

Project Title:

Melt 5a – Developing and Deploying Thin-Wall Ductile Iron Castings for High Volume Production



Lead Industry Partner: Grede

Technology Pillar: Melt Processing

Lead Research Partner: Michigan Technological University

Project Summary

This project will focus on the manufacturing process development required to bring thin-wall, vertical green sand-molded ductile iron (DI) castings to high volume production.

Technology Gap / Need

The ability to cast thin-wall DI castings is critical to leveraging the high stiffness and strength of these materials. Current components often have section sizes thicker (i.e., heavier) than dictated by mechanical requirements due to process and material limitations.

Proposed Technology

The high volume production of thin-wall ductile iron castings requires the integration of several recently developed technologies:

1. High precision molding machines
2. Utilization of pearlitic and high silicon, ferritic ductile iron alloys to mitigate carbide formation. Ferritic ductile iron alloys are currently in production but are not applied in thin-wall castings.
3. In-stream and in-mold inoculation practice to control microstructure
4. "Soft-touch" shake out and finishing operations

Project Benefits

By integrating and implementing improved methods and alloys, there is potential to decrease wall thicknesses of ductile iron cast parts by up to 50%, thus enabling lightweighting of transportation components by 30%-50% depending on component loading.

Workforce and Educational Impact

The American Foundry Society, through workshops, webinars, the annual Metalcasting Congress, and AFS's training arm (The Institute) will assist in the dissemination of knowledge and create new courses on how to manage this new thin-wall production environment. LIFT will support the development of integrated computational materials engineering (ICME) workforce training initiatives.

Period of Performance

Start Date: June 2015

End Date: June 2016

Funding

Total Project Value: \$1.34M

Participants

Industry Partners

American Foundry Society
Comau
Eaton
Grede
PDA

Research Partners

Massachusetts Institute of Technology
Michigan Technological University

