New Possibilities for the Repair of Surface Defects on Al Castings with the Use of Laser

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CONCLUSIONS

When repairing surface defects of Al castings with the use of conventional TIG welding method, large amounts of heat are transferred into the repair zone, and in result thereof, the base structure of the material is strongly impacted (by making it rough). The repair zone shows mechanical characteristic values of a raw casting (Tab.1), and the entire casting needs to be retreated thermally.

When repairing surface defects on Al castings with the use of LASER, only a small amount of heat (unlike the TIG method) is transferred into the repair zone so that almost no thermally affected transition zone is formed and the base structure of the material is impacted only minimally. Castings repaired with the use of LASER do not require any thermal post-treatment for stress relief.

Silicon particles in the LASER repair zone feature the most appropriate globular morphology as they are not released in the form of spines that would make the casting more fragile. The casting retains its original high mechanical characteristic values (see Tab. 1) across its entire cross-section.

When repairing surface defects with the use of LASER, variations in the surface colour should be expected. This is due to the differences between the structure of the weld metal and the structure of the casting (see Fig. 1 and Fig. 2).

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