

## TUNDISH FOR BETTER INCLUSION SEPARATION IITM Technology Available for Licensing

### Problem Statement

- Existing tundish designs struggle to effectively remove small-sized impurities (<50  $\mu\text{m}$ ) from molten steel, impacting its quality and processing.
- There is a critical need for a tundish design that efficiently separates smaller impurities (<20  $\mu\text{m}$ ) from molten steel, ensuring cleaner steel production and desired material properties.

### Technology Category/ Market

#### Category – Metallurgy/Materials Engineering

**Applications** - Steel Production, Metal Casting, Metallurgical processes, Manufacturing/ Chemical Industry - Steel Manufacturing, Metalworking, Extraction / Mining

**Market** - The global Steel market size was valued at USD 1159247.89 million in 2022 and is expected to expand at a CAGR of 3.3% during the forecast period, reaching USD 1408401.06 million by 2028

### Intellectual Property

- IITM IDF Ref. 1592
- IN 474018 (Patent Granted)

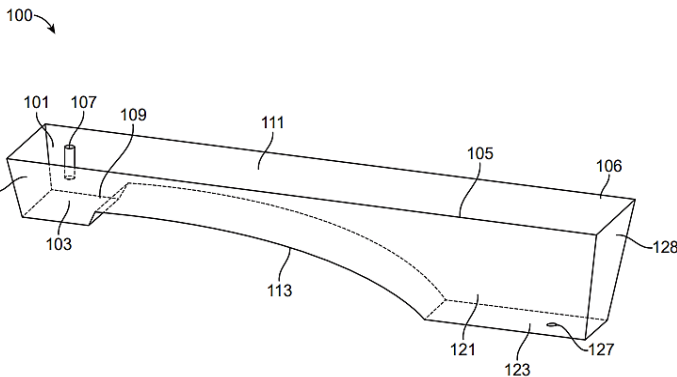


FIG. 1A depicts the isometric view of the improved tundish design.

### Technology

#### Enhanced Inclusion Separation:

The invention focuses on improving the separation of non-metallic inclusions (NMIs) from molten steel, particularly targeting smaller impurities (<50  $\mu\text{m}$ ) for better steel quality.

#### Unique Tundish Design:

It introduces a novel tundish design featuring a recirculating region, a contoured neck region, and a reservoir region, optimizing the flow dynamics to achieve superior inclusion separation.

#### Gradual Flow Expansion:

The contoured bottom wall of the neck region facilitates a gradual expansion of molten metal, reducing velocity and enhancing the effectiveness of inclusion removal.

#### Application Versatility:

The design can be tailored for various steel production configurations, offering adaptability for single or multiple strands, thereby accommodating diverse industrial needs.

#### Significant Efficiency Gains:

Compared to traditional tundish designs, this invention promises a substantial increase in inclusion separation efficiency, contributing to the production of cleaner and higher-quality steel.

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**Key Features / Value Proposition**

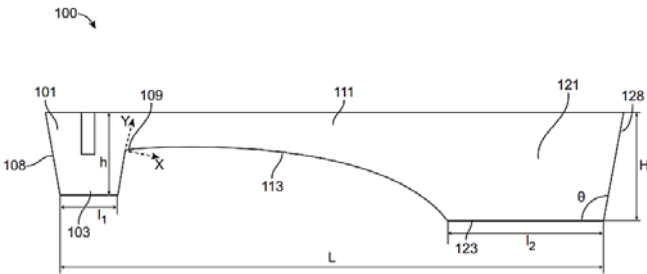
**User Perspective:**

- Enhanced **steel quality** through **superior inclusion removal**.
- Increased **operational efficiency** and **cost-effectiveness** for steel manufacturers.

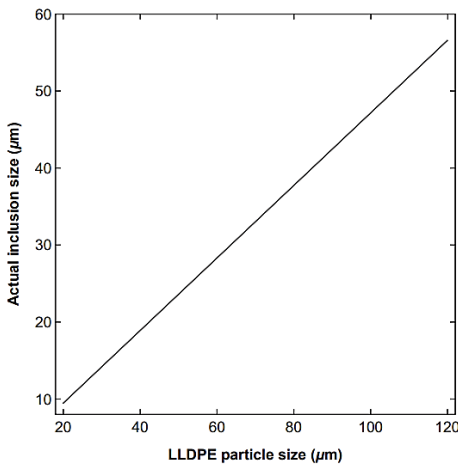
**Technical Perspective:**

- **Advanced flow dynamics** for superior inclusion separation.
- Adaptable design for **seamless integration** and **enhanced process efficiency**.

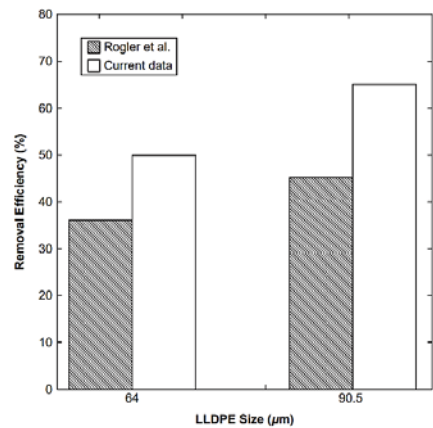
**Image**



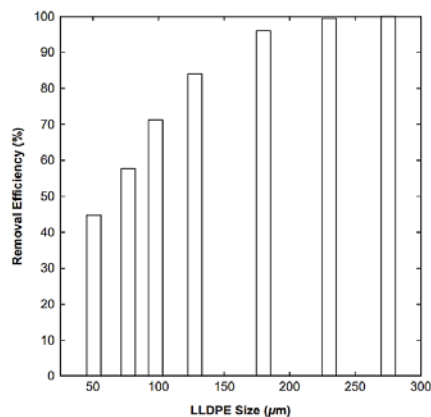
**FIG. 1B illustrates the cross-sectional view of the improved tundish design.**



**FIG 2 Plot comparing tested LLDPE particle size to actual inclusion sizes in a full-scale tundish.**



**FIG. 3 Compares separation efficiency of improved tundish to traditional shape for 64 and 90.5-micron LLDPE particles.**



**FIG. 4 depicts separation efficiency of linear low-density polyethylene (LLDPE) particles of various sizes in the improved tundish.**

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**TRL (Technology Readiness Level)**

**TRL- 4, Technology validated in Lab scale**

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