MODINE

A Century of Innovation

est. 1916

"We are building our factory around our laboratory—an unusual procedure for a tractor radiator manufacturer."

A.B. Modine

A Century of Innovation


January, 1917 GAS POWER 43

Modine
Racine

We are building our factory around our Laboratory—an unusual procedure for tractor radiator manufacture.

Please mention Gas Power when you write.

Modine Manufacturing Company's first formal advertisement in 1917 established a guiding principle that has set the company apart for one hundred years: business built on innovation.
It's this focus that has taken Modine from a small manufacturer in Racine, Wisconsin to a global leader in the research, development and production of heat transfer technology.


MODINE
1910's: Beginnings

The gas-powered engine was changing the world. But the matter of cooling it was still a very new science. Young engineer Arthur B. Modine had a new insight: instead of focusing on the best way to cool the radiator's water, he looked for the best way to heat the air passing through the device. His observations would forever change the heat transfer market.

1910's – Business Growth

1916: On June 23rd, A.B. Modine founds Modine Manufacturing Company and begins to build a reputation around thermal innovation.

1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

1910's – Key Innovations

1916: The Spirex Radiator serves as a foundation for the company. It is Modine's first invention using the innovative approach of "heating the air passing through the device."

1918: The Unit Heater is first built out of spare parts by A.B. Modine to warm his radiator assemblers. The heater becomes a staple of Modine's product line.

1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

1910's – Key Innovations

1918: The Detachable Core Radiator allows for field-replacement of individual radiator core sections, a concept still used today for large off-highway and mining equipment.


MODINE
1920's: Business Heats Up

1920's: Business Heats Up

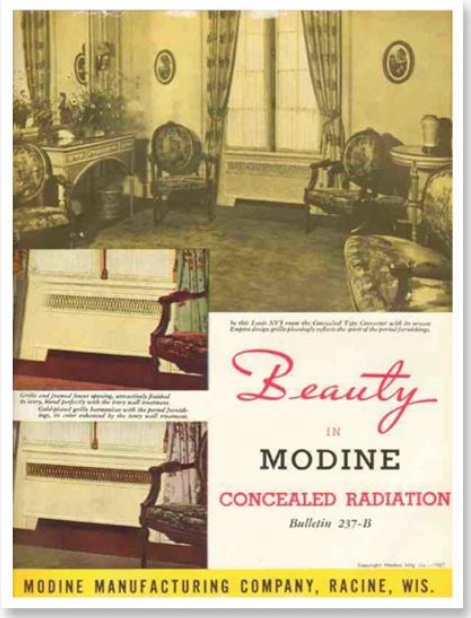
Ford's Model T dominated the 1920's as the "first affordable automobile." With 15 million vehicles produced by 1927, the Model T was a huge opportunity for manufacturers—an opportunity Modine seized. The 1920's marked the beginning of a decades-long relationship between the two companies.

1920's: Business Heats Up

1925: Modine's Turbotube radiator becomes standard equipment in the incredibly popular Model T.

1928: The Heating Division is officially established, and Modine Manufacturing becomes a publicly traded company.

