CBI Product Factsheet:

Jigs, Fixtures and Welding Jigs in Europe
**Introduction**

Many countries in Europe are home to some kind of assembly line production and therefore need jigs and fixtures. It means that many European countries offer good market opportunities. Currently, only China has established as supplier to Europe, at large distance followed by India and Turkey. The high labour content in jigs and fixtures production is, in fact, an opportunity for Developing Country producers. However, the complex nature of jigs and fixtures is also a barrier for subcontracting jigs and fixtures production to producers overseas. Developing Country producers that are able to show strong ambition and strong communication skills drastically improve their change of success.

**Product description**

Jigs are custom-made tools used to control the location and/or motion of another tool. A jig’s primary purpose is to provide repeatability, accuracy, and interchange ability in the manufacturing of products.

A jig is often confused with a fixture. While a fixture holds the work in a fixed location, the device that does both (holding the work and guiding a tool) is called a jig. Examples of fixtures are vises and chucks.

Welding jigs are also called ‘frame jigs’. They can be defined as follows: a device designed to allow something being welded to be held such that the intended shape is made and can be repeatedly made using the jig. That way each unit coming out of the jig has the same dimensions. In other words: welding jigs are a special type of jigs, controlling the location and/or motion of welding equipment. Welding jigs are applied in medium to high volume production lines. Such production lines can be found in many industries, from car, bicycle and truck manufacturing to the fabrication of household equipment (e.g. beds) and pre-fabrication of welded constructions and equipment for e.g. machinery.

When ‘jigs and fixtures’ are referred to in this survey, this concerns the selection of products in Table 1 of Annex 1, unless stated otherwise.

**Geographic scope**

The geographic scope is Europe, however, in certain parts of this survey, the focus is on a selected group of countries. Germany, France, Spain, the United Kingdom and Italy have been selected as these countries are among the largest importers of jigs and fixtures in Europe and also import these from Developing Countries. When ‘focus countries’ are referred to in this survey, this concerns the selection of these five countries, unless stated otherwise.

**Product specifications**

Jigs and fixtures are often tailor-made, as they need to fit to the products which they need to hold. They are usually made of hardened materials, such as cast iron, die steel, CS and HSS) to resist wear and to avoid frequent damage.

The following pictures also show the large variety in jigs and fixtures.

Specifications of jigs and fixtures as required by European buyers can be categorised as follows: great precision in positioning and location, maximum possible adaptability and process safety, and easy maintenance:

- **Production tolerance/Precision.** The jigs/fixtures must offer the required precision during production. Accurate dimensions of the final products can be very demanding, e.g. in the case of welding jigs for bed frames production tolerances may have a maximum of $\pm 0.5$ mm.\(^1\)

- **Adaptability.** In many cases customers require the jigs/fixtures to be used in the manufacturing of more than one product. Therefore, they want the jig or fixture to accommodate the production of various width and length combinations. Welding cases therefore must have engagement points for all the product variants that a customer wants to make on the production line, and lift arrangements in the jigs may be necessary to accommodate different products. In addition, shims can be used at critical tolerance positions in the welding jigs to compensate for distortion of the product during welding. These shims allow adjustment during test phase or set-up trials.

- **Safety and easy maintenance.** The jigs and fixtures must guarantee optimum safety during production and offer good ergonomics and ease of use to machine operators. This may include, for example, tilting lift design.

The welding jig should also be strong enough to resist scratch and erosion, and to protect against welding impact and spatter adhesion. For example, welding jigs can be made of high quality plasma nitride steel (hardness >700 HV).

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\(^1\) Notwithstanding the clear categorisation of certain types of products, definitions of what constitutes low-, medium-, and high-precision items vary by product application and end-use market. Therefore, the final use and intended market segment or consumer affect the levels of precision needed and the subsequent degree of accuracy built into the required jigs and fixtures.
The development of jigs/fixtures for a European customer can take between 4-50 weeks, depending on the customer’s requirements, and depending on the basis – some projects start from scratch, in other projects can be started from existing established designs. The projects for which Developing Country exporters could act as partner, take approximately 8-12 weeks.

There are many variations in the production set-up possible, varying from fully or semi-automatic to manually operated. For example, the clamping and discharge of components can vary (e.g. manually or pneumatic), and also the welding, inspection etc. can vary between manual or 100% automatic operation.

