T.C.
MİLLİ EĞİTİM BAKANLIĞI

METALÜRJİ TEKNOLOJİSİ

TEKNİK YABANCI DİL (İNGİLİZCE) 2
222YDK020

Ankara, 2011
• Bu modül, mesleki ve teknik eğitim okul/kurumlarında uygulanan Çerçeve Öğretim Programlarında yer alan yeterlikleri kazandırmaya yönelik olarak öğrencilere rehberlik etmek amacıyla hazırlanmış bireysel öğrenme materyalidir.

• Milli Eğitim Bakanlığına ücretsiz olarak verilmiştir.

• PARA İLE SATILMAZ.
EXPLANATION ................................................................. iii
INTRODUCTION ...................................................................... 1
LEARNING ACTIVITY-1 .......................................................... 3
1. MAIN TERMS OF FOUNDRY .............................................. 3
  1.1. Casting ................................................................. 3
  1.2. Alloy ...................................................................... 4
  1.3. Element ................................................................... 4
  1.4. Melting ................................................................... 4
  1.5. Mould ................................................................. 5
  1.6. Core ..................................................................... 5
APPLICATION ACTIVITY ......................................................... 7
MEASURING AND EVALUATION ............................................ 9
LEARNING ACTIVITY-2 ........................................................ 10
2. THE TOOLS AND EQUIPMENT USED IN THE FOUNDRY ..... 10
  2.1. Moulding Box ........................................................ 10
  2.2. The Sand ............................................................... 11
    2.2.1. Moulding Sand .................................................. 11
    2.2.2. The Facing Sand .............................................. 12
    2.2.3. The Backing Sand ............................................ 12
    2.2.4. The Core Sand ............................................... 13
  2.3. The Feeding System .................................................. 13
  2.4. The Gating System ................................................... 13
    2.4.1. Downgate ....................................................... 14
    2.4.2. Sprue Base ...................................................... 14
    2.4.3. Pouring Basin ................................................. 14
    2.4.4. Top Trench .................................................... 14
    2.4.5. Ingate ............................................................ 15
  2.5. Pattern .................................................................... 15
  2.6. The ladle .................................................................. 15
  2.7. Melting Furnaces .................................................... 17
    2.7.1. Crucible Furnaces ........................................... 18
    2.7.2. Cupola Furnace ............................................. 22
    2.7.3. Induction Furnaces .......................................... 23
  2.8. Hand Tools And Equipment ....................................... 25
    2.8.1. Gate knife ....................................................... 26
    2.8.2. Trowels .......................................................... 28
    2.8.3. Vent Tools ....................................................... 28
    2.8.4. Cleaner And Boss Tool ..................................... 29
    2.8.5. Shovels And Spades ........................................ 33
    2.8.6. Sieves And Riddles ......................................... 34
  2.9. The Riser ............................................................... 34
  2.10. Melting Metals ....................................................... 35
    2.10.1. Cast Iron ......................................................... 35
    2.10.2. Steel ............................................................ 35
    2.10.3. SG ( Spheroidal-Graphite ) Cast Iron ................. 36

i
<table>
<thead>
<tr>
<th>KOD</th>
<th>222YDK020</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALAN</td>
<td>Metalürji</td>
</tr>
<tr>
<td>DAL/MESLEK</td>
<td>Döküm</td>
</tr>
<tr>
<td>MODÜLÜN ADI</td>
<td>Teknik Yabancı Dil -2 (İngilizce)</td>
</tr>
<tr>
<td>MODÜLÜN TANIMI</td>
<td>Dökümçülükle ilgili İngilizce kelime ve kavramların tanınmasını, okunmasını ve yazılımasını hedefleyen öğrenme materyalidir.</td>
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<td>SÜRE</td>
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<td>ÖN KOŞUL</td>
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<tr>
<td>YETERLİK</td>
<td>Dökümçülükle ilgili temel kavram ve araç-gereçleri İngilizce ifade etmek</td>
</tr>
</tbody>
</table>
| MODÜLÜN AMACI | Genel Amaç: Gereklı ortam sağlandığında, dökümçülükle ilgili temel kavram ve araç-gereçlerin İngilizcelerini dilbilgisi kurallarına uygun olarak okuyup ifade edebileceksiniz.  
Amaçlar:  
1. Dökümçülükle ilgili temel kavramların İngilizcellerini doğru olarak okuyabileceksiniz.  
2. Dökümçülkte kullanılan araç ve gereçlerin İngilizcellerini doğru olarak okuyabileceksiniz |
| EĞİTİM ÖĞRETİM ORTAMLARI VE DONANIMLARI | Dil laboratuari; Kulaklık, bilgisayar ve donanımları, kütüphane, projeksiyon vb.  
Bireysel öğrenme ortamları; İngilizce sözlük, yardımıcı teknik kitaplar. İnternet ortamları, bilgi teknolojileri vb. İşletmeler ve üniversiteler |
| ÖLÇME VE DEĞERLENDİRME | Modül içinde yer alan her öğrenme faaliyetinden sonra verilen ölçme araçları ile kendinizi değerlendireceksiniz. Öğretmen modül sonunda ölçme aracı (çoktan seçmeli test, doğru-yanlış testi, boşluk doldurma, eşleştirme vb.) kullanarak modül uygulamaları ile kazandığınız bilgi ve becerileri ölçerek sizi değerlendirecektir. |
Dear Student,

One of the most considerable reasons why the humanity advances is the production and “Research and Development”. The countries which are paying more money from their incomes are getting an easier and more comfortable life style because the countries which don’t renew their technology become underdeveloped day by day.

New technology develops thanks to foreign language and the one who knows foreign language. Hardworking people can read the magazines, books and internet documents in English so can follow the recent technology on their own branches or jobs by learning foreign languages and technical foreign languages. They broad their mind. So they can be more effective and useful people for their country. Lazy people can’t follow the recent technology since they don’t have enough foreign language. So they are blocked in their factories or workshops.

We have aimed to improve your occupational English in to a higher level with the “Technical English 2”. In this case, you can learn the technical words and terms in English and follow the recent technology in the world more closely.

We wish you success in your job and life…
LEARNING ACTIVITY-1

AIM

By the end of this learning activity you will be able to acquire the equivalents of the basic terms about foundry.

SEARCH

➢ Search the topics given below on internet and in university libraries from English sources.

1. MAIN TERMS OF FOUNDRY

1.1. Casting

An artifact process of introducing molten metal into a cavity of the required shape, using gravity, pressure or centrifugal force.

Picture 1.1: A typical steel casting picture  
Picture 1.2: A typical aluminum casting
1.2. Alloy

A substance having metallic properties, composed of a metal and one or more elements, usually possesses qualities different from those of the constituents.

Picture 1.3: A car’s rim made of aluminum alloy

1.3. Element

It’s such a pure material that cannot be decomposed into materials by chemical methods. Iron, nickel, chrome, carbon, aluminum, copper are all elements.

Table 1.1: Periodic Table of Elements

1.4. Melting

Metal melting is the process of producing a liquid metal of the required composition at the required rate, and with the required amount of superheat while incurring the minimum cost.
1.5. Mould

The form, usually made of sand, which contains the cavity into which is poured to make a casting.

![Figure 1.1: A mould with cored](image)

1.6. Core

A shape made in core sand and baked hard in a core oven, which is inserted into the mould before pouring to form an internal cavity of some part of the casting which cannot be shaped by the pattern. After the casting has cooled, the core is broken up and removed.
Touch print

- The use of a touch print eliminates the top print in the cop box.
- More suitable for block cores as illustrated in the section with a simple flat back pattern with a ‘touch’ print core. (See, Figure 1.2)

Cover / hanging print

- Useful where it is needed to eliminate the use of a top (cope) box.
- Eliminates a hanging section (cod) of sand. (See, Figure 1.3)

Balance print

- Eliminates the need for other core holding techniques (i.e. studs, chaplets).
- Extended print provides additional support to lock and secure the core in position. (See, Figure 1.4)
Read the basic concepts in English about foundry correctly.

