

MSITM

MSI-Forks

About Fork-arms

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QUALITY

There are International Standards that control the fork arms quality, safety and dimensional tolerances.

MSI-Forks rigorously complies with the ISO standards below:

- 1. ISO 2330:** controls the technical characteristics, fabrication and testing required for the fork arm to meet the desired level of resistance and safety.
 - Yield load test: capacity safety factor of 3:1
 - Fatigue test: support over one million lifting cycles with 1.25 of its rated capacity
 - Crack detection: 100% checked against surface crack
 - Marking: capacity, load center, manufacturer and traceability number
- 2. ISO 2328:** controls the mounting dimensional tolerances of hook type fork arms and truck carriages. It sets the fork mounting class I, II, III, IV or V and type A or B to guarantee a perfect fit with the truck carriage.
- 3. ISO 5057:** controls the inspection and repair procedures of fork arms in service. It guarantees the safety of the material handling operation.

Apart from the above, fork arms can also be controlled by International Associations, such as:

- 1. ITA:** Industrial Truck Association, USA
- 2. FEM:** European Federation of Materials Handling, Europe
- 3. JIVA:** Japan Industrial Vehicles Association, Japan

The fork arm production process at MSI-Forks is regimented by an ISO 9001 certified quality control system that delivers consistency material output of the highest standards. Each critical step in the manufacturing process is controlled, measured, verified and recorded.



FABRICATION

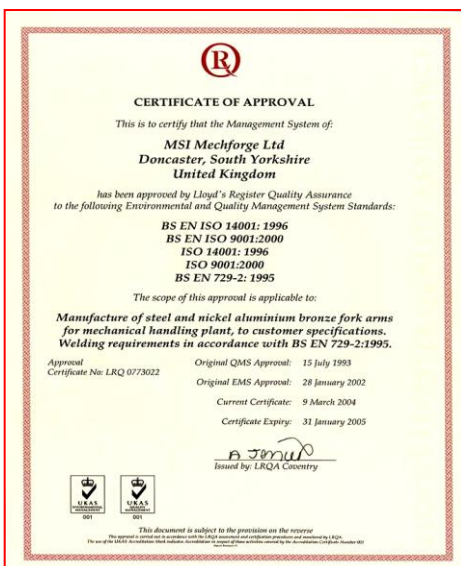
MSI-Forks starts with the choice of the highest quality raw materials and only uses Carbon Boron Steel, which withstands the challenges of day-to-day use.

The main production steps at MSI-Forks are:

1. **TAPER:** Cutting or forging the steel bar according to the fork length
2. **FORGE:** Bending and upsetting the steel bar or hammer forging the billet
3. **HEAT TREAT:** Altering the material properties to reach the desired hardness
4. **WELDING:** Setting up and welding mounting components to the fork arm
5. **INSPECTION:** Crack test every fork and check dimensional tolerances
6. **FINISHING:** Shot blast and paint the final fork arm

The manufacturing process used by MSI-Forks is one of the most modern in the world, using fully and semi automated production lines.

All forks produced by MSI-Forks have 1 year warranty against manufacturers defects.



FORK TYPES

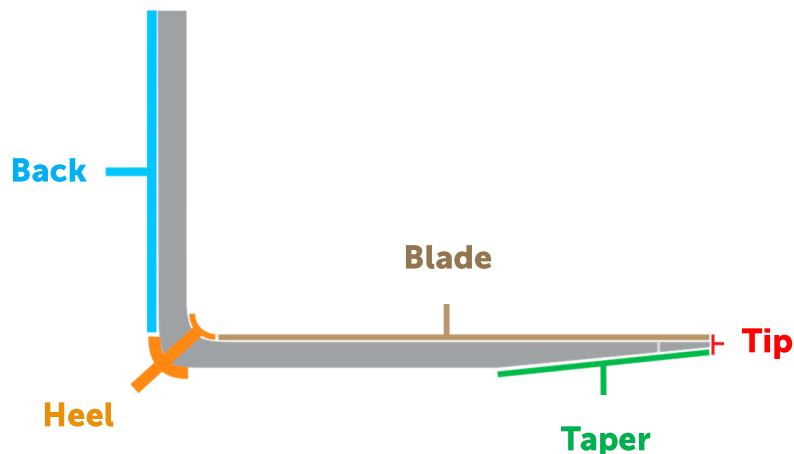
There are several types of forks to perfectly fit each material handling application and machinery. Identifying the correct fork is the best way to maximize your equipment safety and performance.