1920's: Key Innovations

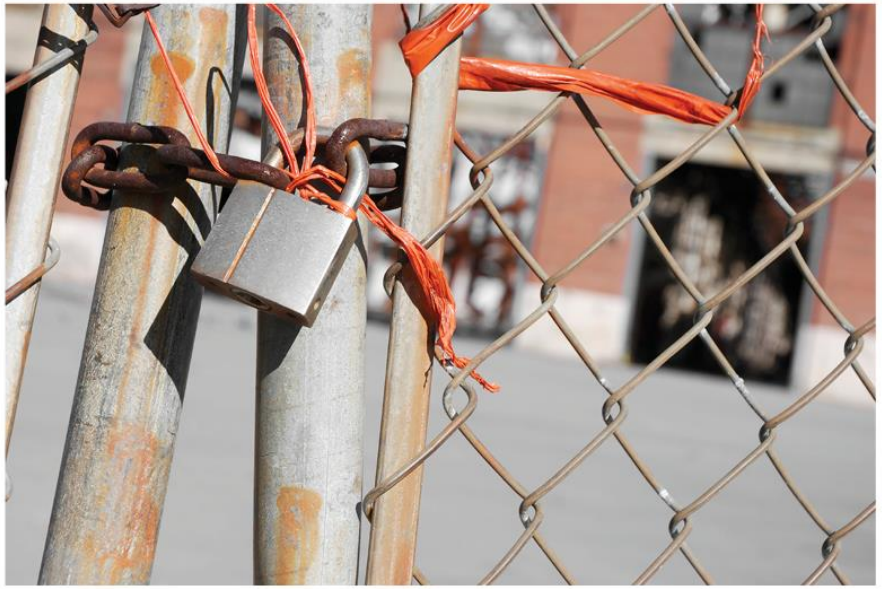


1923: The Cabinet Heater convector heats an entire room with only rising air.

1925: The Louvered Fin for radiators appears in its first incarnation.


MODINE
1930's: Unlikely Expansion

1930's: Unlikely Expansion



The Great Depression saw industrial production levels fall dramatically as automakers and manufacturers shut down. Modine posted a loss of over $150,000 in 1932 but quickly recovered, posting gains for many decades to come. Despite a rough start, a growing partnership with Ford turned the 1930's into an unexpected time of growth for Modine.

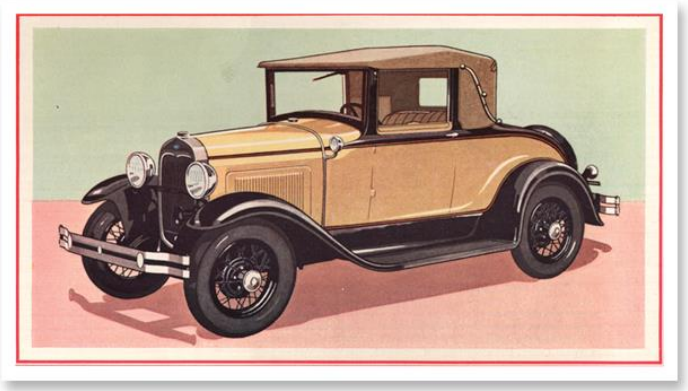
1930's – Business Growth

1932: In the midst of the Great Depression, a huge licensing deal with Ford saves Modine. Within a few years, Modine is the sole supplier of radiators for Ford trucks.

1934: With growing product demand, Modine purchases a second manufacturing site in LaPorte, Indiana.

1937: Modine kicks off an ambitious 10-year expansion plan to invest in new research and development facilities, factories and equipment.

1930's – Key Innovations



1930: The Fresh Air Automobile Heater is the first known means of heating a car's interior with fresh, outside air.

1935: The Unit Cooler, a precursor of modern air conditioning, expands Modine's product line beyond heating.


MODINE
1940's: Wartime Production

1940's: Wartime Production

Vol. 1 BACOLOD CITY, NEGROS OCCIDENTAL, P. I., AUG. 15, 1945 No. 21

WAR ENDS!

Japan has capitulated!

President Truman announced from the White House at 8 o'clock Philippine time this morning that Japan has accepted the unconditional surrender terms of the Potsdam ultimatum.

Under the Potsdam terms, Japan will find herself reduced territorially to the four main home islands. This means the loss of the following territories which her years of aggression had subjugated: Manchuria, Korea, Kwantung leased area, Karafuto, Formosa, Pescadores, Ryukyus, Spratly, Marshalls, Carolines, Marcus, and Palau Islands.

In addition to that, the Emperor, while still figuratively on the throne, takes his orders from the Allied military commanders. Allied forces will occupy the Japanese home land until such a time as there is a reliable liberal government instituted. Later the Japanese people will be given a chance to vote on whether or not they want an Emperor.

The Japanese war machine will be eliminated, and the "Greater East Asia Co-Prosperity Sphere" sinks with the setting sun.

VICTORY EXTRA!! DISTRIBUTED FREE-NOT TO BE SOLD VICTORY EXTRA!!

World War II spurred massive amounts of industrial production and new technologies on the home front. Like many manufacturing companies, Modine grew significantly in the 1940's in terms of output, innovation, and research and development.

1940's – Business Growth

1940: Modine builds the largest automotive wind tunnel of its kind, used for testing heat transfer components within operating vehicles. It proves invaluable in testing WWII vehicles, including the Jeep.