<table>
<thead>
<tr>
<th>Steps of Process</th>
<th>Suggestions</th>
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<tbody>
<tr>
<td>➢ Write the English Words those are used in the Main Terms of Foundry.</td>
<td>➢ Repeat the terms that you have just learnt.</td>
</tr>
<tr>
<td>➢ Learn the words correctly that you determined by writing repeatedly.</td>
<td>➢ Prepare a pocket dictionary with these terms.</td>
</tr>
<tr>
<td></td>
<td>➢ You can follow the foundry and different foundry methods on the internet.</td>
</tr>
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CHECKLIST

If you have behaviors listed below, evaluate yourself putting (X) in “Yes” box for your earned skills within the scope of this activity otherwise put (X) in “No” box.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Yes</th>
<th>No</th>
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<tr>
<td>1. Have you written the English Terms about foundry?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you learnt the terms correctly by writing them correctly?</td>
<td></td>
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EVALUATION

Please review your “No” answers in the form at the end of the evaluation. If you do not find yourself enough, repeat learning activity. If you give all your answers "Yes" to all questions, pass to the "Measuring and Evaluation".
**Answer these questions as Yes or No**

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Yes</th>
<th>No</th>
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<tr>
<td>1. Can a Foundry man draw a technical drawing?</td>
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<tr>
<td>2. Can a Foundry man work on the various machines?</td>
<td></td>
<td></td>
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<tr>
<td>3. Can a Foundry man use the program “Auto cad”?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. A Foundry man can not cast a mechanical part which is used in Space Technologies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. A person who works on Industrial Casting can cast a statue from tinned bronze.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. A person who works on Industrial Casting can not work in Investment Casting.</td>
<td></td>
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**EVALUATION**

Please compare the answers with the answer key. If you have wrong answers, you need to review the Learning Activity. If you give right answers to all questions, pass to the next learning activity.
You will be able to learn the equivalents of the tools and equipment used in the foundry when the necessary equipment is obtained.

Search the tools and equipment used in the foundry from the factories around, maintain a catalogue and find the English equivalents.

2. THE TOOLS AND EQUIPMENT USED IN THE FOUNDRY

2.1. Moulding Box

The moulding box is used for making a mould material.

- Select two boxes – the chosen boxes should have enough space for the runner and riser system around the pattern
- Check condition of box location holes
- Locate top box onto bottom box to round the hole
- Round hole
- Check clamp slides for dovetail arrangement

Figure 2.1: A couple of moulding boxes
2.2. The Sand

2.2.1. Moulding Sand

- **Advantages:**
  - Comparatively cheap.
  - Readily available.
  - Suitable for short run and jobbing work.
  - Withstands casting temperatures of high melting point metals.
  - Has flexibility to take up almost any shape for casting.
  - Sands and additives can be used to create special properties for particular purposes.
  - In certain instances it can be re-cycled; i.e., reclaimed for re-use.

- **Disadvantages:**
  - Longer production time.
  - New mould has to be made from pattern for each casting.
  - Waste sand must be disposed of.
  - Castings are generally not as dimensionally accurate as those produced by die casting.
  - Additional processes may be needed to deal with problems like 'burn on' and metal penetration.

- **Sand may be classified into three broad categories:**
  - Natural sands.
  - Synthetic sands.
  - Special purpose sands.

![Figure 2.2: Types of Sand Grains in common use](image)
2.2.2. The Facing Sand

- Using a 3mm (¼") sieve, shake facing sand over the pattern.
- Carefully pack sand around the pattern until it is about 25mm (1") thick.

Excessive thickness of facing sand is unnecessary and increases costs. It is only necessary to cover the surface of the pattern (See, Fig.2.3.)

Figure 2.3: Using the facing sand.

2.2.3. The Backing Sand

Sand generally used for moulds, for filling in the mould behind the facings and layers (See, Fig. 2.4.).

Figure 2.4: The Backing Sand
2.2.4. The Core Sand

Silica sand to which a binding material has been added in order to obtain good cohesion and porosity after drying for purpose of making cores.

2.3. The Feeding System

Supply hot metal to the feeder head of an ingot mould or to the riser of feeding head in a casting to prevent the formation of shrinkage cavities as the metal contracts on cooling.

![Figure 2.5: A typical feeder](image)

2.4. The Gating System

That part of the running system through which molten metal enters the casting cavity. Sometimes it is used as a general term for the whole running or gating system. (See, Fig. 2.6.)

![Figure 2.6: A Gating System](image)
2.4.1. Downgate

A vertical channel is used for conveying molten metal from the top of the mould to the ingates of the casting. (Look at Figure 2.6)

2.4.2. Sprue Base

![Figure 2.7: Sprue Base](image)

It is appearing a simple Gating System without top trench in figure. 2.7. Back part of the ingate was deepened. Under this part of sprue is called Sprue Base.

Sprue base is a place in which its speed is dimming of the molten metal that is falling down through the down sprue while it is changing its direction. Besides, solidifying metal drops are kept in the sprue base while the molten metal’s being poured down for the first time.

2.4.3. Pouring Basin

A basin in the cope which the molten metal is poured and from where it passes down the gate. (Look at figure 2.6)

2.4.4. Top Trench

A channel through which molten metal or slag is passed from one receptacle to another. In a casting mould that portion of the gate assembly which connects the downgate or sprue to the casting. (Look at figure 2.6)
2.4.5. Ingate

The opening through which metal is poured into the mould. Then it passes along runners to the spaces made vacant by the withdrawal of the patterns. (Look at figure 2.6)

2.5. Pattern

A model of wood, metal, plaster, resin or other suitable material, around which the mould cavity is formed. (See, Picture.2.1.)

![Picture. 2.1. A Typical Pattern](image)

2.6. The ladle

![Figure. 2.8. Crucible and Bale out Ladle](image)
In some furnaces, the metal is melted in a crucible, which can be lifted out of the furnace using crucible tongs and carried, using a shank.

There are two basic types of ladle: Bale-out, and refractory lined steel shell, plus carbon based crucibles. (See, Fig.2.8.)

- Bale-out ladle

These are usually in the size range 40 to 80cm (16-32in) diameter and are almost always carried by hand. They are mainly used for the hand pouring of light metals. (See, Fig.2.8.)

- Refractory lined steel shell

This type ranges in size from 10cm (4in) diameter x 20cm (8in) deep, which can be carried by one man, through the intermediate sizes which are fitted to a shank and carried by two men, to the largest sizes mounted on bogies, and those which can only be manipulated and carried by the help of a crane. This type is usually used for the heavier metals. (See, Fig.2.9)

- Ladle securing straps

This is a simple latching device made of mild steel rod to suit the ladle. Formed to retain ladle in place in handle or shank. (See, Fig.2.10.)
Shanks
- Single-ended shank; also used for crucibles. (See, Fig.2.11.)
- Double-ended shank; also used for crucibles. (See, Fig.2.11.)

Reducing collar
This fits into standard shank to enable a smaller ladle or crucible pot to be used. (See, Fig.2.12.)

2.7. Melting Furnaces

A wide range of furnaces are used for melting metals, the type is used being determined by the metal to be melted. A foundry establishment will normally have a melting facility to suit its needs, whereas a foundry training centre will have a melting facility to cater for a range of casting alloys.
2.7.1. Crucible Furnaces

- Crucible furnaces utilize a refractory pot which can be fixed as a semi permanent feature, or removed from the furnace after each melt. (See, Fig.2.13.)
- There are several types of crucible furnace units in use:
  - Lift-out/Push out.
  - Bale-out.
  - Tilting.

