

NANDINI CHEMICAL JOURNAL

Dedicated to the cause of chemical industry



- * **TALK OF THE MONTH
INDIAN CHEMICAL INDUSTRIES SHOULD HENCEFORTH
FOCUS ON BIO TECHNOLOGY ROUTES**
- * **INDIA'S GLOBAL COAL PORTFOLIO**
- * **FOCUS ON BIO FUEL FROM AGRICULTURAL WASTE-
RECENT GLOBAL EFFORTS**
- * **RED MUD – PRODUCT PROFILE**
- * **SPOTLIGHT ON SPECIALITY CHEMICAL- LEVULINIC ACID**

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TALK OF THE MONTH

INDIAN CHEMICAL INDUSTRIES SHOULD HENCEFORTH FOCUS ON BIO TECHNOLOGY ROUTES



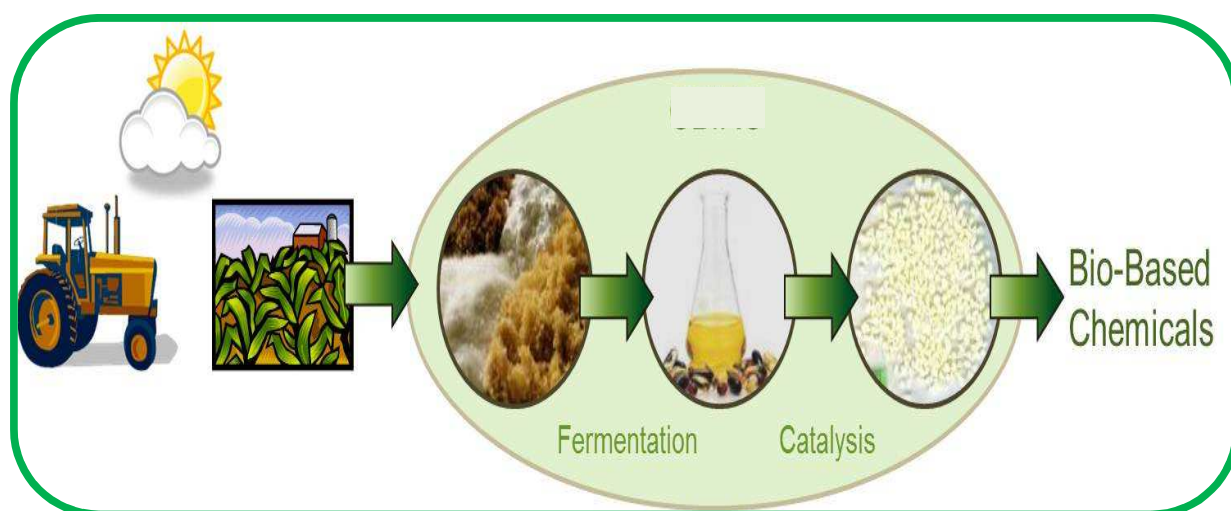
It is now evident that the pace of manufacturing capacity build up in chemical and allied sector have declined sharply in India in the last few years. Apart from the fact that new projects are not being built to the level of the need, several existing projects are being closed even by large companies. Recent closure of vinyl acetate monomer (VAM) plants is the striking example.

Obviously, with the increasing dependence of India on import of fuel and petrochemical feedstock, Indian chemical industries are no more confident that the new projects built in such scenario would be globally competitive. There is crisis of confidence amongst chemical project promoters, which is now conspicuous. There is no evidence that Government of India and state governments have realized the serious implications of this grim issue.

This is an alarming situation and if allowed to continue, India would become net importer of hundreds of bulk commodities and fine chemicals in the coming years. It is high time that appropriate and suitable strategy should be worked out to tackle this difficult situation, in tune with the India's limitation, strength and opportunities.

Internationally, research efforts are now underway with frantic speed to develop bio technology routes for the products, which have until recently been produced from petrochemical feedstock. Such bio technology oriented R&D efforts have been necessitated, not only to make the process more eco friendly and avoid environmental issues, but also due to the need to tackle the problem of increasing petrochemical feedstock prices. In such efforts, enzyme and fermentation technology is getting great focus and several bio technology routes have been developed. Many of such efforts have already borne fruit and semi commercial / commercial scale operations have commenced for several products.

