

ASM International  
Historical  
Landmarks  
1972-2019



The World's Leading  
Association Serving  
the Materials Industry.

*In 1969, the ASM Historical Landmarks Designation was established to permanently identify the many sites and events that have played a prominent part in the discovery, development, and growth of metals and metalworking. In 1987, the scope of this award broadened to include all engineered materials.*

**The 2019 Historical Landmarks are:**

**FERRERIA MIRANDAOLA IRONWORKS.....2019**

Legazpi, Guipúzcoa, Basque Country, Spain  
“Mirandaola Ferrería, integrated to the Territorial Museum LENBUR, provided work and economical livelihood for over 500 years to the Iron Valley, as an economical engine for Legazpi and the Basque Country.”

**PRATT & WHITNEY CASTING LABORATORY. ....2019**

Hartford, CT  
“For the development and industrialization of directionally solidified columnar grain and single crystal casting alloys and processes for use for gas turbine engine components.”

**Other Historical Landmarks:**

**ELECTRIC FURNACE.....1972**

Crucible Specialty Metals Division, Colt Industries, Syracuse, New York  
“The first electric arc steelmaking furnace (1906) in the Western Hemisphere, which revolutionized specialty steel production in the U.S.A.”

**GRAPHITE REACTOR .....1973**

Oak Ridge National Laboratory, Oak Ridge, Tennessee  
“Initiation of the use of radioisotopes, neutron diffraction and radiation damage in the study of metals and alloys was made possible by this reactor 1943–63.”

**FIRST CONTINUOUS SHEET ROLLING MILL.....1975**

Armco Steel Corporation, Ashland, Kentucky  
“This mill, built in 1923 at Ashland, Kentucky, revolutionized the art of economically rolling steel into sheets of uniform quality, which paved the way for America’s mass production of autos and other consumer sheet steel products.”

**LOCATION OF THE FIRST STEEL CONVERTER (Kelly Steel Converter) .....1976**

Bethlehem Steel Corporation, Johnstown, Pennsylvania  
“First trial of the bottom-blown tilting converter took place in 1861.”

**CORNWALL IRON MINE AND FURNACE .....1976**

Bethlehem Steel Corporation, Cornwall, Pennsylvania  
“Starting in 1734, Cornwall Mine supplied iron ore continuously for 231 years.”

**WESTERN ELECTRIC—ALLENTOWN WORKS .....1976**

American Telephone and Telegraph, Western Electric Division, Allentown, Pennsylvania  
“Produced the first commercial transistors in 1951.”

**ALL-WELDED TEST BOILER DRUM.....1976**

Combustion Engineering, Inc., Metallurgical Laboratory, Chattanooga, Tennessee  
“This drum was pressure tested to destruction on May 30, 1930 proving welded drums would withstand high pressure in service.”

**TREDEGAR IRON WORKS .....1976**

Ethyl Corporation, Richmond, Virginia

“Chartered in 1837, Tredegar Iron Works was a major supplier of armament to the Confederacy during the Civil War. The rolling mills turned out heavy iron plates for Confederate naval vessels, including the Merrimac.”	
<b>CLIMAX MINE AND MILL COMPLEX .....</b>	<b>1976</b>
Climax Molybdenum Company, Division of AMAX Inc., Climax, Colorado	
“Since 1917, this mine/mill complex has been the primary source of America’s molybdenum.”	
<b>TREMONT NAIL COMPANY .....</b>	<b>1976</b>
Tremont Nail Company, Wareham, Massachusetts	
“Established in 1819, Tremont Nail Company has made nails continuously for more than 150 years and pioneered the production of heat treated nails.”	
<b>OLD NEW-GATE PRISON AND COPPER MINE .....</b>	<b>1976</b>
State of Connecticut Historical Commission, East Granby, Connecticut	
“First copper mine chartered in America and is believed to be the first copper mine in the thirteen original colonies. Mining began in 1707 and continued through the 1850s.”	
<b>IRON RANGES OF MINNESOTA .....</b>	<b>1976</b>
Iron Range Interpretive Center, Chisholm, Minnesota	
“High-grade iron ores of the ranges were instrumental in the development of America’s huge steel industry. Ore was first discovered in 1850 near Gunflint Lake.”	
<b>FORD TRI-MOTOR AIRPLANE .....</b>	<b>1976</b>
Island Airlines, Port Clinton, Ohio	
“The first commercially successful all-metal aircraft, opened a new era in commercial aviation in the late 1920s.”	
<b>ATLAS STEEL CONCAST MACHINE .....</b>	<b>1977</b>
Atlas Steels Company, Welland, Ontario, Canada	
“In 1954, the first commercially successful unit in North America for continuous casting of steel billets.”	
<b>LES VIEILLES FORGES ST. MAURICE .....</b>	<b>1977</b>
Quebec Historical Monuments Commission, Trois-Rivieres, Quebec, Canada	
“Its establishment, in 1729, marks the beginning of the Canadian iron and steel industry.”	
<b>WATERBURY BRASS COMPANY MILL .....</b>	<b>1977</b>
Waterbury, Connecticut	
“Constructed in 1846, it was the largest brass mill of its type in the United States.”	
<b>BLAST FURNACE #1 .....</b>	<b>1978</b>
Fundidora Monterrey, S.A., Monterrey, Mexico	
“First blast furnace in Latin America, built in 1902.”	
<b>CRADLE OF ALLOY STEEL .....</b>	<b>1978</b>
Republic Steel Corporation, Canton, Ohio	
“At this facility, constructed in 1907, United Steel Company (now LTV Steel Corporation) poured the first production heats of quality chromium-vanadium and chromium-molybdenum alloy steels.”	
<b>FIRST BASIC OXYGEN FURNACES IN WESTERN HEMISPHERE .....</b>	<b>1978</b>
Dofasco Melt Shop, Hamilton, Ontario, Canada	
“The first basic oxygen furnaces erected in the western hemisphere and put into production in 1954 for the production of top-blow, basic oxygen steel.”	