**Labelling and packaging**

Depending on the product characteristics and customer wishes, jigs and fixtures are packed in wood, plastic or in containers. In the case of a heavy fixture (jigs are usually lighter of weight), for example, the outer package is a heavy box with the jig or fixture secured with help of a range of supporting materials, such as wooden beams (also refer to Picture 8-10 for examples). The package for ocean transportation may be wooden pallets wrapped with wooden sheeting, strengthened with metal strips on the exterior. In some cases, the packaging and labelling requirements are included in the customer’s specifications. Last but not least: packaging is always labelled, not only for the purposes of identification during transport, but also to indicate the quantity, weight, the products themselves and the producer’s name. The packaging should also represent the relevant company’s image.

**What is the demand for jigs and fixtures in Europe?**

**Imports**

*Figure 1-6: Imports of jigs and fixtures to Europe and focus countries, by main origin (2010-2014), in € million*
Germany

![Chart for Germany showing data from 2010 to 2014 for Europe, Developing Countries, and Rest of the World.]

France

![Chart for France showing data from 2010 to 2014 for Europe, Developing Countries, and Rest of the World.]

Europe
Developing Countries
Rest of the world
Figure 7: Absolute growth in imports of jigs and fixtures from developing countries (2010-2014), in € million (countries in range of largest importers)

Source: Trademap
• European imports of jigs and fixtures reached €1.4 billion in 2014. Average annual growth in 2010-2014 was 17%.
• The share of European imports from developing countries peaked in 2011 (9%) and decreased to 7.2% in 2014. Most imports originate from intra-European sources (65% of all imports). For the coming years, the share of imports from developing countries is predicted to remain stable.
• The five focus countries represented only 43% of European imports in 2014. This relatively low share reflects the fact that many countries in Europe are home to some kind of assembly line production and that they therefore need jigs and fixtures.
• The leading importer is Belgium, followed by Germany, the United Kingdom, France, Spain and Italy. Germany is the leader in imports from developing countries, followed by Italy and, at some distance by the United Kingdom, Poland, France and Spain.
• The import of jigs and fixtures is expected to show a small growth in the next few years, in the range of 0-2%.

Leading suppliers

• Germany, the Czech Republic, Italy and Switzerland are the four leading intra-European suppliers.
• Japan is by far the largest supplier in the category ‘rest of the world’, followed by the USA and South Korea.
• Imports from developing countries are dominated by China, followed at a considerable distance by India, Bosnia and Herzegovina, and Mexico.

Tip:
• Benchmark your company against your peers from China and also those from European countries. Several factors can be taken into account, such as market segments served, perceived price and quality level, countries served, etc. One source that could be used to find exporters of jigs and fixtures per country is ITC Trademap.

Exports

Figure 8: Exports of jigs and fixtures from Europe, by main destination (2010-2014), in € million

Source: Trademap

Figure 9: Leading exporters of jigs and fixtures (2014), in € million
- European exports of jigs and fixtures reached €1.6 billion in 2014. Average annual growth in 2010-2014 was 11%.
- The share of European exports to developing countries has shown remarkable development in the period under review. From almost 24% in 2010, it reached almost 26% in 2012, thereafter decreasing to 22% in 2013 and to just under 22% in 2014. For the coming years, the share of exports to developing countries is predicted to grow to 23%-24%.
- The five focus countries represented 66% of all European exports in 2014.
- The leading exporter is Germany, accounting for 40% of total exports from Europe, followed at considerable distance by Italy and France (9%), the Czech Republic (6%), the Netherlands, Austria and the United Kingdom (5%).
- Germany is the leading exporter to developing countries, accounting for 50% of all European exports to developing countries. France is in the second position, followed by Italy.

European exports of jigs and fixtures are expected to grow slightly in the next few years, in the range of 0%-2%.
Production and apparent demand

Figure 10: European production of jigs and fixtures (2009-2013), in € million

Source: Eurostat Prodcom

Figure 11: Main European producers of jigs and fixtures, 2013

Source: Eurostat Prodcom
European apparent demand amounted to a total of €1.2 billion in 2013, following an average annual increase of 12% in the period 2009-2013 (this was partly due to the weak reference year of 2009).

The machine tool and welding equipment industry (and thus also the demand for jigs and fixtures) experienced growth in production and exports until 2008-2009, when it was hit by the economic turmoil, which led businesses to postpone new tooling and equipment purchases. Since 2010, the European market has increased year by year, with highest annual growth realised in 2011 (+30%).