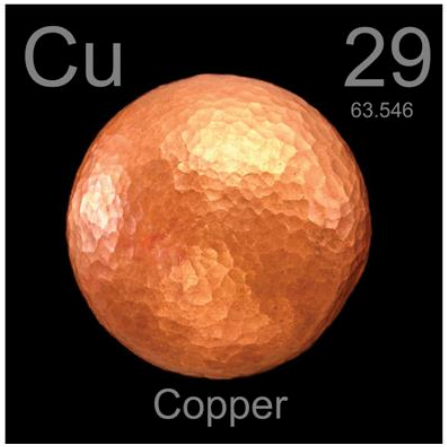
1945: By the end of the war, Modine has received four Army-Navy awards for outstanding production.

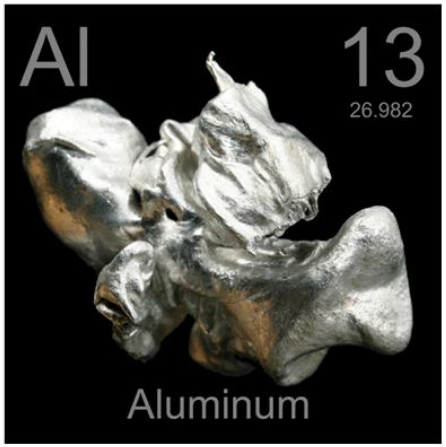
1947: The expansion plan started in 1937 comes to a successful close, leaving Modine with a total of four manufacturing facilities.

1940's – Key Innovations

WWII: The Supercharger Aftercooler, used in the fastest Allied fighter plane, the P-51 Mustang, gets a Modine redesign. It is one of many air aftercoolers designed and sold during the war.

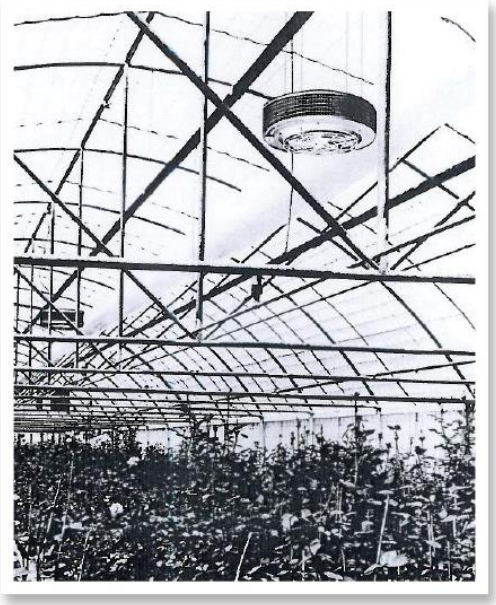

MODINE
1950's: Time of Transition





Of all the post-war changes, the shift from copper to aluminum was the biggest for manufacturers. A shortage of copper forced Modine to redesign products and develop new processes for aluminum production. Modine spent the 1950's dealing with the complications of a new metal and a post-war economy.

1950's – Business Growth



1950: Modine enters the greenhouse market, which it continues to lead today, with innovative steam-based unit heaters.

1953: A new research facility is built, adding four more component wind tunnels and specialized equipment to Modine's research and development testing capabilities.

1958: Modine makes another big deal with Ford—but this one falls through. The plant intended for Ford production becomes Modine's first all-aluminum products plant.

1950's – Key Innovations

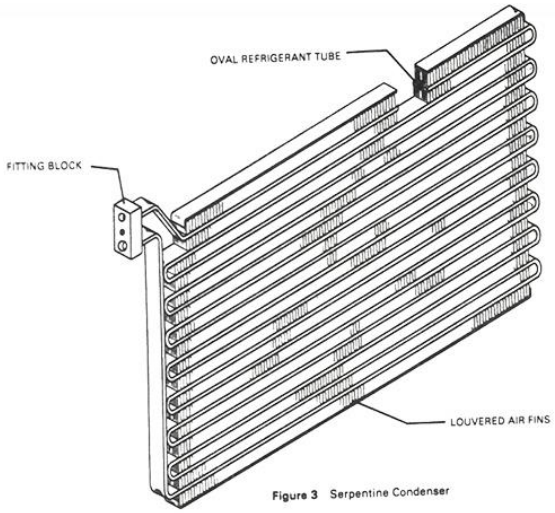


Figure 3 Serpentine Condenser

1955: The Alfuse Method, a new chemical process to bond aluminum to aluminum in a brazing furnace, is first developed.