<b>FIRST HYLSA SPONGE IRON PLANT .....</b>	<b>1978</b>
HYLSA, S.A., Monterrey, Mexico	
“The world’s first successful gas direct reduction plant for iron ore.	
It is the pioneer plant that opened an alternative route for economic steel making.”	
<b>GENERAL ELECTRIC COMPANY, RIVER WORKS .....</b>	<b>1978</b>
Lynn, Massachusetts	
“The first American turbojet engine was built at this site and tested in April 1942.”	
<b>GRUMMAN AEROSPACE CORPORATION.....</b>	<b>1978</b>
Bethpage, New York	
The primary developer and producer of the lunar excursion module which enabled	
U.S. astronauts to land on and explore the moon on July 20, 1969.”	
<b>#1 VACUUM INDUCTION MELTING FURNACE .....</b>	<b>1978</b>
Special Metals Corporation, New Hartford, New York	
“In 1952, first commercial vacuum induction melting furnace for production of superalloys.”	
<b>AMERICA’S FIRST BESSEMER STEEL MILL.....</b>	<b>1979</b>
Wyandotte, Michigan	
“Site of the Eureka Iron Works where the Bessemer converter was first used, in 1864,	
for the commercial production of steel in America.”	
<b>EADS BRIDGE .....</b>	<b>1979</b>
St. Louis, Missouri and East St. Louis, Illinois	
“World’s first alloy steel bridge, dedicated July 4, 1874.”	
<b>DISCOVERY OF FIRST ECONOMICAL PROCESS FOR ELECTROLYTIC EXTRACTION OF ALUMINUM .....</b>	<b>1979</b>
Oberlin, Ohio	
“Charles Martin Hall invented the first economical process for the extraction	
of aluminum and in December 1888, the process was first commercialized.”	
<b>PITTSBURGH WORKS OF THE PITTSBURGH REDUCTION COMPANY .....</b>	<b>1979</b>
Pittsburgh, Pennsylvania	
“Charles Martin Hall invented the first economical process for the extraction	
of aluminum and in December 1888, the process was first commercialized.”	
<b>FREE INSTITUTE OF INDUSTRIAL SCIENCE .....</b>	<b>1979</b>
Worcester Polytechnic Institute, Worcester, Massachusetts	
“In 1868, the first American academic institution combining the concept	
of classroom learning and shop practice to engineering education.”	
<b>SAUGUS IRON WORKS.....</b>	<b>1979</b>
Saugus, Massachusetts	
“During the period 1646–1675, the ironworks was the first in the western hemisphere	
to successfully engage in the integrated production of cast and wrought iron.”	
<b>EXPERIMENTAL BREEDER REACTOR I .....</b>	<b>1979</b>
Idaho Falls, Idaho	
“In 1951, useful electric power was first generated from atomic energy.”	
<b>JOHN WINTHROP JR. BLAST FURNACE .....</b>	<b>1980</b>
West Quincy, Massachusetts	
“The first commercial blast iron furnace in America was built in 1644 and	
produced iron from bog ore dug from the bottom of brooks and swamps.”	

