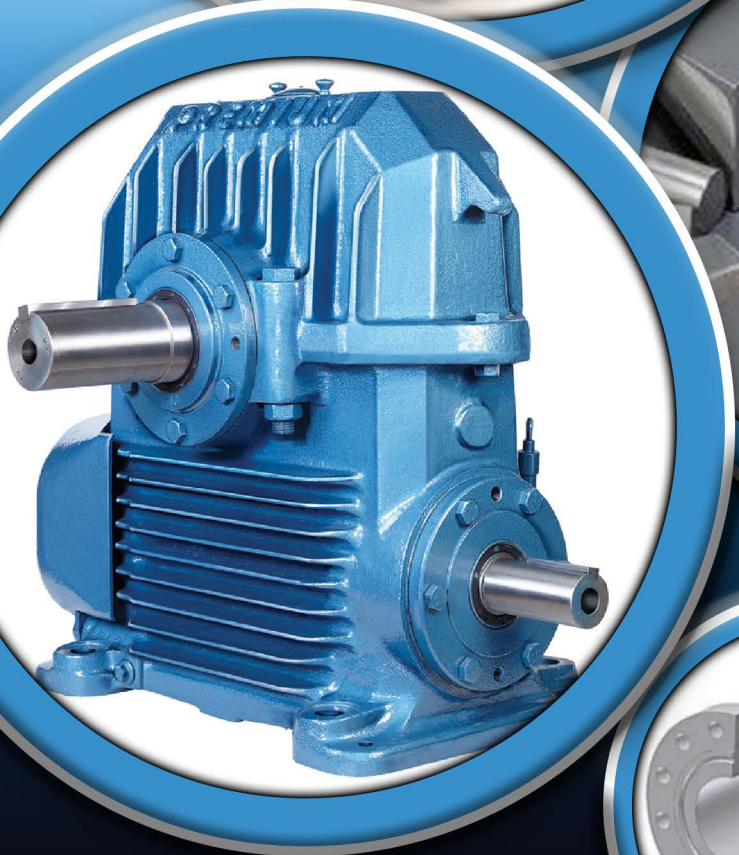
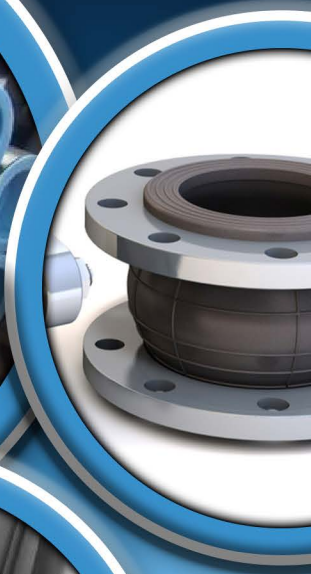
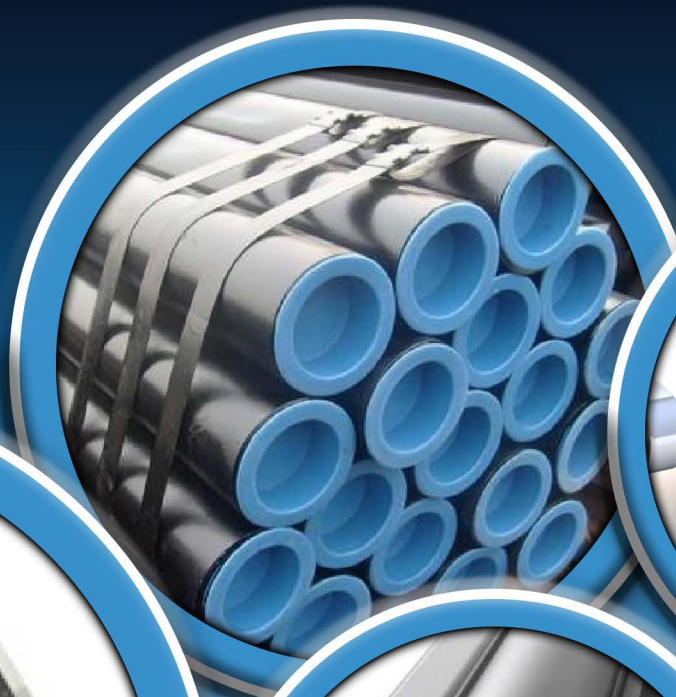
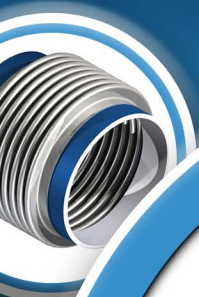
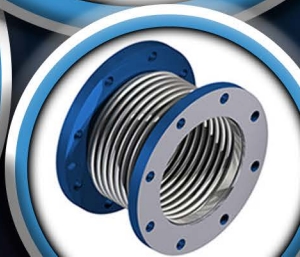
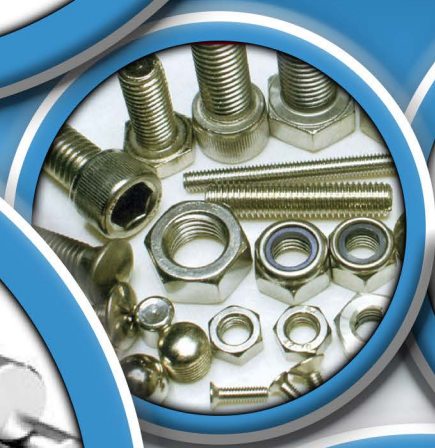
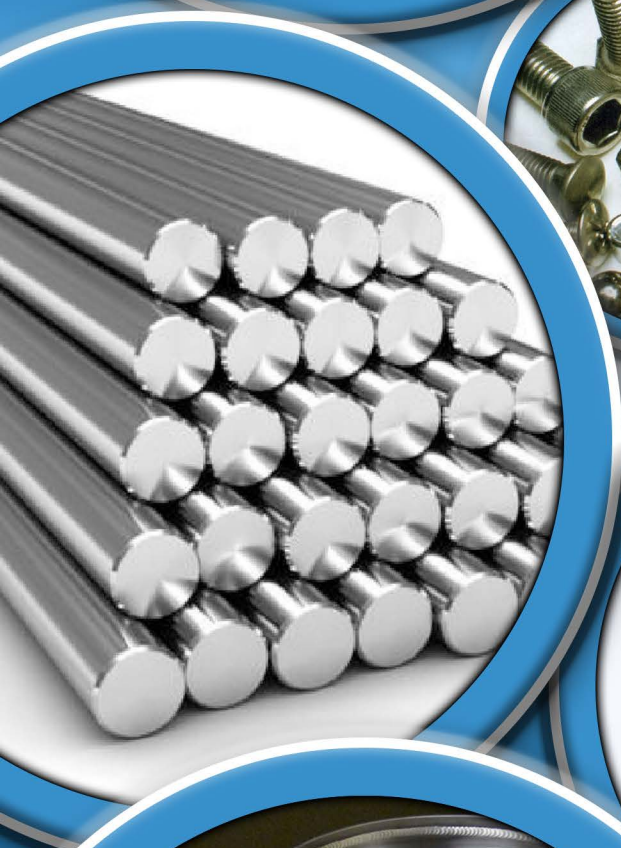
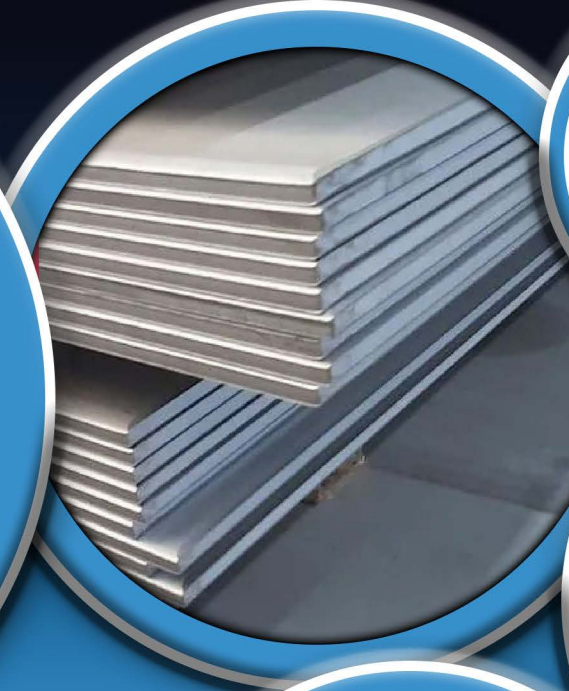




# AS ENGINEERING & FABRICATORS PVT. LTD.

Rendering dual legacy  
Quality product &  
Timely delivery





# Table of Contents

## BEARINGS

Roller Bearings -----	1
SKF Bearings -----	2
FAG Bearings -----	3
TIMKEN Bearings -----	4
NTN Bearings -----	5

## EXPANSION JOINTS

Metal Expansion Joints -----	6
Axial Expansion Joints -----	7
Universal Expansion Joints -----	8
Hinged Expansion Joints -----	9
Rectangular Expansion Joints -----	10
Pressure Balanced Expansion Joints -----	11
Gimbal Expansion Joints -----	12
Slip Type Expansion Joints -----	13
Rubber Expansion Joints -----	14
Fabric Expansion Joints -----	15

## ORIFICES

Restriction Orifice Plate -----	16
Single Stage Restriction Orifice -----	17
Multi Stage Restriction Orifice -----	18
Eccentric Restriction Orifice -----	19
Segmental Restriction Orifice -----	20
Quadrant Edge Restriction Orifice -----	21
Square Edge Restriction Orifice -----	22

## PUMPS

Axial Flow Pump -----	23
Centrifugal Pump -----	24
Diaphragm Pump -----	25
Rotary Gear Pump -----	26
Rotary Lobe Pump -----	27

## VALVES

Ball Valve -----	28
Butterfly Valve -----	29
Gate Valve -----	30
Globe Valve -----	31
Needle Valve -----	32

## FLANGES

Blind Flange -----	33
Lapped Joint Flange -----	34
Slip-on Flange -----	35
Socket Weld Flange -----	36
Threaded Flange -----	37
Weld Neck Flange -----	38

# Table of Contents

## BARS

Flat Bar -----	39
Hexagonal Bar -----	40
Round Bar -----	41
Square Bar -----	42

## PIPES

Carbon Steel Pipe -----	43
Duplex Stainless Steel Pipe -----	44
Hastelloy Pipe -----	45
Mild Steel Pipe -----	46
Stainless Steel Pipe -----	47

## PLATES

Duplex-2205 Plate -----	48
Inconel Plate -----	49
Monel-400 Plate -----	50
Stainless Steel Plate -----	51

# ABOUT US

We are trading and supplying a wide range of various Industrial Products. We have invested our time and capital to offer a variety of products to help our clients with all their demanding needs for different industries like Power Plant, Cement Plant, Power and Gas Industries, Food Processing Industries, Chemical Industries, Foods and Beverages, Pharmaceuticals, Pulp and Paper Industries & Textile Industries.





## Roller Bearings

Roller bearings are a type of rolling-element bearing that uses cylindrical, tapered, spherical, or needle-shaped rolling elements to reduce friction, support loads, and facilitate smooth rotational or linear motion.

### **Key Features of Roller Bearings:**

1. **Line Contact Design:**
  - Roller bearings offer a greater load-bearing capacity due to the larger contact area between the rolling elements and raceways, compared to ball bearings.
2. **High Load Capacity:**
  - Suitable for applications requiring support for heavy radial loads, and some types can handle axial or combined loads.
3. **Versatility:**
  - Available in various designs to cater to different load types, speeds, misalignment tolerances, and operational environments.
4. **Durability and Reliability:**
  - Designed to withstand harsh conditions, including high temperatures, contamination, and shock loads.
5. **Precision Engineering:**
  - Manufactured to tight tolerances for high-speed, low-friction operation and minimal vibration.
6. **Low Friction:**
  - Designed to reduce energy loss, improving system efficiency and operational lifespan.

### **ASENFAB supplies following types of Roller Bearings:**

Roller bearings are classified based on their rolling element shape and load-carrying capabilities:

1. **Cylindrical Roller Bearings:**
  - Design: Cylindrical rollers provide line contact with raceways.
  - Features: High radial load capacity, low friction, and suitability for high-speed applications.
  - Applications: Gearboxes, electric motors, turbines, and pumps.
2. **Tapered Roller Bearings:**
  - Design: Tapered rollers and raceways are angled to accommodate combined radial and axial loads.
  - Features: Ideal for handling heavy loads and axial thrust in one direction.
  - Applications: Automotive wheel hubs, gear reducers, and construction equipment.
3. **Spherical Roller Bearings:**
  - Design: Spherical rollers with self-aligning raceways to tolerate misalignment.
  - Features: High radial and moderate axial load capacity, ideal for applications with shaft deflection or misalignment.
  - Applications: Mining equipment, heavy machinery, and wind turbines.
4. **Needle Roller Bearings:**
  - Design: Cylindrical rollers with a small diameter and high length-to-diameter ratio.
  - Features: Compact design, high load capacity, and efficient space utilization.
  - Applications: Automotive transmissions, hydraulic pumps, and small industrial equipment.
5. **Thrust Roller Bearings:**
  - Design: Rollers oriented perpendicular to the bearing axis to support axial loads.
  - Features: Suitable for high axial loads but limited radial load capacity.
  - Applications: Rotary tables, cranes, and vertical shafts.



## SKF Bearings

**SKF (Svenska Kullagerfabriken)**, founded in 1907 in **Sweden**, is one of the world's leading manufacturers of bearings, seals, lubrication systems, and related components. SKF bearings are renowned for their precision, durability, and ability to perform under extreme conditions, making them integral to various industries, including automotive, aerospace, industrial machinery, and renewable energy.

SKF manufactures a wide range of bearing types to meet various application requirements:

### **1. Ball Bearings:**

- a) Deep Groove Ball Bearings:
  - Most common type, suitable for radial and axial loads.
  - Used in electric motors, pumps, and fans.
- b) Angular Contact Ball Bearings:
  - Designed for combined radial and axial loads.
  - Common in high-speed applications like turbines and machine tools.
- c) Self-Aligning Ball Bearings:
  - Accommodates misalignment in shafts and housings.
  - Ideal for long shafts or flexible systems.

### **2. Roller Bearings:**

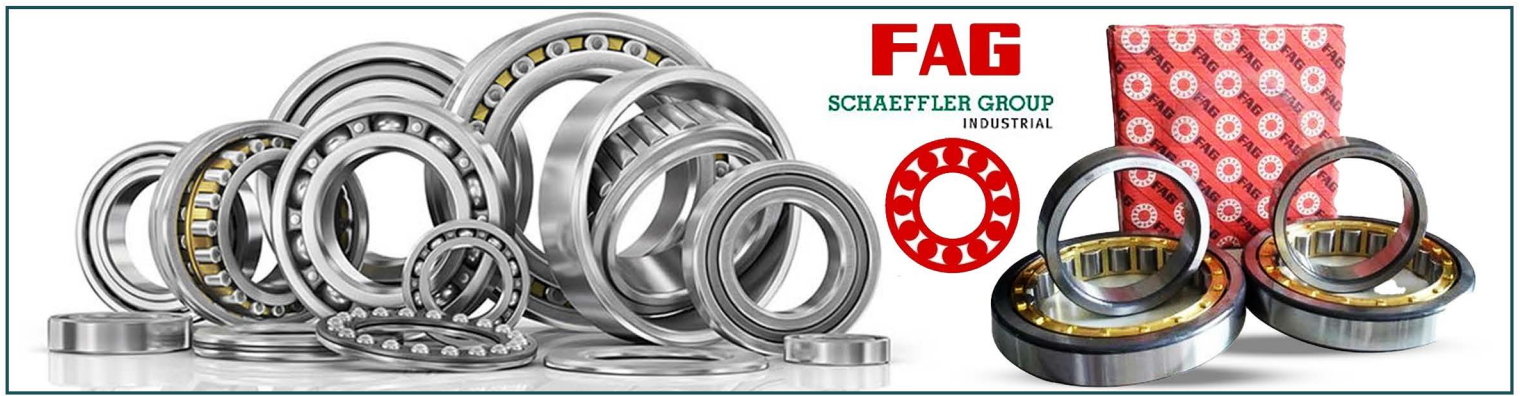
- a) Cylindrical Roller Bearings:
  - High radial load capacity and suitable for high speeds.
  - Used in gearboxes, compressors, and railway vehicles.
- b) Tapered Roller Bearings:
  - Handle combined radial and axial loads, especially in one direction.
  - Common in automotive wheel hubs and heavy machinery.
- c) Spherical Roller Bearings:
  - Designed for heavy radial loads and moderate axial loads.
  - Used in mining, construction, and material handling equipment.
- d) Needle Roller Bearings:
  - Compact design with high load-carrying capacity.
  - Often used in transmissions and automotive applications.

### **3. Thrust Bearings:**

- Handle high axial loads and are often used in vertical shafts and rotary tables.
- Types include thrust ball bearings and thrust roller bearings.

**ASENFAB supplies following type of SKF Bearings in the range of Bore Diameter from 100 mm to 1000 mm.**

- Ball Bearings
- Cylindrical Roller Bearings
- Tapered Roller Bearings
- Spherical Roller Bearings
- Needle Roller Bearings



## FAG Bearings

**FAG (Fischer's Automatische Gussstahlkugelfabrik)** is a renowned bearing brand founded in 1883 by **Friedrich Fischer**, who is credited with inventing the ball grinding machine that allowed for the production of perfectly round steel balls. Now part of the Schaeffler Group, FAG is a leading manufacturer of high-quality rolling bearings, plain bearings, and linear motion products. Known for their precision and reliability, FAG bearings are used in a wide range of applications, from automotive and aerospace to heavy industry and wind energy.

FAG produces a wide variety of bearings to meet diverse application needs:

### **1. Ball Bearings:**

- a) Deep Groove Ball Bearings:
  - Handle radial and axial loads.
  - Widely used in motors, pumps, and industrial machines.
- b) Angular Contact Ball Bearings:
  - Designed for combined axial and radial loads, especially in high-speed applications.
  - Common in machine tools and turbines.
- c) Self-Aligning Ball Bearings:
  - Accommodates misalignment in shafts.
  - Ideal for applications with long shafts or fluctuating loads.

### **2. Roller Bearings:**

- a) Cylindrical Roller Bearings:
  - High radial load capacity with low friction, suitable for high-speed systems.
  - Used in gearboxes and electric motors.
- b) Spherical Roller Bearings:
  - Designed to handle heavy radial loads and misalignment.
  - Frequently used in mining, construction, and wind turbines.
- c) Tapered Roller Bearings:
  - Withstand combined axial and radial loads.
  - Common in automotive wheel hubs and industrial equipment.
- d) Needle Roller Bearings:
  - Compact, with high load-carrying capacity.
  - Used in automotive transmissions and small gearboxes.

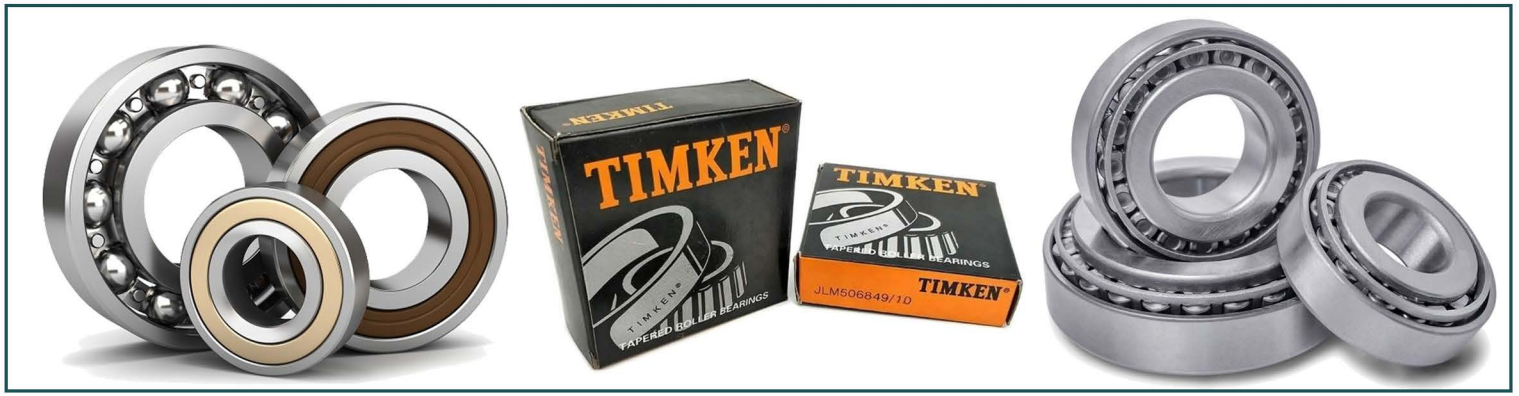
### **3. Thrust Bearings:**

- Handle axial loads in vertical shafts or rotary applications.
- Types include thrust ball bearings and thrust roller bearings.

