This is combined with aluminum ingot and alloys to create aluminum for extrusion products.

According to the *Aluminum Statistical Review for 1997*, published by the Aluminum Association, 36.5 percent of the aluminum supply in the United States in 1997 was secondary billet. Technically, both primary and secondary billet can be used to make threshold ramps. Aluminum extruders will buy both, depending on price. To obtain the necessary performance specifications, however, no more than 35 to 40 percent of recovered aluminum is used in secondary billet. According to one aluminum extruder, the company uses about 30 percent secondary billet on average through the course of a year. Since secondary billet contains only 35 to 40 percent recovered aluminum, the end product contains an average of 10 percent recovered materials**.** According to the Aluminum Extruders Council, the choice of which aluminum alloy to use is generally driven by the product's application. Everyday threshold ramps can

probably be made from common 6xxx alloys (e.g., 6061, 6063, etc.), which can use scrap aluminum. There are a few alloys with low impurity limits (e.g., 7050) but these do not apply to threshold ramp applications.

Several of the manufacturers contacted by EPA make aluminum threshold ramps. One company makes aluminum folding ramps, curb ramps, handrail ramps, and entrance ramps, among other products. EPA did not confirm whether these particular ramps contained any recycled content, since the manufacturers generally do not specify secondary billet.

Steel

EPA received information from two manufacturers of stainless steel threshold ramps. The steel used in threshold ramps can be made from either BOF or EAF steel, or a combination of the two. It could potentially contain 25 to 85 percent total recovered content, including 16 to 67 percent postconsumer material.

Copper

According to the Copper Development Association (CDA), copper and copper alloys have been recycled for thousands of years. The entire economy of the copper industry is dependent on recycling. Although worldwide copper resources are estimated at nearly 5.8 trillion pounds, only about 0.7 trillion pounds (12 percent) have been mined. Nearly all of this is still in circulation, because copper's recycling rate is higher than that of any other engineered material. Each year, nearly as much copper is recovered from recycled material as is derived from newly mined ore in the United States.

Copper and brass threshold ramps are generally more expensive than rubber and steel. EPA contacted one manufacturer of brass threshold ramps. This company makes extruded aluminum and brass (bronze) thresholds and strips, including an interlocking ramp system that meets ADA accessibility guidelines. The company did not specify the percentage of recovered material in its ramps.

Table 5 presents information provided by manufacturers of modular threshold ramps on recovered content availability.

Table 5
Recovered Materials Content of Modular Threshold Ramps

Material	Postconsumer Content (%)	Total Recovered Materials Content (%)
Aluminum	Company A: unknown	10
	Company B: unknown	10
	Company C: unknown	10
Rubber	Company D: 100	100
	Company E: 100	100
	Company F: 80-100 (flooring material)	up to 100
Steel	Company G: 16 to 67	25 to 100
	Company H: 16 to 67	25 to 100
Copper	Company I: unknown	unknown

7. Specifications

Although the federal government is not governed by ADA, the Access Board's ADA standards are more current than the UFAS and are therefore generally used by federal facilities. According to the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities" (28 CFR Part 36), published in the *Federal Register*, July 26, 1991, ground and floor surfaces along accessible routes and in accessible rooms and spaces including floors, walks, ramps, stairs, and curbramps, must be stable, firm, and slip-resistant. The guidelines do not define what is meant by "stable, firm, and slip-resistant," but the Access Board recommends static coefficient of friction values of 0.8 for ramps and 0.6 for accessible routes.

C. Nonpressure Pipe

1. Background

In Section §247.14(l) of the proposed CPG IV, EPA proposed to designate nonpressure pipe containing recovered steel, plastic, or concrete as an item whose procurement will carry out the objectives of section 6002 of RCRA. In Section C-12 of the accompanying RMAN IV, EPA recommended that nonpressure pipe contain the levels of recovered materials listed in Table 6.

Table 6

Draft Recovered Materials Content Recommendations for Nonpressure Pipe Containing Recovered Steel, Plastic, and Concrete

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16 67	25 - 30 100
HDPE	100	100
PVC	5 - 15	25 - 100
Cement	Refer to cement and concrete recommendations in C-3 of the RMAN	

Notes: A final designation would not preclude a procuring agency from purchasing nonpressure pipe made from other materials. It simply requires that a procuring agency, when purchasing steel, plastic, or concrete nonpressure pipe, purchase the item containing recovered materials when they meet applicable specifications and performance requirements.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated item can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which, 67% is postconsumer steel.

In the proposed CPG IV, EPA requested comments on amount of recovered aluminum that is being used in aluminum pipe. EPA did not receive any comments in response to this request or specific to the proposed designation nonpressure pipe. Therefore, EPA is designating nonpressure pipe in the final CPG IV, but is not including aluminum in the final RMAN table.

2. Summary of Comments and Agency's Response

As mentioned above, EPA did not receive specific comments on nonpressure pipe.

3. Rationale for Designation

EPA believes that nonpressure pipe satisfies the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

The principal recovered materials investigated by EPA in its research on pipe were plastics (HDPE and PVC), steel, aluminum, and coal fly ash used in cement and concrete. EPA is also aware that cement and concrete containing ground granulated blast furnace slag (GGBF), cenospheres, and silica fume can also be used to make nonpressure pipe.

A 1996 report by the Reason Foundation indicated that because the pipe industry uses minimal amounts of recycled resin in its manufacturing, the industry could potentially absorb additional quantities. Reason estimated that as much as 130,000 additional tons of recovered PVC and 120,000 additional tons of recovered HDPE could be used in the manufacture of pipe.

b. Technically Proven Uses

Pipe containing recovered material has been used throughout the country for many years. Manufacturers of postconsumer-content plastic pipe report their products are used primarily for agricultural drainage and other applications where specifications do not preclude recovered materials. Several organizations have developed specifications related to pipe. These are referenced in the "Background Document for Proposed CPG IV and Draft RMAN IV," located in the RCRA Docket.

Several contacts expressed concern about some technical performance issues that could present purchasing barriers, particularly with plastic pipe. EPA addresses these concerns in the "Background Document for Proposed CPG IV and Draft RMAN IV," located in the RCRA Docket.

c. Impact of Government Procurement

Nonpressure pipe is purchased by federal, state, and local government agencies that engage in new construction or renovation projects. EPA was not able to quantify purchases of these items, but EPA has determined that nonpressure pipe is purchased in quantities sufficient enough to support the proposed designations of these items. In most cases, architects, engineers, and contractors are engaged for "turn-key" projects that include all design specifications and construction details. With the advent of performance-based contracting, agencies are leaving all details of the design and material specifications to the contractor.

4. Designation

In CPG IV, EPA is designating nonpressure pipe containing recovered steel, plastic, or cement.

EPA's designation is limited to nonpressure pipe used for noncritical applications such as agricultural drainage, drain, waste and vent (DWV), building and construction duct and pipe, road and highway ducts and drainage, and electrical and communications conduit.

5. Preference Program

EPA is recommending the draft RMAN recommendations in the final RMAN IV. EPA recommends that, based on the recovered materials content levels shown in Table 7 and the corresponding table in the RMAN IV, procuring agencies establish minimum content standards for use in purchasing nonpressure pipe.

Table 7

Final Recovered Materials Content Recommendations for Nonpressure Pipe Containing Recovered Steel, Plastic, or Cement

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16 67	25 - 30 100
HDPE	100	100
PVC	5 - 15	25 - 100
Cement	Refer to cement and concrete recommendations in C-3 of the RMAN	

Note: The recommended recovered materials content levels for steel in this table reflect the fact that the designated item can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which, 67% is postconsumer steel.

6. Background for Recommendations

Nonpressure pipe is used throughout the United States as drainage pipe and conduit in construction, communications, municipal, industrial, agricultural, and mining applications. Drainage pipe is used in water distribution systems for surface and subsurface applications (e.g., building foundations, highway construction, and general land drainage) to collect and convey water by gravity flow. It also is used in drain, waste, and vent (DWV) applications where it functions similarly to drainage pipe. In DWV applications, it is used primarily in residential construction and other building projects. It is used in sanitary and storm sewer applications and as conduit and ducts to house electrical and communications wires.

The principal recovered materials investigated by EPA in its research on pipe were plastics (HDPE and PVC), steel, aluminum, and coal fly ash used in cement and concrete.

HDPE

Two types of HDPE bottle resins are used in pipe: homopolymer and copolymer. Homopolymer is generally natural in color and used to contain products with a short shelf life such as milk and water. Copolymer is stronger, usually colored, and is used to contain detergent or household chemical products. Although manufacturers use homopolymer material, they prefer copolymer HDPE due to its lower cost and environmental stress crack resistance properties. Resin characteristics vary according to the type of pipe being manufactured.

A chemical company manufacturers a 100 percent postconsumer homopolymer derived from plastic bottles collected in recycling programs (i.e., milk and water jugs). Incoming material is cleaned and extruded into pellets. According to the specification, small amounts of other plastics, paper, metals, and other materials typically found in postconsumer plastic waste streams can be expected. Nothing is added to the material. In August 1997, the company was the only major virgin resin manufacturer producing postconsumer resin in pellet form for resale.

Polyvinyl Chloride (PVC)

Recovered PVC is being used for a variety of applications including conduit, sewers, gas extraction systems on landfill sites, and DWV. The PVC industry primarily uses "preconsumer" (also called "postindustrial") PVC recovered from the siding and window industries. A small amount of construction site scrap is included. This material includes ultraviolet (UV) stabilizers as well as fillers. Singlewall pipe manufacturers avoid "bottle" material, because it melts at a different rate. Co-extruded pipe manufacturers can accept 5 to 15 percent bottle grade PVC when it is blended with other materials in the interior layer.

One company manufacturers a conduit pipe containing 50 percent postindustrial PVC recovered from the fabrication of siding, window frames, and other PVC products. The remaining feedstock is virgin PVC. This manufacturer does not use postconsumer PVC because of its variable molecular weight.

Another company, however, uses 10 percent postconsumer PVC from house siding and window installations, and from bottles in the manufacture of its pipe. The other 90 percent is postindustrial PVC from fabricators of PVC house siding, windows, and bottles. The pipe is formed with layers of virgin material on the interior and exterior of the pipe, sandwiching recovered material between them. The pipe is used in sewers, gas extraction systems on landfill sites, and DWV applications. Another company manufacturers a PVC pipe from 25 percent postindustrial PVC. It also manufacturers a 100 percent postindustrial PVC pipe on demand. The company considers this pipe to be stronger than a comparable pipe made of virgin materials because the recovered PVC is purer than the standard virgin formulation that contains 40 to 50 percent calcium carbonate. The pipe also meets the appropriate ASTM specifications for nonpressure applications such as sewage and drainage.

Steel

Steel pipe is manufactured in three basic types: corrugated, welded, and cast. All types contain recovered steel. If manufactured in the Basic Oxygen Furnace (BOF) process, the pipe contains 25 to 30 percent recovered steel including at least 15 percent postconsumer steel. Pipe made by the Electric Arc Furnace (EAF) process can contain 100 percent recovered steel including 67 percent postconsumer steel.

Aluminum

Aluminum products are manufactured from aluminum billet—small ingots of aluminum. (An ingot is a mass of metal shaped for convenience in storage and transportation). Aluminum billet is manufactured in two types: primary and secondary. Primary manufacturers make aluminum ingot from bauxite, a naturally-occurring mineral. Secondary plants produce aluminum billet from recovered materials. Although EPA has concluded that the aluminum used for pipe can and does contain some percentage of recovered materials, we could not obtain any information on the recycled content levels in aluminum pipe from industry sources.

Cement and Concrete

Coal fly ash, a recovered material, can be used in the cement used to make pipe. ASTM Committee C13 on Concrete Pipe is responsible for the formulation and review of specifications, methods of test and definitions for concrete pipe.

Table 8 presents information provided by manufacturers of nonpressure pipe on recovered content availability.

Table 8
Recovered Materials Content of Nonpressure Pipe

Material	Postconsumer content (%)	Total recovered materials content (%)
HDPE	Company A: 15-100	up to 100
	Company D: 80	100
	Company E: up to 50	up to 50
PVC	Company B: 0	50
	Company C: 10	10
	Company F: unknown	25-100
Steel	Companies G through II: 16 to 67	25 to 100

7. Specifications

EPA recommends that procuring agencies refer to the following tables 9, 10, 11, and 12 when purchasing nonpressure pipe containing recovered materials.

Table 9

ASTM Plastic Pipe Specifications

F1960, Standard Specification for Co-extruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed Recycled Content
F1732, Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer and Drain Pipe Containing Recycled PVC Material
D1248, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
F810, Smooth wall Polyethylene (PE) Pipe for Use in Drainage and Waste Absorption Fields
F405, Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings
F512, Standard Specification for Poly(Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation
F667, Standard Specification for Large Diameter Corrugated Polyethylene Tubing and Fittings
F949, Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings
D2665, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
D3034, Standard Specification for Type PSM (Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D2239, Standard Specifications for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
D2447, Standard Specification for Polyethylene (PE) Plastic Pipe Schedules 40 and 80, Based on Controlled Outside Diameters
D2729-96a, Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
D3035, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
D4976, Standard Specification for Polyethylene Plastic Molding and Extrusion Materials
D3350, Standard Specification for Polyethylene Plastic Pipe and Fitting Materials
D4396, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds for Plastic Pipe and Fittings Used in Nonpressure Applications
F810, Standard Specification for Smooth wall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields
F405, Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings
F1970, Standard Specification for Special Engineered Fittings or Appurtenances for Use in Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Systems

Note: ASTM Committee C13 on Concrete Pipe is responsible for the formulation and review of specifications, test methods and definitions for concrete pipe and develops and reviews practices and guides covering design, installation, testing, economic evaluation, and performance of concrete pipe systems. While the previous ceiling on fly ash content had been set at 25 percent, in 1999, ASTM Committee C13 removed all limitations on fly ash content in pipe.

