

REQUIRED PROPERTIES & TESTING OF MAGNETITE
USED AS HEAVY MEDIUM

1. Specific Gravity

A high S.G. is necessary to ensure a satisfactory S.G. of the medium. Ideal magnetite has a S.G. of 5.17; as the value falls below this figure the proportion of magnetite in the suspension has to be increased, resulting in higher viscosity and less efficient separation. Most specifications call for a minimum S.G. of 4.6.

Low S.G. may be due to porosity, partial oxidation or to the presence of impurities such as ilmenite.

2. Susceptibility

This is a measure of the force with which a particle of magnetite will be attracted to a magnet. It depends on the type and amount of magnetic mineral present, and on grain size and shape. It is reduced by non-magnetic inclusions and by chemical departure from Fe_3O_4 , eg. to Fe_2O_3 . It diminishes with particle size.

Susceptibility should be high to permit satisfactory recovery and re-use. If susceptibility is low, magnetic losses will be high in the recovery section.

A value in excess of 0.050 e.m.u./gm. in a magnetic field of 800 oersteds is considered satisfactory.

Magnetics Content. A Davis tube may be used. A fixed weight of sample is introduced into the tube as a slurry and a fixed flow of water at constant velocity is passed through the tube which is agitated slowly. A variable electrical control allows the selection of any desired field strength from 500 to 3800 gauss between the poles. (Field strengths of less than 500 gauss are difficult to keep constant.) The test is run for a constant time.

A magnetics content greater than 90% obtained with a field of 700 gauss is regarded as acceptable.

3. Coercive Force.

This indicates the ease with which the magnetite particles can be demagnetised. It is intrinsic to a particular magnetite but also varies with particle size.

Coercive force should be low to permit easy removal of remanent magnetism after recovery from the washing circuit - otherwise unstable bath conditions such as magnetic flocculation and