Top Piping Interview Questions on Materials and Fittings

Introduction to Piping Engineering Fundamentals

Preparing for technical interviews in the oil and gas sector requires a strong grasp of piping engineering fundamentals. Whether you are discussing plant maintenance, flange management, or system design, clearly communicating these core concepts is essential.

This guide covers the most common piping interview questions. It breaks down industrial piping materials, pipe fittings classification, and essential routing practices in simple, professional English to help you build confidence and demonstrate your expertise.

Pipe Fittings Classification and Types

Understanding the types of pipe fittings and their proper applications is a basic requirement for any piping professional. Fittings dictate how fluid moves and how pressure drops are managed across the system.

How are pipe fittings classified based on end connections?

Pipe fittings are classified into several specific connection types:

- Socket weld fittings.
- Screwed end fittings.
- Beveled end or Butt weld fittings.
- Spigot socket fittings.
- Buttress end fittings.

What is the basis for using short radius and long radius elbows?

- Long radius elbows have a radius of 1.5D (where D is pipe diameter) and are used to achieve a low pressure drop.
- Short radius elbows have a radius of 1D and are used where a high pressure drop is acceptable or space is limited.
- Very long radius elbows are reserved for specialized applications like catalyst flows.

Where do we use concentric and eccentric reducers?

- **Eccentric Reducers:** These are used at pump suctions and should be installed with the flat side up (FSU). This orientation prevents air pockets from forming, which could lead to pump cavitation. They are also used to maintain the bottom of pipe (BOP) elevation in pipe racks.
- **Concentric Reducers:** These are typically installed at pump discharges and on vertical lines.

What are Weldolets and Sockolets?

- Both are self-reinforced branch fittings.
- Weldolets are used for making butt weld branch connections in critical services.
- Sockolets are utilized for socket weld connections that require a reinforcing pad.

Industrial Piping Materials

Selecting the right material ensures safety and longevity in industrial plants. The choice between carbon steel vs. alloy steel piping, or the use of specific stainless grades, depends heavily on operating temperature and fluid properties.

How does temperature affect material selection?

- Carbon steel materials are safe to use for temperatures up to 425°C.
- For operating temperatures above 426°C, alloy steel materials must be used.
- Superheated high-pressure steam lines require specific Chromium-Molybdenum grades, such as A335 Gr. P1 or P11.

Which materials are used for specific fluids?

- Stainless steel piping applications are primarily required for handling corrosive fluids.
- Galvanized steel materials are used for low-pressure utilities like drinking water and instrument air.
- For standard piping, ASTM A53 is commonly used for utility services.
- ASTM A106 Gr.B is specified for high-pressure and high-temperature services.

The Pipe vs. Tube Difference

One of the most common oil and gas piping basics tested in interviews is the technical distinction between a pipe and a tube.

- A pipe is identified by its Nominal Bore (NB), and its wall thickness is defined by a Schedule.
- A tube is identified by its Outside Diameter (OD), and its wall thickness is measured using the Birmingham Wire Gauge (BWG).
- For pipe sizes of 14 inches and above, the Nominal Bore is exactly equal to the Outside Diameter.
- Regarding manufacturing methods, ERW (Electric Resistance Welded) and seamless pipes have no functional difference based on their longitudinal or spiral seams. However, seamless pipes are generally used for sizes below 18 inches in higher temperature and pressure applications, while ERW is common for sizes above 18 inches.

Essential Routing and Construction Practices

Beyond materials and fittings, engineers must know how to route lines safely and prepare them for testing and maintenance.

How do you determine branch connection orientations?

- For gas, air, steam, or cryogenic services, branch connections must be taken from the top side of the header.
- Taking a cryogenic branch from the bottom side is dangerous because there is a risk of ice formation blocking the branch.
- For liquid services, branch connections are taken from the bottom side.

Why are High Point Vents (HPV) and Low Point Drains (LPD) necessary?

- High Point Vents (HPV) are required to remove trapped air from the system during hydrotesting.
- Low Point Drains (LPD) are used to completely drain the water out of the lines after hydrotesting is complete.

What are the rules for welding and flow measurement?

- The minimum distance maintained between two pipe welds should be 1D (or 1.5 inches). Preferably, it should be 4 times the wall thickness or a minimum of 25 mm.
- For accurate flow measurement using an orifice flow meter, the piping must have a straight length of 15D upstream and 5D downstream.

What is Jacketed Piping?

- Jacketed piping is a system used to maintain uniform heating for fluids that require precise temperature control, such as molten sulphur or polymers. It is utilized when standard steam tracing is insufficient.