

with a density range of 1.2 to 1.8; and the Staatsmijnen in 1938 minus 200 micron loess to obtain densities up to 1.6.

Use of magnetite was introduced in the Conklin process (1922) and the Tromp process (1938). The magnetite was minus 150 microns and densities of 1.3 to 1.9 were obtained.

Today there is a wide variety of units for dense medium separation. One item of recent interest has been the revival of the air-sand process first introduced in 1923. Aerated solids (sand minus 20 mesh plus 80 mesh) are used for densities of 1.2 to 1.4. When magnetite is used densities of 1.8 to 2.1 are obtained. For intermediate densities a mixture of the two materials (equal settling particles) are required.

ADVANTAGES OF SINK AND FLOAT SEPARATION

The process is easy to control, has a high capacity, low operating cost, causes little degradation of the products and handles a large feed particle size with a wide size range. The lower particle size limit is governed by hindered settling rates.

Medium

The use of sodium chloride solution is limited to an S.G. of 1.14; calcium chloride to 1.4 at forty per cent concentration and 20°C; zinc chloride to 1.96 S.G. at seventy per cent concentration and 20°C. Use of such solutions requires thorough washing of the product (though some chloride may have an advantage as an anti-freeze). They also require thermal concentration and they may be corrosive.

Organic liquids such as perchlorethylene (S.G. 1.60), bromoform (S.G. 2.90), and tetrabromethane (S.G. 2.96) may be used but they are costly.

Solid materials which have been used as a pseudo-liquid with water include:-

Sand	S.G. 2.65 for densities of 1.35 to 1.80,
Galena	S.G. 7.5 for densities of 3.0,
Magnetite	S.G. 4.5 to 5.2 for densities of 1.30 to 2.0,
Ferrosilicon	for densities of 3.0,
Shale	for densities of 1.25 to 1.65,
Barites and clay	for densities of 1.25 to 1.60,
Copper slag	S.G. 3.4,
Pyrite cinder	S.G. 4.2
Atomised lead	S.G. 11.3
Litharge and rubber grains.	S.G. 3.7 for densities of 3.0