Introducing the “New” ACI

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American Combustion International – ACI Holding, LLC

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Outline

- **Introduction**
- Product Portfolio
- Key Customers

ACI History

- Founded by Russian scientists in 1984
- One of the most well known names in Oxy combustion with a global customer base
- Air Liquide acquired in 2001 to leverage oxy-combustion expertise in the Steel industry
- Air Liquide decided to carve-out the company to move away from equipment business and focus on Oxygen sales instead
- Purchased by ACI Holding LLC, an employee owned firm, in August 2016
- Started re-conducting business as American Combustion

ACI Mission and Ambitions

- ACI is a worldwide leading combustion technology solution provider
  - An employee owned company
  - Office in Atlanta, US with complete design, manufacturing and service capabilities
- ACI's mission is to design, deliver and service advanced oxygen combustion systems and thus to provide innovative and energy efficient solutions for the steel, non-ferrous metal and glass as well as the Oil & Gas and Energy industry
  - Increase customer's productivity and flexibility (shorter production cycles)
  - Reduce customer's total operating costs (savings in electricity and fuel)
  - Help customers meet specific environmental regulations (NO_X, CO, VOC)
- ACI's ambitions are
  - To have the highest safety achievements in the combustion equipment industry
  - Be the global leader in oxygen combustion technology
  - Support end customers with state-of-the-art combustion technology allowing to leverage the potential of oxy-combustion and injection
  - Constantly drive innovation toward market needs in collaboration with customers
  - Be the trusted partner to our customers, suppliers and employees

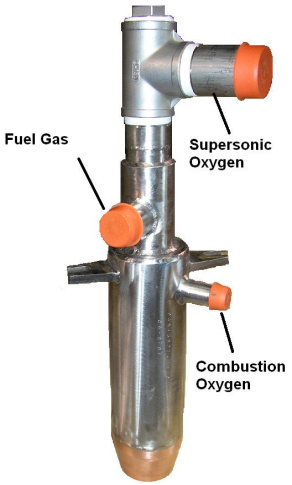
Industries served by ACI

- **Steelmaking**
  - Electrical Arc Furnaces (EAF)
  - Ladle Heating
- **Non Ferrous Metal (S)melting and Recycling**
  - Copper
  - Aluminum
  - Lead
  - Glass
- **Benefits offered to the customers**
  - Reduced operating costs – bottom line improvement
  - Increased productivity – top tine improvement
  - Reduced emissions – regulatory compliance
  - Improved safety – regulatory compliance

EAF Solutions

EAF

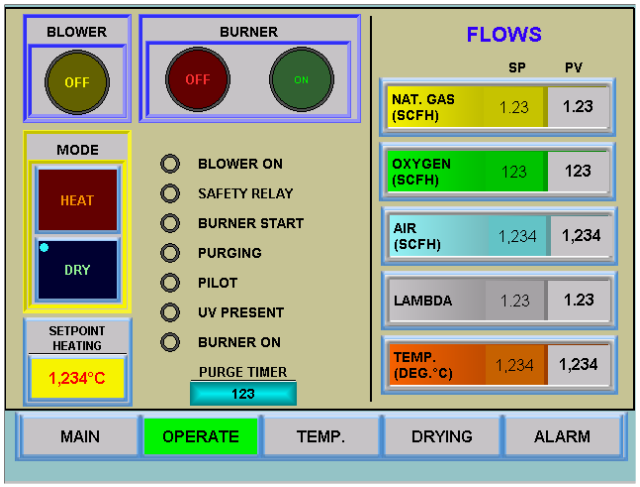
- Major Customers – SDI, Nucor UT, Gerdau, Shagang, OEMK, VTZ, Usha, Sunflag, Sanyo
- More than 50 global references
- ACI offers burners, O_2 injectors, panels, carbon injection, valve trains, controls and process optimization

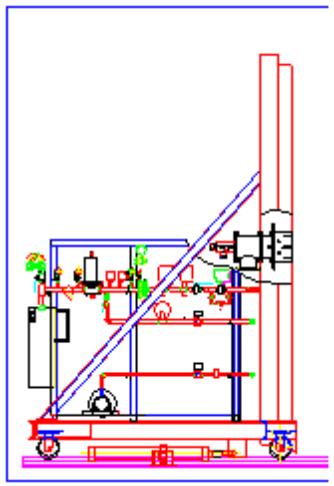


Ladle Heating Solutions

- Major Customers: Nucor, SDI, Gerdau, SSAB, Sanyo, Topy
- More than 180 references in the 50 to 300 t range
- ACI offers burners, valve trains, controls and process optimization

