METALLURGY USED IN EOR THERMAL PROCESSES (HIGH TEMPERATURE ALLOYS).

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The application of thermal processes for enhanced oil recovery requires the use of special materials or alloys resistant to high temperatures to provide greater mechanical integrity to the components that make up the oil extraction system.

These types of alloys have a very important characteristic: they work effectively at temperatures equal or higher than 600 °F. High temperature resistant alloys, which typically consist of a metal and another element, are known for their incredible durability and ability to perform perfectly in harsh environmental conditions, and can be used for any type of well completion that requires high-grade materials, great durability and resistance.

Steel alloys for high temperature environments:

Iron, nickel and cobalt are the base metals for alloys capable of operating at very high temperatures. In addition to these metals, alloys contain other elements, such as aluminum, zirconium, manganese, or carbon. Other metals that are very effective at high temperatures are rhenium and niobium.

It is very important to select alloys resistant to high temperatures, especially in the case of the metallurgy of the tubing injection string, downhole special packer, connection nipples, liner hangers, among others. In these cases, steels with nickel and cobalt alloys are used, previously prestressed and heat treated to provide a high degree of resistance and increase the limit due to plastic deformation (Grades N80Q and L80). The manufacture of these alloys is carried out through the use of advanced technologies, such as ultrasonic and electrochemical machining.

In the case of the metallurgy used for the cables and housings of downhole sensors for Pressure and Temperature measurement, the Inconel 601, Hastelloy X and IN-100 stand out. All this metallurgy contains nickel in its composition with different degrees of concentration for different types of high temperature environments.

As a leading supplier of surface and downhole equipment for thermal recovery processes, **Nakasawa** uses special alloys resistant to high temperatures, in order to offer the best customized solution for each type of well and thus increase the efficiency and profitability of thermal projects.