

Why does the steel industry need specialized lubrication?

Steel is the most popular building material in the world due to its unique combination of durability, workability, and cost. According to the World Steel Association (<https://www.worldsteel.org/about-steel.html>), more than 1.8 billion tons of steel were produced in 2018 alone.

The steelmaking process is extremely demanding and has some of the most extreme operating conditions. Due to these conditions, specialized lubrication plays a critical role in ensuring process flow, thus maintaining high productivity.

In this guide you will find what the critical lubrication points are in the stages of the steelmaking process, the operating conditions that make it vulnerable and the role of specialized lubrication.

Stages of the iron and steel process requiring specialized lubrication

The steelmaking process can be carried out through two routes: Steelworks (Blast Furnace) and Direct Reduction (Electric Arc Furnace). For both, the stages with the most critical conditions of the process are:

1. Pelletizing

Pelletization is the process by which the iron ore concentrate is agglomerated in the form of spheres or pellets, which are subjected to heating to acquire the properties of hardness, stability, and reduction for use in the smelting stage.

In this stage the mechanical components are exposed to high temperatures, high loads, and contaminants such as humidity and minerals from the process.

What are the critical points in the Pelletizing stage?

A failure in the pelletizing affects the rest of the process. Critical equipment where operating conditions make a specialized lubricant necessary are screens, ball mills, and pelletizing discs.

2. Foundry

In this stage the materials are smelted. This is where the two manufacturing routes differ. The steel mill route carries out the process using Blast Furnaces and the Direct Reduction route is carried out in an electric arc furnace.



3. Continuous casting

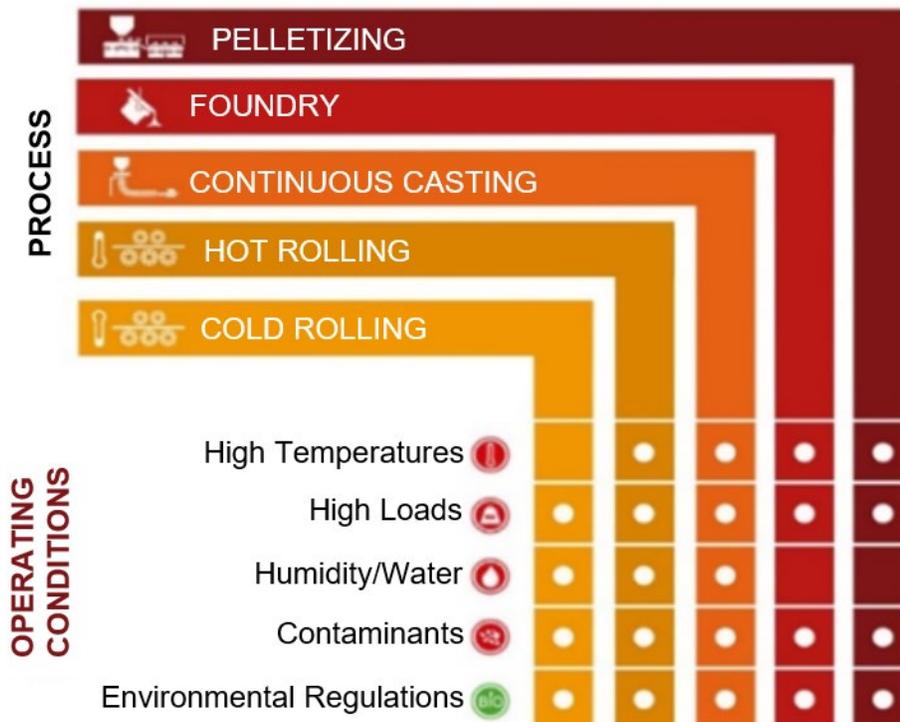
In this procedure, the liquid steel is passed through continuous casting machines where it is transformed into a solid steel bar called billet.

4. Lamination

In the rolling stage, the billet is passed between two rollers that rotate at the same speed and in opposite directions, thus reducing its cross section due to the pressure exerted. It is divided into hot rolling and cold rolling.

How do operating conditions affect the steelmaking process?

The operating conditions of the different stages of the steel manufacturing process are highly demanding. This creates unique requirements for lubrication in critical equipment to ensure continuous operation.



High temperatures

High temperatures can directly affect the performance of the lubricant if it does not have the required properties. They can cause the lubricant to char, run off or evaporate. This generates problems such as accelerated wear of machinery components and stoppages in production, which generates loss of productivity. High temperature conditions are present in the pelletizing, steelworks, continuous casting, and hot rolling stages.

High loads

When there are high loads and the lubricant used in the equipment does not have the correct viscosity and load bearing properties, contact is generated between the surfaces of the mechanical elements. This accelerates wear and tear and can lead to unwanted stoppages in production and high consumption of spare parts. High loads are present in all stages of the process.

Humidity

The presence of water in the process equipment can cause the lubricant to wash off when it does not have the necessary resistance properties, this results in an inadequate amount of lubricant. This results in more wear and high lubricant consumption.

Another effect that can be generated is; when the lubricant does not have the required sealing properties allowing moisture to enter the mechanical element causing corrosion. This generates accelerated wear, production stoppages and high consumption of spare parts.

Humidity is found in all stages of the steelmaking process, but where it becomes critical is in continuous casting.

Contamination by dust and other abrasive elements

When dust or other materials enter the mechanical elements, they can have an abrasive effect and accelerate wear. Contamination is present in all stages.