Ladle Preheat





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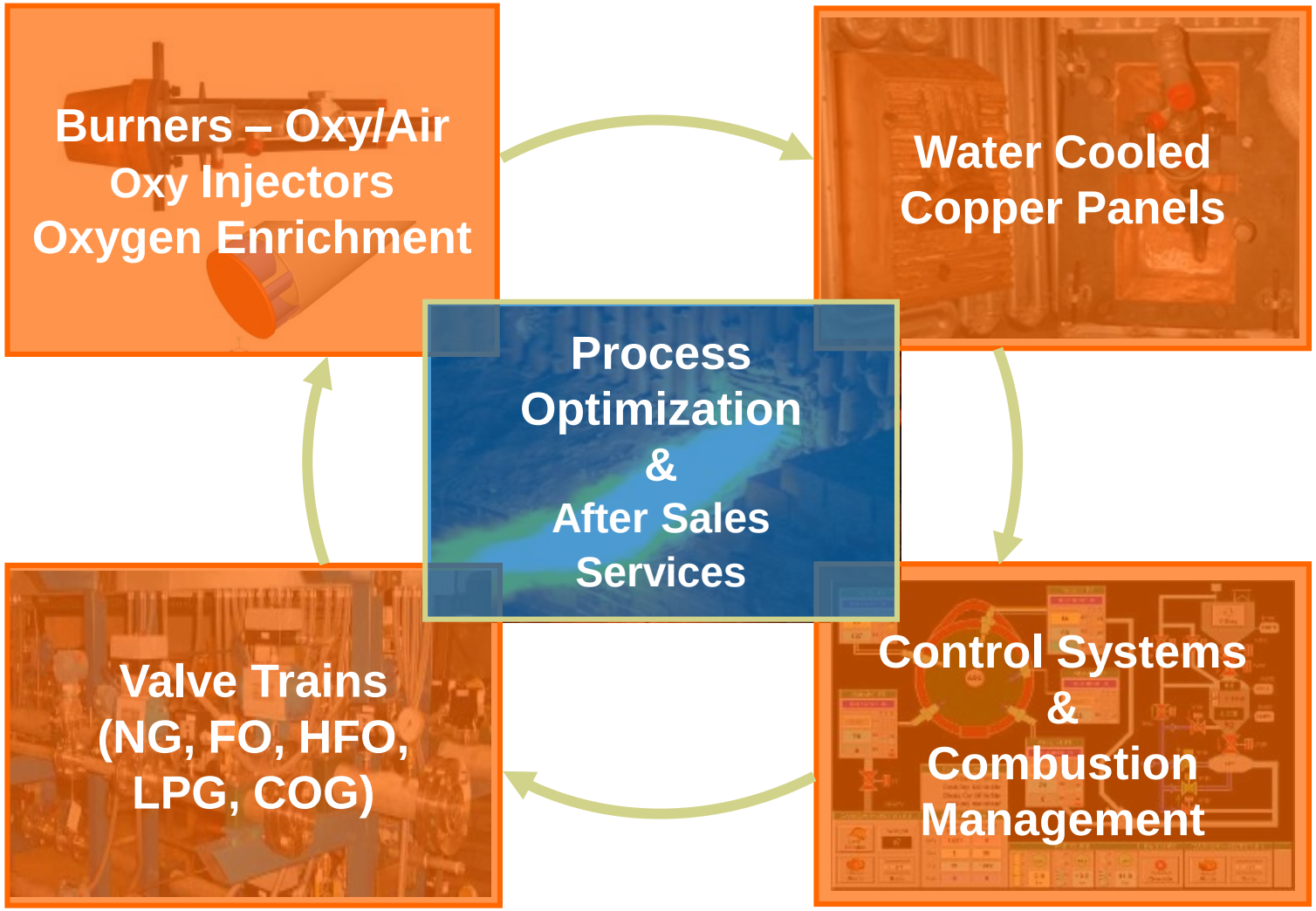
- **Product Portfolio**
- Key Customers

Complete Solution Portfolio

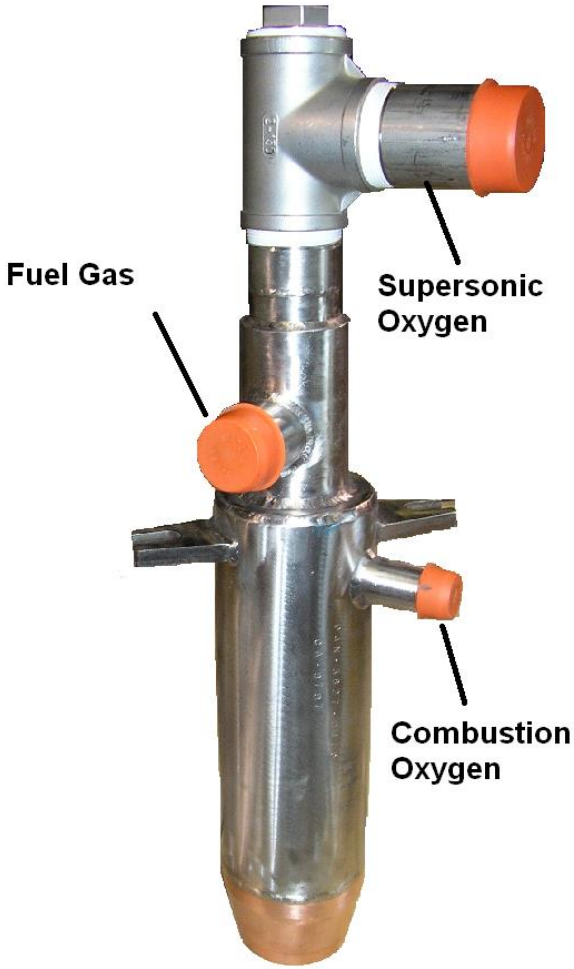


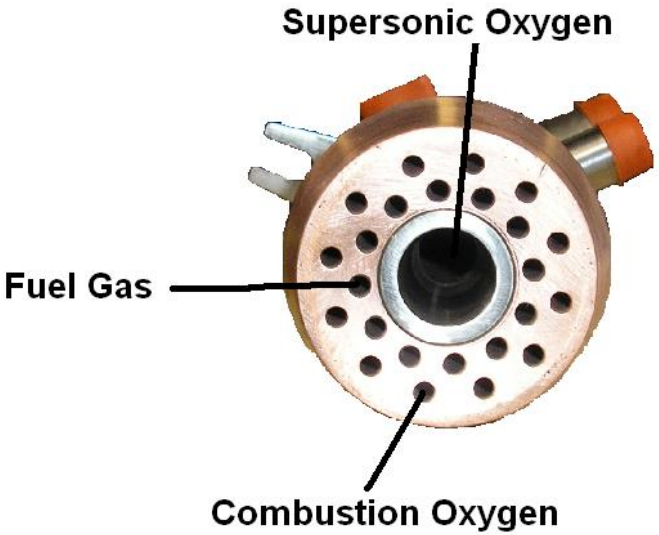
PyreJet™

An EAF multi tool designed to combine the functions of an oxy fuel burner and oxygen lance and enhance foamy slag from carbon injection

