

Title (en)

LUBRICANTS SUITABLE FOR HYDROFORMING AND OTHER METAL MANIPULATING APPLICATIONS

Title (de)

FÜR INNENHOCHDRUCKUMFORMUNG UND ANDERE METALLBEARBEITUNGSVERFAHREN GEEIGNETE SCHMIERMITTEL

Title (fr)

LUBRIFIANTS APPROPRIES POUR L'HYDROFORMAGE ET POUR D'AUTRES APPLICATIONS DE MANIPULATION DE METAUX

Publication

EP 1608474 A2 20051228 (EN)

Application

EP 03800331 A 20031230

Priority

- US 0341577 W 20031230
- US 33952303 A 20030109

Abstract (en)

[origin: US2003181340A1] The present invention discloses a hydroforming process for metal parts that uses liquid-film and solid-film lubricants. The lubricants used in the invention are particularly useful for die-side lubrication. The process includes a step in which a ductile metal part is over-coated with either the liquid-film or solid-film lubricant. The liquid lubricants preferably include an oil and a optionally a surfactant. The solid lubricants preferably include a hard wax and optionally a surfactant.

IPC 1-7

B22D 1/00

IPC 8 full level

B21D 9/15 (2006.01); **B21D 26/033** (2011.01); **B21D 26/035** (2011.01); **B21D 26/057** (2011.01); **B22D 1/00** (2006.01); **C10M 105/02** (2006.01); **C10M 105/32** (2006.01); **C10M 159/06** (2006.01); **C10M 169/04** (2006.01); **C10M 173/00** (2006.01)

IPC 8 main group level

B22D (2006.01)

CPC (source: EP US)

B21D 26/033 (2013.01 - EP US); **B21D 26/035** (2013.01 - EP US); **B21D 26/057** (2013.01 - EP US); **C10M 169/04** (2013.01 - EP US); **C10M 169/041** (2013.01 - EP US); **C10M 173/00** (2013.01 - EP US); **C10M 2201/02** (2013.01 - EP US); **C10M 2201/062** (2013.01 - EP US); **C10M 2203/1065** (2013.01 - EP US); **C10M 2205/123** (2013.01 - EP US); **C10M 2205/14** (2013.01 - EP US); **C10M 2205/143** (2013.01 - EP US); **C10M 2205/16** (2013.01 - EP US); **C10M 2205/163** (2013.01 - EP US); **C10M 2205/17** (2013.01 - EP US); **C10M 2205/173** (2013.01 - EP US); **C10M 2205/18** (2013.01 - EP US); **C10M 2205/183** (2013.01 - EP US); **C10M 2207/021** (2013.01 - EP US); **C10M 2207/0215** (2013.01 - EP US); **C10M 2207/125** (2013.01 - EP US); **C10M 2207/126** (2013.01 - EP US); **C10M 2207/129** (2013.01 - EP US); **C10M 2207/141** (2013.01 - EP US); **C10M 2207/243** (2013.01 - EP US); **C10M 2207/281** (2013.01 - EP US); **C10M 2207/2815** (2013.01 - EP US); **C10M 2207/284** (2013.01 - EP US); **C10M 2207/2845** (2013.01 - EP US); **C10M 2207/40** (2013.01 - EP US); **C10M 2207/401** (2013.01 - EP US); **C10M 2207/402** (2013.01 - EP US); **C10M 2207/404** (2013.01 - EP US); **C10M 2207/4045** (2013.01 - EP US); **C10M 2209/10** (2013.01 - EP US); **C10M 2209/104** (2013.01 - EP US); **C10M 2209/107** (2013.01 - EP US); **C10M 2209/108** (2013.01 - EP US); **C10M 2209/109** (2013.01 - EP US); **C10M 2209/12** (2013.01 - EP US); **C10M 2211/04** (2013.01 - EP US); **C10M 2215/042** (2013.01 - EP US); **C10M 2219/044** (2013.01 - EP US); **C10N 2030/06** (2013.01 - EP US); **C10N 2040/24** (2013.01 - EP US); **C10N 2040/241** (2020.05 - EP US); **C10N 2050/01** (2020.05 - EP US); **C10N 2050/02** (2013.01 - EP US); **C10N 2060/04** (2013.01 - EP US)

C-Set (source: EP US)

EP

1. **C10M 2209/104 + C10M 2209/108**
2. **C10M 2209/104 + C10M 2209/105**
3. **C10M 2209/104 + C10M 2209/109**
4. **C10M 2207/141 + C10N 2010/02**

US

1. **C10M 2207/141 + C10N 2010/02**
2. **C10M 2209/104 + C10M 2209/108**
3. **C10M 2209/104 + C10M 2209/105**
4. **C10M 2209/104 + C10M 2209/109**

Citation (search report)

See references of WO 2004062836A2

Designated contracting state (EPC)

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

DOCDB simple family (publication)

US 2003181340 A1 20030925; AU 2003300073 A1 20040810; CA 2512682 A1 20040729; EP 1608474 A2 20051228; US 2006128573 A1 20060615; WO 2004062836 A2 20040729; WO 2004062836 A3 20051208

DOCDB simple family (application)

US 33952303 A 20030109; AU 2003300073 A 20031230; CA 2512682 A 20031230; EP 03800331 A 20031230; US 0341577 W 20031230; US 54150603 A 20031230