



## NATIOANAL METALLURGICAL LABORATORY

### Technology Offer

<b>Title</b>	Column Flotation for the Beneficiation of Low-Grade and Finely Disseminated Ores.
<b>Description</b>	<p>Flotation column is a type of non-mechanical flotation system. The concept of counter current contact between the downward flowing slurry with raising air bubbles forms the essential basis of column flotation. The column contains two zones, for recovery and cleaning of valuable minerals in the ore pulp. The conditioned pulp is fed through a side inlet located about two thirds height from the bottom of the column. The mineral particles encounter raising air bubbles while settling down by gravity in the recovery zone. Thus continuous head on collision between air bubbles and mineral particles ensures the flotation of hydrophobic minerals. When these mineralized bubbles reach the upper portion of the column, the cleaning zone, they encounter a blanket of wash water which sweeps away gangue and slurry water entrapped in the froth. This wash water supplied through a distribution system located above the top of the column. Tailings are discharged from the bottom of the column.</p> <p>The throughput of the column is mainly determined by its cross-sectional area, while the length of recovery zone and cleaning zone determines the recovery and grade respectively. The size of air bubbles is much finer in column due to the specially designed air sparger/bubble generator used.</p> <p>The merits of the flotation column include; improved metallurgical performance in terms of grade and recovery, effective cleaning action, smaller floor space, low capital investment, less operational and maintenance cost and easier control.</p>
<b>Area of Application</b>	<ul style="list-style-type: none"><li>• Mineral Processing.</li><li>• Enrichment of ores by flotation.</li><li>• Flotation of ores and minerals.</li><li>• Quality and quantity improvement in mineral processing circuits.</li><li>• Flotation of base metal ores (Cu, Pb, Zn ores), iron ores (hematite, magnetite, BHQ, etc.), beach sand minerals (sillimanite) &amp; industrial minerals (limestone, barite, etc.).</li></ul>

<b>Keywords</b>	Column Flotation, ores, Grade, Recovery, low-grade ores
<b>Advantages</b>	<p>Improved metallurgical performance is assured by column flotation as a result of:</p> <ul style="list-style-type: none"> <li>• Less entrainment and entrapment through froth washing</li> <li>• Independent control of operating variables</li> <li>• Flotation of coarse and slimes particles</li> <li>• Can also be used as roughers and scavengers</li> </ul> <p>Reduced running costs as a result of:</p> <ul style="list-style-type: none"> <li>• No moving parts</li> <li>• Lower reagent consumption</li> <li>• Lower energy consumption</li> <li>• Reduced downtime</li> </ul> <p>Reduced capital costs as a result of:</p> <ul style="list-style-type: none"> <li>• Lower residence time</li> <li>• Higher gas holdup</li> <li>• Substantial reduction in floor area</li> <li>• One stage of column flotation is equivalent to 3 stage conventional flotation</li> </ul>
<b>Environmental Aspects</b>	NA
<b>Development Status</b>	<p>Laboratory scale – 74mm diameter- 10kg/h treatment capacity (4 Nos. at NMLMC, NML-JSR, GVIT-Kolar &amp; NEIST-Jorhat)</p> <p>Pilot scale – 500mm diameter-1ton/h capacity (2 Nos. at NMLMC &amp; RBSSN-Hospet, for low-grade iron ore)</p> <p>Commercial scale – 1250mm diameter-150TPD capacity (Installed 3 Nos. at IREL-Chatrapur, Orissa, for sillimanite; Calpro-Salem, for limestone &amp; IREL-Chavra, Kerala, for sillimanite)</p> <p>Installation of a 2500mm diameter column for the beneficiation of barite is in progress at Mangampet, A P.</p>
<b>Legal Protection</b>	Spargers (ceramic) Licensed to a party in Bangaluru.
<b>Technical specifications</b>	<p>The diameter of the column will be decided based on the feasibility studies and the customer's production requirements.</p> <p>All types of columns are fully automatic and equipped with state-of-the art instruments and proprietary sparging system.</p>
<b>Transfer Terms</b>	<p>Patent/Technology Licensing -Others</p> <p>NML has signed an MOU with McNally Bharat Engineering Co. Ltd.</p>
<b>Upload</b>	Attached separately

<b>Document/picture</b>	(A document on the "Development of Column Flotation at NML")
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