



**SHIMANO**

## Shimano's technology drives the HAGANE concept.

Reel manufacturing based on the HAGANE concept is supported by the unique metalworking technology that Shimano has developed over the years. The precision cold-forged "HAGANE Gear" is tremendously strong and durable from the edges of the teeth to the root of the gear. The "Micro Module Gear System" provides seamless reeling through the engagement between the super-refined teeth. The "X-SHIP" system achieves powerful and smooth cranking thanks to the gear system that is designed to effectively transmit input power. The highly rigid "HAGANE Body" eliminates distortion as well as flex during reeling and protects the interior of the reel from unexpected impact. By integrating these representative metalworking technologies, Shimano gives you the feeling of smooth reeling that is unique to Shimano reels. The more you use the reel, the more you realize the value of HAGANE.



**HAGANE**  
GEAR



  
MICROMODULE



  
SHIP



  
KQ  
BODY

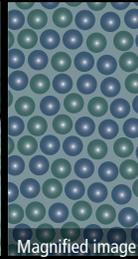
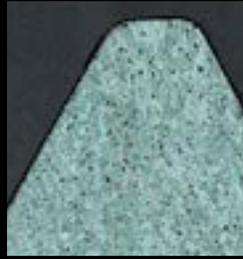
Transforming raw metal  
into precision gears.



High density: Metal gets densified with 200 tons of pressure.

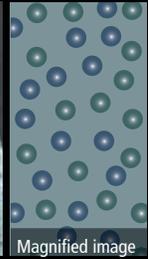


Precision cold forging



Magnified image

Casting (zinc die casting)



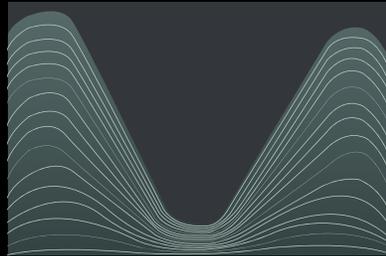
Magnified image

A comparison between a cross section of the precision cold-forged HAGANE Gear and that of a cast gear (zinc die casting) clearly shows a difference. Unlike the casting in which the raw metal is melted and then poured into a mold, the precision cold forging results in higher crystal density, with little space among crystals. This process is the main reason why we can produce tougher gears.

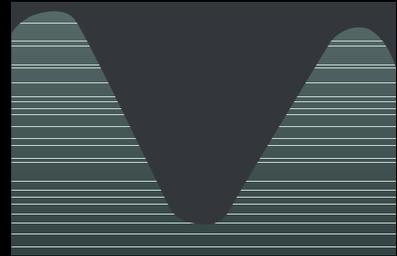
Extreme hardness: Gear is exceptionally strong due to uninterrupted metal flows.



Precision cold-forging



General machining

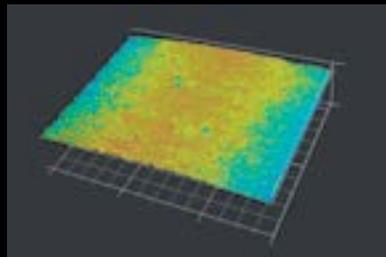


Metal flows refer to the flows of the metallographic structure. Precision cold forging, which does not involve machining the gear tooth surfaces, does not interrupt the metal flows. The gear, with its metal structure preserved along the processed shape, is highly resistant to impact and exceptionally difficult to break.

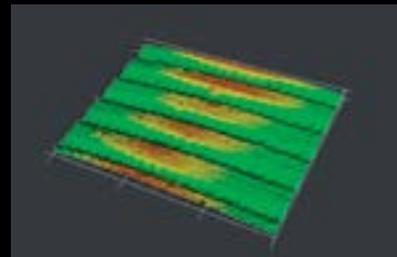
Exceptional smoothness: Smooth gear tooth surfaces enable long-lasting rotation



Precision cold-forging



General machining



On the surfaces of a machined gear, there are minute flaws and projections which cause metal fatigue. On the other hand, there are virtually no irregularities on the surfaces of the HAGANE Gear. Even after repeated reeling over a number of fishing seasons, the gear hardly generates any noise and continues to reel smoothly.