Title (en)

HOLLOW MEMBER AND METHOD FOR MANUFACTURING SAME

Title (de)

HOHLKÖRPER UND VERFAHREN ZU SEINER HERSTELLUNG

Title (fr)

ELÉMENT CREUX ET PROCÉDÉ POUR SA FABRICATION

Publication

EP 2239343 B1 20171122 (EN)

Application

EP 09703762 A 20090120

Priority

- JP 2009051148 W 20090120
- JP 2008010018 A 20080121

Abstract (en)

[origin: EP2239343A1] A method for manufacturing a hollow article having excellent durability is provided. In particular, an electric resistance welded steel pipe which is made from a steel sheet and in which the width of a low carbon layer is 2h (m) is subjected to a heat treatment that includes a quenching treatment in which the electric resistance welded steel pipe is heated to a heating temperature T (K) not lower than the Ac 3 transformation temperature at a heating rate V h (K/s), held for a soaking time k (s), immediately cooled to a quenching start temperature Tq (K) at a primary cooling rate V c (K/s), and then secondarily cooled (quenched). The heating rate V h , the maximum heating temperature T, and the primary cooling rate V c are adjusted so as to satisfy an inequality (herein C 0 (mass percent) is the C content (mass percent) of the steel sheet, t is the diffusion time (s), t = 50 / V h + 50 / V c + k, V h is the heating rate (K/s), V c is the primary cooling rate (K/s), k is the soaking time (s), D is the diffusion coefficient (m 2 /s), D (m 2 /s) = D 0 exp(-Q / RT), Do is 4.7 × 10 -5 (m 2 /s), Q = 155 (kJ/mol·K), R = 8.31 (J/mol·K), and T is the maximum heating temperature (K)) and the quenching start temperature Tq is higher than the Ar 3 transformation temperature. This prevents the hardness as quenching of the electric resistance welded portion from being reduced and significantly increases the durability of the heat-treated article. 0.83 #¤ 1 - 1 - 0.09 / C 0 #« - h h exp - y 2 / 4 #¢ Dt / 4 #¢ ÀDt #¢ dy

IPC 8 full level

C21D 9/08 (2006.01); **C21D 1/25** (2006.01); **C21D 9/50** (2006.01); **C22C 1/00** (2006.01); **C22C 38/00** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/14** (2006.01); **C22C 38/58** (2006.01)

CPC (source: EP KR)

C21D 1/25 (2013.01 - EP KR); **C21D 9/08** (2013.01 - EP KR); **C21D 9/50** (2013.01 - EP KR); **C22C 1/11** (2023.01 - EP KR); **C22C 38/001** (2013.01 - EP KR); **C22C 38/002** (2013.01 - KR); **C22C 38/02** (2013.01 - EP KR); **C22C 38/04** (2013.01 - EP KR); **C22C 38/06** (2013.01 - EP KR); **C22C 38/14** (2013.01 - EP KR); C21D 2211/008 (2013.01 - EP KR)

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DOCDB simple family (application)

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