Company Profile

Founded in 1918 as a supplier of precision automotive piston rings, Smalley Steel Ring Company had many years of successful growth in an expanding marketplace. Having had a variety of products throughout the years, it wasn't until 1963, when present ownership began the development of products in the wire forming industry. Spiral Retaining Rings and Wave Springs emerged and Smalley developed into a reputable manufacturer of precision rings, springs & wire forms. But one thing never changed from years back, and that is our commitment to providing ever-higher levels of quality, performance, deliverability, and value to our customers. Today, Smalley Steel Ring Company is a market leader in the industrial retaining ring and wave/compression spring business; a position we work hard to maintain and build upon.

Every Smalley ring and spring is engineered and manufactured to the highest quality standards using skills and processes we have honed over three quarters of a century. Our obsession with quality, combined with our near-perfect record of on-time delivery, has earned us an approved supplier status with leading OEM manufacturers around the world. Due to the ceaseless demands we place upon ourselves, Smalley has won the coveted title of Preferred Source in the most demanding applications: automotive, agriculture, aerospace, electronics, appliance, industrial, medical and power generation.

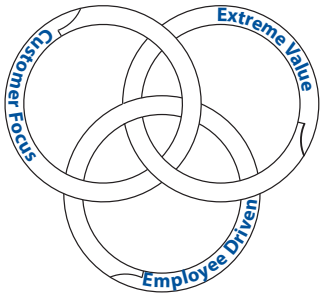
While we are understandably proud of the recognition we have received, ultimately, it is our products that set us apart. Unlike stamped rings and springs, which are die-stamped through the metal grain, our edgewound rings and springs have a circumferential metal grain structure that gives them exceptional strength, dimensional stability, and predictable performance characteristics.

Finally, every Smalley ring and spring is backed by our continued support. We are constantly searching ways to expand and improve our Customer Service and Engineering/Technical Assistance. We welcome your comments and your design challenges. Engineers are available to help assist with any design questions.

With regional offices in Europe, we are prepared to service our European customers. Smalley provides customized global supply chain solutions, to meet your WORLDWIDE manufacturing requirements, in Europe, Asia Pacific and the America's.

Please call us at **847.719.5900** or visit our website today!

Mission Statement



Customer Focus:
Always deliver the very best quality ON TIME with exceptional service.

Employee Driven Organization:
Attracting creative individual talent with a passion for TEAM SUCCESS.

Products with Extreme Value:
Having unique characteristics that differentiate SMALLEY PRODUCTS within our customer's innovative designs.

Products

All of Smalley's wave springs and retaining rings are manufactured with our unique edgewinding manufacturing process. This eliminates any tooling charges, greatly increases design flexibility and reduces lead times as dies do not have to be produced.