Table 10

ASTM Concrete Pipe Specifications

C14-99, Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe
C118-99, Standard Specification for Concrete Pipe for Irrigation or Drainage
C412-99, Standard Specification for Concrete Drain Tile
C444-95, Standard Specification for Perforated Concrete Pipe
C505-99a, Standard Specification for Nonreinforced Concrete Irrigation Pipe With Rubber Gasket Joints
C654-99, Standard Specification for Porous Concrete Pipe
C76-99, Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
C506-99, Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
C507-99, Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe
C478-97, Standard Specification for Precast Reinforced Concrete Manhole Sections

Table 11

ASTM and AASHTO Specifications for Steel Pipe

Material	Description	AASHTO Specifications	ASTM Specifications
Zinc Coated Sheets and Coils	Steel base metal* with 610 g/m2 (2 oz/ft2) zinc coating	M-218	A929M
Polymer Coated Sheets and Coils	Polymer coatings applied to sheets* and coils* 9.25 mm (0.010 in.) thickness each side	M-246	A742M
Fiber Bonded Coated Coils	Steel base metal with zinc coating and fibers pressed into the zinc while molten to form fiber bonded coating	--	A885
Aluminum Coated	Steel base metal* coated with 305 g/m2 (1 oz/ft2) of pure aluminum	M-274	A929M
Sewer and Drainage Pipe	Corrugated pipe fabricated from any of the above sheets or coils. Pipe is fabricated by corrugating continuous coils into helical "from with lockseam or welded seam, or by" rolling annular corrugated mill sheets and riveting seams:		
	Galvanized corrugated steel pipe	M-36	A760M
	Polymeric pre-coated sewer and drainage pipe	M-245	A762M
	Fiber bonded impregnated corrugated steel pipe	--	A760M
	Aluminized corrugated steel pipe	M-36	A760M
	Structural plate pipe	M-167	A761M
Asphalt Coated Steel Sewer Pipe	Corrugated steel pipe of any of the types shown above with a 1.3 mm (0.0050 in.) high purity asphalt cover	M-190	A849 A862
Invert Paved Steel Sewer Pipe	Corrugated steel pipe of any one for the types shown above with an asphalt pavement poured in the invert to cover the corrugation by 3.2 mm (l/8 in.)	M-190	A849 A862

Material	Description	AASHTO Specifications	ASTM Specifications
Fully Lined Steel	With an internal asphalt lining centrifugally spun in place	M-190	A849 A862
	Corrugated steel pipe with a single thickness of smooth sheet fabricated with helical ribs projected outward	M-36	A760M
	With an internal concrete lining in place	M-36	A760M
	Corrugated steel pipe with a smooth steel linter integrally formed with the corrugated shell.	M-36	A760M
Cold Applied Bituminous Coatings	Fibrated mastic or coat tar base coatings of various viscosities for field or shop coating of corrugated pipe or structural plate	M-243	A849
Gaskets and Sealants	Standard O-ring gasket	--	D1056
	Gasket strips, butyl or neoprene	--	C361

Notes: * Yield point 0230Mpa (33ksi) min,; tensile strength -310Mpa (45 ksi) min.; Elongation (50 mm/2 in.) - 20% min.

AASHTO pipe specifications restrict the use of recycled plastic through the reference to "rework" material. Specifications referenced by those who commented in 1994 are listed in Table 12. AASHTO's specifications are updated annually.

Table 12

AASHTO Pipe Specifications (1994)

M 252-93, Corrugated Polyethylene Drainage Tubing
M 294-93, Corrugated Polyethylene Pipe
M278, Class PS 46 Polyvinyl Chloride (PVC) Pipe
Section 18, Standard Specifications for Highway Bridges

D. Nylon Carpet and Nylon Carpet Backing

1. Background

In §247.12(d), EPA proposed to revise the existing carpet designation to include nylon carpet and carpet backing made with recovered materials. In Section C-4 (Revised) of the accompanying draft RMAN, EPA recommended that nylon carpet and backing contain the recovered material levels listed in Table 13.

Table 13
Draft Recovered Materials Content Recommendations for Nylon Carpet and Nylon Carpet Backing

Product	Material	Postconsumer content (%)	Total recovered materials content (%)
Nylon carpet face fiber	Old carpets	1 - 100	25 - 100
Nylon carpet backing	Vinyl	35 - 70	100

Notes: EPA's recommendations do not preclude a procuring agency from purchasing carpet made from other materials such as acrylic or wool. They simply require that procuring agencies, when purchasing nylon carpet, purchase it with recovered materials in either the fiber facing or the backing, or both, when it meets applicable specifications and performance requirements.

The nylon carpet recommendations also applied to "renewed" nylon carpet, which is cleaned, retextured, recolored, or otherwise reused to produce a new nylon carpet product.

2. Summary of Comments and Agency's Response

As summarized below, EPA received a number of comments on its proposed designation of nylon carpet in the proposed CPG IV and its recovered materials content recommendations for nylon carpet face fiber and nylon carpet backing contained in the draft RMAN IV. Many of these comments provided additional information that was conflicting in nature. As a result of these comments, EPA has decided not to finalize the designation of nylon carpet face fiber and nylon carpet backing at this time.

EPA instead issued a Notice of Data Availability (NODA) on July 16, 2003 (68 FR 42040) announcing the availability of information on nylon carpet submitted both during and after the public comment period and provided a summary of the revisions EPA is considering making to the draft RMAN for nylon carpet as a result of this information. EPA will consider information and data submitted in response to this notice when issuing the final RMAN recommendations for nylon carpet in the future. The NODA can be accessed at www.epa.gov/cpg. Supporting materials and public comments submitted in response to the NODA are available through the EDOCKET, EPA's electronic public docket and comment system, at http://www.epa.gov/edocket/. The docket number for the NODA is RCRA-2003-0013. Copies of all of the comments submitted to EPA in response to the CPG IV proposed rule and draft RMAN IV are also available through EDOCKET, in docket number RCRA-2001-0047.

Many commenters generally supported the designation of nylon carpet in the federal procurement guideline program and were generally supportive of EPA's recycled-content recommendations. However, some commenters recommended that EPA not designate nylon carpet at all, while others suggested that EPA not include traditional broadloom carpet in the guideline. Several commenters provided new information that suggested an alternative approach: that EPA should provide RMAN recommendations for the different types of nylon carpet (e.g., broadloom vs. tiles or modular, and traditional broadloom vs. performance broadloom) and designate and/or provide recovered materials content recommendations for the entire nylon carpet product rather than issue separate recommendations for the fiber face and backing.

Eight commenters raised concern over the availability of recovered nylon for producing face fiber for nylon carpet, stating that the closure of the Evergreen nylon recycling facility would seriously impact the availability of recovered nylon face fiber. One commenter stated that closing of the Evergreen facility left no practical options for incorporating postconsumer nylon into new nylon carpet face fiber and that the remaining sources of recovered material feedstock for nylon carpet are post-industrial in nature and are not enough to satisfy EPA's criteria for designating a product. Commenters pointed out that using recycled content in traditional broadloom would be of particular concern since traditional broadloom carpet does not have a structured backing that could easily incorporate recycled content and, therefore, most of the recycled content would have to be in the fiber face. Three commenters disagreed with this point of view and stated that the closure of the Evergreen facility should not prevent EPA from

going forward with its designation because other fiber manufacturers have the ability to produce recovered content fiber with reasonable postconsumer levels. Some commenters questioned whether EPA should include recycled-content recommendations at all for traditional broadloom carpets, and one set of comments from members of the carpet industry questioned whether EPA should designate nylon carpet or issue recycled-content recommendations as part of the federal CPG program. These commenters claim that focusing on recycled content in nylon carpet could be inconsistent with the broader product stewardship goals established in industry environmental programs such as the Carpet America Recovery Effort (CARE) and could also divert scarce resources from such programs. The concerns from these commenters are that a postconsumer content requirement would foster the use of heavy weight backing products with postconsumer material as a filler and that, when broader issues of energy, emissions and other resources are taken into consideration, recycled content carpets are not always environmentally preferred over non-recycled content carpets. Another commenter stated that the development of an end of life recovery infrastructure has to precede the broad availability of postconsumer recycled materials for manufacturing.

One commenter believes EPA improperly restricted nylon backing products to those made from PVC or vinyl. The commenter believes that the recovered material used in the backing should not be limited to PVC or vinyl, because other technologies utilize other types of recovered material in nylon carpet backing and there are many other recovered nylon materials and products that can and are being used in the manufacture of carpet backing. (These include old carpets containing urethane, fiberglass or latex.)

Four organizations submitted comments on fly ash (used as a filler material and substitute for calcium carbonate or limestone feedstock) as a recovered material in nylon carpet. Some requested that EPA not accept fly ash as a recovered material for nylon carpet while others believe that EPA should not restrict the types of recovered materials that make up carpet.

A number of commenters suggested recovered materials content ranges that EPA should consider in making final RMAN recommendations for nylon carpet. Since EPA had proposed separate recovered content recommendations for nylon fiber face and backing, many of the commenters recommended

recovered materials content ranges for each carpet component (i.e., fiber face and backing, separately). Some commenters recommended recycled content ranges for the entire carpet (i.e., fiber face and backing combined).

E. Revision to Polyester Carpet Designation

1. Background

In 40 CFR §247.12(d), EPA proposed to amend the designation for polyester carpet to specify that the designation is limited to moderate- and heavy-wear applications such as those found in single-family housing units, private offices, and similar applications, as classified at the time by the Carpet and Rug Institute (CRI).

2. Summary of Comments and Agency's Response

EPA received several comments regarding its proposed amendment to the polyester carpet designation. As explained in the responses to these comments, summarized below, EPA is moving forward with the amendment to the polyester carpet designation.

Comment: Five organizations submitted comments on EPA's recommended use of polyester carpet in moderate and heavy minimum use classifications based on CRI's End-Use Applications Classification. CRI recommended that polyester carpets be limited for application only in moderate end-use as indicated in CRI's revised Carpet End-Use Applications Classification document. With its comments, CRI provided a revised table for Carpet End-Use Applications Classification. In the Background Document for Proposed CPG IV and Draft RMAN IV, EPA noted that at the time the proposed CPG IV/RMAN IV was issued, the classifications were under review and were expected to be revised. CRI also provided GSA-recommended density specifications for polyester carpet construction.

With regard to EPA's proposal clarifying its original specifications for polyester carpet, the White House Task Force on Recycling indicated that it was not clear whether EPA intends to exclude bachelor-enlisted quarters and other dormitory-style housing from the scope of its revision. The Task Force asked that EPA state unambiguously in the final notice whether the specifications apply to these types of housing.

Response: EPA has revised the final RMAN to address these comments and reference CRI's End-Use Applications Classification. The final RMAN for polyester carpet in thus limited to moderate end uses and does not include heavy or severe end uses. Under CRI's revised classification system, bachelor-enlisted quarters and other dormitory-styled housing are categorized as "heavy" use. Therefore, these types of housing would be excluded from the polyester carpet recommendation. EPA also has included the GSA-recommended density specifications provided by CRI in the final RMAN.

Comment: Manatt, Phelps, & Phillips, LLP (on behalf of Milliken Carpet) does not believe EPA has sufficiently explored and evaluated the problems related to uses for polyester carpet, particularly as they relate to performance characteristics. Specifically, the company does not believe that polyester carpet should be recommended for heavy-wear applications. Even though EPA's recommendation does not include polyester carpet for severe-wear and commercial applications, Milliken believes some heavy-wear applications, such as in private offices, may be considered "commercial" use in some situations. Three other commenters (DuPont Nylon Flooring , the National Recycling Coalition, and the CRI) stated that polyester carpet should be limited to moderate end-use classifications.

Response: As discussed above, EPA has revised the recommendations for polyester carpet to reflect CRI's revised End-Use Applications Classification table and is revising its recommendation to limit polyester carpet to moderate end uses.

Comment: Milliken also commented that EPA's instruction on purchasing polyester carpet for suitable applications is confusing in light of EPA's proposed designation of nylon carpet. Milliken believes that the language EPA included in the proposed rule may be interpreted to require the purchase of polyester carpet over nylon carpet when both products are designated for the same use. Milliken

suggests making it clear that customers can choose either nylon carpet or polyester carpet if both qualify for a particular use. Milliken specifically referred to language on page 45267 of Proposed CPG IV.

Response: In the carpet discussion on page 45267 of the proposal, EPA in no way meant to favor one type of carpet product over another. As mentioned previously, EPA has issued a NODA announcing the availability of information on nylon carpet submitted both during and after the public comment period and provides a summary of the revisions EPA is considering making to the draft RMAN for nylon carpet as a result of this information. EPA will consider information and data submitted in response to this notice when issuing the final RMAN recommendations for nylon carpet in the future. The NODA can be accessed at www.epa.gov/cpg. Supporting materials and public comments for this notice are available through EPA's electronic public docket and comment system. If EPA moves forward with a nylon carpet designation, it will ensure that the recommendations for both polyester and nylon carpet are made clear.

3. Designation

EPA is amending the polyester carpet designation to reference the new Carpet and Rug Institute (CRI) classifications and specify that the designation be limited to moderate-wear applications.

a. Preference Program

EPA recommends that, based on the recovered materials content levels recommended for polyester carpet in CPG I, procuring agencies establish minimum content standards for use in purchasing polyester carpet for moderate-wear applications such as those found in single-family housing units or other similar applications as identified by the Carpet and Rug Institute (CRI). This recommendation does not include polyester carpet for heavy- or severe-wear or commercial-type applications.

b. Specifications

Procuring agencies should refer to CRI's table entitled "Use Classification by End-Use Application" for a complete listing of CRI's recommended carpet applications. A copy of this table has been placed in the public docket for the RMAN.

