TE_3. Unit 2.2. Processes. Rolling process. Extrusion. Surname Name Group

Task 1. Fill in the gaps with the appropriate verb from the box and put it in the correct form.

PASS / SUBJECT / HEAT / APPLY / COMPLETE / OBTAIN / REDUCE / REACH / PROCEED

How does the metal rolling process work?

The first step is the preparation of the material. The metal, generally in the form of ingots, is 1)_____ in order to make it malleable and facilitate processing. At this point, a first rolling takes place, called primary rolling, during which the preheated metal 2) _____ through rolling rollers which 3) _____ pressure in order to roughly 4) _____ its thickness.

Subsequently, we 5) _____ with a second rolling where the previously rolled metal is passed through another series of rolling rollers so as to further reduce the thickness until the desired dimensions are 6) _____.

Once the metal rolling phases have been 7) _____, the material is cooled and 8) _____ to surface treatments, cutting and any other finishings to 9)_____ the final product.

Task 2. Read the text and take the test below.

Major parameters in the three stages of mill processing are as follows.

- Reheating – The input material usually billet is heated in the reheating furnace to the rolling temperature. The important parameters are heating rate, time of heating, and temperature of reheating.
- Rolling – The important parameters for rolling in the roughing, intermediate, and finishing group of stands in the rolling mill are temperature, percentage of reduction in area, inter-pass time and strain rate.
- Cooling – The major parameters after finish rolling during cooling of the rolled product are start temperature, cooling rate and the final temperature.

1. What is the purpose of reheating in the material processing stages?
   A) To cool down the billet
   B) To shape the billet
   C) To clean the billet
   D) To heat the billet to the rolling temperature
2. Which of the following is NOT an important parameter during the reheating stage?
   A) Heating rate
   B) Percentage of reduction in area
   C) Time of heating

D) Temperature of reheating

3. What are the crucial parameters during the rolling stage?
   A) Temperature and inter-pass time
   B) Cooling rate and start temperature
   C) Time of heating and strain rate
   D) Heating rate and percentage of reduction in area
4. In which stage does the reduction in area occur?
   A) Reheating
   B) Cooling
   C) Rolling
   D) Intermediate stage
5. What is the purpose of cooling in the material processing stages?
   A) To cool down the product after finish rolling
   B) To heat the product to the rolling temperature
   C) To shape the product
   D) To increase the temperature of the product
6. Which parameter is not crucial during the cooling stage?
   A) Start temperature
   B) Cooling rate
   C) Final temperature
   D) Percentage of reduction in area
7. What is the purpose of the roughing, intermediate, and finishing group of stands in the rolling mill?
   A) To shape the billet
   B) To control the temperature of the billet
   C) To perform different levels of rolling to achieve desired dimensions
   D) To cool down the billet after rolling

Task 3. Complete these sentences, using the active or passive forms of the verbs in brackets.

1. Reheating _____(occur) in the reheating furnace, where the billet is heated to the rolling temperature.
2. Rolling _____ (execute) to shape the material in the rolling mill stands.
3. Rolling _____(carry out) to reduce the thickness of the material in the stands.
4. Rolling mills _____(shape) the material to achieve the desired dimensions.
5. The billet _____(heat) in the reheating furnace for the rolling process.

6. Reheating _____(perform) to raise the temperature of the billet in the furnace.
7. Cooling _____(facilitate) the solidification of the rolled product, ensuring structural integrity.
8. Cooling _____(follow) finish rolling, adjusting start temperature, cooling rate, and final temperature.
9. Cooling _____(employ) to facilitate the solidification of the rolled product.

Task 4. Put the stages in the correct order to tell about the process of extrusion. Fill in the gaps with the most appropriate word from the box.

causes / feeding / undergo / emerges / molten / heated / forced / cut / conveyed /

_____ As the extruded plastic 1) _____ from the die, it begins to cool and solidify. Cooling may be achieved through ambient air or by passing the extruded product through a water bath or cooling chamber.

_____ Inside the extruder, the plastic material is 2) _____ forward by a rotating screw while being 3)_____ to a molten state. The combination of heat and mechanical energy from the screw 4)_____ the plastic to melt and become homogeneous.

_____ After solidification, the extruded plastic is 5)_____ to the desired length or size using cutting blades or saws. The cut pieces may 6)_____ further processing or packaging before being sent for use or distribution.

_____ The process begins with 7)_____ raw plastic material, typically in the form of pellets, granules, or powder, into the hopper of the extruder.

_____ Once the plastic material is fully 8)_____ and homogenized, it is 9)_____ through a specially shaped die at the end of the extruder. The die imparts the desired shape and dimensions to the extruded plastic, such as a tube, profile, or sheet.

Task 5. Match the terms with their definitions.

1. Extruder	a) A container or funnel-shaped reservoir used to hold and feed raw plastic material into the extruder.
2. Die	b) The state of a material, such as plastic, when it has been heated to a temperature at which it becomes fluid and can be shaped or molded.
3. Cooling Chamber	c) A machine used to melt and shape plastic material into a continuous profile or shape by forcing it through a die.
4. Hopper	d) Tools or equipment used to cut the extruded plastic product to the desired length or size after solidification.
5. Molten State	e) A controlled environment or enclosure where the extruded plastic product is cooled and solidified after emerging from the die.
6. Cutting Blades	f) A specially shaped tool or aperture through which molten plastic material is forced to give it the desired shape and dimensions.
7. Conveyed Forward	g) The process of mixing and blending the molten plastic material to ensure uniformity and consistency in composition and properties.
8. Solidification	h) The process of moving the plastic material through the extruder in the direction of extrusion, typically facilitated by a rotating screw or auger
9. Homogenized	i) The process by which the molten plastic material cools and hardens, transforming from a liquid state to a solid state.