otherwise specified. Brick shall be placed in a running bond with joint finis
concave, flush, beaded, raked form. Detailing, such as soldier courses, r
shall be shown in the construction documents. See construction docume
fireplace details.

DIVISION 05 00 00. METALS
05 00 00 - Metals
Contractor shall review construction documents and provide labor and m
metal work as required in said documents and as specified herein, while
applicable building codes.

05 05 00 – Common Work Results for Metals

SPECIFIER NOTE:
resource management: Mining raw materials (iron, limestone, coal) can p
pollutant runoff, and habitat loss. Ore refinement produces heat, combus
requires significant amounts of water. Supply of some of the raw materia
and manganese) is very limited.
The iron and steel industry sector has multi-media impacts, including air
NOx, PM2), wastewater contaminants, hazardous and solid wastes. As a
are the largest U.S. consumers of recycled steel scrap, but also face issu
contaminants in scrap products. Refer to the Steel Recycling Institute (SR
steel.org
The energy used by minimills generates greenhouse gas emissions from
emerging trend to generate heat on-site by burning carbon may improve
may also increase emissions. Refer to www.epa.gov/sectors/ironsteel/ind
EPA partnerships have addressed environmental impacts from metal finis
www.epa.gov/sectors/metalfinishing/index.html and from die casting; refe
www.epa.gov/sectors/metalcasting/index.html
Aluminum is fabricated from bauxite, a mineral found primarily in tropical
factor in the clear-cutting of tropical rainforests is the desire to gain acces
Aluminum is extensively recycled from both post-industrial sources, such
head, butt and edge trim from rolling or extrusion operations, and post-co
as used beverage cans, scrapped automobiles and end-of-life building pr
produced aluminum is a relatively young building material. This fact coup
aluminum building components, means that aluminum is only beginning t
building applications. To produce aluminum from recycled material requir
the energy and greenhouse gas emissions required to produce aluminum
each ton of recycled aluminum saves 4 tons of bauxite. In addition, using
instead of raw materials reduces the generation of air pollution, such SOx
percent and water pollution by 97 percent. About one third of the aluminu
States comes from recycled material with post-consumer scrap contributi
that total.

toxicity/IEQ: Metal is considered inert. Factory applied finishes emit cons
situ than field applied coatings because the primary outgassing occurs at
controlled conditions.

performance: Performance is comparable for green methods and standa
Where feasible, use mechanical connections to allow for deconstructioon

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. Steel.
   2. Aluminum.
   3. Copper.
   4. **[xxxx]**.

1.2 SUBMITTALS

A. Product data. Unless otherwise indicated, submit the following for
provided under work of this Section:

SPECIFIER NOTE:
Green building rating systems often include credit for materials of
USGBC-LEED™ v2.2, for example, includes credit for materials v
calculated on the basis of pre-consumer and post-consumer perc
includes credit for use of salvaged/recovered materials.
Green Globes-US also provides points for reused building materi
and for building materials with recycled content.

   1. Recycled Content:
      a. Indicate recycled content; indicate percentage of p
      consumer recycled content per unit of product.
      b. Indicate relative dollar value of recycled content pr
      value of product included in project.
      c. If recycled content product is part of an assembly,
      of recycled content product in the assembly by wei
      d. If recycled content product is part of an assembly,
      value of recycled content product to total dollar val

      SPECIFIER NOTE:
      Specifying local materials may help minimize trans
      however it may not have a significant impact on re
      embodied energy of a building material because o
      some modes of transportation.
      Green building rating systems frequently include c
      Transportation impacts include: fossil fuel consum
      labor. USGBC-LEED™ v2.2 includes credits for m
      extracted/harvested and manufactured within a 50
      project site.

Green Globes-US also provides points for material manufactured.

2. Local/Regional Materials:
   a. Sourcing location(s): Indicate location of extraction recovery; indicate distance between extraction, ha and the project site.
   b. Manufacturing location(s): Indicate location of man indicate distance between manufacturing facility ar
   c. Product Value: Indicate dollar value of product con materials; include materials cost only.
   d. Product Component(s) Value: Where product com manufactured in separate locations, provide locati component. Indicate the percentage by weight of e unit of product.

PART 2 - PRODUCTS

SPECIFIER NOTE:
EO 13423 includes requirements for Federal Agencies to use "sustainabl practices, including acquisition of biobased, environmentally preferable, e efficient, and recycled-content products"

Specifically, under the Sustainable Building requirements per Guiding Pri Environmental Impact of Materials, EO13423 directs Federal agencies to or exceeding EPA's recycled content recommendations" for EPA-designa other products to "use materials with recycled content such that the sum recycled content plus one-half of the pre-consumer content constitutes at cost) of the total value of the materials in the project."