**ASENFAB supplies following type of FAG Bearings in the range of Bore Diameter from 100 mm to 1000 mm.**

- Ball Bearings
- Cylindrical Roller Bearings
- Tapered Roller Bearings
- Spherical Roller Bearings
- Needle Roller Bearings





## TIMKEN Bearings

Founded in 1899, The **Timken Company** is a globally renowned leader in the design and manufacturing of bearings, power transmission products, and related services. Timken is synonymous with innovation, reliability, and durability, offering solutions for demanding industrial applications. Known for its tapered roller bearings, Timken has expanded its portfolio to include a wide variety of bearing types that cater to diverse industries, including automotive, aerospace, energy, and heavy machinery.

Timken manufactures a broad range of bearings to meet different application requirements:

### **1. Tapered Roller Bearings (Signature Product):**

- Designed to handle high radial and axial loads.
- The tapered design allows the bearing to support loads in both directions while ensuring smooth motion.
- Commonly used in gearboxes, wheel hubs, and industrial machinery.

### **2. Spherical Roller Bearings:**

- Accommodate heavy radial and moderate axial loads.
- Self-aligning, capable of handling misalignment and shaft deflection.
- Ideal for mining, construction, and wind energy applications.

### **3. Cylindrical Roller Bearings:**

- Feature high radial load capacity with low friction, suitable for high-speed applications.
- Widely used in gearboxes, electric motors, and pumps.

### **4. Needle Roller Bearings:**

- Compact design with high load-carrying capacity and low cross-section.
- Frequently used in automotive transmissions and small industrial equipment.

### **5. Ball Bearings:**

- Deep Groove Ball Bearings:
  - Handle radial and axial loads with low noise and vibration.
  - Common in electric motors and conveyors.
- Angular Contact Ball Bearings:

### **6. Thrust Bearings:**

- Specialized for axial loads, suitable for rotary tables and vertical shafts.
- Includes thrust ball bearings and thrust roller bearings.

**ASENFAB supplies following type of TIMKEN Bearings in the range of Bore Diameter from 100 mm to 1000 mm.**

- Ball Bearings
- Cylindrical Roller Bearings
- Tapered Roller Bearings
- Spherical Roller Bearings
- Needle Roller Bearings



## NTN Bearings

**NTN Corporation**, founded in 1918 and headquartered in **Osaka, Japan**, is one of the world's leading manufacturers of bearings, constant velocity joints, and precision equipment. Renowned for its innovation, NTN produces high-quality bearings that serve a broad range of industries, including automotive, aerospace, industrial machinery, and renewable energy. With a focus on advanced technology, durability, and efficiency, NTN bearings are recognized for their performance and reliability.

NTN offers a comprehensive range of bearings, each designed for specific performance requirements:

### **1. Ball Bearings:**

- a) Deep Groove Ball Bearings:
  - Handle radial and axial loads with low noise and high rotational speed.
  - Commonly used in electric motors, pumps, and gearboxes.
- b) Angular Contact Ball Bearings:
  - Designed for combined axial and radial loads, especially in high-speed applications like machine tools.
- c) Self-Aligning Ball Bearings:
  - Accommodate misalignment and are ideal for shafts prone to bending or deflection.
- d) Thrust Ball Bearings:
  - Handle axial loads in low-speed applications, such as rotary tables and cranes.

### **2. Roller Bearings:**

- a) Cylindrical Roller Bearings:
  - High radial load capacity with low friction, suitable for high-speed applications.
  - Common in gearboxes and electric motors.
- b) Tapered Roller Bearings:
  - Designed to handle combined axial and radial loads.
  - Widely used in automotive wheel hubs and industrial machinery.
- c) Spherical Roller Bearings:
  - Capable of handling heavy radial loads and misalignment.
  - Ideal for mining, construction, and heavy industrial applications.
- d) Needle Roller Bearings:
  - Compact with high load-carrying capacity, suitable for automotive transmissions and compact machinery.

### **3. Thrust Bearings:**

- Specialized for axial loads, suitable for rotary tables and vertical shafts.
- Includes thrust ball bearings and thrust roller bearings.

**ASENFAB supplies following type of NTN Bearings in the range of Bore Diameter from 100 mm to 1000 mm.**

- Ball Bearings
- Cylindrical Roller Bearings
- Tapered Roller Bearings
- Spherical Roller Bearings
- Needle Roller Bearings



## Metal Expansion Joints

### **Definition:**

Metal Expansion Joints (also known as compensators) are flexible, metallic devices designed to absorb and compensate for dimensional changes in piping systems, ducting, or equipment. These changes may result from thermal expansion, mechanical movements, pressure variations, or vibration. They are critical components in industries where thermal and mechanical stress are common, such as power generation, oil and gas, chemical processing, and HVAC systems.

### ASENFAB supplies following type of Metal Expansion Joints:

1. Axial Expansion Joint
2. Universal Expansion Joint
3. Hinged Expansion Joint
4. Rectangular Expansion Joint
5. Square Expansion Joint
6. Pressure Balanced Expansion Joint
7. Gimbal Expansion Joint
8. Slip type Expansion Joint

### Key Components of Metal Expansion Joints:

#### 1. Bellows:

- The core component, typically made of stainless steel or other high-grade alloys.
- Formed by rolling and hydroforming or mechanically shaping thin metal sheets into corrugated structures.
- Provides the flexibility required to absorb axial, lateral, and angular movements.

#### 2. End Fittings:

- Connect the expansion joint to the piping or equipment.
- Common types include flanges, threaded ends, or weld ends.

#### 3. Reinforcements:

- Components such as internal sleeves, external covers, or tie rods to enhance durability and protect the bellows from over-extension, external damage, or internal flow turbulence.

#### 4. Cover or Shroud:

- Protects the bellows from external environmental factors like dust, debris, and mechanical damage.

#### 5. Limit and Control Devices:

- Tie rods, hinges, or gimbals to control the movement of the joint and prevent overextension or misalignment.

### Functions and Applications:

#### 1. Thermal Expansion Compensation:

- Absorb dimensional changes due to temperature variations in hot or cold pipelines.

#### 2. Vibration Isolation:

- Minimize vibrations transmitted from pumps, compressors, and turbines.

## Axial Expansion Joints

### 1. Brief Description

- Axial Expansion Joints are mechanical devices designed to absorb axial movements (linear expansion and contraction) in piping systems.
- They consist of a flexible bellows element that compresses or extends in response to changes in temperature, pressure, or mechanical forces.
- Commonly used to manage thermal expansion and prevent damage to piping, equipment, and structures.

### 2. Main Features

- Absorbs axial movement in a single line of piping.
- Reduces thermal stresses and eliminates the need for expansion loops.
- Can operate under high pressure and temperature conditions.
- Compact design, making them space-saving and easy to install.
- Optional features like internal liners (to reduce turbulence and wear) or external covers (for protection).
- Designed for long service life with minimal maintenance.

### 3. Material of Construction

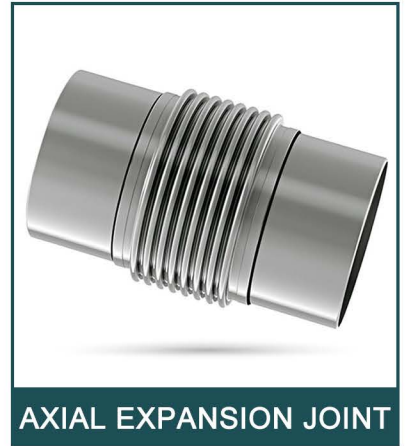
- Bellows: Stainless steel (grades like SS304, SS316, SS321) for flexibility and corrosion resistance.
- End Connections (Flanges/Weld Ends): Carbon steel, stainless steel, or alloy steel.
- Liners (if included): Stainless steel or other alloys to withstand high velocities and abrasive media.
- Covers (if included): Carbon steel or stainless steel for external protection.

### 4. Applications

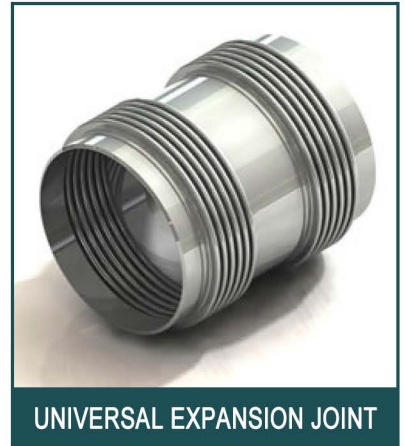
- Power generation (steam, hot water, and gas pipelines).
- Petrochemical and chemical plants (fluid transfer lines).
- Oil and gas industry (pipelines and refineries).
- HVAC systems for thermal movement control.
- Desalination plants and water treatment facilities.
- Pulp and paper industries.

### 5. Size Range of Axial Expansion Joints supplied by ASENFAB:

- Typically available in sizes ranging from **1 inch (25 mm) to 120 inches (3,000 mm) in diameter**.
- Custom sizes and configurations can be designed for specific project requirements.



## Universal Expansion Joints



### 1. Brief Description

- Universal Expansion Joints are designed to absorb axial, lateral, and angular movement in piping systems.
- They consist of two or more bellows connected by a center pipe or spacer, providing greater flexibility and movement accommodation compared to standard expansion joints.
- These joints are ideal for systems requiring multi-directional flexibility while managing pressure thrust and reducing thermal stress.

### 2. Main Features

- **Multi-directional Flexibility:** Accommodates axial, lateral, and angular movements, making them suitable for complex piping systems.
- **Pressure Thrust Compensation:** Pressure thrust is managed by internal tie rods or external restraining systems, preventing excessive force on anchors and supports.
- **Enhanced Flexibility:** The design allows greater flexibility and movement in comparison to simpler expansion joints.
- **Customizable:** Can be tailored to fit specific piping configurations and operational conditions.
- **Durable and Reliable:** Suitable for high-pressure, high-temperature environments.

### 3. Material of Construction

- **Bellows:** Typically made from stainless steel (SS304, SS316, SS321) for flexibility, corrosion resistance, and long service life.
- **Flanges, Tie Rods, and End Connectors:** Carbon steel, stainless steel, or alloy steel depending on the application requirements.
- **Optional Linings:** In some cases, internal linings of PTFE or other materials are used for abrasion resistance.
- **Tie Rods:** Carbon steel or stainless steel with coatings to prevent corrosion.

### 4. Applications

- **Power Plants:** Used in steam, gas, and water pipelines.
- **Chemical and Petrochemical Industries:** For processing plants that require flexibility in large, complex piping systems.
- **Oil and Gas Pipelines:** To absorb movement in long pipelines exposed to thermal and pressure-induced expansion.
- **HVAC Systems:** In large industrial and commercial buildings with significant movement in ductwork and piping.
- **Marine and Offshore:** For systems that require movement absorption in harsh environmental conditions.
- **Water Treatment Plants:** For managing movement in water distribution and treatment systems.

### 5. Size Range of Universal Expansion Joints supplied by ASENFAB:

- Typically available in sizes from **2 inches (50 mm) to 96 inches (2,400 mm) in diameter.**
- Custom sizes can be designed to meet specific project requirements, accommodating both standard and non-standard pipe sizes.

## Hinged Expansion Joints

### 1. Brief Description

- Hinged Expansion Joints are specialized mechanical devices designed to absorb angular movement in piping systems while restraining axial and lateral movement.
- They include a hinge mechanism that allows the joint to flex in one plane, providing controlled movement.
- These joints are typically used to protect piping systems from thermal expansion, vibration, and other stresses.

### 2. Main Features

- Designed to allow angular movement while preventing axial displacement.
- Equipped with hinge plates and pins for controlled flexibility and stability.
- Absorbs stresses caused by temperature changes, pressure, or system movement.
- Provides high reliability and durability under demanding conditions.
- Can accommodate large angular movements within a single plane.
- Often combined with other expansion joints in systems requiring multi-plane movement control.

### 3. Material of Construction

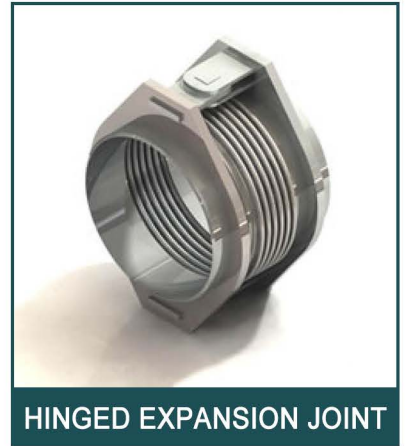
- Bellows: Stainless steel (SS304, SS316, or other grades based on application requirements).
- Hinges and Support Hardware: Carbon steel, alloy steel, or stainless steel, often with protective coatings.
- Flanges/Ends: Carbon steel, stainless steel, or other materials depending on the pipe material.
- Gaskets: Non-metallic materials like PTFE, graphite, or elastomers for sealing.

### 4. Applications

- Power plants (steam and gas piping systems).
- Petrochemical and chemical industries.
- Refineries and process plants.
- HVAC systems for thermal expansion control.
- Marine and shipbuilding for piping subjected to motion.
- Pulp and paper industries.

### 5. Size Range of Hinged Expansion Joints supplied by ASENFAB:

- Typically available in sizes ranging from **2 inches (50 mm) to 120 inches (3,000 mm) in diameter.**
- Custom sizes and designs are available based on specific project requirements.



## Rectangular Expansion Joints

### 1. Brief Description

- Rectangular Expansion Joints are designed to absorb thermal expansion, contraction, and vibrations in ducting systems and piping networks with non-circular cross-sections.
- These joints are specifically tailored for rectangular or square ductwork, commonly found in applications involving gases or air rather than liquids.
- They allow movement in one or more directions while maintaining the integrity of the system.

### 2. Main Features

- Designed for Rectangular Systems: Suitable for rectangular or square ducting and piping systems where standard circular joints are not applicable.
- Thermal and Mechanical Movement Absorption: Accommodates axial, lateral, and angular movements caused by temperature changes or system vibrations.
- Customizable Configurations: Can be designed to fit specific dimensions and movement requirements.
- Multi-Layer Construction: Can include multiple layers for enhanced durability and flexibility.
- Low Maintenance: Durable and designed for minimal servicing over long periods of operation.
- Optional Reinforcements: Reinforced with steel corners or stays to manage high-pressure or temperature environments.

### 3. Material of Construction

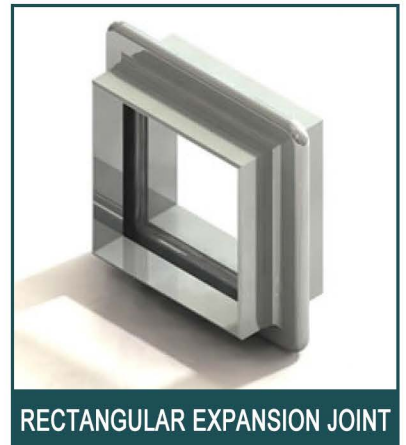
- Bellows/Body: Stainless steel (SS304, SS316) or carbon steel, depending on the operating environment.
- Reinforcements: High-strength steel or alloy reinforcements for additional support at corners and edges.
- Seals (Optional): Elastomeric or PTFE linings for systems requiring gas-tight operation or corrosion resistance.
- Frame/Flanges: Carbon steel, stainless steel, or other alloy metals, depending on application requirements.

### 4. Applications

- Air Handling Systems: Used in HVAC systems for thermal expansion and vibration absorption in large air ducts.
- Exhaust Systems: Ideal for flue gas or exhaust systems in power plants and industrial setups.
- Boiler Ducts: Used in ducts connecting boilers, chimneys, or heat recovery systems.
- Chemical and Petrochemical Plants: For handling gases in rectangular ducts exposed to high temperatures or corrosive environments.
- Steel and Cement Industries: Used in systems requiring movement accommodation in rectangular ducting, such as kiln exhaust or air preheaters.

### 5. Size Range of Rectangular Expansion Joints supplied by ASENFAB:

- Typically manufactured to fit specific duct dimensions, ranging from **small cross-sections (500 mm x 500 mm) to large duct systems (up to 5,000 mm x 10,000 mm) or larger.**
- Completely customizable based on project-specific requirements, including unique shapes or configurations.



## Pressure Balanced Expansion Joints

### 1. Brief Description

- Pressure Balanced Expansion Joints are designed to absorb axial, lateral, and sometimes angular movements while neutralizing pressure thrust to reduce stress on the piping system's anchors and supports.
- They use a combination of bellows and tie rods (or other balancing mechanisms) to counteract internal pressure forces, ensuring that only the movement forces are transmitted to the system.
- These joints are ideal for applications where space constraints or system limitations prevent the use of large external anchors.

### 2. Main Features

- **Pressure Thrust Neutralization:** Reduces the need for heavy anchors or supports by balancing internal pressure forces.
- **Multi-Directional Movement:** Accommodates axial, lateral, and/or angular movement, depending on the configuration.
- **Customized Designs:** Can be designed for in-line, elbow, or multi-plane systems.
- **High Reliability:** Minimizes stress on surrounding components, extending the life of the system.
- **Space-Saving:** Reduces the need for additional anchor points, making it ideal for systems with limited space.
- **Leak-Tight Construction:** Ensures safe operation in high-pressure environments.

### 3. Material of Construction

- **Bellows:** Stainless steel (SS304, SS316, SS321) for corrosion resistance and flexibility.
- **Balancing Bellows/Components:** Made of stainless steel or alloy steel, depending on the application's temperature and pressure requirements.
- **End Fittings:** Carbon steel, stainless steel, or alloy steel (flanged or welded connections).
- **Tie Rods and Hardware:** High-strength alloy or stainless steel with anti-corrosion coatings.
- **Internal Linings:** Optional PTFE or other materials for abrasion or chemical resistance.

### 4. Applications

- **Power Plants:** Steam, gas, and water piping systems requiring pressure thrust management.
- **Chemical and Petrochemical Industries:** For pipelines transporting fluids under high pressure and temperature.
- **Oil and Gas Pipelines:** Especially in areas with limited anchor points or high-pressure operations.
- **Marine and Offshore:** Used in confined spaces with significant axial or lateral movement.
- **Industrial Plants:** HVAC systems, exhaust systems, or fluid transport systems in factories and plants.

### 5. Size Range of Pressure Balanced Expansion Joints supplied by ASENFAB:

- Typically available in sizes from **3 inches (75 mm) to 72 inches (1,800 mm) in diameter.**
- Custom sizes and designs are available based on specific system requirements, including higher pressure or temperature ratings.





## Gimbal Expansion Joints

### 1. Brief Description

- Gimbal Expansion Joints are designed to absorb angular movement in any plane while eliminating the transfer of pressure thrust forces to the piping system.
- They feature a gimbal mechanism (a system of hinges and gimbal rings) that allows controlled angular flexibility while maintaining structural stability.
- Ideal for systems where multi-plane angular movement needs to be accommodated without axial or lateral movement.

### 2. Main Features

- Multi-Plane Angular Movement: Absorbs angular movement in all directions, making it suitable for complex piping systems.
- Pressure Thrust Isolation: Does not transfer pressure thrust to the system, reducing the need for heavy anchors.
- Stability and Control: The gimbal mechanism provides controlled and predictable movement.
- Durability: Designed for high-pressure and high-temperature environments.
- Versatile Installation: Can be used in combination with other types of expansion joints for more complex movement requirements.
- Low Maintenance: Built to last with minimal servicing.

### 3. Material of Construction

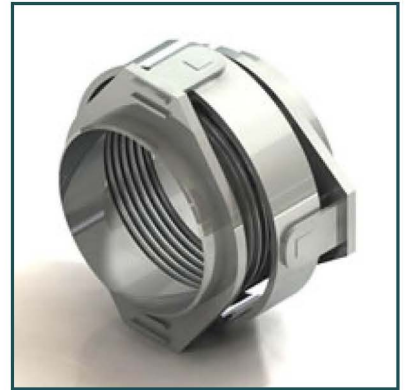
- Bellows: Stainless steel (SS304, SS316, SS321) for corrosion resistance and flexibility.
- Gimbal Rings and Hinges: Carbon steel, stainless steel, or alloy steel for strength and durability.
- End Connections: Flanged or welded, made from carbon steel, stainless steel, or alloy steel.
- Optional Internal Liners: PTFE or abrasion-resistant materials for specific media compatibility.
- Hardware and Tie Rods: High-strength steel with anti-corrosion coatings.

