



NATIONAL INSTITUTE OF TECHNOLOGY CALICUT

# INDIAN RARE EARTHS LTD, KOLLAM



*By*

**ARAVIND VENUKUMAR**

**M110419EE**

# IREL PROFILE

**IREL is a Mining Industry under Atomic Energy of Energy, Govt of India.**

**God's Own Country is blessed with long coastal belt. Kerala is endowed with heavy deposits of**

- . Ilmenite**
- . Rutile**
- . Zircon**
- . Monazite**
- . Sillimanite**

# Products and Specifications

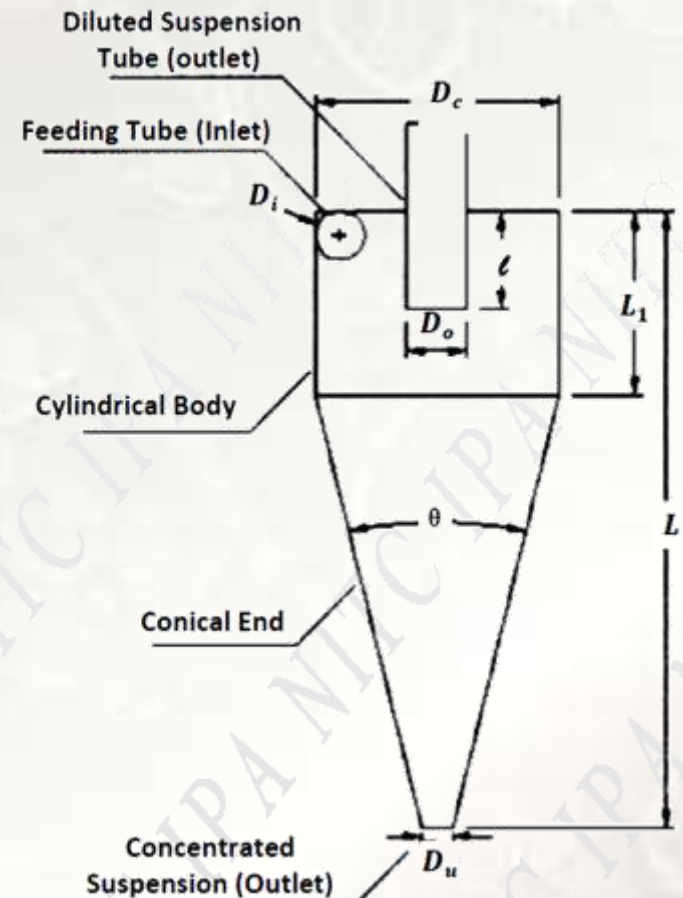
Product	Specification	Specific Gravity	Bulk density (kg/m)	Major Application
1. Ilmenite	TiO <sub>2</sub> -58%	4.45-4.54	2600-2630	TiO <sub>2</sub> pigment, Ti metal
2. Rutile	TiO <sub>2</sub> -95%	4.18-4.24	2630-2650	Used as flux in welding electrode industry
3. Zircon	ZrO <sub>2</sub> -65%	4.60-4.7	2900-3000	In ceramics refractories, foundries & glass industry
4. Sillimanite	Al <sub>2</sub> O <sub>3</sub> -58%	3.2-3.25	1950-2050	In refractory bricks, castable cordierites
5. Zirflor	ZrO <sub>2</sub> -64%	-----	1800-1850	In refractory and foundry coating, opacifier in ceramic industry
6. Micro Zir	ZrO <sub>2</sub> -63.5%	-----	-----	In ceramic glasses, heat resistant porcelain, refractories, plastics etc
7. Garnet	Abrasive for sand blasting water jet cutting & glass polishing			
8. Monazite	Raw material for production of rare earth compounds			