2.1 MATERIALS

A. Steel:

SPECIFIER NOTE:
US-EPA Comprehensive Procurement Guidelines (CPG) discuss in either a Basic Oxygen Furnace (BOF) or an Electric Arc Furnac the BDF process contains 25-30 percent total recovered materials is post-consumer steel. Steel from the EAF process contains a to recovered steel, of which 67 percent is post-consumer.
Recommendations for recycled content in steel reinforcing are no

Typical BOF products include: hollow structural sections, steel stu purlins, and wall studs. Typical EAF products include: beams and angles, plate, steel deck, and piling.
The amount of recycled content in steel products varies over time the cost of steel scrap and its availability.

BOF Steel Recycled Content Value for Typical Product:
Steel Stud Framing
Value = ($XXXX) (23.0 % + ½ 7.3 %) = ($XXXX) (26.65 %)

EAF Steel Recycled Content Value for Typical Product:
Wide Flange Structural Steel Framing
Value = ($XXXX) (58.6 % + ½ 32.6 %) = ($XXXX) (74.90 %)

For more information, refer to SRI at www.recycle-steel.org which information on recycling rates, recycling databases, and the envir steel for homes building, steel roofing, and bridges; and, the Ame Construction at www.aisc.org/sustainability which includes detaile steel factors into the LEED rating system, steel mill recycled cont articles about the use of steel in sustainable projects.

1. Recycled Content: Minimum **[23] [58] [xxxx]** percent post content, or minimum **[7] [32] [xxxx]** percent pre-consume contractor's option.

B. Aluminum:

SPECIFIER NOTE:
Green building rating systems often include credit for materials of may distinguish allowable credit for post-consumer and post-indus recycled content. USGBC-LEED™ v2.2, for example, factors 100 consumer recycled content but only 50 percent of pre-consumer (recycled content into calculations for its recycled content material grants one credit to a project for using materials with recycled cor of post-consumer recycled content plus one-half of the post-indus at least 10 percent of the total value of the materials in the project + 1/2 post-industrial). It grants an additional point for 20% (post-c industrial).
Green Globes-US also provides points for reused building materia and for building materials with recycled content.
Recycled content is typically determined by calculating the weight material divided by the total weight of the product and expressed weight. (The recycled content "value" of a product as assessed u determined by multiplying the recycled content percentage and th Verify with manufacturer for product availability and recycled cont

1. Recycled Content: Minimum **[5] [10] [xxxx]** percent post-c content, or minimum **[20] [40] [xxxx]** percent pre-consum contractor's option.

C. Copper:
1. Recycled Content: Minimum **[5] [10] [xxxx]** percent post-c content, or minimum **[20] [40] [xxxx]** percent pre-consum contractor's option.

2.2 FACTORY FINISHING

SPECIFIER NOTE:
Specify factory finishing rather than field-coating where possible. Plant fa
handles raw materials and by-products at a single location that typically a
and better pollution prevention than job site fabrication/finishing.
Powder coating is preferable to solvent based coating application system
uses an electrostatic charge to adhere colored powder to metal. The pow
electrostatic chamber is 'vacuumed' out and reused.
Consider factory finishing that utilizes mechanical process rather than ch
processes such as abrasive blasting, grinding, buffing, and polishing do r
hazardous waste as chemical and electrical processes.
When electroplating is necessary, select one of the available replacemer
the US EPA. The EPA has identified as toxic and/or polluting cadmium p
chromium plating materials, cyanide-based electroplating, and copper/ fo
electroless copper solutions. Available replacement technologies include
cyanide copper plating, metal stripping and zinc-plating; ion vapor depos
vapor deposition (PVD); Chromium-free substitutes for selected immersio
spray coating; and Trivalent chromium plating for decorative applications

A. Finishing System:
    1. Toxicity: **[Solvent coating systems are not permitted.] [**
    systems are not permitted.]
    2. Anti-Corrosive Paint: Comply with GS-03.

05 05 23 - Metal Fastenings
Provide 1/2” diameter x 10” long anchor bolts in filled cells and poured c
center (OC) maximum at all window locations and on each side of exterio
install appropriate tie downs or straps as required by applicable building
05 10 00 – Structural Steel

SPECIFIER NOTE:
resource management: Refer to Section 05 05 00 (05050) for general inf
metals industries.

