# Converting a Pressure Pour from DI to HiSiMo and back again

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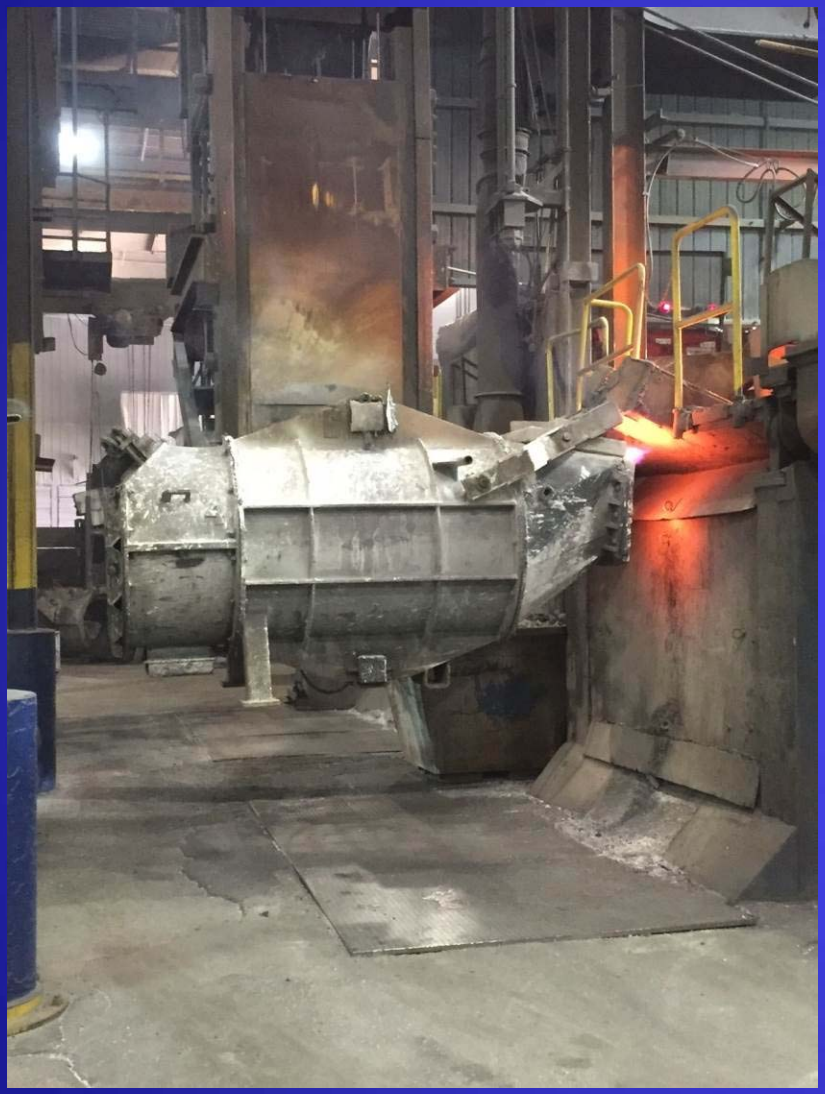
# Reedsburg Operation

- The Coreless Melt Department has two in line IT8 5300 KW coreless furnace each with a 20 ton capacity.
- Heel melting process with a dropped charge of 6800 lbs.
- Furnaces feed iron into a 16 Ton GF Pressure Pour that supplies a 2070 Disamatic.

# Reedsburg Operation



GF converter system with a pure Mg treatment.

# Ductile Base Iron

- Normal base iron in our IT8's has the following range
  - Carbon = 3.55 – 3.75%
  - Silicon = 2.30% - 2.70%

# Hi Si Moly Iron

- Our Hi Si Mo has a completely different range
  - Carbon = 3.00 – 3.30%
  - Silicon = 4.00 – 4.30%

# Conversion Process

- The difficulty of this conversion is two fold.
  - Convert a 20 ton coreless furnace with a 33,000 lbs heel
  - Convert a 16 ton pressure pour with a 12,000 lbs heel.

# Conversion Process

- Option 1
  - Take iron out of the coreless furnace and drop all steel charges in to change the chemistry
  - Tilt Pressure pour up and drain to there is only 500 lbs in the furnace or just enough to cover the inductor
  - Bring over Hi Si Moly iron from the IT8's
- Option 2
  - Take iron out of the coreless furnace and drop all steel charges in to change the chemistry
  - Take pressure pour to minimum heel and then bring over iron in two stages of converters to the pressure pour
  - Pig pressure pour until chemistry is reached.

# Option 1

- Benefits
  - Quicker chemistry turn over
  - Iron is pigged into convenient starter blocks that can be used for start up
- Negatives
  - Draining pressure pour is a 2 hr process that requires manually building a trough in the intake
  - Iron temperature loss
  - Slag build up from the cool furnace and the low temperature Hi Si Mo slag
  - Refractory attack from the slag build up / Thermal Shock

# Option 2

- Benefits
  - Maintain a minimum heel in the furnace so iron temperature is maintained
  - Slag is controlled by hotter iron
  - No thermal shock to the refractory
  - Better chemistry control
- Negatives
  - Have to pig numerous converters through the pressure pour into molds
  - Pigged returns are a waste of sand and only usable when HiSiMo is run

# Conversion Process

- After trialing both processes we settled on option 2.
- Main reason for this was to prevent refractory and inductor damage from the drain / refill thermal shock

# Conversion Process Details

- First step is to leave the silicon as high as possible in the Pressure Pour once ductile production is finished.
- Leave the coreless furnace two converters down (13,600 lbs).
- Backfill the coreless with a 50 / 50 returns / steel charge to bring down the carbon.
- Add alloy to bring the silicon up.
  - Note: There can be some silicon solubility issues
- Utilize spectro and Leco for carbon and silicon

# Conversion Process Details

- Add a Ferro- Moly alloy to the two converters and take over to the pressure pour, mix, sample and then pig through the mold line.
- Then add two more 50 / 50 steel / return charges to the IT8 furnace with silicon addition and carbon addition to maintain the lower carbon target.
- You will need the carbon, silicon and moly results from the pressure pour to help with final alloying of the IT8 furnace.
- Once you have the chemistries in the coreless set then you can add the moly to two more converters and take over to the pressure pour.
  - Moly is not a 100% recovery so you will have to determine your recovery rate
- At this time chemistry should be good to start pouring.

RETURN TO DI NEWS

# Converting back to DI

- The best way we found to convert back to DI is to pig iron through the Pressure Pour.
- Take the silicon in your coreless furnace back to a normal range.
- Then this can be pigged back through the pressure pour until the Mo has dissipated enough to begin normal production.