Retaining Rings

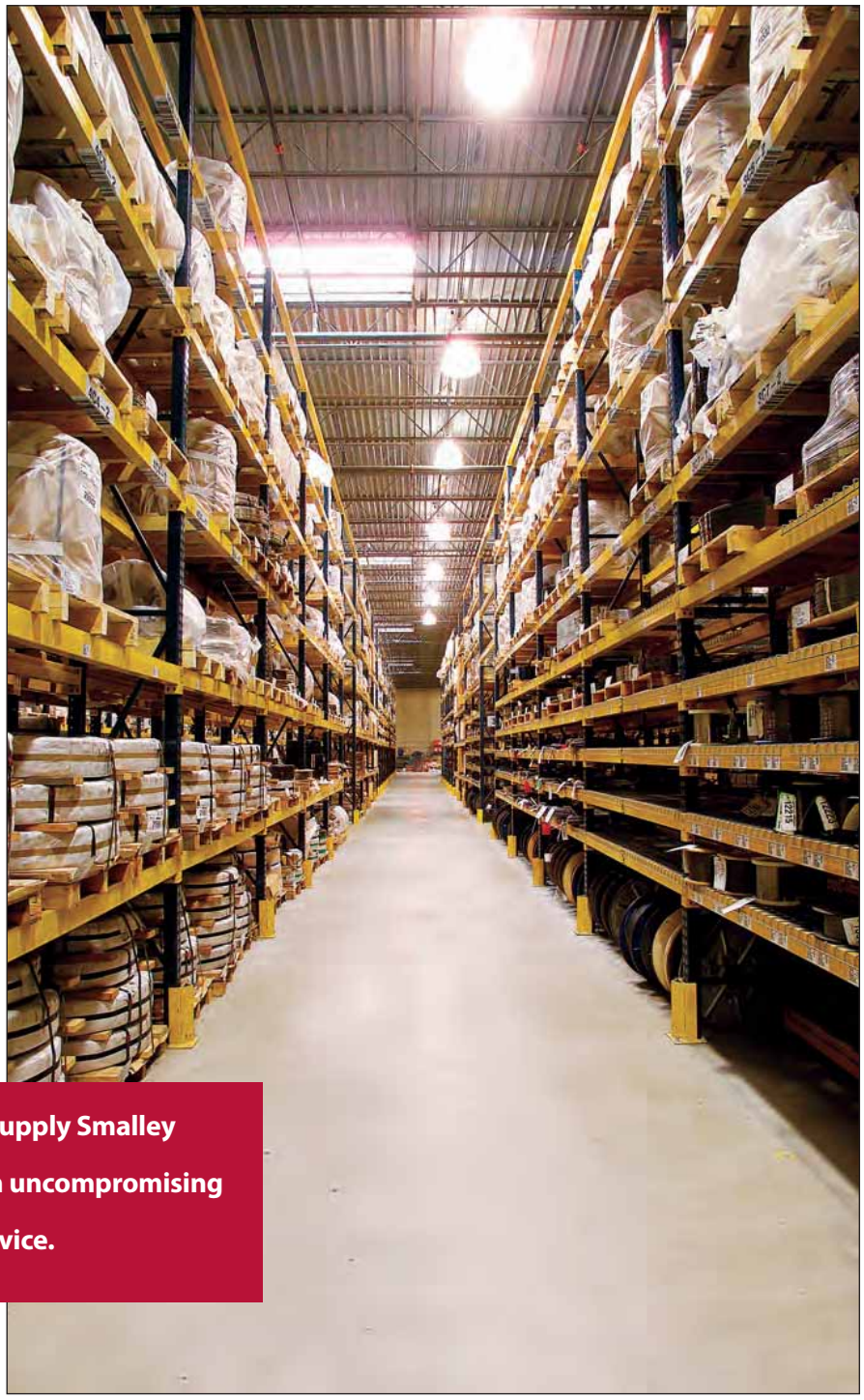
Unlike die-stamped circlips / retaining rings, Spirolox Retaining Rings and Constant Section Rings are coiled on edge to the exact diameter required. They have a uniform cross-section (or to use our terminology, No Ears To Interfere within an assembly) and are free of burrs. Spirolox Retaining Rings meet military and aerospace specifications and are found in thousands of mechanical products around the world.

Wave Springs

Wave springs are precise flat wire compression springs that fit into assemblies that other springs cannot. Since the overall lengths and operating heights of wave springs are lower than those of conventional round wire springs, they will often reduce the size of an assembly by as much as 50%. Of course, this will also reduce the part weight and raw material cost of every spring produced.

Raw Material

As we meet the increasing demand for more raw material sizes, the flat wire rolling mill operation in our plant continues to grow. Years ago, Smalley began a vertical integration that has evolved into the production of hundreds of material cross-sections in a wide variety of alloys.



Our goal… to supply Smalley customers with uncompromising quality and service.

Manufacturing

Edgewinding, also known as "The No-Tooling-Cost Process", is our precision forming operation that coils pre-tempered flat wire on edge to create a near-perfect circle. (Visualize a Slinky®, the coiled metal toy which has delighted generations of children.) Circular-Grain metallurgy gives our products strength and stability far superior to that of conventional retaining rings and wave washers which are simply stamped through the metal grain. Smalley edgewound products can be coiled to your exact specification in any diameter and with any number of turns (layers or coils), effectively eliminating material waste.

As flexible as it is precise, our edgewinding process accommodates your design changes without the need for additional tooling and die modifications. This facilitates your developmental work, allowing us to produce your low-quantity custom orders and your working prototypes quickly and economically. Even after your initial prototype is produced, or in mid-stream production, our edgewinding process allows us to alter your design or dimensions with simple machine adjustments or a change in raw material size. After the revised specifications are approved, we complete and document the final setup. Then, we quickly resume production of your order, whether it consists of one part or one million.