<b>LUKENS STEEL CORPORATION .....</b>	<b>1981</b>
Coatesville, Pennsylvania	
“Founded in 1810 as Brandywine Rolling Mill. The company’s pioneer efforts in plate rolling led to metallurgical and technical firsts directly related to plate production.”	
<b>ACHESON GRAPHITE COMPANY.....</b>	<b>1982</b>
Niagara Falls, New York	
“Site of the first facility for production of graphite and graphite articles in 1899. Production of graphite made possible development of electric furnaces, motors and generators, and later, graphite fibers.”	
<b>NEW ALMADEN QUICKSILVER MINE .....</b>	<b>1982</b>
New Almaden, California	
“Discovered in November 1845, it was the first workable quicksilver mine in North America and preceded the Coloma gold discovery of January 1848 by 27 months.”	
<b>PALACIO DE MINERIA .....</b>	<b>1982</b>
Mexico City, Mexico	
“The first school of metals in the New World, created in Mexico City in 1774.”	
<b>ARMY MATERIALS AND MECHANICS RESEARCH CENTER .....</b>	<b>1983</b>
Watertown, Massachusetts	
“Developed and applied numerous significant metallurgical processes, tests and materials to the benefit of national security.”	
<b>THE CAST ALUMINUM CAP ON THE WASHINGTON MONUMENT .....</b>	<b>1983</b>
Washington, D.C.	
“This cap, installed on December 6, 1884, was the largest aluminum casting of its time.”	
<b>REED GOLD MINE .....</b>	<b>1983</b>
Cabarrus County, North Carolina	
“Site of the first major discovery of gold in the United States in 1799, and birthplace of the American gold mining industry.”	
<b>THE IRONBRIDGE .....</b>	<b>1984</b>
Telford, Shropshire, England	
“The first iron bridge, cast of iron smelted with coke, erected in 1779, leading to Britain’s renown for engineering and manufacturing innovations.”	
<b>HASHINO BLAST FURNACE RELICS .....</b>	<b>1984</b>
Kamaishi City, Iwate, Japan	
“These first Western-style blast furnaces in Japan succeeded in producing pig iron from iron ore in 1857, thus marking the birthplace of the modern Japanese steel industry.”	
<b>ALBANY RESEARCH CENTER, UNITED STATES BUREAU OF MINES .....</b>	<b>1984</b>
Albany, Oregon	
“At this site, William J. Kroll and associates developed the process for making ductile zirconium, pioneering a new age of modern extractive metallurgy.”	
<b>WORLD’S FIRST HOT AND COLD-WALL HOT-ISOSTATIC-PROCESSING (HIP) VESSELS .....</b>	<b>1984</b>
Battelle Columbus Laboratories, Columbus, Ohio	
“A revolutionary process invented and developed in 1955–56.”	

<b>BLAENAVON IRON WORKS .....</b>	<b>1985</b>
Blaenavon, Wales	
“Birthplace of the basic steel process developed by Sydney Gilchrist Thomas in 1878.”	
<b>COLONEL FRISHMUTH’S FOUNDRY .....</b>	<b>1985</b>
Philadelphia, Pennsylvania	
“Site of the first commercial aluminum reduction facility in the United States and the only producer of aluminum from its ore until the late 1880s.”	
<b>ELWOOD HAYNES MUSEUM.....</b>	<b>1985</b>
Kokomo, Indiana	
“This site commemorates the achievements of Elwood Haynes who invented the cobalt base alloys called <i>Stellite</i> in the period 1899 to 1915.”	
<b>FOREST HILLS RESEARCH LABORATORIES WESTINGHOUSE ELECTRIC CORPORATION .....</b>	<b>1986</b>
Forest Hills, Pennsylvania	
“At this facility, researchers developed materials for the pressurized water reactor, paving the way for the utilization of nuclear power.”	
<b>LA FARGA DE RIPOLL .....</b>	<b>1986</b>
Ripoll, Spain	
“The Farga Catalana utilized an original process now known as the <i>Catalan Process</i> for making iron and steel from the 10th century until recent times.”	
<b>MAGNESIUM PRODUCTION, DOW CHEMICAL COMPANY .....</b>	<b>1986</b>
Midland, Michigan	
“Produced the first economically feasible magnesium metal product, which resulted in widespread use of magnesium.”	
<b>METALS RESEARCH LABORATORIES ELKEM METALS COMPANY, TECHNOLOGY CENTER .....</b>	<b>1986</b>
Niagara Falls, New York	
“Pioneering technological advances made the use of alloy and stainless steels advantageous and practical.”	
<b>STATUE OF LIBERTY .....</b>	<b>1986</b>
New York Harbor, New York	
“Represents an exceptional engineering and metallurgical innovation in its use of copper and steel in the original design and construction in 1886 and the restoration in 1986.”	
<b>SLOSS FURNACES .....</b>	<b>1986</b>
Birmingham, Alabama	
“These furnaces which became operative in 1882 were instrumental in establishing the steel industry in the South.”	
<b>MARAMEC IRON WORKS .....</b>	<b>1987</b>
Maramec Spring Park, St. James, Missouri	
“Operations began on this site in 1829, producing cast iron implements and household goods that contributed greatly to the civilization and industrialization of the western frontier.”	
<b>ARGONAUT BUILDING, GENERAL MOTORS RESEARCH LABORATORIES .....</b>	<b>1987</b>
Detroit, Michigan	
“The End Quench Hardenability Test was developed on these premises in 1936 by Walter E. Jominy.”	



