Title (en)
  Single crystal turbine blade

Title (de)
  Einkristall-turbinenschaufel

Title (fr)
  Aube de turbine monocristalline

Publication
  EP 2071125 B1 20110413 (FR)

Application
  EP 08171584 A 20081212

Priority
  FR 0708751 A 20071214

Abstract (en)
  [origin: EP2071125A1] The monocrystalline turbine blade for a wheel of a turbomachine, comprises a propeller (11) having a leading edge (BA),
  a lower face (FI), an upper face (FE), a trailing edge (BF), a skeleton (S) and longitudinal axis (ZZ), and a connection area (11E) between the
  propeller and the side of the blade. The blade is prepared by direct solidification of foundry parts. The sides (FI) and (FE) have a pass line, and
  respective lower pass (CI) and upper pass (CE) with respect to the adjacent blade in the turbomachine wheel of which it constitutes an element. The
  monocrystalline turbine blade for a wheel of a turbomachine, comprises a propeller (11) having a leading edge (BA), a lower face (FI), an upper face
  (FE), a trailing edge (BF), a skeleton (S) and longitudinal axis (ZZ), and a connection area (11E) between the propeller and the side of the blade.
  The blade is prepared by direct solidification of foundry parts. The sides (FI) and (FE) have a pass line, and respective lower pass (CI) and upper
  pass (CE) with respect to the adjacent blade in the turbomachine wheel of which it constitutes an element. An end part (20) of the propeller such
  as a stud or platform has a face of rib forming an angle with the longitudinal axis. The connection area extends around the leading edge between a
  point P1 located on the upper face of the blade and on the face of the upstream stud end with reference to the direction of the fluid flow and a point
  P3 located on the upper face of the blade and on the face of the upstream stud end of the lower pass. A section of the propeller in the connection
  area is measured perpendicularly to the leading edge of the theoretical profile, and extends towards the stud. Pointed line P2 is located in upstream
  of the blade with respect to the direction of the fluid flow in the connection area and in the extension of the leading edge of the propeller on the
  skeleton, and forms an angle of lower than 90[deg] with end face of the blade. The curvature of the connection area in a perpendicular plane that
  is cut at the leading edge of the theoretical profile depends on the curvature of the theoretical leading edge BAV and the distance separating the
  point P2 from the theoretical leading edge of the blade in the cut plane. The radius of curvature of point of the line P2 is equal to radius of curvature
  corresponding to the theoretical profile BAV, and is more than one-third of the distance. The surface of the connection area at point P1 is tangential
  along its upper surface end of the blade. The surface of the connection area in P3 is tangential along its lower surface end of the blade. A surface of
  the connection area has a profile C1 between the pointed line P2 and the pointed line P1. The upper surface of the blade is changed by geometrical
  transformations such as rotation, proportional transformation and/or affinity. The center of gravity of the connecting area defined by the surface
  located in upstream of the points P1 and P3 with respect to the direction of fluid flow, is on the axis of the smallest inertia of the theoretical profile
  surface, and close to the center of gravity of the theoretical profile surface.

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