![Figure. 2.13. A Crucible Furnace](image)

- **A lift-out Crucible Furnace**

  The lift-out crucible is sited either above floor or in a pit below floor level.

  Fuel is coke, oil or gas burned with natural or forced draught/air supply for combustion.

  Metals are all non-ferrous. (See, Fig.2.14.)

- Push-out crucible furnaces provide an alternative method of removing the crucible from the furnace. Metals are all non-ferrous. (See, Fig.2.14.)
The automatic bale-out furnace is ideally suited for melting small amounts of metal at frequent intervals, i.e., for gravity die casting or aluminum jobbing work. (See, Fig. 2.15.)

Figure. 2.14: A lift-out Crucible Furnace

Figure. 2.15: An Automatic Bale-Out Furnace
- Manually Controlled Bale-Out Furnace

The manually controlled bale-out furnace has features similar to automatic control furnaces. (See, Fig. 2.16.)

- The tilting crucible is suitable for larger quantities of metal.
- Batch production is made of different alloys by melting them.
- The furnace tilts about a central axis.
- Ideal metals are aluminum and copper based

![Figure. 2.16: A Manually Controlled Bale-Out Furnace](image)
Alloys. Iron can be melted but other furnaces are more suitable.

- For removal of molten metal, the furnace is shut down and the tilting mechanism is operated. (See, Fig. 2.17.)

- Reverberatory Furnace

This is a long horizontal furnace which uses either oil or gas for its source of heat. The floor, or hearth of the furnace is gently sloped and a tapping hole is located at the lowest point. (See, Fig. 2.18.)
2.7.2. Cupola Furnace

Figure 2.19. A Cupola Furnace

- Reverberatory Furnace

This is a vertical shaft furnace consisting of a shell lined with refractory material in which the charge is fed in through a door at the top and molten metal is ‘tapped-out’ at the bottom.

The charge consists of metal (pig iron, steel scrap, cast iron scrap, foundry scrap) coke and limestone.
The cupola is a simple, uncomplicated furnace with the lowest capital cost per unit of output. It is easy to maintain and very versatile. The fuel is used efficiently because the charge is pre-heated by the hot waste gases.

Unfortunately, there is a high emission of fumes, smoke and grit and exhaust cleaning equipment is required to conform to present day environmental legislation. The most commonly used fume cleaning equipment is the ‘wet arrester’ as shown at the top of the furnace in the illustration.

The capacity of a cupola furnace is measured by the output rate of molten metal and can be from 1 to 35 tons per hour, dependent on the internal diameter of the shaft. Shaft diameters range from 1 to 9 feet (30 to 270cm) and shaft height from 10 to 80 feet (3 to 24m). (See, Fig.2.19.)

2.7.3. Induction Furnaces

![Figure 2.20. A Channel Induction Furnace](image)

A high voltage electrical source from a primary coil induces a low voltage, high current in the metal (secondary coil) to be melted. The high induced current in the charge metal provides the necessary heat for melting. A crucible of high resistivity is used for preventing induced currents and therefore melting being produced in the crucible itself. The crucible is made of material with a high thermal conductivity to aid heat transfer.
Induction furnace arcs are ideal for melting and alloying with minimum metal loss, but little refining of the metal is possible. Therefore, these furnaces are not normally used with a slag, although a protective flux covering may be used. There are two main types of induction furnace: channel and coreless.

The channel induction furnace (See, Figure 2.20) has an iron core in the form of a ring. A primary induction coil is wound round this at some convenient positions. The current from this induction coil produces a changing magnetic flux in the core. The core and furnace are so designed that channels, carrying the molten metal, form a loop which passes close to, and through the core. The changing magnetic flux in the core induces a secondary current in the loop of molten metal generating heat which is then circulated into the main well of the furnace, which is situated above the channels.

The rapid circulation of molten metal, due to electrical and thermal effects, provides a useful mixing action. It is essential to maintain the furnace at least one third full of metal; solid charge being added above the heel of molten metal. Occasionally, the metal core and associated channel are positioned on the side of the main furnace well, but this design takes up more floor space. Other types of channel furnaces have two separate chambers; one for melting, and the other for holding the metal prior for casting. The latter type is particularly useful for die-casting operations. Channel induction furnaces are normally used for melting lower melting point alloys, e.g., aluminum, copper-based alloys of low melting point, or as a holding for the higher melting point metals e.g., cast iron.

- Coreless Induction Furnace

Coreless induction furnaces (See, Figure 2.22. ) normally have a cylindrical steel shell and do not employ internal iron cores and therefore no internal molten metal channel. Basic or acidic linings can be used and capacities vary from less than a kilogram for precious metals and laboratory work to more than 15 tones for large steel casting requirements. A helical coil of flattened copper tubing is wound round the lining. This coil carries the electric current which induces a current in the metal charged to the furnace. The induced current produces the heat required to melt the charge and also provides a vigorous stirring action of the metal once molten. The induction coil is normally protected with insulating varnish and asbestos tape. To prevent heating of the steel shell due to the effect of stray currents and the fact that the steel shell will have magnetic properties, magnetic shielding, using packets of silicon steel laminations is employed. These laminations take the form of a yolk around the shell. Alternatively, the shell can be made from non-magnetic materials. The furnaces usually have tilting facilities and the frequencies vary from 500 cycles per second (medium frequency) to in excess of 1,000 cycles per second (high frequencies) while a few furnaces operate from a medium frequency supply on as low as 15 cycles per second.
The coreless induction furnace has largely replaced the crucible furnace, especially for melting high melting point metals and alloys; the higher the melting point the higher the frequency required. Hence this furnace is used for melting steels, high alloy steels, stainless and magnetic steels, nickel chromium heat resisting alloys and alloys containing expensive alloying elements, e.g., cobalt, tungsten, vanadium, nickel and chromium, and applications in which low carbon content and the avoidance of carbon pickup is a necessity. Recently, the coreless induction furnace has replaced some cupola melting operations due to the improved pollution control.

The coreless induction furnace is ideal for straight remelting and alloying, since a high degree of control over temperature, furnace atmosphere and metals can be achieved while the induction current provides good circulation of the melt. However, it is of little use where metal-slag refining is required, since the slag is not effectively heated by the induced current. (See, Figure 2.22.)

2.8. Hand Tools And Equipment

- Rammers

The hand rammer, or peg, pin or peen rammer, is used for packing sand into the moulding box.

![Figure 2.22. A Coreless Induction Furnace](image)
The flat or floor rammer is used for consolidating the final layer of sand. Usually has a steel shaft with a cast-on bottom section. (See, Figure 2.23.).

2.8.1. Gate knife

- Similar to heart and square, it is used for cutting ingates and feeders and for repairing moulds. Made of spring steel, it is used in two different ways:
  - The tool is held in the same way like a pencil, with fingers positioned towards the end being used. The thumb and second finger support and position the tool. The first finger is held on top. The end of the tool not in use rests in the 'V' between the thumb and first finger.

![Figure 2.24. Gate Knife](image)
The tool is held with the first finger extended on top of the end being used, with the thumb resting along one side of the centre portion with the second, third and little fingers are folded under to support the tool between themselves and the palm of the hand, the end of the tool not in use passing up the centre of the hand to rest at the junction of the base of the thumb and wrist. (See, Figure 2.24.)

Heart and square

This tool is used for finishing mould surfaces and shaping joints. It is usually made of steel and is useful if the areas to be sleeked are too small to allow a trowel blade to be used. It is normally held in the same way like a trowel.

Corner sleekers

Used to sleek internal and external 90° corners. The action is to draw the sleeker along the corner, holding it up at the leading edges so that the smoothing action is achieved with the back edge.
2.8.2. Trowels

The trowel is the most widely used moulder’s tool. It is used for finishing and repairing moulds, cutting ingates and making joints. It is made of steel with a wooden handle. It can be moved in any direction provided the leading edge is always tilted slightly upwards to clear the sand surface, the smoothing action is achieved with the back edge.