<b>BROWNSVILLE—ROUTE 40 BRIDGE .....</b>	<b>1988</b>
<p>Brownsville, Pennsylvania          “This bridge is the first cast iron bridge to be built west of the Allegheny Mountains.”</p>	
<b>BUILDING 228, EXPERIMENTAL STATION .....</b>	<b>1988</b>
<p>E.I. duPont de Nemours and Co., Wilmington, Delaware          “At this site, Dr. Wallace H. Carothers and his associates invented and developed nylon.”</p>	
<b>ELECTRIC ARC FURNACE .....</b>	<b>1988</b>
<p>Daido Steel Company, Ltd., Nagoya, Japan          “The first Japanese electric arc Heroult-type furnace was erected on this site in 1916.”</p>	
<b>IPANEMA IRON AND STEEL WORKS.....</b>	<b>1988</b>
<p>Sao Paulo, Brazil          “The Ipanema Works, which was constructed and operated in the very early part of the 19th century, is the birthplace of the iron and steel industry in Brazil.”</p>	
<b>KURE BEACH MARINE ATMOSPHERIC TEST FACILITY .....</b>	<b>1988</b>
<p>LaQue Center for Corrosion Technology, Kure Beach, North Carolina          “Established in 1935 by Francis L. LaQue, this facility has pioneered research on marine atmosphere corrosion with continuous field testing and evaluation of engineering materials.”</p>	
<b>MASSENA PLANT .....</b>	<b>1988</b>
<p>Aluminum Company of America, Massena, New York          “Established in 1902, this site is the oldest continuously operating aluminum reduction facility in the western hemisphere.”</p>	
<b>METALLURGY DIVISION .....</b>	<b>1988</b>
<p>National Institute of Standards and Technology, Gaithersburg, Maryland          “The metallurgy division was the first federally established laboratory devoted to metals research.”</p>	
<b>METALWORKING FURNACES .....</b>	<b>1988</b>
<p>Mission San Juan Capistrano, San Juan Capistrano, California          “The two furnaces at this site, circa 1790s, are the oldest existing metalworking structures in California.”</p>	
<b>MICHIGAN COPPER COUNTRY .....</b>	<b>1988</b>
<p>Coppertown Museum, Calumet, Michigan          “The Michigan copper country is the site of the earliest prehistoric metalworking in North America.”</p>	
<b>BUILDING “2-0-2” NORTHROP AIRCRAFT.....</b>	<b>1988</b>
<p>El Segundo, California          “On this site, in the early 1930s, utilizing innovative metal fabrication, joining and design, Douglas Aircraft Company/Northrop Corporation created the cradle of Naval and Marine Corps Aviation.”</p>	
<b>RADWERK IV BLAST FURNACE .....</b>	<b>1988</b>
<p>Vordernberg, Austria          “The Radwerk IV Blast Furnace, utilizing the technology of iron making with charcoal and water-power, continuously produced iron for Central Europe from medieval time, until the 20th century. It developed the <i>Fillafer</i>, heating of the air blast and special ore roasting processes.”</p>	

<b>PAUL REVERE'S COPPER ROLLING MILL .....</b>	<b>1988</b>
Plymouth Rubber Co., Inc. Canton, Massachusetts	
<b>SUDBURY DISTRICT ORE BODY .....</b>	<b>1988</b>
Sudbury, Ontario, Canada "The Sudbury District is the world's greatest single source of nickel sulphide ores. Mined since 1886, these ores also contain large amounts of copper, iron, cobalt and the precious metals."	
<b>RESEARCH INSTITUTE FOR IRON AND STEEL .....</b>	<b>1988</b>
Tohoku University, Sendai, Japan "Constructed in 1920, this site is considered to be the birthplace of physical and chemical science of metallic materials in Japan. KS and Sendust magnet materials were invented here."	
<b>ZINC DISTILLATION FURNACE .....</b>	<b>1988</b>
Zawar Mine, India "At this site are preserved the zinc retort distillation furnaces and remnants of related operations."	
<b>AC ROCHESTER DIVISION .....</b>	<b>1989</b>
General Motors Corporation, Flint, Michigan "Development of specially designed aluminum oxide refractory materials and electrically conductive glass-powdered metal seals has contributed greatly to automobile and aircraft internal combustion engine reliability."	
<b>RESEARCH AND DEVELOPMENT CENTER .....</b>	<b>1989</b>
Carpenter Technology Corporation, Reading, Pennsylvania "The invention of the world's first straight chrome and chrome-nickel free machining stainless steels, patented in 1931 and 1934, resulted in the use of stainless parts and fittings in almost every industry."	
<b>DSV ALVIN .....</b>	<b>1989</b>
Woods Hole Oceanographic Institution, Woods Hole, Massachusetts "Deep Submergence Vehicle Alvin was accomplished by the imaginative use and development of advanced materials, including high yield strength steel, titanium, and special polymeric materials."	
<b>THE EIFFEL TOWER.....</b>	<b>1989</b>
Paris, France "The Eiffel Tower, erected in 1889 of puddled iron, is a distinctive architectural and engineering masterpiece."	
<b>MILL FOR THE PRODUCTION OF NICKEL-BASE ALLOYS .....</b>	<b>1989</b>
Inco Alloys International, Huntington, West Virginia "This facility placed in operation the first continuous bright annealing sheet furnace in the world, and is the first facility solely dedicated to the production of wrought nickel and nickel-base alloys."	
<b>OLIVER CHILLED PLOW WORKS .....</b>	<b>1989</b>
South Bend, Indiana "The economical chilled iron plow was ideal for breaking the rich loam of the Great Plains."	
<b>YTTERBY MINE .....</b>	<b>1989</b>
Resaro Island, Stockholm Archipelago, Sweden "Four periodic elements — Yttrium, Terbium, Erbium, and Ytterbium — were isolated from	



the black stone gadolinite mined here and were named after the Ytterby Mine.”

**MANNESMANN PIERCING AND PILGER MILLS .....1990**

Mannesmannröhren-Werke AG, Düsseldorf-Rath, Germany  
“The first seamless steel pipe and tubing was manufactured by the Mannesmann piercing and pilger processes, circa 1890.”