Procuring agencies should also refer to GSA's minimum density recommendations, as follows:

- Cut pile constructions: 5,000 ounces/yard^3 minimum density
- Loop pile constructions:4,500 ounces/yard^3 minimum density

While numerous carpet specifications exist, the members of the carpet industry do not utilize any universal standards. Specifications vary and are determined based on the particular factors of the installation. The project's designer, architect, general contractor, and/or facility manager typically decide the specifications. Some procuring agencies, such as the Department of the Army and the Department of Housing and Urban Development, have developed their own specifications for end-use carpet applications. These specifications should be readily available to procurement officials in those agencies.

F. Roofing Materials

1. Background

In Section §247.12(m) of the proposed CPG IV, EPA proposed to designate roofing materials made from recovered content steel, aluminum, fiber, rubber, plastic or plastic composites, and cement as items whose procurement will carry out the objectives of section 6002 of RCRA. In Section C-14 of the accompanying draft RMAN IV, EPA recommended that roofing materials contain the levels of recovered materials listed in Table 14.

Table 14

Draft Recovered Materials Content Recommendations for Roofing Materials

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16 67	25 - 30 100
Aluminum	20 - 95	20 - 95
Fiber (felt)	66 - 100	100
Rubber	12 - 100	100
Plastic or Plastic/Rubber Composite	100	100
Wood/Plastic Composite	–	100
Cement	Refer to cement and concrete recommendations in C-3 of the RMAN	

Notes: A final designation would not preclude a procuring agency from purchasing roofing materials manufactured from another material. It simply requires that a procuring agency, when purchasing steel, aluminum, fiber, rubber, plastic, wood, or cement roofing materials, purchase these items made with recovered materials when these items meet applicable specifications and performance requirements.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated item can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which, 67% is postconsumer steel.

2. Summary of Comments and Agency's Response

In the proposed CPG IV, EPA requested comments on the use of recovered materials in wood, fiberglass, and asphalt/plastic composite roofing materials. The Agency did not receive any comments in response to this specific request, but did receive the comment summarized below.

Comment: Nuline believes that there is a significant omission in the background document. Nuline provided language to recognize its product—organic corrugated asphalt panels and tiles—as part

of the designation in the Residential Roofing section. Nuline requested that EPA insert the language into Section 1.e of the background document following the designation for Organic Corrugated Asphalt Panels and Tiles.

Response: In its research, EPA included discussion of Nuline's roofing product in the section addressing "fiber" products, since the product contains 50 percent cellulose fibers. EPA's research found that asphalt roofing products do not typically contain recovered asphalt, so the Agency placed items such as those made by Nuline in the "Fiber" category. To make it clearer, EPA has changed the material to "Fiber or Fiber Composite" in the RMAN table to capture companies making roofing products both from fiber alone of fiber combined with other materials, such as asphalt or wood. EPA has also adjusted the recommended postconsumer and total recovered content to 50-100 percent to reflect information provided by the commenter. In addition, upon designation, Nuline and other companies will be added to EPA's online Supplier Database.

3. Rationale for Designation

EPA believes that roofing materials satisfy the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

Steel containing recovered and postconsumer material content is used in roof decking, shingles, and panels. According to the Steel Recycling Institute, depending on whether the steel is produced by the basic oxygen furnace or electric arc furnace method, the steel used in roofing materials could contain 25 to 100 percent recovered steel, including 16 to 67 percent postconsumer steel. Fiber used in matting (tar paper, underlayment, felt), roll roofing, and organic asphalt shingles normally has some recovered and postconsumer materials content derived from old corrugated containers, old newspapers, mixed office waste, wood chips from used pallets, or recovered used dry felt. A fiber base can also be used in concrete

shingles. EPA contacted four manufacturers of organic shingles that each use between 66 and 100 percent postconsumer corrugated containers, kraft paper, mixed paper, and other recovered paper.

Large fiberglass shingle manufacturers contacted by EPA indicated that they do not manufacture the shingles with recovered content material. Likewise, EPA found that asphalt used in matting, roll roofing, shingles, coatings, modified bitumen, and built-up roofing usually does not contain recovered or postconsumer materials. Aluminum shingles and panels can and are being made with recovered and postconsumer materials. One manufacturer uses up to 20 percent postconsumer material from curbside collection programs. Another manufacturer makes 95 percent postconsumer aluminum shingles. Rubber single-plies, shingles, and "rubberized" modified bitumen (styrene-butadiene-styrene, known as SBS) can contain some recovered and postconsumer materials, including old tires. One manufacturer of rubber shingles uses 100 percent postconsumer (old) tires. EPA is aware of one other manufacturer that claims to use at least 50 percent postconsumer rubber in its shingles. Plastic single-plies, shingles, and plasticized modified bitumen (atactic polypropylene, known as APP) can contain various types of recovered and postconsumer plastics. One contact was unable to provide a percentage of recovered material content of its plastic. Another manufacturer EPA contacted makes plastic shingles and shakes from 100 percent postconsumer plastic. Wood shakes can contain recovered materials from old pallets, pallet scraps, sawmill waste, and manufacturing waste. EPA contacted one manufacturer that incorporates the company's manufacturing waste into wood shakes and shingles. Another manufacturer makes roofing shingles from 100 percent recovered wood and PVC plastic. Cement-based shingles can include recovered materials. One manufacturer uses 4 percent postconsumer newsprint fibers and 14 percent recovered silica fume in their fiber base concrete shingles, which are made with portland cement.

b. Technically Proven Uses

Durability is critical in roofing because a failure can mean serious damage, not just to the roofing itself, but to the building and its contents as well. EPA found no performance issues relating to the use of recovered materials in roofing products.

Roofing systems and their components are subject to an array of standards, tests, and codes pertaining to performance and other characteristics. EPA found no building codes or standards that prohibit the use of recovered materials in roofing products.

c. Impact of Government Procurement

The federal government procures a vast amount of roofing materials annually, although statistics are not kept on this information. The Department of Commerce's "Commerce Business Daily" has on online, searchable database, however, and EPA was able to find numerous active and archived notices for construction and renovation projects by federal agencies that involve, among other things, roofing, While most of the information available is for re-roofing projects, it goes without saying that all new building construction projects would include roofing.

Several manufacturers indicated that they sell to federal, state, or local government entities, but did not provide names of specific agencies, contact names, or the amount sold.

4. Designation

In CPG IV, EPA is designating roofing materials containing recovered steel, aluminum, fiber, rubber, plastic or plastic composites, or cement.

5. Preference Program

EPA recommends that, based on the recovered materials content levels shown in Table 15, procuring agencies establish minimum content standards for use in purchasing or procuring roofing materials or services. EPA's research indicates that wood shakes and shingles as well as asphalt/plastic composite roofing materials can be made from recovered materials, but we were unable to identify recycled-content percentages in these products.

Table 15

Final Recovered Materials Content Recommendations for Roofing Materials Containing Steel, Aluminum, Fiber, Rubber, Plastic or Plastic Composites, or Cement

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16 67	25 - 30 100
Aluminum	20 - 95	20 - 95
Fiber (Felt) or Fiber Composite	50 - 100	50-100
Rubber	12 - 100	100
Plastic or Plastic/Rubber Composite	100	100
Wood/Plastic Composite	–	100
Cement	Refer to cement and concrete recommendations in C-3 of the RMAN	

Note: The recommended recovered materials content levels for steel in this table reflect the fact that the designated item can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which, 67% is postconsumer steel.

6. Background for Recommendations

A building's roof system and its finished roofing materials are the primary means of shielding a structure's interior from the natural elements. According to the Roofing Industry Educational Institute, approximately 30 variables determine the type of roof to use on a building. Variables include the roof structure and decking, its slope, appearance, the weight the structure must support, local building and fire codes, the roofing materials already on the building, and the area's climate and wind zone. For example, while a sloping shingle roof easily sheds water, a flat roof must depend on a continuous waterproof membrane to contain the water while it drains and/or evaporates.

Consequently, roofing systems fall into two general categories: 1) high-sloped or "pitched" roofs and 2) low-sloped or flat roofs. Residential structures normally have pitched roofs, although parts (such as garages or some additions) can be low-sloped. Commercial roofs are generally low-sloped. Roofs are generally referred to as "residential" or "commercial," but these terms can refer either to the slope of the roof or the use of the building (also see section 1e below).

In its research, EPA identified dozens of roofing systems and materials, but focused on those systems and materials that are most prevalent in the industry, as follows.

Commercial—New Construction	Built-up roofing
Commercial—Re-roofing	Single-ply systems (re-covering)
	Modified bitumen (tear-off/replacement)
	Built-up roofing (tear-off/replacement)
Residential—New Construction	Organic and Fiberglass Shingles
Residential—Re-roofing	Roll roofing (re-covering)
	Shingles (tear-off/replacement)

According to the National Roofing Contractors Association (NRCA), new construction represents only 26 percent of low-slope roofing; most low-slope roofing jobs (74 percent) are re-roofing and repair and maintenance. New construction makes up 29.5 percent of steep-slope roofing; most steep-slope roofing jobs (70.5 percent) are re-roofing and repair and maintenance. The roofing systems most commonly used in new construction are built-up roofing (commercial) and shingles (residential). The roofing systems most commonly used in re-roofing are single-ply systems (commercial) and roll-roofing and shingles (residential). In addition, the Asphalt Roofing Manufacturers Association (ARMA) stated that the major component of any roofing system [by volume] is thermal insulation. EPA did not research

this aspect of roofing materials, however, because EPA has already designated building insulation in the CPG.

Most residential and some commercial roofing systems comprise three distinct "layers" or components: 1) the substructure, 2) the underlayment, and 3) the surface layer. Each one of these layers can contain a variety of components and materials (including recovered materials), as follows.

The Substructure

The substructure is the primary layer and serves as the structural support for the roof. The components of this layer include **rafters** (also known as decking), which act as the "ribs" of the roof; and **sheathing**, which is a rigid, flat material (often 1 inch x 6 inch or 1 inch x 12 inch plywood boards) that is nailed to the rafters, and to which the underlayment and/or surface layer is attached. These components are commonly made of wood, plywood, poured or precast concrete, gypsum planks, lightweight aggregate, or steel, with steel being the substructure material of choice for about 70 percent of new commercial buildings. In residential structures, the substructure is more commonly made of wood and plywood.

The Underlayment

The secondary layer of a roof is known as the underlayment. It provides a comprehensive substrate to help seal the roof and prevent leaking. It is designed to adhere tightly to roof sheathing and around the shanks of nails driven through it. The components of this layer include different types of **sheeting, matting, and membranes.** Often this component is referred to as "roll roofing," because these products often are applied in rolls. (Note: some roll roofing products are also used as primary or "surface" layer materials.) "Tar paper" is another commonly used industry term because some products consist of a fiberglass or fiber substrate impregnated and coated with asphalt or tar.

Sheeting, matting, and membranes are made from a variety of materials, including fiberglass, paper, and felt; and more impervious materials (in sheet form, sometimes also used in "single-ply" systems as the "surface" layer) such as PVC, rubber composites such as Ethylene Propylene Diene Monomer (EPDM), and other elastomeric/polymeric materials such as butyl rubber or chlorinated polyethylene. EPDM, an elastomer which is generally used in conjunction with other elastomers and modifiers, is a synthetic rubber used in many rubber products except tires. It is thermoset rubber, meaning that it cannot be remelted or reformed without destroying its original characteristics. EPDM rubber most likely cannot contain recovered materials. In addition, as mentioned above, more porous substrate materials (such as paper and felt) are often impregnated or coated with additional water-resistant materials, such as tar or asphalt.

The Surface Layer

The surface or finish layer is the most important layer of a roof because it is the area directly exposed to the elements. This layer is constructed in a way that diverts precipitation toward gutters or other drainage systems. The surface layer can be constructed of many different types of products, depending on the type of building, climate, aesthetics, and desired durability. These products can include: shingles, shakes, tiles, and panels; flashing, gutters, and downspouts; and coatings.

Shingles, shakes, tiles, and panels are made from a wide variety of materials, including wood, plywood, steel, tin, iron, plastic, fiber-cement, clay (ceramic), concrete, asphalt (which may have either a fiberglass or natural fiber base), slate, rubber, and fiberglass. Metal panels often have a galvanized coating, or are factory-coated with a highly durable finish such as polyvinylidene fluoride or an aluminum zinc alloy (i.e., Galvalume).

Flashing is small pieces of surface material that are applied around vent pipes, chimneys, skylights, eaves, and in valleys that connect two sections of a roof, to prevent leaks. Flashing is usually made of galvanized sheet aluminum or copper, but can also be made of polymer modified bituminous material. Some roll roofing products are occasionally used as flashing. Gutters catch and channel excess

precipitation off the roof into downspouts, and onto the ground. Gutters are commonly made of aluminum and tin.

Roll roofing is commonly used in residential surface applications. These products consist primarily of coated and saturated (impregnated) felt.

Coatings are used for both residential and commercial roofing systems to patch, repair, retrofit, or extend the life of a roof, most commonly roofs without shingles. Coatings are most often asphalt and a fiber mixed with solvent and emulsion. Other kinds of coatings include aluminized asphalt, elastomeric systems (made from latex resin), and specialty coatings, such as urethane, modified acrylic, and soybean-based coatings.

Built-up (Slag), Single-ply, Foam, and Modified Bitumen Roofs

Several types of roofing systems do not consistently meet the 3-layer structure outlined above. These systems are used most commonly on commercial, low-slope buildings, and have design elements and material components that are, in some cases, unique unto themselves (i.e., not used in any other roofing product or system.) These independent systems often combine the underlayment and surface layers into one effective system. The systems and the materials used in them are outlined below:

Built-up roofing (also referred to as "slag" roofing) is the oldest type of roofing system in use today. This simple yet effective system consists of several alternating layers of hot asphalt and roofing felt (also called tar paper). The final (surface) layer is commonly covered with pea gravel or slag. Sheathing is often used with this system as underlayment. A built-up roof can generally be expected to last 10 to 20 years.

