An Overview of Süd-Chemie India and Clariant
A brief about:

1. Süd-Chemie India

2. Clariant

Süd-Chemie India: Overview

- Established in 1969, as a 50:50 JV between Catalyst & Chemicals Inc. (USA) & the Lalljee family (India)
- Parent Company Catalyst & Chemicals Inc. (USA) went through a series of acquisitions/mergers over a period of four decades:
  - Catalysts & Chemicals Inc. ➔ United Catalysts Inc. ➔ Süd-Chemie AG ➔ Clariant
- Süd-Chemie AG (Germany) was acquired by specialty chemicals major Clariant Corporation (Switzerland) in 2011 Indian business remains as 50:50 JV between Clariant & the Lalljee family.
- Catalyst manufacturing and R&D facilities in Kochi (Kerala) & Vadodara (Gujarat), Marketing & Corporate office in New Delhi and Logistics office in Mumbai.
- Over 70% of SCIL’s revenue is from exports to world’s leading companies like, Yara, OCI, Agrium, ExxonMobil, Shell, BP, Neste, Safco, Maaden, Aramco etc. via the Clariant group.
- SCIL’s revenue is growing at a CAGR of ~ 18% YOY/FY 2015 - 726 crore ( FY 2005 - 132 Crore)
Süd-Chemie India: Overview

• Well equipped ISO-9001 certified R&D units recognized by the DSIR, Govt. of India

• ISO-14001,9001:2000,OHSAS-18001 and TS-16949 accredited by BVQI

• SCIL R&D Policy:
  – 25% of Sales turnover should be generated from catalysts developed over period of last 5 years.

• SCIL R&D centres have developed and commercialised average 7-10 new catalyst formulations every year, (12 catalysts so far in 2016)

• Rich culture driven by strong internal policies
  “Ethics & Values”, “Work culture”, “Communication”, “Customer”

• Awarded by World HR congress as a “Dream company to work for in Manufacturing sector in India” for two consecutive years 2014 and 2015
A Clariant group company

10th BEST EMPLOYER OF THE YEAR
Presented to
Süd-Chemie India Pvt. Ltd.

Dream Companies to work for Awards

DREAM EMPLOYER OF THE YEAR
Presented to
RANK 12TH
Süd-Chemie India Pvt. Ltd.

15th February, 2014 | Taj Lands End, Mumbai
Süd-Chemie India: Overview

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- Awarded by World HR congress as a “Dream company to work for in Manufacturing sector in India” for two consecutive years 2014 and 2015
- **Most awarded Indian chemical company (medium scale) in areas of export sales, Cost Management, quality, environment & safety.**
### Business Area – Catalysis

**CREATING PERFORMANCE TECHNOLOGY®**

<table>
<thead>
<tr>
<th>PROCESS CATALYSTS</th>
<th>PETROCHEMICALS</th>
<th>REFINERY / FUELS</th>
<th>OLEFIN POLYMERIZATION</th>
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<tbody>
<tr>
<td>CHEMICALS</td>
<td>Olefin purification and production (steam cracker, Houdry, MTP etc.)</td>
<td>Hydrogen plants</td>
<td>Ziegler-Natta catalysts for PP (all technology platforms)</td>
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<tr>
<td>Hydrogenation</td>
<td>Aromatics</td>
<td>Fuels upgrading</td>
<td></td>
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<tr>
<td>Fine Chemicals</td>
<td>Ethylene-Oxide</td>
<td>Fuels from alternative feedstocks</td>
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**CUSTOM CATALYSTS** tailor-made for specified applications

- MegaMax® and AmoMax® for methanol and ammonia ActiSorb®
- ReforMax® for HC reforming
- ShiftMax® for H₂ / CO ratio adjustment
- PhthaliMax® for phthalic anhydride production
- OleMax® for olefin purification
- PolyMax® for monomer purification
- CATOFIN® for C₃ prod.
- StyroMax® for styrene prod.
- MTPROP® for propylene from methanol
- ReforMax®, ShiftMax®, etc for H₂ plants
- Actisorb® for S, Cl, Hg removal
- HDMAX®, Hydex®, PolyMax® for fuels upgrading
- FTMAX® for natural gas and coal to gasoline and diesel
- C-MAX® for polypropylene production with most production processes
# Business Area – Catalysis

## CREATING PERFORMANCE TECHNOLOGY®

### ENVIRONMENTAL CATALYSTS

<table>
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<tr>
<th>APPLICATIONS</th>
<th>KEY PRODUCTS</th>
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</table>
| **AIR PURIFICATION** | • EnviCat® for industrial and mobile off-gas treatments  
• Zeolite powders for diesel exhaust applications |
| **FUEL CELL TECHNOLOGY** | • HyProGen® for hydrogen production in fuel cells  
• EnviNOx® process for NOx removal |