FORK TYPES

1. **HOOK TYPE (ISO 2328 or ITA):** Hook forks are the most common fork in the market. Hook type forks have dimensional tolerances controlled by international standards ISO 2328 and/or ITA.
2. **PIN TYPE:** Pin type forks usually fit construction machinery and medium capacity lift trucks (above 7 tons). Pin type dimensional tolerances will vary for each type and model of machinery.
3. **BIG FORKS:** Big forks are high capacity fork-arms, usually above 20 tons. There is a wide variation of suspension types and section sizes, which makes every Big Fork unique.
4. **CUSTOM MADE:** Custom made is a fork-arm specially produced to meet a special material handling requirement. Example, spark resistant forks.

FORK TERMINOLOGY

The Fork basic structure is composed of: Blade, Back, Heel, Tip, Taper and Suspension or Attachment devices (hooks, tubes, brackets or others to hang the fork on the truck carriage).



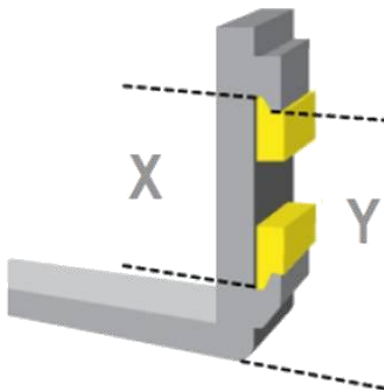
HOOK TYPE FORK

Hook type forks are classified and controlled by the international standard ISO 2328 or ITA (see Table and Figure below).

The classes are set according to the fork capacity and carriage dimensions (distance between hooks, dimension X). There are two main class types, A and B, set by the under head height distance of the top hook to the ground (dimension Y). The most common type is the class A.

TABLE (only most common standards):

ISO 2328 / ITA	Capacity (kg & lbs)	X (mm & inches)	Y (mm & inches)
2A	1000 – 2500 kg 2.200 – 5.500 lbs	407mm 16"	470mm / 18.50"
2B			546mm / 21.46"
3A	3000 – 4500 kg 5.501 – 10.000 lbs	508mm 20"	568mm / 22.36"
3B			695mm / 27.32"
4A	5000 – 7000 kg 10.001 – 17.500 lbs	635mm 25"	744mm / 29.25"



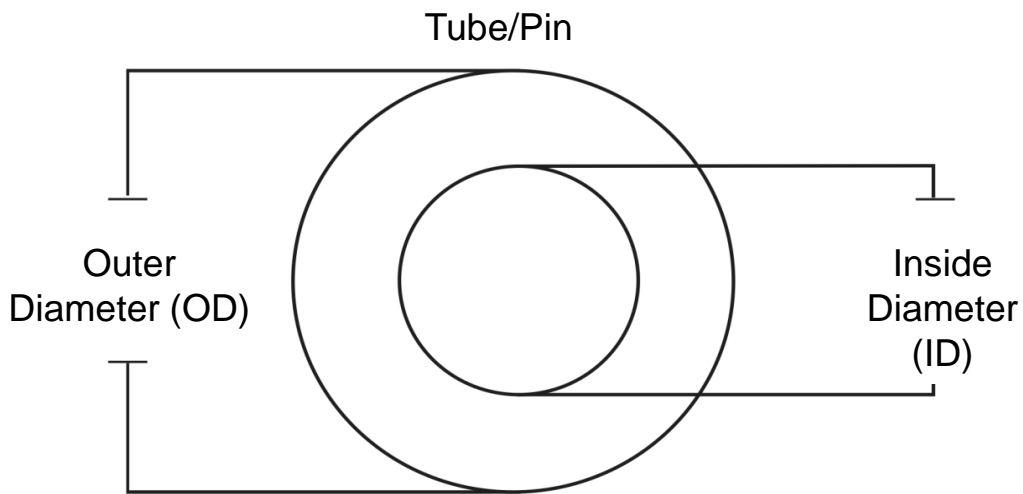
Respecting the carriage dimensional tolerances, hook type forks can have a wide range of blade lengths and section sizes.