### 4. Applications

- Power Plants: Steam and exhaust systems requiring controlled angular movement.
- Chemical and Petrochemical Industries: For high-pressure pipelines with thermal and mechanical stresses.
- Oil and Gas Pipelines: To handle angular movement in offshore or onshore applications.
- Marine and Offshore: Used in systems subjected to wave motion and multi-plane movement.
- Industrial Systems: HVAC systems, ducting, and process equipment requiring controlled angular flexibility.

### 5. Size Range of Gimbal Expansion Joints supplied by ASENFAB:

- Typically available in sizes from **3 inches (75 mm) to 96 inches (2,400 mm) in diameter.**
- Custom sizes and configurations can be manufactured for specific application requirements.



**GIMBAL EXPANSION JOINT**

## Slip type Expansion Joints

### 1. Brief Description

- Slip Type Expansion Joints are designed to absorb axial movement in pipelines by utilizing a sliding mechanism.
- They feature a sleeve or pipe section that slides within another pipe, effectively compensating for thermal expansion and contraction.
- Ideal for systems where controlled axial movement is required while maintaining a sealed connection.

### 2. Main Features

- Axial Movement Absorption: Specifically designed to handle significant axial displacement in piping systems.
- Leak-Proof Design: Incorporates packing or seals to ensure a secure, leak-free connection during movement.
- Robust and Durable: Withstands high pressure and temperature fluctuations.
- Ease of Maintenance: The sliding parts and seals are accessible for inspection or replacement.
- Customizable: Can be tailored for specific movement, pressure, and environmental conditions.
- Minimal Anchor Requirements: Reduces the need for heavy anchoring in the pipeline.

### 3. Material of Construction

- Outer Sleeve and Sliding Pipe: Carbon steel, stainless steel (SS304, SS316), or alloy steel based on the operating environment.
- Sealing Material: Graphite, PTFE, or other elastomeric materials suitable for the fluid and temperature.
- End Connections: Flanged or welded, made from carbon steel, stainless steel, or alloy steel.
- Internal Linings (Optional): Abrasion-resistant materials for handling corrosive or abrasive media.

### 4. Applications

- Thermal Expansion Management: Used in pipelines where thermal growth or contraction occurs due to temperature changes.
- Power Plants: Steam and water pipelines with high-temperature variations.
- Oil and Gas Pipelines: For managing axial displacement in long-distance pipelines.
- Chemical Processing Plants: To handle temperature-induced movements in process lines.
- Water and Wastewater Treatment: For pipelines carrying treated water or waste under varying temperatures.

### 5. Size Range of Slip type Expansion Joints supplied by ASENFAB:

- Typically available in sizes **from 2 inches (50 mm) to 48 inches (1,200 mm) in diameter.**
- Custom sizes and configurations are available for larger or unique requirements.



SLIP TYPE EXPANSION JOINT



## Rubber Expansion Joints

### Definition:

Rubber expansion joints are flexible connectors made from natural or synthetic elastomers, often reinforced with fabric, metal, or wire. They are designed to absorb and compensate for movement, vibration, thermal expansion, and contraction in piping systems and equipment. Their versatility and durability make them vital components in industries such as water treatment, HVAC, chemical processing, and power generation.

### ASENFAB supplies following type of Rubber Expansion Joints:

- 1. Single Arch Expansion Joints:**
  - Designed with one arch for general applications.
- 2. Multiple Arch Expansion Joints:**
  - Feature two or more arches for greater movement absorption and flexibility.
- 3. Tapered Expansion Joints:**
  - Have a conical design to accommodate pipes of varying diameters.
- 4. Spherical Rubber Joints:**
  - Spherical design offers excellent flexibility and movement absorption.

All in the range of **Nominal Diameter (DN): 25 mm to 3600 mm. Pressure (PN): PN 6 to PN 25**

### Key Components of Rubber Expansion Joints:

- 1. Body (Bellows):**
  - Made from natural or synthetic rubber, providing flexibility and resilience.
- 2. Reinforcements:**
  - Layers of fabric (usually nylon, polyester, or aramid) or metal wire are embedded in the rubber to enhance strength and pressure resistance.
- 3. End Connections:**
  - Typically flanged or threaded ends made from steel, stainless steel, or other metals.
- 4. Arch Design:**
  - Single or multiple arch profiles in the body enhance flexibility and movement capacity.
- 5. Internal Liner (Optional):**
  - Protects the inner surface of the rubber body from abrasive or corrosive media.
  - Common materials include PTFE or a more chemically resistant rubber.
- 6. External Cover:**
  - Protects the joint from environmental factors such as UV radiation, ozone, and mechanical damage.
- 7. Control Units (Optional):**
  - Includes tie rods, limit rods, or control rings to restrict excessive movement and protect the joint from overextension or compression.

### Functions and Applications:

- 1. Movement Absorption:**
  - Compensate for axial, lateral, and angular movements caused by thermal expansion, contraction, or misalignment.
- 2. Vibration Damping:**
  - Isolate mechanical vibrations from pumps, compressors, and turbines to protect connected equipment.



## Fabric Expansion Joints

### Definition:

Fabric expansion joints are flexible connectors designed to accommodate movement, vibration, thermal expansion, and misalignment in ducting systems. They are constructed from layers of fabric, elastomers, and insulating materials, providing a lightweight and versatile solution for systems handling gases, air, or other low-pressure mediums. These joints are especially useful in applications with large movements, high temperatures, or corrosive environments, such as power plants, chemical processing, cement manufacturing, and HVAC systems.

### ASENFAB supplies following type of Fabric Expansion Joints:

#### 1. Flat Belt Expansion Joints:

- Simple design with a flat, flexible belt clamped between metal flanges.
- Suitable for low-pressure systems.

#### 2. Round Expansion Joints:

- Designed for circular duct systems, providing movement flexibility in all directions.

#### 3. Rectangular Expansion Joints:

- Used in rectangular ducts, often found in HVAC or industrial gas flow systems.

#### 4. Multi-Layered Expansion Joints:

- Feature several layers of fabric and insulation for high-temperature or aggressive chemical environments.

All in the range of **Nominal Diameter (DN):** Custom sizes, typically from **150 mm to 5000 mm** or larger  
**Pressure (PN):** PN 0.1 to PN 2

### Key Components of Fabric Expansion Joints:

#### 1. Flexible Element (Fabric Belt):

- The core of the expansion joint, composed of various layers to withstand the operating environment.
- Common materials include PTFE, silicone, fiberglass, or aramid fibers.
- Designed to absorb axial, lateral, angular, and torsional movements.

#### 2. Reinforcements:

- Reinforcement layers enhance the strength and durability of the flexible element.
- Materials include woven fabrics or metal wire inserts.

#### 3. Insulating Layers (Optional):

- High-temperature applications often include insulation made of materials like ceramic fibers or glass mats.
- Protects the fabric layers from excessive heat.

#### 4. External Cover:

- A protective outer layer shields the joint from mechanical damage, UV radiation, and environmental exposure.

#### 5. Frames or Flanges:

- Metal components (typically stainless steel, carbon steel, or aluminum) that connect the fabric expansion joint to the ductwork.

### Functions and Applications:

#### 1. Thermal Expansion Compensation:

- Absorbs dimensional changes due to temperature variations in ducts.

#### 2. Movement Absorption:

- Handles axial, lateral, angular, and torsional movements caused by mechanical or operational factors.

## Restriction Orifice Plates

### 1. Brief Description

Restriction Orifice Plates are flow control devices installed in pipelines to reduce fluid pressure, limit flow rate, or both. They operate by creating a restriction in the pipeline, causing a controlled pressure drop and adjusting the flow to the desired levels. These plates are designed with a specific bore size, calculated to achieve the required flow characteristics.

Restriction orifice plates are commonly used in various industries, such as oil and gas, chemical processing, power generation, and water treatment.



### 2. Main Features

- **Accurate Pressure Drop:** Precisely designed bores for controlled and predictable pressure reduction.
- **Versatile Designs:** Available in various configurations, including single-stage, multi-stage, eccentric, and segmental.
- **Durable Construction:** Built to withstand extreme pressures, temperatures, and corrosive environments.
- **Ease of Installation:** Compatible with standard piping flanges, ensuring easy integration into existing systems.
- **Customizable:** Tailored designs for specific flow rates, fluid properties, and pressure requirements.

### 3. Material of Construction

Restriction orifice plates are manufactured from a range of materials to suit different operating conditions, including:

- **Stainless Steel (304, 316, 316L):** Corrosion-resistant and suitable for most industrial applications.
- **Carbon Steel:** Cost-effective for non-corrosive environments.
- **Inconel:** Ideal for high-temperature and high-pressure applications.
- **Hastelloy:** Suitable for highly corrosive fluids in chemical industries.
- **Monel:** Used for applications involving seawater and other aggressive fluids.
- **Duplex and Super Duplex Steel:** High strength and excellent corrosion resistance for critical applications.
- **PTFE-Lined Plates:** For highly corrosive fluids requiring non-metallic surfaces.

### 4. Applications

- **Oil and Gas Industry:** Flow control and pressure reduction in pipelines transporting crude oil, natural gas, and refined products.
- **Chemical and Petrochemical Plants:** Regulating the flow of chemicals and preventing cavitation.
- **Power Generation:** Controlling steam flow and reducing noise and vibration in turbine systems.
- **Water Treatment Plants:** Managing flow rates in water distribution and filtration systems.
- **Cryogenic Systems:** Handling pressure reduction in pipelines carrying liquefied gases.
- **HVAC Systems:** Controlling flow rates in heating, ventilation, and air conditioning systems.

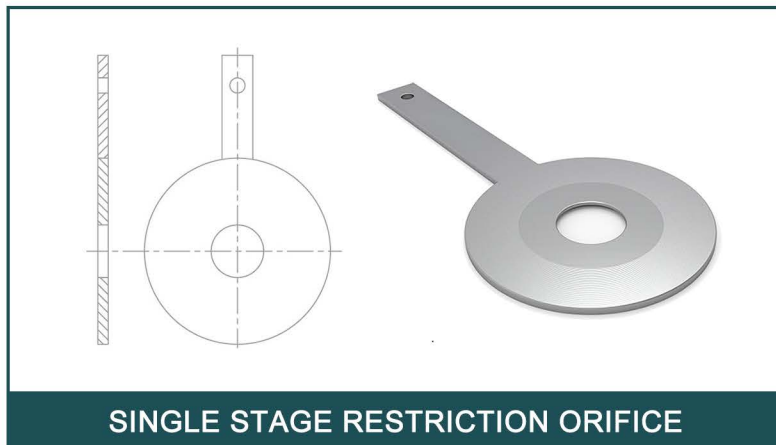
### 5. Size Range of Restriction Orifice Plates supplied by ASENFAB:

- **Nominal Diameter (DN):** Typically available from 10 mm to 4000 mm, depending on the application and pipeline size.
- **Thickness:** Varies based on operating pressure, fluid type, and plate material.
- **Bore Diameter:** Customizable to achieve the required flow rate and pressure drop.

## Single Stage Restriction Orifice

### 1. Brief Description

Single-stage restriction orifices are flow control devices designed to create a specific pressure drop or flow restriction in a single step. These devices consist of a single plate with a precisely sized bore, calculated to meet the desired pressure and flow requirements. They are widely used in systems requiring moderate pressure reduction or flow control. Their simple and effective design makes them a cost-efficient solution for many industrial applications.



### 2. Main Features

- Simple Design: A single orifice plate, easy to install and maintain.
- Accurate Pressure Drop: Engineered for precise pressure reduction and flow control.
- Versatility: Suitable for a variety of fluids, including liquids, gases, and steam.
- Durability: Designed to withstand high pressures and temperatures.
- Customizable: Bore size and plate thickness can be tailored to specific application requirements.

### 3. Material of Construction

Single-stage restriction orifices are constructed from materials suitable for the fluid type, pressure, temperature, and operating environment. Common materials include:

- Stainless Steel (304, 316, 316L): Ideal for corrosion resistance and general-purpose applications.
- Carbon Steel: Economical choice for non-corrosive environments.
- Inconel and Hastelloy: Suitable for high-temperature and corrosive conditions.
- Monel: Preferred for seawater and other aggressive fluids.
- Duplex and Super Duplex Steel: High strength and excellent resistance to stress corrosion cracking.
- PTFE or Other Non-Metallic Linings: Used for highly corrosive or reactive fluids.

### 4. Applications

- Oil and Gas Industry: Pressure reduction in crude oil and natural gas pipelines.
- Chemical Processing: Flow control and pressure management in chemical plants.
- Power Generation: Steam flow regulation in turbines and boiler systems.
- Water Treatment Plants: Pressure control in water distribution and filtration systems.
- Cryogenic Applications: Managing pressure in pipelines carrying liquefied gases.
- HVAC Systems: Flow restriction in heating, ventilation, and air conditioning networks.

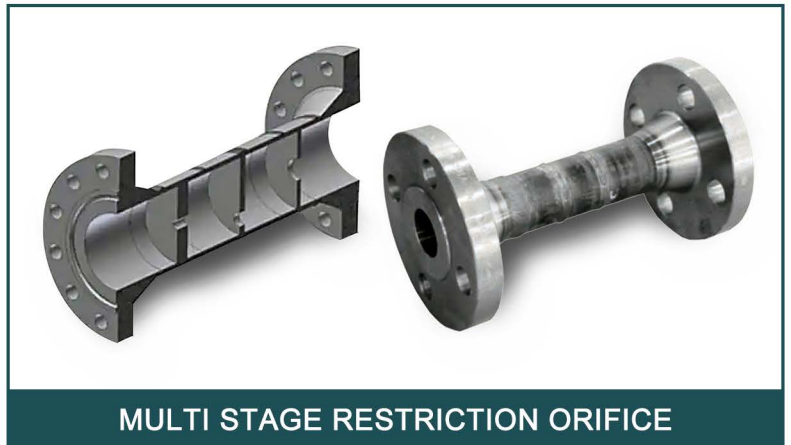
### 5. Size Range of Single Stage Restriction Orifice supplied by ASENFAB:

- **Nominal Diameter (DN):** Typically available from 10 mm to 4000 mm.
- **Plate Thickness:** Varies depending on operating pressure, fluid type, and plate material.
- **Bore Diameter:** Customized based on flow and pressure drop requirements.

## Multi Stage Restriction Orifice

### 1. Brief Description

Multi-stage restriction orifices consist of multiple orifice plates arranged in series to achieve a gradual pressure drop. This design minimizes the risk of cavitation, noise, and vibration by distributing the total pressure reduction across several stages. Multi-stage orifices are ideal for high-pressure systems and critical applications where controlled pressure reduction and flow management are essential.



### 2. Main Features

- Gradual Pressure Reduction: Multiple stages prevent sudden pressure drops, reducing the risk of cavitation and associated damage.
- Noise and Vibration Control: Effective in mitigating noise and vibration caused by high-velocity flows.
- Customizable Design: Number of stages and bore sizes can be tailored to specific application requirements.
- High Durability: Designed to handle extreme pressures and temperatures.
- Versatility: Suitable for liquids, gases, and steam.

### 3. Material of Construction

Multi-stage restriction orifices are constructed from robust materials to withstand demanding operating conditions. Common materials include:

- Stainless Steel (304, 316, 316L): Corrosion-resistant and suitable for a wide range of applications.
- Carbon Steel: Cost-effective option for non-corrosive environments.
- Inconel and Hastelloy: Preferred for high-temperature and corrosive fluid applications.
- Monel: Ideal for seawater and other aggressive fluids.
- Duplex and Super Duplex Steel: High strength and excellent resistance to corrosion and stress cracking.
- PTFE-Lined Plates: For applications involving highly corrosive or reactive fluids.

### 4. Applications

- Oil and Gas Industry: Pressure reduction in high-pressure pipelines transporting crude oil, natural gas, and refined products.
- Chemical Processing: Gradual pressure management for critical chemical flows.
- Power Generation: Steam pressure control in turbine and boiler systems.
- Cryogenic Systems: Pressure reduction in pipelines carrying liquefied gases.
- Water Treatment Plants: Noise and cavitation control in high-pressure water distribution systems.

### 5. Size Range of Multi Stage Restriction Orifice supplied by ASENFAB:

- **Nominal Diameter (DN):** Typically available from 10 mm to 4000 mm.
- **Plate Thickness:** Varies based on operating pressure, fluid type, and material.
- **Bore Diameter:** Custom-designed for the desired flow rate and pressure drop.

## Eccentric Restriction Orifice

### 1. Brief Description

Eccentric restriction orifices are specialized flow control devices designed with an off-center (eccentric) bore. This configuration allows solids, debris, or heavier particles in the fluid to pass through without causing blockages. These orifices are particularly suitable for pipelines handling dirty fluids, slurries, or fluids with suspended solids.

### 2. Main Features

- Off-Centre Bore: Prevents clogging by allowing debris or heavy particles to pass through.
- Improved Flow Continuity: Minimizes flow disturbances and reduces pressure losses.
- Customizable Design: Bore size and position can be tailored to specific flow and particle requirements.
- Durable Construction: Designed to withstand abrasive and corrosive conditions.
- Versatility: Suitable for both liquid and gas flows containing particulates.

### 3. Material of Construction

Eccentric restriction orifices are constructed from materials that provide durability and resistance to abrasive and corrosive environments. Common materials include:

- Stainless Steel (304, 316, 316L): Corrosion-resistant and widely used in various industries.
- Carbon Steel: Economical option for non-corrosive or mildly abrasive fluids.
- Inconel and Hastelloy: Ideal for high-temperature and highly corrosive applications.
- Monel: Suitable for seawater and aggressive fluid environments.
- Duplex and Super Duplex Steel: High strength and excellent corrosion resistance for critical applications.
- PTFE-Lined Plates: For highly reactive or corrosive fluids.

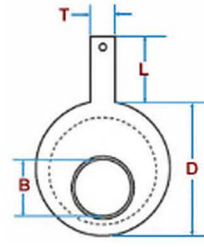
### 4. Applications

- Oil and Gas Industry: Handling crude oil with sand or other impurities.
- Chemical Processing: Managing slurries or fluids with suspended solids.
- Power Generation: Boiler blowdown and ash slurry systems.
- Water Treatment Plants: Controlling flow in sewage and wastewater pipelines.
- Mining Industry: Slurry pipelines transporting ores and minerals.
- Food and Beverage: Fluids with suspended organic particulates.

### 5. Size Range of Eccentric Restriction Orifice supplied by ASENFAB:

- **Nominal Diameter (DN):** Typically available from 10 mm to 4000 mm.
- **Plate Thickness:** Designed based on operating pressure, fluid type, and material.
- **Bore Diameter and Position:** Customizable to match flow requirements and particle sizes.

When bore is tangent to 98% of top line I.D., then entrained gases will pass the orifice. When at bottom, entrained solid will pass.



Dashed line = Pipe ID



**ECCENTRIC RESTRICTION ORIFICE**



## Segmental Restriction Orifice

### 1. Brief Description

Segmental restriction orifices are designed with a partially open bore, typically in a semi-circular or segmental shape. This configuration allows the controlled passage of fluids while accommodating solid particles or sediments that might settle in the pipeline. These orifices are widely used in applications requiring partial flow restrictions without causing clogging or significant pressure drops.

### 2. Main Features

- **Segmental Bore Design:** Prevents clogging by allowing sediments or heavier particles to pass freely.
- **Flow Stability:** Ensures consistent flow control with minimal turbulence.
- **Customizable Geometry:** Bore size and shape can be tailored to specific flow and sediment handling requirements.
- **Robust Construction:** Built to withstand abrasive and corrosive environments.
- **Versatility:** Suitable for a wide range of fluid types, including those with particulate content.

### 3. Material of Construction

Segmental restriction orifices are manufactured from durable materials to handle various operating conditions.

Common materials include:

- **Stainless Steel (304, 316, 316L):** Corrosion-resistant and suitable for general industrial applications.
- **Carbon Steel:** Cost-effective for non-corrosive or mildly abrasive environments.
- **Inconel and Hastelloy:** Ideal for high-temperature and highly corrosive applications.
- **Monel:** Excellent for seawater and other aggressive fluid environments.
- **Duplex and Super Duplex Steel:** Provides high strength and superior corrosion resistance for demanding applications.
- **PTFE-Lined Plates:** Suitable for highly reactive or corrosive fluids.

