MAGNETIC SEPARATORS

The magnetic separator has been used for many years in industrial applications ranging from removal of tramp iron from coal to the purification of pharmaceuticals. The most common uses are separation of ores and removal of tramp iron from non-ferrous materials.

The first use of the magnetic process in seed separations was made in England some 30 to 40 years ago. Iron oxide was mixed with red clover containing dodder, and the mixture was passed through a magnetic field. The results were not satisfactory because the red clover was badly discolored and the dodder was not completely removed. Since then, several machines have been designed specifically for seed cleaning by United States, English, and German firms.

General types of separators available include the drum or cylinder, induced roll, and crossbelt types. The induced roll and crossbelt separators were originally designed for industrial use and have been adapted for seed separation. The revolving cylinder or drum is the most common type of separating device used for seed. Regardless of the make or type, the principles of operation are the same.

The basic requirement for magnetic cleaning is that the seeds and other material to be separated must differ in seed coat characteristics. Generally, the "good" seed must have a smooth seed coat, while contaminating seed or inert matter must have a rough, gelatinous, or granular surface that will retain a dusting of fine iron powder when pretreated with water or a combination of oil and water. (The iron powder, water and/or oil are called "dosage materials".) The effectiveness of separation depends largely upon the magnitude of difference in seed coat texture between the good and undesirable seed and the thoroughness with which the seed and dosage materials are mixed. If the dosage materials are not applied to the seed mixture thoroughly, uniformly, and in correct proportion, some undesirable seed will not be coated with the iron and will not be separated.

Parts of the Machine

A magnetic separating system consists of three units: the feeding unit, the mixing unit, and the separating unit. Automated systems also include a panel with controls for the machine.

Feeding Unit

The feeding unit consists of a hopper with a device for controlling the rate of feed. The feed hopper may be located differently on different