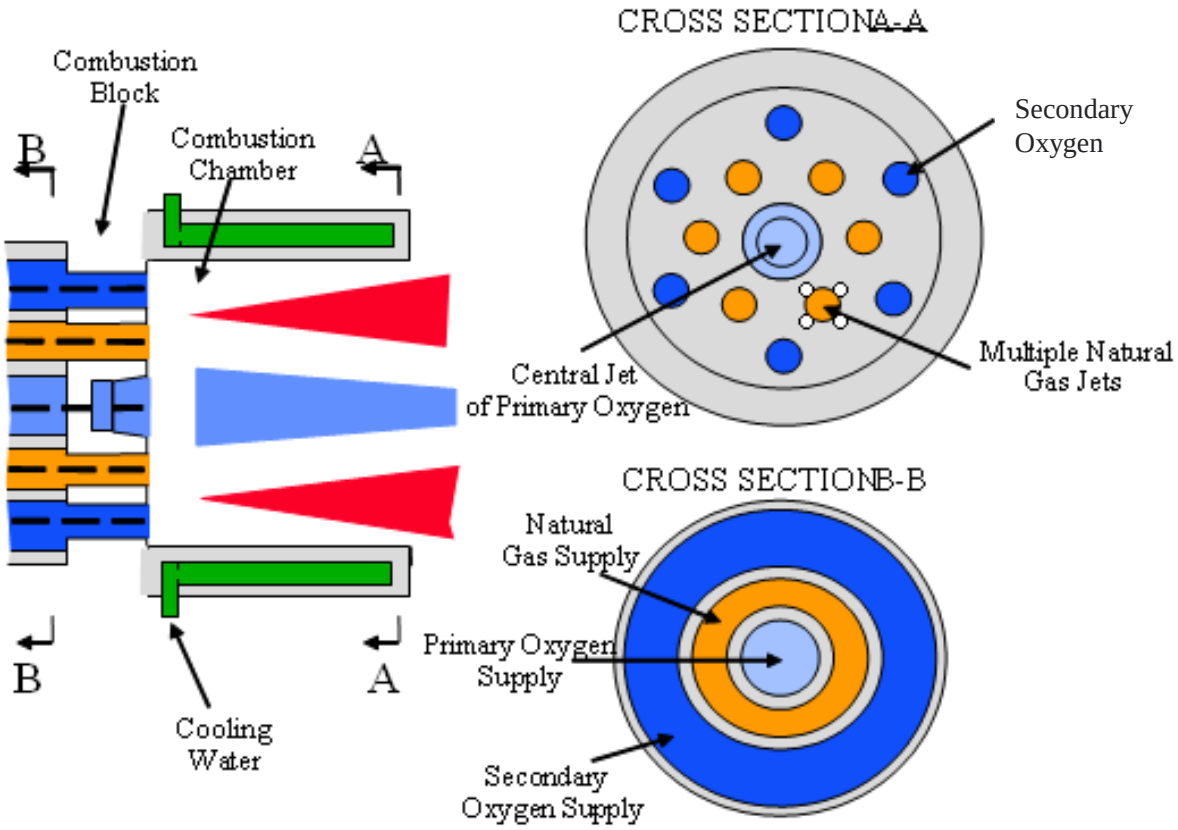
- Designed for solid charge mixes
- Decreases electrical consumption
- Lowers power on time
- Reduces electrode consumption
- Improves refractory life

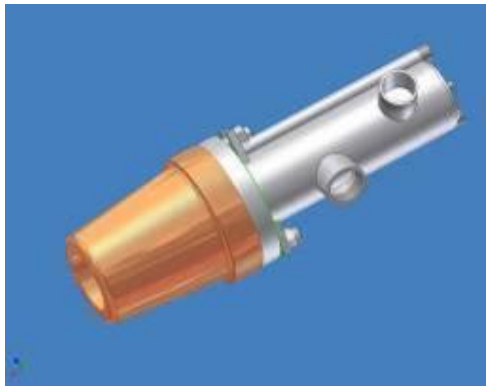
$1 to $3 savings per ton obtained





PyrOx™ Burner



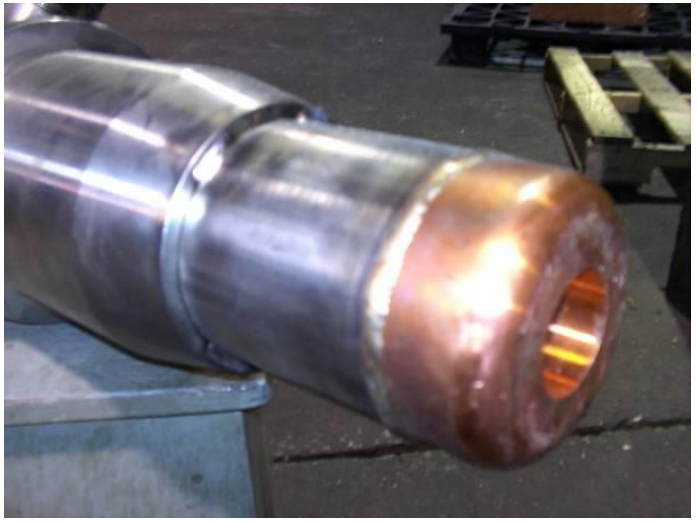


- Highly efficient 1 to 4.5 MW oxy-fuel burner, used in EAFs
- High velocity, high pressure flame impinging on the steel scrap pile
- Water-cooled combustion allows active mixing of natural gas and oxygen protects the nozzle from plugging with splashing slag and steel

ALARC-Jet™

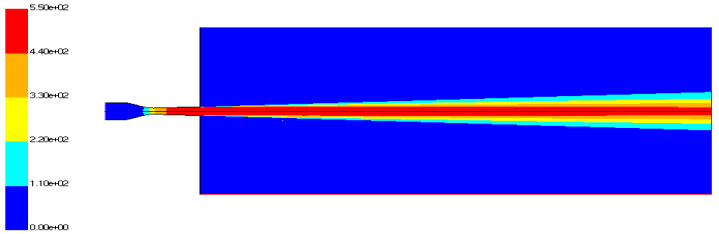
EAF Chemical "Energy Solution" for operations that are predominately:

