Raw Material Update
March 2017
FORWARD LOOKING STATEMENTS

This report contains a number of forward looking statements. Forward looking statements reflect our current views about future events and are based on currently available financial, economic and competitive data and therefore include a level of risk and uncertainty.
The world is not becoming easier

- Different governments take different positions to try and fight their stagnant economies
  - Increased trade barriers, either real or perceived, driving up costs
  - Exchange rate / interest rate interventions
  - Commodity speculation

- Currencies are very volatile and change in demand / supply flows are heavy

- Environmental measures hitting suppliers quite unexpected, including those that are state of the art and keep within all requirements (local and international standards). For example: Many factories in Chinese suburbs are ordered to stop or cut production due to heavy air pollution.

- The downward cost trend, has halted since mid 2016, with the first increases in Q3 2016, followed by the first serious increases in Q4 and now in early 2017 many materials spiral up DOUBLE DIGIT %’s
The world is not becoming easier

- Key drivers:
  - Crude increases
  - Reduction of capacity (equals supply) for Ink related raw materials, while demand is overall flat
  - Major commodities (amongst others BTX and Styrene) on a fast track up (over and above the cost curve of crude), caused by other general market trends
  - Further supply consolidation in major markets
  - Currency movements hitting, specifically Europe (Euro weak versus USD)
  - Transport costs are moving up, both sea-freight and road transport

AND:
- Incidents like the fire at Huntsman Pori facility causing a global shortage of sulphate based TiO2 (also caused by the EU decision to force Huntsman to sell off capacity to a Chinese producer who has since had to reduce capacity due to governmental enforcements to reduce air pollution,
- Force majeure with different suppliers of commodities
Crude Oil

- Ongoing price increases starting in early 2016 and continuing onwards

- Major jump of $10 per barrel in November, 2016, as OPEC and non-OPEC countries jointly agreed to reduce production

- Refined product pricing dependent on refinery capacity remaining at current levels
  - Unscheduled refinery shutdowns cause shortages and price increases

- Refinery closures continue globally due to low margins

- More producers decide to reduce specific heavier fractions required for ink
  - Several refinery closures in Europe have taken out more than 40% of the heavier fraction capacity
Crude Oil
Some Market Price developments of base chemicals driving many materials

Benzene

Toluene

Ethylene

Xylene
Supply outlook is very uncertain. Other than environmental, supply of pigment intermediates is also very erratic with wide price fluctuation. Some small intermediate producers may not be able to get permits or afford additional environmental investments. This would cause them to exit the market. This will impose more challenges to pigment producers.

Supply of diketene was disrupted in China due to an explosion at one large local producer, this misfortune continues to hold prices higher than expected. Hence, all prices of arylides for yellow stay elevated.

A major Chinese producer was initially scheduled to relocate their ONCB / PNCB production facility in 2017 however now the move is uncertain. Such uncertainties have impacted the market price for DCB, a key ingredient for yellow.

Shortage of MX, to make AAMX, used to make yellow pigment (Y13 / Y174). The MX producer in China is closed due to air pollution measures.

Cost increases in tar derivatives, such as naphthalene have caused increases for red.

Both Copper and PA price have increased more than 20% in the recent quarter. Urea price has also increased more than 10%, which resulted a substantial increase in cyan pigment price since beginning of the year.
Suppliers of Pigments have started to do risky **Cost Cutting** to survive. Risk of cutting corners technically and financial engineering specifically of exports.

- This may be a thing of the past with the regulatory environment getting tougher.

**Environmental pressure** continues to intensify and many producers are forced to commit more money to environmental protection, not just for waste water but also solid waste and air pollution.

- Many will not have the financial strength to implement this
- Additional cost being passed on to customer.

**Air pollution** remains an issue within **China** and worsened during the winter. The Government has asked many factories to shut-down or reduce production to mitigate air pollution. Similar problem have also started to surface in **India**.
Pigments
Standard AZO’s (Yellow / Red) and PCN (Blue)

Prices have started to increase end 2016 and will continue to uptrend in the mid-term:

- Blue → 7-9%
- Red → 5-7%
- Yellow → 5-7%
Print Media
Oil Based Inks (SF, HS, News)

- Key cost issues driven by **crude oil** increases during 2016
  - First half year **50%** up
  - Due to the OPEC supply reduction up another **$10** per barrel at the end of 2016

- In addition the reduction in supply by downstream producers, specifically of heavy fractions, to return to acceptable results

**As a consequence:**

- Carbon black – **increase 6 -10%**
- Hydrocarbon resin – **increase 2 – 5%**
- Mineral oils - **increase 20%**