The trowel is also used for cutting and finishing ingates and runners. It needs a sharp edge for these tasks since it will be used as a knife to make vertical cuts in the sand. It is used in the repair of damaged areas and parts that have broken away. Fresh sand is built up on the part that has broken away; it is then shaped to the required profile.

![Trowels](image)

**Figure 2.27. Trowels**

2.8.3. Vent Tools

The simplest one is made of stiff wire 1/16 in diameter, pointed at one end and may have a wooden handle fitted to larger diameter types. It’s used for making holes in the mould after ramming up to permit the escape of gasses generated during pouring.

Flexible venting material may be used where complex shapes have to be vented. It is put in position during ramming up operation.
2.8.4. Cleaner And Boss Tool

- Cleaner

This tool is used for lifting dirt or loose sand out of the mould, and for finishing the bottom and sides of deep, narrow, openings. It is made of spring steel. It is held in a similar way to a pencil, with fingers around the flat surfaces. Both ends of the cleaner, foot and flat, are used for finishing moulds. The foot end is used for lifting out dirt from the bottom of deep sections and cut sections of sand from narrow ingates. The cleaner is used for sleeking surfaces where no other tools can reach.
Figure 2.29. Cleaner

- **Boss tool** This tool is used for sleeking around a boss and making up prints around a core.

Figure 2.30. Boss tool

- **Quick make gate knife tools**

Figure 2.31. Quick make gate knife tools.
➢ Spoon tools

These are double ended tools in various shapes and sizes, having a spoon or scoop shape at each end. They are used for scooping and finishing curved surfaces for which flat tools would be unsuitable.

![Figure 2.32. Spoon tools](image)

➢ Hand bellows

These are used for removing waste sand from the mould cavity, after withdrawal of the pattern. Air lines may be used, but bellows are useful as a standby.

![Figure 2.33. Hand bellows](image)

➢ Moulding Box

A container, generally made of metal, into which sand is rammed around a pattern, to produce a mould.

The topmost section is known as the 'cope'.

The middle section (if used) is known as the cheek or mid-part.

The bottom section is known as the 'drag'.

Lugs are fixed to each end of the boxes to take locating or box pins to ensure proper registration of the parts of the mould.

Clamping slides are provided on the sides of the boxes to enable them to be securely clamped together using dovetail clamps.
Rapping/lifting plate

A metal plate having one plain and one tapped hole, to accept rapping or lifting irons.
- **Rapping bar and spike**

  A metal rod inserted into the plain hole of the rapping plate is then struck sharply to loosen the pattern from the mould.

- **Lifting screw**

  An iron or steel rod used for lifting or drawing the pattern from the moulding sand. One end screws into the threaded hole in the lifting plate, the other end is eye-shaped to facilitate ease of handling.

![Figure 2.36. Rapping bar and spike](image)

### 2.8.5. Shovels And Spades

These are necessary for handling sand and other materials, like a wheelbarrow.

The fork is used for coke and stone handling.
The rake is used for removing foreign objects from sand piles, and for leveling moulding beds.

![Image of a rake](image)

**Figure 2.37. Shovels and spades**

### 2.8.6. Sieves And Riddles

A sieve is necessary for preparing fine sand for facings and other purposes. Riddles are coarse, having mesh sizes from 3 - 13mm (\(\frac{3}{8}\)" to \(\frac{1}{2}\)"") or more. Sieves are fine, having mesh sizes from six to twenty holes per inch.

![Image of a sieve and riddle](image)

**Figure 2.38. Sieves and riddles**

### 2.9. The Riser

The opening leading from the mould cavity which, among other things, indicates when the mould has been filled. This function should not be confused with that of feeding.
2.10. Melting Metals

2.10.1. Cast Iron

Grey cast iron is widely used general purpose Cl.

- SG (spheroidal-graphite) cast iron – also known as nodular iron.
- Malleable cast iron is produced in three types:
  - Blackheart, after the colour of a fractured section after heat treatment.
  - White heart, after the steely white colour of a fractured section after heat treatment.
  - Pearlitic, produced from fettled white Cl castings are similar in composition to that used for blackheart.
- Wear resistant for special applications.

![Figure 2.40 Cast iron](image)

2.10.2. Steel

An alloy of iron and carbon that may contain other elements, and in which the carbon does not exceed 1.7%. (See also BS 3100.)

Only the more commonly used steels are described, due to the great variety and metallurgical complexity of the steels available.

- Mild steel has a low carbon content (0.1%C).
- Medium carbon steel is harder than mild steel (0.35%C).
- High carbon steel is hard (0.6%C).
2.10.3. SG (Spheroidal-Graphite) Cast Iron

Cast iron containing graphite in the form of substantially spheroidal particles, produced by suitable molten metal treatment and not by heat treatment.

![Figure 2.41. Steel](image)

2.10.4. Malleable Cast Iron

Malleable cast iron is produced in three types:

- Blackheart, after the colour of a fractured section after heat treatment.
- White heart, after the steely white colour of a fractured section after heat treatment.
- Pearlitic, produced from fettled white CI castings, similar in composition to that used for blackheart.

2.10.5. Aluminum

This is a light metal, white in color, with a melting point of approximately 660° C.

- The principal aluminum casting alloys are:
  - Aluminum/silicon alloys.
  - Aluminum/magnesium alloys.
  - Aluminum/copper alloys.
  - Aluminum/copper/nickel/magnesium alloys.

These alloys are usually referred to by a British standards number, e.g., LM6, LM24, which are specified in BS 1490.
2.10.6. Copper Based Alloys

- This is a heavy metal with a melting point of 1083° C.

It is the major metal used in the group of alloys known as brasses, bronzes and gunmetal.

- Brass, an alloy of copper and zinc. It casts well and is easily machined.
- Bronze, an alloy of copper and tin, with phosphor makes excellent bearing/bushing material.
- Gun-metal, an alloy of copper, tin and zinc.
2.10.7. Zinc

This is a heavy, with low melting point metal, usually alloyed with aluminum for die casting.

2.10.8. Magnesium

This is a very light, strong metal with a melting point of 659°C.

2.11. The Machines Used In Foundry

2.11.1. Sand Mill Or Muller

- A mechanical mixer used in the preparation of facing sand.
- Fresh sand is mixed with recycled sand and other additives. It is then milled to distribute the bonding agent and any other additives uniformly throughout the mix.
Figure 2.44. Sand mill or muller

Figure 2.45. A kind of sand mill
It can be identified by the heavy roller/s necessary for the energy requirements needed to ensure dispersion of the bonding agent.

2.11.2. Sand Mixer

- A mechanical mixer having rotating paddles and static spiral ribs which roll (turn) the sand to evenly disperse additives throughout the sand mass.
- Commonly used for mixing core sands (oil sand).

Figure 2.46. Sand mixer
2.11.2. Moulding Machines

Picture 2.2. Moulding machine

2.11.3. Cranes

Nearly all foundries have a crane to lift and move heavy objects.
Types of crane are:

- **Rope pulley blocks**: These are light and easily mounted, but are generally only suitable for light loads.
- **Chain pulley blocks**: These are normally portable, and are used for heavier loads than rope blocks.

![Figure 2.47. Rope pulley block](image)

- Powered chain pulley blocks.

![Figure 2.48. Powered chain pulley block](image)

These may be powered by either electricity or compressed air. They are faster and can carry much heavier loads than hand operated blocks.
- **Full mechanized overhead**: These are usually large, heavy duty cranes which move on steel tracks mounted in the roof of the foundry, along its length. A gantry spans the width of the foundry. Thus loads can be lifted from most parts of the foundry floor.

- **Jib cranes**: These are marked to show safe working loads at any point on the beam.