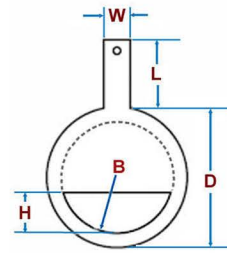
### 4. Applications

- **Oil and Gas Industry:** Handling fluids with sediments or impurities, such as crude oil.
- **Chemical Processing:** Managing slurries or fluids with suspended solids.
- **Power Generation:** Controlling ash-laden fluids in boiler systems.
- **Water Treatment Plants:** Regulating flow in wastewater and sewage systems.
- **Mining Industry:** Transporting ore slurries and other particulate-heavy fluids.
- **Food and Beverage:** Handling fluids containing organic particulates or sediments.

### 5. Size Range of Segmental Restriction Orifice supplied by ASENFAB:

- **Nominal Diameter (DN):** Typically available from 10 mm to 4000 mm.
- **Plate Thickness:** Designed based on operating pressure, fluid characteristics, and material strength.
- **Bore Diameter and Shape:** Customizable to meet specific flow and sediment handling requirements.

For fluids containing heavy sediments, B is 98% of line I.D. and H is height of circular segments.



Dashed line = Pipe ID



**SEGMENTAL RESTRICTION ORIFICE**

## Quadrant Edge Restriction Orifice

### 1. Brief Description

Quadrant-edged restriction orifices are designed with a rounded or curved edge at the bore entrance. This feature minimizes turbulence and allows for a smoother flow of fluids, particularly in applications with low Reynolds numbers or viscous fluids. These orifices are ideal for applications requiring precise flow control and reduced wear on the orifice edge.

### 2. Main Features

- **Rounded Bore Edge:** Reduces flow turbulence and minimizes wear over time.
- **Enhanced Accuracy:** Provides precise flow control, especially in low-flow or viscous fluid applications.
- **Improved Durability:** The rounded edge reduces erosion and prolongs the orifice's operational lifespan.
- **Versatility:** Suitable for a wide range of fluids, including those with varying viscosities.
- **Customizable Design:** Bore size and edge curvature can be tailored to meet specific flow requirements.

### 3. Material of Construction

Quadrant-edged restriction orifices are constructed using materials suitable for diverse operating conditions. Common materials include:

- **Stainless Steel (304, 316, 316L):** Corrosion-resistant and widely used in industrial settings.
- **Carbon Steel:** Economical choice for non-corrosive applications.
- **Inconel and Hastelloy:** Suitable for high-temperature and highly corrosive environments.
- **Monel:** Preferred for seawater and other aggressive fluid conditions.
- **Duplex and Super Duplex Steel:** High strength and excellent corrosion resistance for demanding applications.
- **PTFE or Other Non-Metallic Linings:** Used for highly reactive or corrosive fluids.

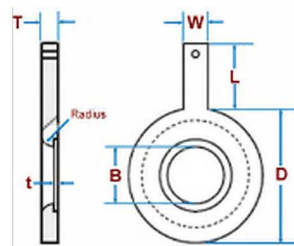
### 4. Applications

- **Oil and Gas Industry:** Precise flow control in pipelines transporting viscous crude oil or refined products.
- **Chemical Processing:** Handling fluids with varying viscosities and ensuring smooth flow.
- **Power Generation:** Controlling low-flow steam or other viscous fluids in turbine systems.
- **Water Treatment Plants:** Managing the flow of treated water or viscous chemical additives.
- **Pharmaceutical and Food Processing:** Ensuring precise flow rates of viscous or delicate fluids.
- **Cryogenic Systems:** Handling liquefied gases with low Reynolds numbers.

### 5. Size Range of Quadrant Edge Restriction Orifice supplied by ASENFAB:

- **Nominal Diameter (DN):** Typically available **from 10 mm to 4000 mm.**
- **Plate Thickness:** Designed based on operating pressure, fluid type, and material.
- **Bore Diameter and Edge Radius:** Customizable to achieve the desired flow and minimize turbulence.

For high viscosity, low Reynolds number are applied. Plate thickness and rounded edge contribute to greater durability and plate life.



Dashed line = Pipe ID

## QUADRANT EDGE RESTRICTION ORIFICE

## Square Edge Restriction Orifice

### 1. Brief Description

Square Edged Restriction Orifices (SERO) consist of a thin, flat plate with a precisely machined square-edged hole in the centre. The fluid passes through this hole, and due to the sharp edge, a pressure drop occurs at the orifice. This pressure differential can be used for measuring flow rates or controlling the flow in a system.

### 2. Main Features

- **Sharp Edged Design:** The most defining feature of the SERO is its sharp, square-edged hole, which causes a distinct pressure drop as the fluid flows through it.
- **Flow Measurement and Control:** SERO is widely used for accurate flow measurement and flow control in various industrial systems.
- **Compact and Simple:** These orifices have a simple design and are typically smaller in size, making them easy to integrate into systems.
- **Pressure Drop:** The sharp edge creates a high-pressure drop, which is critical for precise flow rate measurements.
- **Standardized Sizes:** SERO comes in standardized sizes, making them easy to replace and incorporate into existing systems.
- **Minimal Energy Loss:** While they create a pressure drop, the energy loss is typically less compared to other orifice types like conical orifice plates.

### 3. Material of Construction

The material used for Square Edged Restriction Orifices depends on the application, the fluid type, and the operating conditions (such as temperature and pressure). Common materials include:

- **Carbon Steel:** Used for non-corrosive or general-purpose applications.
- **Stainless Steel:** Common in applications where corrosion resistance is important, such as in food processing, chemical industries, and water treatment plants.
- **Alloy Steels:** Used in high-temperature or high-pressure systems, such as in steam or gas applications.
- **Brass/Bronze:** Used for lower pressure systems or in applications with non-corrosive fluids.
- **Plastic Materials (PVC, PTFE):** Used in industries requiring resistance to aggressive chemicals or in lower pressure systems.

### 4. Applications

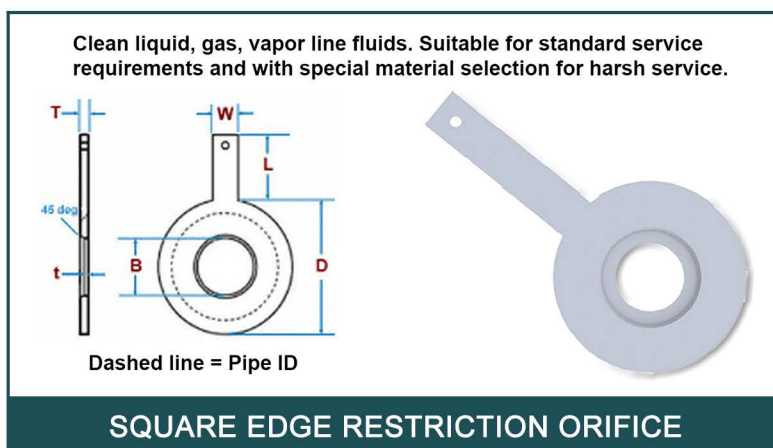
Square Edged Restriction Orifices are widely used in various industrial settings. Common applications include:

- **Flow Measurement:** In water treatment plants, chemical processing, HVAC systems, and steam lines, where flow rate needs to be precisely measured.
- **Oil and Gas Industry:** Used in pipelines and production systems for measuring and controlling the flow of fluids.
- **Venturi Systems:** Can be part of venturi or similar systems for fluid measurement.
- **Metering Applications:** Used in metering devices to provide accurate flow data for billing and process control in both liquid and gas systems.
- **Pressure Regulation:** They are employed for controlling fluid pressure by creating a constant pressure drop.
- **Automated Control Systems:** In industries that require automated control of fluid processes, such as in pumps and turbines.

### 5. Size Range of Square Edge Restriction Orifice supplied by ASENFAB:

Square Edged Restriction Orifices come in various sizes depending on the flow rates and the pipe diameter. Typical size ranges include:

- **Small Sizes:** From ¼ inch (6 mm) to 2 inches (50 mm) in diameter, suitable for smaller pipelines and low flow applications.
- **Medium Sizes:** From 2 inches (50 mm) to 12 inches (300 mm) in diameter, commonly used in medium-scale industrial applications.
- **Large Sizes:** From 12 inches (300 mm) and above, used for high flow applications in large pipelines and systems.



## Axial Flow Pumps

An axial-flow pump, or AFP, is a common type of pump that essentially consists of a propeller (an axial impeller) in a pipe. The propeller can be driven directly by a sealed motor in the pipe or by electric motor or petrol/diesel engines mounted to the pipe from the outside or by a right-angle drive shaft that pierces the pipe.

Fluid particles, in course of their flow through the pump, do not change their radial locations since the change in radius at the entry (called 'suction') and the exit (called 'discharge') of the pump is very small. Hence the name "axial" pump.

An axial flow pump has a propeller-type of impeller running in a casing. The pressure in an axial flow pump is developed by the flow of liquid over the blades of impeller. The fluid is pushed in a direction parallel to the shaft of the impeller, that is, fluid particles, in course of their flow through the pump, do not change their radial locations. It allows the fluid to enter the impeller axially and discharge the fluid nearly axially. The propeller of an axial flow pump is driven by a motor.

### **Salient Features**

Vertical pumps take little space in plan since the liquid is led away to the axis of shaft.

The impeller is submerged, so pump does not require to be primed and is always ready for use.

The positive suction condition also prevents the cavitation in the pump and pitting in impeller & diffuser.

Due to positive head at suction the pump gives its rated performance as well as high overall efficiency, whereas in Horizontal pumps due to losses in suction line, foot valve etc. the rated performance of the pumps is not achieved

### **ASENFAB supplied Technical Specifications of Axial Flow Pumps :**

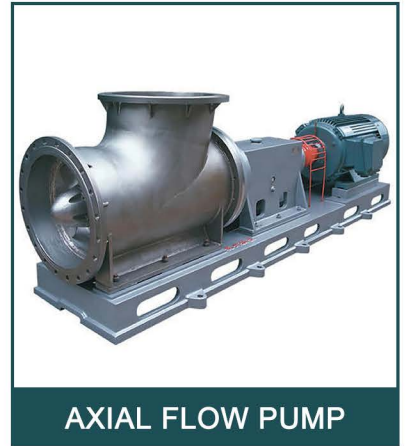
- Capacity : (Maximum) 40,000 m<sup>3</sup>/hr
- Head : (Maximum) 300 mtrs.
- Temperature : 95°C
- Working Pressure : 35 kg/cm<sup>2</sup>

### **Applications**

One of the most common applications of AFPs would be in handling sewage from commercial, municipal and industrial sources.

In sailboats, AFPs are also used in transfer pumps used for sailing ballast. In power plants, they are used for pumping water from a reservoir, river, lake or sea for cooling the main condenser. In the chemical industry, they are used for the circulation of large masses of liquid, such as in evaporators and crystallizers. In sewage treatment, an AFP is often used for internal mixed liquor recirculation (i.e. transferring nitrified mixed liquor from aeration zone to denitrification zone).

In agriculture and fisheries very large horsepower AFPs are used to lift water for irrigation and drainage. In East Asia, millions of smaller horsepower (6-20 HP) mobile units are powered mostly by single cylinder diesel and petrol engines. They are used by smaller farmers for crop irrigation, drainage and fisheries. Impeller designs have improved as well bringing even more efficiency and reducing energy costs to farming there. Earlier designs were less than two meters long but nowadays they can be up to 6 meters or more to enable them to more safely "reach out" to the water source while allowing the power source (many times two-wheel tractors are used) to be kept in safer, more stable positions, as shown in the adjacent picture.



## Centrifugal Pumps

Centrifugal pumps handle high volumes with a smooth and non-pulsating flow. The flow rate can be regulated from maximum output to no flow with no damage to the pump. An excellent pump for general transfer applications.

Low Maintenance : Few moving parts mean that wear due to operation is minimal.

Easy Installation : Compact size for flow rate. Option of port position simplifies pipe runs.

Versatility : Centrifugal pumps can be built in submersible form.

Low Power Consumption : Electric centrifugal pumps consume less power than most other pump types.



### **What ASENFAB offers...**

Our supplied Centrifugal Process Pump is the most preferred hydraulic pump for industrial and domestic uses. It is used to move or raise the pressure of a liquid. High-quality impeller which is used in our centrifugal pump rotates the liquid and the centrifugal force which is generated in the pump push the liquid to move out. The impeller is the device which rotates and transfer energy to the fluid.

We supply the centrifugal pump that includes the end-suction and back-pullout type centrifugal pump. Our heavy duty pump is capable to handle a wide spectrum of corrosive chemicals, starting from strongly oxidizing solutions to strongly reducing ones, at different temperatures and concentration, which can be used in different process plants.

### **Salient Features**

- Heavy duty process design
- High Efficiency
- Back pullout design makes inspection and maintenance process easy.
- Low maintenance
- High productivity due to three bearing design

### **ASENFAB supplied Technical Specifications of Centrifugal Pumps :**

- Type End-Suction and Back-Pullout Type Centrifugal Pump
- Capacity up to 1100 m<sup>3</sup>/hr
- Head up to 150 Meter
- Pressure up to 15 kg/cm<sup>2</sup>
- Size 25mm to 300mm
- Speed up to 3500 rpm
- Temperature up to 350° C
- M.O.C. = CI, CS, SS304 / 316, SS 304 L/316L, Alloy 20, Hast alloy B or C, CD4MCU, etc...

### **Applications**

- Hot and Cold Water Circulation
- Cooling Towers Installation
- Paper Industries
- Thermic Fluid Boiler
- Heat Exchanger
- Chemical Industries
- Sugar Plants
- Textile Industries
- Ceramic Industries
- Solvent Transfer
- Food Industries
- Laminate Industries
- Marine/Ports
- Automobile Industries
- Seawater and in many more industries and applications

## Diaphragm Pumps

The Diaphragm Pump Working Principle is as simple as two valves opening and closing using air pressure to force a piston back and forth, or as complicated as delicately balanced vanes that are revolved by the air. The use of an air motor on this type of pump allows it to be used in more than one application. Air motors can be made small and light, ideal for use as a portable pump. As a submersible pump, the use of air makes it a sealed unit with no external moving parts. Because it doesn't give off fumes or use electricity, it may be used indoors or around flammable liquids. These advantages make it a very handy pump to have around a concentrator plant, if only as an emergency piece of equipment.

When the diaphragm is collapsed all of the air is forced out of the diaphragm chamber. When the diaphragm is extended the slurry, or whatever is being pumped, is sucked into the diaphragm chamber through the intake line. That is the INDUCTION or SUCTION STROKE, the EXPULSION or DISCHARGE STROKE is simply causing the diaphragm to collapse once more.

The electrically operated diaphragm pump is Efficient for handling Slurry, Effluent and Viscous Material. Electrical single Diaphragm pump is a simple and low cost solution. The electrical single diaphragm hand pump is useful for continuous, high flow as also occasional pumping duties. The electrical single diaphragm pump can be easily used in many locations.

### **ASENFAB** supplied **Technical Specifications of Diaphragm Pumps :**

- Diaphragm : PTFE/Rubber
- Suction & Discharge : 1 1/4 inch / 1 inch
- Power : 220V/ 440V, 0.5 HP
- Max Flow : 50 LPM
- Suction Lift : 4.5 m
- Head : 5 m
- Weight : 26/34/19 (kg)
- MOC : AL/SS/PP

### **Important Features**

- High Capacity
- Low maintenance
- Portable - Trolley Mounted
- Easy to use
- Handles all types of Liquids and Slurry

### **Applications**

Diaphragm Pumps are commonly applicable in many industries. These pumps are used to push liquids like corrosive chemical, volatile solvents, viscous, shear-sensitive foodstuffs, pharma product, sticky fluids, dirty water, smaller solids, creams, abrasive slurry, oils, and gels.

Normally they work most excellent for dirt free fluids & hard chemicals within fewer pressure applications. These pumps are an extremely efficient kind pump because it can handles fluids with low, medium, or high viscosities.



## Rotary Gear Pumps

An internal rotary gear pump is a positive displacement pump which employs a rotor and idler gear assembly to generate its flow. The assembly is offset, using a crescent adjacent to the inner gear, all within an outer gear. As the rotor gear drives the idler gear, the space caused by the crescent offsetting the gears and the meshing of the gear teeth displace the fluid, expelling it to the discharge port.

An internal rotary gear pump is typically specified for viscous fluids such as oils, bitumen, fats, syrups, chocolate and resins as the more viscous the product is, the more efficient the displacement aspect of the working principle becomes. An internal rotary gear pump can handle fluids with a viscosity of 100,000cSt!

An internal rotary gear pump employs a positive displacement principle. The pump features a casing in which a dual gear (an outer rotor gear and an internal idler gear) and crescent assembly is housed. As the rotor gear begins to turn, the idler gear rotates with the teeth beginning to mesh accordingly. It is the space between these gears and the meshing action which both draws in the fluid and displaces it. The crescent shape both offsets the idler gear and provides a seal between the suction and discharge ports.

### **Salient Features**

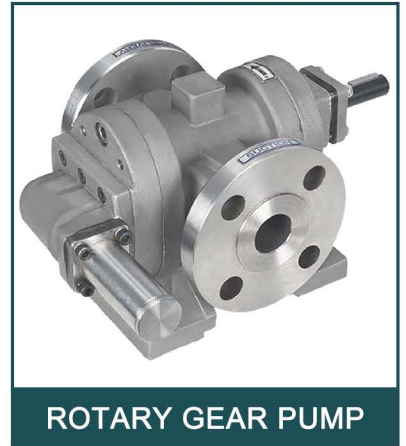
- Compact design
- Low leakage path
- Robust construction
- Less noise
- High efficiency
- Non-corrosive

### **ASENFAB supplied Technical Specifications of Rotary Gear Pumps :**

- Type : Double Helical Rotary Gear Pump
- Capacity : up to 195 m<sup>3</sup>/hr
- Head : up to 100 Meter
- Pressure : up to 10 kg/cm<sup>2</sup>
- Size : 12 mm to 200 mm
- Speed : up to 1500 rpm
- Temperature : up to 200°C
- M.O.C. : CI, CS, SS304 / 316, SS 304 L/316L, Alloy 20, Hast alloy B or C, CD4MCU, etc

### **Applications**

- Oil industries
- Soft Drinks
- Paper pulp
- Chemical plants
- Glue plants
- Food industries
- Soap solution handling
- Highly Viscous Or Semi Viscous Liquids
- Resins and pigment and in many other other applications and industries



## Rotary Lobe Pumps

Rotary Lobe Pumps are self-priming, valveless, positive displacement pumps. The even rotation of the rotor pair creates a vacuum on the priming side of the pump, which can be defined by the direction of rotation of the drive. This vacuum draws the liquid into the pump chamber. With further rotation, the pumped medium is conveyed past the pump wall into the pressure area.

The rotary positive displacement Lobe Pump are designed without compromise to fulfill even the most critical customer demands in clean-ability, sterilize-ability and bacterial tightness. This 316L stainless steel design uses bi-wing or five-lobe rotor designs specifically utilized to achieve the very lowest shear rate and product degradation characteristics.

Lobe pumps are similar to external gear pumps in operation in that fluid flows around the interior of the casing. Unlike external gear pumps, however, the lobes do not make contact. Lobe contact is prevented by external timing gears located in the gearbox. Pump shaft support bearings are located in the gearbox, and since the bearings are out of the pumped liquid, pressure is limited by bearing location and shaft deflection.

Lobe pumps are frequently used in food applications because they handle solids without damaging the product. Particle size pumped can be much larger in lobe pumps than in other PD types. Since the lobes do not make contact, and clearances are not as close as in other PD pumps, this design handles low viscosity liquids with diminished performance. Loading characteristics are not as good as other designs, and suction ability is low. High-viscosity liquids require reduced speeds to achieve satisfactory performance. Reductions of 25% of rated speed and lower are common with high-viscosity liquids.

### **Material of Construction**

Externals (head, casing) : Typically 316 or 316L stainless steel head and casing

Externals (gearbox) : Cast iron, stainless steel

Internals (rotors, shaft) : Typically 316 or 316L stainless steel, non-galling stainless steel

Shaft Seal : O-rings, component single or double mechanical seals, industry-standard cartridge mechanical seals

### **ASENFAB supplied Technical Specifications of Rotary Lobe Pumps :**

- Inlet/Discharge : 1.5"/1.5" to 3"/3"
- Max RPM : 960
- Max Temp Deg C : 300
- Max Output LPH : 11,000 – 65,000 @ 0 Kg pressure
- MOC : SS

### **Applications**

Lobe pumps are also known as High Viscous transfer pumps. Rotary Lobe pumps are used for transfer of highly viscous substances such as creams, lotions, Ointment, pastes, chocolate, butter, fruit pulp, pickles, jams, shrikhand, glucose, soaps. Rotary lobe pumps are used in Dairies, Food, Beverage, Chemical, Pharmaceutical, Cosmetics and personal care industries





## Ball Valves

Ball valves are mechanical devices that are used to restrict or allow the passage of a fluid (liquid or gas) in a piping system. They are known as quarter-turn valves because a 90o rotation of the handle is all that is required to change the valve position from fully open to fully closed or vice versa. This quick quarter-turn movement on ball valves contrasts with the multiple 360o turns needed on other valve types such as gate or globe valves.

