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**05-272 Practical Channel Furnace Panel**

**An Update on Successful Case Studies of  
Flux Combating Channel Furnace Build-Up**

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# An Update on Successful Case Studies of Flux Combating Channel Furnace Build-Up

**Severe Throat Build-Up** in Pressure Pour Channel Furnace Holding/Pouring Alloyed Iron

**Emergency Plugging Situation** in Two Melting Vertical Channel Furnace Successfully Revived “Back from the Dead”

**Re-Establishing Original Furnace Capacity** in Holding Channel Furnace and Improving Channel Cleanliness

**Elimination and Further Prevention of Slag Shelf** in Vertical Channel Holding Furnace

# What is the Physical Appearance of the Flux?



**2.73Kg(6 lbs) Bricks**



**0.45Kg(1 lb.) Powder packs**



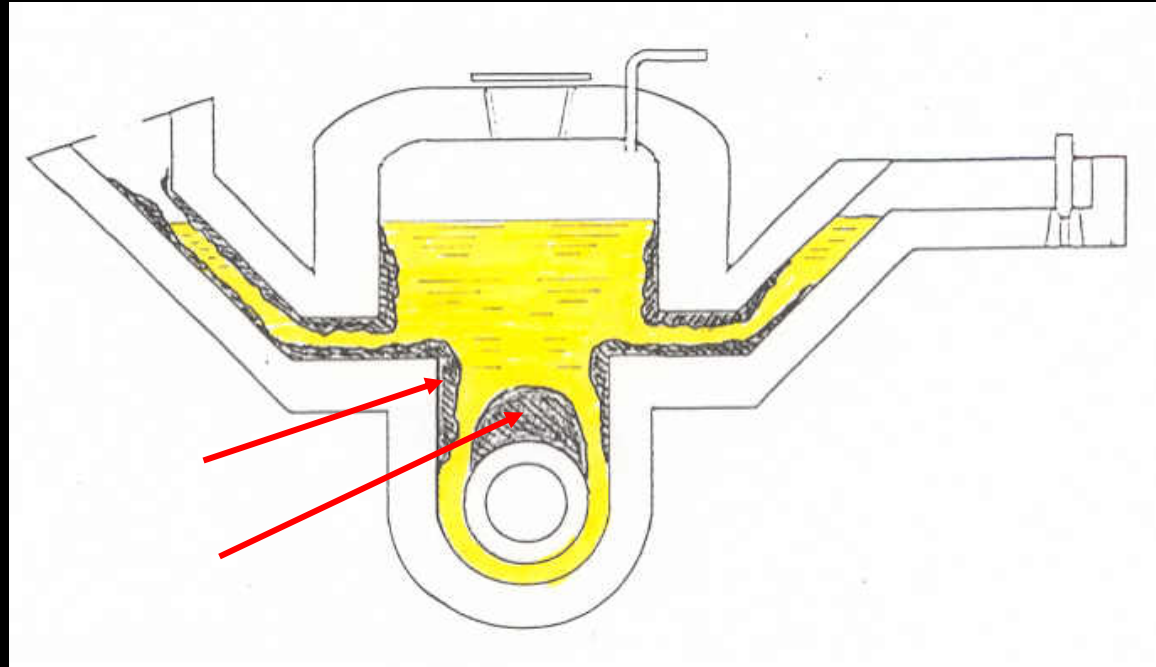
**45 gram Briquettes**

# Build-Up in Pressure Pour Furnaces

## “Conventional Throated Inductor”

**Insoluble build-up typically occurs in inductor, throat, upper case and entrances to spouts**

- energy inefficiencies
- poor temperature control
- diminished heat transfer
- superheating in clogged inductor loop can lead to dangerous run-outs