- **Hydraulic lifts**: Look for load figures or marks on the telescopic beam

- **Slings**: Types of sling in common use are:
  - **Chain slings**: These are used for lifting loads, having sharp edges such as rolled steel joists, or for lifting hot materials.
  - **Wire rope slings**: These are the most widely used.
  - **Fibre rope slings**: These are generally used for lifting light articles.
  - **Belt slings**: These give a breadth of bearing, reducing the risk of damage to the load.
Figure 2.50: Types of sling in common use

- **Leg chains**

  These consist of a lifting ring to which is attached two or more chains, each with a hook at the end.

Figure 2.51. Leg chains
Belts

These are usually made of canvas in widths varying from 30mm to 150mm (1¼ 6in). They are used where damage to a sand surface must be avoided.

Lifting beams

These consist of a horizontal bar with a central lifting ring or shackle which is placed over the crane hook. The beam has notches equally spaced at each end, into which the lifting rings or slings or leg chains are placed.
2.11.4. Compressor

Figure 2.54. The details of a compressor

Picture 2.4. A two stages compressor

2.11.5. Ventilator

Picture 2.5. Ventilator
2.11.6. Drilling Application

There are two types of machine drill, the bench drill and the pillar drill. The bench drill is used for drilling holes through materials including a range of woods, plastics and metals. It is normally bolted to a bench so that it cannot be pushed over and that larger pieces of material can be drilled safely.

The larger version of the machine drill is called the pillar drill. This has a long column which stands on the floor. This can do exactly the same work as the bench drill but because of its larger size it is capable of being used for drilling larger pieces of materials and produce larger holes.
Application:

Picture .2.9: Drilling Machine

Figure .2.53. The drill is making a hole by twisting helically on a work piece.

This machine is designed for drilling, counter-boring, reaming, taping, spot-facing, etc. It’s widely used in machine works.

Parts of A Drilling Machine

- Spindle Speed
- Power
- Spindle
- Feed lever
- Drill Chuck
- Vise
- Table
- Dept Gage
Picture 2.10. Parts of A Drilling Machine
Read the English equivalents of the tools and equipment in the Foundry correctly.

<table>
<thead>
<tr>
<th>Steps of Process</th>
<th>Suggestions</th>
</tr>
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<tbody>
<tr>
<td>Write the English Words those are used on the subject of the tools and equipment in the Foundry.</td>
<td>Repeat the terms that you have just learnt.</td>
</tr>
<tr>
<td>Pronounce the industrial molding terms in English.</td>
<td>Prepare a pocket dictionary with these terms.</td>
</tr>
<tr>
<td>Write various of the sand which is used for making a Green Sand Mould.</td>
<td>You can follow the foundry and different foundry methods on the internet.</td>
</tr>
<tr>
<td>Write the part of the Gating System.</td>
<td>Following the terms from internet you learnt before you can acquire actual and updated knowledge.</td>
</tr>
<tr>
<td>Write the name of the Melting Furnaces that you know.</td>
<td></td>
</tr>
</tbody>
</table>
CHECKLIST

If you have behaviors listed below, evaluate yourself putting (X) in “Yes” box for your earned skills within the scope of this activity otherwise put (X) in “No” box.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>1. Have you written the English terms of the tools and equipment in the Foundry?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you learnt the correct forms of the terms by writing them repeatedly?</td>
<td></td>
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<tr>
<td>3. Have you written the types of the sand in order to make a sand mould?</td>
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<tr>
<td>4. Have you written the parts of the gating system in English?</td>
<td></td>
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</tr>
<tr>
<td>5. Have you written the English equivalents of the melting furnaces that you know?</td>
<td></td>
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</tr>
</tbody>
</table>

EVALUATION

Please review your "No" answers in the form at the end of the evaluation. If you do not find yourself enough, repeat learning activity. If you give all your answers "Yes" to all questions, pass to the "Measuring and Evaluation".
Match the figures below:

1. Moulding Box

![Diagram of Moulding Box]

A

2. A Facing Sand

![Diagram of Facing Sand]

B
3. Feeder

4. A Gating System

5. A Pattern
6. A Ladle

7. A Vent Tool
8. Induction Furnace

9. A sand Mill
PERFORMANCE TEST

Check your knowledge that you acquire from the module. Is it true or false?

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mould: The form, usually made of sand, which contains the cavity into which is poured to make a casting</td>
<td></td>
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</tr>
<tr>
<td>2. Element: It’s a pure material that cannot be decomposed into materials by chemical methods. Iron, nickel, chrome, carbon, aluminum, copper are all elements.</td>
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<tr>
<td>3. The moulding box is used for making a mould.</td>
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<tr>
<td>4. A Tilting Crucible furnace tilts about a central axis.</td>
<td></td>
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<tr>
<td>5. The Riser: The opening leading from the mould cavity, which is among other things, indicates when the mould has been filled.</td>
<td></td>
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<tr>
<td>6. Cast Iron: This is a light metal, white in color, with a melting point of approximately 660°C.</td>
<td></td>
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<tr>
<td>7. Rope pulley blocks: These are normally portable, and are used for heavier loads than rope blocks</td>
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</table>

EVALUATION

Please compare the answers with the answer key. If you have wrong answers, you need to review the Learning Activity. If you give right answers to all questions, consulting your instructor proceed to the next learning activity.
**LEARNING ACTIVITY-1**

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**LEARNING ACTIVITY-2**

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**MODULE EVALUATION**

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abr-asive disk
abr-asive mach-ining
accep-tance sam-ping
ac-cessory
ac-cu-racy
ac-ety-len-gas
acorn nut
ac-tuator
ad-de-nd-um
ad-he-sion
ad-he-sive join-ing
ad-jus-tment
age hard-en-ing
air fur-nace
allen screw
allen wrench
al-lotro-pic changes
al-lowance
al-loy
an-chor bolt
an-gle
an-gle milling cut-ter
an-neal-ing
an-nular gear
an-o-di-zing
anvil
ap-paratus
apron
ar-bor
arch pres-s
ar-c spot weld-ing
arti-fi-cial ag-ing
as-sem-ble
as-sem-bly
at-tach-ment
zımpara taşı
aşındırma ile talaş kaldıurma
kabul için örnek alma
aksesor, yardımcı teşhisat
hassasiyet, doğrulık
asetilen gazo
tırtılı somun, taşlı somun
uyarıcı
adapör (aru rakor; birbirinden ayrı cins
iki dişli ucu birleştiriren ara parça)
dış ucu (dişlide)
tutma, adezyon
yapıştırma yolu ile birleştirme
ayarlama
yaslandırarak sertleştirme
hava firmı
ālyen vida; altı köşeli gömme başı vida
ālyen anahtar, gömme anahtar, altı-köşe
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allootropik değişme, eşzödek değişimi
pay, tolerans
ałamı
tesbit civatası, ankraj bulunu
köşebent demiri, köşebent, korniye; açı
açı frezesi, konik freze biçağı
normalleştirme tuvi, menevişleme
içen dişli
anotlama, anotsal işlem, anotlama usulü ile oksitleme
örş
cihaz, aygit, alet
araba önluğu
malafa
kemerli pres
arklı nokta kaynağı
suni yaşlanma
monte etmek
takım; birkaç parçaadan meydana gelen
parça grubu; komple, montaj
yardımcı teşhisat, atışman
austempering
austenite
automatic screw machine
axial

B

bainite
bikalite
band sawing machine
barrel finishing
base
base circle
batch production
batch size
batch furnace
beam
  l-beam
  U-beam
bearing
  ball-bearing
  needle bearing
  roller bearing
  tapered roller bearing
  bearing cone
  bearing cup
bellows
belt
belt polishing
bench lathe
bench molding
bending
bentonite
bessemer converter
bevel gear
bevel protractor
bilateral
billet
bit
blast furnace