Germany accounts for one fifth of the European market, followed by the United Kingdom and France (both 9%), Spain (8%) and Italy (6%). Each focus country has its own specific market profile. The six focus countries can be described as follows:

- Germany is the number one producer in virtually every industry in Europe. The country is well-known for its output of machinery, cars and electronics.
- Key manufacturing sectors in the United Kingdom include aerospace, automotive, defence equipment and electronics. The United Kingdom has a long tradition of producing machinery and equipment. Important market segments include 'Agricultural Machinery', and 'Construction, Quarying and Mining Machinery'.
- Italy’s main industries are iron and steel; machinery; motor vehicles; footwear; and ceramics. After Germany, Italy is the 2nd largest machinery producer in Europe; the country produces virtually all categories of machinery.
- France’s leading industries produce a wide range of machinery, automobiles, metals, aircraft, and electronics equipment. Most machinery production is focussed on agricultural machinery, and machinery for textile, apparel and leather.
- Spain is home to manufacturing of metals and metal products, ships, automotive, machine tools, footwear, ceramics and medical equipment.

**Tip:**
- Developing Country exporters should focus on the countries with relatively high production output of jigs and fixtures. These countries are home to a relatively large number of producers which offer subcontracting opportunities to Developing Country exporters. These countries are, in range of importance, Germany, United Kingdom and Italy. In terms of market size, France and Spain seem interesting, however these markets are mostly supplied by imports from other European countries (primarily Germany).
The major determinant of jigs and fixtures demand is spending activity in the end-user industries. Jigs and fixtures demand depends mainly on the demand for new equipment and the level of investments in new products in a wide range of industries, such as automotive, rolling stock production, construction equipment, and other industries in which assembly line production is common. In general, both are stimulated by economic growth, however note that some market segments are relatively stable (e.g. medical), others are very sensitive and not always following GDP development (e.g. automotive), while electronics and the engineering industry have a cycle that mostly corresponds to GDP development.

In each focus country, GDP is expected to show continued growth year on year in the years to come. Evidently, it is a profound basis for continuous demand and import growth in the coming years.

The profitability of jigs and fixtures imports is influenced by the exchange rate between the euro and the US dollar, as products that are sourced globally are paid in US dollars. While earlier forecasts did not predict this exchange rate to surpass 0.80 until 2020, it reached this point in 2015, with an exchange rate of 0.90 in June 2015. This is having a major effect on the price of imports. Particularly if it persists for several years, this situation will have a negative impact on the level playing field of European imports paid in US dollars, relative to local European production.

What trends offer opportunities on the European market for jigs and fixtures?

In Europe, jigs and fixtures are relatively complex and expensive manufacturing tools to design and produce, mainly because of a high labour content on the development, engineering, manufacturing and testing. This is, in fact, an opportunity for Developing Country producers. However, the complex nature of jigs and fixtures is also a barrier for subcontracting jigs and fixtures production to producers overseas. Moreover, while they are expensive to make, well-designed jigs and fixtures guarantee, stable product quality, long lifetime with relatively low maintenance costs, and increase of profit and production efficiency.
Technological drivers

- The automotive industry is often a frontrunner in new developments and trends. Probably the major trend in the automotive industry is the further downsizing of engines, which will stimulate the need for machining smaller parts. Suppliers of manufacturing tools, including jigs and fixtures, will need to adapt to this development by also reducing the footprint of tools by 1) shifting to more environmentally-friendly processes and 2) making equipment and tools smaller.
- European machine tool producers are focused on high-end, customised machines with relatively longer production cycles, as opposed to standard machines with short lead times. Major technological trends in this high-end segment include:
  - advances in machining technologies to achieve faster processes with fewer resources;
  - processing technologies for new materials (such as glass, composites, titanium);
  - advances in precision, reliability and productivity;
  - increasing automation to eliminate monotonous work and ensure a more extensive scope of delivery;
  - improvements in machine-user interface to improve safety and ergonomic aspects.
- Jigs and fixtures are seen more and more as part of the manufacturing process, not as an independent resource with no connection to other processes. Jigs and fixtures makers in Europe therefore strive to ensure their integration to the value chain of their customers. Within this context, lean production, co-design and cooperation with customers and other suppliers are becoming more and more important.

Economical drivers

- The robust levels of the manufacturing indicators suggest that the manufacturing recovery in Europe looks set to gain further strength in 2015 and beyond. Strongest growth is expected in investment in machinery and equipment – posting some 3% growth in 2014 and 4.5% in 2015. This forecast offers a good perspective for jigs and fixtures sales in Europe in the next few years.