**ELECTRIC ARC FURNACE .....1990**

Deutsches Werkzeugmuseum, Remscheid, Germany  
“This direct current electric arc furnace is the original furnace built according to the invention of Dr. Paul Héroult in 1905. The first heat of steel was made in this furnace on February 17, 1906.”

**ALUMINUM RESEARCH LABORATORIES .....1990**

Aluminum Company of America, Alcoa Center, Pennsylvania  
“Established in 1929, the Alcoa Aluminum Research Laboratories were the first research facilities for the aluminum industry. The laboratories have performed fundamental and applied research on aluminum alloys, corrosion mechanisms, smelting technology, and precision testing.

**CLYDACH REFINERY .....1990**

Inco, West Glamorgan, South Wales  
“This refinery was the world’s first to produce, beginning in 1902, pure nickel by the Mond nickel carbonyl process.”

**AIR FORCE MATERIALS LABORATORY .....1990**

Wright-Patterson Air Force Base, Dayton, Ohio  
“Since 1917, the Air Force Materials Laboratory, formerly the Material Section of McCook Field, has pioneered research and development of advanced materials and manufacturing processes for aerospace systems.”

**RESEARCH CENTER, ARMCO INC. ....1991**

Middletown, Ohio  
“Established in 1903, Armco’s Research Center is the first commercial iron and steel research facility in North America. Its many accomplishments include electrical steel sheet, Armco ingot iron and continuous rolling of sheet steel.”

**AT&T BELL LABORATORIES .....1991**

Murray Hill, New Jersey  
“AT&T Bell Laboratories has hastened our understanding of impurity effects in semiconductors and the fundamental properties of metal crystals by its invention of zone melting, including zone refining and zone leveling.”

**RESEARCH LABORATORIES, CORNING GLASS WORKS.....1991**

Corning, New York  
“The first industrial glass research laboratory in the United States was established by Corning Glass Works in 1908. Major inventions from this laboratory changed glass technology throughout the world.”

**WATERVLIT ARSENAL, U.S. ARMY .....1991**

Watervliet, New York  
“Major technological developments in the advancement of gun steel were made at the Watervliet Arsenal including autofrettage, guided boring, and chrome plating. Established in 1813, it is the oldest, continuously active arsenal in the United States.”

<b>WATERLIET PLANT, AL TECH SPECIALTY STEEL CORPORATION .....</b>	<b>1992</b>
Colonie, New York	
“Since 1907, this plant has been instrumental in the technical and commercial development of stainless steels, tool steels and other specialty metals and the processes for their manufacture.”	
<b>ELECTRIC ARC FURNACE, THE MUSEUM OF SCIENCE AND TECHNOLOGY .....</b>	<b>1992</b>
Milano, Italy	
“The first electric furnace of the indirect-arc type for melting steel was invented by Ing. Ernesto Stassano in 1898. Furnaces of this type were used to produce industrial quantities of steel in Europe and America.”	
<b>BETHFORGE DIVISION, BETHLEHEM STEEL CORPORATION .....</b>	<b>1992</b>
Bethlehem, Pennsylvania	
“In 1898 F. W. Taylor and M. White developed at this location a heat treatment practice which permitted the widespread use of high-speed tool steels.”	
<b>MOUND LABORATORY, EG&amp;G MOUND APPLIED TECHNOLOGIES, U.S. DEPT. OF ENERGY .....</b>	<b>1993</b>
Miamisburg, Ohio	
“Mound Laboratory’s pioneering efforts in applied materials research and development successfully supported the Manhattan Project and provided radioisotope thermoelectric generators for space exploration.”	
<b>MATERIALS SCIENCE AND TECHNOLOGY DIVISION, NAVAL RESEARCH LABORATORY .....</b>	<b>1993</b>
Washington, DC	
“In this building, starting in 1927, pioneering work led to landmark developments in gamma ray radiography, defect-free steel castings, heavy section steel weldments and fracture mechanics concepts.”	
<b>TANNEHILL IRONWORKS .....</b>	<b>1994</b>
Birmingham, Alabama	
“Founded in 1830 and known as the birthplace of the Birmingham iron industry, Tannehill became a major supplier of iron for cannons and naval plate to the Confederacy.”	
<b>METALLURGICAL ENGINEERING LABORATORY .....</b>	<b>1994</b>
Wayne State University, Detroit, Michigan	
“In 1941, research conducted in the Old Main Building by Dr. E.O. Kirkendall led to the discovery that defects in the crystal lattice affect atomic diffusion in metals. This discovery established the foundation for worldwide understanding of solid-state diffusion.”	
<b>CHAMPION SPARK PLUG MINE (JEFFREY MINE) .....</b>	<b>1994</b>
Mono County, California	
“In 1919, discovery of andalusite at this mine led to the commercialization and development of advanced ceramic spark plug insulation for internal combustion engines and the growth of the world’s transportation industry.”	
<b>EDGAR THOMSON PLANT .....</b>	<b>1994</b>
U.S. Steel Mon Valley Works, Braddock, Pennsylvania	
“Built in 1873 by Andrew Carnegie, the Edgar Thomson Plant pioneered numerous technological advances in the production of quality steel products for the railroad, automotive and appliance industries.”	
<b>“LITTLE GIANT” UNIVERSAL TESTING MACHINE .....</b>	<b>1995</b>
Tinius Olsen Testing Machine Co., Inc., Willow Grove, Pennsylvania	
“The ‘Little Giant’, invented by Tinius Olsen I, in 1880, the world’s first truly universal	

testing machine, became the basis of all tension testing machines later produced in the United States of America.”