INDIAN CHEMICAL INDUSTRIES SHOULD HENCEFORTH FOCUS ON BIO TECHNOLOGY ROUTES



Some of the products for which the bio technology routes have been developed successfully in recent time include the following

- * Bio 1,3 propanediol
- * Bio 1,4 butanediol
- * Bio acetic acid
- * Bio acrylic acid
- * Bio adipic acid
- * Bio butadiene
- * Bio caprolactum
- * Bio dicarboxylic acid
- * Bio EPDM
- * Bio epichlorohydrin
- * Bio ethylene
- * Bio formic acid
- * Bio glycolic acid
- * Bio metha methyacrylate
- * Bio methanol
- * Bio monoethylene glycol & Bio polyethylene terephthalate
- * Bio n butanol
- * Bio n propanol
- * Bio p xylene
- * Bio PHA
- * Bio polybutyleneterephthalate (PBT)
- * Bio polylactic acid
- * Bio propylene
- * Bio propylene glycol
- * Bio succinic acid
- * Bio syngas

What is causing concern is that while multi national companies and several universities and research bodies abroad have put forth great efforts in such directions to develop bio tech routes and have reaped benefits, India has nothing much to talk about.

In the global survey of such bio technology routes developed by various organizations, there are only handful of Indian organizations whose name can be found amongst global companies. Even in such cases, the efforts and success level do not match the international trends.

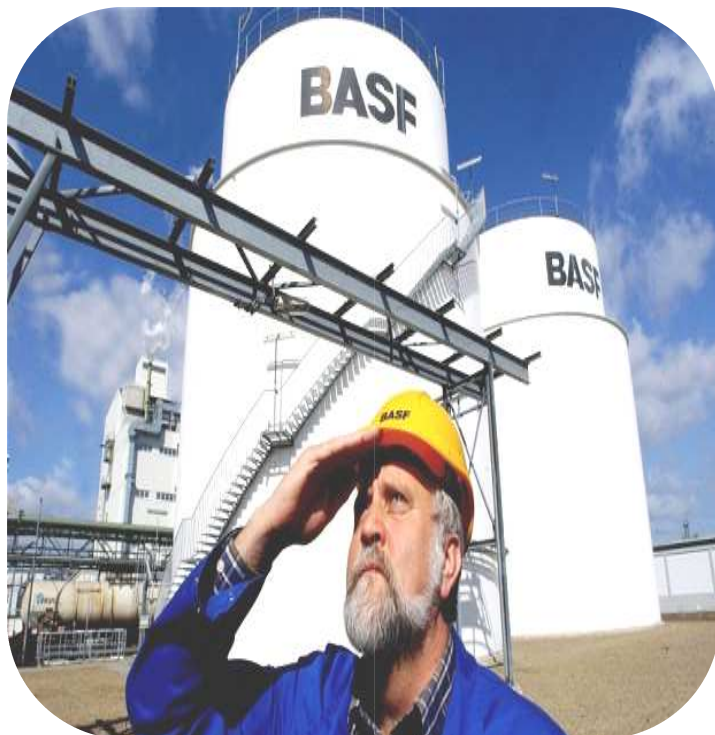
PLANT CLOSURES

KMG Chemicals to shut electronic chemicals site

KMG Chemicals will close a former OM Group site at Fremont, CA, USA by 31 March 2014.

The site, acquired along with OM's ultrapure chemicals (UPC) business earlier this year, manufactures and packages high purity process chemicals for use in semi conductors.

Production from Fremont will be shifted primarily to larger US facilities, where it is more economical and efficient for KMG to produce and package these products. Production will be switched to KMG's plants at Hollister, CA, and Pueblo, CO, starting later this year.



BASF to close UK plant

BASF has announced a restructuring plan for its pigments business, including 650 job cuts by 2017. The plan includes the closure of the Paisley, UK plant and the restructuring of the Huningue, France plant. In addition, BASF is examining options, including divestment, for the Maastricht, Netherlands, site.