ösmenevişleme
östenit
index tezgahı
eksenel

bainit, alçak derecede sylanmış çelik
bakalit
şerit testere
dolaplama
taban, kaide, temel
diş dibi daireşi (dişlide)
küme üretimi
küme büyülüğü
yığın firmi
kiriş
l profilli demir, l-kirisi
U profilli demir, U-kirisi
yatak, rulman
biyali rulman
iğneli rulman
makaralı yatak
yatak göbeği, ıç yatak
rulmanların dış çemberi, yatak kabı
körük, körük biçiminde
kayış
kayışi parlatma
masa tornası, saatçi tornası
tezgah kalıplaması
bükme, eğme
yumuşak balık
bessemer potası
konik dişli
dereceli gönye
çift yönlü
bilet, ham demir çubuk
uç, matkap ucu, kalem ucu
yüksek firın
blind riser
blister copper
bloom
blow molding
bluing
board hammer
bolt
bonding
boring machine
boring mill
bottom board
brace
bracket
brass
braze
break corner
brittle
broaching
broaching machine
broaching tools
bronze
buffing
built-up edge
burnishing
burr
bushing
butterfly nut
button
butt welding
calibration
calliper
calorizing
cam
cap screw
carboide
carbide tools
kör oluk
saf bakır
demir kütüğü
hava basınçlı kalıplama
menevişleme
tahtalı şahmerdan
civata
yapıştırma, bağlama
oyma tezgahı, delik işleme tezgahı
delik tezgahı
faraş tahtası
el matkabı
konsol, çıkma, destekli raf, dirsek
pirinç
sert lehim, pirinç kaynağı
kırma ağız
gevrek, kırılın
tırmalama, tug çekme, boşalma
boşalma tezgahı
boşalma kalemleri, boşalma tişleri
bronz, tunç
perdahtlama
yığma ağız
çapak temizleme
çizik, kazıntı, torna taleminin bırakıtı iz, çapak
burş
kelebek somun
kontrol düğmesi, düğme
düz ek kaynağı, alın kaynağı
calibration
kalibrasyon, ayar
calliper
kumpas
calorizing
sementasyon ile alüminyum kaplama
cam
kam, eksenlik, armatürek, mil dirceği, boynuz
cap screw
civata başlı vida; altu köşe başlı somunsuz vida, kapak vidası, başlık vidası
carbide
karbür
carbide tools
sert maden takımlar
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crest
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cross-wise
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crusible
cupola
curling
cutting edge
cutting fluid
cutting force
cutting speed
cyaniding
decendum
depreciation
depth gage
depth of cut
dial
dial indicator
diametral pitch
diamond tools
die
die casting
diffusion
direct arc furnace
disc
discontinuous chip
disposable pattern
distortion allowance
dividing head
dog
double housing planer
double margin drill
down milling
draft allowance
drag
draw bar
draw-cut shaper
drawing
dragging die
drill chuck
drill performance
drill point
drilling machine
drive
drop forging
drop hammer
drug
drum
drum lathe
ductility
duplicating machine
dye
dynamometer

eccentric
elastic
elastic limit
elasticity
electric discharge machining
electrode
electromechanical grinding
electroforming
electrohydraulic forming
electroplating
electroslag welding
electrotinning
element
elongation
embedding
embossing
emery
emery paper

e itsantrik, dış merkezli; kam
esnek, elastik
esneklik sınırı
esneklik
kvitlemla malzeme işleme
elektrot, elektrik kaynak çubuğu, elektrik kutup çubuğu
elektro mekanik taşlama
elektrikle şekillendirme
elektrohidrolitik şekillendirme
elektroliz yoluya kaplama (galvanoplasti)
cürafaltı kaynağı
elektrikle kalaylama
öge, eleman
uzama
gömülme
kaburma
zimpara
zimpara kağıdı
emulsion  sütüşü, sübeyne, emülsiyon
enamel  emaye
end clearance angle  üç boşluk açısı
end cutting edge angle  yan ağız açısı
end-mill cutter  parmak freze
endurance  dayanım, sürme
engine lathe  torma tezgahi
equipment  ağıt, aparat, ekipman
etching  asitle aşındırma, dağılama
expansion  genişleme
expansion reamer  genişletme rayası
explosive forming  patlama yoluyla şekillendirme, patlama kalıplaması
extract  özüt
extraction  özütleme
eextrusion  ekstrüzyon, kalıptan basma, dar çıkmış

ágina

face  alın, yüz
face milling  alın frezelemesi
face milling cutter  alın frezesi, alın işleme çıkısı
face plate  fırıncı aynası
facing  alın tornalama işlemi
fastening  sıkıştırma, bağlama
fatigue  yorulma, hareket halindeki aksamanın yorulması
feed  ilerleme, besleme
feedback  geriye besleme
feed rate  talaş kaldırma hızı, ilerleme hızı
feed rod  talaş mili
feeler gage  hassas mastar
ferrous metal  demirli, demirden oluşan metal
file  ege, törpü
coarse file  kaba ege
bastard file  orta kalın dişli ege
needle file  saatçi egesi
slitting file  oluk egesi
square file  dörtköşe ege
superfine file  ince perdeh egesi
triangular file  üçköşe ege
round file  yuvarlak ege
taper file
parallel file
flat file
drill file
fillet
fillet weld
fillister head screw
fillister head screw driver
fine
finish allowance
finishing
finishing cut
finishing teeth
fit
transition fit
interference fit
clearance fit
medium fit
running fit
sliding fit
shrink fit
fixture
flame cutting
flame hardening
flange
flank (gear)
flank wear
flash welding
flexibility
floor molding
flute
fly-cutter
fly nut
follower rest
forging
form milling cutter
forming
foundary process

konik ege, fare kuyruğu ege
düz ege
yassı ege
delik tesviye egesi
törpüleme, eğeleme
pervaz
pervaz kaynağı
yıldız başlı vida
yıldız uçlu tornavida
ince
işleme payı
son işleme
ince işleme
kalibre ağzıları
alıştırma, geçme
ara geçme
siki geçme, temaslı alıştırma
bol geçme
orta siki alıştırma, tatlı alıştırma, tatlı geçme
döner alıştırma, oynar alıştırma
kayıar alıştırma, kayar geçme
siki geçme, sıkma alıştırma
bağlama ağıtı, bağlama düzeni
oksijenle kesme
alevle sertleştirme
flanş, bağıntı, birleşme yüzü
dış yani
siberesty yüzey aşınması
yakma ahn kaynağı
esneklik
yer dökümü
yiv, oluk (matkapta)
yaprak çakı
kelebek somun
gezer yatak
dövme
modül freze başlığı, profil frezesi
şekillendirme
dökümüllük
foundation
fracture
fracture point
frame
friction disc
friction drive
front pilot (broaches)
furnace
fuse
gage (or gauge)
gage block
galvanizing
gang drilling machine
gasket
gasket ring
gate
gear
gear-cutting machine
gear train
girder
goggles
grain
grain size
graphite
gravity sintering
gray cast iron
grease
grease gun
grinding
grinding machine
grinding wheel
grinding wheel dresser
grindstone
grit
grub screw
gun drill

temel
kırlıma, kopma
kopma dayanımı
iskelet, çerçeve, şasi, gövde
sürünme aynası
sürünmeli tahrik, sürünme mekanizması
ön kilavuz
tav firmı, ocak
sigorta; madenin sıcaklık dolayısıyla sıvı haline gelmesi; kaynayıp birleşme

mastar, ölçü, birim, gösterge, ölçü aleti
johnson mastarı
galvanizleme
çok milli delme tezgahı
conta
conta bileği, salmastra bileği
araht, kapı
dişli
carkıla diş açma makinası
dişli düzeni; birbirine geçmiş müteaddit dişli tertibatı
kiriş, payanda, putrel, kuşak
kaynakçı gözlüğü
tane
tane büyüklüğü
grafit; saf ve yumuşak karbon
ağdırma kılıç eleme
kır dökme demir
gres yağı
gres pompası
taşlama
taşlama tezgahı
zimpura taşı, taşlama taşı
zimpura taşı düzelticişi
bileyi taşı
maden talaşı, maden kırmızısı; iri taneli kum
yarık başlı makina vida, saplama vida
namru matkabı


