

Title (en)

Moulding material mixture, moulded blank for moulding purposes and method for producing a moulded blank

Title (de)

Formstoffmischung, Formling für Giessereizwecke und Verfahren zur Herstellung eines Formlings

Title (fr)

Mélange de matière à mouler, pièce brute pour des besoins de fonderie et procédé de fabrication d'une pièce brute

Publication

EP 2014392 A2 20090114 (DE)

Application

EP 08007906 A 20080424

Priority

DE 102007027577 A 20070612

Abstract (en)

Molding material mixture (I) for foundry purposes, comprises: molding sand; sodium hydroxide solution (0.1-10 wt.%); a binding agent based on alkali silicate; and additives, where: the molding sand particles comprise a grain size of 0.1-1 mm; sodium hydroxide solution comprises a concentration of 20-40 wt.%; (I) contains 0.1-5% of binding agent based on alkali silicate with a solid matter percentage of 20-70%; and the molding material mixture, as the additive, contains 0.1-3 wt.% of a suspension with a solid matter percentage of 30-70% of amorphous, spherical silicon dioxide. Molding material mixture (I) for foundry purposes, comprises: molding sand; sodium hydroxide solution (0.1-10 wt.%); a binding agent based on alkali silicate; and additives, where: the molding sand particles comprise a grain size of 0.1-1 mm; the sodium hydroxide solution comprises a concentration of 20-40 wt.%; (I) contains 0.1-5% of binding agent based on alkali silicate with a solid matter percentage of 20-70%; the molding material mixture, as the additive, contains 0.1-3 wt.% of a suspension with a solid matter percentage of 30-70% of amorphous, spherical silicon dioxide in two grain size classifications in the suspension with a first grain size classification (A) containing silicon dioxide particles with a grain size of 1-5 micrometers and with a second grain size classification (B) containing silicon dioxide particles with a grain size of 0.01-0.05 micrometers; and the distribution rule of 0.8-1.0 to 1.2-1 applied for the volume percentages of the two grain size area (A) and (B). Independent claims are included for: (1) a molded part for foundry purposes, produced from (I), where the surface of the individual molding sand grain in the molding part exhibits a primary structure made of silicon dioxide particles with a grain size of 1-5 micrometers; the micrometer-sized amorphous silicon dioxide spheres separate the individual quartz sand particles from one another and further characterized by a substructure of silicon dioxide particles with a grain size of 0.01-0.05 micrometers, which are distributed in a binding agent layer, which is 0.5-2 micrometers thick and is uniformly distributed on molding sand grains; and the nanometer-sized amorphous silicon dioxide spheres form adjoining peaks and valleys of up to 300 nanometers of height/depth; and (2) producing the molded part comprising: providing molding; mixing the sodium hydroxide solution with the binding agent based on alkali silicate; uniformly and homogeneously distributing the molding sand grains in the form of a binding agent envelope; adding a mixture of silicon dioxide particles with two grain size classifications in the binding agent envelope; and drying the molding material mixture to form a molded part, where the binding agent envelope shrinks during the drying process and forms a roughness structure with a maximum height differential of 300 nanometers.

Abstract (de)

Die Erfindung betrifft eine Formstoffmischung für Gießereizwecke, bestehend aus Formsand, Natronlauge, Binder auf Alkali-Silikat-Basis und Zuschlägen, wobei die Formsandpartikel eine Korngröße von 0,1 - 1 mm aufweisen. Die Formstoffmischung enthält 0,1 - 10 Gewichts % Natronlauge bezogen auf das Sandgewicht und 0,1 - 5% Binder auf Alkali-Silikat-Basis mit einem Feststoffanteil von 20 - 70%, wobei die Natronlauge eine Konzentration von 20 bis 40 Gewichts% aufweist und wobei das Formstoffgemisch als Zuschlag 0,1 - 3 Gewichts% einer Suspension mit einem Feststoffanteil zwischen 30 - 70% an amorphem, kugelförmigem SiO₂ enthält. Das amorphe, kugelförmige SiO₂ ist in zwei Korngrößenklassierungen in der Suspension enthalten mit einer ersten Korngrößenklassierung A, beinhaltend SiO₂-Partikel mit einer Korngröße zwischen 1 - 5 Mikrometern und einer zweiten Korngrößenklassierung B, beinhaltend SiO₂-Partikel mit einer Korngröße zwischen 0,01 - 0,05 Mikrometern. Für die Volumenanteile der beiden Korngrößenbereiche A, B gilt folgende Verteilungsregel: 0,8 zu 1,0 bis 1,2 zu 1. Weiterhin betrifft die Erfindung einen Formling für Gießereizwecke sowie ein Verfahren zur Herstellung des Formlings.

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Citation (applicant)

- DE 102004042535 A1 20060309 - LUENGEN GMBH & CO KG AS [DE]
- US 5641015 A 19970624 - CHALLAND NIGEL [GB]
- EP 1095719 B1 20051228 - HYDRO ALUMINIUM DEUTSCHLAND [DE]

Cited by

DE102012020509A1; EP3950168A1; DE102012103705A1; WO2013159762A1; DE102012020511A1; WO2014059969A2; DE102012020510A1; WO2014059968A2; DE102012020510B4; WO2020229623A1; WO2014059967A2; KR20150074109A

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JP 2008152417 A 20080611; KR 20080053646 A 20080609; MX 2008007515 A 20080611; NZ 56893908 A 20080609; PL 08007906 T 20080424;
RU 2008123122 A 20080610; SI 200830356 T 20080424; UA A200807901 A 20080610; US 13782208 A 20080612