BELT GRINDER

GENERAL

Belt grinding machines achieve rates of high production efficiency, quality finish and economy never realized in any other method of grinding or polishing. For example, by changing grit sizes, a machine may be converted from a heavy duty grinder to a fine micropolisher. Belt grinding machines can be adopted for semi-automatic or fully automatic working. Further, in most applications, belt grinding imposes less strain on the workpiece when compared to other forms of grinding, cracking, burning etc. are non-existent.

CLASSIFICATION OF BELT GRINDING MACHINES

Abrasive belt grinding machines are usually classified by the surface that forms the backup of the coated abrasive at the work area. This backup has an important effect on the material removal rate and on the finish. The backup governs choice of contact pressure, the angle of cut and the speed of operation.

Belt Grinding Machines may be broadly classified according to the backups used as

1. Platen Grinding Machines
2. Contact Wheel Grinding Machines
3. Free belt grinding machines
4. Centreless grinding machines

In construction, all the machines are similar. A coated abrasive belt runs over two pulleys - one driving pulley and one idler pulley. There is (a) provision to maintain the belt under constant tension between the two pulleys. (b) a mechanism to prevent the belt for from 'walking' or running off the pulleys.

(1) PLATEN GRINDING MACHINES

The function of the platen is to shape the workpiece by creating greatest pressure on the areas that do not conform to the configuration on the platen. Most platens are flat; they are also often shaped in the traverse direction to conform to the contour of the workpiece. The belt, working at a high speed, is interposed between the workpiece and the platen fixed to the machine. Platens, are generally smooth faced, but occasionally have grilled or serrated patterns to increase the aggressiveness. The face of the platen, in contact with backing of the abrasive, belt must always be smooth to decrease friction and the consequent wear of the belt backing. The horsepower required for a given metal removal rate is therefore, much higher in the case of platen machines than that of serrated wheel machines. One compromise solution that emerges is the use of a rubberised and serrated idler pulley for the heavy work and a platen for finishing work, both on the same machine. But, in general, machines are designed for light and medium duty operations.

PLATEN GRINDER SPECIFICATIONS

MODEL	Unit	**05-15**	**05-16**
Type of grinding		Platen	Platen
Belt Size	mm	200 x 1500	200 x 1500
Belt Speed	m/sec	15, 18, 22, 26	15, 18, 22, 26
Swivel of Platen bracket (Optional)	deg.	0°,45°,90°	0°,45°,90°
Main Motor	kw/hp	1.5/ 2	1.5/ 2
Dust extraction Motor	kw/hp	-	1.5/ 2

SPECIFICATIONS

SINGLE ENDED

MODEL	Unit	**05-10**	**05-12**
Type of grinding		Contact wheel	Contact wheel
Dimension of belt	mm	Standard 50 x 2000 Optional 50 x 3000 100 x 2000 100 x 3000	Standard 50 x 2000 Optional 50 x 3000 100 x 2000 100 x 3000
No of belt		One	One
Belt speed	m/sec	30	30
Swivel of belt bracket		0 - 90°	0 - 90°
Main Motor	kw/hp	2.2/ 3	2.2/ 3
Dust extraction Motor	kw/hp	--	2.2/ 3

DOUBLE ENDED

MODEL	Unit	05-09	05-11
Type of grinding		Contact wheel	Contact wheel
Belt Size	mm	Standard 50 x 2000 Optional 50 x 3000 100 x 2000 100 x 3000	Standard 50 x 2000 Optional 50 x 3000 100 x 2000 100 x 3000
No. of belts		Two	Two
Belt Speed	m/sec	30	30
Swivel of belt bracket		0 - 90°	0 - 90°
Main motors (Two)	kw/hp	2.2/ 3	2.2/ 3
Dust extraction Motor	kw/hp	--	3.7/ 5

HEAVY DUTY BELT GRINDER

Model	Unit	**40.49**
Type of grinding		Contact wheel
Belt size		75 x 3000
No of belts		One
Belt speed	m/sec	28
Contact wheel size		400 x 75
Swivel of belt bracket		0 - 90°
Main Motor	kw/hp	7.5 / 10
Dust extraction Motor	kw/hp	2.2 / 3

CENTRELESS GRINDER

MODEL	Unit	40-50
Type of grinding		Centreless
Belt Size	mm	3000 x 50
Contact Wheel Size	mm	450 Ø x 50
Regulating Wheel Size	mm	250 Ø x 50
Belt Speed	m/sec	32
Main Motor	kw/hp	7.5 / 10
Dust extraction Motor	kw/hp	3.7 / 5
Machine Size	m	1.8 x 1.75 x 1.5

2. CONTACT WHEEL GRINDING MACHINES

In contact wheel grinding, a coated abrasive belt travels over a wheel, which serves to apply on opposing pressure to the work piece. Generally, the contact wheel is driven directly by the motor. An idler pulley is positioned in tandem with the contact wheel to support the belt at the correct tension.

Rubberized Contact Wheels consist of solid rubber, tyres vulcanized to metallic hubs. The hub is made of aluminium to decrease the weight of the rotating mass. A judicious choice of hardness, form and size of the wheel is necessary to ensure effective and economic operation.

Hardness or density of the rubber is directly related to the stock removal rate and quality of surface finish obtained. For a given wheel diameter and grain size, the harder the, wheel, the faster is the cut and coarser is the finish. In fact, a substantial change in hardness can have the same effect as a jump in grain size.

Form or face, as applied to contact wheels, means the peripheral surface. The surface can be: (a) plain metallic face (b) plain rubber face (c) serrated rubber faces plain metallic or soft rubber, face are best for very fine polishing or burnishing They also ensure that the maximum belt area as in contact with the work, and thus ensures the lowest grain pressure. Serrated wheels, however, offer very definite advantages and are more widely used.

Serrations or slots are alternate lands and grooves across the face of the wheel. The ratio of the width of grooves to land the depth of the groove and the shape of the land together with the hardness and diameter of the wheel play an important part in the cutting action of the coated abrasive. The effect of the groove is to decrease the contact area. Therefore, for a given infeed force, the serrated increases the unit pressure, causing the grain to be more aggressive and the stock removal rate becomes higher.

Serrations also provide a means of controlling the breakdown of abrasive grains, thereby ensuring renewed sharp edges. A further advantage results from the flexing action of the coated abrasive ahead of the point of infeed pressure. Flexing of the belt result in good chip clearance and prevents chips from being wedged between adjacent grains.

Like grinding wheels, contact wheels have **maximum safe operating** speeds. Tests have shown that surface speed of 3000 meters per minute is the upper limit. While this figure is a practical limit, trials using serrated contact wheels have shown maximum stock removal rates occur at surface speeds between 1300-2000 meters per minute. At speed greater than 1700 meters per minute, even soft wheels tend to act hard i.e. by increasing the speed, the soft backup can be made to perform like a hard back up.

Proper selection of **surface speed** of the abrasive belt is essential for economic and effective operation and since the speed, size and form of the contact wheel also affect the speed of operation, these facts must be considered while selecting the operating speed.

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