April 21, 2021

Beskar and Ultra-Strength Materials: When Reality is as Good as Fiction

Beskar is the priceless Mandalorian steel in the Star Wars cinematographic universe. The unique properties of the Mandalorian beskar armour and weapons have given rise to countless debates among fans of the series, ‘The Mandalorian’.

What makes the Mandalorian steel so tough? What is this alloy? And, ultimately, is there even a slight chance that an equivalent of beskar can be produced in real life?

The arrival of the Mandalorian

The Mandalorian or Mando is the title character, after whom the Disney+ Space Western series, ‘The Mandalorian’, created by Jon Favreau, is named. The first season premiered in November 2019. The Mandalorian has been a phenomenal success with audiences and even received high praise from critics. At the 72nd Emmy Awards, the series took seven Emmys. The second season was aired last October, less than one year after the first one. The third season is currently in production. It became known in December that the filmmakers were preparing at least three surprises for fans. The Mandalorian will have spin-offs, titled: ‘The Book of Boba Fett’ (another bounty hunter popular amongst Star Wars fans), ‘Ahsoka’ (a Jedi, who first appeared in the second season) and ‘Rangers of the New Republic’.

The new projects will be prequels, set before the events happening around Mando and his small friend from another planet in The Mandalorian, and will shed some light on the future of the characters from the series.

The Mandalorian follows Din Djarin, an orphan who grew up to be an invincible warrior whose fame reached as far as distant frontiers of the Galaxy. At the beginning of the story, Mando, who is a bounty hunter, gets his next, seemingly easy assignment ,to track down and capture a dangerous 50-year-old criminal in exchange for a handsome reward. His target, though, turns out to be the adorable baby Grogu. The child has green skin, giant dark eyes, cute, translucent pointed ears, and resembles the famous Masters Yoda and Yaddle in their early years. What started as ‘easy money’ develops into a multi-episode story about their travel together, with the Mandalorian becoming the adoptive father of the little green Jedi. The child desperately needed a strong protector as the best bounty hunters of the fallen Galactic Empire were after him. ‘This is the Way’, and only those who have the armour made of the Mandalorian steel will find success on this path.

Mandalorian steel

Beskar armour, indeed, saves the bounty hunter's life throughout the entire series. The Mandalorian armour has endured throwing knives, shots from a modified MK sniper rifle and even lightsaber strikes.

Beskar and the armour made of it, the mere sight of which strikes fear into enemies, is a distinctive feature of Mandalorians. Aside from its unparalleled strength, the Mandalorian armour has a whole range of additional properties, from built-in blasters and bayonets to a jetpack that Mando uses to engage in air fights and travel through the insides of a giant monster. A helmet with built-in radar, night vision and voice commands enabling the control of other elements of Din Djarin's amour deserves special mention.

The earlier book , 'Republic Commando: Order 66' (a reference to the instruction to kill all Jedis) sheds some light on the secret of beskar. Talking about the armour quality, Mandalorians from 'Order 66' say that the high-quality beskar "contains 2% ciridium, no lamination or carbon-alloy". However, the secret of the Mandalorian iron is not just about alloy proportions, but also about the metallurgical process itself. Multiple layers of the metal are placed on top of each other during the forging process.

A viewer who is knowledgeable about the history of earthly weapons immediately thinks of the legendary Indian wootz, first mentions of which date back to the 3rd century A.D. The wootz used for the famous Damascus steel also underwent multiple re-forging. In addition, wootz, just like beskar, has a unique pattern consisting of a combination of lines and stains. Another interesting coincidence is that the Damascus steel stopped being produced due to issues with the availability of raw materials. Mandalore also experienced a certain shortage of raw materials. For a long time, deposits of the iron ore used to produce beskar were thought to have been exhausted during the Imperial era (Imperial blacksmiths were unable to fully learn the metallurgical craft of the indigenous folk). Eventually, a new ore vein was uncovered and the Mandalorians supported the economy of the planet, as it had experienced a setback during the war with the Empire, by developing the newly discovered deposit.

Notably, the unique properties of beskar made it an indispensable material, not only for the manufacture of weapons. It is mentioned in other works that describe the Star Wars universe that beskar was used to manufacture a whole

range of metal goods

, such as plates, mesh, wire, film, etc. Aside from armour and cold weapons, the Mandalorian steel was used to manufacture shields as well as musical instruments, which served two purposes (they could be played or used to defend oneself), metal parts of lightsabers, etc. Beskar was also used in the cladding of spaceships, architectural structures and in the manufacture of various home appliances. All in all, its range of application was similar to the applications of steel on Earth.

Earthly ultra-strength materials and alloys

Sure enough, the properties of ordinary steel are far from the unique strength and lightness of the Mandalorian beskar. However, a lot of modern ultra-strength materials could be of interest to Mandalorians.

One example is nanoceramics. This material, based on oxides, nitrides, borides and other inorganic compounds, is composed of grains measuring up to 100 nanometres (one-billionth of a meter). The first developments in the nanoceramics field go back around 40 years. Today, this extraordinary material is used for applications where the highest levels of durability and reliability take priority. Light emitting diodes, for one, are made from nitride nanoceramics and plates for bulletproof vests and military armoured vehicles from carbide nanoceramics. Zirconium-based nanoceramics are used in the manufacture of stop valves for the chemical and oil and gas industries.

Hard tungsten-carbide alloys

(the famous group of tungsten carbide-based ‘pobedits’, which have been used in the former Soviet Union for nearly a century) are also worth mentioning. Tungsten carbide is used in the manufacture of tools and elements designed for extreme applications, such as various drills, abrasive disks, chisels, rolls for rolling mill, elements of equipment used in the boring process, etc. Tungsten carbide (along with the titanium carbide, tantalum carbide, and niobium carbide) is extensively used by BOSCH to manufacture their popular tools.

But then again, we Earthlings are not as warlike as Mandalorians, who even managed to use musical instruments as weapons. On Earth, hard alloys are used to manufacture not only wear-resistant tools but also jewellery. Tungsten carbide, for one, is commonly used in jewellery. This material is hypoallergenic, and, thanks to its extraordinary strength, rings made of the tungsten carbide are scratch-resistant, not prone to deformation and do not lose their noble steel shine.