

6.

exercises

Please select technical terms from the text below and translate them:

Primary and Secondary Steel Making

Integrated steel works include a blast furnace and a converter to produce liquid steel. This is also called blast furnace steel making or primary steel making. In addition to iron ore, about 20% scrap iron is also used in this process. The energy required to melt this iron is provided by fossil fuels. Before the raw materials (iron ore and coal) are suitable for use in the blast furnace, they have to undergo intensive preparation.

Electric furnaces on the other hand are charged with 100% scrap iron or with iron ore or direct reduced iron (DRI). These materials melt by putting in large amounts of electrical energy by means of an electric arc. Hence their name: Electric Arc Furnace (EAF) also called secondary steel making. Steel production in electric furnaces no longer requires intensive preparation of raw material. Because the charges of an electric furnace are smaller, they can meet the demand more flexibly. But the process also has its limitations: quality and price of scrap metal are of overriding importance. Besides, some elements present in the scrap metal are retained in the liquid steel.

Suggested answers:

Integrated steel works – Integrované ocelárny

Blast furnace – Vysoká pec

Converter – Konvertor

Direct reduced iron - Železo po přímé redukci

Electric arc furnace – Elektrická oblouková pec

Fossil fuel – Fosilní palivo

Charge – Vsázka

Scrap metal – Kovový šrot

Scrap iron – Železný šrot

Liquid steel – Tekutá ocel

ex2

Steel is produced from iron ore and scrap .

There are two main processes for producing steel: by means of a blast furnace (indirect reduction) in combination with a converter, or by means of an electric furnace. In the former process, iron ore is the main raw material. In an electric furnace, scrap iron is used and occasionally also sponge iron. Sponge iron is an intermediate product, which is produced from iron ore by means of direct reduction (DRI or directly reduced iron) and then further reduced and smelted in an electric furnace.

The pig iron from the blast furnace is taken to the steel plant in torpedo ladles.

The production capacity of the blast furnace is increased by first converting fine iron ore and additives into sinter rather than charging the ore as such directly to the blast furnace.

ex3

Translate the following into Czech:

Coke is produced from coal. Coal is not suitable for direct use in a blast furnace since it contains too many harmful or useless constituents for the reductive smelting process. Moreover, coal is not strong enough to bear the blast furnace charge. The conversion from coal to coke takes place in the coking plant, in the coke ovens at a temperature of up to 1100 °C. Since no oxygen is present in these ovens, the coal does not burn. This process is called dry distillation. It liberates a large quantity of gas and smoke, which, after purification, yields coke oven gas and other valuable commodities such as tar, ammonia and benzene. When the coal has been converted into coke, the coke is removed from the oven and quenched by spraying with water. Then the coke is crushed and screened until its granule size is suitable for use in the blast furnace. To reduce coke usage in the blast furnace, pulverized coal is also used. This pulverized coal is injected via tuyeres into the smelting section.

Koks se vyrábí z uhlí, neboť to není vhodné pro přímé použití ve vysoké peci. Nejen, že obsahuje příliš mnoho škodlivých a nepotřebných složek které se uvolňují při procesu tavení, ale ani by vsázku do vysoké pece nevydrželo. Proměna uhlí na koks se děje v koksovně, v koksárenských pecích, při teplotě okolo 1100 °C. Protože tam není kyslík, uhlí nehoří. Tento postup se nazývá suchá destilace a uvolňuje se při něm velké množství plynu a kouře, z kterého se pak čištěním vyrábí koksárenský plyn a jiné cenné produkty jako dehet, čpavek a benzen. Po proměně se koks odebere z pece, hasí vodou a následně drtí na granule vhodné k použití ve vysoké peci. Pro zredukování množství koksu ve vysoké peci se může také použít práškové uhlí, zaváděné výfučnou do tavící části.

ex4

Use external resources for the following answers:

1. Why is a blast furnace called a blast furnace and not a “tall” furnace comparing to Czech “Vysoká pec“ or German “Hochofen”?
2. Why pig iron is called pig iron and not raw iron comparing to Czech “Surové železo“ and German “Roheisen”?

Answers:

1. It is because hot air is literally blasted in through the bottom of the furnace.

Read more at:

http://wiki.answers.com/Q/Why_is_a_blast_furnace_called_a_blast_furnace_and_not_a_furnace_or_fire_furnace#ixzz1W99ldk2U

2. In the 1800s, one method of iron-making involved pouring molten iron into molds in sand beds fed from a common channel. The resulting blocks of iron were called the suckling "piglets", and the channel was called the "pig". Since then, "pig iron" has become a widely used term.

Read more at:

http://en.wiktionary.org/wiki/pig_iron

<http://www.newton.dep.anl.gov/askasci/chem03/chem03354.htm>

ex5

Co je "coking plant"? Co se tam vyrábí a jaké přitom vznikají vedlejší produkty? (použij anglické i české pojmenování)

2) Jaká je vsázka do vysoké pece? Co se vyprodukuje ve vysoké peci?

(použij anglické i české pojmenování)

3) Jaké jsou výhody použití elektrické pece? Jaké suroviny používá a na co si dát pozor? (použij anglické i české pojmenování)

1)

Coking plant – Koksárna. Proměna uhlí na koks – Coal is converted into coke. Vedlejší produkt: koksárenský plyn, dehet, čpavek a benzene. – By-products: coke oven gas, tar, ammonia and benzene.

Všimněte si použití "coke": koks. Jiné použití: coke - koks pro kokain (cocaine) – stejné jako v češtině, ale Coke (registrovaná obchodní značka) – kola (pro nápoje podobného typu)

2)

Vsázka – charge: Aglomerát, koks, přísady - Sinter, coke, additives

Produkty – products: Surové železo, struska - Pig iron, Slag

Všimněte si použití “charge”: vsázka. Jiné použití: účtovat (komu), obvinít z, nálož, zaútočit na atd.

3)

Není třeba aglomerace, koksárny, vysoké pece a konvertoru - the sintering plant, the coking plant, the blast furnace and the converter are no longer required

ex6

translate into Czech

Iron - Železo

Carbon monoxide - Oxid uhelnatý

Calcium - Vápník

Magnesium - Hořčík

Calcium carbide - Karbid vápenatý

Calcium sulphide - Siřičitan vápenatý

Aluminum-killed - Uklidněno hliníkem

Ammonia - Čpavek

Benzene - Benzen

Tar - Dehet

Lime - Vápenec

ex7

Přečti si 3.7 a zjednodušeně popiš proces kontilití. (anglicky a česky)

2) Z čeho se skládá lička? (anglicky a česky)

3) Proč se to nazývá kontilití? (anglicky a česky)

4) Jaký produkt vyjede na konci kontilití? (anglicky a česky)

Answers:

1) In the continuous casting unit, steel from the ladle is poured into the tundish and then into the caster. - V kontilití se ocel z pánve vléva do nálevky a pak do ličky.

2) Caster consists of a casting mould that is cooled by water. – Lička se skládá z lící formy která je chlazena vodou.

3) Because the tundish has a considerable buffer capacity, it is easy to exchange the empty ladle for a full one without interrupting casting into the mould. That is why the process is called continuous casting. - Protože má nálevka dostatečnou vyrovnávací kapacitu, je jednoduché vyměnit prázdnou pánev za plnou, aniž bychom přerušili lití do lící formy. Proto process nazýváme kontilití.

4) From casting, we obtain slabs. – Litím získáme bramy.