The steel industry, the world's largest recycler, utilizes scrap in both of th
manufacturing processes (Basic Oxygen Furnace and Electric Arc Furna
Furnace process, sometimes called minimills, utilizes virtually 100% stee
Oxygen Furnace process utilizes approximately 30% steel scrap in makir

Steel in existing buildings may be considered a resource for the future. T
single organization that provides estimates for potential future supplies o
the AISI, SRI, and IISI provide estimates for steel production and recyclin

Iron is the largest raw material stream in steelmaking. The first record of
back to 2500-2000 BC, and the first deliberate production of iron began a
furnaces that burned charcoal were used in iron production. High temper
first introduced in Germany around 1300 AD, using a very similar design
furnaces. Charcoal was the primary fuel used in the furnaces until 1718 v
coke is reported in the United Kingdom. The modern blast furnace was d

Second World War and remains the main process used to make iron.

As Per the U.S. EPA Profile of the Iron and Steel Industry, EPA/310-R-95
outputs are produced as a result of the manufacturing of coke, iron, and
metals into basic shapes, and the cleaning and scaling of metal surfaces
categorized by process (RCRA waste code provided where applicable), i

Cokemaking

Inputs:

- Coal, heat, quench water

Outputs:

- Process residues from coke by-product recovery (RCRA K143, K
- Coke oven gas by-products such as coal tar, light oil, ammonia lic
of the gas stream is used as fuel. Coal tar is typically refined to pr
industrial products including pitch, creosote oil, refined tar, naphth
- Charging emissions (fine particles of coke generated during oven
transport, loading and unloading of coke that are captured by poll
equipment. Approximately one pound per ton of coke produced a
generally land disposed).
- Ammonia, phenol, cyanide and hydrogen sulfide
- Oil (K143 and K144)
- Lime sludge, generated from the ammonia still (K060)
- Decanter tank tar sludge (K087)
- Benzene releases in coke by-product recovery operations
- Naphthalene residues, generated in the final cooling tower
- Tar residues (K035, K141, K142, and K147)
- Sulfur compounds, emitted from the stacks of the coke ovens
- Wastewater from cleaning and cooling (contains zinc, ammonia s
decanter tank tar (K087), tar distillation residues (K035)
- Coke oven gas condensate from piping and distribution system; n
characteristic waste for benzene.

Ironmaking

Inputs:

- Iron ore (primarily in the form of taconite pellets), coke, sinter, coa

Outputs:

- Slag, which is either sold as a by-product, primarily for use in the or landfilled
- Residual sulfur dioxide or hydrogen sulfide
- Particulates captured in the gas, including the air pollution control treatment plant (WTP) sludge
- Iron is the predominant metal found in the process wastewater
- Blast furnace gas (CO)

Steelmaking

Inputs:

- In the steelmaking process that uses a basic oxygen furnace (BO molten iron, metal scrap, and high-purity oxygen
- In the steelmaking process that uses an electric arc furnace (EAF are scrap metal, electric energy and graphite electrodes.
- For both processes, fluxes and alloys are added, and may include and alloying agents such as aluminum, manganese, and others.

Outputs:

- Basic Oxygen Furnace emission control dust and sludge, a metal
- Electric Arc Furnace emission control dust and sludge (K061); ge dust per ton of steel is expected, but as much as 40 pounds of du be generated depending on the scrap that is used.
- Metal dusts (consisting of iron particulate, zinc, and other metals scrap and flux (lime and/or fluorspar)) not associated with the EA
- Slag.
- Carbon monoxide.
- Nitrogen oxides and ozone, which are generated during the melti

Forming, Cleaning, and Descaling

Inputs:

- Carbon steel is pickled with hydrochloric or sulfuric acid; stainless hydrochloric, nitric, and hydrofluoric acids.
- Various organic chemicals are used in the pickling process.
- Alkaline cleaners may also be used to remove mineral oils and ar the steel surface. Common alkaline cleaning agents include: caus alkaline silicates, phosphates.

Outputs:

- Wastewater sludge from rolling, cooling, descaling, and rinsing op
  contain cadmium (D006), chromium (D007), lead (D008)
- Oils and greases from hot and cold rolling
- Spent pickle liquor (K062)
- Spent pickle liquor rinse water sludge from cleaning operations
- Wastewater from the rinse baths. Rinse water from coating proce
  lead, cadmium, or chromium.
- Grindings from roll refinishing may be RCRA characteristic waste
- Zinc dross

toxicity/IEQ: Metal is considered inert. Factory applied finishes emit cons
situ than field applied coatings because the primary outgassing occurs at
controlled conditions.

performance: Steel is made by reducing the carbon content in iron to leve
reduction of carbon reduces the brittleness of the material, making it easi
Performance is comparable for green methods and standard methods.
Where feasible, use mechanical connections to allow for deconstruction a

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. Structural steel.

1.2 SUBMITTALS

A. Product data. Unless otherwise indicated, submit the following for
   provided under work of this Section:

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   USGBC-LEED™ v2.2, for example, includes credit for materials w
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   includes credit for use of salvaged/recovered materials.
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   and for building materials with recycled content.

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         value of product included in project.