# An Update on Successful Case Studies of Flux Combating Channel Furnace Build-Up

## **Severe Throat Build-Up** in Pressure Pour Channel Furnace Holding/Pouring Alloyed Iron

**Alloyed Chrome Iron at  
1482C(2700F)**

**0.23Kg(0.5 lbs) per 1 ton per ladle  
entering the Pressure Pour Fce  
continuously. Using 45 gram  
briquettes.**

**Deslagged twice a week through  
small cover**

**No negative effect on Uppercase,  
Floor, Throat Refractories**

**Lining Life extended from 1-2  
months to 7-9 months**

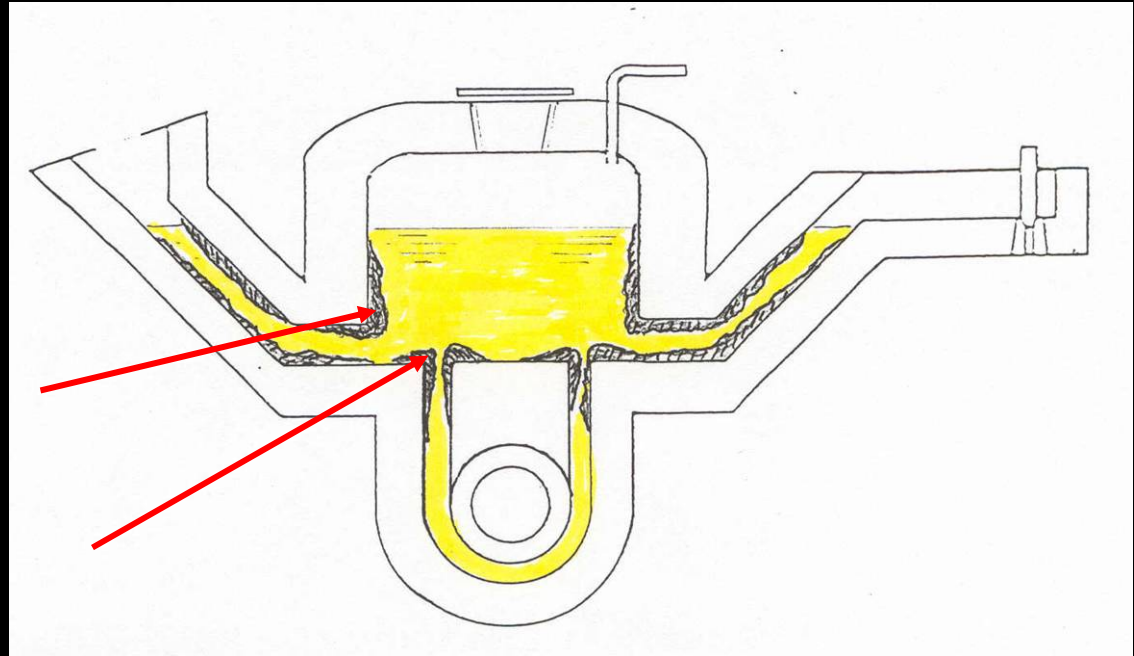


*Courtesy of Inductotherm Corp.*

# Build-Up in Pressure Pour Furnaces “Modified Throatless” Design

**Insoluble build-up can occur in channel passages, upper case and entrances to spouts**

- energy inefficiencies
- poor temperature control
- diminished heat transfer
- superheating in clogged inductor loop can lead to dangerous run-outs



# Severe Throat Build-Up in Pressure Pour Channel Furnace Holding/Pouring Treated Ductile Iron

Continuous Addition of 0.23Kg(0.5 lb) per ton of molten metal being introduced

Manual Scraping of Receiver  
Once every 4 hours

Once a week, 0.45Kg(1 lb) per ton of molten metal (low heel) through small cover. High power on inductor for 60-120 minutes. Monitor temp not to exceed 1565C(2850F). Rod out channel openings fill furnace and Deslag

Repeat treatment next day, depending on the severity of the build-up.

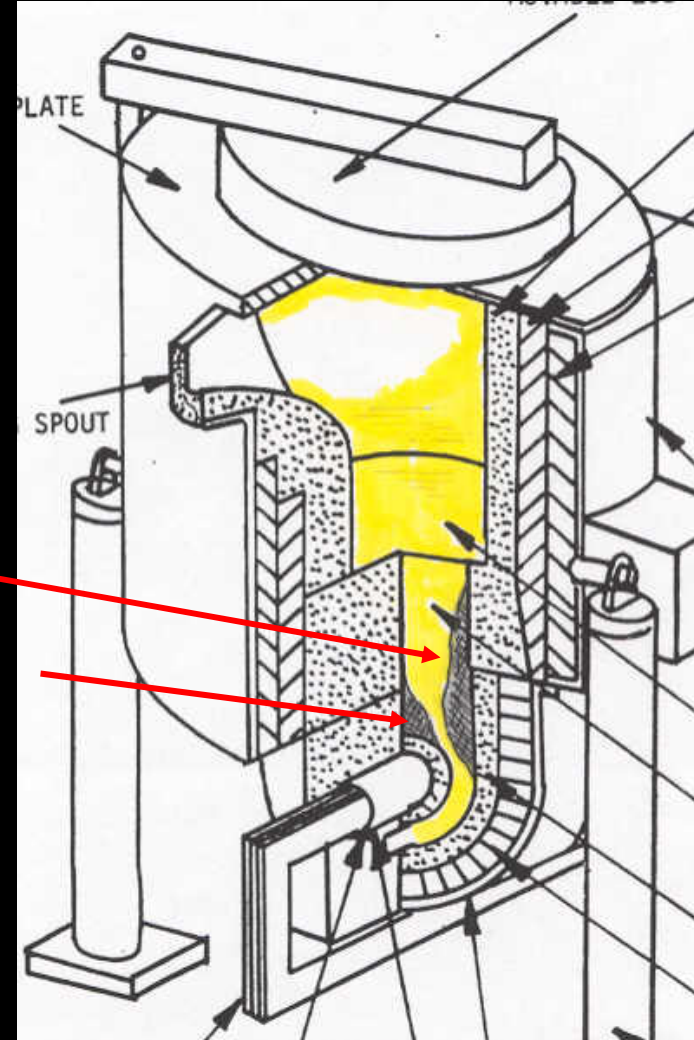


*Courtesies of Waupaca Plt 4 and Duca Mfg*

# **Emergency Plugging Situation in Two Melting Vertical Channel Furnaces Successfully Revived “Back from the Dead”**

**Insoluble build-up occurs in the throat or between individual Channels**

- **energy inefficiencies**
- **poor temperature control**
- **diminished heat transfer**
- **superheating in inductor loop could lead to run-outs**