- High proportion of hot metal in charge
- Flat bath (large proportion of DRI/HBI, CONSTEEL, Shaft Furnaces)



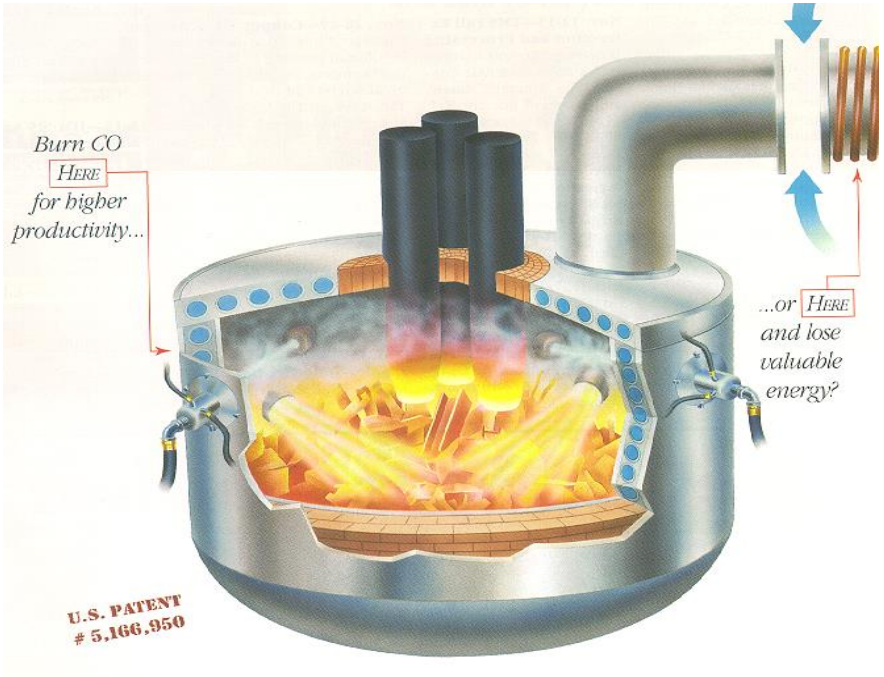
ALARC™-Jet provides a focused stream of oxygen that maintains its supersonic velocity without using a flame shroud.

- No need for gaseous fuel
- Reduces EAF operation cost

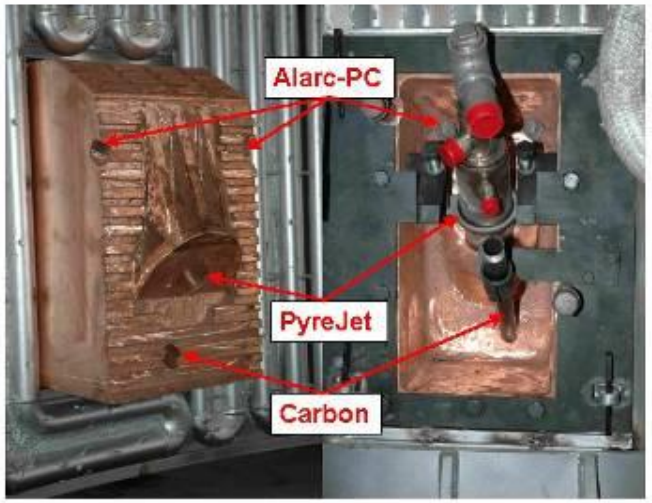


Advanced design protects jet from turbulence

ALARC™-PC (Post Combustion)



ACI's patented low velocity oxygen injection for post combustion



- **Increased energy efficiency**
  - More efficient than burners using excess O_2
  - Much larger coverage (different angle than burners)
  - Decreased velocity (does not affect electrodes)
  - Reduced baghouse CO emissions & Temperature
- **Adapted for molten Pig Iron operations (CO generation)**

The Broadest Range of Panels

BASILISK™ B-1000 DWC

BASILISK™ B-1000

BASILISK™ B-400

DRAGON™

For the EBT zone and Other Specific Needs

New Innovations – Dynamic burner, Supersonic Carbon Injector

Moving flame for improved scrap melting

- Burner follows the scrap as it melts
- No moving parts
- Reduced electrical consumption & POT

Supersonic carbon injection for foamy slag

- Reduced carbon consumption
- Lower maintenance

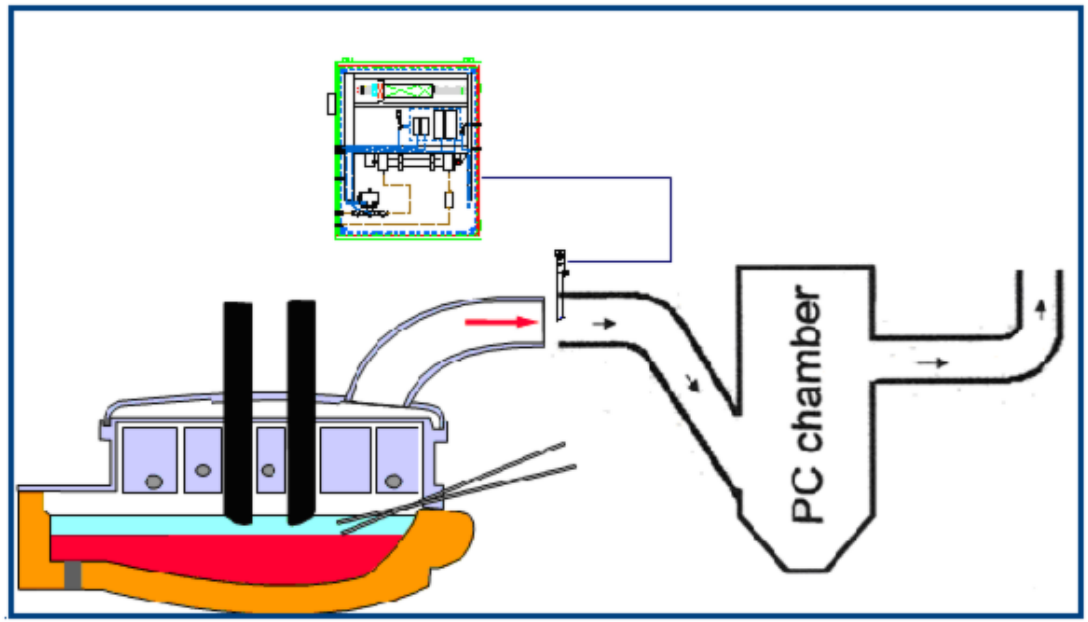
Water-cooled panels for aggressive burner/injector positioning