PIN TYPE FORK

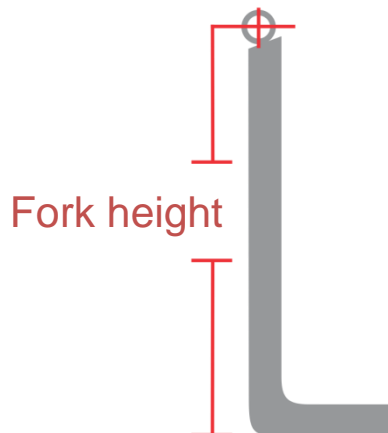
Pin type forks are hanged to the truck carriage using a welded tube/pin. The tube/pin dimensional tolerances and position are unique for each model and type of equipment.

Below we have 3 easy steps to help you define the Pin/Tube dimensions and position of your forks:

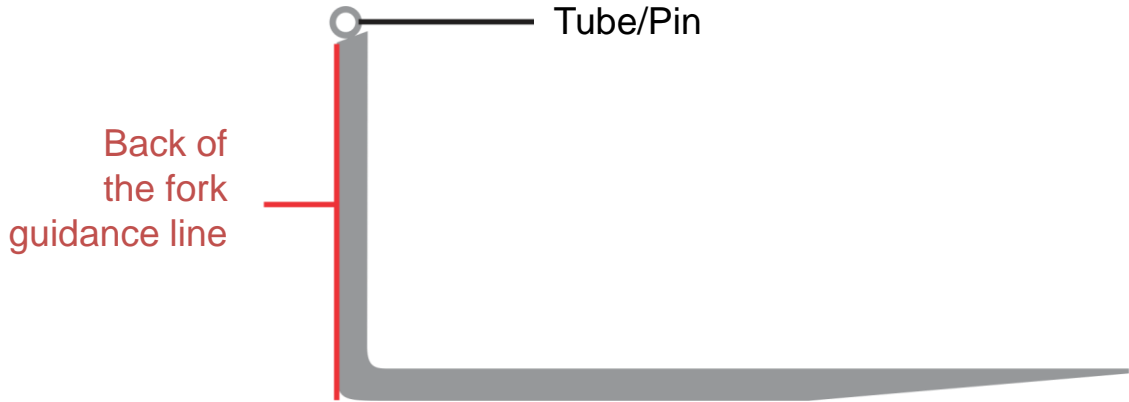
1. Tube/Pin diameter: measure the inside and outer diameter of the tube/pin.



2. Fork height: measure the distance from the center of the tube/pin to the ground. This is known as the working height of the fork.



PIN TYPE FORK



3. Tube/Pin position: there are 3 different tube/pin positions, Inline, Inset and Offset. You have to select one.

INLINE: the center of the Tube/Pin is positioned Inline in relation to the back of the fork (red guidance line).



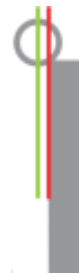
Inline: no measure required

INSET: the center of the Tube/Pin is positioned Inset in relation to the back of the fork (red guidance line). In this case, you need to inform the Inset distance from the back.



Inset: measure distance from red line (back of the fork) to green line (center tube)

OFFSET: the center of the Tube/Pin is positioned Offset in relation to the back of the fork (red guidance line). In this case, you need to inform the Offset distance from the back.



Offset: measure distance from red line (back of the fork) to green line (center tube)



BIG FORKS

Big Forks are specially forged to handle loads above 20 tons up to 150 tons and beyond.

Due to its application nature, Big Forks require extra production expertise and flexibility. Every Big Forks is forged to fit a specific application requirement and machinery.

MSI Big Forks have two forging processes:

- **Closed die forging:** the most common process to forge fork-arms. This process uses rolled bars and delivers consistent product reproducibility.
- **Open Hammer forging:** very specialized forging process, which requires years of expertise. This process delivers immense flexibility of product configuration. It starts with a square billet that can be forged to any section size and shape.

Big Forks have several suspension types with different dimensional tolerances and devices, some of the traditional models are:

- Terminal west
- Roller type
- Pin/Tube type
- Blanks (no attachments)
- Inverted forks
- Custom made



CUSTOM MADE

Custom Made forks are forged to meet a very specific application requirement. These forks are made to order according to customer's specification. Custom Made forks can have standard ISO/ITA suspension or any other configuration.

Some of the Custom Made forks are:



INVERTED FORK



STAINLESS STEEL



FULL TAPER & POLISHED (FTP)



CRANKED FORK