Single-ply roofing is made up of one layer of an impervious flexible membrane. Plies are either welded, attached with adhesive, or otherwise affixed to sheathing. They can be made in sheet form from rubber (EPDM), PVC, and elastomeric and polymeric materials such as butyl rubber or chlorinated polyethylene. They can also be liquid- applied using synthetic elastomeric rubber such as Hypalon (a proprietary DuPont product). (Note: This system differs from roll roofing in terms of the type of materials used—"roll roofing" refers to a group of products made with a fiber substrate and impregnated

and/or coated with asphalt and/or tar.) Because single-ply is a relatively new roofing technology, there is little evidence as to life-span, but industry estimates range from 25 to 40 years.

Modified Bitumen Roofing is a cross between built-up roofing and single-ply roofing. There are two forms of this asphalt-based system: plasticized (also called atactic polypropylene or APP), and rubberized (also called styrene-butadiene-styrene or SBS). These roofing systems are often used in re-roofing projects, and can be expected to last from 25 to 40 years.

Foam roofing is used primarily in re-roofing jobs to remedy roof leaks, roof failures, and inadequate insulation. The foam is commonly made of urethane, and a silicone rubber or urethane elastomer protective coating is often applied over the foam. Foam roofing applications can be expected to last from 15 to 25 years.

Residential vs. Commercial Roofing

As previously mentioned, roofing systems generally fall into two categories: residential (high-sloped or pitched) and commercial (low-sloped). These two types of systems generally are constructed differently and use different materials, although some materials are used for both residential and commercial systems. A market survey found that 71 percent of the overall roofing market is commercial roofing and 29 percent of the market is residential roofing.

To re-roof commercial and residential roofs, the old roof is torn off and replaced or is covered over. Nationwide, tearoff/replacement represents 67 percent of the residential and commercial markets combined, and re-covering represents 33 percent of the market. For the most part, commercial and residential roofing systems can be used interchangeably for both new construction and re-roofing.

Residential Roofing

According to NRCA, new construction made up 18 percent of the 1996 - 1997 residential roofing market, while re-roofing made up 82 percent. Of residential re-roofing, tearoff/replacement comprised 77 percent of the market and re-covering comprised 23 percent. The most common types of residential

roofing materials used in new construction and re-roofing in North America are fiber/asphalt shingles, which make up 63 percent of the residential roofing market nationwide.

Up to three layers of shingles can be placed on a roof for re-roofing. Although asphalt shingles (with either fiberglass or organic fiber mats) are still the most common choice for residential roofing applications, several other surface layer roof coverings are also commonly used on residential roofs, as described below. (Several types are or can be made from recovered materials, as discussed later in section 2):

- **Fiberglass asphalt shingles.** These shingles are made with a fiberglass base layer impregnated and coated with asphalt and covered with slag or other granular material (often a byproduct of coal-burning furnaces). This type of shingle makes up approximately 80 percent of the asphalt shingle industry. An asphalt shingle roof can last anywhere from 15 to 35 years, depending on the climate.

- **Organic asphalt shingles (also known as "composite" shingles).** These shingles are made with a fiber base layer (usually corrugated containers, newspaper, kraft, or mixed paper) impregnated and coated with asphalt and covered with slag or other granular material (often a byproduct of coal-burning furnaces). This type of shingle makes up approximately 20 percent of the asphalt shingle industry.

- **Wood shingles or shakes**. Most commonly made of red cedar, wood shingles are thin, machine-cut, and smooth on both sides, while shakes are thicker and rough on at least one side. In addition, hardboard shingle panels are sometimes used, which are larger than traditional shingles or shakes. Wood shingles can last anywhere from 10 to 50 years, depending on the climate and type of wood.

- **Clay/Ceramic tiles**. Often used in the western United States, these tiles are very heavy but effective and long-lasting.

- **Slate tiles/panels**. One of the oldest and most expensive roofing materials, slate is made from unprocessed stone that is mined and cut to size. Synthetic slate, an alternative, has been created from cement-impregnated fiber. Slate roofing is typically used on buildings for historical accuracy. A slate roof can last indefinitely.

- **Cement shingles/concrete tiles.** Fiber-reinforced concrete tiles have many of the same attributes of ceramic tile and slate but are lighter weight.

- **Plastic shingles or shakes.** Plastic shingles and shakes often resemble other types of shingles and shakes, such as wood, clay, or slate, but can be less expensive, lighter weight, and can require less maintenance. This appears to be a small but growing new market.

- **Rubber shingles or shakes.** These types of roof coverings, often made from old tires, also appear to be a new type of roofing material that can be used in place of asphalt shingles or wood or plastic shakes.

- **Metal shingles/panels**. Metal roofing is commonly made of aluminum or a combination of steel with an alloy of aluminum and zinc. Some metal roofing is corrugated and used like fiberglass panels, and some metal shingles are designed to look like other types of materials. Normally these types of roof coverings have a galvanized coating, or are factory-coated with a highly durable finish such as polyvinylidene fluoride or an aluminum zinc alloy. A coated metal roof can last indefinitely, depending on materials and coatings used.

- **Fiberglass panels.** Corrugated fiberglass panels are often used to construct roofs in decks, carports, and greenhouses.

- **Roll roofing.** Roll roofing is made with the same materials as composite shingles: usually fiber (such as felt) impregnated and/or coated with asphalt. It comes in a roll and is often used on low-slope parts of a building.

- **Built-up roofing** (see definition above).

- **Single-ply roofing** (see definition above).

- **Modified bitumen** (see definition above).

Commercial Roofing

About 900 distinct commercial roofing systems are on the market. In 1998, new construction made up 23 percent of the commercial market, while re-roofing made up 77 percent. For re-roofing, tearoff and replacement made up 65 percent of the market and re-covering made up 35 percent. The most common types of new commercial construction materials used in 1998 were single-ply and built up

roofing. The most common types of systems used for commercial re-roofing were single-ply, modified bitumen, and built-up roofing. Commercial roofs can also be made from:

- **Roll roofing**
- **Metal panels**
- **Tile (ceramic or slate)**
- **Fiberglass and organic asphalt shingles**
- **Matting**

Commercial roof decking can be made from wood, concrete, lightweight aggregate, or steel, but about 70 percent of new buildings are made with steel decking.

EPA ascertained the following information on the use of recovered materials in roofing:

- **Steel** used in roof decking, shingles, and panels always contains some recovered and postconsumer content. According to the Steel Recycling Institute, depending on whether the steel is produced by the basic oxygen furnace or electric arc furnace method, the steel used in roofing materials could contain 25 to 100 percent recovered steel, including 16 to 67 percent postconsumer steel. EPA contacted one manufacturer of steel decking that uses 30 to 35 percent recovered or postconsumer materials. The contact believes his product's postconsumer content is consistent with the industry standard for recycled steel. Most manufacturers do not know that their steel products contain recycled materials and do not advertise as such. There are at least 10 to 15 other steel decking manufacturers in the East and Midwest that use levels of recovered steel that are comparable with industry standards.

  EPA spoke with two manufacturers of steel shingles and panels. Both claimed levels of recovered materials in their products consistent with the steel industry standard. One of these manufacturers indicated that their steel panels are used primarily for commercial applications and are stone-coated.

- **Fiber** used in matting (tar paper, underlayment, felt), roll roofing, and organic asphalt shingles normally has some recovered and postconsumer materials content. A fiber base can also be used in concrete shingles. EPA contacted four manufacturers of organic shingles that each use between 66 and 100 percent postconsumer corrugated containers, kraft paper, mixed paper, and other recovered paper. One manufacturer that makes mostly organic asphalt shingles uses felt that is made from almost 100 percent postconsumer corrugated containers or kraft paper with negligible amounts of mill scraps from the company (less than 1 percent). The company's postconsumer materials are purchased from recyclers. In addition, one company manufactures a "corrugated asphalt" roofing product which contains 50 percent asphalt and 50 percent postconsumer recycled cellulose fibers from newspapers, magazines, corrugated paperboards, and office waste paper.

  Another manufacturer makes organic felt shingles from recovered paper. About 66 percent of the felt paper is made with postconsumer mixed paper and corrugated containers collected from recyclers who deliver it baled. The other 33 percent is made of wood chips, both from pallet scraps and virgin wood. The company also uses granules made from coal-fired-boiler slag (an industrial waste) as a surface coating.

  Still another company EPA contacted makes five weights of roofing felt from 100 percent postconsumer paper. About 70 percent of the material is old corrugated containers and 30 percent is mixed paper. The company buys the material through a broker, and also directly from businesses where it has a baler. The products are used both in the residential and commercial sector. The contact indicated that the company uses recycled materials because the price for recovered paper can be less than virgin paper and because it feels "regulatory pressure" from the federal government to do so. One other company EPA contacted makes 100 percent recovered content dry felt for use in shingles and tar paper. About 70 percent is postconsumer paper from collection programs and 30 percent is sawdust. The sawdust and paper are used together, saturated with asphalt, and coated with a durable finish.

- **Fiberglass** used in matting (tar paper, underlayment, felt), roll roofing, and asphalt shingles may contain recovered and postconsumer content. EPA has been unable to confirm this, however. In addition, EPA has not been able to confirm the use of recovered materials in the fiberglass substrate in fiberglass shingles. To date, large fiberglass shingle manufacturers that have been contacted, do not manufacture the shingles with recovered content material. Several smaller fiberglass shingle manufacturers contacted have been unable to confirm the use of recovered content materials in the shingles.

- **Asphalt** used in matting, roll roofing, shingles, coatings, modified bitumen, and built-up roofing usually does not contain recovered or postconsumer materials. The Asphalt Roofing Manufacturers Association (ARMA), however, claims that asphalt itself is a recovered material, because it is a necessary by-product of the oil refining process. According to the Asphalt Institute, asphalt would have to be disposed of as a solid waste if it wasn't sold for use in other products. Most, if not all refineries sell their asphalt because a market exists. While shingles can be recycled into other asphalt products (see

section 4c), other asphalt products are not currently recycled into roofing materials in the United States because the cost of doing so is not reasonable and demand is minimal. It is, however, being done in Germany. EPA contacted one manufacturer of an asphalt and rubber composite for built-up roofing with a fiber matting, penetrated with an asphalt emulsion containing latex. This composite is made with 12 to 20 percent postconsumer (old) tires. One company manufactures a "corrugated asphalt" roofing product called Ondura which contains 50 percent asphalt and 50 percent postconsumer recycled cellulose fibers from newspapers, magazines, corrugated paperboards and office waste paper.

- **Aluminum** shingles and panels can and are being made with recovered and postconsumer materials. EPA contacted two manufacturers of aluminum shingles. One manufacturer uses up to 20 percent postconsumer material from curbside collection programs. This company indicated that its aluminum shingles are used primarily for residential applications. The other manufacturer makes 95 percent postconsumer aluminum shingles. The 1-foot by 2-foot residential shingles are made of postconsumer aluminum from used beverage containers. The company buys the aluminum from a broker who purchases the postconsumer aluminum, has it smelted, and delivers it as a raw material in coils.

- **Rubber** single-plies, shingles, and modified bitumen (SBS) can contain some recovered and postconsumer materials, including old tires. EPA spoke with one manufacturer of rubber shingles that uses 100 percent postconsumer (old) tires. The company takes old tires, removes the highly flammable sidewalls, and cuts and flattens the tires into shingles. It does not grind or re-melt the tires. EPA is aware of one other manufacturer that claims to use at least 50 percent postconsumer rubber in its shingles. One manufacturer of rubber roofing shingles uses postindustrial EPDM from automotive parts such as automotive door and trunk seals. Another company uses postindustrial tire scrap to manufacture rubber shingles. Both companies are looking into using postconsumer tires in their rubber shingles in the future. They currently do not use postconsumer tires because the rubber is contaminated with resin and glue. Additionally, tire rubber is composed of five different types of rubber. Rubber for the tread, lining, and interior are all different. Not all of this rubber is reusable. In order to use car tire rubber, the nonuseable rubber must be separated from the reusable rubber. It is uncertain whether this separation process will be cost-effective or not. EPA contacted one manufacturer who is planning to introduce rubber/plastic shingles into the roofing industry soon. These rubber/plastic shingles will be composed of approximately 50 percent rubber from old car tires and 50 percent plastic from postconsumer milk jugs. The manufacturer could not provide additional information due to its proprietary content.

- **Plastic** single-plies, shingles, and modified bitumen (APP) can contain various types of recovered and postconsumer plastics. EPA spoke with one manufacturer of modified bitumen (APP). The plastic is made with polypropylene scrap materials from the carpet industry and plastic rope manufacturers, and polyester film scraps. The contact, however, was unable to provide a percentage of recovered material content. Another

manufacturer EPA contacted makes plastic shingles and shakes from 100 percent postconsumer plastic.

- **Wood** shakes can contain recovered materials from old pallets, pallet scraps, sawmill waste, and manufacturing waste. EPA contacted one manufacturer that incorporates the company's manufacturing waste into wood shakes and shingles. In addition, this company uses salvaged material, including trees killed by beetles, which come from the eastern part of the state of Oregon, where a beetle infestation has left millions of trees dead. These dead trees can not be used by pulp and saw mills for a variety of reasons. The company grinds the trees into "semi-fiber bundles" using a dry process, much like the process used to grind wood for manufacturing newsprint. The company is currently exploring the possibility of incorporating waste wood from building demolition into its shakes and shingles. Another manufacturer makes roofing shingles from 100 percent recovered wood and PVC plastic. This product has the look of a wood shake or shingle, without common wood related problems like degradation from water, wind damage, and fire danger. The source of recovered material is manufacturing waste from medical products and garden hoses for PVC, and wood pallets and sawmills for wood.

- **Cement**-based shingles can include recovered materials. One manufacturer EPA contacted uses 4 percent postconsumer newsprint fibers and 14 percent recovered silica fume in their fiber base concrete shingles, which are made with portland cement.