### FUEL CELL TECHNOLOGY

- Fuel processing catalysts for production of H₂
“Make in India” – Partial list of New Catalysts developed and commercialized

• Pre-reforming Catalyst
• Hexavalent chrome free High Shift catalyst
• Gas processing catalysts for Hg, As, H2S, Cl removal
• SulfoMax CS, EV
• Zeolite SAPO-11 & Silicalite for proprietary applications
• Benzene Hydrogenation Catalyst (Food Grade Hexane)
• Solid Oxide catalyst for Biodiesel production
• *Metal Oxide based catalyst for Gasoline/Diesel Sulfur Reduction
• *FCC additives (ZSM-5 additive, CO Promoter, Bottom Cracking, Metal Passivator)
• *DHDS/DHDT catalysts
• @Octane Boosting Additive for S-Zorb process (FCC Gasoline desulphurisation)
• ^Toll manufacturing ZSM-5 additives & PDEB catalyst
• Ongoing collaboration with 3rd party R&D like IOCL, BPCL, NCL & Reliance etc.

In collaboration with  *Indian Oil R&D   @Phillips 66 (USA), ^Reliance Industries
Key Strengths

• Largest & Only catalyst manufacturer in India with experience of over 40 years

• Commercial manufacturing capability for over 70 different types of catalysts

• Rich and diverse experience in development, scale up and commercial production

• Indian Catalyst plants manufacture most diverse types of catalysts (Oxide, Precious Metals, Zeolites, Honeycomb etc.,)

• Facilities for scale-up from lab to pilot & commercial scales with support from in-house R&D

• Facilities/equipment are highly customisable, hence suitable for quick scale-up of new catalyst formulations

• In-house production of Alumina and ability to manufacture carriers in unique shapes

Holistic approach: Key Raw Materials – Manufacturing – Effluent Treatment
An Overview of Clariant
## Clariant at a Glance

**A GLOBALLY LEADING COMPANY IN SPECIALTY CHEMICALS**

<table>
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<tr>
<th><strong>5,807</strong> Sales 2015 (CHF m) from continuing operations</th>
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<tr>
<td><strong>227</strong> Net result 2015 (CHF m) from continuing operations</td>
</tr>
<tr>
<td><strong>4</strong> Business Areas</td>
</tr>
<tr>
<td><strong>110</strong> in <strong>53</strong> companies</td>
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<tr>
<td><strong>17,213</strong> Employees 2015</td>
</tr>
</tbody>
</table>
Four Business Areas – the right portfolio for future growth

Care Chemicals
Catalysis
Natural Resources
Plastics & Coatings
Business Unit Catalysts within the Clariant Group

Clariant
BU Catalysts

704
Sales 2015 (CHF m) from continuing operations

11
Technical and R&D Centers

3
Business Segments

28 in 14
Locations Countries

1 750
Employees 2015

Data as at 31 Dec 2015.
Clariant Catalysts believes in Global Presence with Local Focus
Planet – environment protection as a driver for growth

ENVIRONMENTAL TARGETS BY 2025 IN % (per ton of products produced)

- Reduce Energy Consumption: -30%
- Reduce Direct CO₂ Emissions: -30%
- Reduce Emissions of Greenhouse Gases: -35%
- Reduce Water Consumption: -35%
- Reduce Volume of Waste Water: -40%
- Reduce Volume of Waste: -35%
Ammonia Industry in India

- Ammonia market development is highly dependent on government policies / initiatives
  - Strong control on feedstock (natural gas) as well as end product (urea)
  - Conversion of fuel oil and naphtha feed plants to natural gas

- Rising import dependence for natural gas (25-30%)
- Growing margin pressure due to rising natural gas costs
- No ammonia capacity addition since 1999 / debottlenecking during 2008 to 2012
  - 3 new projects expected till 2020 → increase capacity by 2.3 MMTA
  - Several new projects were announced but put on hold
Top 18 Processes by Energy Use

Source: Technology Roadmap IEA / ICCA / DECHEMA, 2013
Energy Consumption of Ammonia Units

Figure 1.2  Advances in Energy Efficiency from 1960 to 2012

Net Energy Consumption, GCal/MT NH₃

- 2012 IFA Average
- 2012 IFA Best in Class
- Thermodynamic Minimum

For Expert Panel / Some Teasers for Out of the room thinking
Challenges to reduce energy consumption by catalysis

• Is it possible to bring down energy consumption by 20% from the best of now?

Please think and fill in your questions for Expert Panel Discussion!
About the Seminar

• R&D

Ammonia
• Purification
• Pre Reforming & Parallel reforming
• Primary reforming
• Shift conversion
• Methanation
• Synthesis

Sulfuric acid
• SulfoMax - wide range of products & services
THANK YOU