The Paisley plant is scheduled to close by the second half of 2015. The restructuring of the Huningue facility includes a reduction in pigment capacities.

BASF will, over the next four years, invest €250 million (\$343.9 million) in its pigments production network as well as in R&D. The plan includes the start-up and expansion of a plant for high-performance pigments at BASF's wholly owned production site at Nanjing, China, and the expansion of the BASF pigments plant at Ulsan, South Korea.



Shell shuts Nigerian plant

Royal Dutch Shell Plc has shut its Obigbo natural gas processing plant in Rivers State, southern Nigeria, after buildings were erected over pipelines connected to the facility.

About 40 million standard cubic feet a day of gas was shut , affecting supply to industrial consumers and power plants.

The facility was halted in November, after discovering that different types of buildings and structures have been erected on high pressure gas pipelines, thereby exposing the occupants to considerable health and safety risk.

Asian paints closes down unit in Himachal Pradesh

Asian Paints Industrial Coatings Ltd has closed down the operations of its powder coatings plant at Baddi in Himachal Pradesh with effect from November 25, 2013, due to significant decline in the processing volume of powder coatings for the last two years.

The Unit's plant at Sarigam, Gujarat will continue its normal operations and is sufficient to cater to the future requirements, the company added in the statement.



NEED TO FIND AMICABLE SOLUTION FOR NATURAL GAS PIPELINE ISSUE IN TAMIL NADU

Chemical Industries Association , an apex body representing the cross section of chemical industries and based in Chennai , submitted the following representation and suggestion to the Government of India and Tamil Nadu government.

This has been made on the basis of understanding of the requirement of natural gas in Tamil Nadu as well as the anxiety felt by the farmers in the areas in Tamil Nadu where GAIL proposes to lay gas pipeline in the agricultural farms in Tamil Nadu.

Judgement of the Madras High court

Madras High court delivered a judgement on 25th November,2013 giving green signal for implementation of GAIL India Ltd.'s natural gas pipe line project , which is to pass through several districts of Tamil Nadu. The High court quashed the order of the Tamil Nadu government asking GAIL not to lay the pipe line in agricultural farms but on highways.



But, this judgement has caused huge disappointment amongst the farmers ,who now feel that their interests have not been protected by the judgement. The farmers are bound to launch protest that would make it difficult for GAIL to implement the pipeline project.

Chemical Industries Association is of the view that natural gas availability for Tamil Nadu is necessary and extremely important for the economic and industrial growth of the state. At the same time, the Association feels that steps should be taken to convince the farmers in appropriate manner or atleast give an impression to the farmers and all citizens in Tamil Nadu that impartial study has been made on the need for gas vis a vis the interests of the farmers and the most balanced recommendations have been arrived at.

Chemical Industries Association is of the view that , given the opposition of the farmers , the court could have constituted an independent committee to look into all aspects of the project, which would do lot of good and take the project forward for implementation.

The grievance of the farmers :

The understanding of the Chemical Industries Association is that some of the grievances of the farmers have to be recognised and suitable steps should be taken to redress their grievances to the extent possible.

NEED TO FIND AMICABLE SOLUTION FOR NATURAL GAS PIPELINE ISSUE IN TAMIL NADU



The farmers say that the area of agricultural farms do not have much irrigation potentials both by way of river or underground water. Therefore, most of the crops cultivated are deep rooted crops and not like paddy or vegetables or other commercial crops which are not deep rooted.

Therefore, in the areas where the pipeline would be laid which in all would occupy a width of around 9 feet, including the area on both sides of the pipe with depth of around 7 feet including the laid pipe line and the concrete , no cultivation of deep rooted crops would be possible. Most of the farmers in the area have only small holdings and in some cases less than one acre. Depriving them of such area in the land would make the agricultural operations in the area under their possession extremely unviable.