Table 16 presents information provided by manufacturers of roofing materials on recovered content availability.

Table 16

Recovered Materials Content of Roofing Materials

Material	Postconsumer content (%)	Total recovered materials content (%)
Cement/ Fiber/Silica Fume	Company A: 4 (fiber)	18
Steel	Company B: 16	25 to 30
	Company C: 67	100
	Company D: 16	25 to 30
Aluminum	Company B: 20	unknown
	Company E: 95	unknown
Aluminum/Steel	Company B: unknown	60-90
Fiber/Felt	Company F: 100	100
	Company G: 66	unknown
	Company H: 100	100
	Company I: 70	100
Rubber	Company J: unknown	unknown
	Company K: 12-20	unknown
	Company L: unknown	unknown
	Company M: 100	100
Rubber/Plastic	Company N: 100	100
Asphalt/Plastic	Company O: unknown	unknown
Wood	Company P: unknown	unknown
Wood/Plastic	Company Q: unknown	100

7. Specifications

EPA recommends that procuring agencies refer to the 186 standards for roofing products maintained by ASTM's Committee D08 on Roofing, Waterproofing, and Bituminous Materials. The specifications, however, do not discuss use of recovered materials, nor do they preclude the use of recovered materials.

G. Revision to Railroad Grade Crossing Surfaces

1. Background

In §247.12(j), EPA proposed to revise the existing designation for railroad grade crossing surfaces to include railroad grade crossing surfaces containing recovered wood or composite wood materials and composite plastic materials. EPA previously recommended purchasing practices, including recovered materials content levels, for railroad grade crossing surfaces in RMAN III. In Section C-10 (Revised) of the draft RMAN IV, EPA recommended that, based on the recovered material content levels in Table 17, procuring agencies revise their preference program to establish minimum content standards for use in procuring railroad grade crossing surfaces.

Table 17

Draft Recovered Materials Content Recommendations for Wood and Plastic Railroad Grade Crossing Surfaces

Surface material	Recovered material	Postconsumer content (%)	Total recovered materials content (%)
Wood	Wood or wood composite	90 - 97	90 - 97
Plastic	Plastic or plastic composite	85 - 95	100

Notes: Railroad grade crossing surfaces made from recovered wood may also contain other recovered materials such as plastics. The percentages of these materials contained in the product would also count toward the recovered materials content level of the item.

Railroad grade crossing surfaces made from recovered plastics may also contain other recovered materials such as auto shredder residue, which contains a mix of materials. The percentages of these materials contained in the product would also count toward the recovered materials content level of the item.

2. Summary of Comments and Agency's Response

EPA requested comments on the inclusion of recovered wood and plastic as materials to be added to the previous designation of railroad grade crossing surfaces containing recovered content cement, rubber, or steel. The Agency did not receive any public comments on railroad grade crossing surfaces.

3. Designation

EPA is revising the designation for railroad grade crossing surfaces to add recovered wood and plastic as material options.

a. Preference Program

EPA recommends that, based on the recovered materials content levels shown in Table 18 (Revised), procuring agencies establish minimum content standards for use in purchasing railroad grade crossing surfaces.

Table 18

Final Recovered Materials Content Recommendations for

Railroad Grade Crossing Surfaces (Revised)

Surface Material	Recovered Material	Postconsumer content (%)	Total recovered materials content (%)
Concrete	Coal Fly Ash	–	15-20
Rubber	Tire Rubber	–	85-95
Steel	Steel	16 67	25-30 100
Wood	Wood or wood composite	90 - 97	90 - 97
Plastic	Plastic or plastic composite	85 - 95	100

Notes: The recommended recovered materials content levels for rubber railroad grade crossing surfaces are based on the weight of the raw materials, exclusive of any additives such as binders or other additives.

Coal fly ash can be used as an ingredient of concrete slabs, pavements, or controlled density fill product, depending on the type of concrete crossing system installed. Higher percentages of coal fly ash can be used in the concrete mixture; the higher percentages help to produce a more workable and durable product but can prolong the curing process.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated items can be made from steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered materials, of which 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which 67% is postconsumer.

Railroad grade crossing surfaces made from recovered wood may also contain other recovered materials such as plastics. The percentages of these materials contained in the product would also count toward the recovered materials content level of the item.

Railroad grade crossing surfaces made from recovered plastics may also contain other recovered materials such as auto shredder residue, which contains a mix of materials. The percentages of these materials contained in the product would also count toward the recovered materials content level of the item.

b. Specifications

EPA has not identified any industry specifications or standards for wood or plastic railroad grade crossing surfaces.

H. Revision to Consolidated and Reprocessed Latex Paint

In the final EPA is deleting reference to federal specification TT-P-2846, which was cancelled by GSA, and recommends that procuring agencies refer to commercial item description (CID) A-A-3185 instead when purchasing recycled paint.

X. NONPAPER OFFICE PRODUCTS

a. Office Furniture

1. Background

In §247.16(l), EPA proposed to designate office furniture. In Section G-9 of the accompanying draft RMAN IV, EPA recommended that, based on the recovered materials content levels in Table 19, agencies establish minimum content standards for use in purchasing office furniture with recovered materials, including remanufactured or refurbished office furniture.

Table 19

Draft Recovered Materials Content Recommendations for Office Furniture

Product	Material	Postconsumer content (%)	Total recovered materials content (%)
Furniture structure	Steel	16	25 - 30
Furniture structure	Aluminum	–	75 - 100
Particleboard/ Fiberboard component	Wood composite Agricultural fiber	1 - 50 –	80 - 100 100
Fabric	PET	100	100
Plastic furniture component	HDPE	70 - 75	95
Remanufactured or Refurbished Furniture	Various	25 - 75	25 - 75

Notes: A final designation would not preclude a procuring agency from purchasing office furniture manufactured from another material. It simply requires that a procuring agency, when purchasing office furniture made from steel, aluminum, wood, agricultural fiber, or plastic, purchase these items made with recovered materials when these items meet applicable specifications and performance requirements, or procure office furniture that has been remanufactured or refurbished.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated item is generally made from steel manufactured in a Basic Oxygen Furnace (BOF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel.

Particleboard and fiberboard used in the wood components of office furniture may also contain other recovered cellulosic materials, including, but not limited to, paper, wheat straw, and bagasse. The percentages of these materials contained in the product would also count toward the recovered materials content level of the item.

2. Summary of Comments and Agency's Response

Comment: Pacific Northwest Fiber (PNF), the Idaho State Department of Agriculture, and the Spokane County Conservation District submitted comments in support of the designation of office furniture, since it would establish new uses for diverted agriculture fiber, such as grass seed residue, wheat straw, rice straw, bagasse, and other agricultural products. All three commenters noted

competition from the forest products industry. PNF believes particle board made from agricultural fiber or from wood or other materials diverted from the solid waste stream would qualify as recovered material, but that traditional wood particle board would not qualify as recovered material because it is manufactured from wood fiber "generated from, and commonly reused within an original manufacturing process."

Response: EPA agrees that diverted agricultural fibers that meet the statutory definition of "recovered materials" would be included in office furniture designated in the CPG. Traditional wood particle board would not contain recovered materials if the recovered wood fiber is generated from, and is commonly used within, the original manufacturing process to manufacture particle board. However, EPA's research found that some particle board manufacturers are using materials that fall under the RCRA definitions of postconsumer and recovered materials. Examples of postconsumer materials used in particle board include used pallets and wood crating, and recovered wood from home deconstruction. Examples of non-postconsumer recovered materials used in particle board include mill wastes, scraps, and trimmings from the lumber industry.[1]

Comment: The Composite Panel Association (CPA) commented on the level of recovered wood used in the manufacture of particleboard and fiberboard. Based on its survey of the industry and subsequent findings, CPA recommends that EPA change the postconsumer content range in the RMAN from "1 to 50 percent" to "Greater than 0 percent" with no upper level value. In addition, CPA asserts that nearly all manufacturers use a high percentage of recovered material and that the total recovered content range should be changed to "Greater than 80 percent" with no upper limit.

[1]As noted in the final RMAN IV recommendations for office furniture, while EPA has no evidence or indication that wood treated with chromated copper arsenate (CCA) is currently used in office furniture, EPA is not recommending the use of CCA-treated wood as a recovered material in office furniture. The arsenic in CCA is a known human carcinogen and EPA is currently conducting a thorough and comprehensive risk assessment of CCA as a part of the pesticide reregistration process for CCA. In addition, EPA is conducting a risk assessment for children who contact CCA-treated wood playsets and decks.

Response: At the time of EPA's proposed rulemaking, CPA had provided information that some particleboard (PB)/medium density fiberboard (MDF) plants use a small amount of postconsumer wood in their products. Based on this initial information, EPA set the lower level of the postconsumer range at 1 percent. However, based on the subsequent information provided by CPA, EPA now recognizes that, although the PB/MDF industry does use some postconsumer wood, it is not always feasible, mostly due to logistical reasons. For example, CPA indicated that many PB/MDF plants are located near the raw material source, such as sawmills and plywood plants, which means they are often far from urban areas where most postconsumer wood waste is available. Furthermore, EPA recognizes that many plants, if they are able to obtain postconsumer wood, are not able to obtain enough to equate to 1 percent of their final product. Therefore, EPA believes that the recommended postconsumer content level should be "Greater than 0 percent." In addition, since a high level of recovered wood is commonly used by the industry, EPA is recommending a total recovered content at range of 80 - 100 percent, which represents what is currently being used in the industry.

EPA realizes that, in the particleboard recommendation in Table G-9 of the draft RMAN, we inadvertently recommended recycled content levels only for "wood composites." EPA's recommendations should have read "wood or wood composites." The final RMAN corrects this error.

3. Rationale for Designation

EPA believes that office furniture meets the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

Reused office furniture tends to have the highest postconsumer content because the product is not significantly altered. Refurbished office furniture contains almost as much postconsumer content as reused office furniture, although it usually has virgin materials added due to necessary touch-ups.

Remanufactured office furniture tends to contain less postconsumer content than reused or refurbished furniture, but generally conserves the greatest value in the product.

EPA found that new furniture contains varying amounts (from 0 to 98 percent) of recovered materials. Refurbished and remanufactured office furniture typically contains 25 to 75 percent postconsumer materials depending on the condition of the core being refurbished or remanufactured. According to a government consultant with 20 years experience as a federal government sales representative, remanufactured office furniture can contain as much as 60 to 80 percent postconsumer content.

According to Office Furniture Recyclers Forum (OFRF), approximately 3 million tons of office furniture are discarded in landfills each year. Remanufacturing and refurbishing can divert some of this furniture away from landfills by returning it to offices. In fact, remanufacturing just 40 typical work stations diverts one tractor-trailer load of furniture from a landfill. Also, reusing one pound of material through remanufacturing saves five to nine pounds of original materials.

Using recovered materials in manufacturing and remanufacturing also diverts waste from landfills. According to OFRF, when a company manufacturers or remanufacturers one typical work station with fabric made from recovered materials, for example, it uses 240 recovered PET soda bottles. So, if an agency were to purchase 1,000 remanufactured work stations, it would divert 240,000 soda bottles from landfills.

One company estimates it has diverted approximately 48.4 million pounds of workstation materials from landfills since opening for business in 1989.

b. Technically Proven Uses

According to one vendor, furniture made with recovered materials content, remanufactured furniture, and refurbished furniture all perform as well as furniture manufactured with virgin

materials. Remanufacturing and refurbishing restores worn office furniture to a condition comparable to new furniture in quality and reliability. In general, upholstery made with recovered PET looks, cuts, and upholsters the same as fabric made with virgin resins.

Office partitions covered with postconsumer content fabric are stain-proof and fabric rated, which means they comply with Boston, New York, and California fire codes (the most stringent state fire codes in the country). Office partitions made from postconsumer content fabric are similar in durability to those made from fabrics with virgin materials.

In many cases, there are advantages to using remanufactured or refurbished furniture. For example, furniture is usually available for delivery on much quicker time frame. In the case of one company, the refinishing can be done on the premises due to the absence of toxic chemicals. As a result, there is very little moving of furniture required and minimal downtime for the client.

c. Impact of Government Procurement

OFRF estimates that the federal government purchased $396.3 million in office furniture in 1996. According to another contact, however, the federal government spent approximately $562 million on office furniture in 1996. According to the Coalition for Government Procurement, over the past 5 years, federal government agencies purchased over $1.9 billion of office furniture including metal filing cabinets, seating, systems furniture and pedestals, office tables (excluding executive type), and executive offices. According to one contact, most federal purchases are made through GSA schedules and some are made via open market contractors.

GSA operates programs to reuse, refurbish, and donate used furniture. Additionally, GSA's National Furniture Center works with agencies interested in incorporating environmental considerations into its selection process. The 1999 GSA consolidated schedule, which is valid for 5 years, includes furniture items in Solicitation No. 3FNO-M1-990001-B, Schedule 71, Part 1. This schedule includes remanufactured furniture as Special Item Number (SIN) 711-92.

UNICOR's Federal Prison Industries, Inc., is a mandatory source provider to the government for office furniture and many other items. According to UNICOR, the government purchases over 15 percent of its furniture from them, which equates to 40 percent of UNICOR's furniture sales. In 1997, UNICOR's office furniture sales to the federal government totaled $80 million.

4. Designation

In final CPG IV, EPA is designating office furniture containing recovered steel, aluminum, wood, agricultural fiber, or plastic.

5. Preference Program

EPA recommends that, based on the recovered materials content levels shown in Table 20, procuring agencies establish minimum content standards for use in purchasing office furniture with recovered materials, including remanufactured or refurbished office furniture.