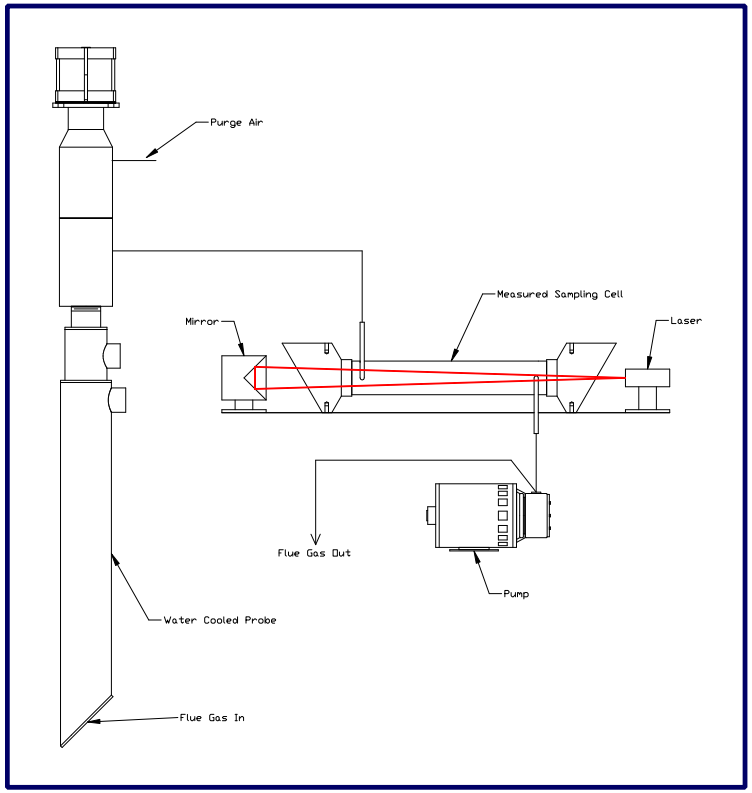
- Improved metal yield
- Reduced O_2 consumption
- Improved safety and reliability

New Innovations – ALARC™-TDL and Continuous Measurements

Tunable Diode Laser based solution for off-gas analysis (O_2/CO/CO_2/H_2O)

- Improve EAF operation safety
- Increased overall efficiency
- Decreased POT
- Enabled Closed Loop Control
- Reduced operator error





Strong R&D push for continuous bath carbon and temperature measurements

- Improved energy & cost efficiency
- Improved metal yield

Carbon Injection Systems

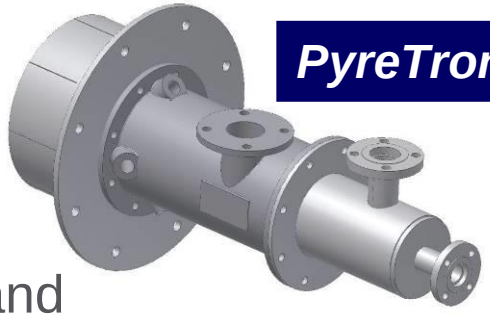
- Carbon injection through the PyreJet burners is needed in order to prevent local oxidation of iron and to enhance slag foaming
- Slag foaming improves arc energy transfer and increases the life time of refractory, electrodes and water panels
- ACI can also modify the client's existing carbon injection system to allow multiple injection points or can design, build and start-up a completely new system

Example of ACI Carbon Injection System

Advanced Ladle Heating Solutions

50t Ladles and above

PyreTron™

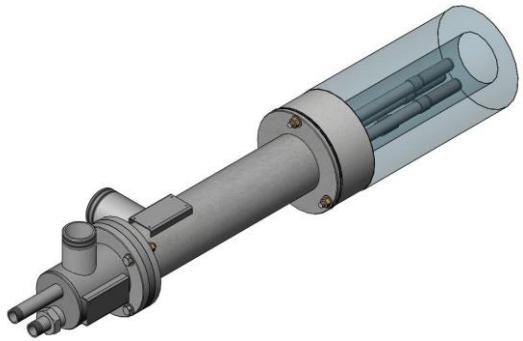


- Air/Oxy design for maximum flexibility and minimum operating costs
- 60 to 95% Oxygen Participation
- Heating/Drying/Curing
- Refractory combustor for minimum maintenance
- From 1.5 to 5 MW nom power
- Built-in UV detection and pilot burner for safe and reliable operation
- For vertical or horizontal mount

20 to 50t Ladles

PyrOx™

- Full Oxy design for maximum productivity gains and minimum CAPEX
- Water Cooled copper jacket
- From 0.5 to 1 MW nom power
- Built-in UV detection and pilot burner for safe and reliable operation
- For vertical or horizontal mount



Gas Control Valve Trains

Proprietary design of valve trains

- Oxygen valve trains are specifically designed for safe operation – stainless steel, Ni filter, slow opening valves

- Fuel valve trains can be designed for usage of natural gas, propane/LPG, coke oven gas or fuel oil