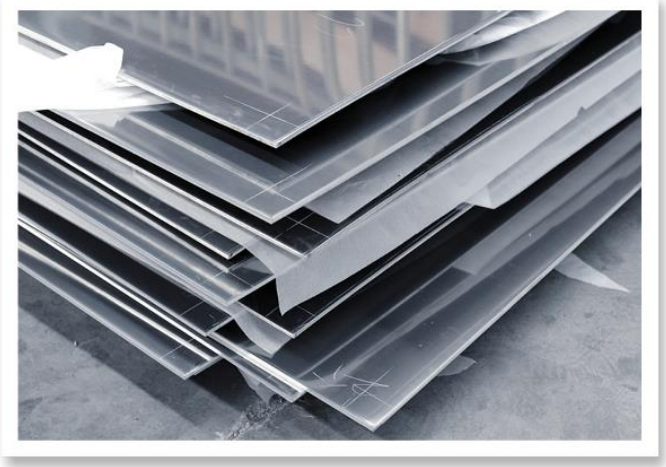
1956: The All-Aluminum Air Conditioning Condenser becomes one of Modine's first all-aluminum product successes.


MODINE
1960's: Redefinition

1960's: Redefinition

By the 1960's the Baby Boom was an economic game changer, creating new markets and shifting the consumer make-up. Modine embraced the change, aggressively redefining and expanding its business with the boomers at home and the Japanese abroad.

1960's – Business Growth

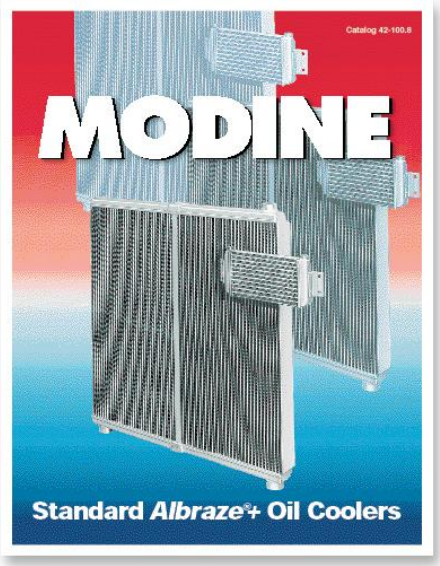


1962: A full line of Modine metal convectors, ventilators, cabinets and water fountains breaks into the booming school market.

1968: Modine licenses the Alfuse technology to Showa Aluminum of Tokyo, its first formal arrangement with a Japanese auto company.

1969: By the end of the 1960's, Modine acquires two companies and operates a total of 10 manufacturing plants, including two specifically focused on aluminum production.

1960's – Key Innovations



1960: The School-Vent Convector heating system anchors a new product line for the new school market.

1961: The Albraze Aluminum Bonding Method is developed as another method in an expanding portfolio of aluminum bonding techniques.


MODINE
1970's: A Shifting Industry

1970's: A Shifting Industry

The 1973 oil embargo and resulting energy crisis created a new demand for compact vehicles—including Japanese imports. Evolving alongside the shifting auto market, and entering the auto aftermarket, Modine continued to expand throughout the 1970's.

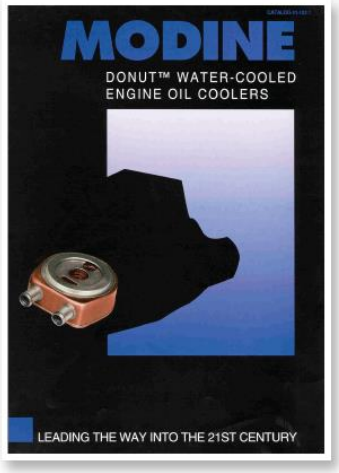
1970's – Business Growth

1972: Aggressively moving into the auto aftermarket, Modine Auto-Cool, Inc. is established to help market and distribute Modine's replacement radiators and other replacement parts.

1978: Modine sends its first trade delegation to Japan, a valuable connection given Ford's shift to self-sourcing.

1979: Modine is the leading U.S. supplier of condensers and evaporators for imported Toyotas, Nissans and Hondas. By the end of the 70's, six new Modine plants have opened.