Table 20

Final Recovered Materials Content Recommendations for Office Furniture

Product	Material	Postconsumer content (%)	Total recovered materials content (%)
Furniture structure	Steel	16	25 - 30
Furniture structure	Aluminum	–	75 - 100
Particleboard/ Fiberboard component	Wood or wood composite	Greater than 0	80 - 100
	Agricultural fiber	–	100
Fabric	PET	100	100
Plastic furniture component	HDPE	70 - 75	95
Remanufactured or Refurbished Furniture	Various	25 - 75	25 - 75

Notes: The recommended recovered materials content levels for steel in this table reflect the fact that the designated item is generally made from steel manufactured in a Basic Oxygen Furnace (BOF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel.

Particleboard and fiberboard used in the wood components of office furniture may also contain other recovered cellulosic materials, including, but not limited to, paper, wheat straw, and bagasse. The percentages of these materials contained in the product would also count toward the recovered materials content level of the item. In addition, while EPA has no evidence or indication that wood treated with chromated copper arsenate (CCA) is currently used in office furniture, EPA is not recommending the use of CCA-treated wood as a recovered material in office furniture. The arsenic in CCA is a known human carcinogen and EPA is currently conducting a thorough and comprehensive risk assessment of CCA as a part of the pesticide reregistration process for CCA. In addition, EPA is conducting a risk assessment for children who contact CCA-treated wood playsets and decks.

6. Background for Recommendations

Office furniture includes seating, desks, storage units, file cabinets, tables, and systems furniture (or “cubicles”) used in virtually all federal offices. Definitions of specific types of office furniture, according to the Office Furniture Recyclers Forum (OFRF), are listed below.

Conference Desk - A desk having a large overhang so visitors can draw their chairs under the desk top.

Chairs:

- ***Fixed Back Chair*** - Chair with a nonmobile back that does not tilt.
- ***Ganging Chairs*** - Usually stack or side chairs that are attached to each other by a clip or bolt so they stay in a straight line.
- ***Posture Chair*** - Desk chair with a back that reclines independently from the seat-tilt mechanism.
- ***Side Arm Chair*** - Guest chair with arms and usually without casters.
- ***Stacking Chair*** - A chair designed to meet or stack together for ease of storage with minimum space.
- ***Swivel Tilt Chair*** - Seat revolves on a hub for easy access to desk and files, but also tilts back for comfort.

Credenza - A large office storage unit. Usually of the same style and finish as a desk and placed behind the desk.

Systems Furniture - Classification applied to a coordinated line of work surface, storage, and panels or partitions that are designed to work together to form work spaces. Systems often include integral electrical distribution and lighting capabilities.

Vertical File - Conventional file cabinet where each drawer is deeper than it is wide.

Most office furniture is made of wood or steel. Other materials used in office furniture manufacturing include polyethylene terephthalate (PET) in fabrics; plastic, which is integrated in components such as laminated work surfaces and arm rests; aluminum; particleboard; and medium-

density fiberboard (MDF), which is thicker than particle board. According to the Business and Institutional Furniture Manufacturer's Association (BIFMA), approximately 25 percent of furniture products are manufactured with wood and 75 percent are manufactured with nonwood materials.

Most companies in the furniture industry do not manufacture and assemble furniture from raw materials. Rather, companies specialize in one aspect of manufacturing and work together. Suppliers, or "base manufacturers," for example, take raw materials, usually, plastic, aluminum, wood, or steel, and convert them into components (e.g., table tops, rubber edging, metal frames). Furniture manufacturers then purchase the components from suppliers and piece them together to make furniture products. In some instances, however, manufacturers fabricate their own wood and metal components.

In researching office furniture, EPA found that products fall into one of the following categories:

- New office furniture
- Reused furniture
- Refurbished furniture
- Remanufactured furniture

New Office Furniture

New office furniture is purchased from an original equipment manufacturer (OEM) and is composed of entirely OEM parts. The parts are made mostly of virgin materials, but some have recovered materials content.

Reused Furniture

Reused or "as-is" office furniture has been returned to the market for sale without repair or improvement to its appearance.

Refurbished Furniture

Refurbished office furniture is used furniture that has been "touched-up" or cosmetically improved and then returned to the market for sale. Refurbished furniture remains the same product throughout its life. Refurbishers improve the condition of old furniture through a number of processes including adding material, cutting, or painting the product. All major systems furniture manufacturers refurbish only their own systems furniture. The federal prison industries (UNICOR) provide a refurbishing and remanufacturing service for desks and credenzas in addition to systems furniture. UNICOR also works with the U.S. Department of Agriculture (USDA) to refurbish and remanufacture surplus furniture, which is then sold in a USDA store.

Remanufactured Furniture

Remanufactured office furniture goes through a reconstruction process in which products are completely disassembled; parts are inspected, cleaned, repaired or replaced; and the products are reassembled and refinished to improved "like new" condition before being returned to the market for sale. With systems furniture, for example, the remanufacturer buys used furniture or gives the owner credit for the furniture, which the seller can use to acquire remanufactured furniture. The old furniture is then stripped; the original steel or aluminum frame, the center partition, and batten (i.e., foam) from the product are cleaned, inspected, and then covered with new fabric to produce the remanufactured product. In addition, any old surfaces in salvageable condition are kept and relaminated. Most remanufacturers of systems furniture and seating are small businesses.

According to the Business Products Industry Association (BPIA), today's furniture remanufacturers and refurbishers contribute more than $1.2 billion to the $13.6 billion commercial furniture industry, representing almost 9 percent of the market.

Reused office furniture tends to have the highest postconsumer content because the product is not significantly altered. Refurbished office furniture contains almost as much postconsumer content as reused office furniture, although it usually has virgin materials added due to necessary touch-ups. Remanufactured office furniture tends to contain less postconsumer content than reused or refurbished furniture but conserves the greatest value in the product.

EPA found that new furniture contains varying amounts (from 0 to 98 percent) of recovered materials. Refurbished and remanufactured office furniture typically contains 25 to 75 percent postconsumer materials depending on the condition of the core being refurbished or remanufactured. According to a government consultant with 20 years experience as a federal government sales representative, remanufactured office furniture can contain as much as 60 to 80 percent postconsumer content.

One company remanufactures office workstations. The company purchases used, name-brand workstations from end users, brokers, and dealers and then disassembles all components. All components are cleaned, painted, and oven-cured before being reassembled. In addition, it applies new fabric to the panels, flipper doors, and tackboards using fabric made from recovered materials (see below). The company is the only systems furniture manufacturer on GSA's schedule.

Another company specializes in restoring furniture from the hospitality industry (e.g., hotels) and university housing. The company has developed waterborne wood furniture refinishing technologies that do not use any toxic chemicals or emit VOCs or esters. The company also reupholsters seating units with new fabrics that contain 20 to 100 percent recovered (postindustrial) fibers. Although some small pieces might need to be replaced at the time of refinishing, the resulting furniture is essentially 100 percent postconsumer recovered material.

EPA identified seven manufacturers that use recovered materials in their new, remanufactured, refurbished, or reused office furniture. Manufacturers of office furniture often substitute virgin materials with recovered materials such as polyethylene terephthalate (PET), newspaper, cardboard, corrugated paper, wood, fiberglass, cellulose, nylon, acrylonitrile butadiene styrene (ABS), acetyl, polypropylene, polystyrene, foam, and rubber.

A contact with a manufacturer, marketer, and distributor of furniture and other items to government agencies, indicated that the company currently markets several types of office furniture and furniture components with recovered materials content. The company manufactures office partitions (i.e., systems furniture) with 75 percent total recovered materials content, all of which is postconsumer material. The core material, which is made of cellulose, contains 20 percent recovered newspaper, cardboard, and corrugated paper. The framing of the partitions is made from aluminum with 75 percent recovered materials content, and the fabric covering the batten is made from 100 percent recovered content PET from plastic bottles. The contact indicated that the partitions are due to be submitted to GSA's Federal Supply Schedule by summer 2000.

Steel

Steel used in office furniture inherently has recovered content; it also can be painted with recycled-content or virgin paint. According to the Steel Recycling Institute, the recovered steel used in office furniture would most likely be made from the basic oxygen furnace (BOF) process, and would, therefore, contain 25 to 30 percent recovered materials, including 16 percent postconsumer content.

A manufacturer of office furniture, including systems furniture, seating, storage units, surface materials, case goods, and tables, indicated that its steel components contain 30 percent recovered content, including 16 percent postconsumer steel.

Newspaper, Wood, Cardboard, and Corrugated Paper

According to Government Sales Associates, virgin wood usually is the first choice for manufacturing wood furniture and also is used in manufacturing particleboard and MDF. Substitutes for these materials are postconsumer newspapers and wood (e.g., shipping pallets and packing crates). Recovered-content fiberglass or cellulose also are made with postconsumer newspaper and can substitute for virgin fiberglass in office partitions.

According to a contact with the Composite Panel Association, a trade association representing the particleboard and MDF industries, most manufacturers of particleboard and MDF incorporate some level of recovered materials (typically mill scraps and trimmings) into their products, although very few use postconsumer, and any amount that is used is very small. The contact indicated that the reason for this is due to the limited availability of postconsumer wood. Some manufacturers are also combining recovered wood with other cellulosic materials such as wheat straw and bagasse (a material derived from sugarcane). The contact estimates the industry average for recovered materials content to be about 80 to 90 percent.

Government Sales Associates also distributes a recovered content wood component used in MDF-type furniture. The components are used by other companies to manufacture case goods such as desks, bookcases, and credenzas. The material is made from 100 percent urban wood waste such as pallets and wood crating. The wood is ground into flour and mixed with nontoxic binders to make a slurry. When hardened, the material can replace MDF in many types of office furniture. Biobased sealers, stains, and finishes are used to treat the furniture.

Three years ago one manufacturer made a product from 100 percent recovered newspaper or cardboard that substituted for plywood. The curved fiberboard was used as interior frames for seats and chair backs. Although this company is no longer in business, a contact from the company believes other companies could use the process to manufacture recovered-content furniture. The contact indicated that the substitute materials cost about half of what plywood components would cost and meet all of the BIFMA industry standards.

Another company manufactures recovered content furniture, mostly dormitory style—desks, bookcases, lofts, study carrels. The desks that the company assembles are laminate tops made from either recovered content particleboard or a material which contains recovered newsprint and a soy resin.

Another company's recovered content sound insulating material is used in certain panel products. The company uses corrugated paper with between 15 and 35 percent recovered materials content. The company was unable to specify postconsumer vs. recovered materials and content percentages. The particle board that the company uses is made from approximately 50 percent postconsumer waste (e.g., from home deconstruction) and approximately 50 percent recovered waste (e.g., mill wastes, scraps, and trimmings). In addition, the company manufactures tackable surfaces with 12 percent recovered paper fibers.

One company used to make a honeycomb core material that could potentially replace the MDF or particleboard used in conference table tops, desk tops, door cabinets, and shelves. The material was made with 98 percent postconsumer cardboard and corrugated paper. The factory was shut down in early 1999 due to financial difficulties. The company is still solvent and has been working with several parties who are interested in pursuing the rights to revive the technology.

Plastics

Recovered PET can substitute for virgin plastics used in chair structures, furniture backings, and batten material.

One company has developed a 100 percent postconsumer content PET panel/partition fabric. The company currently has 12 designs of the fabric. The contact estimates that the company covers 60 to 80 percent of the market for panel fabric for systems furniture. The company also recently introduced a postconsumer content PET seating fabric for upholstering chairs, couches, and benches.

ANS Custom manufactures a line of office partitions using the postconsumer content PET fabric. As the first panel fabric manufactured in the U.S., it was used to manufacture most office partitions. It was originally made without recovered PET, however. When replacing that fabric, remanufacturers and refurbishers purchase the new 100 percent recovered content fabric because they are most familiar with it.

In addition to panel fabric, the company also manufactures a seating fabric with recovered materials content.

A contact with one company indicated that the company's products contain at least 95 percent total recovered material content, including 70 to 75 percent postconsumer material. Most of the company's furniture is made from plastic containing high density polyethylene resins from milk bottles. Some small steel components contain 25 to 30 percent recovered material, including 16 percent postconsumer material.

Depending on the particular piece and its color and property needs the company sometimes uses plastic that contains 10 percent recovered material. The company also uses fabrics that contain a range of recovered materials. One collection from is made from 100 percent postconsumer recovered PET from plastic bottles.

Agricultural Fiber

One company is investigating wheat as a substitute material for flakeboard, which currently is made from bark, wood chips, sawdust, and other wood resins. Toxic additives that are used to manufacture flakeboard, such as urea formaldehyde, produce off gases. Possible raw material substitutes in making flakeboard include products made from wheat, rather than lumber, that do not require the use of formaldehydes in their manufacturing process. The contact indicated that the wheat used to replace wood is left over from the harvesting process and otherwise would be discarded. EPA is aware that five companies manufacture particleboard and/or fiberboard made from agricultural

fiber, including wheat, grass, rice, kenaf, jute, and soybean hulls. Many of these products contain up to 100 percent recovered agricultural material.

Miscellaneous Recovered Materials

A manufacturer and distributor of office products, offers four lines of chairs with 58 to 70 percent recycled content. The chairs are manufactured with recovered aluminum, PET, ABS, steel, nylon, acetal, polypropylene, polystyrene, foam, and fabric. Like most furniture companies it does not distinguish between recovered and postconsumer. It uses the term "recycled content" to refer to both types of materials. The company uses 26 different recycled-content materials that it purchases from suppliers who do not identify their product materials uniformly.

Another company is a design firm that incorporates sustainability practices into their office management as well as their products. The company manufactures tables, shelving, desks, computer supports, and free standing systems—partitions that offer visual and acoustical privacy and accommodate free standing furniture. It procures components that contain recovered materials, such as wheat board made from 98 percent postindustrial wheat shafts, which it uses instead of wood in manufacturing work surfaces. The company also purchases and uses furniture legs made of 98 percent postconsumer cardboard and partition edges and other rubber accessories made of 98 percent postconsumer tires. Additionally, the company manufactures partitions with 98 percent postconsumer newsprint and reception desks with 98 percent recovered aluminum.

