

## The Great Outdoors: Magnesium Makes Light Work of Lawn & Garden Chores

From lawn and hedge trimmers to blower vacuums and mulching equipment and even decorative fountains, lightweight magnesium components make yard work faster and more convenient with greater reliability and durability. Top quality lawn and garden equipment manufacturers continue to choose magnesium alloys for their lightness, high strength-to-weight ratio and ease of fabrication. The magnesium parts integral to these lawn and garden products give weekend warriors more time to enjoy life at home.

### Magnesium Has the Clear Edge

Husqvarna Consumer Outdoor Products, Inc., Texarkana, Texas, uses cast AZ91D magnesium alloy for the crankcase on its Partner Colibri II Trimmer. The lightweight trimmer is designed especially for homeowners, with an easy-to-manuever curved shaft for excellent positioning when trimming lawn edges and flowerbeds. The Colibri II trimmer weighs just 3.7 kilograms (8.14 pounds) and features a Tap 'n Go trimmer head that feeds nylon line automatically when the head is pushed into the ground.



According to Ronnie Goldman, Director of Engineering, magnesium was chosen for the crankcase of the Colibri II trimmer due to its superior strength-to-weight ratio, compared to aluminum. Ease of manufacturing has evolved with the magnesium crankcase design, making the trimmer more competitive:

“Originally, this crankcase went through several machining operations to machine the cylinder mounting surface, bearing pockets and drill and tap some fastener holes. Since, we have changed the design to allow for zero machining. By adding an o-ring between the cylinder and crankcase, we went to an as-cast crankcase and cylinder surface. All fasteners have been converted to self-tapping. We are now pressing in bearings into as-cast features as well. The magnesium crankcase is used in its natural state with absolutely no secondary operations required,” notes Goldman.



The magnesium crankcase's streamlined manufacturing efficiencies enhance Husqvarna's ability to produce world-class outdoor consumer products at its Nashville, Arkansas facility, making its trimmers top sellers globally according to Goldman: “Converting the magnesium crankcase to non-machined surfaces has allowed our U.S. operations to stay highly competitive in the worldwide marketplace.”

The Weedeater Featherlite Xtreme trimmer also offers lightweight maneuverability and reduced vibration using the magnesium crankcase. The cutaway view shows how the magnesium crankcase anchors the trimmer design. © Photo and Graphic courtesy of Husqvarna Consumer Outdoor Products, Inc. Used with permission.



The Partner Colibri II trimmer's magnesium crankcase fabrication has evolved to the point of zero machining required. © Photos courtesy of Husqvarna Consumer Outdoor Products, Inc. Used with permission.



Toro's rugged magnesium impeller efficiently reduces 16 bags of leaves down to one. © Photo courtesy of The Toro Company. Used with permission.

### **Magnesium Impeller Shreds and Mulches with Ease**

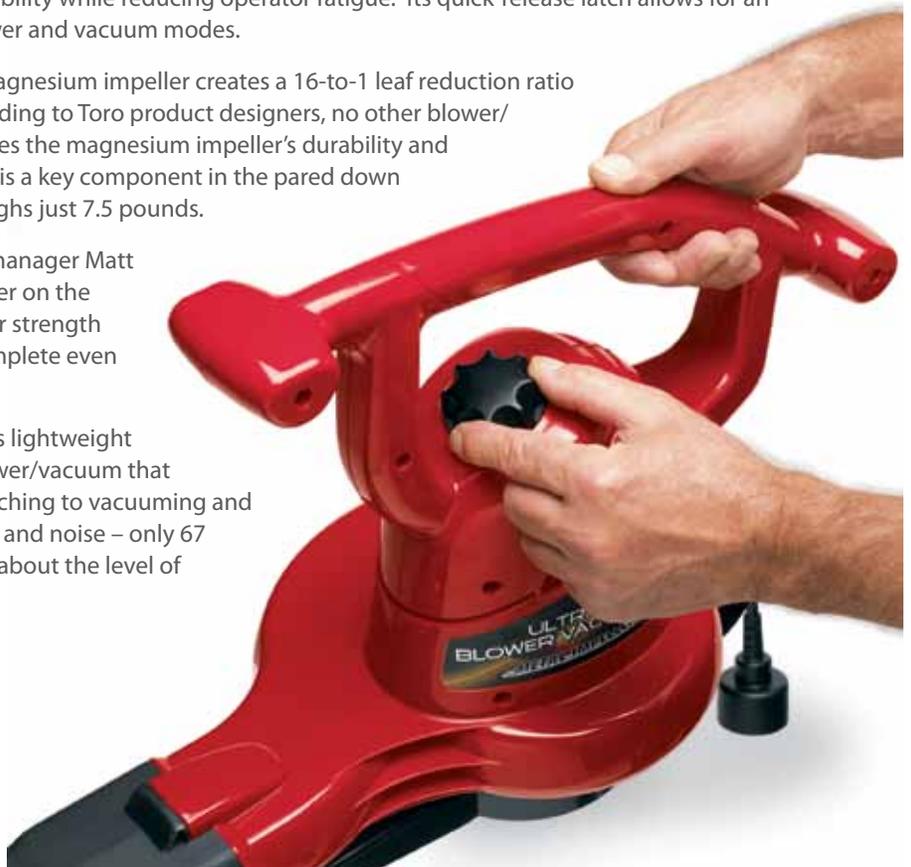
The Toro Company, Bloomington, Minnesota, gives new meaning to the cutting edge, with its electric Ultra Blower/Vac. The powerful blower vacuum has a top air speed of 235 miles per hour with an infinitely variable speed controller which dials in the precise air speed required for each task. The Ultra Blower/Vac has an ergonomic design with permanent front and rear handles to increase control and mobility while reducing operator fatigue. Its quick-release latch allows for an easy no-tools conversion between blower and vacuum modes.

