

# ENGINEERING A DIFFERENCE.

FROM SUSTAINABILITY TO SAVING LIVES,  
ENGINEERS ARE ACCELERATING INNOVATION.



PRESENTED BY



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# INTRODUCTION



Sustainability. Once considered a nice to have in the business, residential and commercial sectors, is now an urgent global imperative for all, and for good reason.

According to the **2018 Fourth National Climate Assessment**<sup>1</sup>, which is released every four years and conducted by the U.S. Global Change Research Program, "Evidence of human-caused climate change is overwhelming and continues to strengthen. By the end of the century, dealing with climate change could cost us hundreds of billions of dollars." Climate change is real, it's expensive and its problems are compounding.

# ENGINEERS ARE ON IT! RANK ENVIRONMENTAL ISSUES FIRST.

In DiscoverE's first-ever **Global Engineer Survey**<sup>2</sup> (released 2019) out of 2,882 engineers surveyed, engineers rank **environmental issues**—such as access to clean water and sanitation and economical clean energy—as the most daunting global challenges of the next 25 years.

As Joe Kindregan, President of the Institution of Structural Engineers, points out in his 2019 Inaugural Address<sup>3</sup>, by 2050 the world population will hit 9.8 billion, up from today's population of 7.8 billion. The Earth will need as much as 70 percent more food to sustain its population and it is estimated that as many as four billion people will live in regions where water shortages will be a persistent problem. The highest risk in terms of future impact will be the failure to mitigate and adapt to the effects of climate change.

## 2019 GLOBAL ENGINEER SURVEY

## ENGINEERS RANK ENVIRONMENTAL ISSUES AS MOST DAUNTING GLOBAL CHALLENGE



## SUSTAINABILITY—MULTI-FACETED

Environmental issues are daunting, however; they comprise only one aspect of sustainability. Sustainability also addresses the effect that organizations have on the environment and on society. It is comprised of environmental protection and resource allocation; economic prosperity and continuity; as well as social well-being and equity. It is a balancing act of meeting the needs of the present without compromising the ability of future generations to meet their needs.



## **SUSTAINABLE INNOVATION: IN THE HANDS, HEARTS, AND MINDS OF ENGINEERS WORLDWIDE**

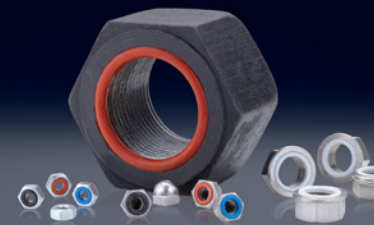
Environmental and societal challenges, like all challenges, are problems to be solved and there are no better problem solvers than engineers. “The effects of climate change, globalization and rising expectations will all require engineering solutions. Engineers need to think about the social impacts of our projects not just the physical impacts. The focus will be on resilience and social outputs and in particular the UN Sustainable Development Goals,” noted Mr. Kindregan.

*“Engineers need to think about the social impacts of our projects not just the physical impacts. The focus will be on resilience and social outputs and in particular the UN Sustainable Development Goals.”*

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## ACCELERATING INNOVATION: DESIGNING WITH PURPOSE IN MIND



“To address the myriad dimensions of sustainability and social impact, we increasingly see engineers designing products and technologies from a purpose-driven perspective,” notes Gail Friedberg-Rottenstrich, CEO of ZAGO Manufacturing, a sustainable company and global producer of clean, green, custom, high-tech sealing solutions and components used by thousands of engineers and OEMs worldwide.

“Engineers are taking into account the short and long-term benefits and consequences that their products and technologies will have on multiple stakeholders, including customers, community, global citizens, healthcare, the economy, suppliers and the environment.”

“As a result of this 360 perspective, engineers are accelerating innovation and engineering solutions that simultaneously address multiple problems. This is great news for humanity, society, and the planet,” adds Friedberg-Rottenstrich.

Engineers and OEMs adopting a purpose-driven perspective are fast-forwarding innovation in virtually every industry sector, ranging from aerial drones and robotics to alternative energy sources, smart lighting and wearables, and they count on ZAGO high-tech sustainable sealing solutions and components to protect and optimize the functionality and lifespan of their cutting-edge inventions and high asset equipment.

“One of the most exhilarating parts of the job is collaborating with engineers to pinpoint or custom-design sustainable sealing solutions and components that solve their toughest challenges—especially when inventions benefit the health and well-being of people and planet,” says Harvey Rottenstrich, Lead Engineer, President and Co-Founder of ZAGO Manufacturing.

“In addition to manufacturing sustainable products for a sustainable world, ZAGO is a proud practitioner of sustainability. We implement the latest lean manufacturing processes designed to conserve energy, minimize waste, and enhance operational efficiencies. We bought and refurbished a 100-year old manufacturing facility and warehouse located in Newark, NJ, to brighten a blighted urban community and benefit the local economy. We are powered by clean energy derived from a solar array installed on our rooftop, and we participate in a global supply chain that complies with global initiatives restricting the use of hazardous and questionably sourced materials.”