Refer to the CBI document on Trends for Metal Parts and Components for general trends for metal parts and to its document on Trends for Automotive parts and components for trends in the automotive industry.

With which requirements should jigs and fixtures comply in order to be allowed on the European market?

Requirements can be divided into: (1) legal requirements you must meet in order to enter the market and (2) additional requirements, which are those most of your competitors have already implemented, in other words, the ones you need to comply with in order to keep up with the market.

You can find a general overview of the EU buyer requirements for metal parts on the Market Intelligence Platform of CBI. In addition, refer to the EU Export Helpdesk, the ITC Market Access Map and the ITC Standards Map for more information on gaining access to the European market.

Legal requirements

As jigs and fixtures are only parts used in manufacturing processes, virtually no legislative requirements are applicable. The only relevant legislation is related to packaging: Wood packaging materials used for transport (including dunnage) (Directive 2000/29/EC): Europe sets requirements for wood packaging materials such as packing cases, boxes, crates, drums, pallets, box pallets and dunnage (wood used to wedge and support non-wood cargo).

For jigs and fixtures, a 1.2% (jigs and fixtures) or 2.7% (welding jigs) duty is levied on European imports from countries outside Europe, among which is also China. Several countries benefit from a preferential 0% tariff, for example Turkey and South Africa. The TARIC database shows more details for Chapters 8466 and 8515. Note that it is only possible to claim a preferential tariff treatment with a Certificate of Origin.

Tip:

- Make sure that your wood packaging material qualifies for the European market. If you are not sure, ask your wood packaging material supplier for clarity. Your wood packaging material supplier should take any further action required in order to comply with the Directive. If the supplier is not able to do so, you can possibly switch to another supplier.
Additional requirements

The customer’s main requirements will be related to the jigs and fixtures itself, as described at pages 2-3 in "Production tolerance/Precision", "Adaptability" and "Safety and easy maintenance" above.

Furthermore, certification according to ISO 9001 is a minimum which European buyers expect when searching for new suppliers. Other certification, such as OHSAS 18001 (health and safety), can be beneficial when promoting your company and products to potential customers. There are also a few ISO and EN standards applying to jigs and fixtures.

Last but not least, as the development of jigs/fixtures for a European customer can take between 4 to 50 weeks, Developing Country producers need to possess strong communication skills. This not only applies to the communication skills of the sales manager (who is mainly involved in the presales and aftersales process) but it is even more important for the engineering and quality assurance and control department. This factor should not be underestimated, and is in fact also a reason why European companies often choose a local partner for such development projects.

European customers may also want to keep control of all design, technical documents, and sometimes they even want to keep ownership. Probably, to ensure this, European customers may want to settle how the jigs and fixtures will be handled up front during the contract negotiations.

What do the trade channels and interesting market segments for jigs and fixtures look like in Europe?

European jigs and fixtures makers are the foremost trade channel for jigs and fixtures producers from Developing Countries. Producers in Europe often employ subcontractors, including those from low-cost countries, which can be low-cost European countries but also Developing Countries.

There are a few other trade channels, however, these are less important. They include direct sales with end users of jigs and fixtures, and trade with distributors. The best way to approach prospects in Europe is to exhibit at the leading European trade fairs, such as EMO, AMB or METAV in Germany.

The end users of jigs and fixtures are manufacturing companies that operate in a wide range of industries, e.g. automotive, rolling stock production, construction equipment, and other industries in which assembly line production is applied. Figure 14 displays the available European trade channels for Developing Country exporters of jigs and fixtures. As the thickness of the arrows emphasises, the European jigs and fixtures maker (producer) is the most important trade channel for the Developing Country jigs and fixtures maker. Another, less important channel is the intermediary channel (importers/distributors). After Figure 14 follows a short list of companies that can be interesting prospects in the focus countries. Note that sources to find prospects are included in the section "Useful sources".

Figure 14: Trade structure for jigs and fixtures in Europe

Europe is home to several interesting players. As each company is unique, with its own customers, market segments and products, the profile of the potential partner is very important. You are very likely, however, to find a match. Below follows a short list of examples of prospects for each focus country.