The farmers say that GAIL would take possession of the land under Right to Use law . In other words , GAIL have the authority to do whatever they want to do with such land without really becoming owners. On the other hand, the present owners of the land will for all practical purposes become sort of tenants. At any time, GAIL can enter into the land and dig the particular area in case of any maintenance or inspection requirements. In such scenario, the farmers feel that they would be at the mercy of GAIL.

The farmers further say that when they become "part owners of the land" , they may not be able to pledge the land to the financing institutions for raising loans and they may not even be able to sell the land , as the buyers will be reluctant to buy such land where ownership would not be clear.

The farmers further say that such arrangement of their becoming "part owners of the land" will be permanent , affecting their posterity as well.

In the view of Chemical Industries Association, the above apprehensions of the farmers are genuine and need to be looked into with extreme care and responsibility. There is no indication that GAIL has addressed such issues adequately to the satisfaction of the farmers. To this extent, GAIL has failed to tackle the matter adequately and amicably and has shown lack of understanding of the ground realities.

What is the way out ?

Chemical Industries Association is of the view that an independent committee of experts including agricultural scientists, geologists, piping engineers, chemical engineers and representative of the farming community should be constituted immediately to look into all aspects of the matter and provide its considered recommendations within a period of 45 days.

NEED TO FIND AMICABLE SOLUTION FOR NATURAL GAS PIPELINE ISSUE IN TAMIL NADU

It has to be recognised that the farmers are not against the natural gas pipeline project in Tamil Nadu but only insist that it should not be laid through agricultural farms but only on national highways.

There is no information in the public domain that GAIL has conducted a DETAILED AND INDEPTH STUDY on the feasibility of laying the pipeline on national highways, to establish the fact that it would not be feasible, with facts and figures that would stand technical scrutiny. If GAIL has done such detailed survey that would stand scrutiny, it has not shared such information with the media and the public. GAIL should explain the highway pipeline feasibility issue to the above independent committee of experts.

The issue faced by the farmers is one relating to the security of their personal and family economy in the short and long run. Obviously , GAIL has to offer them adequate compensation based on each one of their fear and apprehension. There is no indication that GAIL has addressed this compensation issue in a meaningful way. The independent committee should evolve a fair and detailed formula for the compensation payment to the farmers immediately and also in the long run under any specific eventuality like accidents in the pipeline etc.

Overall approach of GAIL

Chemical Industries Association is of the view that GAIL should have handled this sensitive issue with much more caution and forward planning and established a healthy channel of communication with the farming community in the area and take some steps to build public opinion in favour of this important and much needed gas pipeline project.

Instead, GAIL rushed to the court to find a solution, which , in the eyes of the farmers, represent a confrontationalist approach. Perhaps, GAIL has to learn a lesson or two from Atomic Energy Commission, which handled the Koodankulam Nuclear Plant issue by building public opinion in favour of the project and deputing experts to explain the complex technology issue .

The representation:

Chemical Industries Association requests that an independent expert committee be constituted immediately to evolve a suitable compensation mechanism for the farmers, duly taking into account the apprehensions of the farming community.

Based on the recommendation of the independent committee, GAIL and Tamil Nadu government should move forward in the matter , keeping the long term interests of Tamil Nadu's industrial and economic growth.

NEW PUBLICATION ON “ALGAE BIOFUEL GLOBAL OVERVIEW AND INDIA’S OPPORTUNITIES”



Nandini Consultancy Centre, a renowned organization of chemical engineers and chemical business consultants based at Chennai and Singapore, has released an investigative and updated publication on “Algae Biofuel - Global overview and India’s opportunities”.

Importance of algae

Microalgae, a large and diverse group of unicellular photo and heterotrophic organisms and energy crop, have attracted much global attention in recent years for the valuable natural products such as biofuel, methane, hydrogen, ethanol, protein they produce and their ability to remediate effluents.

The U.S. Department of Energy’s (DOE) National Algal Biofuels Technology Roadmap, envisages an important role for algae in the energy management in the coming years all over the world.

Global research efforts

More than one hundred firms across the world are working on research, cultivation and harvesting of algae biomass and production of algae biofuel and other derivative products such as ethanol.

