

Title (en)

Cold-rolled steel sheet and galvanized steel sheet having excellent strain age hardenability and method of producing the same

Title (de)

Kaltgewalztes Stahlblech und Zinkblech mit Reckalterungseigenschaften und Verfahren zur dessen Herstellung

Title (fr)

Toile d'acier laminee a froid, galvanisee ayant excellent aptitude au durcissement au vieillissement par ecrouissage et son procede de fabrication

Publication

EP 1498507 A1 20050119 (EN)

Application

EP 04023101 A 20010214

Priority

- EP 01906128 A 20010214
- JP 2000156274 A 20000526
- JP 2000193717 A 20000628
- JP 2000328924 A 20001027
- JP 2000335803 A 20001102

Abstract (en)

An object of the present invention is to provide a cold-rolled steel sheet and an alloyed hot-dip galvanized steel sheet in which tensile strength is effectively increased by press forming and heat treatment while maintaining excellent deep drawability in press forming. Specifically, a steel composition contains less than 0.01% of C, 0.005 to 1.0% of Si, 0.01 to 1.0% of Mn, 0.005 to 0.050% of Nb, 0.005 to 0.030% of Al, 0.005 to 0.040% of N, 0.0005 to 0.0015% of B, 0.05% or less of P, and 0.01% or less of S, the balance substantially composed of Fe, in which the following equations (1) and (2) are satisfied: $\text{N} \geq 0.0015 + 14/93 \cdot \text{Nb} + 14/27 \cdot \text{Al} + 14/11 \cdot \text{B}$ and $\text{C} \leq (12/93) \cdot \text{Nb}$.

IPC 1-7

C22C 38/00; **C22C 38/06**; **C22C 38/58**; **C21D 9/46**; **C22C 38/04**; **C21D 8/02**

IPC 8 full level

C21D 8/02 (2006.01); **C21D 8/04** (2006.01); **C21D 9/48** (2006.01); **C22C 38/00** (2006.01); **C22C 38/02** (2006.01); **C22C 38/04** (2006.01); **C22C 38/06** (2006.01); **C22C 38/12** (2006.01); **C21D 1/18** (2006.01)

CPC (source: EP KR)

C21D 8/0236 (2013.01 - EP); **C21D 8/0273** (2013.01 - EP); **C21D 8/0426** (2013.01 - EP); **C21D 9/48** (2013.01 - EP); **C22C 38/00** (2013.01 - KR); **C22C 38/001** (2013.01 - EP); **C22C 38/004** (2013.01 - EP); **C22C 38/02** (2013.01 - EP); **C22C 38/04** (2013.01 - EP); **C22C 38/06** (2013.01 - EP); **C22C 38/12** (2013.01 - EP); **C21D 1/185** (2013.01 - EP); **C21D 8/0226** (2013.01 - EP); **C21D 8/0436** (2013.01 - EP); **C21D 8/0473** (2013.01 - EP); **C21D 2211/005** (2013.01 - EP); **C21D 2211/008** (2013.01 - EP)

Citation (search report)

- [XA] EP 0659890 A2 19950628 - KAWASAKI STEEL CO [JP]
- [A] EP 0943696 A1 19990922 - KAWASAKI STEEL CO [JP], et al
- [A] EP 1002884 A1 20000524 - NIPPON KOKAN KK [JP]
- [A] EP 0769565 A1 19970423 - NIPPON STEEL CORP [JP]
- [A] EP 0612857 A1 19940831 - NIPPON STEEL CORP [JP]
- [A] EP 0510718 A2 19921028 - KAWASAKI STEEL CO [JP]
- [A] US 5405463 A 19950411 - SHIMOMURA TAKAYOSHI [JP], et al
- [A] EP 0608430 A1 19940803 - NIPPON STEEL CORP [JP]
- [A] US 4838955 A 19890613 - EDELMAN ARIE B C [NL], et al
- [A] US 5582658 A 19961210 - MASUI SUSUMU [JP], et al
- [XDA] PATENT ABSTRACTS OF JAPAN vol. 005, no. 012 (C - 040) 24 January 1981 (1981-01-24)

Cited by

CN103590352A

Designated contracting state (EPC)

BE DE FR GB IT

DOCDB simple family (publication)

EP 1291448 A1 20030312; **EP 1291448 A4 20040630**; **EP 1291448 B1 20060628**; CA 2379698 A1 20011129; CA 2379698 C 20090217; CN 1158398 C 20040721; CN 1386140 A 20021218; DE 60121162 D1 20060810; DE 60121162 T2 20061109; DE 60121233 D1 20060810; DE 60121233 T2 20061109; DE 60121234 D1 20060810; DE 60121234 T2 20061109; EP 1498506 A1 20050119; EP 1498506 B1 20060628; EP 1498507 A1 20050119; EP 1498507 B1 20060628; KR 20020019124 A 20020309; TW 565621 B 20031211; WO 0190431 A1 20011129

DOCDB simple family (application)

EP 01906128 A 20010214; CA 2379698 A 20010214; CN 01802186 A 20010214; DE 60121162 T 20010214; DE 60121233 T 20010214; DE 60121234 T 20010214; EP 04023082 A 20010214; EP 04023101 A 20010214; JP 0101004 W 20010214; KR 20027001080 A 20020125; TW 90103293 A 20010214