# Magnetic and Electrostatic Properties of Sand components

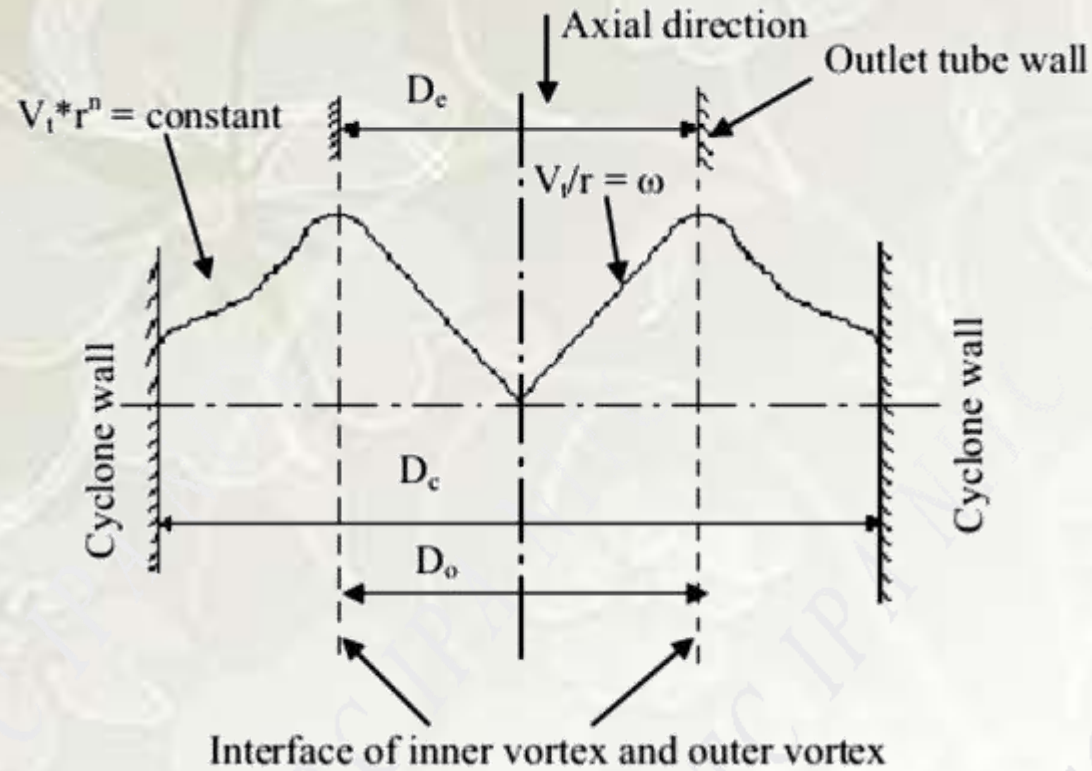
Components	Magnetic Properties	Electrostatic Properties
Ilmenite	Magnetic	Conducting
Rutile	Non- magnetic	Conducting
Leucoxene	Weakly magnetic	Non conducting
Monazite	Weakly magnetic	Non conducting
Zircon	Non-magnetic	Non conducting
Sillimanite	Non-magnetic	Non conducting
Balance material	Non-magnetic	Non conducting

# HYDROCYCLONES

- Hydrocyclones are Also Known as Cyclone Separators
- Two Exits on the Axis
- Concentrated Suspension Outlet or Underflow
- Diluted Suspension Outlet or Overflow



# HYDROCYCLONE PARAMETERS



- The velocity profile in a cyclone can be characterized by three velocity components (tangential, axial and radial).
- The tangential velocity is the dominant velocity component.

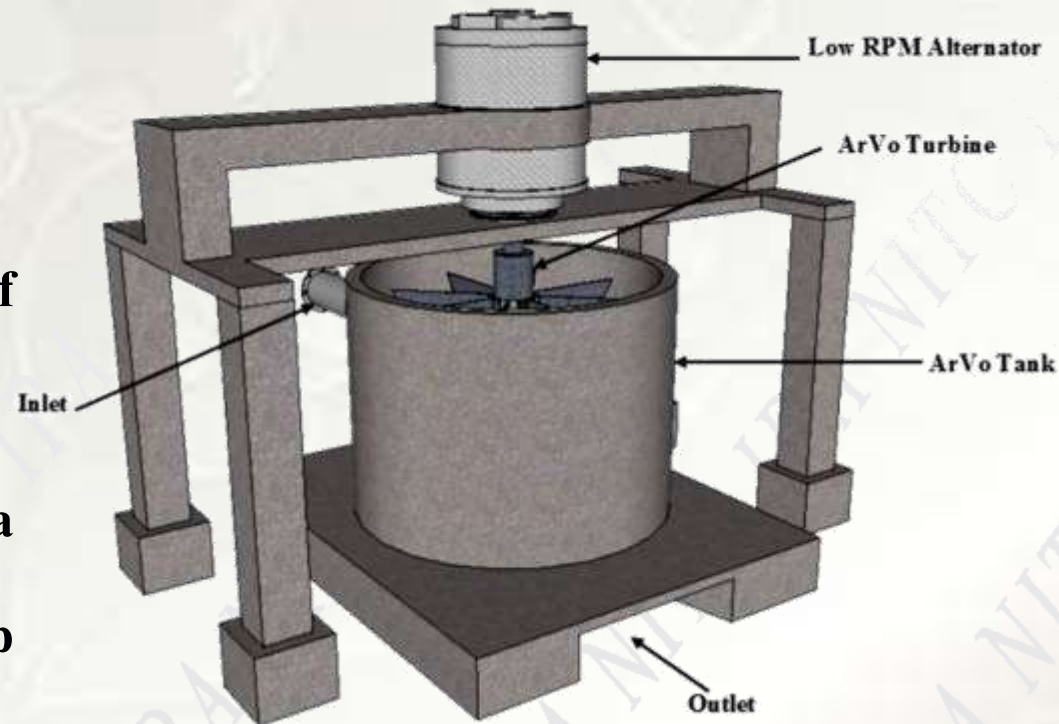
# SPIRAL SEPARATORS

- Owing to the spiral shape, the feed while coming down the concentrator by gravity, acts upon by centrifugal forces and gets separated according to differences in density



# ENERGY ENGINEERING SCOPES

- **The drainage water :**
- **Flow rate of 20 lps**
- **Velocity of 0.3m/s.**
- **The loss in velocity because of sumps present in the system.**
- **The values suggested a feasible location for setting up of an Artificial Vortex (ArVo) power generation plant**





# CONCLUSION

- **The industrial training was primarily aimed at understanding the industrial environment and to get acquainted to the life of a responsible worker.**
- **The separation process using hydrocyclones and spirals are comprehensively studied.**
- **Suggestions for setting up of a power saving arrangement were put forward**

Thank You!