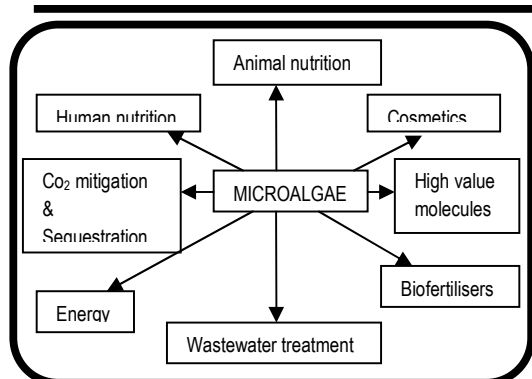
Large scale production for algae based biofuel and derivative products are expected to start between now and 2020 in several countries.

Relevance of algae for India

Algae bio fuel represents one of the best options for India to overcome the fuel shortage scenario and impending energy crisis.

Marine algae species can be raised in saltwater, pond and even in contaminated water and therefore, they do not compete with food crops for land or fresh water.

NEW PUBLICATION ON ALGAE BIOFUEL



Highlights of contents of the publication

- Algae characteristics, applications , cultivation practices and appropriate cultivation areas in India.
- Biofuel scenario /R & D and promotional initiatives in India.
- Technology development efforts of 25 Indian research and development organisations/ companies.
- Technology development efforts of 62 global research and development organisations
- Broad details of pilot plants, semi commercial plants, commercial plants being operated or under implementation by 22 organisations abroad
- Broad details of technologies offered by 16 organisations abroad
- 33 patent details relating to various aspects of algae processing in recent years
- Activities of important 8 promotional bodies and funding agencies abroad.
- Parameters for algae biofuel production
- Strategies and recommendation

Authors : This book has been prepared on the basis of extensive desk research and quick survey by a team of senior chemical engineers and technologists.

Why should you study this book?

This book would be of great asset to organizations and individuals desiring to have broad understanding of the developments relating to algae technology, that would enable them to work out their preliminary strategies to exploit the opportunities.

Price : Rs.3000/-(Rupees three thousand only) inclusive of courier charges.

The cheque should be drawn in favour of NANDINI CONSULTANCY CENTRE payable at Chennai and sent to the following address

NANDINI CONSULTANCY CENTRE
M-60/1, IV Cross Street, Besant Nagar, Chennai 600 090.
Tel : 91-44-24461346, 43511945, 24916037

Delivery : The book would be sent on receipt of order along with the payment.

INDIA'S GLOBAL COAL PORTFOLIO



Over the years, Indian companies have established a footprint in major coal rich nations, by acquiring assets in Indonesia, South Africa, Australia and the US, amongst others. The overall deal size was \$10-12 billion.

Acquiring coal mines abroad has its share of risks and advantages. Companies have to consider the target country's policy, tax implications and labour rules before striking a deal

The details of Indian companies who have acquired coal mines in abroad is given below:

Aditya Birla Group:

Country: Colombia
Deal: \$1 billion
Foreign Company: Drummond Company
Reserves Base: NA
Year: Under consideration

Bhushan Steel:

Country: Australia
Deal: AUD 3.2 million
Foreign Company: Bowen Energy
Reserves Base: NA
Year: 2007

ICVL:

Country: Australia
Deal: N/A
Foreign Company: Grosvenor Coking Coal
Reserves Base: NA
Year: Deal un conclusive

Jindal Steel and Power:

Country: Botswana, South Africa
Deal: \$115 million
Foreign Company: CIC Energy
Reserves Base: 2.4 billion tonne
Year: 2012

JSW:

Country: USA
Deal: \$250 million
Foreign Company: Mines in West Virginia
Reserves Base: 123 million tonnes
Year: 2010

Lanco Infratech :

Country: Australia
Deal: \$790 million
Foreign Company: Griffin Coal Mining Co
Reserves Base: 1.1 billion tonne
Year: 2010

NMDC :

Country: Queens land, Australia
Deal: NA
Foreign Company: Legacy Iron
Reserves Base: NA
Year: 2012