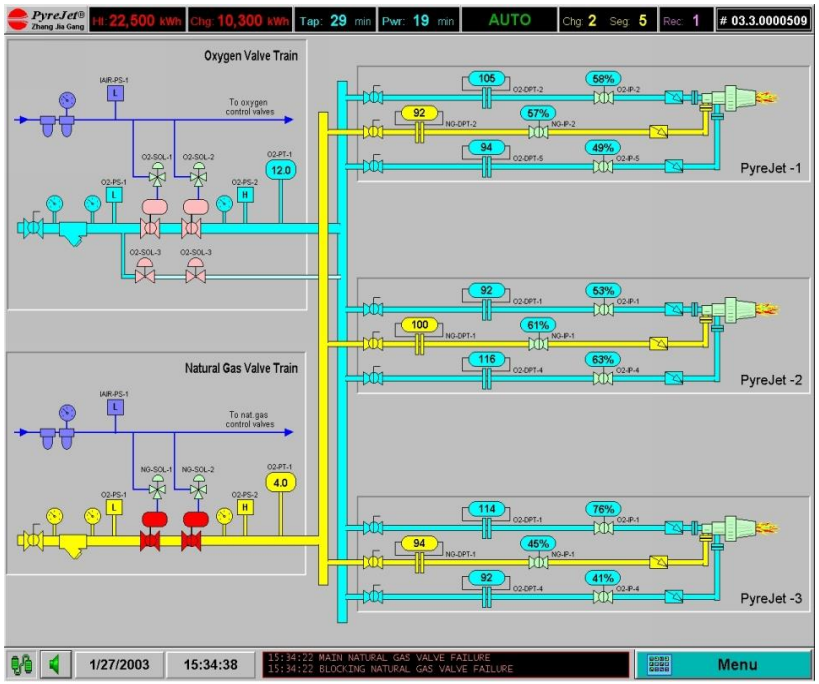
ACI Natural Gas Valve Train

ACI Oxygen Valve Train

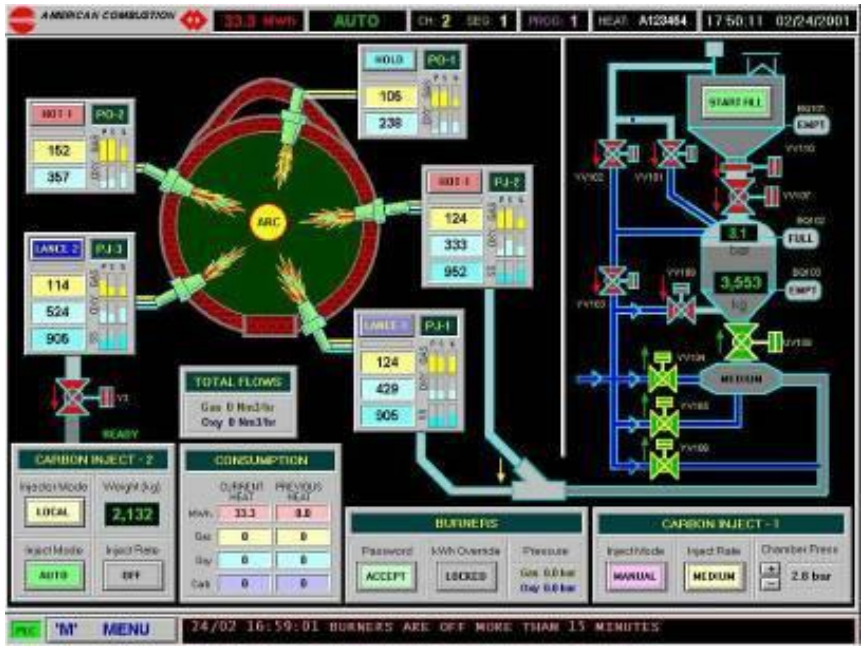
PLC Programming and HMI

- PLC Programming
  - Allen Bradley, SLC, PLC
  - Siemens, S5, S7 and TI505
  - Square D , Modicon, Concept
  - GE, Series 6 and 7

- Human Machine Interface (HMI)
  - Siemens, WinCC and ProTool
  - Allen Bradley, RSView and Panelview
  - Intouch (Wonderware)
  - PanelMate
  - Visual Basic



Example of Valve Train Control Screen



Example of HMI Control Panel

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- Introduction
- Product Portfolio
- **Key Customers**

EAF References

- *SDI Butler (x4)*
- *SDI Pittsboro*
- *Gerdau Whitby*
- *Nucor Steel Plymouth (Utah)*
- *Gerdau Rancho Cucamonga*
- *Cascade Steel*
- *North American Hoganas*