One of the largest furniture manufacturers in the U.S. currently does not have complete information on the use of materials with recovered content. The company does, however, currently offer one recovered content fabric which is made with 100 percent recovered polyester. Customer demand for the fabric is low, but if it increases, the company plans to explore additional lines of fabrics made with recovered materials. The plastics the company uses contain between 1 and 10 percent recovered materials. It also uses metals, mostly steel, that contain 25 to 30 percent recovered materials, and aluminum that contains between 10 and 100 percent recovered materials. The company

uses mineral board made with less than 2 percent recovered material content, but can not obtain recovered content lumber (e.g., salvage timber an urban wood waste) in large or consistent volumes.

One company uses laminates that can contain an unspecified amount of recovered materials. Its laminate manufacturer regrinds defective top or finish sheets and uses them to make the backer sheets.

Table 21 presents information provided by manufacturers of office furniture on recovered content availability. In addition, EPA has limited information that particleboard and fiberboard are being made with 100 percent recovered agricultural fiber.

Table 21

Recovered Materials Content of Office Furniture

Material	Postconsumer content (%)	Total recovered materials content (%)
Fabric	Company A: 100	100
	Company C: 100	100
	Company D: unknown	100
	Company G: 100	100
HDPE	Company B: 70 to 75	95
Steel	Company D: 16	25 to 30
	Company I: 16	25 to 30
Aluminum	Company D: unknown	10 to 100
Miscellaneous	Company E: unknown	58 to 70
	Company I: unknown	unknown
	Company J: up to 98	up to 98
Refurbished Furniture	Company D: 25 to 75	25 to 75
Remanufactured Furniture	Company F: unknown	25 to 75
	Company G: unknown	25 to75
	Company H: unknown	25 to 75
	Company I: unknown	unknown

7. Specifications

EPA did not identify any standards or specifications that would preclude government agencies from purchasing office furniture with recovered materials content or remanufactured or refurbished

office furniture. GSA requires that remanufactured furniture meet the same Underwriters Laboratories, ASTM, and Business and Institutional Furniture Manufacturer's Association standards and fire codes (Boston and California) as new furniture.

XI. MISCELLANEOUS PRODUCTS

A. Bike Racks

1. Background

In §247.17(h), EPA proposed to designate bike racks. In Section H-8 of the accompanying draft RMAN IV, EPA recommended that, based on the recovered materials content levels shown in Table 22, procuring agencies establish minimum content standards for use in purchasing bike racks.

Table 22

Draft Recovered Materials Content Recommendations for Bike Racks

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16	25 - 30
HDPE	100	100

Notes: A final designation would not preclude a procuring agency from purchasing bike racks manufactured from another material. It simply requires that a procuring agency, when purchasing steel or plastic bike racks, purchase them containing recovered materials when they meet applicable specifications and performance requirements.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated item is generally made from steel manufactured in a Basic Oxygen Furnace (BOF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel.

2. Summary of Comments and Agency's Response

Comment: The White House Task Force on Recycling submitted a comment in which it questioned the rationale for designating bike racks. The Task Force claims it is not clear whether individual agencies purchase $10,000 worth of bike racks annually or if agencies create barriers to using bike racks containing recovered content.

Response: As discussed in the proposed FR notice and background document, EPA believes that bike racks meet all of the statutory criteria for designating items under the CPG. It is conceivable that agencies such as the Department of the Interior, state and local governments, and large school districts receiving federal funds could purchase $10,000 worth of bike racks annually. The $10,000 level is not a selection criteria for designation, but is just the threshold at which certain provisions of RCRA 6002 apply. EPA believes designating bike racks will encourage the use of alternative materials, such as plastic, in the manufacture of bike racks.

3. Rationale for Designation

EPA believes that bike racks satisfy the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

According to the Steel Recycling Institute, the steel used in bike racks is most likely made using the basic oxygen furnace (BOF) process and would, therefore, contain 25 to 30 percent recovered material including 16 percent postconsumer material.

EPA identified four manufacturers that use 100 percent HDPE plastic lumber to manufacture their bike racks. EPA's research noted that most of these plastic lumber manufacturers use 100 percent postconsumer HDPE for their products.

b. Technically Proven Uses

Most contacts reported that steel bike racks are very durable and virtually maintenance-free. According to a facilities employee at a university, however, although most steel bike racks are marketed as "maintenance-free," some of them tend to rust. Furthermore, for painted steel bike racks, contact with bikes and bike locks makes them vulnerable to scratches. Applications of paint are sometimes required to maintain their appearance. According to one manufacturer, plastic lumber bike racks are just as secure as steel bike racks. Furthermore, plastic lumber bike racks do not tend to rust or scratch as easily as steel bike racks.

According to the government agencies EPA contacted that use steel bike racks, there are no specifications or requirements that would preclude the purchase of bike racks with recovered materials.

c. Impact of Government Procurement

According to the four county governments EPA contacted, purchases for equipment such as bike racks are usually not tracked, but EPA assumes all counties and schools purchase bike racks. EPA also is convinced that all federal agencies purchase bike racks. EPA was not able to quantify purchases of this item but has concluded that they are purchased in quantities sufficient enough to support the proposed designation.

4. Designation

EPA is designating bike racks containing recovered steel or plastic.

5. Preference Program

EPA recommends that, based on the recovered materials content levels shown in Table 23, procuring agencies establish minimum content standards for use in purchasing bike racks.

Table 23
Final Recovered Materials Content Recommendations for Bike Racks

Material	Postconsumer Content (%)	Total Recovered Materials Content (%)
Steel	16	25 - 30
HDPE	100	100

Notes: The recommended recovered materials content levels for steel in this table reflect the fact that the designated item is generally made from steel manufactured in a Basic Oxygen Furnace (BOF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel.

6. Background for Recommendations

Bike racks provide a method for cyclists to secure their bicycles safely. Commonly found in public areas, bike racks can be designed to hold 1 to 50 bicycles and can range from $100 to $1,000 each, depending on type. They can be free standing units, anchored by bolts or cement, or embedded into the ground.

Steel

Steel is the primary material used to manufacture bike racks. Stainless steel racks are made from American Society for Testing and Materials (ASTM) A312 Schedule 40 TP 304 stainless steel pipe. A majority of steel bike racks use a hydraulic pipe-bending machine and mandrel specifically tooled for this purpose. For aesthetics and protection, steel bike racks can be coated with a polyester

powder coat or a polyvinyl thermoplastic coat. Bike racks made with galvanized steel are also available.

Plastic Lumber

Bike racks can also be made of plastic lumber or a combination of plastic lumber and steel. Bike racks that use a combination of both materials use plastic lumber for end posts and steel for the railings. Plastic lumber is generally made in one of two ways: by extrusion into a mold, or by continuous extrusion. For 100 percent HDPE plastic lumber, HDPE is ground up, melted, and mixed with additives. These additives frequently include ultraviolet (UV) inhibitors and color. A blowing agent can also be added to decrease the density of the material. The material is then either flowed into a mold (extrusion into a mold) or pulled out of a machine and shaped using a series of sizing plates, then cooled and cut to the desired length (continuous extrusion).

An ASTM definition states that plastic lumber is "a manufactured product composed of more than 50 weight percent resin, and in which the product generally is rectangular in cross-section and typically supplied in board dimensional lumber sizes, may be filled or unfilled, and may be composed of single or multiple resin blends." As noted in this definition, plastic lumber is normally produced in standard dimensional lumber profiles, such as 2 by 4 foot lengths, but it can also be produced in sheets. Some plastic lumber is available in a variety of colors, while other types come in only one or two different colors.

Plastic lumber can also be manufactured from HDPE, polyethylene, commingled plastics, plastic and fiberglass, and wood/thermoplastic composites. All the manufacturers of plastic lumber bike racks that EPA contacted use plastic lumber made from 100 percent postconsumer HDPE.

The manufacturers EPA contacted were not able to provide information on the recovered materials content of steel bike racks. According to the Steel Recycling Institute, however, the steel

used in bike racks is most likely made using the basic oxygen furnace (BOF) process and would, therefore, contain 25 to 30 percent recovered material including 16 percent postconsumer material.

EPA identified four manufacturers that use 100 percent HDPE plastic lumber to manufacture their bike racks. EPA's research noted that most of these plastic lumber manufacturers use 100 percent postconsumer HDPE for their products.

Table 24 presents information provided by manufacturers on availability of recovered content bike racks.

Table 24
Recovered Materials Content of Bike Racks

Material	Postconsumer content (%)	Total recovered materials content (%)
HDPE	Company A: 100	100
	Company C: 100	100
	Company E: 100	100
	Company G: 100	100
	Company I: 100	100
Steel	Company B: 16	25-30
	Company C: 16	25-30
	Company D: 16	25-30
	Company F: 16	25-30
	Company H: 16	25-30
	Company I: 16	25-30

7. Specifications

EPA did not identify any industry standards or specifications that would preclude the use of recovered materials in bike racks.

B. Blasting Grit

1. Background

In §247.17(i), EPA proposed to designate blasting grit. In Section H-9 of the accompanying draft RMAN IV, EPA recommended that, based on the recovered materials content levels shown in Table 25, procuring agencies establish minimum content standards for use in purchasing blasting grit containing recovered materials.

Table 25
Draft Recovered Materials Content Recommendations for Blasting Grit

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16 - 67	25 - 100
Coal Slag	–	100
Copper and Nickel Slag	–	100
Glass	100	100
Glass/Plastic	20	100
Walnut Shells	–	100

Notes: A final designation would not preclude a procuring agency from purchasing blasting grit manufactured from another material. It simply requires that a procuring agency, when purchasing blasting grit made from steel, coal and metal slag, glass, plastic, or walnut shells, purchase this item made with recovered materials when it meets applicable specifications and performance requirements.

The recommended recovered materials content levels for steel in this table reflect the fact that the designated item can contain steel manufactured in either a Basic Oxygen Furnace (BOF) or an

Electric Arc Furnace (EAF). Steel from the BOF process contains 25% - 30% total recovered steel, of which, 16% is postconsumer steel. Steel from the EAF process contains a total of 100% recovered steel, of which, 67% is postconsumer steel. In addition, blasting grit can be made from a combination of BOF and EAF steel which, according to industry sources, would result in a steel with 25% - 85% total recovered steel content, of which 16% - 67% would be postconsumer steel.

2. Summary of Comments and Agency's Response

Comment: The Utility Solid Waste Activities Group (USWAG) c/o Edison Electric Institute and the American Coal Ash Association (ACAA) commented that there was an erroneous reference to the Bevill Regulatory Determination on Wastes from the Combustion of Fossil Fuels as a "final rule." This was actually issued as a "regulatory determination," which is legally distinct from a final rule. In addition, USWAG and ACAA pointed out what they believe was an oversight in including only coal slag, but not bottom ash, in the RMAN specification.

Response: EPA agrees that the "Regulatory Determination on Wastes from Combustion of Fossil Fuels" was issued as a "regulatory determination," rather than as a final rule, and understands that there is a legal distinction between the two terms. EPA also agrees that it inadvertently omitted bottom ash from its RMAN recommendations. EPA's research found that "...bottom ash can also be used as a light- to medium-duty blasting grit." Therefore, in this final notice, EPA has amended the RMAN table to add 100 percent total recovered content bottom ash as a recommended recovered material for blasting grit.

Comment: During the public comment period, Environmental Abrasives (formerly Idaho Powder Products) submitted information on its recycled fused alumina oxide material, which it has researched, developed, patented, and is processing for use as an abrasive material. According to the company, the material is the waste product from the manufacture of cast fused alumina oxide containers and lab equipment, and since the material is typically landfilled, it presents a solid waste problem that can be alleviated by collection and use as an abrasive product. Environmental Abrasive's product is marketed in the same cost range, if not less, than other similar products. The product has already been used for a federally funded job in Nevada.

Response: Since this fused alumina oxide material is an appropriate material for use as an abrasive, and it meets EPA's criteria and definition of recovered material, EPA has added it to the final RMAN table as a recommended material in its final FR notice. Although EPA is unaware of any ASTM or other industry specifications for this material used as an abrasive, Environmental Abrasives indicated that users can request instruction for proper use of the product on its Web site <www.enviroabrasives.com>.

3. Rationale for Designation

EPA believes that blasting grit satisfies the statutory criteria for selecting items for designation.

a. Use of Materials in Solid Waste

EPA's research suggests that the use of recovered materials in blasting grit is already diverting millions of tons of solid waste from the waste stream. For example, according to the American Coal Ash Association, electric utilities produced 2.9 million tons of boiler slag in 1998. Of this amount, 2.1 million tons were re-used as blasting grit and roofing granules.

In addition, the use of postconsumer recovered glass in the manufacture of blasting abrasives has the potential to significantly boost demand for recovered glass. One company that manufactures blasting abrasives from recovered glass, for example, has developed a glass processing system capable of handling 5,000 to 10,000 tons of recovered glass per year. In addition to recovered steel, coal and metal slag, and glass, EPA is aware that blasting grit can be manufactured from other materials that otherwise would be disposed of as part of the municipal solid waste stream, such as plastic and walnut shells.

b. Technically Proven Uses

EPA identified potential issues associated with the use of some recovered materials in blasting grit and is requesting comments on whether it should proceed with the designation. In particular, there is some evidence that documents dangerously high levels of heavy metals in abrasives containing coal and mineral slag materials that may present risks to workers. For example, a study by NIOSH entitled "Evaluation of Substitute Materials for Silica Sand in Abrasive Blasting" reveals high concentrations of heavy metals present in airborne dust from blasting with copper, nickel, and coal slags, as well as several other mineral abrasives.

