“Keynote Paper – Market and Applications for Ferritic Stainless Steels”

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The Role of Niobium in Advanced Ferritic Stainless Steels

Building a Sustainable Future

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Global Stainless Steel – a story of success

* China counts now for almost 50 % of the worldmarket!

- **CAGR – World**: 3 % p.a.
- **CAGR – China**: +15 % p.a.
- **CAGR – Rest of the World**: +4 % p.a.

* finished products, excl. Tube & Pipe

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Substitution Trends in the Stainless Steel Industry

*It's a bumpy ride, but ferritics are heading up!*

![Graph showing substitution trends in the stainless steel industry with share percentages for 300 series and 400 series over time.](image)
`Top 20` Global Stainless Steel Producers 2014 (est. volumes)

15 of Top 20 are Asian!

* incl. Fujian Desheng  
** incl. Southwest Stainless  
*** incl. NTK  
**** incl. 13CrOCTG

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Quarterly Profitability by Mill

The industry is profitable again, but way below target levels

Consolidated Profit in [mill. USD]

Operating Profit [€/t]

Acerinox Group*
Outokumpu*
ATI
Aperam
AKSteel
JSI
TISCO

* EBIT
** EBT
1. The Big Picture

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Nickel – LME (3-month) Price & LME Stock Levels

*NPI becomes the ‘invisible hand’ and a real game changer* *(Status: July 13, 2015)*

Nickel Price

- **Upper NPI Limit:** $9/lb
- **NPI kicks in massively**

Stocks

- **Lower NPI Limit:** $5.5/lb
- **NPI Disappears**

Future Nickel Price Band

- $10/lb
- $7.5/lb

Indonesian Costs?
Chinese NPI Cost Advantage over Stainless Steel (18-8) Scrap

NPI has lost its cost advantage over stainless steel scrap
Historic Ferro Chrome Price Development

**Q2/15 price is at 1.08 $/lb same as in Q1/15**

- **South Africa**: 30%
- **China**: 37%
- **Russia**: 3%
- **India**: 11%
- **Kazakhstan**: 11%
- **Others**: 8%

**Quarterly Producer Prices**

- Q1/14
- Q2/14
- Q3/14
- Q1+Q2
- Q4/14
- 2015
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Top 15 Ferritic Producers 2014 (estimated crude steel basis)

*In volume terms, TISCO is a class of its own*
China = 44%

Other Asia = 19%

Europe = 16%

Americas = 12%

ROW = 9%

Market 2014: 7.8 mill t

Asia = 63%

Europe is getting marginalized
Global Stainless Steel Market by End Use Segment

Market 2014: 37 mill. t

- Consumer Goods & Catering 47%
- Process Equipment 25%
- Automotive & Heavy Transport 10%
- ABC & Infrastructure 15%
- Others 3%

Share of 400 series 30%

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Global End Use of Ferritic/Martensitic Stainless Steels

What is hot and what is not?

- 7.8 mill t

Market 2014:

Construction 22%

Industrial Usage 13%

Transportation 24%

Consumer Durables 41%

- 410 / 410S for refinery columns
- Commercial catering / bakeries
  - 13Cr OCTG
- 420 Pump shafts
- 409 Containers (only China)
- 13% OCTG
- Anti-fingerprint surfaces
- High quality cutlery and tableware
- Replacement of 300 in dish washers
- High end appliances (energy saving)
  - Kitchen surfaces use alternatives
  - Plastic internals in budget-appliances

+ Solar water heaters
+ Roofing / Facades (no coastal build.)
+ Drinking water systems
+ Public infrastructure & streetware
- Stainless Sinks lose market share
- Elevators use increasingly alternatives
- Plastic vs. Stainless in press fittings

+ Truck exhausts (Euro 6)
+ Decorative trim
+ Sensors (martensitic)
+ Fuel injection components (martensitic)
+ 409 Containers (only China)
- Long term: e-mobillity

+ 410 / 410S for refinery columns
+ Commercial catering / bakeries
- 13Cr OCTG
- 420 Pump shafts
Transportation System Trends

2014
Market: 2.270kt

2023
Market: 3.050kt

+780kt
Ferritic / Martensitic Grade Structure 2014

430 grade is still the ferritic ‘workhorse’

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2014

- 430: 55%
- 409: 14%
- 410: 7%
- 420: 3%
- 429: 0%
- 436: 2%
- 434: 1%
- 439: 7%
- 441: 3%
- 444: 0%
- 445: 0%
- Others: 1%
Grade Changes of 400 series (2014 – 2023)
Grade 441, 444, 436 will grow faster than other grades

CAGR in [%]

- Avg. Nb
- Avg Non Nb
- Avg All Stainless Grades

Grade

409
410
420
429
430
434
436
439
441
444
445
446
Others

0%
1%
2%
3%
4%
5%
6%
7%
8%
9%
10%
Our Events 2015

14th International Stainless & Special Steel Summit
October 6 - 8, 2015
Vienna, Austria

in association with

29th Stainless & Its Alloys Conference
October 27 - 28, 2015
Chicago, USA

in association with

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Any Questions ... or comments?