GVK Power and Infrastructure:

Country: Australia; Indonesia
Deal: \$1.26 billion; \$1 billion
Foreign Company: Hancock Coal ;
MEC Coal
Reserves Base: 8 billion tonne;
1.5 billion tonne
Year: Deal cancelled by GVK

Adani Group:

Country: Australia
Deal: \$2.7 billion
Foreign Company: Linc Energy
(Carmichael Coal Mine)
Reserves Base: 7.8 billion tonnes
Year: 2010

INDIA'S GLOBAL COAL PORTFOLIO

Essar Group:

Country: Indonesia & USA
Deal: \$208 million; \$600 million
Foreign Company: Aries Coal Mines Trinity Coal
Reserves Base: 64 million tonnes,
200 million tonnes
Year: 2010

Gujarat NRE Coke:

Country: Australia; New Zealand
Deal: AUD 95m & 60m
Foreign Company: Wollong Colliery near Sydney,
Pike River Coal Company of New Zealand
Oil & Gas Ltd.,
Reserves Base: 550 million tonne ;
15 billion tonne
Year: 2006

GMR:

Country: Indonesia & South Africa
Deal: \$200 million; \$100 million
Foreign Company: PT Burasentosa Lestari
(2 mines in South Sumatra);
Homeland Energy Group (55.84%)
Reserves Base: 115 million tonne;
400 million tonne
Year: 2009

Reliance Power:

Country: Indonesia
Deal: \$1.6 billion
Foreign Company: Srivijaya Bintangita Energy,
Bryan Bintangita Energy and
Sugico Pendragon Energy
(3 mines in South Sumantra)
Reserves Base: 2 billion tonnes
Year: 2010

Tata Power:

Country: Indonesia
Deal: \$1.1 billion; NA
Foreign Company: Khaltim Prima and
Arutima Mines in Bumi Resource;
PT Baramulti Sukses Sarana Tbk (BSSR)
Reserves Base: 2.9 million tonnes ;
1 billion tonne
Year: 2007; 2012

NTPC:

Country: Indonesia, Australia, South Africa,
Queensland (Australia)
Deal: N/A, \$1.2 billion; \$ 1 billion;
\$994 million
Foreign Company: Sumatra & Kalimantan
coal mines; Mines in Western Australia;
N/A; MetroCoal Ltd (Bundli Coal Project)
Reserves Base: 1.8 billion tonne;
720 million tonne ; 1 billion tonne ;
1561.8 million tonne
Year: Deal un conclusive; 2010
Deal un conclusive;
Deal under consideration

Coal India :

Country: USA, Australia, Indonesia,
Mozambique
Deal: \$1 billion, \$ 100 million;
Foreign Company: Massey Energy Co.
Peabody Energy Corporation;
Indonesia Sinar Mas;
Non disclosure pact;
Coal India Africana Limitada
Reserves Base: 2.3 billion tonne;
9 billion tonne ;
N/A; 10-15 million tonne;
NA
Year: Deal un conclusive;
Deal un conclusive;
Deal un conclusive;
Deal under consideration; 2009
(Exploration Contract for
5 years)

ALL INDIA ESSAY COMPETITION FOR COLLEGE STUDENTS ON INDIA'S ENERGY OPTIONS

Nandini Chemical Journal organized an All India essay competition for college students on "India's Energy Option". There was good response from the college students all over India.

The following students were awarded prize in the essay competition :

- * Keval Shah, Hardik Panchal, and Mayur Padharia
Institute of Technology, Nirma University, Patni, Gujarat
- * B.Barani Soundar, Kongu Engineering College, Perundurai,
Tamil Nadu

Excerpt from the prize winning essays are provided.

POLYMER SOLAR CELL AS ENERGY OPTION

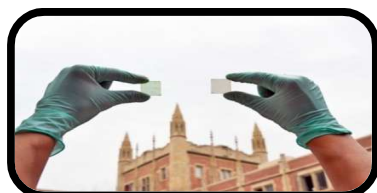
Keval Shah, Hardik Panchal, Mayur Padharia and Prof.Neha Patni,
Institute of Technology, Nirma University, Patni

Polymer solar cells are built from thin films (typically 100 nm) or organic semiconductors including polymers, for example polyphenylene vinylene and small molecule compounds like copper phthalocyanine, carbon fullerenes and derivatives of fullerene such as PCBM.