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**Harvey Rottenstrich**

LEAD ENGINEER, PRESIDENT, & CO-FOUNDER  
OF ZAGO MANUFACTURING



# ENGINEERING FOR GOOD



Helping engineers who are driving innovation for the greater good is a privilege. The ZAGO Manufacturing team is proud to share examples of how engineers are leveraging ZAGO high-tech self-sealing fasteners with rubber O-ring technology to create a better world.



## ALTERNATIVE SOURCES FOR ENERGY RECOVERY

A California-based company—which manufactures energy recovery devices for the oil and gas, chemical, and water industries—is applying the practice of energy recycling in industrial processes to a new source: pressure energy. Pressure, like heat, is wasted in industrial processes through letdown in valves or other devices. This wasted energy increases a plant's energy consumption, utility costs, and carbon footprint. By recycling pressure energy—in addition to heat energy—industrial companies can save on energy costs, protect vulnerable equipment, lower carbon emissions, and negate the harmful effects of climate change.

### THE CHALLENGE

Energy recovery devices, especially those designed to recycle pressure, require a highly specialized sealing solution to withstand extreme pressure while optimizing performance, resilience, and function of high-value equipment.



## THE SOLUTION: ZAGO HIGH-TECH SELF-SEALING FASTENERS WITH O-RING TECHNOLOGY

Engineers and OEMs depend on ZAGO's clean, air-tight, high-tech, self-sealing fasteners and components to protect equipment powering new technologies, such as recycled pressure energy and oil and gas pipelines, pressure gages, hydraulic pumps, wind turbines, solar panels, and drilling equipment extracting geothermal energy.

They choose ZAGO high-tech, self-sealing fasteners because they are engineered with a groove under the head of the fastener or in the face of the nut that when combined with a rubber O-ring and tightened, forms a leak-proof 360 seal against the incursion and expulsion of liquids and gases, including fuel and petroleum. These fasteners are impervious to dust, dirt, and chemical contaminants that can infiltrate and destroy sensitive devices.

## PRESSURE TESTING—GOOD ENOUGH FOR THE MILITARY

ZAGO high-tech self-sealing custom fasteners are designed to perform under extreme pressure and are pressure resistant per military standard to 1500 psi. ZAGO military standard parts meet the strict specifications of both the MS and NASM82496. ZAGO is the only manufacturer of sealing screws capable of performing NASM specified pressure testing.

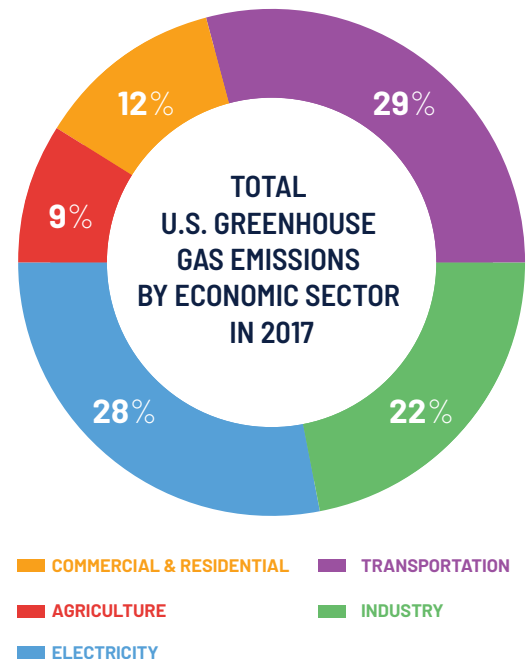
"In the race to replace fossil fuels, renewable energy is a hotbed for exploration." says Jackie Luciano, Vice President, ZAGO. "Whether developing new solutions in green energy or enhancing existing ones, ZAGO is ready, willing and able to help engineers and OEMs identify the proper sealing solutions and components for optimal protection, unlimited shelf-life, and durability."



## POWERING ROBOTS FOR DANGEROUS TASKS

### DETECTING ACCIDENTS, SAVING LIVES; COMBATING CLIMATE CHANGE

A designer and manufacturer of rechargeable and non-rechargeable battery systems is expanding its footprint in wireless security, home automation, and—more specifically—in next generation robots; including, those designed to replace humans in performing dangerous tasks in harsh environments.



### DID YOU KNOW?

Industrial processes represent about one third <sup>4</sup> of the world's total energy consumption, and the **Industrial** sector is the third largest contributor to U.S. greenhouse gas emissions, after the **Transportation** and **Electricity** sectors.