The term ball valve refers to the fact that the internal mechanism that is used to change the flow through the device is a spherical ball that has a hole drilled through it which serves as the valve's flow control. Ball valves are known for their overall durability and long service life, as well as for their reliable sealing and are therefore often preferred as a choice for shut-off applications. They are especially capable of tolerating contaminated media, more so than other valve types. In most instances, they are not used for precise regulation of flow as there are other valve designs such as needle valves that allow for finer metering of flow rate. There are some special designs that permit some degree of flow regulation.

The primary components used in the construction of a ball valve are the:

- Valve body
- Ball flow control
- Valve seats
- Valve stem
- Packing
- Bonnet
- Actuator

### **Applications**

Ball valves are used in many different industries. Some of these include chemical, oil & gas, pharmaceutical, food processing, HVAC, sanitary applications, and others such as corrosive media and cryogenics. Many manufacturing processes use ball valves, and they are widely used in residential settings as well. They can effectively function with a full range of media, including liquids, gases, chemicals, potable water, fuels, and food and beverages, provided that the material selection for the valve components was done with the type of media in mind.

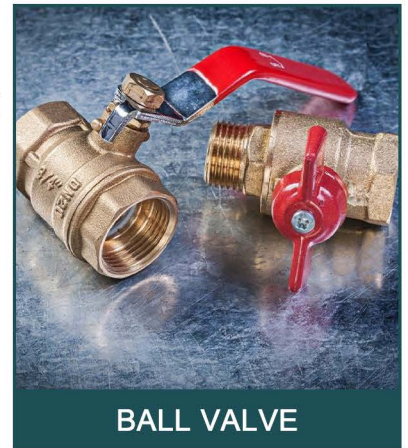
Ball valves have many advantages. They are very easy to use, open and close quickly, and are available in multi-port designs unlike some other valve styles like globe or gate valves. They are also smaller and lighter than other valve styles and can have a lower price point. They are reliable devices and offer a long service life. Additionally, they can have lower operating torque than other valves.

### **Product Range**

- Gate, Globe & Check Valves
- Valves for Power
- Pipeline & Process Ball Valves
- Triple-offset Butterfly Valves
- Flanged & Wafer-type Butterfly Valves
- Double Block and Bleed Plug Valves
- Control Valves
- Customised Solutions

**ASENFAB** supplied **Ball Valves** are available in sizes **up to 8" (DN 200)** and in **ASME classes from 150 to 2500**.

Generally, valves below 2 inches of diameter have 2 pieces of three pieces forged bodies (the most common is ASTM A105 for high-temperature service, ASTM A350 LF2 and LF3 for low-temperature service and ASTM A182 F304, F316 for stainless steel valve or higher grades, such as duplex valves ASTM A182 F51 and super duplex ASTM A182 F53/F55).



## Butterfly Valves

Butterfly Valves are a type of quarter-turn valve that feature a pivoting disk mounted on a valve stem that can rotate within the valve body. By changing the position of the disk, control of the flow of fluid through the valve can be achieved. The valve stem can be rotated through a full 90° from the open to the closed position, which can be accomplished either manually using a handle or in an automated manner with a quarter-turn valve actuator. Powered actuators may operate electrically, mechanically, or hydraulically. For larger valve sizes, actuation may be aided by the addition of a gearbox to reduce the torque requirement on the operator.

Butterfly valves are relatively simple in design and have only a few key components, which are the valve body, the disk, the valve stem, and the seat.

The valve body holds the working components of the valve and is designed to fit between flanges in piping systems.

The disk (sometimes spelled disc), also called the butterfly, is the component that rotates within the valve body to serve as the flow control mechanism. Several evolutions of butterfly valve design use offsets of the disk orientation to improve the performance characteristics of the valve;

Other components in butterfly valves include disk seals, stem seals, o-rings, and bushings.

### **Type of Butterfly Valves**

There are several different ways to characterize butterfly valves – by body style, by materials used, and by disk alignment. This leads to some degree of overlap as these types are not all mutually exclusive.

The primary types of butterfly valves include:

- Wafer style butterfly valves
- Lug style butterfly valves
- Flanged butterfly valves
- Welded butterfly valves
- Lined butterfly valves
- Metal butterfly valves
- Zero offset butterfly valves
- Double offset butterfly valves
- Triple offset butterfly valves

Butterfly valves have several advantages worth noting:

- They are good for starting, stopping, and regulating the flow
- They are available in a wide range of sizes, including large sizes, unlike some other types of valves
- They are good for use with slurries and liquids that have suspended solids due to the large valve opening
- Many of the designs are simpler and use less material, making them lightweight options
- They are narrow and take up less space in an installed setting, and are easy to install, saving time and installation costs
- They can be less expensive to purchase and are easier to maintain, thereby resulting in lower maintenance costs
- They are fast-acting, being quarter-turn valves, and can open and close in less time than some other valve designs
- They generate small pressure drops
- With suitable seats, they can be used with chemicals and corrosive media

**ASENFAB** supplies **Butterfly Valves** in the range from **50 mm (2")** to **900 mm (36")**.

They are available in Cast Iron, SG Iron and carbon steel, in a variety of body styles, materials and actuation options.



**BUTTERFLY VALVE**

## Gate Valves

Gate valves, or sluice valves, are mainly used to block or permit fluid flow through pipes. They are not good at regulating flow for which other valve designs, such as globe valves, are better suited. Ball valves are another on/off valve type unsuited to throttling. Gate valves offer a size advantage over these other types in terms of how much space must be allotted between pipe flanges to accommodate the valve.

Gate valves consist of three major portions, the valve body and seats, the gate (or disc) and stem, and the packing and bonnet. In operation, the body and seats remain stationary while the threaded stem rotates to lift the gate off its seats. Stem rotation is accomplished manually through a handwheel or automatically via a valve actuator. The bonnet houses the disc while the valve is open and provides a location for the stem packing where the stem exits the valve.



As with some other valve types, a distinction is made between rising stem and non-rising stem designs. Rising stem styles give a quick visual indication as to whether the valve is opened or closed. In non-rising stem designs, the stem threads into the disc, raising or lowering it as the stem turns while remaining fixed axially. Gates can be straight-sided or tapered discs. Wedge gate valves, also called tapered gates, are most common as they provide stronger sealing action and they can be solid, flexible, or split. Flexible gates accommodate some distortion of the seats arising from pipeline flex.

When a gate valve is fully opened, the gate disc is completely withdrawn from the flow path into the bonnet. For this reason, the pressure drop through gate valves is minimal. When closed, the gate disc seals against seats in the valve body which may be integrally cast or, more likely, welded or threaded into place. Metal seats are most common and seats are generally lapped after installation. In certain applications, the seats may be hardened. Seats on both sides of the gate permit the valve to be used bi-directionally. Where some leakage is acceptable, the gate seals without an extra sealing ring.

### **Applications**

Gate valves are used in wastewater plants, power plants, and process plants for shut-off and isolation service. They overshadow ball valves in larger applications because of the mechanical advantage a threaded stem offers over a quarter-turn lever. Some very large valves must incorporate a means of pressure reduction before the gate can be moved. Their simple design makes them an economical solution as pipe diameters increase beyond 2 inches.

The body of gate valves below 2 inches is generally made of forged steel (the most common body material grades are ASTM A105 for high-temperature service, ASTM A350 for low-temperature service and, ASTM A182 F304/F316 for corrosive service).

The bodies of gate valves of bore sizes above 2 inches are, instead, made of cast steel (the main cast grades are ASTM A216 WCB for high-temperature service, ASTM A351 for low-temperature conditions and ASTM A351 CF8 and CF8M – i.e. stainless steel 304 and 316 gate valves).

**ASENFAB** supplies **Gate Valves** in the range from **50 mm (2")** to **900 mm (36")**.

## Globe Valves

Globe valves are mainly used to regulate and to stop fluid flow through pipes. They differ from valves such as ball valves and gate valves in that they are specifically designed to govern fluid flow and are not limited to shut-off service. Globe valves are so named because older designs exhibited something of a globular body and could be divided into two hemispheres separated by an equator, where the flow changes direction. The actual internal element that closes against the seat is not usually spherical (as in a ball valve) but more typically flat, semi-spherical, or plug shaped. Globe valves, when opened, are more restrictive to fluid flow than gate or ball valves, resulting in higher pressure drops through them. Globe valves are available in three main body configurations, some of which are intended to reduce the pressure drop through the valve.



Globe valves consist of three major portions, the valve body and seat, the disc and stem, and the packing and bonnet. In operation, rotation of the threaded stem through a handwheel or a valve actuator lifts the disc off the seat. Fluid passage through the valve traces a Z-shaped path, enabling the fluid to meet the disc head on. This differs from a gate valve where the fluid passes perpendicularly to the gate. This configuration is sometimes described as a Z-body or Tee pattern valve. Inlets and outlets are situated in line with one another.

Other configurations include Angle and Wye patterns. In the angle globe valve, the outlet is oriented 90° from the inlet and fluid flows along an L-shaped path. In the wye pattern, or Y-body, configuration, the stem enters the valve body at 45°, while inlet and outlet remain in line, as with the tee pattern. The angle pattern is less resistive to flow than the tee pattern, and the wye, less so still. The tee pattern valve is the most common of the three types.

Depending on the design of the sealing element, globe valves may open quickly with a few turns of the stem to rapidly initiate flow (or closed to stop it) or they may open gradually with many stem revolutions to produce more regulated flow through the valve. Although a plug is sometimes used as the sealing element, these should not be confused with plug valves which are quarter-turn devices, similar to ball valves, which use plugs instead of balls to stop and start flow.

### **Applications**

Globe valves are used in wastewater plants, power plants, and process plants for shut-off and regulation service. They are used in steam lines, coolant loops, lubrication systems, etc. where control over the amount of fluid passing through the valve plays a role.

**ASENFAB** supplies **Globe Valves** in the range from **50 mm (2")** to **900 mm (36")**.

## Needle Valves

Needle valves are specialized valves used for metering fluid flow. Their use is primarily limited to small systems such as instrumentation or fuel regulation where the ability to control the flow of fluid precisely and repeatably is highly desirable.

Needle valves assemblies consist of three major portions, the valve body and seat, the stem and stem tip, and the packing and bonnet. In many instances, needle valves are small enough that their bodies can be machined directly from hex or square bar stock. Typical configurations include Z- and L-shaped flow paths through the body, sometimes referred to as globe and angle patterns, respectively.



The stem usually incorporates fine threads to allow for micrometer-like adjustment of the needle relative to the seat. Often a locking means is provided either internally, or via a set screw, locknut, etc. on the stem, in order to keep vibration from changing valve settings. Sometimes a scale is included to permit accurate resetting of the flow rate. Manufacturers will often publish curves showing the mostly linear relationship between turns of the stem and the flow coefficient, Cv.

Needle valves are typically operated by hand but automatically controlled versions are available. Needle valves provide positive shut-off and can be used as shut-off valves but other more economical valves are available if this, and not metering, is the only requirement. Care must be taken when closing a needle valve as it is possible to damage the stem tip or the seat if torque is applied excessively.

Certain designs are available that provide rapid adjustment of flow with fewer stem turns than standard designs.

### **Applications**

Needle valves are used in power plants, refineries, chemical plants, and in oil and gas exploration, laboratory analysis, etc. They are employed for gas chromatography, sampling, instrument air, and other uses where precise flow metering is needed.

Needle valves are typically applied as a means of reducing flow rates of liquids or gases so that they may be introduced to measuring instruments which might otherwise be damaged by the full flow. Another application is in regulating flow to air cylinders to control piston speed. They are often employed in automated combustion control systems to regulate fuel flow. Governor controlled pumps will often use needle valves as a way of cushioning the governor from damaging surges. Needle valves are sometimes used as components of larger control valves.

**ASENFAB** supplied **Needle Valves** are available in **stainless steel** and **aluminium** in sizes from **DN 08 (8 mm)** to **DN 25 (25 mm)** with a pressure ratings of **400 BAR (6000 psi)** or **12 BAR (177 psi)** depending upon model.

## Blind Flange

Blind Flanges are used for testing the flow of gas or liquid through a pipeline or vessel. It helps to close the end of piping systems or vessel openings. It allows easy access to the pipeline when there is a requirement to work done inside the line. They are used in high pressure applications available in all grades, materials, size and specifications.

Blind pipe flanges are typically provided with a raised face, flat face, or RTJ facing. The standard height is 1/16" when a raised face is required under 400#. The standard height is 1/4".for blind pipe flanges of 400# and above.

### ASENFAB supplied Specifications of Blind Flange :

Size : 1/2"NB TO 24"NB IN

Class : 150 LBS, 300 LBS, 600 LBS, 900 LBS, 1500 LBS, 2500 LBS DIN Standard ND-6,10, 16, 25, 40 Etc.

Materials : Monel :

Grade : Monel 400, Monel K500, Monel R-405

Nickel :

Grade : Nickel 200, Nickel 201

Hastalloy :

Grade : Hastalloy B2, Hastalloy B3, Hastalloy C22, Hastalloy C276, Hastalloy X

Stainless Steel :

Grade : ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316TI, F310, F321, F904L

Carbon Steel :

Grade : ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48, F50, F52, F56, F60, F65, F70, A516.60, 65, 70

Duplex Steel :

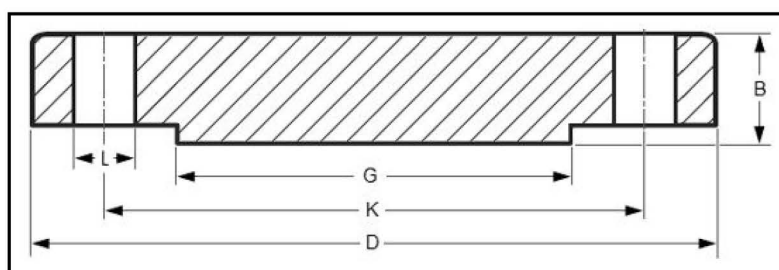
Grade : ASTM / ASME A/SA 182 UNS F44, F45, F51, F53, F55, F60, F61

Alloy Steel :

Grade : ASTM A182 F1, F5, F9, F11, F22, F91



BLIND FLANGE						
ASME B16.5 Dimensions (NPS 1/2 in)						
Class	150	300	600	900	1500	2500
Dia (D)	90	95	95	120	120	135
Dia (B)	9.6	12.7	14.3	22.3	22.3	30.2
	11.2	14.3	20.7	28.7	28.7	36.6
Dia (G)	35.1	35.1	35.1	35.1	35.1	35.1
Dia (K)	60.3	66.7	66.7	82.6	82.6	88.9
Holes Qty	4	4	4	4	4	4
Dia (L)	15.9	15.9	15.9	22.2	22.2	22.2
Stud Bolts Diameter x Length						
Diameter (in)	1/2	1/2	1/2	3/4	3/4	3/4
Length (mm)	55	65	75	110	110	120
Dimensions are in millimeters unless otherwise indicated.						



## Lapped Joint Flange

Lapped Joint Flange is also called Loose Flange or LJ flange. It is used with a stub end, which is welded to the pipe. The advantage of this flange connection is that the flange can be rotated. It is easy to align the bolt holes and easy to install on large diameter pipes. Loose flanges are also suitable for areas where the pipe needs to be removed frequently for cleaning or inspection, or where only the flange and not the pipe need to be rotated when aligning the flange bolt hole. When using the loose flange, the material of the flange stub shall be the same as that of the pipe, and Flange material can be different from pipe material, so it is more suitable for conveying corrosive medium of pipe and non-ferrous metal pipe system, in order to achieve as much as possible to save expensive materials (such as stainless steel and non-ferrous metal).



LAPPED JOINT FLANGE

According to the different stubs, the flange can be subdivided into 4 types: "Butt welding ring with neck loose flange", "Butt welding ring plate type loose flange", "Flat welding ring plate type loose flange" and "Flanged ring plate type loose flange".

### ASENFAB supplied Specifications of Lapped Joint Flange : ASME B16.5

Size : 1/2"NB TO 24"NB IN

Class : 150 LBS, 300 LBS, 600 LBS, 900 LBS, 1500 LBS, 2500 LBS DIN Standard ND-6,10, 16, 25, 40 Etc.

Materials : Monel :

Grade : Monel 400, Monel K500, Monel R-405

Nickel :

Grade : Nickel 200, Nickel 201

Hastalloy :

Grade : Hastalloy B2, Hastalloy B3, Hastalloy C22, Hastalloy C276, Hastalloy X

Stainless Steel :

Grade : ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316TI, F310, F321, F904L

Carbon Steel :

Grade : ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48, F50, F52, F56, F60, F65, F70, A516.60, 65, 70

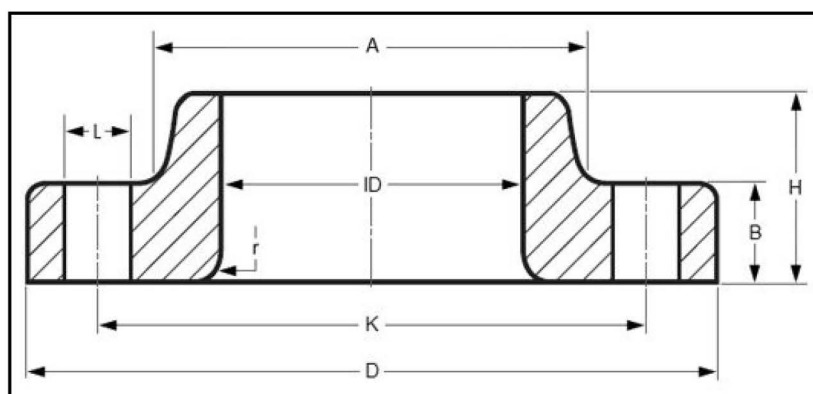
Duplex Steel :

Grade : ASTM / ASME A/SA 182 UNS F44, F45, F51, F53, F55, F60, F61

Alloy Steel :

Grade : ASTM A182 F1, F5, F9, F11, F22, F91

LAPPED JOINT FLANGE						
ASME B16.5 Dimensions (NPS 1/2 in)						
Class	150	300	600	900	1500	2500
Dia (A)	30	38	38	38	38	43
Dia (D)	90	95	95	120	120	135
Thk (B)	11.2	14.3	14.3	22.3	22.3	30.2
Dia (K)	60.3	66.7	66.7	82.6	82.6	88.9
Height (H)	16	22	22	32	32	40
Holes Qty	4	4	4	4	4	4
Dia (L)	15.9	15.9	15.9	22.2	22.2	22.2
Stud Bolts Diameter x Length						
Diameter (in)	1/2	1/2	1/2	3/4	3/4	3/4
Length (mm)	55	65	75	110	110	120
Dimensions are in millimeters unless otherwise indicated.						



## Slip-on Flange

According to their name, these pipe flanges slip over the pipe, that is why it is called slip-on flange. It is fabricated with an inside diameter that is bigger than the pipe's outside distance across. These connections are associated with the pipe by means of fillet weld at the top and base of the flange.

The Slip On pipe flanges include materials carbon steel slip-on pipe flanges, stainless steel slip on pipe flanges and alloy steel slip on pipe flanges available in various class such as 150 LBS, 300 LBS, 600 LBS, 900 LBS. These flanges are ideal for low pressure applications.

Advantages/Features of Slip-on Flanges:

They need low pressure temperature environments

They are leak-proof

Installation cost is low

It allows easier alignment of bolting holes because of its smaller thickness

One size is appropriate for all pipe schedules



SLIP ON FLANGE

### ASENFAB supplied Specifications of Slip-on Flange : ASME B16.5

Size : 1/2"NB TO 24"NB IN

Class : 150 LBS, 300 LBS, 600 LBS, 900 LBS, 1500 LBS, 2500 LBS DIN Standard ND-6,10, 16, 25, 40 Etc.