H

- hacksaw blade
- hacksaw machine
- hammer
- hand milling machine
- hardenability
- hardness
- headstock
- heat treatment
- helical gear
- helical spring
- helix angle
- herringbone gear
- high speed steel
- honing
- horn press
- hot spinning
- hot working
- hose
- hub
- hydraulic press
- hydraulic shaper
- hypoid gear

I

- idler gear
- impact
- impurity
- inclined press
- indentation
- independent chuck
- index head
- indicator
- induction hardening
- ingot
- injection molding

el testere biçtiği
kollu testere makinası
çekiç
el freze tezgahı
sertleşebilme
sertlik
torna başlık taraflı, torna aynası,
torna feneri, tahrik tertibatı
isil işlem
helis dişli
helezoni yay
helis açısı
çavuş dişli
hava çeliği, yüksek hız çeliği
azırma
honlama, ince taşlama, parlatma, bileme
mahmuzlu pres
steak sıvama
steak işleme
hortum
göbek (kasnak, dişli vb. göbeği)
hidrolık pres
hidrolık vargel
hipoid dişli

avarı dişli
çarpma, darbe, şok
pislik, kir, yabançı madde
eğik pres
çukuriz
çeneleri ayrı ayır sıklır ayna, mengeneli ayna
bölümlü başlık
gösterge, sayaç
endüksiyonla sertleştirmeye
ingot, külece
enjeksiyonlu kalıplama
lead
lead screw
leather
lever
linkage
lip angle
lock nut
longitudinal
lubricant
lubricating gun
lubrication
lubricator

kurşun
vida açma mili (tornada)
deri
levye, kol, manivela, kumanda kolu
bağlantı, mekanizma, düzen
kenar açısı
kontra somunu
boyuna, uzunlmasına
yağlama maddesi
yağ tabancası
yağlama
yağdanlık, gresörlük

M

machinability
machine bed
machine frame
machine molding
machine screw
machine shop
machine tool
machining time
magnet
magnetic chuck
maintenance
malleable
malleable iron
mandrel
manual
manufacturing processes
margin (drills)
martensite
mash seam weld
masking
mass production
material
measurement
measuring instruments
mechanism

işlenebilirlik
tezgah gövdesi
tezgah gövdesi
makinalı kalıplama
makina vidası, civata başlı vida, somunlu vida
atolye, işlık
takım tezgahı
işleme zamanı
mknats
mknatslı ayna
bakım
dövülgen
dövülgen demir
mandrel, malafa, torna punta veya matkap başlığı
elle işleyen, elle çalıştırılan; el kitabı
imalat yöntemleri
faz, zirh
martensit
ezme dikiş kaynağı
maskeleme
seri imalat
gereç, malzeme
öçme, ölçü
öçme aletleri, ölçme cihazları
mekanizma, tertibat
mesh  
metal  
metal removing  
metal spinning  
metal spraying  
metrology  
mica  
micrometer  
mild steel  
milling cutter  
milling machine  
monel metal  
morse taper  
mould (or mold)  
multiple cut  
multipoint  

N  
nail  
nail puller  
natural  
neck (drills)  
nipple  
nitriding  
nodular iron  
nominal size  
nonferrous metal  
normalizing  
notching  
numerical control  
nut  

O  
offset  
oil  
oil bath  
oil screw gun  
tel örgü, örgü süzgeç; birbirine geçme, dişlilerin temas halinde olması  
metal  
talaş kaldırma  
sivama  
metal şişkürme  
ölcme bilimi  
mika  
mikrometre  
yumuşak çelik  
iferе çакı sı  
iferе tezgahi  
monel pirinci  
mors konikligi  
döküm kalibi, kalıp dökme  
çoklu kesme  
çoк ağızlı takım  
cиви  
kerpeten  
doğal, tabii  
boyun  
ğne, ibre  
nipel, boru rakoru, meme, meme ucu  
nitritleme  
yumruку demir  
nominal ölçü  
demir içermeyen metal  
normalleştirme tavı  
kertikleme  
sayısal denetim  
somun  
kaçıklık, sapma, yerinden kaçma  
yağ  
yağ banyosu  
vidalı yağ pompası
oil tempered
open-end wrench
open-hearth furnace
operation
ore
oxidation
oxy-acetylene welding

panel
parkerizing
pattern
pattern allowance
pellet
penetration
percussion press
perforating
permeability
piercing
pig iron
pin
pincers
pinion
pipe
pipe wrench
pit molding
pitch
pitch circle
plain milling cutter
plain milling machine
planer
planetary gear
planetary milling machine
plant
plastic
plate
plating

yağda tavanlanmış
açık ağız anahtar
siemens-martin firmi
işlem
eevher
oksitlenme, paslanma
oksiyen kaynağı

