MICRO-SCALE ENERGY DIRECTORS FOR ULTRASONIC WELDING

The invention relates to a replication tool (1) for producing a part (4) with a microscale textured replica surface (5a, 5b, 5c, 5d). The replication tool (1) comprises a tool surface (2a, 2b) defining a general shape of the item (4). The tool surface (2a, 2b) comprises a microscale structured master surface (3a, 3b, 3c, 3d) having a lateral master pattern and a vertical master profile. The microscale structured master surface (3a, 3b, 3c, 3d) has been provided by localized pulsed laser treatment to generate microscale phase explosions. A method for producing a part (4) with microscale energy directors on flange portions thereof uses the replication tool (1) to form an item (4) with a general shape as defined by the tool surface (2a, 2b). The formed item (4) comprises a microscale textured replica surface (5a, 5b, 5c, 5d) with a lateral arrangement of polydisperse microscale protrusions. The microscale protrusions may be provided on a flange portion of a first part (40) and are configured to act as energy directors when forming an ultrasonic joint with a cooperating flange portion of a second part (50).