# **Emergency Plugging Situation in Two Melting Vertical Channel Furnaces Successfully Revived “Back from the Dead”**

**Two 30 ton Vertical Channel Melters with one 1750 KW Double Loop Inductor per Furnace**

**2 Days later, Conductance Ratio dropped from 75-80% down to 50-55%.**

**Molten iron surface free of slag before adding Flux**

**Saturday treatment of 0.68Kg(1.5 lbs) per ton of molten metal in the furnace(low heel). Full Power on inductor for 60 minutes.**

**Monitor temp, keeping below 1565C(2850F). Fill furnace to partial bath. No Deslagging**

**Sunday treatment of 0.45Kg(1 lb) per ton of molten metal in furnace. Full power on inductor for 60 minutes. Monitor temp, keeping below 1565C(2850F). Fill furnace to maximum capacity and remove slag. Allow the temperature drop to normal holding 1454C(2650F) temperature.**

**Furnace returned to normal operating Conductance Ratio of 75-80%**



*Courtesy of Martin Sprocket/ Ajax Tocco*

# **Re-Establishing Original Furnace Capacity** in Holding Channel Furnace and Improving Channel Cleanliness

## **Two 65 ton Vertical Channel Holders**

**After 11 months of operation, working furnace capacity was reduced to less than 35 tons.**

**0.05% flux was added to the cupola transfer ladle feeding the channel holders for 3 weeks. The flux removed 11 months of buildup without any sign of refractory attack. The original working volume was systematically restored.**

**Both furnaces were taken off line for their yearly reline 3 months later and the linings carefully examined. Again, no sign of refractory erosion. The newly relined furnaces have been on line for 8 months, flux is added as needed, and the foundry fully expects each holder to now last 24 months!**



*Courtesy of Asea Brown Boveri*

# Elimination and Further Prevention of Slag Shelf in Vertical Channel Holding Furnace

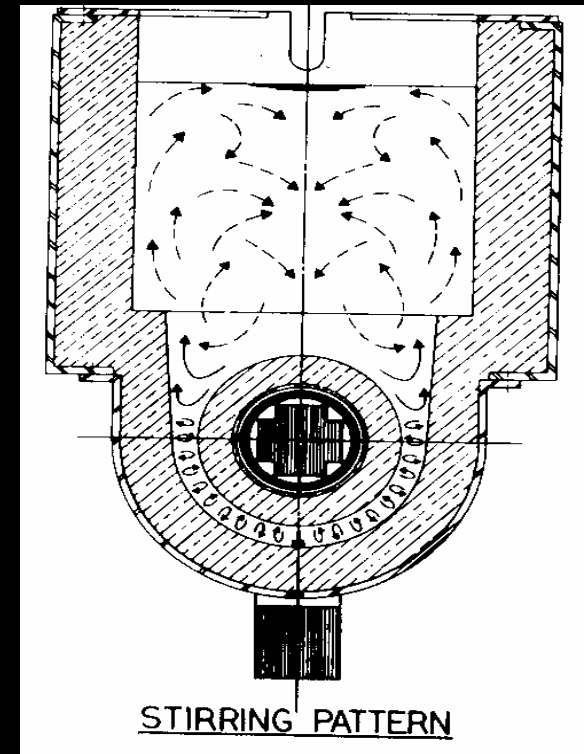
Continuous Cupola fed Holding Channel Furnace. Metal temperature 1454C(2650F). Continual feed of 16 tons per hour.

Slag Shelf Build-Up on Sidewall reducing Capacity

For a three consecutive day trial, FLUX was added at the rate of 3.6Kgs(8 lbs) per 16 tons per hour. This was continued for 11 hour period each day. Furnace continued to operate w/o FLUX addition until 4 am daily. Deslagging then occurred

Flux addition resumed each consecutive day and the steps were repeated, Deslagged every day at 4 am. Last day of Flux additions were followed by leaving the furnace without Deslagged for 2 additional days.

Monday morning inspection verified disappearance of Slag Shelf



# **An Update on Successful Case Studies of Flux Combating Channel Furnace Build-Up**

**Other Applications utilizing Flux to combat:**

**Build-up in Fischer Converters**

**Build-Up in Transfer Ladles**

**Build-Up in Silica-lined and Alumina-lined Coreless Induction Furnaces**

**Build-Up in Non-Ferrous/Copper Applications**

**Cupola Flux to assist Limestone Addition**

**Mild Desulfurizer**

# **An Update on Successful Case Studies of Flux Combating Channel Furnace Build-Up**

**FLUX is no longer a bad FOUR LETTER Word in the melting department. Often Refractory manufacturers were Fearful of the NEGATIVE Effects against the refractories.**

**Controlled additions of a new, mild, fluorspar free FLUX has proven to be extremely effective in dealing with the proverbial BUILD-UP / CLOGGING headache that foundries had to battle with for decades.**

**Thank you. Enjoy the AFS Cast Expo.**

*D. C. Williams*