**METALS TECHNOLOGY LABORATORIES ..... 1995**

Canada Centre for Mineral and Energy Technology, Ottawa, Ontario, Canada  
“Established in 1942, the Laboratories are recognized for outstanding contributions to metallurgy and materials science in support of the Government of Canada and to promote the growth of the Canadian industries.”

**GREENWOOD FURNACE..... 1995**

Greenwood Furnace State Park, Greenwood Furnace, Pennsylvania  
“Beginning in the 1830’s, Greenwood Furnace produced a superior grade of charcoal iron that was made into axles, wheels, and other locomotive parts. These products contributed to the industrial growth and westward expansion of America.”

**48” GREY MILL ..... 1996**

Bethlehem Steel Company, Bethlehem, Pennsylvania  
“The 48” Grey Mill, put into operation on January 9, 1908 at the Bethlehem Plant of Bethlehem Steel Corporation, was the first U.S. rolling mill to successfully produce large wide-flange steel beams as single sections rolled from ingots.”

**FORGE OF FONTENAY ..... 1996**

Fontenay, Bourgogne, France  
“The Forge of Fontenay, erected around 1220 as a part of the Abbey of Fontenay, is the first metallurgical factory in Europe and the place of the invention of the hydraulic hammer. This invention became the basis of industrial manufacturing of iron in Europe.”

**FREEDOM FORGE ..... 1996**

Standard Steel, Burnham, Pennsylvania  
“Founded as a tiny frontier iron foundry and forge shop on the banks of the Kishacoquillas Creek, Standard Steel grew with the nation to become a leading producer of high quality machined steel forgings.”

**LATROBE PLANT..... 1997**

Allvac—An Allegheny Teledyne Company, Latrobe, Pennsylvania  
“Established on this site in 1919, the metallurgical department of Vanadium-Alloys Steel Company made significant, innovative contributions to the field of tool and high-speed steels.”

**WILLIAM TOD CROSS-COMPOUND STEAM ENGINE ..... 1997**

Former Youngstown Sheet and Tube Breir Hill Works, Youngstown, Ohio  
“The William Tod Company of Youngstown was one of a handful of builders of very large machinery for the American steel industry. This engine, with cylinders of 34- and 68-inch bore by 60-inch stroke, is representative of the firm’s — and the industry’s — application of steam power to rolling-mill drive early in the period of gradual transition to electric drive. The frame, cylinder, and flywheel castings, and the crankshaft, piston-rod, and connecting-rod forgings of these engines are typical of the largest work pieces produced by the nation’s foundries and forges.”

**LD-VESSEL NUMBER 1 ..... 1998**

Technical Museum of Vienna, Vienna, Austria  
“In 1952, the first commercial production of steel utilizing the basic oxygen method, developed by VOEST, took place in Vessel Number 1 located at the Linz steel plant. Today, much of the world’s steel is made using Linz-Donawitz (LD) based processes.”

**SPEEDWAY LABORATORIES ..... 1998**

Praxair Surface Technologies, Inc., Indianapolis, Indiana

“Original site of Prest-O-Lite and Acetylene Research of Union Carbide, where many inventions for the metals, automotive and aviation industries were made. It was here that the first useful application of detonation waves in gases led to the invention of the detonation gun process for plating metal and ceramic coatings on metal components. Patented in 1955, that process marked the inception of the modern thermal spray industry. In 1992, Union Carbide Coating Service became Praxair Surface Technologies.”

#### **HEROULT ELECTRIC ARC FURNACE FOR SMELTING IRON .....1998**

Town of Heroult, Shasta County, California

“In 1907, at Shasta County, the first electric arc furnace in the western hemisphere was utilized for the direct production of iron from this area’s indigenous resources of magnetite ( $\text{Fe}_3\text{O}_4$ ), charcoal, limestone, and hydro electricity. It operated at the town of Heroult, named in honor of the furnace inventor Paul Heroult of France (who assisted in the installation). The town site, located at the confluence of the Pit and McCloud rivers, was subsequently submerged by the rising waters behind Shasta Dam in 1945.”

#### **POLYMERIC MATERIALS LABORATORY .....1999**

Department of Industrial Chemistry and Chemical Engineering Politecnico, Milan, Italy

“At Polymeric Materials Laboratory in the Department of Industrial Chemistry and Chemical Engineering “G. Natta,” Prof. Natta and co-workers pioneered the synthesis of chemically and sterically ordinate polymers, of outstanding importance for the industrial development of plastics, synthetic fibers and elastomers.”

#### **COVINGTON-CINCINNATI SUSPENSION BRIDGE .....2000**

Covington, Kentucky and Cincinnati, Ohio

“The Covington-Cincinnati Bridge, built to the design of John A. Roebling, epitomizes the best of mid-nineteenth century materials and fabrication technology, particularly in its use of wire rope for suspension cables and inclined stays.”