Materials : Monel :

Grade : Monel 400, Monel K500, Monel R-405

Nickel :

Grade : Nickel 200, Nickel 201

Hastalloy :

Grade : Hastalloy B2, Hastalloy B3, Hastalloy C22, Hastalloy C276, Hastalloy X

Stainless Steel :

Grade : ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316TI, F310, F321, F904L

Carbon Steel :

Grade : ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48, F50, F52, F56, F60, F65, F70, A516.60, 65, 70

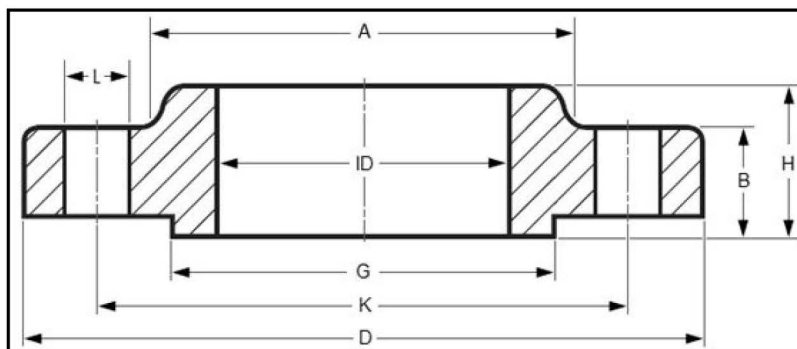
Duplex Steel :

Grade : ASTM / ASME A/SA 182 UNS F44, F45, F51, F53, F55, F60, F61

Alloy Steel :

Grade : ASTM A182 F1, F5, F9, F11, F22, F91

SLIP-ON FLANGE						
ASME B16.5 Dimensions (NPS 1/2 in)						
Class	150	300	600	900	1500	2500
Dia (A)	30	38	38	38	38	...
Dia (D)	90	95	95	120	120	...
Thk (B)	9.6	12.7	14.3	22.3	22.3	...
	11.2	14.3	20.7	28.7	28.7	...
Dia (G)	35.1	35.1	35.1	35.1	35.1	...
Dia (K)	60.3	66.7	66.7	82.6	82.6	...
Height (H)	14	21	22	32	32	...
	15.6	22.6	28.4	38.4	38.4	...
Holes Qty	4	4	4	4	4	...
Dia (L)	15.9	15.9	15.9	22.2	22.2	...
Stud Bolts Diameter x Length						
Diameter (in)	1/2	1/2	1/2	3/4	3/4	...
Length (mm)	55	65	75	110	110	...
Dimensions are in millimeters unless otherwise indicated.						





## Socket Weld Flange

In applications with smaller sizes of high-pressure tubing, socket weld pipe flanges are used via inserting the tube into the socket end and adding the fillet weld around the top. The fluid or gas inside the pipe flows easier. This flange socket is available in all materials, sizes, and requirements.

Flanges in sockets Weld tubes usually have a raised face or flat face. For socket-weld tube flanges, the usual height for socket-weld tube flanges is 1/16" and the minimum for socket-weld tube-solder-face-high tube flows of up to 400# is 1/4".

Socket Weld Flange is commonly used in small and high-pressure structures that do not transport extremely corrosive fluid materials. This is achieved after the weld.



**SOCKET WELD FLANGE**

### ASENFAB supplied Specifications of Socket Weld Flange : ASME B16.5

Size : 1/2" NB TO 24" NB

Class : 150 LBS, 300 LBS, 600 LBS, 900 LBS, 1500 LBS, 2500 LBS DIN Standard ND-6,10, 16, 25, 40 Etc.

Materials : Monel :

Grade : Monel 400, Monel K500, Monel R-405

Nickel :

Grade : Nickel 200, Nickel 201

Hastalloy :

Grade : Hastalloy B2, Hastalloy B3, Hastalloy C22, Hastalloy C276, Hastalloy X

Stainless Steel :

Grade : ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316TI, F310, F321, 904L

Carbon Steel :

Grade : ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48

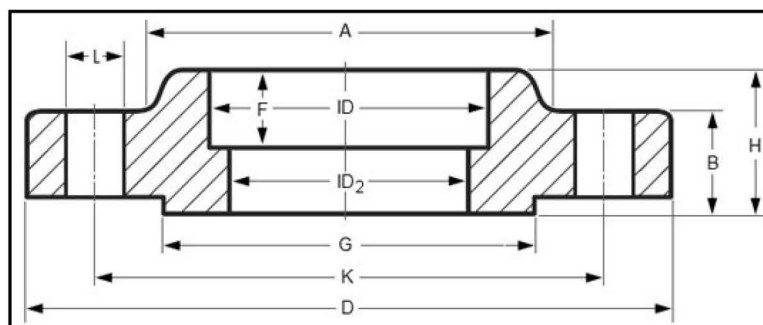
Duplex Steel :

Grade : ASTM / ASME A/SA 182 UNS F44, F45, F51, F53, F55, F60, F61

Alloy Steel :

Grade : ASTM A182 F1, F5, F9, F11, F22, F91

SOCKET WELD FLANGE							
ASME B16.5 Dimensions (NPS 1/2 in)							
Class	150	300	400	600	900	1500	2500
Diameter - A	30	38	...	38	...	38	...
Diameter - D	90	95	...	95	...	120	...
Thickness - B	9.6	12.7	...	14.3	...	22.3	...
	11.2	14.3	...	20.7	...	28.7	...
Diameter - G	35.1	35.1	...	35.1	...	35.1	...
Diameter - K	60.3	66.7	...	66.7	...	82.6	...
Height - H	14	21	...	22	...	32	...
	15.6	22.6	...	28.4	...	38.4	...
Holes Qty	4	4	...	4	...	4	...
Diameter - L	15.9	15.9	...	15.9	...	22.2	...
Stud Bolts Diameter x Length							
Diameter (in)	1/2	1/2	...	1/2	...	3/4	...
Length (mm)	55	65	...	75	...	110	...
Dimensions are in millimeters unless otherwise							



## Threaded Flange

Threaded pipe flanges are the special type of flanges which can be attached to the pipe without welding. Threaded flanges are threaded in the bore which matches an external thread on the pipe. Threaded pipe flanges is just like to slip-on pipe flanges that are used with pipes that have external threads. It is used where small diameter and high pressure is required. These flanges are available in all materials, specifications, sizes and grades.

### Key Features of Threaded Flange:

- No welding is needed
- Good for smaller pipe sizes
- Should be avoided for larger roads

### Uses of threaded Flanges:

- It can be fitted to pipes of various sizes without welding
  - Used in extremely high pressure applications
  - Economical and time saving equipment
  - Can be used in applications where welding is hazardous
- Threaded pipe flanges are typically provided with a raised face or flat face. When a raised face is essential for threaded pipe flanges, the standard height is 1/16" for threaded pipe flanges under 400#. For threaded pipe flanges of 400# and up, the standard threaded pipe flange raised face height is 1/4".



THREADED FLANGE

### ASENFAB supplied Specifications of Threaded Flange : ASME B16.5

Size : 1/2" NB TO 24" NB

Class : 150 LBS, 300 LBS, 600 LBS, 900 LBS, 1500 LBS, 2500 LBS DIN Standard ND-6,10, 16, 25, 40 Etc.

Materials : Monel :

Grade : Monel 400, Monel K500, Monel R-405

Nickel :

Grade : Nickel 200, Nickel 201

Hastalloy :

Grade : Hastalloy B2, Hastalloy B3, Hastalloy C22, Hastalloy C276, Hastalloy X

Stainless Steel :

Grade : ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316TI, F310, F321, 904L

Carbon Steel :

Grade : ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48

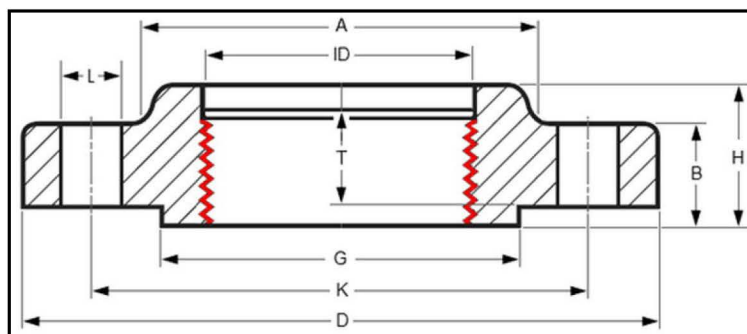
Duplex Steel :

Grade : ASTM / ASME A/SA 182 UNS F44, F45, F51, F53, F55, F60, F61

Alloy Steel :

Grade : ASTM A182 F1, F5, F9, F11, F22, F91

THREADED FLANGE							
ASME B16.5 Dimensions (NPS 1/2 in)							
Class	150	300	400	600	900	1500	2500
Diameter - A	30	38	38	38	38	38	43
Diameter - D	90	95	95	95	120	120	135
Thickness - B	9.6	12.7	14.3	14.3	22.3	22.3	30.2
	11.2	14.3	20.7	20.7	28.7	28.7	36.6
Diameter - G	35.1	35.1	35.1	35.1	35.1	35.1	35.1
Diameter - K	60.3	66.7	66.7	66.7	82.6	82.6	88.9
Height - H	14	21	22	22	32	32	40
	15.6	22.6	28.4	28.4	38.4	38.4	46.4
Holes Qty	4	4	4	4	4	4	4
Diameter - L	15.9	15.9	15.9	15.9	22.2	22.2	22.2
Stud Bolts Diameter x Length							
Diameter (in)	1/2	1/2	1/2	1/2	3/4	3/4	3/4
Length (mm)	55	65	75	75	110	110	120
Dimensions are in millimeters unless otherwise indicated.							



## Weld Neck Flange

Weld Neck Flanges are used where high pressure is required. These tubes are attached to the neck of the flange by welding the pipe. It helps to lower tension levels from the center's foundation. These flanges are used in applications with high-pressure factor, with a broad tempered core. It is essential to define the schedule pipe for the ordering of the soldering flange.

### ASENFAB supplied Specifications of Weld Neck Flange : ASME B16.5

Size : 1/2"NB TO 24"NB IN

Class : 150 LBS, 300 LBS, 600 LBS, 900 LBS, 1500 LBS, 2500 LBS DIN Standard ND-6,10, 16, 25, 40 Etc.

Materials : Monel :

Grade : Monel 400, Monel K500, Monel R-405

Nickel :

Grade : Nickel 200, Nickel 201

Hastalloy :

Grade : Hastalloy B2, Hastalloy B3, Hastalloy C22, Hastalloy C276, Hastalloy X

Stainless Steel :

Grade : ASTM A182 F202, F304/304L/304H, F316/316L, F316H, F316TI, F310, F321, F904L

Carbon Steel :

Grade : ASTM A105/A105N, A350 LF1, LF2 CL1/CL2, LF3 CL1/CL2, A694 F42, F46, F48, F50, F52, F56, F60, F65, F70, A516.60, 65, 70

Duplex Steel :

Grade : ASTM / ASME A/SA 182 UNS F44, F45, F51, F53, F55, F60, F61

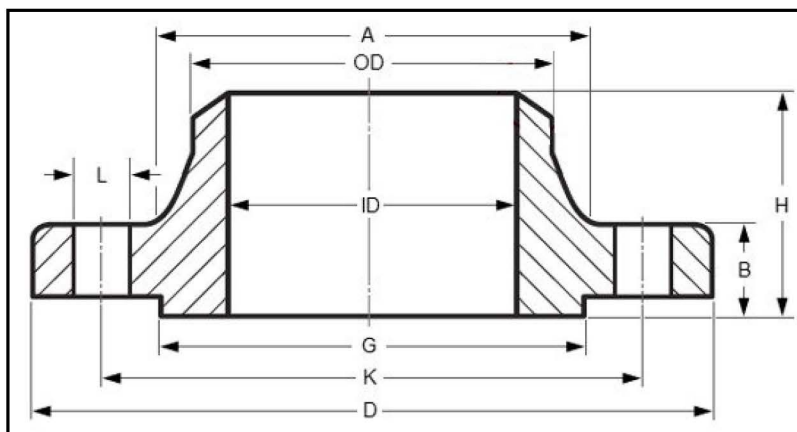
Alloy Steel :

Grade : ASTM A182 F1, F5, F9, F11, F22, F91



**WELD NECK FLANGE**

WELD NECK FLANGE						
ASME B16.5 Dimensions (NPS 1/2 in)						
Class	150	300	600	900	1500	2500
Dia (A)	30	38	38	38	38	43
Dia (D)	90	95	95	120	120	135
Thk (B)	9.6	12.7	14.3	22.3	22.3	30.2
Dia (G)	35.1	35.1	35.1	35.1	35.1	35.1
Dia (K)	60.3	66.7	66.7	82.6	82.6	88.9
Height (H)	46	51	52	60	60	73
Holes Qty	4	4	4	4	4	4
Dia (L)	15.9	15.9	15.9	22.2	22.2	22.2
<b>Stud Bolts Diameter x Length</b>						
Diameter (in)	1/2	1/2	1/2	3/4	3/4	3/4
Length (mm)	55	65	75	110	110	120
Dimensions are in millimeters unless otherwise indicated.						



## Flat Bars

Stainless steel Flat Bars and stainless steel Plates are ideal for applications that required erosion resistance and a more elevated amount of quality. Stainless steel is easy to weld and is perfect for frame work, shafting, axles and braces - especially those that are exposed to salt water, chemical and acidic environments. We stock a series of flat bars in a variety of shapes, sizes that cover metric and standard, and finishes including TGP.

Our all material meets ASTM or AMS specifications with ultrasonic testing as required. Test certificates are maintained to ensure full material traceability. We stand as the most genuine Flat Bar Manufacturer of Indian as well as international market. We ensure our flat bars are precisely engineered in accordance with latest industry specifications and according to the requirements of the clients.

### ASENFAB supplied Specifications of Flat Bars :

Range: 3.17 MM TO 350 MM DIA

Materials: Stainless Steel Bars– SS Bars

ASTM / ASME SA 312 GR. TP

304 , 304L , 304H, 309S ,309H , 310S, 310H , 316 , 316Ti , 316H , 316 LN , 317 , 317L , 321 , 321H , 347 , 347 H , 904L .

ASTM / ASME SA 358 CL 1 & CL 3

GR . 304 , 304L , 304H, 309S ,309H , 310S, 310H , 316 , 316H , 321 , 321H , 347.

Duplex Stainless Steel Bars - Duplex SS Bars

ASTM / ASME SA 790 UNS NO S 31803 , S 32205 , S 32550 , S 32750 , S 32760 .

Carbon Steel Bars – CS Bars

ASTM / ASME A 53 GR. A & B , ASTM A 106 GR. A , B & C . API 5L GR. B , API 5L X 42 , X 46 , X 52 , X 60 ,X 65 & X 70 .

ASTM / ASME A 691 GR. A , B & C

Alloy Steel Bars – AS Bars

ASTM / ASME A 335 GRP 1, P 5, P 9, P 11, P 12, P 22, P 23, P 91ASTM / ASME A 691 GR 1 CR, 1 1/4 CR, 2 1/4 CR, 5 CR



FLAT BARS

FLAT BARS			
Size (mm x mm)	Mass (kg/m)	Metres Per Tonne	Standard Length (m)
20 x 3	0.47	2123	6
20 x 5	0.79	1274	6
20 x 6	0.94	1062	6
20 x 10	1.57	637	6
25 x 3	0.59	1695	6
25 x 5	0.98	1019	6
25 x 6	1.18	847	6
25 x 8	1.57	637	6
25 x 10	1.96	510	6
25 x 12	2.36	424	6
32 x 3	0.75	1333	6
32 x 5	1.26	794	6
32 x 6	1.51	662	6
32 x 8	2.01	498	6
32 x 10	2.51	398	6
32 x 12	3.01	332	6
40 x 3	0.94	1064	6
40 x 5	1.57	637	6
40 x 6	1.88	532	6
40 x 8	2.51	398	6
40 x 10	3.14	318	6
40 x 12	3.77	265	6
40 x 16	5.02	199	6
40 x 20	6.28	159	6
50 x 3	1.18	847	6
50 x 5	1.96	510	6
50 x 6	2.36	424	6
50 x 8	3.14	318	6
50 x 10	3.93	254	6
50 x 12	4.71	212	6
50 x 16	6.28	159	6
50 x 20	7.85	127	6
50 x 25	9.81	102	6
65 x 3	1.53	654	6
65 x 5	2.55	392	6
65 x 6	3.06	327	6
65 x 8	4.08	245	6
65 x 10	5.1	196	6

FLAT BARS			
Size (mm x mm)	Mass (kg/m)	Metres Per Tonne	Standard Length (m)
65 x 12	6.12	163	6
65 x 16	8.16	123	6
65 x 20	10.2	98	6
65 x 25	12.8	78	6
75 x 5	2.94	340	6
75 x 6	3.53	283	6
75 x 8	4.71	212	6
75 x 10	5.89	170	6
75 x 12	7.07	141	6
75 x 16	9.42	106	6
75 x 20	11.8	85	6
75 x 25	14.7	68	6
75 x 40	23.6	42	6
90 x 5	3.53	283	6
90 x 6	4.24	236	6
90 x 8	5.65	177	6
90 x 10	7.07	141	6
90 x 12	8.48	118	6
100 x 5	3.93	254	6
100 x 6	4.71	212	6
100 x 8	6.28	159	6
100 x 10	7.85	127	6
100 x 12	9.42	106	6
100 x 16	12.6	79	6
100 x 20	15.7	64	6
100 x 25	19.6	51	6
100 x 50	39.3	25	6
110 x 6	5.18	193	6
110 x 8	6.91	145	6
110 x 10	8.64	116	6
110 x 12	10.4	96	6
130 x 5	5.1	196	6
130 x 6	6.12	163	6
130 x 8	8.16	123	6
130 x 10	10.2	98	6
130 x 12	12.2	82	6
130 x 16	16.3	61	6
130 x 20	20.4	49	6

FLAT BARS			
Size (mm x mm)	Mass (kg/m)	Metres Per Tonne	Standard Length (m)
130 x 25	25.5	39	6
150 x 5	5.89	170	6
150 x 6	7.07	141	6
150 x 8	9.42	106	6
150 x 10	11.8	85	6
150 x 12	14.1	71	6
150 x 16	18.8	53	6
150 x 20	23.6	42	6
150 x 25	29.4	34	6
150 x 50	58.9	17	6
180 x 5	7.07	141	6
180 x 6	8.48	118	6
180 x 10	14.1	71	6
180 x 12	17	59	6
180 x 16	22.6	44	6
180 x 20	28.3	35	6
180 x 25	35.3	28	6
200 x 6	9.42	106	6
200 x 8	12.6	79	6
200 x 10	15.7	64	6
200 x 12	18.8	53	6
200 x 16	25.1	40	6
200 x 20	31.4	32	6
200 x 25	39.3	25	6
250 x 6	11.8	85	6
250 x 8	15.7	64	6
250 x 10	19.6	51	6
250 x 12	23.6	42	6
250 x 16	31.4	32	6
250 x 20	39.3	25	6
250 x 25	49.1	20	6
300 x 6	14.1	71	6
300 x 8	18.8	53	6
300 x 10	23.6	42	6
300 x 12	28.3	35	6
300 x 16	37.7	27	6
300 x 20	47.1	21	6
300 x 25	58.9	17	6

## Hexagonal Bars

A hexagon bar is a bar with six straight sides and angles. It is used in the mining, specialized bolt and nut, machinery, chemical, shipping and architectural industry.

We provide a great service as a leading supplier of hexagon bars available in all materials and in various size, shape, grade and specifications. We offer hexagon bars in stainless corrosion resistance and "acid proof" steel. We are engaged in offering a wide range of the finest quality of Hexagon Bars according to the industry set norms that has optimum tensile strength and durable construction.

### ASENFAB supplied Specifications of Hexagonal Bars :

Range: 3.17 MM TO 350 MM DIA

Materials: Stainless Steel Bars– SS Bars

ASTM / ASME SA 312 GR. TP

304 , 304L , 304H, 309S ,309H , 310S, 310H , 316 , 316TI , 316H , 316 LN , 317 , 317L , 321 , 321H , 347 , 347 H , 904L .

ASTM / ASME SA 358 CL 1 & CL 3

GR . 304 , 304L , 304H, 309S ,309H , 310S, 310H , 316 , 316H , 321 , 321H , 347.

Duplex Stainless Steel Bars - Duplex SS Bars

ASTM / ASME SA 790 UNS NO S 31803 , S 32205 , S 32550 , S 32750 , S 32760 .

