

As the number of available abrasive types have increased over recent years, the selection and purchase of suitable abrasives has now become a difficult task. Today the term 'sandpaper' is often used to cover any type of abrasive material, of which there are many.

The systems used to classify abrasives based on grit size in Europe and Japan (JIS - Japanese Industrial Standard) are compatible with each other but not the USA (Figure 1). In essence the two systems used are CAMI (Coated Abrasives Manufacturing Institute, the USA based system) and FEPA (Federation of European Producers of Abrasives). There are variations in the grit size between the two systems (FEPA and CAMI) and hence are incompatible. FEPA abrasives are denoted by the use of the letter 'P' before the grit number.

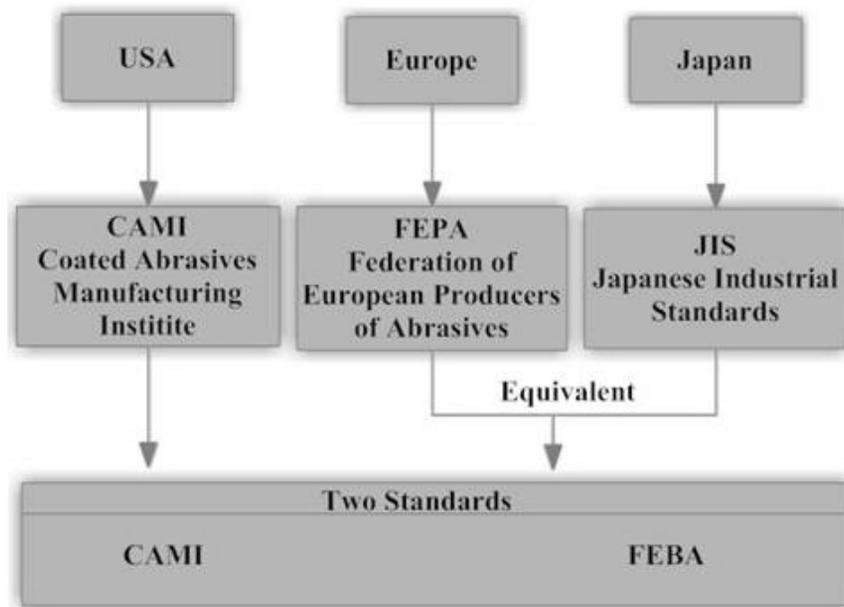


Figure 1 - Two Standard Systems for Abrasives

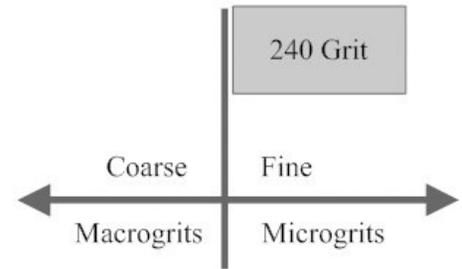


Figure 2 - Macrogrits and Microgrits

Figure 2 shows the sub-division of abrasives into two groups, this takes place with reference to the 240 grit. Any material coarser than a 240 grit is called a 'Macrogrit' while anything finer and including 240 grit is called a 'Microgrit'

Grit size varies from P12 to P2500 in the FEPA system and from 24 to 1000 in the CAMI system. A comparison of grit size from extra coarse to ultra fine is shown in Tables 1a and 1b.

## Macrogrits

	Extra Coarse	Coarse	Medium	Fine	Very Fine
<b>FEPA</b>	P12, P16, P20, P24, P30	P40, P50	P60, P80	P100, P120	P150, P180, P220
<b>CAMI</b>	24, 30, 36	40, 50	60, 80	100, 120	150, 180, 220

## Microgrits

	Very Fine	Extra Fine	Super Fine	Ultra Fine
<b>FEPA</b>	P240, P280, P320, P360	P400, P500, P600	P800, P1000, P1200	P1500, P2000, P2500
<b>CAMI</b>	240	320, 360	400, 500, 600	800, 1000

Tables 1a & 1b – Comparison of Grit Size

### ► Mohs' Hardness Scale

Mohs' scale of hardness was devised by Fredrich Mohs (1773-1839), a German mineralogist in 1826. The relative hardness of minerals are grouped into 10 levels of hardness from talc (1) – the softest mineral known to diamond (10) the hardest mineral known. Those in each succeeding group are capable of scratching those in the groups proceeding, for example, an '8' will scratch a '7' mineral, or anything below a seven. Hardness is of obvious interest in abrasives with many materials which we use as abrasives belonging to the upper part of the scale of hardness. For example, emery and garnet are in a range 7.5 to 8.5 with silicon carbide graded 9.25.



Figure 3 – Reverse of different types of abrasive sheets

Table 2 shows a comparison table of a number of abrasives.

Abrasive Type	Mohs Scale	Colour	Cost	Comments
Ceramic Aluminium Oxide	9.5		Expensive	Hard wearing; grit size 80-220 available. Long lasting. Recommended for heavy work on timber.
Alumina Zirconia	9.2-9.5		Expensive	Hard wearing, grit limited to 150 or larger, difficult to crush grains for use in finer abrasives. Available in sheets, discs and flap wheels.
Silicon Carbide	9.25	Black		Used wet or dry. Useful on hard lacquers, plastics and some metals. Dark grains can discolour light timber.
Aluminium Oxide	9.0			Tough, can grind metals. Useful for hardwoods.
Emery	7.5-8.5	Dark grey		Used for metal finishing and glass grinding. Can discolour timber due to reaction with tannin. Often creates deep scratches when used on wood.
Garnet	7.5 – 8.5	Reddish brown	Inexpensive	Useful on softwoods. When hand sanding - a better finish is obtained compared to using aluminium oxide abrasives.
Powdered Glass	5.0	Yellow	Inexpensive	Still used in French polishing, although superseded by other abrasives. Hand sanding only.

Table 2 – Abrasives comparison

### Open and Closed Coats

Abrasives in use can become clogged with resin or sawdust, this is called 'loading' In order to reduce 'loading' problems, abrasives are designed with different covering densities of abrasive particles on the abrasive surface. An 'Open Coat' refers to an abrasive which has only 50-60% of the working surface covered with abrasive grains, this gives an abrasive material which is flexible and less prone to 'loading' problems compared to 'closed coat' abrasives. 'Closed coat' is when the abrasive surface is 100% covered with grit, this makes them less flexible than open cut but also gives increased sanding rate compared to open coat materials.