Polymer solar cells (PSC) are cheaper to produce than conventional inorganic solar cells. Furthermore, they can be fabricated on surfaces of arbitrary shape and are flexible.

Polymer solar cells usually consist of an electron on top of an indium tin oxide (ITO) conductive glass, followed by electron donor and an electron acceptor and metal electrode on top.

These lightweight, flexible cells can be used in bulk at a low cost, and could be used to create power generating windows, since these cells can be processed from solution.



One of the main advantages of organic materials is their high optical absorption, which results in solar cell thicknesses on the order of 100nm; a thousand times thinner than silicon based solar cell.

Polymer solar cells have the following advantageous features:

- Thin film architecture
- Low material consumption resulting from a high absorption coefficient
- Their use of organic materials, which are abundant,
- Their utilization of efficient solution processes
- Low manufacturing energy requirements
- Low specific weight
- Mechanical flexibility
- High transparency lightweight
- Potentially disposable and inexpensive to fabricate,
- Customizable on the molecular level
- Lower potential for negative environmental impact
- High watt peak value - the total cost of the system divided by the nominal peak power it generates at the beginning of the PV system's lifetime.

In 2011, researchers at MIT and Michigan State University developed the efficient transparent solar cells, that have power efficiency close to 2% with transparency to the human eye greater than 65%, achieved by selectively absorbing the ultraviolet and near infrared parts of the spectrum with small molecule compounds.

Researchers at UCLA more recently developed an analogous polymer solar cell, following the same approach, that is 70% transparent and has 4% power conversion efficiency.

Commercialization prospects

Finding an alternative for Indium Tin Oxide is crucial for the successful commercialization of PSCs.

Improvement in efficiency and life span of polymer solar cells are necessary, so that polymer solar cells can compete with other technologies, that offer an equally reduced cost of installation or a much longer lifespan.

Based on the current growth of technology, it may be feasible to achieve an efficiency of 15%. If this would happen, the organic PV will replace every other solar module and the use of solar energy on a commercialized level will increase drastically.

KITEGEN WIND POWER AS ENERGY OPTION

B.Barani Soundar, Kongu Engineering College, Perundurai, Tamil Nadu

KiteGen is a concept developed in Italy for a wind harnessing machine that takes power from high altitude winds. KiteGen is the latest evolution of wind energy exploitation. It is a radically new and innovative concept that may be the most practical and effective. The main innovation is given by the fact that KiteGen can exploit an unexploited virtually endless and almost universally available wind energy power.

High altitude wind is much more powerful and constant when compared to that at earth level, which is intense in very few places and at full speed for only about 1,700-1,800 hours per year, which limits the annual production of wind energy.

Large wings, driven by a high tech control system based on avionic sensors, fly at high altitude, harvesting the energy of powerful winds much faster than those available to traditional wind mills. The wind which is planned to be used at is around 800 meters height with average speed of 7 m/s and specific power of 200 W/m.



Section of wind width of 1,000 meters at an altitude between 600 and 1,000 meters has a power equal to 80 MW. A park of Kitegens with 100 MW peak power should produce 500 GWh per year; enough for 86,000 households. The Kitegen can generate for about 6000 hours per year.

The basic idea is that electrical generator can be driven by the pull of a kite's aerofoil. Kite Gen's configuration is so designed that, the kite is flown on two tethers, each one held on a separate drum attached to a computer-controlled winch. Once the kite is launched and in stable flight and pulling on its tethers, the winches are released. The tethers then reel out, spinning the generators. When nearly the entire length of the tethers has unspooled, the winches are engaged to haul them back in, returning the kite to its original position.

Kite Gen's electric winches will consume only about 12 per cent of the total generated power. The difference between power generated and power used can be maximized by taking advantage of lulls in the wind and also by using a mechanism that adjusts the kite's aerofoil in-flight to reduce lift.