Carbon Steel Bars – CS Bars

ASTM / ASME A 53 GR. A & B , ASTM A 106 GR. A , B & C . API 5L GR. B , API 5L X 42 , X 46 , X 52 , X 60 ,X 65 & X 70 .

ASTM / ASME A 691 GR. A , B & C

Alloy Steel Bars – AS Bars

ASTM / ASME A 335 GRP 1 , P 5 , P 9 , P 11 , P 12 , P 22 , P 23 , P 91

ASTM / ASME A 691 GR 1 CR , 1 1/4 CR , 2 1/4 CR , 5 CR , 9CR , 91



HEXAGONAL BAR			
Size measured across Face to Face			
Size (mm)	Size (in)	Weight (kg)	Weight / 12 ft (kg)
10	0.3937	0.207	2.486
11	0.4331	0.251	3.012
12	0.4724	0.298	3.583
13	0.5118	0.350	4.200
14	0.5512	0.406	4.876
15	0.5906	0.466	5.597
16	0.6299	0.531	6.368
17	0.6693	0.599	7.189
18	0.7087	0.672	8.060
19	0.748	0.748	8.981
20	0.7874	0.829	9.952
21	0.8268	0.914	10.968
22	0.8661	1.003	12.038
23	0.9055	1.097	13.163
24	0.9449	1.194	14.324
25	0.9843	1.295	15.545
26	1.0236	1.401	16.815
27	1.063	1.511	18.135
28	1.1024	1.625	19.504
29	1.1417	1.743	20.920
30	1.1811	1.866	22.389
31	1.2205	1.992	23.904
32	1.2598	2.123	25.474
33	1.2992	2.258	27.088
34	1.3386	2.396	28.758
35	1.378	2.539	30.472
36	1.4173	2.687	32.241

HEXAGONAL BAR			
Size measured across Face to Face			
Size (mm)	Size (in)	Weight (kg)	Weight / 12 ft (kg)
37	1.4567	2.838	34.051
38	1.4961	2.993	35.920
39	1.5354	3.153	37.834
40	1.5748	3.317	39.798
41	1.6142	3.484	41.812
42	1.6535	3.656	43.876
43	1.6929	3.833	45.994
44	1.7323	4.013	48.162
45	1.7717	4.198	50.371
46	1.811	4.386	52.635
47	1.8504	4.579	54.948
48	1.8898	4.776	57.311
49	1.9291	4.977	59.729
50	1.9685	5.182	62.187
52	2.0472	5.605	67.258
54	2.126	6.045	72.534
55	2.1654	6.270	75.246
56	2.2047	6.501	78.008
58	2.2835	6.973	83.678
60	2.3622	7.462	89.548
65	2.5591	8.758	105.097
70	2.7559	10.157	121.889
75	2.9528	11.660	139.919
80	3.1496	13.267	159.201
85	3.3464	14.977	179.721
90	3.5433	16.792	201.503
100	3.937	20.729	248.749

## Round Bars

Round bars are available in multitude of length, width and dimensions in accordance with international quality standards. These round bars have amazing features that are excellent finish, superior polish, high tolerance level and sturdy construction.

Round Bars are available in all materials such as Stainless Steel, Duplex Steel, Carbon Steel and Alloy Steel and designed according to the ANSI/ASME standard. They are known for their superior tensile strength and corrosion resistance properties. Round Bar is a long cylindrical metal bar with diameters ranging from 1/4" up to 24". The common applications of round bar are braces, shafts, frameworks and axles.

### ASENFAB supplied Specifications of Round Bars :

Range: 3.17 mm to 350 mm Diameter

Materials: Stainless Steel Bars – SS Bars

ASTM / ASME SA 312 GR. TP

304 , 304L , 304H , 309S , 309H , 310S , 310H , 316 , 316Ti , 316H , 316 LN , 317 , 317L , 321 , 321H , 347 , 347 H , 904L .

ASTM / ASME SA 358 CL 1 & CL 3

GR . 304 , 304L , 304H , 309S , 309H , 310S , 310H , 316 , 316H , 321 , 321H , 347.

Duplex Stainless Steel Bars - Duplex SS Bars

ASTM / ASME SA 790 UNS NO S 31803 , S 32205 , S 32550 , S 32750 , S 32760 .

Carbon Steel Bars – CS Bars

ASTM / ASME A 53 GR. A & B , ASTM A 106 GR. A , B & C . API 5L GR. B , API 5L X 42 , X 46 , X 52 , X 60 , X 65 & X 70 .

ASTM / ASME A 691 GR. A , B & C

Alloy Steel Bars – AS Bars

ASTM / ASME A 335 GRP 1 , P 5 , P 9 ,

P 11 , P 12 , P 22 , P 23 , P 91

ASTM / ASME A 691 GR 1 CR ,

1 1/4 CR , 2 1/4 CR , 5 CR , 9CR , 91



ROUND BARS						
Diameter or Width (mm)	Weight per meter		Sectional Area		Perimeter	
	Square (kg)	Round (kg)	Square (cm <sup>2</sup> )	Round (cm <sup>2</sup> )	Square (cm)	Round (cm)
5	0.2	0.15	0.25	0.2	2	1.57
5.5	0.24	0.19	0.3	0.24	2.2	1.78
6	0.28	0.22	0.36	0.28	2.4	1.88
7	0.38	0.3	0.49	0.38	2.8	2.2
8	0.5	0.39	0.64	0.5	3.2	2.51
9	0.64	0.5	0.81	0.64	3.6	2.83
10	0.73	0.63	1	0.79	4	3.14
11	0.95	0.75	1.21	0.95	4.4	3.46
12	1.13	0.89	1.44	1.13	4.8	3.77
14	1.54	1.21	1.96	1.54	5.6	4.4
16	2.01	1.58	2.56	2.01	6.4	5.03
18	2.54	2	3.24	2.54	7.2	5.65
20	3.14	2.47	4	3.14	8.0	6.28
22	3.8	2.98	4.84	3.8	8.8	6.91
25	4.91	3.85	6.25	4.91	10	7.85
28	6.15	4.83	7.84	6.16	11.2	8.80
32	8.04	6.31	10.24	8.04	12.8	10.05
36	10.17	7.99	12.96	10.18	14.4	11.31
40	12.56	9.86	16	12.57	16	12.57
45	15.9	12.49	20.25	15.9	18	14.14
50	19.62	15.41	25	19.64	20	15.71
56	24.62	19.34	31.36	24.63	22.4	17.59
63	31.16	24.47	36.69	31.17	25.2	19.79
71	39.57	31.08	50.41	39.59	28.4	22.31
80	50.24	39.46	64	50.27	32	25.13

## Square Bars

Square Bars are made from very high quality raw material which ensures high toughness at its user end. These steel square bars are widely finds its applications in various commercial sectors. Square Bars offered can be made available in different size options like 60\*60mm to 150\*150mm as well as in lengths of up to 12m or as demanded by the customers. Further, these square bars come in hot rolled finish and bear better surface quality as well as are available at competitive prices. Some of its features include better surface quality, optimum chemical composition, mechanical properties; available in size options of 10mm\*10mm to 40mm\*40mm; choice of customized lengths among others.



### ASENFAB supplied Specifications of Square Bars :

Range: 3.17 MM TO 350 MM DIA

Materials: Stainless Steel Bars– SS Bars

ASTM / ASME SA 312 GR. TP

304 , 304L , 304H , 309S ,309H , 310S, 310H , 316 , 316Ti , 316H , 316 LN , 317 , 317L , 321 , 321H , 347 , 347 H , 904L .

ASTM / ASME SA 358 CL 1 & CL 3

GR . 304 , 304L , 304H , 309S ,309H , 310S, 310H , 316 , 316H , 321 , 321H , 347.

Duplex Stainless Steel Bars - Duplex SS Bars

ASTM / ASME SA 790 UNS NO S 31803 , S 32205 , S 32550 , S 32750 , S 32760 .

Carbon Steel Bars – CS Bars

ASTM / ASME A 53 GR. A & B , ASTM A 106 GR. A , B & C . API 5L GR. B , API 5L X 42 , X 46 , X 52 , X 60 ,X 65 & X 70 .

ASTM / ASME A 691 GR. A , B & C

Alloy Steel Bars – AS Bars

ASTM / ASME A 335 GRP 1 , P 5 , P 9 ,

P 11 , P 12 , P 22 , P 23 , P 91

ASTM / ASME A 691 GR 1 CR ,

1 1/4 CR , 2 1/4 CR , 5 CR , 9CR , 91

SQUARE BARS						
Diameter or Width (mm)	Weight per meter		Sectional Area		Perimeter	
	Square (kg)	Round (kg)	Square (cm <sup>2</sup> )	Round (cm <sup>2</sup> )	Square (cm)	Round (cm)
5	0.2	0.15	0.25	0.2	2	1.57
5.5	0.24	0.19	0.3	0.24	2.2	1.78
6	0.28	0.22	0.36	0.28	2.4	1.88
7	0.38	0.3	0.49	0.38	2.8	2.2
8	0.5	0.39	0.64	0.5	3.2	2.51
9	0.64	0.5	0.81	0.64	3.6	2.83
10	0.73	0.63	1	0.79	4	3.14
11	0.95	0.75	1.21	0.95	4.4	3.46
12	1.13	0.89	1.44	1.13	4.8	3.77
14	1.54	1.21	1.96	1.54	5.6	4.4
16	2.01	1.58	2.56	2.01	6.4	5.03
18	2.54	2	3.24	2.54	7.2	5.65
20	3.14	2.47	4	3.14	8.0	6.28
22	3.8	2.98	4.84	3.8	8.8	6.91
25	4.91	3.85	6.25	4.91	10	7.85
28	6.15	4.83	7.84	6.16	11.2	8.80
32	8.04	6.31	10.24	8.04	12.8	10.05
36	10.17	7.99	12.96	10.18	14.4	11.31
40	12.56	9.86	16	12.57	16	12.57
45	15.9	12.49	20.25	15.9	18	14.14
50	19.62	15.41	25	19.64	20	15.71
56	24.62	19.34	31.36	24.63	22.4	17.59
63	31.16	24.47	36.69	31.17	25.2	19.79
71	39.57	31.08	50.41	39.59	28.4	22.31
80	50.24	39.46	64	50.27	32	25.13

## Carbon Steel Pipes

We provide large quantities of the Carbon Steel pipe in both seamless & welded with a wide range of dimensions so that they can fit to any size and shapes.

Carbon Steel Seamless Pipes as per ASTM A106 Gr. B, A53 Gr. B, API 5LGr. A, B, X42, X46, X52, X56 & X60 with IBR Test Certificate. Carbon Steel Seamless Pipes & Tubes for Low Temperature services as per ASTM A 333 Gr. 1 & Gr. 6 with IBR TC. Carbon Steel ERW & Seamless Boiler Tubes as per BS 3059 Part I Gr. 320, BS 3059 Part II Gr. 360, 440 & 620 with IBR Test Certificate.

Carbon Steel Seamless Heat Exchangers Tubes as per ASTM A179, ASTM A210 Gr. A1 & ASTM A192 with IBR Test Certificate etc.

### **ASENFAB** supplied **Specifications of Carbon Steel Pipes :**

Grade : ASME/ASTM SA179, SA192, SA210, SA178, SA214, API 5L

Size : 1/8" NB TO 24" NB Sch 40/80/160/XXS

Form : Round, Square, Rectangular, Coil, U Tube,

Length : Single Random, Double Random & Required Length

End : Plain End, Bevelled End

Type : Seamless / ERW / Welded

Certification For Carbon : Mill Test Certificate as per EN 10204 / 3.2B

General Requirements : ASTM A 530/A 530M

Dimensional Tolerances : ANSI B 36.10

OD Range : 1.250" – 6.000" (30-150mm)

Wall Range : 0.095" – 1.000" (.25-25mm)

### **Features**

- High strength
- High resistance to pitting, crevice corrosion resistance
- High resistance to stress corrosion cracking, corrosion fatigue and erosion
- Good sulfide stress corrosion resistance
- Low thermal expansion and higher heat conductivity than austenitic steels
- Good workability and weldability.
- High energy absorption.
- Dimensional accuracy
- Excellent finish
- Durable
- Leak proof
- Thermal resistance
- Chemical resistance

### **Applications**

- Instrumentation
- Offshore Fire Water Systems
- Structural Purposes
- Medical
- Pharmaceutical
- Economizers
- Condenser
- Furniture industries
- Domestic applications
- Offshore construction
- Food and pharmaceutical processing
- Desalination and wastewater projects
- Electrical Submersible Pum





## Duplex Stainless Steel Pipes

We provide large quantities of the Duplex Stainless Steel pipes in both seamless & welded types with a wide range of dimensions, so that they can fit to any size and shapes.

Called Duplex Pipe because of its mixed microstructure with about equal proportions of ferrite and austenite, duplex stainless steels are a family of grades, which range in corrosion performance depending on their alloy content. The chemical composition based on high contents of Cr and Mo, improves intergranular and pitting corrosion resistance, respectively. Additions of nitrogen can promote structural hardening by interstitial solid solution mechanism, which raises the yield strength and ultimate strength values without impairing toughness. Moreover, the two-phase microstructure guarantees higher resistance to pitting and stress corrosion cracking in comparison with conventional stainless steels.

### **ASENFAB supplied Specifications of Duplex Stainless Steel Pipes :**

Grade : UNS S31803 / UNS S32205 / UNS S32750 / UNS S32760 / UNS S32550 and more

Size : 6.35 mm OD upto 254 mm OD in 0.6 TO 20 mm thickness

Form : Round, Square, Rectangular, Coil, U Tube,

Length : Single Random, Double Random & Required Length

End : Plain End, Bevelled End

Type : Seamless / ERW / Welded

Certification For Duplex Mill Test Certificate as per EN 10204 / 3.2B

Standard : ASTM / ASME A/SA 269 / 213 / 249

### **Features**

- High strength
- High resistance to pitting, crevice corrosion resistance
- High resistance to stress corrosion cracking, corrosion fatigue and erosion
- Good sulfide stress corrosion resistance
- Low thermal expansion and higher heat conductivity than austenitic steels
- Good workability and weldability.
- High energy absorption.
- Dimensional accuracy
- Excellent finish
- Durable

### **Applications**

Duplex Stainless Steel Pipes are used in Heat Exchangers, Instrumentation, Hydraulic & Pneumatic system, Nuclear Power Plants, Automotive industries, Aerospace, Medical, Pharmaceutical, Oil coolers, Pre-heater, Economizers, Condenser, LNG, Pulp and paper, Offshore construction, Food and pharmaceutical processing, Desalination and waste water projects, Aircraft Tubing, Electrical Submersible Pump.

### **Major Chemical Composition :**

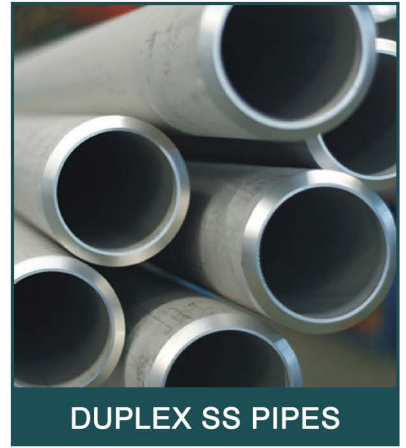
Ni – 6.00 / 8.00

Cr – 24.00 / 26.00

Mo – 3.00 / 4.00

Cu – 0.50 / 1.00

W – 0.50 / 1.00



**DUPLEX SS PIPES**

## Hastelloy Pipes

We provide large quantities of the Hastelloy Pipes in with a wide range of dimensions, so that they can fit to any size and shapes.

Our products like Hastelloy Pipes which are known for their excellent dimensional accuracy and high tensile strength. The products offered in this range are made out of optimum quality raw material. These are made in various specifications based on the requirement of the client. These are available at a cost effective price.

### Specifications

Grades : ASTM/ASME A213/SA213 A249/SA249 A268 A312/SA312 A269 A270 A358 A376 A409 A511 A688 A789 A790 A803 A928 A544 A409 A632 A688 A778 A908 SB161 SB163 SB167 SB338 SB407 SB423 SB444 SB619 SB622 SB626 SB668 SB677 SB829

JIS G3459 G3446 G3447 G3448 G3459 G3463 G3468  
DIN 17455 17456 17457 17458 17459 2391 2462  
EN 10216-5 10217-7  
GOST9941 GOST9940  
NFA NACE API ISO HAF

### ASENFAB supplied Specifications of Hastelloy Pipes :

Size : 15mm NB to 150mm NB (1/2" to 6"), 7" (193.7mm OD to 20" 508mm OD)

Form : Round, Square, Rectangular, Coil, U Tube,

Length : As per customer's requirement (Maximum upto 7 meters)

End : Plain End, Bevelled End

Type : Seamless / ERW / Welded

Surface : Black painting, varnish paint, anti rust oil, hot galvanized, cold galvanized, 3PE

Test : Chemical Component Analysis, Mechanical Properties (Ultimate tensile strength, Yield strength, Elongation), Technical Properties (Flattening Test, Flaring Test, Bending Test, Hardness Test, Blow Test, Impact Test etc), Exterior Size Inspection.

OD Range : 1.250" – 6.000" (30-150mm)

Wall Range : 0.095" – 1.000" (.25-25mm)

Mill Test Certificate : EN 10204/3.1B

Additional Testing : NACE MR0175, NACE TM0177, NACE TM0284, HIC TEST, SSC TEST, H2 SERVICE, IBR, etc.

Standard : ASTM A53, A106, API 5L, ASME B36.10M-1996

DIN1626, DIN1629, DIN17175, DIN 2448

JIS G3452, JIS G3454, JIS G3455, JIS G3456, JIS G3457, JIS G3461

Material :

304/304L/304H;321/321H;316/316L/316H;316Ti;317L;347H;310S;UNS31803;UNS32750 /U NS08904L,TP410/TP410S;ECT

### Mechanical Property

Density : 8.89 g/cm<sup>3</sup>

Melting Point : 1370 °C (2500 °F)

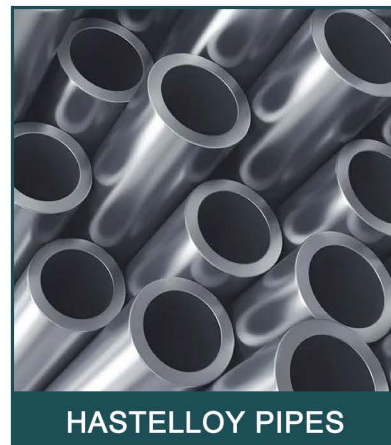
Tensile Strength : Psi – 1,15,000 , MPa – 790

Yield Strength : (0.2%Offset)Psi – 52,000 , MPa – 355

Elongation : 40 %

### Applications

Duplex Stainless Steel Pipes are used in Heat Exchangers, Instrumentation, Hydraulic & Pneumatic system, Nuclear Power Plants, Automotive industries, Aerospace, Medical, Pharmaceutical, Oil coolers, Pre-heater, Economizers, Condenser, LNG, Pulp and paper, Offshore construction, Food and pharmaceutical processing, Desalination and waste water projects, Aircraft Tubing, Electrical Submersible Pump.



## Mild Steel Pipes

We provide large quantities of the Mild Steel pipes in both seamless & welded types with a wide range of dimensions, so that they can fit to any size and shapes.

### ASENFAB supplied Specifications of Mild Steel Pipes :

Size : 15mm NB to 150mm NB (1/2" to 6"), 7" (193.7mm OD to 20" 508mm OD)

Form : Round, Square, Rectangular, Coil, U Tube,

Length : As per customer's requirement (Maximum upto 7 meters)

End : Plain End, Bevelled End

Type : Seamless / ERW / Welded

Certification For Mild Steel : Mill Test Certificate as per EN 10204 / 3.2B

Dimensional Tolerances : IS: 1239 (Pt I) – 2004, Equivalent to BS – 1387 / 1985

OD Range : 1.250" – 6.000" (30-150mm)

Wall Range : 0.095" – 1.000" (.25-25mm)



MILD STEEL PIPE

### Features

High strength, High resistance to pitting, crevice corrosion resistance, High resistance to stress corrosion cracking, corrosion fatigue and erosion, Good sulfide stress corrosion resistance, Low thermal expansion and higher heat conductivity than austenitic steels

Good workability and weldability, High energy absorption.

Dimensional accuracy, Excellent finish, Durable, Leak proof, Thermal resistance.

### Applications

Mild steel Pipes are used in Instrumentation, Offshore Fire Water Systems, Medical, Pharmaceutical, Economizers, Condenser, Furniture industries, domestic applications, Offshore construction, Food and pharmaceutical processing, Desalination and waste water treatment plants, Electrical Submersible Pumps.