#### **HENDRICHS FORGE .....2000**

Solingen, Germany

“The Hendrichs Forge, founded in 1886, is representative of the drop forges which revolutionized the cutlery trade in Solingen.”

#### **BETTIS ATOMIC POWER LABORATORY .....2000**

West Mifflin, Pennsylvania

“The pioneering work carried out at Bettis Atomic Power Laboratory provided new materials for nuclear and non-nuclear applications, developed naval nuclear pressurized water reactor plants, and made significant contributions to the creation of the commercial nuclear power industry.”

#### **OHIO CRANKSHAFT COMPANY .....2001**

Cleveland, Ohio

“Ohio Crankshaft is the site of the first production application for selective induction hardening of steel parts. Known as the TOCCO Process, its success spurred the growth of induction hardening technology.”

#### **OUTOKUMPU FLASH SMELTER .....2002**

Helsinki-Espoo, Finland

“In 1949, Outokumpu Oyj introduced autogenous flash smelting of copper concentrates at their facility in Harjavalta, Finland. The process has become a primary means of copper and nickel production worldwide.”

#### **ALTASTEEL LTD .....2002**

Edmonton, Alberta, Canada

“In 1962, this site became the first “minimill” in North America, a revolutionary concept

relying entirely on electric furnaces, continuous casting and rolling mills for commercial production of carbon steels.”	
<b>THE ELI WHITNEY ARMORY .....</b>	<b>2003</b>
Hamden, Connecticut	
“On this site, between 1798 and 1825, Eli Whitney built the first significant independent American armory. The development of materials processing innovations began the tradition of precision production and interchangeable parts in America.”	
<b>L'ANSE AUX MEADOWS .....</b>	<b>2003</b>
Newfoundland, Canada	
“Viking site of the first known metal smelting (iron from bog iron) and metal working (forging of iron into nails) that took place in North America.”	
<b>POPULONIA—ISOLA D’ELBA .....</b>	<b>2003</b>
Tuscany, Italy	
“Populonia and the Island of Elba are recognized as the sites of significant ferrous and non-ferrous mining and metalworking during the Etruscan (7th–3rd century BC) and Roman (2nd century BC–1st century AD) periods.	
<b>THE CATERPILLAR TRACTOR AT HAGGIN MUSEUM .....</b>	<b>2004</b>
Stockton, California	
“Birthplace of the first useful Caterpillar tractor, an invention of Benjamin Holt of Stockton, California, that simulated the development of alloys for improved abrasion and wear resistance applications.”	
<b>BURDEN IRON WORKS .....</b>	<b>2005</b>
Ballston Spa, New York	
“Headquarters of a giant 19th century iron manufacturer. Burden’s patented horse-shoe making and concentric squeezing machines resulted in the automation and mass production of many essential iron products, a basis for the Industrial Revolution.”	
<b>LADISH COMPANY, INC., CUDAHY FORGE DIVISION .....</b>	<b>2005</b>
Cudahy, Wisconsin	
“The location for substantial contribution to forging metallurgy and deformation processing technology.”	
<b>THE LIBERTY BELL .....</b>	<b>2006</b>
Philadelphia, Pennsylvania	
“The Liberty Bell is an international symbol of freedom whose history is as significant to metallurgy and casting technology as it is to American heritage.”	
<b>THE PHOENIX IRON &amp; STEEL COMPANY .....</b>	<b>2006</b>
Phoenixville, Pennsylvania	
“Established in 1783, from a modified grist mill, the Phoenix Iron & Steel Works was the site of many metalworking firsts in America including rolling of iron nails, structural shapes and beams as well as invention and production of the spiral wrapped wrought iron Griffen gun and the hollow wrought iron Phoenix column.”	
<b>THE H.L. HUNLEY .....</b>	<b>2007</b>
North Charleston, South Carolina	
“In context of naval warfare, H.L. Hunley changed the world. Its builders’ innovative use of materials, design and manufacturing techniques in the world’s first successful attack submarine.”	