EPA regulations do not, however, restrict the use of materials of these types or require their management under the RCRA hazardous waste management system. Thus, recently, in EPA's final rule on the Regulatory Determination on Wastes from the Combustion of Fossil Fuels (40 CFR Part 261), issued May 22, 2000, the Agency chose to retain the exemption for fossil fuel combustion wastes from the hazardous waste management system under RCRA section 3001(b)(3)(C). In addition, EPA stated in the final rule that it did not wish to place any unnecessary barriers on the beneficial use of fossil fuel combustion wastes for applications that conserve natural resources and reduce disposal costs. Therefore, EPA is proposing to include blasting grit containing slag materials in this designation but recommends that workers using these types of abrasives exercise OSHA or other required standard practices designed to protect worker health and safety.

Regarding technical feasibility and performance, abrasive blasting grit made from postconsumer recovered glass can be used in most conventional blasting equipment. A variety of industry standards pertain to industrial abrasives, and all blasting grit products containing recovered materials meet these standards. Reference to industry standards can be found in the "Background Document for Proposed CPG IV and Draft RMAN IV," which is located in the RCRA Docket.

c. Impact of Government Procurement

Federal, state, and local governments purchase large amounts of blasting grit products, but EPA was unable to obtain figures on actual amounts purchased. A recent search of the "Commerce Business Daily's" online database turned up six active awards for contracts for the purchase of industrial abrasives (all military agencies). In addition, a search of the Defense Logistics Agency's Federal Logistics Information System's database (http://www.dlis.dla.mil/online.htm) identified 62 types of abrasive products currently being purchased by the armed services alone. Judging by this information, it is apparent that the federal government in particular procures a vast amount of industrial abrasives, including blasting grit, either directly, or through contracts.

4. Designation

EPA is designating blasting grit containing recovered steel, coal and metal slag, bottom ash, glass, plastic, fused alumina oxide, or walnut shells.

5. Preference Program

EPA recommends that, based on the recovered materials content levels shown in Table 26, procuring agencies establish minimum content standards for use in purchasing blasting grit containing recovered materials.

Table 26

Final Recovered Materials Content Recommendations for Blasting Grit

Material	Postconsumer content (%)	Total recovered materials content (%)
Steel	16 - 67	25 - 100
Coal Slag	–	100
Copper and Nickel Slag	–	100
Bottom Ash	–	100
Glass	100	100
Glass/Plastic	20	100
Fused Alumina Oxide	100	100
Walnut Shells	–	100

Note: The recommended recovered materials content levels for steel in this table reflect the fact that the designated item may contain steel manufactured in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnace (EAF), or a combination of both. Steel from the BOF process contains 25% - 30% total recovered steel, of which 16% is postconsumer. Steel from the EAF process contains 100% total recovered steel, of which 67% is postconsumer. According to industry sources, blasting grit containing a combination of BOF and EAF steel would contain 25% - 85% total recovered steel, of which 16% - 67% would be postconsumer. Since there is no way of knowing which type of steel was used in the manufacture of the item, the postconsumer and total recovered material content ranges in this table encompass the whole range of possibilities, i.e., the use of EAF steel only, BOF steel only, or a combination of the two.

6. Background for Recommendations

Blasting grit is an industrial abrasive used to shape, cut, sharpen, or finish a variety of other surfaces and materials. It comes in countless varieties of grade (particle size), which is dictated by the materials being ground and the finish that is required. Abrasives can be fashioned for use on metals, ceramics, carbides, composites, glass, and plastics. They can be made from a variety of materials, both virgin (including metal, minerals, silicon, and natural materials such as walnut shells) and recovered, (including aluminum oxide, coal and metal slag, and glass). Abrasives are used in many industries, including construction, automotive, and landscaping.

There are several specific types of industrial abrasives:

- *Bonded* abrasives are abrasive materials that have been mixed and hardened with polymer or phenol formaldehyde resins or other types of fixing agents. They are also sometimes affixed to a substrate (most commonly aluminum oxide). They most often take the form of grinding wheels or sanding discs, but can also have flexible substrates and be customized to fit almost any application. These are commonly used in the automotive industry (among others) for sanding and refinishing purposes. Types of bonded abrasives include vitrified (aluminum oxide or silica carbide), resinoid (plastic), rubber, and shellac (a non-toxic resin secreted by insects).

- *Coated* abrasives are commonly known as sandpaper, sandpaper discs, and sanding belts, although the term is used somewhat loosely and is occasionally used to include some types of bonded abrasives as well.

- Abrasives are also commonly sold in raw or *unbonded* form for such purposes as blasting grit. These materials are sometimes used with water to help remove contaminants from the substrate, to wet the abrasive, and to reduce dispersion of fine particles (dust). These products can be made from coal and mineral slag, glass, plastic and steel.

- *Superabrasives* are abrasives made from only the strongest materials or minerals such as garnet or even diamond. These are highly specialized and expensive products and are used for heavy duty jobs such as compacted rust removal.

The following is a list of broad applications for industrial abrasives used for shaping or finishing surfaces:

Airports

Blasting grit (engine cleaning, surface priming and cleaning, corrosion control, etc.)

Bridges

Buildings

Dams

Grit for snow and ice removal

Highways/roads

Landscaping

Paint and rust removal

Tunnels

EPA found only limited information about the levels of recovered materials content in abrasive products. Based on this research, the application often determines whether or not recovered materials can be used. One contact indicated a commercial preference for abrasive products that do not incorporate recovered materials, as does comment #CPGN-L0003 (submitted by the Utility Solid Waste Activities Group, the Edison Electric Institute, the American Public Power Association, and the National Rural Cooperative Association on September 20, 1995, pertaining to the viability of incorporating coal combustion byproducts into commercial applications). Furthermore, the commentor pointed out that abrasive products made from some recovered materials, such as coal-combustion byproducts, can present a health risk if not applied with the appropriate personal protective equipment because they contain heavy metals.

In terms of the binding materials used in bonded abrasives (such as grinding wheels), EPA's research indicates that the use of recovered materials in fixing agents and substrates for these products is technically possible, but has proven cost-prohibitive for companies that have tried to incorporate recovered materials into the manufacture of these products. Based on the results of this research, bonded abrasives may not be readily available with recovered materials and therefore, this item is not being considered for designation at this time.

In terms of coated abrasives (i.e., sandpaper and sand discs), EPA is aware of one company that incorporates recovered fibers in the manufacture of coated abrasives. Additional research conducted by EPA indicates that many coated abrasive products are manufactured overseas, and do not contain recovered materials. Based on the results of this research, coated abrasives may not be readily available with recovered materials and therefore, this item is not being considered for designation at this time.

In terms of blasting grit, EPA is aware of several companies that manufacture blasting grit from recovered glass. In addition, several companies also manufacture blasting grit from other recovered materials, including copper and nickel slag, but the safety of blasting grit products containing slag is uncertain (see Technical Feasibility and Performance section below).

Minerals and Gems

As mentioned above, certain abrasives are made from minerals and gems (e.g., garnet and diamond) for specific, heavy-duty applications. Because of the need for the hardest of materials in superabrasives, these specialized, virgin resource-based products do not incorporate recovered materials.

Metals

Many abrasives are derived from metal products such as steel grit, and steel and iron shot. According to one contact, recovered aluminum oxide is used as filler material by some companies to make #27 aluminum oxide grinding wheels (widely used in the auto-refinishing industry). However, EPA was not able to confirm this information as the contact could not reference a company currently incorporating this practice. Companies contacted to date denied using recovered aluminum oxide or even straight recovered aluminum for this product, except for one. The contact there said that until a year ago, they incorporated used (i.e., recovered) vitrified grinding wheels obtained from other companies into their manufacturing process, but no longer do so. The contact said his company now processes virgin bauxite into aluminum oxide because it has proven to be cheaper and more efficient.

The same contact said that while his company does not manufacture any products that contain recovered materials, it does send its waste material (such as used grinding wheels, which are crushed and sold to asphalt companies for use as aggregate or to aluminum oxide furnace plants to make a number of products) to be recycled. This contact also said that resin grinding wheels, which are made with a non-abrasive "center" or substrate, can incorporate recovered (preconsumer) dust collector fines (aluminum oxide), which are small metal particles or shavings created at the end of the grinding wheel manufacturing process, when the wheel is shaped and sized.

Furthermore, another contact who has worked in the industry for 45 years said he has never heard of anyone using recovered material to manufacture grinding wheels. He said that technically,

using recovered aluminum oxide to manufacture grinding wheels is possible, but it would add several steps to the manufacturing process which would make it cost-prohibitive. He said currently that there is no equipment available to recover postconsumer aluminum oxide abrasive products, although straight recovered aluminum could conceivably be incorporated into the aluminum oxide manufacturing process. Another contact said that his company investigated the possibility of using recovered aluminum oxide wheels in the manufacture of new wheels several years ago, but abandoned their efforts when the process proved to be too costly.

EPA's research indicates that the use of recovered materials in the grinding wheel manufacturing process is not a widespread practice because of cost concerns.

Another contact noted that copper and nickel slag (both recovered materials) are used by many companies to make blasting grit abrasives. The contact, however, could not name any companies. To date, EPA has identified one overseas company based in the United Arab Emirates, that manufactures blasting grit from copper slag. The source of the copper slag is a company in Japan, one of the largest producers of copper in the world. EPA has not been able, however, to identify any U.S. companies that manufacture abrasives from copper or nickel slag, possibly because of the potential health risks presented by abrasive products containing slag materials (see Technical Feasibility and Performance section below).

In addition, EPA is aware of a few companies who sell blasting grit made from steel shot. Depending on whether the steel shot is produced by the basic oxygen furnace or electric arc furnace method, the steel used in blasting grit could contain 25 to 100 percent recovered steel, including 16 to 67 percent postconsumer steel.

Glass

Glass is emerging as a promising blasting grit material that can effectively and efficiently incorporate postconsumer materials. Although glass is gaining acceptance as a blasting and surface

preparation media, its market share is still relatively small. Glass blasting grit is a "low-end" blasting abrasive; its applications include rust and debris removal on bridge, dam, and marine projects. Glass is particularly effective on aluminum, which, because it is a softer metal, is a challenge for blasting (it shreds easily). But because glass is lighter and more precise, it works well on aluminum and does not damage the surface.

One company in particular makes a blasting grit product from 100 percent postconsumer container and plate glass, which are collected through curbside recycling programs. Plate glass tends to be more dusty, harder, and brittle than container glass and thus, is used less frequently. According to the manufacturer, its blasting grit can be used for up to 75 percent of all blasting applications.

Several other companies are currently using postconsumer or recovered glass to make blasting grit material. One company manufactures and is beginning to market a product that combines both 100 percent postconsumer recovered container glass and recovered plastic.

Coal Combustion By-Products (Boiler Slag and Bottom Ash)

Boiler slag abrasives consist of fused ferro-alumino-silicates that are formed when molten coal slag is quenched in cold water. As an industrial abrasive, boiler slag can be used in a variety of applications such as surface cleaning and paint and rust removal. It is a relatively heavy material and can also be used for more difficult, heavy-duty blasting projects and surface preparation. According to comment #CPGN-L003, industrial abrasives made from boiler slag commonly contain 100 percent recovered materials, but no postconsumer materials. According to the American Coal Ash Association (ACAA), more than 2.1 million metric tons of boiler slag were used to make blasting grit and roofing granules in 1998, making it the number one or number two (silica sand may be higher; statistics for sand were unavailable) blasting abrasive used in the U.S. by weight. Coal slag is widely accepted as a cost-effective abrasive.

According to comment # CPGN-L0003, bottom ash can also be used as a light-to-medium-duty blasting grit. According to the American Coal Ash Association (ACAA), 220,914 metric tons of fly ash were used to make blasting grit and roofing granules in 1998. While several companies manufacture blasting grit from coal combustion by-products, the safety of blasting grit products containing these materials is currently uncertain (see Technical Feasibility and Performance section below).

Copper and Nickel Slag

Another popular product on the market, known as "black beauty," is manufactured from copper slag. This product is versatile, performs well, and is relatively inexpensive. While several companies manufacture blasting grit from copper and nickel slag, the safety of blasting grit products containing slag is currently uncertain (see Technical Feasibility and Performance section below).

Cotton Fiber

According to one manufacturer, coated abrasive products (primarily discs) can include fiber that is recovered from old rags.

Plastic

According to one manufacturer, certain recovered plastics can be used to manufacture blasting grit, either by itself or combined with glass. Plastic abrasives are a specialized, small niche market. As previously mentioned, one company manufactures and is beginning to market a product that combines both 100 percent postconsumer recovered container glass and postindustrial recovered plastic (urea- and melamine-based).

Table 27 presents information provided by manufacturers of blasting grit on recovered content availability.

Table 27
Recovered Material Content of Blasting Grit

Material	Postconsumer content (%)	Total recovered materials content (%)
Glass	Company C: 100	100
	Company D: 100	100
	Company E: unknown	unknown
Plastic/Glass	Company F: 20	100 (80/20)
Coal Slag	Company B: 0	100
Miscellaneous	Company A: unknown	unknown

7. Specifications

EPA did not find any specifications that would preclude the use of recovered materials in blasting grit. EPA recommends that procuring agencies exercise OSHA or other required standard safety practices when using blasting grit, particularly when using blasting grit containing slag materials.

XII. DESIGNATED ITEM AVAILABILITY

EPA has identified a number of manufacturers and vendors of the items designated in the CPG IV final rule. These companies will be added to EPA's CPG Supplier Database, which can be

accessed at www.epa.gov/cpg. . This database is updated frequently as additions/changes are requested and new sources are identified. Procuring agencies should contact the manufacturers and vendors in the database directly to discuss their specific needs and to obtain detailed information on the availability and price of recycled products meeting those needs.

Other information is available from the GSA, DLA, state and local recycling offices, private corporations, and trade associations.

XIII. ECONOMIC IMPACT ANALYSIS

Details of the economic impact of CPG IV are described in the document entitled *Economic Impact Analysis for the Final Comprehensive Procurement Guideline IV,* April 2004, which is included in the RCRA Docket for CPG IV.