MILD STEEL PIPES									
Nominal Bore		Outside Diameter		Light (A-Class) Thickness Weight		Medium (B-Class) Thickness Weight		Heavy (C-Class) Thickness Weight	
Inch	mm	Inch	mm	mm	kg/mtr	mm	kg/mtr	mm	kg/mtr
1/8"	3 mm	0.406	10.32	1.8	0.361	2		2.65	0.493
1/4"	6 mm	0.532	13.49	1.8	0.517	2.35	0.407	2.9	0.769
3/8"	10 mm	0.872	17.1	1.8	0.674	2.35	0.852	2.9	1.02
1/2"	15 mm	0.844	21.43	2	0.952	2.65	1.122	3.25	1.45
3/4"	20 mm	1.094	27.2	2.35	1.41	2.65	1.58	3.25	1.9
1"	25 mm	1.312	33.8	2.65	2.01	3.25	2.44	4.05	2.97
1.1/4"	32 mm	1.656	42.9	2.65	2.58	3.25	3.14	4.05	3.84
1.1/2"	40 mm	1.906	48.4	2.9	3.25	3.25	3.61	4.05	4.43
2"	50 mm	2.375	60.3	2.9	4.11	3.65	5.1	4.47	6.17
2.1/2"	65 mm	3.004	76.2	3.25	5.84	3.65	6.61	4.47	7.9
3"	80 mm	3.5	88.9	3.25	6.81	4.05	8.47	4.85	10.1
4"	100 mm	4.5	114.3	3.65	9.89	4.5	12.1	5.4	14.4
5"	125 mm	5.5	139.7	–	–	4.85	16.2	5.4	17.8
6"	150 mm	6.5	165.1	–	–	4.85	19.2	5.4	21.2

## Stainless Steel Pipes

Stainless Steel Pipes are widely used in petroleum, chemical, medical, food, light industry, machinery, instrument and other industrial pipeline and mechanical structure parts.

Stainless Steel Pipe according to the mode of production divided into two categories: Seamless Pipe and Welded Pipe, Seamless Steel Pipe can be further divided into Hot Rolled Pipe, Cold Rolling Pipe, Cold Drawn Pipe and Extruded Pipe, etc. Welded pipe is divided into Straight Seam Welded Pipe and Spiral Welded Pipe, etc.

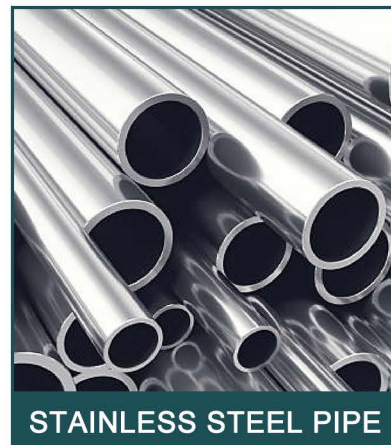
### **ASENFAB** supplied **Specifications of Stainless Steel Pipes :**

Grade : TP304/304L, 304H, TP316/316L, 316Ti, TP 317/317L, TP321/321H, TP347/347H, TP405, TP410, S31260, S31500, S31803, S32550, S32750, S32760.

Size : OD 1/8" NB to 24" NB, 1/4" OD to 24" OD sizes

Thickness : 4 mm THK to 100 mm THK

Specifications: ASTM A-269, A-268, A-213, A-789, Equivalent to ASME, EN, JIS Etc.



### **Features**

- State-of-art manufacturing facility
- Wide Product Range
- In House Inspection and Testing facilities
- Proven Track Records
- Good Technical expertise
- Having rich experience of serving various sectors
- Vendor approval with various EPC Contractors, End Clients and Consultants worldwide.

### **Applications**

Carbon steel Pipes are used in Instrumentation, Offshore Fire Water Systems, Medical, Pharmaceutical, Economizers, Condenser, Furniture industries, domestic applications, Offshore construction, Food and pharmaceutical processing, Desalination and waste water treatment plants, Electrical Submersible Pumps.

### Seamless Pipes & Tubes Material and Grades

Stainless Steel Seamless Pipes & Tubes : ASTM A312, A790 TP-304/L/LN/H/N, TP-316/L/LN/H/N/Ti, TP-317L, TP-317LM, TP-321/H, TP-347/H. ASTM A213 / A269 / A270 / A632 TP series - 201, 202, 304, 304H, 304L, 304N, 304LN, 309, 310, 310S, 316, 316H, 316L, 316LN, 316Ti, 317, 317L, 321, 321H, 347, 347H, 348, 348H, 904L, XM10, XM11, XM15, XM19, XM29.

Duplex & Super Duplex Steel Seamless Pipes & Tubes : ASTM A240 / ASME SA240 UNS NO S31803, S32205. Werkstoff No. 1.4462

Carbon Steel Seamless Pipes & Tubes : ASTM A53, ASTM A106 Gr. A , B & C API 5L Gr. A / B, X42 ,X52 ,X60, ASTM A 53 Gr. A/B, ASTM A 333 GR.1/6 ASTM A179, ASTM A192 ASTM A179, DIN 17175/2391 BS 3059/ Gr 1 & Gr 2, ASTM A 334 GR.1/8/6

Alloy Steel Seamless Pipes & Tubes : ASTM A530 / A530M ASTM A 335 GR.P- 1, ASTM A 335 GR.P- 5, ASTM A 335 GR.P- 9, ASTM A 335 GR.P-11, ASTM A 335 GR.P-22, ASTM A 335 GR.P-91. ASTM A 213 T1,T2,T5,T9,T11,T12,T22,T91 DIN 17175 CR.-MO Tubes

Nickel Alloy Seamless Pipes & Tubes : ASTM B163, B161, B725, B730 / ASME B163, B161, B725, B730 UNS 2200 (Nickel 200), UNS 2201 (Nickel 201), UNS 4400 (Monel 400), UNS 8020 (Alloy 20 / 20 CB 3, UNS 8825 Inconel (825), UNS 6600 (Inconel 600), UNS 6601 ( Inconel 601), UNS 6625 (Inconel 625), UNS 10276 (Hastelloy C 276)

Copper Alloy Seamless Pipes & Tubes : ASTM B466, B111, B469 / ASME SB466, SB111, SB469, UNS NO. C 92200, UNS NO. C 83600, UNS NO. C 10100, C 10200, C 10300, C 10800, C 12000, C 12200, Cupro Nickel 90/10 (C 70600), Cupro Nickel 70/30. (C 71500).

## Duplex Steel Sheets / Plates

Duplex 2205 Sheet / Plate can be hot rolled or cold rolled. The cold rolled plates range from 0.5mm to 6.4mm where the hot rolled plates range from 3mm to 10mm. But the sheets could be made from 0.1mm to 100mm in thickness with a width of 10mm to 2500mm. We are the supplier of these plates and sheets in custom sizes. The Duplex 2205 Plate is used in strong applications such as paneling, platforms, containers and in processing plants for corrosion resistance. It has chromium, nickel and molybdenum in its composition. The minimum tensile strength of the material is 621MPa and the minimum yield strength of the material is 448MPa.

### ASENFAB supplied Specifications of Duplex Steel Sheet / Plate :

- ASTM Specification : ASTM A240 / ASME SA240
- Standard : MSRR, AMS, BS, ASTM A240 / ASME SA240
- Length & Sizes : 1000 mm x 2000 mm, 1000 mm x 2000 mm, 1220 mm x 2440 mm, 1250mm x 2500mm, 1500mm x 3000mm to 6000mm, 2000mm x 4000mm to 6000mm, 1500 mm x 3000 mm, 2000 mm x 2000 mm, 2000 mm x 4000 mm, 2m, 2.44m, 3m, 36" X 120" or 48" X 144", 4' x 8', Cut to size available.
- Thickness : 0.1mm to 100 mm Thk
- Width : 10-2500mm
- Hardness : Soft, Hard, Half Hard, Quarter Hard, Spring Hard etc.
- Temper : Annealed
- Condition : Polished on both sides
- Finish : Hot rolled plate (HR), Cold rolled sheet (CR), 2B, 2D, BA NO(8), SATIN
- Stock in form of : Plate, Sheet, Coils, Foils, Rolls, Plain Sheet, Shim Sheet, Strip, Flats, Clad Plate, Rolling Sheet, Flat Sheet, Rolling Plate, Flat Shim, Blank (Circle), hot rolled, cold rolled, annealed, soft annealed, descaled, sheared, tread plate, Checker Plate
- Value Added Service : Cladding, Heat Treatment, Annealed, Pickling, Polish, Rolling, Cutting, Bending, Forging, Minor Fabrication Etc.
- Test Report :
  - 1 - Raw Materials Certificate
  - 2 - EN 10204/3.1B
  - 3 - 100% Radiography Test Report
  - 4 - High special strength, high melt point



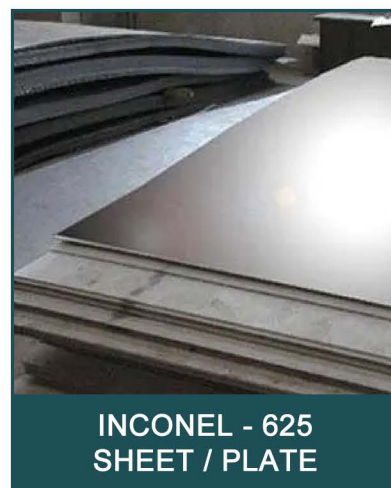
DUPLEX STEEL SHEET / PLATE

Duplex 2205 Plate Metric Dimensions		
Surface finish	Thickness (mm)	Width (mm)
B – Cold rolled, heat treated, pickled, skin passed	0.25 to 8.0	max. 2032
2D – Cold rolled, heat treated, pickled	0.4 to 6.35	max. 1524
2E – Cold rolled, heat treated, mechanically descaled	0.4 to 8.0	max. 2032
2R – Cold rolled, bright annealed	0.25 to 3.5	max. 1524
2H – Work hardened	0.4 to 6.35	max. 1524
Polished, brushed	0.5 to 4.0	max. 1524

Duplex 2205 Plate Imperial Dimensions		
Surface finish	Gauge (in)	Width (in)
2B – Cold rolled, heat treated, pickled, skin passed	10 to 24	max. 72
2D – Cold rolled, heat treated, pickled	12 to 24	max. 60
BA Mexinox only	18 to 28	max. 48
Polished (not brushed)	11 to 24	max. 60
Temper rolled Mexinox only	13 to 29	max. 48

## Inconel 625 Sheets / Plates

Inconel 625 Sheet / Plate is a high alloy high temperature resistant metallic sheet or plate that can operate at temperatures up to 1093 degrees Celsius. This superalloy is made up of nickel, chromium and molybdenum and is stabilized by niobium. We are the supplier of these plates and sheets in various sizes and scales. The Inconel 625 plate is resistant to saline and sea water. This is because the Alloy 625 sheet has high nickel content. The high corrosion allows the plates and sheets to be used in marine applications and equipment. The UNS N06625 Sheets are very strong with 930MPa minimum tensile strength which means they are stronger than most high alloys. With the strength of the ASTM B443 UNS N06625 they are used in sea water processing plants, flare stacks, aircrafts, fabrications, chemical processing plants and others.



### **ASENFAB** supplied Specifications of Inconel 625 Sheet / Plate :

- ASTM Specification : ASTM A240 / ASME SA240
- Standard : MSRR, AMS, BS, ASTM A240 / ASME SA240
- Length & Sizes : 1000 mm x 2000 mm, 1000 mm x 2000 mm, 1220 mm x 2440 mm, 1250mm x 2500mm, 1500mm x 3000mm to 6000mm, 2000mm x 4000mm to 6000mm, 1500 mm x 3000 mm, 2000 mm x 2000 mm, 2000 mm x 4000 mm, 2m, 2.44m, 3m, 36" X 120" or 48" X 144", 4' x 8', Cut to size available.
- Thickness : 0.1mm to 100 mm Thk
- Width : 10-2500mm
- Hardness : Soft, Hard, Half Hard, Quarter Hard, Spring Hard etc.
- Temper : Annealed
- Condition : Polished on both sides
- Finish : Hot rolled plate (HR), Cold rolled sheet (CR), 2B, 2D, BA NO(8), SATIN
- Stock in form of : Plate, Sheet, Coils, Foils, Rolls, Plain Sheet, Shim Sheet, Strip, Flats, Clad Plate, Rolling Sheet, Flat Sheet, Rolling Plate, Flat Shim, Blank (Circle), hot rolled, cold rolled, annealed, soft annealed, descaled, sheared, tread plate, Checker Plate
- Value Added Service : Cladding, Heat Treatment, Annealed, Pickling, Polish, Rolling, Cutting, Bending, Forging, Minor Fabrication Etc.
- Test Report :
  - 1 - Raw Materials Certificate
  - 2 - EN 10204/3.1B
  - 3 - 100% Radiography Test Report
  - 4 - High special strength, high melt point

Inconel 625 Plate Metric Dimensions		
Surface finish	Thickness (mm)	Width (mm)
B – Cold rolled, heat treated, pickled, skin passed	0.25 to 8.0	max. 2032
2D – Cold rolled, heat treated, pickled	0.4 to 6.35	max. 1524
2E – Cold rolled, heat treated, mechanically descaled	0.4 to 8.0	max. 2032
2R – Cold rolled, bright annealed	0.25 to 3.5	max. 1524
2H – Work hardened	0.4 to 6.35	max. 1524
Polished, brushed	0.5 to 4.0	max. 1524

Inconel 625 Plate Imperial Dimensions		
Surface finish	Gauge (in)	Width (in)
2B – Cold rolled, heat treated, pickled, skin passed	10 to 24	max. 72
2D – Cold rolled, heat treated, pickled	12 to 24	max. 60
BA Mexinox only	18 to 28	max. 48
Polished (not brushed)	11 to 24	max. 60
Temper rolled Mexinox only	13 to 29	max. 48

## Monel 400 Sheets / Plates

Monel 400 Sheet / Plate is a very high corrosion resistant material that has a very high melting point. So the sheets and plates are suitable for high temperature and high corrosion applications. We are the supplier of these sheets and plates. The Alloy 400 sheet is used in feed water and steam generator tubing, cladding of oil refinery crude columns, propeller shafts and pump shafts, heat exchangers, brine heaters, sulfuric acid and hydrofluoric acid alkylation plants and other high corrosive and high temperature applications. The ASTM b127 uns n04400 composition includes 63% nickel and 28% copper which allows it to be resistant to strong acids such as the sulfuric acid. The uns n04400 Plate operates at steam and heater elements because it has a high melting point of 1350 degrees Celsius.

### **ASENFAB** supplied Specifications of Monel 400 Sheet / Plate :

- ASTM Specification : ASTM A240 / ASME SA240
- Standard : MSRR, AMS, BS, ASTM A240 / ASME SA240
- Length & Sizes : 1000 mm x 2000 mm, 1000 mm x 2000 mm, 1220 mm x 2440 mm, 1250mm x 2500mm, 1500mm x 3000mm to 6000mm, 2000mm x 4000mm to 6000mm, 1500 mm x 3000 mm, 2000 mm x 2000 mm, 2000 mm x 4000 mm, 2m, 2.44m, 3m, 36" X 120" or 48" X 144", 4' x 8', Cut to size available.
- Thickness : 0.1mm to 100 mm Thk
- Width : 10-2500mm
- Hardness : Soft, Hard, Half Hard, Quarter Hard, Spring Hard etc.
- Temper : Annealed
- Condition : Polished on both sides
- Finish : Hot rolled plate (HR), Cold rolled sheet (CR), 2B, 2D, BA NO(8), SATIN
- Stock in form of : Plate, Sheet, Coils, Foils, Rolls, Plain Sheet, Shim Sheet, Strip, Flats, Clad Plate, Rolling Sheet, Flat Sheet, Rolling Plate, Flat Shim, Blank (Circle), hot rolled, cold rolled, annealed, soft annealed, descaled, sheared, tread plate, Checker Plate
- Value Added Service : Cladding, Heat Treatment, Annealed, Pickling, Polish, Rolling, Cutting, Bending, Forging, Minor Fabrication Etc.
- Test Report :
  - 1 - Raw Materials Certificate
  - 2 - EN 10204/3.1B
  - 3 - 100% Radiography Test Report
  - 4 - High special strength, high melt point



Monel 400 Plate Metric Dimensions		
Surface finish	Thickness (mm)	Width (mm)
B – Cold rolled, heat treated, pickled, skin passed	0.25 to 8.0	max. 2032
2D – Cold rolled, heat treated, pickled	0.4 to 6.35	max. 1524
2E – Cold rolled, heat treated, mechanically descaled	0.4 to 8.0	max. 2032
2R – Cold rolled, bright annealed	0.25 to 3.5	max. 1524
2H – Work hardened	0.4 to 6.35	max. 1524
Polished, brushed	0.5 to 4.0	max. 1524

Monel 400 Plate Imperial Dimensions		
Surface finish	Gauge (in)	Width (in)
2B – Cold rolled, heat treated, pickled, skin passed	10 to 24	max. 72
2D – Cold rolled, heat treated, pickled	12 to 24	max. 60
BA Mexinox only	18 to 28	max. 48
Polished (not brushed)	11 to 24	max. 60
Temper rolled Mexinox only	13 to 29	max. 48

## Stainless Steel Sheets / Plates

Stainless Steel Sheet is a thin layer of stainless steel often ranging up to 6mm in thickness. The sheets are used in various applications for various purposes. We are a leading supplier of stainless steel sheets, plates, coils, strips, foils and other products. The Stainless Steel Sheet is a thicker product than the sheets. While the sheets are used for flexible applications and as cladding material over others, the plates are used for more structural applications for strength such as tankers, containers and platforms. The Stainless Steel Coil can be used in heating applications such as the boilers, heat exchangers and super heaters.

### ASENFAB supplied Specifications of Stainless Steel Sheet / Plate :

- ASTM Specification : ASTM A240 / ASME SA240
- Standard : MSRR, AMS, BS, ASTM A240 / ASME SA240
- Length & Sizes : 1000 mm x 2000 mm, 1000 mm x 2000 mm, 1220 mm x 2440 mm, 1250mm x 2500mm, 1500mm x 3000mm to 6000mm, 2000mm x 4000mm to 6000mm, 1500 mm x 3000 mm, 2000 mm x 2000 mm, 2000 mm x 4000 mm, 2m, 2.44m, 3m, 36" X 120" or 48" X 144", 4' x 8', Cut to size available.
- Thickness : 0.1mm to 100 mm Thk
- Width : 10-2500mm
- Hardness : Soft, Hard, Half Hard, Quarter Hard, Spring Hard etc.
- Temper : Annealed
- Condition : Polished on both sides
- Finish : Hot rolled plate (HR), Cold rolled sheet (CR), 2B, 2D, BA NO(8), SATIN
- Stock in form of : Plate, Sheet, Coils, Foils, Rolls, Plain Sheet, Shim Sheet, Strip, Flats, Clad Plate, Rolling Sheet, Flat Sheet, Rolling Plate, Flat Shim, Blank (Circle), hot rolled, cold rolled, annealed, soft annealed, descaled, sheared, tread plate, Checker Plate
- Value Added Service : Cladding, Heat Treatment, Annealed, Pickling, Polish, Rolling, Cutting, Bending, Forging, Minor Fabrication Etc.
- Test Report :
  - 1 - Raw Materials Certificate
  - 2 - EN 10204/3.1B
  - 3 - 100% Radiography Test Report
  - 4 - High special strength, high melt point



**STAINLESS STEEL SHEET / PLATE**

Stainless Steel Plate Metric Dimensions		
Surface finish	Thickness (mm)	Width (mm)
2B – Cold rolled, heat treated, pickled, skin passed	0.25 to 8.0	max. 2032
2D – Cold rolled, heat treated, pickled	0.4 to 6.35	max. 1524
2E – Cold rolled, heat treated, mechanically descaled	0.4 to 8.0	max. 2032
2R – Cold rolled, bright annealed	0.25 to 3.5	max. 1524
2H – Work hardened	0.4 to 6.35	max. 1524
Polished, brushed	0.5 to 4.0	max. 1524

Stainless Steel Plate Imperial Dimensions		
Surface finish	Gauge (in)	Width (in)
2B – Cold rolled, heat treated, pickled, skin passed	10 to 24	max. 72
2D – Cold rolled, heat treated, pickled	12 to 24	max. 60
BA Mexinox only	18 to 28	max. 48
Polished (not brushed)	11 to 24	max. 60
Temper rolled Mexinox only	13 to 29	max. 48