- *Vallourec*
- *GMH*
- *Usinor Industeel*
- *Acroni*
- *DAM Steel*

- *OEMK (x4)*
- *VTZ*

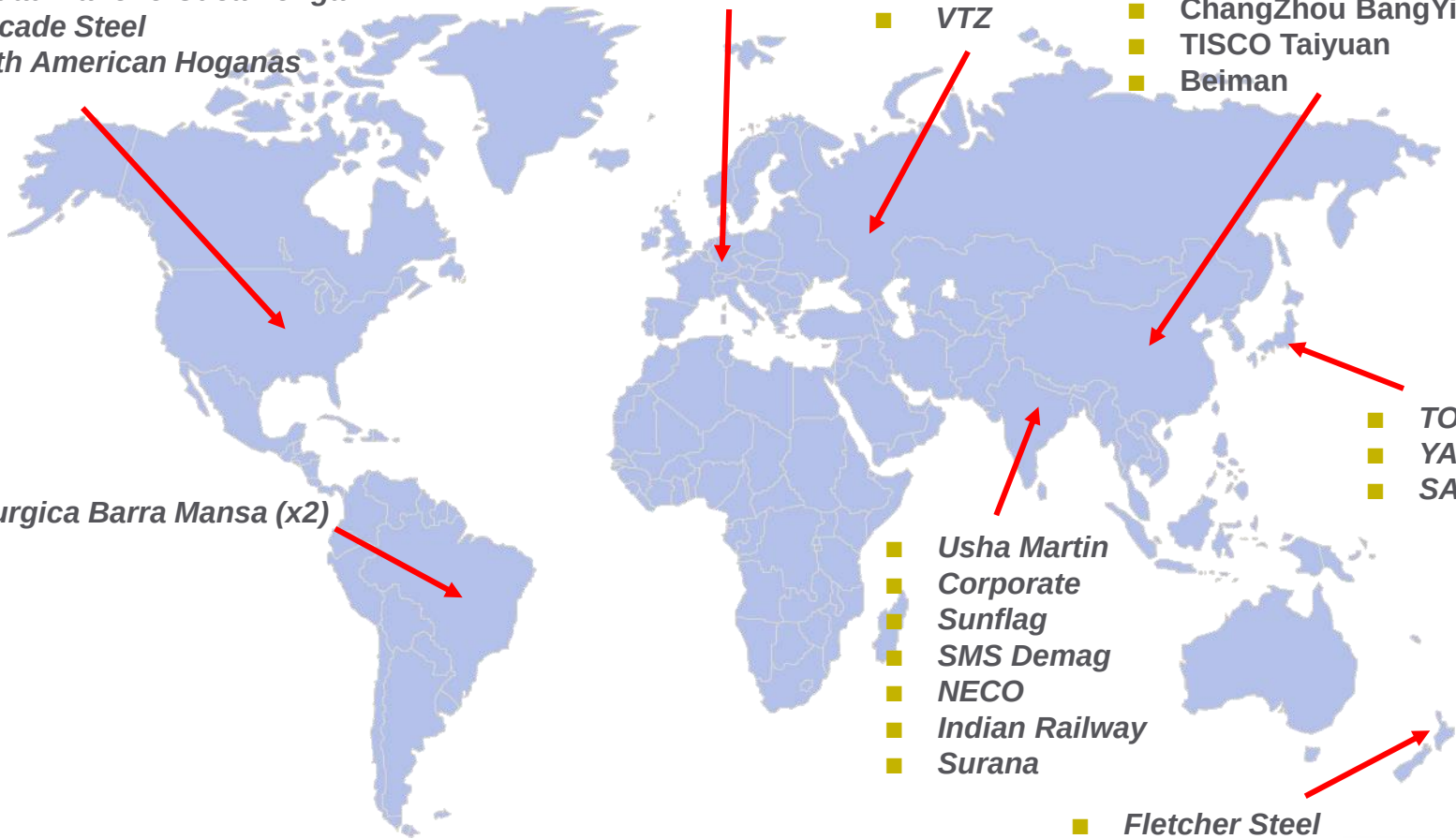
- Shagang ZhangJiaGang (x5)
- JiangYin TFXC (x3)
- Suzhou Suxin Steel (x2)
- Wuyang Steel (x3)
- JiangYin Xincheng
- ChangZhou BangYi
- TISCO Taiyuan
- Beiman

- *TOPY*
- *YAMATO*
- *SANYO*

- *Siderurgica Barra Mansa (x2)*

- *Usha Martin*
- *Corporate*
- *Sunflag*
- *SMS Demag*
- *NECO*
- *Indian Railway*
- *Surana*

- *Fletcher Steel*



Ladle References

COMPANY	LOCATION	Equipment Description (Number/site)
Allegheny Ludlum Steel	Brackenridge Works, USA	120 Ton Horizontal Ladle Heater Stations (3)
Bayou Steel Corp.	La Place, LA, USA	75 Ton Vertical Ladle Heating Stations (2) 75 Ton Horizontal Ladle Heating Stations (2)
BHP Copper	San Manuel, AZ, USA	60 Ton Vertical Ladle Heating Station (1)
Caparo Steel (Shut down)	Farrell, PA, USA	130 Ton Horizontal & Vertical Ladle Heater/Dryer (1) 150 Ton Horizontal & Vertical Ladle Heater/Dryer (1)
Cascade Steel	McMinnville, OR, USA	110 Ton Horizontal Ladle Heating Stations (2)
China Steel Corp.	Kaohsiung, TAIWAN	200 Ton Vertical Ladle Heating Station (1)
CSC, LTD.	Warren, OH, USA	100 Ton Vertical Ladle Heating Station (1)
Ellwood Quality Steel	New Castle, PA, USA	45 Ton Vertical Ladle Heating Station (1)
Gallatin Steel	Ghent, KY, USA	200 Ton Vertical Ladle Heating Station with TDS (1) 200 Ton Horizontal Ladle Heating Station (3)
Geneva Steel (Shutdown)	Vineyard, UT, USA	225/340 Ton Vertical Heating Station (1) Vertical Ladle Heating Station (1)
Georgetown Steel Corp.	Georgetown, SC, USA	225 Ton Horizontal Ladle Heating Station (4) 85 Ton Vertical Ladle Heating Station (1) 100 Ton Horizontal Ladle Heating Stations (6)
Gerdau - AmeriSteel	Jackson, MS, USA	135 Ton Horizontal Ladle Heating Station (1)
Gerdau - AmeriSteel	Knoxville, TN, USA	35 Ton Horizontal Ladle Heating Station (2)
Gerdau - AmeriSteel	Sayreville, NJ, USA	85 Ton Horizontal Ladle Heating Stations (2)
Gulf States Steel, Inc. (Shutdown)	Gadsen, AL, USA	175 Ton Vertical Ladle Heating Stations (4)
IPSCO	Muscatine, IA, USA	180 Ton Horizontal Ladle Heating Stations (3) 180 Ton Vertical Ladle Heating Station (1) 180 Ton Portable Ladle Heater/Dryer (1)
IPSCO	Mobile, AL, USA	175 Ton Horizontal Ladle Heating Stations (3) 175 Ton Vertical Ladle Heating Station (2) 175 Ton Drying Stations with TDS (2)
Inchon Iron and Steel	Inchon, S. KOREA	60 Ton Horizontal Ladle Heating Station (1)
ISG (Bethlehem Steel)	Bethlehem, PA, USA	175 Ton Vertical Ladle Heating Station (1) 250 Ton Vertical Ladle Heating Stations (2)
ISG (Georgetown Steel)	Georgetown, SC, USA	85 Ton Vertical Ladle Heating Station (1) 100 Ton Horizontal Ladle Heating Stations (6)
Newport Steel Corp. (Shutdown)	Newport, KY, USA	80 Ton Horizontal Ladle Heating Stations (2) 80 Ton Vertical Ladle Heater/Dryer (3)
MacSteel Div. of Quanex	Fort Smith, AR, USA	68 Ton Horizontal Ladle Heating Station (2) 68 Ton Vertical Ladle Heating Station (1)

