

Avigliana, May 14, 2021

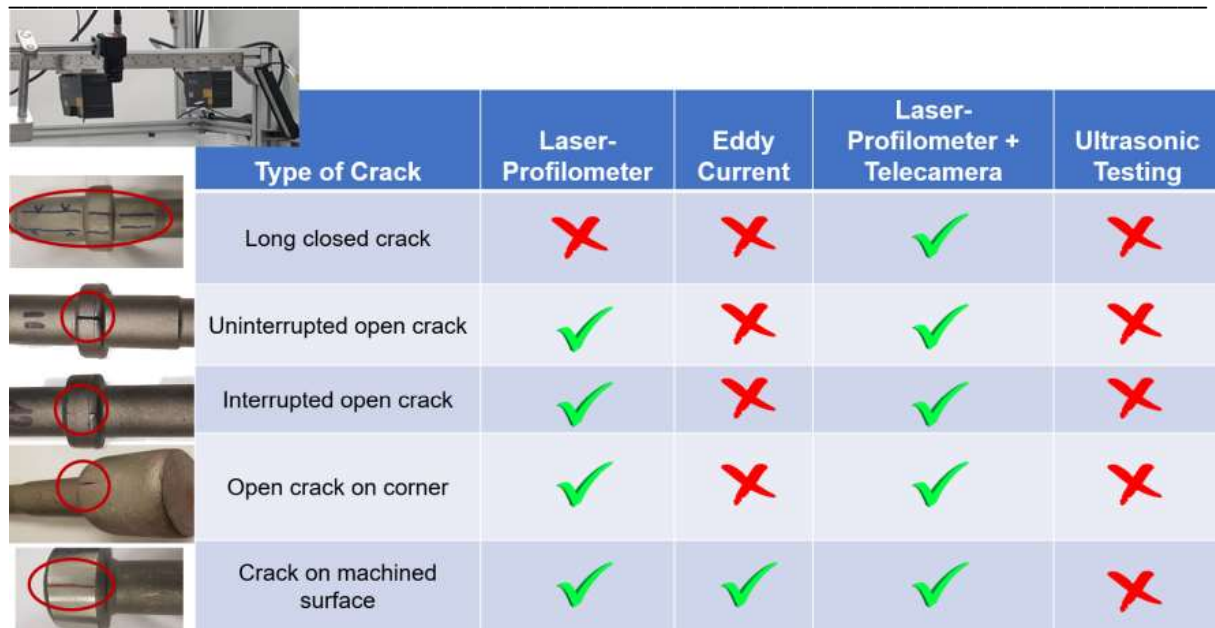
## **PrimoTECS invests in improved Quality of Cold Forged Shafts**

PrimoTECS is a quality driven company. This is not only documented by passing the renewal of the IATF-Certification in March 2021, by a quality policy which is clearly communicated inside PrimoTECS to all employees as well as by excellent quality KPIs. It is also documented by continuously rising the state of the art in quality technology which is applied in PrimoTECS production.

Cold forged shafts which are used in transmission, powertrain and hybrid or electric drive applications can exhibit different types of defects on the surface of the shaft. These can be closed or open cracks, they can be long and continuous or short, interrupted or located on edges, or even still exist on machined surfaces. Common to all these cracks is that they are non-systematic quality defects, appearing at a rate of a few per ten thousand or in even lesser incidents. The reason for these cracks is the deformation of the material in a tensile stress regimen. However, the cracks only form if one of the following three conditions exists: 1) A surface fold introduced by hot rolling of the bar, but so small that it could not be detected by eddy current testing in the steel mill 2) a segregation in the steel which leads to some brittle material structure even after proper heat treatment for cold forging or 3) a bigger inclusion near the surface which reduces the ductility of the steel. Condition 2) and 3) can not be detected by economical non-destructive testing.

Consequently, 100% visual check by skilled labour is undertaken on these types of cold forgings. Neither skills nor optimum working conditions, however, can typically completely prevent that some defective parts slip through the quality check. In order to increase the quality level, PrimoTECS has decided to apply automatic surface checks. The Avigliana plant has undertaken a project in which different methods of surface testing have been analysed. The combination of Laser-Profilometer and camera has proven to be able to detect all relevant surface defects (see Fig. 1), so this technology has been chosen for the quality check of these parts starting from May 2021.

With this investment, PrimoTECS demonstrates its willingness to invest into the highest quality technology in order to become the market leader for forged components in Europe.



| Type of Crack             | Laser- Profilometer | Eddy Current | Laser- Profilometer + Telecamera | Ultrasonic Testing |
|---------------------------|---------------------|--------------|----------------------------------|--------------------|
| Long closed crack         | ✗                   | ✗            | ✓                                | ✗                  |
| Uninterrupted open crack  | ✓                   | ✗            | ✓                                | ✗                  |
| Interrupted open crack    | ✓                   | ✗            | ✓                                | ✗                  |
| Open crack on corner      | ✓                   | ✗            | ✓                                | ✗                  |
| Crack on machined surface | ✓                   | ✓            | ✓                                | ✗                  |

Fig.1: Analysis of detection performance for different types of surface defects

## About PrimoTECS

PrimoTECS is a market leader in forged components, using a very wide range of forging processes. PrimoTECS operates forging processes on horizontal hot Hatebur presses in sizes ranging from AMP 30 to AMP 70 L, as well as vertical processes in hot, warm and cold forging with press forces between 230 and 3000 tons. PrimoTECS applies further value-add by turning, drilling, induction-hardening and friction welding. In 2019, 700 people created sales of 100 Mio. €, working in two plants near Torino in Italy.