Title (en)

HYDROGEN-EMBRITTLEMENT-RESISTANT STEEL ROD WITH HIGH MECHANICAL CHARACTERISTICS

Title (de)

FORMDRAHT AUS STAHL MIT HOHEN MECHANISCHEN EIGENSCHAFTEN UND BESTÄNDIGKEIT GEGEN WASSERSTOFF-VERSPRÖDUNG

Title (fr)

FIL DE FORME EN ACIER À HAUTES CARACTÉRISTIQUES MÉCANIQUES RESISTANT À LA FRAGILISATION PAR L'HYDROGÈNE

Publication

EP 4234749 A2 20230830 (FR)

Application

EP 23173405 A 20110323

Priority

- EP 19166357 A 20110323
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- FR 2011000167 W 20110323
- FR 1002286 A 20100531

Abstract (en)

[origin: CA2801355A1] This profiled wire, of NACE grade, made of low-alloy carbon steel intended to be used in the offshore oil exploitation sector, is characterized in that it has the following chemical composition, expressed in percentages by weight of the total mass: 0.75 < % C < 0.95; 0.30 < % Mn < 0.85; Cr = 0.4%; V = 0.16%; Si = 1.40% and preferably = 0.15%; and optionally no more than 0.06% Al, no more than 0.1% Ni and no more than 0.1% Cu, the balance being iron and the inevitable impurities arising from smelting the metal in the liquid state, and in that the steel is obtained, from hot-rolled rod stock cooled down to room temperature, and then having a diameter of about 5 to 30 mm, by subjecting this starting rod firstly to a thermomechanical treatment comprising two successive steps carried out in order, namely an isothermal quench, giving it a homogeneous perlitic microstructure, followed by a mechanical transformation operation carried out cold with an overall degree of work-hardening (or reduction ratio) of between 50 and 80% at most, so as to give the wire its definitive shape, and in that the profiled wire thus obtained is then subjected to a restoration heat treatment of short duration carried out below Ac1 (preferably between 410 and 710°C), giving it the desired final mechanical properties.

Abstract (fr)

Fil de forme en acier au carbone faiblement allié à hautes caractéristiques mécaniques et résistant à la fragilisation à l'hydrogène, destiné à être utilisé comme constituant de conduites flexibles pour le secteur de l'exploitation pétrolière off shore. Le fil présente la composition chimique suivante, exprimée en pourcentages pondéraux de la masse totale, 0,75 < C % < 0,95 et 0,30 < Mn % < 0,85 avec Cr ≤ 0,4%; V ≤ 0,16%; Si ≤ 1,40 % et de préférence ≥ 0,15%, et éventuellement pas plus de 0,06% d'Al, pas plus de 0,1% de Ni, et pas plus de 0,1% de Cu, le reste étant du fer et les inévitables impuretés venant de l'élaboration du métal à l'état liquide; le fil de forme a une structure perlitique avec des traces possibles de ferrite, sans bainite ni martensite ; le fil de forme a une résistance à la rupture d'au moins 1300 MPa.

IPC 8 full level

C22C 38/46 (2006.01)

CPC (source: CN EP KR US)

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Citation (applicant)

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DOCDB simple family (publication)

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US 2015361535 A1 20151217; US 9249486 B2 20160202; US 9617625 B2 20170411; WO 2011151532 A1 20111208; ZA 201209055 B 20130701

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FR 1002286 A 20100531; AU 2011260159 A 20110323; BR 112012030715 A 20110323; CA 2801355 A 20110323; CN 201180032134 A 20110323; CN 201610101596 A 20110323; DK 11719592 T 20110323; DK 19166357 T 20110323; EP 11719592 A 20110323; EP 19166357 A 20110323; EP 23173405 A 20110323; ES 11719592 T 20110323; ES 19166357 T 20110323; FI 19166357 T 20110323; FR 2011000167 W 20110323; HU E11719592 A 20110323; HU E19166357 A 20110323; JP 2013512959 A 20110323; KR 20127032369 A 20110323; KR 20157018655 A 20110323; KR 20167034373 A 20110323; MX 2012013947 A 20110323; PL 11719592 T 20110323; PL 19166357 T 20110323; PT 11719592 T 20110323; PT 19166357 T 20110323; RU 2012157550 A 20110323; SI 201131760 T 20110323; SI 201132094 T 20110323; TR 201910939 T 20110323; UA A201214881 A 20110323; US 201113700913 A 20110323; US 201514832599 A 20150821; ZA 201209055 A 20121129