COMPANY	LOCATION	Equipment Description (Number/site)
North American Stainless	Ghent, KY, USA	110 Ton Vertical Ladle Heater (2) 110 Ton Horizontal Latdle Heating Station (4) 150 Ton Verticals and Horizontals (12)
North Star - Beaumont	Beaumont, TX, USA	110 Ton Portable Ladle Preheater (1)
Nucor Steel	Ahoskie, NC, USA	180 Ton Horizontal Ladle Heating Stations (3) 180 Ton Vertical Ladle Heating Stations (3) Tundish Heating/Drying Stations (3)
Nucor Steel	Berkley, SC, USA	Tundish Heating Station (2)
Nucor Steel	Birmingham, AL, USA	60 Ton Horizontal Ladle Heating Station (2)
Nucor-Yamato Steel Co.	Blytheville, AR, USA	120 Ton Horizontal Ladle Heating Stations (5) 120 Ton Vertical Ladle Drying/Heating Stat. (3)
Nucor Steel	Bourbonnais, IL, USA	90 Ton Horizontal Ladle Heating Station (2)
Nucor Steel	Crawfordsville, IN, USA	125 Ton Horizontal Ladle Heating Stations (3) 125 Ton Vertical Ladle Heating Stations (2)
Nucor Steel	Darlington, SC, USA	150 Ton Horizontal Ladle Preheating/Drying (3) 150 Ton Vertical Ladle Preheating/Drying (2)
Nucor Steel	Hertford, NC, USA	180 Ton Horizontal Ladle Heating Stations (3) 180 Ton Vertical Ladle Heating Stations (3)
Nucor Steel	Hickman, AR, USA	175 Ton Horizontal Ladle Heating Stations (6) 175 Ton Vertical Ladle Heating Stations (3)
Nucor Steel	Jackson, MS, USA	50 Ton Horizontal Ladle Heating Station (2)
Nucor Steel	Plymouth, UT, USA	90 Ton Horizontal Ladle Preheaters (5)
Rocky Mountain Steel	Pueblo, CO, USA	150 Ton Horizontal Ladle Heating Stations (3) 150 Ton Vertical Ladle Heating Stations (4)
SKW Alloys, Inc.	Nigara Falls, NY, USA	50 Ton Vertical Ladle Heating Stations (2)
SKW Alloys, Inc.	Calvert City, KY, USA	50 Ton Vertical Ladle Heating Stations (2)
SBM	Barra Mansa, Brazil	50 Ton Horizontal Ladle Heater
Severstal	Cherepovets, RUSSIA	380 Ton Vertical Ladle Heating Stations (3) 100 Ton Horizontal Ladle Heating Stations (2) 100 Ton Vertical Ladle Heating Stations (2)
Slater Steels	Hamilton, ONT, CAN	73 Ton Vertical Ladle Preheater (1)
Steel Dynamics	Butler, IN, USA	165 Ton Horizontal Ladle Preheater (5) 165 Ton Ladle Dryer (2)
Steel Dynamics	Pittsboro, IN, USA	125 Ton Horizontal Ladle Preheater (1)
Vallourec	Saint-Saulve, France	130 Ton Vertical Ladle Preheater (1)
Vallourec	Youngstown, OH, USA	80 Ton Horizontal Ladle Heating Stations (2)
Washington Steel Corp.	Washington, PA, USA	50 Ton Horizontal Ladle Heating Station (1)
Warren Consolidated Indus.	Warren, OH, USA	180 Ton Vertical Ladle Heating Stations (2)
West Siberian Steel Works	Novokuznetsk, RUSSIA	350 Ton Vertical Ladle Heating Station (2)
Zhangjiagang Sheenfaifth	Zhangjiagang, PR China	90 Ton Vertical Ladle Heating Station (1)

Management Overview – Dr. Vivek Gautam

Vivek Gautam, President & Chairman of the Board

- Previously worked with Air Liquide and A. T. Kearney in leadership positions
- 13+ years of business experience in steel, non-ferrous and other combustion related fields
- 7 granted patents and multiple technical papers in combustion related applications
- Bachelors degree in Mechanical Engineering from Indian Institute of Technology (IIT) Kanpur
- Ph.D. in Combustion from University of Maryland, College Park
- MBA in Finance from Emory University, Goizueta Business School

Management Overview – Michael Parrish

Michael Parrish, Board Member & Mentor

- Retired from Nucor Corporation as Executive Vice President
- Former Member of Executive Committee and Board of Directors for Steel Manufacturers Association (SMA)
- Former Board Member of Metals Service Center Institute (MSCI)
- BS in Civil Engineering from University of Toledo
- Licensed Civil Engineer in several states

Management Overview – Al Bentz

Al Bentz, Board Member & VP of Sales

- President - Leverage Consulting
  - Working with corporations to enhance contract negotiations
- Director of Pipelines at Messer Griesheim NA; Nucor KAM for Air Liquide Large Industries
- Past Chairman of the AIST's Oxygen Steel Making Committee
  - Current Session chair of the Oxygen Steel Making Committee
  - Member of the AIST's Electric Steel Making Committee
- BS in Psychobiology from University of Pittsburgh