pano, tablo, şalter veya kontrol
saatleri panosu; plaka
parkerleme
model (dökümcelilükte)
kalıp payı
topak
girinim, penetrasyon
vurgu presi
delikleme
geçişergenlik
delme (Mannesman metodu)
piş demir
pim, perno, muydu, şiş, iğne
kerpeten, kısaç, pense
küçük dişli
boru
boru anahtarı
kuyu dökümü
hatve, vidanın her dişte ilerleme miktarı,
iki diş arasındaki uzaklıgın, adım
diş açıklığı dairesi, bölme dairesi (dişlide)
silindirik freze bıçağı
düz freze tezgahı
planya
gezege dişli, gezer dişli, planet dişli
gezege başlı freze tezgahı
fabrika, tesis, atölye
plastik
levha, plaka
kaplama
<table>
<thead>
<tr>
<th>English</th>
<th>Turkish</th>
</tr>
</thead>
<tbody>
<tr>
<td>pliers</td>
<td>pense</td>
</tr>
<tr>
<td>ploughing force</td>
<td>sürte kuvveti, kazma kuvveti</td>
</tr>
<tr>
<td>plug</td>
<td>tara, tıkaç, elektrik fişi</td>
</tr>
<tr>
<td>plug gage</td>
<td>delik mastarı</td>
</tr>
<tr>
<td>plumber</td>
<td>tesisatçı</td>
</tr>
<tr>
<td>pneumatic gage</td>
<td>havali mastar</td>
</tr>
<tr>
<td>pneumatic hammer</td>
<td>havali toşmak</td>
</tr>
<tr>
<td>pneumatic rammer</td>
<td>havali (pümatik) şahmerdan; basınçlı hava tokmağı</td>
</tr>
<tr>
<td>point angle (drills)</td>
<td>üç açısı</td>
</tr>
<tr>
<td>pointer</td>
<td>gösterge, ibre</td>
</tr>
<tr>
<td>polishing</td>
<td>parlatma, polisaj</td>
</tr>
<tr>
<td>porosity</td>
<td>gözeneklilik</td>
</tr>
<tr>
<td>powder metallurgy</td>
<td>toz metal bilimi</td>
</tr>
<tr>
<td>precipitation hardening</td>
<td>çökelterek sertleştirme</td>
</tr>
<tr>
<td>precision</td>
<td>hassasiyet</td>
</tr>
<tr>
<td>press</td>
<td>pres, cendere, presle basma</td>
</tr>
<tr>
<td>pressing</td>
<td>presle şekillendirme, presle basma işlemi</td>
</tr>
<tr>
<td>process</td>
<td>süreç</td>
</tr>
<tr>
<td>product</td>
<td>ürün</td>
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<tr>
<td>production</td>
<td>üretim</td>
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<tr>
<td>profiling machine</td>
<td>kopye tezgahi</td>
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<tr>
<td>protractor</td>
<td>açı ölçer</td>
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<tr>
<td>puller</td>
<td>çekirme</td>
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<tr>
<td>pulley</td>
<td>kasnak, makara</td>
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<tr>
<td>punch</td>
<td>zimba</td>
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<tr>
<td>punching</td>
<td>zimba ile delme, presle delme</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>English</th>
<th>Turkish</th>
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<tbody>
<tr>
<td>rack</td>
<td>kremayer dişli</td>
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<tr>
<td>ram</td>
<td>şahmerdan tokmağı, pres kütüğü</td>
</tr>
<tr>
<td>rammer</td>
<td>şahmerdan</td>
</tr>
</tbody>
</table>
raw
reamer
reaming
recess
red hardness
refractory
reinforce
relief angle
remote control
removable pattern
residual stress
resin
resistance welding
retaining ring
revolver head
rigid
ring
ring gage
riser
riveting
rod
roller
roll forging
roll forming
rolling
rolling mill
rotation
roughing cut
roughing teeth (for broach)
roughness
rubber
run-out
rupture strength
rust
take a cut
saddle
safety pin
sampling
S
shavings
size
smoothness
spring
spirals
sprocket
sphere
cubit, kol
merdane, rulo, silindir
şerit, tekne, tıbbı kağıt
sock
sinkhole
skirt
slight
slave
cut
shaving
shave
shrapnel
shrink
shrinkage
shrinkage stress
shutter
signature
sidewalk
significance
silver
silvering
signal
silver-plated
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sand    kum
saw milling cutter    testere ağrızlı freze çakısı
saw type cutter    testere tipi çakı
sawing machine    testere tezgahı
scale    ölçek
scissors    makas
scrap    hurda
screw cutting    vıda açma
screw driver    tornavida
screw machine    civata makinası
seal    keçe, yağ keçesi
seaming    eklemе, dikiş
seam welding    dikiş kaynağı
sensitivity    duyarlık, hassasiyet
set screw    testıh vidaşi, kontra vida
set-up time    hazırlık zamani
shaft    döner mil, şaft
shake allowance    tıklama payı
shank    kesici kalem sapı, şaft
shank cutter    parmak freze
shaper    yarıma açısı
shaving    trıslaına
shear angle    (preste, makasta) kesme
shear strength    kesme dayanımı, kayma dayanımı
sheathing    kaplama
sheave    oluklu kasnak, makara
sheet    levha
sheet metal screw    saç vidaşi
sheet metal shears    teneke makası
shell reamer    takıma rayba, kovan rayba
shearizing    toz çinko ile galvanizleme, çinko emdirme
shift    varydıya; yerinden oynatma, yer değiştirme, vitese geçme
shim    şım; dişlerden veya hareketli yüzeyle arasmdaki açıklığı ayarlamak için kullanılan madeni levhalar
shock resistance    sarsım direnci
shot peening    bilyalı yüzey dövme
shrinkage allowance    çekilme payı
side milling cutter    silindirik alın freze bıçağı
side rake angle  
yan talaş açısı
sieve  
elek
silicon  
silisyum
silver  
gümüş
sine bar  
sinüs çubuğu
sintering  
küçeleme, sinterleme
skilled  
kalifiye
slab  
slab, yassi kütük
slab milling  
vıls frezeleme
slag  
etüruf, dışık
sleeve  
gömlek, kovan,
mil üzerine bilezik gibi geçen parça; manşon (boruda)
slide  
kızak
slideway  
kızak
slip plane  
kayma düzlemi
slitting  
dilme, yıarma
slotter  
yıarma frezeesi
snap gage  
çeneli mastar
snap ring  
tesbit segmanı, yaylı tutturma bileziği
soaking pit  
çelik demlendirme firını
socket  
yuva, soket, priz
socket adapter  
ener anahtarı
socket wrench  
lıkma anahtarı
soldering  
lehimleme
spanner  
cıvata anahtarı
spare  
yedek, fazla
specific  
özgül
specification  
specifikasyon; makina veya cihazın özellikleri,
kendine has ölçüleri
specimen  
numune, örnek
spindle  
fener mili
spindle support  
mil desteği
spinning  
sıvama
spirit level  
düzce, kabarekli düzce, su terazisi, tesviye ruhu
spline  
freze oluklu kayar geçirme yapma; iç ve dış
dişleri birbirine geçirmek suretiyle birleştirmeye
spot face  
punta kaynağı
spot welding  
pünkürme
spraying
spring
spring lock washer
spring washer
spring winding
sprocket
sprue
spur gear
square nut
stainless steel
stability
standard
standard deviation
stem
step drill
stuff
storage
strain
strain hardening
strength
stress
stretch forming
strip
stripping machine
stroke
structure
stud
submerged arc welding
super finishing
surface finishing
surface hardening
swaging
sweep pattern
synchronization

T
T-slot cutter
tailstock
tang (drill)
yay
yaylı rondela
yaylı rondela
yay sarma
zincir dışlısi, çer dışlısi
döküm deliği
düz dışlı
dörtköşe somun
paslanmaz çelik
dengelilik
standart, tek biçim, ölçülü
standart sapma, tek biçim sapması
sap, gövde
kademeli matkap
bükülmez
depolama
gerinim
uzama sertleşmesi, gerinim sertleşmesi
direnç, mukavemet, dayanım
gerilim
uzatarak, gererek şekillendirme
şerit, lim, kuşak, band
şırma makinasi, soyma makinasi
kurs
yapı
saplaması, başlıksız civata
toz atı kaynağı
hassas perdahtlama
yüzey perdahtlama
yüzey sertleştirme, semente etmek
tokaçlama
silmeli model
senkronize etme; aynı anda ve beraber
calışır duruma getirme, esleme, eş zamanlı

yarak freze biçağı, T-kanalı ağma biçağı
torna punta başlığı
sökme ucu (konik şafli)
<table>
<thead>
<tr>
<th>English</th>
<th>Turkish</th>
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<tbody>
<tr>
<td>torque</td>
<td>burulma momenti, tork</td>
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<td>torque wrench</td>
<td>civata sıkma torkunu ölçen anahtar</td>
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<td>torsion</td>
<td>burulma, torsiyon</td>
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<tr>
<td>torsional strength</td>
<td>burulma dayanımı</td>
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<tr>
<td>toughness</td>
<td>tokluk</td>
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<td>tracing</td>
<td>konye etme</td>
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<tr>
<td>transparent</td>
<td>sayıdam, şeffaf</td>
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<td>transverse</td>
<td>enlemesine</td>
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<td>trimming machine</td>
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<td>T-slot</td>
<td>T-kanalı, T-oluğu</td>
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<td>tumbling mill</td>
<td>döner deformen</td>
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<td>volfram</td>
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<td>turret lathe</td>
<td>revolver torna, yarı-otomatik torna</td>
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<tr>
<td>twist drill</td>
<td>helisel matkap</td>
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<tr>
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<td>şişirme</td>
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<td>valf, vana, süpap, ventil</td>
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<td>V-block (Vee-block)</td>
<td>V-yatağı</td>
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electric arc welding
fusion welding
oxy-acetylene welding
spot welding
thermit welding
welding rod
welding powder
welding machine
welding helmet
white cast iron
wind nut
wire drawing
wiring
wood screw
work hardening
work piece
work table
worm gear
wrench
wrought iron

yield point
yoke

Yield point
Yoke

z
zinc
zone

Zinc
Zone

Y
yield point
yoke

Z
zinc
zone
EITB Engineering Industry Training Board, *Foundry Tools And Terminology*, ENGLAND.

EITB Engineering Industry Training Board, *Moulding*, ENGLAND.

