Lifestyle and living

1 Breakfast is ready: the day can begin.

Your alarm goes off, and the day begins. Maybe it's raining, maybe the sun's shining. Maybe you've got a thousand things to do. Maybe everyone's in a good mood – or maybe not. Out of bed and into the shower. A cup of coffee and a doughnut (or, on second thought, make that an orange juice and an apple), and then it's off to work. From your bed to the office, you've probably already come across several objects machined by a laser or even bumped into the laser itself.

The laser in the bathroom | The first thing many people do after they wake up is take a shower. There's nothing like a shower to get you going. Now for the showerhead setting: gentle or full massage? You look at the chrome showerhead to adjust the spray, and what do you see? That's right: laser markings. The manufacturer logo and product name are also laser-etched into the thin chrome layer of the showerhead. The marks are indelible, and no special preparation or reworking is required in production. They remain clearly legible even after countless cleanings and years of use.

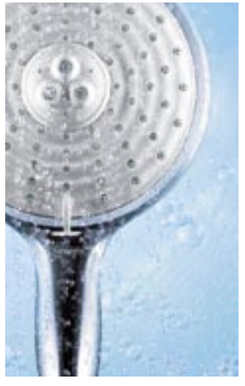
Electric toothbrushes are another good example: they have light-gray markings that are also inscribed by a laser beam. In addition to the name and manufacturer logo, the markings provide product information such as production code, article number, and date of manufacture. If the toothbrush stops working, the manufacturer can trace the product's history all the way back to fabrication. At the company, thousands of such devices are marked daily on automated production systems, with each mark taking only a matter of seconds. The laser can inscribe characters so small that you could write messages on the toothbrush bristles.

Now that the traces of the night have been scrubbed and brushed away, it's time to prepare for the glory of the day – well, this is true at least for the ladies amongst us. Eye shadow, lipstick, mascara, and blush are just a few examples of the different types of makeup at a woman's disposal. High-quality cosmetics bear serial numbers, which are marked on the plastic cases partly by lasers.

Electric razors | The male half of creation, too, requires more than just soap and water to prepare for the day; laser-processed parts such as electric razors are also needed. A close look at the shaving head reveals a masterpiece of mechanical precision. The ultrathin foils through which whiskers enter the cutters are spot-welded in place by the laser. The spot welds produced by the laser are extremely fine.

The center cutter does most of the shaving. It consists of three metal parts attached to each other by laser spot welds. Additional spot welds connect the cutter assembly to the drive element of the motor, which moves the cutter. Shavers are mass-production articles, and the laser delivers the high-speed precision needed to make them: more than 10 million shaving heads are manufactured every year. As you may have guessed, shavers are also laser-marked. The laser beam produces durable marks without marring the high-quality surface of the shaver. It's no wonder designers love lasers: marking is done only by altering the color of the material. The surface remains perfectly smooth.

Jewelry and accessories | An elegant timepiece, fashionable eyewear, or a gold necklace: accessories provide the perfect finishing touch. Here, too, a closer look reveals the work of the laser: the backs of watches are often laser-engraved. Gold chains are laser-welded or laser-soldered. Exclusive, lightweight titanium eyewear is constructed using fine laser welds. You'll have to look pretty hard, though, to actually see the welds. Ok, now one last look in the mirror and the day can begin.



2 Fine laser markings show the spray settings on this showerhead.

3 Laser spot welds hold the foils and center cutter of this electric razor in place.

4 Exclusive, laser-welded titanium eyewear for fashion connoisseurs

1 A brand-name saucepan: laser machining guarantees quality.
2 The laser weld in the drum of this dryer must be smooth enough to prevent nylon stockings from getting runs in them.
3 Radiators like this one are laser-welded.
4 Welded with laser light for collecting sunlight: a solar collector

Searching for signs According to some statistics, an adult owns, on average, around 10,000 things – and some of them are laser-processed. How do you find out which ones? If you see smooth markings in metal or plastic material, they are probably made by lasers. On plastic materials, this is also true for textured dark or light-colored markings. Metal accessories with irregular holes are often laser-cut, and even standard stainless steel sinks are now mostly laser-welded.

When you're hot, you're hot | What would pots and pans be without handles? The answer: hot! The basic handle for the saucepan pictured here is first welded together at the bottom by a solid-state laser. A reinforcing element is also added. Afterwards, a CO_2 laser cuts out the contour of the handle. Finally, the connecting pieces are welded on. In 15 seconds, the handle is finished and can be attached to the saucepan by resistance welding. The job is worth the effort in a number of respects: the stainless steel handle looks great, while providing extra stability. Unlike handles that are screwed together, the laser-welded handle is still firmly in place even after years of use. In addition, the laser provides a distinct technological advantage, distinguishing authentic products from mere imitations.

You can find even more examples of laser-processed parts in your kitchen: markings on stainless steel accessories, laser-cut cutlery, and even Italian designer coffeemakers are produced partly with the laser.

1

Familiar household appliances | The electric range is a classic example of how combined laser technology is used in one product: the knobs are often laser-marked, and the interior of the oven, too, is laser-welded. An intelligent combination of techniques is used to weld the thermostat: the temperature sensor is first heated to maximum temperature to achieve full extension. Then it is welded in place simultaneously at several points by the laser beam; 10 milliseconds is all it takes.

In addition to the kitchen stove, the washing machine and dryer are helpful appliances in any home. The drums of washing machines and dryers are also laser-welded.

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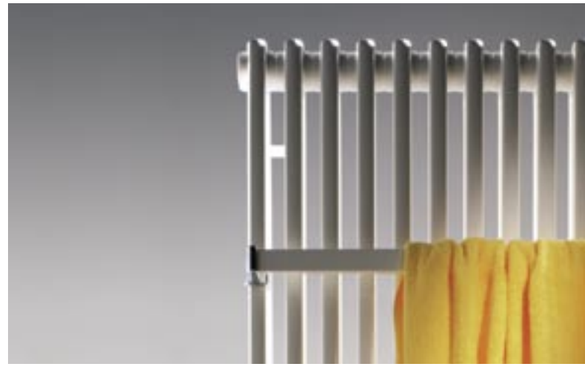
The advantage of the laser weld is its high strength and perfect surface, which is so smooth that it does not require refinishing. Here's a little secret: the quality of the weld can be measured using a woman's stocking. Yes, you heard right: a woman's stocking. The surface of the weld is so smooth that even a piece of material as delicate as a stocking will not snag on it.

Heating | The cozy warmth of a radiator in the dead of winter gives you a sense of the energy of the laser beam used to weld it together. One distinctive feature of radiators – or, more generally, of heat exchangers of all types – is that they require the joining of many different elements. More recently, the massive cast-iron dinosaurs of the past have been giving way to increasingly slim and elegant thin-wall heat exchangers made of sheet metal. All thanks to the laser, of course. The laser beam welds with very little heat input, causing virtually no distortion of the workpiece and producing perfectly sealed welds.

Heat from the sun | Water heaters are being installed less often in basements and more frequently on roofs. To be more precise, they are actually solar collectors, which use solar energy to heat the water. Coated copper plates absorb sunlight and convert it into heat. Fine copper tubes containing water are attached to the flat plates. Copper has a high degree of heat conductivity, enabling it to transmit heat efficiently to the water – but only if the tube is joined directly to the plate. A layer of adhesive would have an insulating effect. The laser weld, on the other hand, does not, because it joins metal to metal. On some solar collectors, the continuous weld is visible from the outside, producing what looks almost like a "pinstripe" design.



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