For more information also refer to CBI’s 1) Market Channels and Segments and 2) Competition for Metal Parts and Components. Sources to find prospects are included in the section “Useful sources”.
Germany
- Producers of jigs and fixtures: ALLMATIC-Jakob Spannsysteme, DEMMELER Maschinenbau & Co, Erwin Halder KG, Heinrich Kipp Werk KG, Schunk
- Producers of fixtures: ANDREAS MAIER & Co, BEST, BISON, Kemmler Präzisionswerkzeuge
- Producers of welding jigs - Forster Welding Systems, Robolution
- Röhm - Producer of chucking tools including vices

United Kingdom
- Producers of fixtures: Craftsman Tools Limited, Taylor Design Engineering, TOP, TQC
- Major Designs Limited – producer of jigs, fixtures, robotic welding tooling
- TRS Engineering Services – producer of jigs and fixtures for machining, welding and assembly

Italy
- Producers of fixtures: Gerardi and Scm.
- Meccanotecnia Centro – producer of jigs for welding
- Mille Miglia Engineering – producer of jigs and fixtures for welding

France
- Producers of welding jigs: Ets Bergheaud and FARMAN.
- Loiretech – producer of fixtures
- Norelem SAS – producer of jigs and fixtures

Spain
- Producers of jigs and fixtures: INDUSTRIAS RÍOS and UTILVIGO GROUP
- Umec – producer of jigs and fixtures for welding

What are the end-market prices for jigs and fixtures?
To establish an export price, you need to consider many of the factors involved in pricing for the domestic market:
- Aim to charge the price the market will bear and keep in mind the quality-price ratio of your products. It should be in line with competitor prices;
- Pricing is a mix of knowing your domestic costs and calculating costs you will incur in delivering and supporting your activities in a foreign market;
- The negotiated price depends on the delivery conditions, means of payment, credit terms and currency risks, quantities and the means of transport;
- Exchange rates fluctuate. Cover this risk by including the currency risk in the contract.

Tip:
- Include the currency risk in the contract.

Useful sources
France
- Finding prospects: ABC Direct, Cyclex.
- Associations: Association for Manufacturing Technologies
- Trade fairs: Midest, Industrie Expo.

Germany
- Finding prospects: German Commercial Agents Directory, Wer liefert was?, Rotes Buch
- Trade fairs: EMO, AMB, METAV and MOTEK.
• Associations: German Machine Tool Builders Association, VDMA.

Italy
• Associations: Italian Moulding Association, Italian Machine Tool Association, Federation of the Italian associations of mechanical and engineering industries, Italian Welding Association
• Finding prospects: Azienda in fiera, Confindustria, Italy Business.
• Trade fairs: EMO Milano

United Kingdom/Spain
• Associations: UK association for precision engineering and tooling, Manufacturing technologies association, Spanish Association of Machine Tool Manufacturers
• Trade Fairs: Manufacturing UK - every year in Worcester, International Machine Tool Exhibition - every 2 years in Bilbao.
• Magazines: Machinery - monthly magazine for machine tools

Other
• International associations: Int. Special Tooling & Machining Association, EU Association of Machine Tools Industries, European Welding Association
• International magazines: European Tool & Mould Making (ETMM)
• Trade fair databases: AUMA, Eventseye.
• Trade statistics: Eurostat, ITC International Trade Statistics
• Other: EU Export Helpdesk, Kwintessential.
Annex

Four codes have been selected for jigs and fixtures. See also Table 1 below for the classification and the Prodcom codes used for the production statistics.

Table 1: Selected products, based on CN and Prodcom nomenclature

<table>
<thead>
<tr>
<th>Subsector and product groups</th>
<th>CN code</th>
<th>Prodcom code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jigs and fixtures – work holders for machine tools</td>
<td>84662010</td>
<td>28492230</td>
<td>work holders for machine tools in the form of jigs and fixtures for specific applications, incl. sets of standard jig and fixture components</td>
</tr>
<tr>
<td></td>
<td>84662020</td>
<td>28492230</td>
<td>work holders for machine tools in the form of jigs and fixtures for specific applications, incl. sets of standard jig and fixture components</td>
</tr>
<tr>
<td>Welding jigs</td>
<td>85159000</td>
<td>28298600</td>
<td>parts of machines and apparatus for soldering or welding or for hot spraying of metals, metal carbides or cermets</td>
</tr>
<tr>
<td></td>
<td>85159090</td>
<td>28298600</td>
<td>parts of electric machines and apparatus for soldering or welding or for hot spraying of metals, metal carbides or cermets</td>
</tr>
</tbody>
</table>

Source: CN and Prodcom Nomenclature