## THE CHALLENGE

Optimizing performance, resilience and durability of batteries in hazardous weather conditions, atmospheres, and extreme temperatures.

## THE SOLUTION: A HIGH-TECH SELF-SEALING FASTENER FOR ALL SEASONS

Once again, engineers and OEMs driving innovation choose ZAGO high-tech self-sealing, clean fasteners with rubber O-ring technology. In addition to forming a leak-proof 360 seal against the incursion and expulsion of liquids and gases, ZAGO high-tech self-sealing custom fasteners are designed to withstand the harshest weather conditions, including, extreme temperatures—both hot and cold—and the extreme cold of the atmosphere.

ZAGO high-tech self-sealing fasteners are impervious to dust, dirt, and chemical contaminants that can infiltrate and destroy sensitive devices. ZAGO contaminant-free, pressure-resistant, sustainable sealing solutions and switch boots are tough enough to protect smart sensors and optimize the life of motors and batteries used in e-mobility, such as robots performing dangerous tasks in harsh and hazardous environments—preventing human error, accidents and saving lives.

*"In the race to replace fossil fuels, renewable energy is a hotbed for exploration."*

“When coupled with artificial intelligence, autonomous robots performing in treacherous environments like the Arctic, the desert and the ocean floor, can help us better understand our world,” says Ms. Friedberg-Rottenstrich. “By accessing areas that are either off-limits or dangerous to humans, they can help us capture and extrapolate data that might otherwise have been lost.”



## DEMOCRATIZING SURGERY— MINUS THE ERROR

One of the largest technology companies in the world has partnered with a global healthcare conglomerate that also produces surgical equipment to develop technology that will democratize surgery globally. How? By combining the power of robotics, advanced instrumentation, enhanced visualization, connectivity and data analytics into one smart, powerful, connected platform.

The digital surgery tool under development taps into the artificial intelligence of machine learning to cull and assess data from thousands of past surgical procedures in order to identify best practices and potential errors that can be shared with surgeons before, during and after an operation. Benefits include democratizing surgical information by making best practices available and accessible around the world, improving patient outcomes and lowering the incidence of malpractice.

### OPPORTUNITY

To enhance and protect functionality and performance of digital surgical tools while keeping digital instruments sterile and clean, motors running, and batteries charged.

### SOLUTION: HIGH-TECH FASTENERS WITH O-RING TECHNOLOGY

Among all the benefits that AI, machine learning, big data, robotics, and medical devices yield, the most important benefits of all may be their ability to improve patient outcomes, reduce medical errors, and save lives.

When combining robotics, visualization, and instrumentation in an antiseptic atmosphere, engineers and OEMs rely on ZAGO high-tech self-sealing fasteners with rubber O-ring technology for their unlimited shelf life and superior ability to conjoin surgical components intended to perform multiple functions.



### DID YOU KNOW?

ZAGO fasteners come with a wide range of **FDA approved O-rings** and can be fabricated from the strongest, lightest metals available.

Thanks to its engineered 360 leak-proof seal, ZAGO sustainable, clean, high-tech fasteners optimize the performance and durability of high-tech, high-asset medical devices and digital instruments by containing the lubricants necessary for proper operation while blocking liquid, such as blood and tissue, from entry. ZAGO high-tech self-sealing fasteners also shield patients from exposure to potentially harmful contaminants that could occur as a result of equipment leakage.

ZAGO high-tech self-sealing fasteners and components are perfect for protecting expensive, invasive medical equipment, including laser scopes, minimally invasive surgical (MIS) products, HD video cameras and dialysis.

“As the worlds of technology and medicine continue to converge, we expect the increased demand for ZAGO high-tech, clean and inherently green sealing solutions and components will continue to rise, too,” notes Ms. Luciano. “Time and again, engineers and OEMs who are accelerating innovation choose ZAGO, and that makes us proud.”



High-tech fasteners are **reusable**, tamper-proof, and made of corrosion-resistant metals, like **stainless steel and steel alloys, titanium, brass & monel**.

Offers rubber O-rings made of **silicone, fluoro-silicone, viton, neoprene & EPDM**.

Was co-founded by an engineer **25 years ago**.

Provides samples and usually ships product within **two days**.

Has a **near zero** rejection rate.

Sealing solutions and components are **inherently green and made in the U.S.A.** at a sustainable facility powered by solar energy.

Is a **DEKRA ISO 9001** registered company, qualified to meet the most exacting demands of engineers and OEMs using verified standards and procedures for product quality.

Serves **thousands** of engineers & OEMs worldwide.

Meets the standards & certifications of **DFARS, MS and NASM82496, REACH, ROHS & California Prop 65**.