- **Not crude** related:
  - Pigments → see general slides
  - Vegetable oils → **increased 15%** in 2016 and expectation **another 10%** in 2017
Rubber Chemicals show **extreme increases**
- Butadiene → almost **tripled** in price since Q3 2016
  - Force Majeures / scheduled shutdowns
- Acrylonitrile → increased **34%** since September
- As a consequence NBR rubber is blending at almost **150%** higher costs

Cotton/Polyester → **Risk** for increases as of Q2 2017

Carbon black → **increase 6 - 10%**

Toluene → **increase 8% – 9%** in Q3 2016
Solvents increasing Fast and Furious

- Hydrocarbon solvent → increased 25% from late Q3, 2016
- Glycols, glycol ethers and isopropanol → increased 8% - 12% in 2017 and expect 2% - 4% increases in both Q2 and Q3
  - Also on allocation
  - And expect further shortages in April and May, specifically Europe

Silicone Oils → increasing 3%

- Market consolidation

Starches → market up by 20% – 30% in EU, more stable in NA

- Crop related challenges – short supply
Packaging

Rely on us.

Flint Group
Paper & Board

Two key issues:

- TiO2 → **increased almost 25%+** in 2016, in the first 2 months of 2017 a further increase of **another 6%**
- The current supply outlook will likely trigger further increases
  - Fire at Huntsman combined with environmental (air pollution) production restrictions in China is causing a **world wide shortage** of sulfate based TiO2

- Acrylic resins → **increased 12%** in Q1 and another **16%** expected
- Both key RM’s to make Acrylic resin are **spiraling up**
  - Styrene **up by 35%** in Q2 another **7% expected in Q3**
  - Acrylic acid **up by 12%** another **6% expected in Q4**
TiO2
Acrylic
Styrene
Main issues:

- **TiO2** → **increased almost 25%+** in 2016, in the first 2 months of 2017 a further increase of **another 6%**

- The current supply outlook will likely trigger further increases
  - Fire at Huntsman combined with environmental (air pollution) production restrictions in China is causing a **world wide shortage** of sulfate based TiO2

- **Polyamides** → **increases 3%** in 2016 and expect a **further 4%** in Q3
  - Feedstock such as dimer acid, benzyl propylene and phenol propylene have been in short supply due to the Chinese government shutting down production
Main issues:

- **Vinyl** → increases 5% in 2016 and expect a further 2% over Q4 2016 price
  - Feedstock (VCM) suppliers have been forced to stop or reduce production due to environmental issues.

- **Solvents**
  - Alcohols & esters up 8%-10% in 2016 with up to 4% more expected in 2017 due to propylene and ethylene costs
  - ETAC → Increased in Q1 2017 by 10%, due to ethylene supply challenges
Main issues:

- **Photoinitiators → Up 8% in Q2 and another 5% in Q4**
  - The Chinese government has increased environmental regulations and also shut down factories to reduce pollution – thus tightened capacity and or shortness on RM for PI’s

- **Monomers → Increases of 10% for Q2 and another 2% expected in Q3**

- **Oligomers → Increases of 5% in Q2 and a further 7% later in the year**
  - Resin content of oligomers causing the continued increases over monomers
Main issues:

- **Photoinitiators** - **Up 8%** in Q2 and another **5%** in Q4

- **Monomers** → **Increases of 10%** for Q2 and another **2%** expected in Q3

- **Oligomers** → **Increases of 5%** in Q2 and a further **7%** later in the year

- **TiO2** → **increases 3%** in 2016 and expect **up to 25%** more by Q3

- **Acrylic resins** → **increased 12%** in Q1 and another **16%** expected
Flexographic Products
Flexographic Plates

Flexographic printing plates are based on SBS rubber. (Butadiene and Styrene critical)

- Rubber Chemicals show **extreme increases**
  - Butadiene → almost **tripled** in price since Q3 2016
    - Force Majeures / scheduled shutdowns
  - Styrene up **35% in Q2** with another **7%** expected in Q3
Freight
Transportation: Road and Sea

- **Road freight**
  - Truck driver shortages, regulatory mandates (like road taxes) and increased diesel surcharge will increase carrier costs by $5\%+$ in 2017.

- **Sea freight**
  - The bankruptcy of Hanjin, one of the major carriers, in combination with unprecedented losses triggered a further consolidation in the market. It is expected that container rates will see an average increase of **15 - 20\%** in 2017.

  [Link](http://www.joc.com/special-topics/hanjin-shipping-bankruptcy)

  - Expect the lanes from China to EU and US to increase more than the average mentioned above.