1970's – Key Innovations



1971: The BT-Unit liquid-to-liquid oil cooler offers greater efficiency for tractor engines at a smaller size compared to large-scale OEM equipment.

1972: The Donut liquid-to-liquid cooler meets the needs of the growing compact vehicle market and becomes standard equipment by the mid-80's.

1977: The U.S. Patent Office issues the last of A.B. Modine's 122 U.S. patents, appropriately titled "Heat Exchanger".


MODINE
1980's: Going Global

1980's: Going Global

Globalization, first sparked by World War II, exploded in the 1980's. A combination of technological advances and relaxing trade regulations allowed a new global marketplace to emerge. Modine built on its previous forays into international business and embraced this opportunity to become a truly global company.

1980's – Business Growth

1982: Modine makes its first non-domestic acquisition in Canada, rapidly followed by international acquisitions in Europe, South America and Asia.

1984: Modine's stock is transferred from the Midwest Stock Exchange to the NASDAQ.

1985: A formalized national network of 11 Regional Sales and Service Centers is established through a series of domestic acquisitions, boosting Modine's presence in the automotive aftermarket.

1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

1980's – Key Innovations

1982: The Beta-Weld Radiator's unique dual bond makes it standard equipment on heavy-duty trucks and the first documented million-mile radiator in trucking history.

1987: The Parallel Flow Condenser revolutionizes condenser design, using significantly less material and less ozone-depleting refrigerant while still increasing performance.


MODINE
1990's: Continued Innovation

1990's: Continued Innovation

After the deregulatory policies of the 1980's, the 1990's saw a resurgence of the environmentalist movement. Environmental concern wasn't new to Modine—the first Pollution Control Manager was appointed back in 1972. But with the 90's came a renewed focus on innovation with less material and more efficiency.

1990's – Business Growth

1990: Modine is named sole supplier of charge-air coolers for both Ford and Navistar International.

1990: Modine controls 40% of the market for complete replacement radiators.

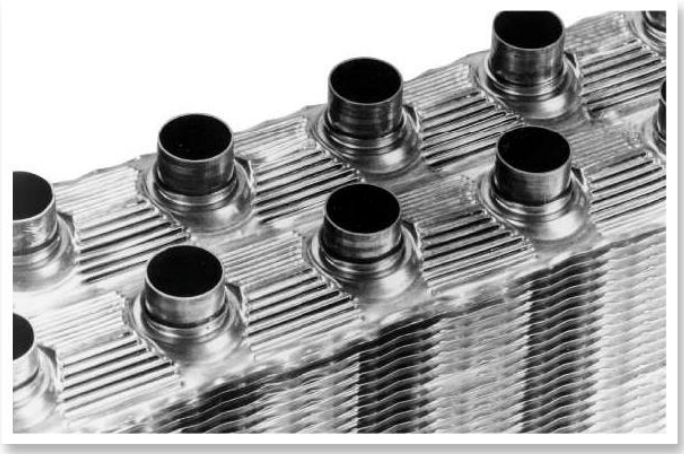
1990: Modine Europe and Modine International are officially established to manage international operations.

1993: Modine acquires Längerer & Reich, a German heat transfer company founded in 1913.

1998: Modine sales exceed $1 billion.

1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

1990's – Key Innovations



1991: Turbofin, a new surface for air-conditioning condensers, reduces fin material without sacrificing heat-transfer capacity.

1996: Layered-Core Oil Cooler Technology patent is filed after several years of development.

1998: The Stainless Steel Oil Cooler for brake retarder cooling appears in its first incarnation at Modine Europe. It evolves into one of Modine's most successful product offerings.


MODINE
2000's: Bigger and Better

2000's: Bigger and Better

Building on the international success of the 1980's and 90's, Modine continued to pursue global opportunities in the new millennium. A growing economy in the early 2000's allowed Modine to make major acquisitions, take important steps in business practices and reach new milestones.

2000's – Business Growth

2004: Modine establishes Asia headquarters and starts Asian expansion.

2004: Modine's stock is transferred from the NASDAQ to the NYSE.

2005: Modine acquires Airedale, a U.K.-based manufacturer of integrated HVAC cooling systems, opening the door to new European business.

2005: The Energy Conservation Initiative launches, a manifestation of Modine's commitment to implementing "green" practices.

2005: Modine divests its U.S. aftermarket operations, focusing instead on its direct offerings to OEM's.