Toro's state-of-the-art serrated blade magnesium impeller creates a 16-to-1 leaf reduction ratio when used in the vacuum mode. According to Toro product designers, no other blower/vacuum/shredder on the market matches the magnesium impeller's durability and functionality. The magnesium impeller is a key component in the pared down lightweight blower/vacuum, which weighs just 7.5 pounds.

The Toro Company's senior marketing manager Matt Medden notes, "The magnesium impeller on the Toro® Ultra Blower Vac provides superior strength and durability to help homeowners complete even the toughest yard clean-up jobs."

Homeowners benefit from magnesium's lightweight strength in this powerful handheld blower/vacuum that multitasks from leaf shredding and mulching to vacuuming and blowing, while producing less vibration and noise – only 67 decibels at peak performance, which is about the level of normal conversation.

**The Ultra Blower/Vac's magnesium impeller makes this mulcher/blower/vacuum a versatile do-it-all machine to tackle yard clean-up chores. © Photo courtesy of The Toro Company. Used with permission.**



## Magnesium Gear Case Anchors Hedge Cutter

Ryobi Technologies, South Pasadena, California, 22-inch gas hedge trimmer sports a lightweight magnesium gear case that facilitates precision hedge cutting using a clean running 26-cc two-cycle gas engine. The Ryobi ZRRY39500 has a multi-position rear handle design and dual-action blade. The hedge trimmer's heavy-duty gear head is made of lightweight die cast magnesium that is easier to handle than standard molded aluminum units.



Ryobi's 26cc clean running gas engine hedge trimmer features a strong yet light magnesium gear case for better comfort while maintaining high performance. © Photo courtesy of Ryobi Technologies, Inc. Used with permission.

Weighing 10.8 pounds, the Ryobi heavy-duty hedge trimmer offers weekend warriors a precision cutting tool that lets the user work quickly and efficiently with less fatigue. "By using magnesium, we are able to cut the weight of the gear head in half, helping to provide a more comfortable experience for the operator," notes Ryobi Technologies' Product Development Team.



A terra cotta finish adheres flawlessly to this fountain's durable magnesium bowls for a beautiful and garden-friendly solar water feature. © Photo courtesy of BrylaneHome.com. Used with permission.

## Solar Fountain Flows Using Magnesium Vessels

BrylaneHome®, New York, New York, puts a new twist on outdoor garden water features by using magnesium bowls in its double cascading solar water fountain. The self-contained and recirculating fountain requires no wiring or plumbing, and is easy to set up and maintain.

The fountain's attractive design features eight magnesium vessels with terra cotta finish and mosaic pattern trim on each bowl. When the solar panel is positioned to catch the sun, water pours from the top vessel and cascades down the bowls in continuous circulation.

The lightweight magnesium bowls make the water feature easy to position in the garden and more resistant to wear and weather. The powder coat painted terracotta finish adheres exceptionally well to the durable magnesium bowls, giving the fountain long-lasting beauty and function.

## A Closer Look: The MAGIC and Power of Magnesium

Thermal and fluid scientist Takashi Yabe is pushing the envelope of alternative clean energy using magnesium as the key to harnessing solar power. Yabe, a laser fusion expert at the Tokyo Institute of Technology, Japan, has developed a system that combines the magnesium energy cycle with the magnesium injection cycle, or MAGIC. Yabe's MAGIC system earned him the 2009 title of TIME's Hero of the Environment in the Scientists and Innovators category.

Yabe explains that the oceans contain 1,800 trillion tons of magnesium – enough to meet the world's energy needs for centuries. To overcome the obstacle of refining magnesium at temperatures up to 4,000°C (7,200°F), which requires massive energy and money, Yabe is creating a system of lasers and lenses that harnesses the sun efficiently.



Shown are the laser media for the solar-pumped laser: the 9-millimeter diameter x 10-centimeter length used in 2008 realized 80 watts output; the 4-millimeter diameter x 5-centimeter length now realizes 70 watts output, showing vast improvement. © Photo courtesy of the Tokyo Institute of Technology. Used with permission.

Yabe's MAGIC cycle completely eliminates CO<sub>2</sub> emissions using magnesium as the key ingredient in the ultimate clean energy system. Harnessing the sun with Yabe's ingenious devices relies on the massive power of magnesium particles to realize the most abundant global energy source imaginable.

Yabe first created a device that uses a special evaporation technique to extract magnesium chloride from seawater. The magnesium chloride is turned into magnesium oxide and then uses plastic Fresnel lenses to focus sunlight into lasers, traveling down microscopic fibers that concentrate light and heat onto magnesium oxide particles inside a vacuum tank, resulting in refined magnesium.

The process then uses Yabe's MAGIC engine, mixing magnesium granules with water to create heat energy and hydrogen to power cars. By-products of water and magnesium oxide are broken down again by the sunlight laser. His refined magnesium may also be used in fuel cell batteries, which are seven times more powerful than the lithium-ion batteries currently used to run today's hybrid and electric vehicles.



The solar-pumped laser devices build in Chitose, Hokkaido, Japan on July, 2007, producing 80W output in 2007. For safety, the 2-meter x 2-meter Fresnel lens is covered with cloth. © Photo courtesy of the Tokyo Institute of Technology. Used with permission.



The solar-pumped laser system in Chitose, Hokkaido, Japan uses the magnesium injection cycle to efficiently refine magnesium for use as a vast energy resource. © Photo courtesy of the Tokyo Institute of Technology. Used with permission.



To learn more about the benefits of designing products with magnesium, contact the **International Magnesium Association**  
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