**CLIENTS INCLUDE:**

Energy Recovery Inc., U.S. Air-force, U.S. Army, U.S. Navy, Raytheon, Teledyne Marine, Ferrari, Caterpillar, Punch Powertrain, Apple, GE, HP, Bose, L3 Communications, & Kongsberg.



# MANUFACTURING SUSTAINABLE SOLUTIONS FOR A SUSTAINABLE FUTURE



ZAGO proudly serves engineers and OEMs in a wide variety of sectors, including automotive, aerospace, electronics, military and defense, commercial lighting, and marine, who are accelerating innovation to slow, stop, and in some cases reverse, the negative effects of climate change or to create a more just and sustainable world.

## ZAGO MANUFACTURING: SUSTAINABILITY 360

ZAGO Manufacturing consciously walks the talk of a sustainable company, ranging from the adoption and implementation of practices that protect the environment and conserve resources to the promotion of economic prosperity and continuity; social well-being and equity.

In 2019, the company started **ZAGO Sustainability 360**: An award-winning, social impact initiative that addresses environmental, economic, and employment issues and provides STEM / manufacturing education, scholarships, and skills-based training to stakeholders in under-served communities. The program is named after ZAGO's rubber O-ring technology

that when combined with its inherently green, clean, high-tech self-sealing fasteners, forms an air-tight 360 leak-proof seal.

ZAGO launched **ZAGO Sustainability 360** with Essex County / Newark Tech Vocational High School with the goal of promoting STEM education and to introduce high school students to the world of manufacturing and its myriad career opportunities; ranging from working on the assembly line, in engineering, and quality management to sales, marketing, customer service and company leadership. As the school year drew to a close, ZAGO offered its first higher education scholarship to a Newark Tech Vocational High School graduating senior who would pursue either a two or four-year STEM or manufacturing degree—and could best illustrate and answer how advanced manufacturing can be used as a force for good and to make a positive difference in the world. The entries were so well-done and thought-provoking that ZAGO awarded not one but two scholarships.

As another example, ZAGO Manufacturing and students from Rutgers Business School, Rutgers University, won second place in the Rutgers Institute for Corporate Social Innovation Newark Project & Case Competition. The team won for its community project, Engaging the Next Generation in Manufacturing Careers, which links local K-12 schools and students with Newark-based manufacturers and is aligned with accomplishing several of the 17 Sustainable Development Goals (SDGs) set forth by the United Nations.



## **SUSTAINABLE MINDSET; SUSTAINABLE COMPANY**

Whether integrating robotics, attending trade shows, speaking at conferences or adopting an ERP system, ZAGO always strives for continuous improvement. This mindset empowers team members to create and deliver the best, most reliable custom products and the highest levels of service and satisfaction for stakeholders. It helped the company transform a mom and pop business into a premier global producer of high-tech sealing solutions and components that thousands of engineers around the world rely on to advance innovation.

*“ZAGO products shield toxins from leaking in or out into the surroundings, are inherently green, and developed to withstand engineers’ toughest production requirements.”*

## LOW TURNOVER; HIGH CLIENT SATISFACTION

In accordance with the sustainability edicts of economic prosperity and continuity, social well-being and equity, ZAGO plays an integral role in providing employees with benefits and opportunities to flourish. For instance, ZAGO covers 100% of employees' health insurance premiums, pays a family wage or more, covers 100% of higher education tuition, and offers bilingual English and Spanish classes.

In a recent article about the rise of the minimum wage in New Jersey, Gail Friedberg Rottenstrich noted that ZAGO "supports a \$15 minimum wage...Because as the company knows from experience that fair pay is better for business. It brings low turnover, which helps (ZAGO) innovate. With a higher wage floor and more dependable workforce, business owners can think about ways to make the business better instead of spending time and money to replace people who left to find a job that pays the bills."

For ZAGO, the proof is in the pudding: Employee retention is 95%; ZAGO continually experiences year-over-year growth and 99% of ZAGO's high-tech sealing solutions and components are never rejected.

**Sustainable, indeed.**







## ABOUT ZAGO MANUFACTURING



Founded over 25 years ago, ZAGO Manufacturing is a Newark-based, family-owned business that develops and manufactures custom, high-tech sealing solutions and components. ZAGO products shield toxins from leaking in or out into the surroundings, are inherently green, and developed to withstand engineers' toughest production requirements.

ZAGO self-sealing fasteners and switch boots are used by thousands of engineers and onsite equipment manufacturers (OEMs) in countless industries: aerospace, transportation, commercial LED lighting, medicine, robotics and drones, energy, electronics, and more. Clients span the world and include major military contractors, Apple, Google, Ferrari, BOSE, Lockheed Martin, HP and others. For more information or to check out the ZAGO High-Tech Sealing Solutions and Components catalog on-line, visit [ZAGO.com](http://ZAGO.com).



### ZAGO MANUFACTURING

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*Fasten Forward*

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