

Title (en)

Method for treating the surface of a high-strength steel mechanical part, and sealing system obtained by implementing said method

Title (de)

Oberflächenbearbeitungsverfahren eines mechanischen Stahlwerkstücks mit hoher Widerstandskraft und Abdichtsystem, das durch die Anwendung dieses Verfahrens entsteht

Title (fr)

Procédé de traitement de surface d'une pièce mécanique en acier à haute résistance, et système d'étanchéité obtenu par la mise en oeuvre dudit procédé

Publication

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Application

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Priority

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Abstract (en)

The process comprises subjecting a mechanical component to a primary finishing step to reduce its roughness on a surface at a value less than or equal to a predetermined first threshold, subjecting the component (P) to a surface cleaning using a degreasing solution, subjecting the cleaned component to a tribofinishing step organized for reducing its surface roughness (Ra) to a value less than or equal to a second predetermined threshold and increasing its wettability to hydraulic fluids, and subjecting the component to a projection of tungsten disulfide powder. The process comprises subjecting a mechanical component to a primary finishing step to reduce its roughness on the surface at a value less than or equal to a predetermined first threshold, subjecting the component (P) to a surface cleaning using a degreasing solution, subjecting the cleaned component to a tribofinishing step organized for reducing its surface roughness (Ra) to a value less than or equal to a second predetermined threshold, which is lower than the first predetermined threshold, and increasing its wettability to hydraulic fluids, and subjecting the component to a projection, at high speed and at an ambient temperature, of tungsten disulfide powder (WS 2) in the form of platelets (p), which is broken thus creating a dense and self-lubricating deposit in surface of the component. The tribofinishing step comprises chamfering (C1) by continuous stirring of component to be treated with a first oxidizing aqueous solution containing abrasive agents for obtaining surface roughness, and polishing (C2) by continuous stirring of components with a second non-oxidizing aqueous solution containing abrasive agents followed by surface cleaning (C3), then checking the surface roughness. The first predetermined threshold of the roughness is 0.2 μm and the second predetermined threshold of the roughness is 0.1 μm . The powder is composed of pure WS 2 and is in the form of hexagonal shape whose main dimension is 0.8-1.5 μm and thickness is 0.1 μm . The process comprises microblasting step to activate the surface of the component to increase the adhesion of the coating deposited in the projection step, and after the projection of WS 2 powder, a step of surface cleaning, then checking both the surface roughness, wettability and coefficient of friction. The microblasting step is: organized such that the surface roughness, which is increased due to the microblasting, remains less than the first predetermined threshold of roughness; implemented with the particles that are not of oxides, and of which the size is 5-15 μm . An independent claim is included for a hydraulic sealing system.

Abstract (fr)

L'invention concerne un procédé de traitement de surface d'une pièce mécanique en acier à haute résistance, visant à conférer à ladite pièce des propriétés en frottement et en lubrification nécessaires à son utilisation. Conformément à l'invention, le procédé comporte les étapes successives suivantes: a) on soumet la pièce (P) à une étape de finition primaire organisée pour abaisser sa rugosité en surface (Ra) à un premier seuil prédéterminé (S1); b) on soumet ensuite la pièce (P) à un nettoyage de surface au moyen d'une solution de dégraissage; c) on soumet la pièce (P) ainsi nettoyée à une étape de tribofinition organisée pour d'une part abaisser encore sa rugosité en surface (Ra) à un deuxième seuil prédéterminé (S2) qui est inférieur au premier seuil prédéterminé (S1), et d'autre part augmenter sa mouillabilité aux fluides hydrauliques; et d) on soumet la pièce (P) à une projection, à haute vitesse et à température ambiante, de poudre de bisulfure de tungstène (WS 2) se présentant sous la forme de platelets (p) qui se brisent ainsi en créant en surface de ladite pièce un dépôt dense et autolubrifiant.

IPC 8 full level

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C23C 24/04 (2013.01 - EP US)

Citation (applicant)

- WO 2004031433 A2 20040415 - MATERIAL TECHNOLOGIES INC [US], et al
- WO 2004092429 A2 20041028 - MATERIAL TECHNOLOGIES INC [US], et al

Citation (search report)

- [AD] WO 2004031433 A2 20040415 - MATERIAL TECHNOLOGIES INC [US], et al
- [AD] WO 2004092429 A2 20041028 - MATERIAL TECHNOLOGIES INC [US], et al
- [A] WO 2006019983 A2 20060223 - KINETITEC CORP [US], et al
- [A] WO 2008010901 A2 20080124 - KINETITEC CORP [US], et al

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CZ307120B6; CN102513900A; FR3014428A1; FR3123012A1; WO2015082851A1; WO2022243623A1

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