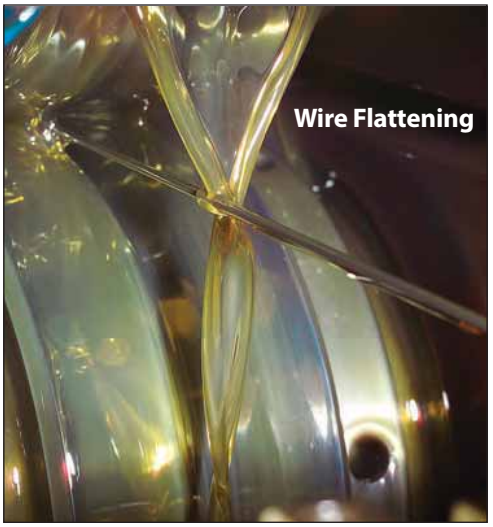
Edgewinding Process

Conventional Stamping Process

Prototypes

About the easiest way to test a theoretical design is to produce a working prototype — a task at which Smalley excels. A prime example is the development of a custom wave spring. We can adjust dimensions, by changing the number of waves and the number of turns, and trying different combinations of spring variables. Finally, we test for function, before production, so we know we have it right.

Smalley-produced prototypes are also the most economical way to provide results on a trial-and-error basis. From one to a thousand pieces, we can produce, try, modify, and reproduce your design as often as necessary — all without special tooling costs.



Finished Parts Warehouse

Smalley maintains a substantial parts inventory of every cataloged/ standard retaining ring and wave spring — in both carbon and stainless steel. We do this to meet our JIT deliveries as well as any immediate requirement that you may have. In the rare circumstance that our inventory runs low, we can quickly replenish any item overnight.

In addition to our finished parts, we house a vast inventory of raw material sizes, stocked in thousands of pounds of flat wire. We are always ready to meet your needs for a quick turnaround in low to high quantities of existing or new designs.

Free

Need a Sample?

We offer free samples of any ring or spring found in our catalog.
See page 138.

Customer Service

Smalley is dedicated to giving you the most positive, efficient and economical service possible, each and every day. We continually train our staff on every important aspect of our business. We can split shipments to suit your "just-in-time" delivery requirements. We offer you lower prices for your annual higher-usage orders. Please contact us directly for complete details and ideas on how you can purchase economically.

General Sales Information

Description:

The product descriptions in this catalog are intended to provide the user with practical information for application selection. Since it is not possible to include complete detail on all parts, please contact Smalley for any information not included in the description which may be critical for a specific application.

Quotations:

We will provide written or verbal quotations as requested.

Returns:

Parts not stocked which must be specially manufactured are not returnable except by special arrangement and will be subject to cancellation charges. Stocked parts may be returned for credit at a standard restocking charge (subject to condition). All returns of stocked parts must be made within 30 days from date of receipt of material.

Delivery:

Parts carried in stock normally will be shipped within 48 hours after receipt of an order. Special parts are normally delivered in 3 weeks (if no special processes are required) or as previously arranged.

Certifications:

Standard Certificate of Conformance will be supplied at no charge. Material and other Certifications for plating, load, etc. will be furnished as quoted.

Transportation:

As specified by the customer. In the absence of instructions, the shipping method will be selected by us. Insurance will be provided only at the customer's request.

Terms:

1/10/NET 30 on open accounts. For consideration of an open account, customers are requested to supply banking information and at least 3 commercial credit references.

Go to **www.smalley.com** for Terms and Conditions, which apply.

F.O.B.:

Factory, Lake Zurich, Illinois, USA

Packaging:

Rings and springs 1 5/16" in diameter and under are bulk packaged. Rings and springs 1 3/8" and over in diameter are generally tube (coin) packaged in lengths 10 to 18 inches.

Smalley is the proud recipient of the GM Quality Excellence Award and the GM Supplier of the Year Award.

Engineering & Design Assistance

Smalley's engineering staff is always ready to address your application requirements. Usually, the sooner we are able to review what you need, the easier the solution will be. Please call us today.

We invite you to draw upon our resources. Over the years, Smalley engineers have built an extensive library of over 25,000 applications while designing rings and springs in mechanical components and assemblies. In addition, we offer computer-aided spring-design alternatives to meet your specifications.

There are many more options that we would be pleased to review with you once your design criteria are established. We are ready to help you with the selection of a standard part from our vast inventory, or to modify a standard part to meet your exact needs.

We are pleased to offer you additional step-by-step resources. The "Special Designs" section of this catalog will help you determine basic retaining ring and wave spring specifications. We also invite you to try the design section on our website for step-by-step interactive design guidelines and options. As you can see, we are well-equipped to help you develop the best design solution possible, just as we have for thousands of other companies in diverse industries.