2006: Modine solidifies presence in South America by buying out its joint venture partner in Brazil.

2008: Modine's sales reach $1.8 billion, a new record.

2000's – Key Innovations

2000: Modine launches the first heavy duty EGR cooler in the world.

2000: Global Off-Highway Radiators are first developed.

2007: The Slot Down Charge-Air Cooler, first developed in Europe in the early 2000's, is applied to heavy-duty commercial vehicles in an enhanced form.

2008: Fuel Cell Technology, an alternative energy source in development for nearly a decade, leads to a lucrative licensing deal with Bloom Energy.


MODINE
2010's: Refocused and Ready

2010's: Refocused and Ready

Uncertain economic conditions saw Modine restructuring in the 2010's. A competitive cost structure and disciplined approach to product development established stability and opened new possibilities, helping Modine to grow stronger than ever moving forward.

2010's – Business Growth

2010: A Four Point Plan helps Modine recover from the financial crisis and lays the groundwork for future growth by refocusing Modine's business strategy and product offerings.

2012: The acquisition of Geofinity, a Canadian producer of geothermal technology, allows Modine to diversify its building HVAC product offerings and continue to invest in alternative energies.

2014: Modine acquires Barkell Limited. The U.K. custom-built air handling manufacturer expands Modine's global product lines and sales channels.

2015: Modine announces a joint venture with Puxin, a manufacturer of stainless steel heat exchangers in Yangzhou, China. This partnership enables Modine to expedite its supply of stainless steel products, including EGR and oil coolers, to the commercial vehicle and automotive markets in China.

2016: Modine Celebrates its 100th anniversary.

2010's – Key Innovations

2010: The Electric Bus Cooling Module uses electric fan technology and aluminum heat exchangers to replace conventional hydraulic fan technology and copper-brass radiators.

2011: The Effinity[93] is the highest efficiency unit heater in North America—coming a long way since Modine's first makeshift unit heater in 1918.

2010's – Key Innovations

2011: The Atherion®, Modine's first packaged ventilation rooftop unit, expands Modine's building HVAC offerings and sets the stage for further growth in the ventilation market.

2012: The Layered Core Battery Chiller ensures a constant temperature for the battery in electric vehicles.

2012: Airedale's TurboChill™ and DeltaChill ™ free-cool chillers draw recognition and awards for their innovative designs.


MODINE
Today: 100 Years and Counting

100 YEARS

We still hold to the same philosophy as we did in 1917: business built around innovation.

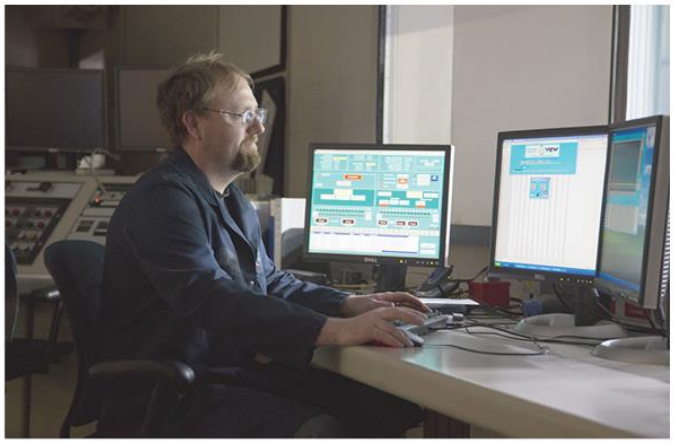
- **More than 2,200 patents**
- **Over 600 Engineers**
- **World-class testing facilities**

Modine Today: 100 Years and Counting

Modine continues to expand internationally.

- **30+ Global Facilities**
- **7,000+ Employees Worldwide**
- **Over 50% of Revenue Generated Outside U.S.**

Modine Today: 100 Years and Counting



The principles that have inspired Modine for the past century continue to do so today.

- **Thermal Innovation**
- **State-of-the-Art Efficiency**
- **Research and Testing on a Global Scale**

Modine Today: 100 Years and Counting

Our enduring goals:

- **To be the fastest improving company in our industry;**
- **To achieve a 10 percent annual growth rate in revenue;**
- **To attain a 15 percent consolidated ROACE; and**
- **To build a more diversified business model.**


MODINE