<b>ATI-ALLVAC .....</b>	<b>2007</b>
Monroe, North Carolina	
“For pioneering achievement in vacuum induction melting of nickel-base superalloys, which began on September 19, 1957.”	
<b>COORSTEK, INC. ....</b>	<b>2008</b>
Golden, Colorado	
“At this site, in 1959, the first aluminum beverage can plant produced its first can, under the direction of William K. Coors and colleagues.”	
<b>BEEHIVE COKE OVENS.....</b>	<b>2008</b>
Various southwestern Pennsylvania locations	
“Beehive ovens marked a major advance in manufacturing coke, allowing the mass production of iron and steel. First built in the 1830’s in Fayette County, Pennsylvania, there were almost 48,000 in operation by 1910.”	
<b>ASM INTERNATIONAL HEADQUARTERS BUILDING AND GEODESIC DOME.....</b>	<b>2009</b>
Materials Park, Ohio	
“Inspirational and visionary, the ASM International Headquarters Building and Geodesic Dome symbolize the enduring fellowship of materials professionals, advancing humanity’s progress through their work with engineered materials.”	
<b>METCUT RESEARCH, INC .....</b>	<b>2010</b>
Cincinnati, Ohio	
“This building constructed in 1951, was the first facility of Metcut Research Associates Inc. Here groundbreaking research was conducted in areas of machinability and surface integrity.”	
<b>CHERRY VALLEY COKE OVENS. ....</b>	<b>2010</b>
Leetonia, Ohio	
“The Leetonia Cherry Valley Coke Ovens enabled the burgeoning 19th century American steel industry fueled by coke transformed from coal in ovens in Pennsylvania and Ohio.”	
<b>USS MONITOR .....</b>	<b>2010</b>
Off the coast of Cape Hatteras, North Carolina	
“With innovations such as a revolving gun turret, steam-driven propulsion, and it’s iconic ironclad construction, the USS Monitor heralded the arrival of the modern warship.”	
<b>THE MILK HOUSE, ELECTRON ENERGY CORP .....</b>	<b>2011</b>
Landisville, Pennsylvania	
“Site where Electron Energy Corp. produced the world’s first rare earth magnets in 1970. These high energy rare earth magnets based on samarium and cobalt made possible revolutionary improvements in performance and miniaturization of thousands of new systems and components for a broad range of industries worldwide.”	
<b>OPEN COIL ANNEALING (OCA OPERATIONS) ArcelorMittal Dofasco.....</b>	<b>2011</b>
Hamilton, Ontario, Canada	
“In 1959 Dofasco pioneered Open Coil Annealing, a finishing process and technology, used to make high quality, specialty steels. Since then, Open Coil Annealing has been adopted worldwide and celebrated for its contribution to steelmaking and manufacturing of appliances and goods.”	
<b>SPONGE IRON POWDER PRODUCTION.....</b>	<b>2012</b>
Riverton, New Jersey	
“Original site for the introduction of tunnel kiln manufacture used for the direct reduction of iron ore to ferrous metal powder for the global powder metal industry.”	

<b>THE DELHI IRON PILLAR.....</b>	<b>2013</b>
New Delhi, India	
“Delhi Iron Pillar—The rustless metallurgical marvel dedicated to ancient iron making traditions and blacksmiths of ancient India.”	
<b>U.S. DEPARTMENT OF ENERGY SAVANNAH RIVER SITE .....</b>	<b>2013</b>
Aiken, South Carolina	
“For advancing the materials technologies necessary to produce tritium, plutonium, and other isotopes for national defense, research, and medical applications.”	
<b>THE WORLD’S HEAVY HYDRAULIC CLOSED-DIE FORGING PRESSES .....</b>	<b>2013</b>
Alcoa—Cleveland, Ohio	
Alcoa—Russia	
PCC Wyman Gordon—Grafton, Massachusetts	
Aubert Duval—France	
Weber Metals—Paramount, California	
VSMPO—Russia	
“These giant presses enabled quantum changes in the approach of modern aircraft design by producing large, forged monolithic structures. In turn, this capability provided designers with greater flexibility in the application of new alloys; lighter, stronger, and affordable aerostructures; and more powerful and fuel efficient gas turbine engines.”	
<b>ALUMINUM COMPANY OF CANADA LTD .....</b>	<b>2014</b>
Kingston, Ontario, Canada	
“At this site, men and women shaped aluminum from war-time need to peaceful use, learning its secrets, and developing new applications for the future.”	
<b>OERLIKON METCO .....</b>	<b>2014</b>
Westbury, New York	
“The first family of exothermically reacting; self-bonding intermetallic forming compounds used by the thermal spray industry for improved surface protection properties was developed at this site. Process and materials were commercialized between 1965–1972.”	
<b>PARK METALLURGICAL/HEATBATH CORPORATION.....</b>	<b>2015</b>
Detroit, Michigan	
“At the forefront of expanding the business and science of metal working, Park Chemical’s contributions to metallurgical advancements began here in Detroit, Michigan by visionary ASM Founder/President, William Park Woodside.”	
<b>SCRANTON IRON FURNACES.....</b>	<b>2015</b>
Scranton, Pennsylvania	
“The Scranton Iron Furnaces spurred the nation’s industrial revolution in iron and coal through the use of anthracite. Locally produced rails contributed to the growth of America’s 19th century railroads.”	
<b>ALCOA INC. TENNESSEE OPERATIONS NORTH PLANT .....</b>	<b>2016</b>
Alcoa, Tennessee	
“For being the primary supplier of aluminum heat-treated sheet and structural members for aircraft during World War II, and for playing a significant role in the sustainability and recycling of aluminum can sheet.”	
<b>QUINCY SMELTING WORKS (QSW).....</b>	<b>2016</b>
Ripley, Franklin Township, Michigan	
“The Quincy Smelting Works is uniquely capable of interpreting the final stage of copper production for one of the few native copper ore mining regions on earth.”	



**WELD MOLD COMPANY .....2017**

Brighton, Michigan

"For the development of the flood welding process, which facilitated the repair of steel alloy forging dies, thereby extending their lifetime and productivity."

**MATERION ELMORE, OHIO PLANT .....2018**

Elmore, Ohio

"Materion's Elmore plant began producing beryllium and beryllium copper alloys in 1953. These materials have contributed to significant innovations in the aerospace and defense, information technology, automotive, and telecommunications industries."