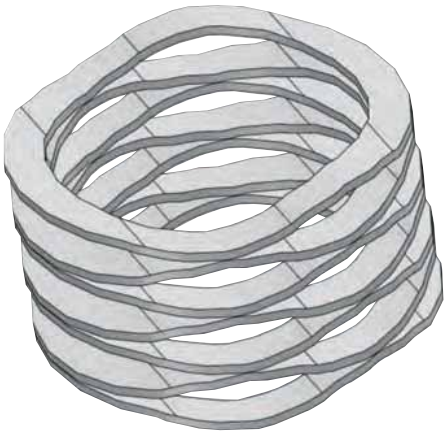
Specials

At Smalley, specials are standard. It's easy to get a custom part from Smalley. With No-Tooling-Charges, die costs, or other fixture charges, we can manufacture a new ring or spring design in just two weeks or to meet your delivery schedules.

Fast, precise, and economically — that's how Smalley produces rings and springs, in short runs or high volumes. If you can't find a standard part to meet your needs from the wide selection in our catalog, please contact our engineering department for immediate assistance with your special design requirements. And please note: Smalley Rings and Springs are available from .200" to 120" in diameter.

CAD Downloads

Visit our website for CAD downloads in 90 different formats. It's easy to search and select a standard part for a quick upload to your computer.



Quality Policy

Smalley has established, and is continuously improving upon, a program that is designed to meet the following objectives:

- **Total product conformance in terms of drawings, specifications and contractual requirements.**
- **100% on-time delivery performance.**
- **Superior products with exceptional value.**
- **Prompt, professional and courteous response in every facet of design, manufacturing, sales, and customer service.**
- **Continued development and use of the latest technology.**

Quality Assurance

Smalley's Total Quality Management philosophy dictates our commitment to quality and customer satisfaction. While this commitment has earned us official certification (ISO 9001, ISO/TS 16949, AS 9100 and ISO 14001), quality assurance and customer satisfaction mean much more at Smalley. They are tradition; the very foundation upon which we have built our company. From the beginning, we have never lost sight of our goal: "to supply Smalley customers with uncompromising quality and service."

Smalley is committed to a quality policy that requires conformance to specification with controlled lot variation about the target, statistical quality control, defect prevention, and annual improvement in process and product. This is a company-wide commitment involving every Smalley employee. Each person works towards excellence, individually and cooperatively, to provide superior products and services.

A history of quality and strict compliance with military and aerospace standards has earned Smalley an approved supplier status with many leading original equipment manufacturers worldwide. Smalley has worked diligently to become their preferred source for Spirolox Retaining Rings and wave springs.

In accordance with the requirements of ISO 9001, ISO/TS 16949, AS 9100 and ISO 14001, we have established and are continuously improving our quality systems. Use of the latest technology, including statistical tools, has helped us achieve and maintain the world-class quality associated with the Smalley name for more than 50 years.

Smalley uses statistical quality control tools to assure the capability and stability of our coiling process. To begin with, we identify common dimensions to monitor and special causes of variation in the product. Then, we collect and analyze data on these critical dimensions. We perform disciplined sampling and take measurements during in-line and final inspection, and yet again, during pre-shipping inspection.

We make formal SQC in-house training programs mandatory for many Smalley employees involved with manufacturing.

This training has noticeably developed quality awareness and responsibility at all levels. Our employees have a clear understanding of what is expected, a means of regulating their processes and checking their output, and statistical tools to determine when machine adjustments are required.

Smalley's machine capability studies help us identify sources of variation before they become a problem. We analyze the capabilities of all production machinery in primary and secondary operations, heat treating, and finishing. In addition, we follow our own meticulous procedures to determine the reproducibility and repeatability of our gauging systems.

Due to the careful documentation of our quality, many Smalley customers have found that they can reduce or even eliminate their incoming inspections of our product. Many of our accounts have also revised their policy of dual sourcing and confidently rely on Smalley as their single source of Spirolox Retaining Rings, wave springs, constant section rings, linear springs and other wire forms.

Defect prevention, or near-zero defects, is a key goal at Smalley. We use the latest automated inspection techniques to monitor production. As a result, we are constantly studying the causes of variation, improving upon and developing processes with capability indexes (Cpk) exceeding 1.33.

Continuous improvement is an integral part of Smalley's quality plan. We require each of our departments to design and implement projects to improve their respective systems.