BREAKTHROUGH IN CHEMICALLY ASSISTED NUCLEAR REACTIONS THIRD ROUTE TO NUCLEAR ENERGY

Mahadeva Srinivasan
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chino37@gmail.com

Abstract of an invited lecture to be delivered at the 37th Indian Social Science Congress to be held at the Aligarh Muslim University during 27th to 30th December 2013 by Dr. Mahadeva Srinivasan.

Back ground

"Nuclear Science" was born over a century ago (in 1911) when Ernst Rutherford discovered the "Atomic Nucleus" during experiments, investigating the scattering of alpha particles by a thin gold foil.

It was soon recognized that during natural radioactivity, alpha particles are emitted from the nucleus with high kinetic energy, as a result of a very tiny fraction of the nuclear mass of the radioactive element being converted into energy, obeying Einstein's famous equation $E = MC^2$.

The subsequent realization (early 1920s) that the source of energy which keeps the sun and the stars glowing bright and hot was "nuclear fusion" reactions, gave birth to the dream of physicists to somehow replicate solar type thermonuclear fusion reactions on earth. But engineering a controlled thermonuclear fusion reactor has turned out to be a formidable task.

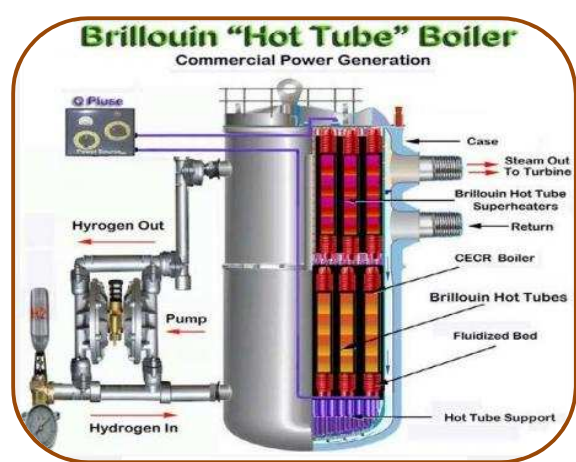
The discovery of the neutron in 1932 followed by the observation of neutron induced fission of the nucleus of U-235 in 1939 accompanied by further neutron emission, drastically changed the picture. Prospects of setting up a neutron induced fission chain reaction inside a block of enriched U^{235} , with the objective of releasing astounding amounts of energy, suddenly appeared achievable. The tense political climate in Europe which was spiraling toward a World war, gave the impetus to designing, fabricating and testing of an Atomic Bomb within a span of a few years (1945). Shortly thereafter (1951), the intense heat released in an Atom Bomb was successfully channeled to detonate a "Thermonuclear Hydrogen Bomb". The rest is history.

BREAKTHROUGH IN CHEMICALLY ASSISTED NUCLEAR REACTIONS : THIRD ROUTE TO NUCLEAR ENERGY

Adapting the fission chain reaction to design and build Nuclear fission reactors to generate power was a solvable engineering challenge. Hundreds of fission nuclear power stations are today operating the world over including India, although the Tsunami triggered Fukushima reactor melt down accident in Japan (March 2011) has raised doubts in some circles, on the wisdom of India becoming heavily dependent on fission nuclear power as a long term strategy.

Experimental thermonuclear reactor

Following decades of research since world war II, the world's first International Experimental thermonuclear Reactor called ITER, based on the "Tokamak" magnetic plasma confinement principle, is currently under construction in France, jointly funded by the top technologically advanced countries at a cost of Rs. 100,000 crores (expected operation 2027).



Brillouin Energy Corp. LENR Device

Third route to nuclear energy cold fusion

So far, science has recognized only nuclear fission and thermonuclear fusion as practically feasible methods of releasing Nuclear Energy.

However, the year 2011, which marked the centenary of the discovery of the Atomic Nucleus, witnessed the emergence of a revolutionary new "Third Route" to generating Nuclear Energy through what is known as "Chemically Assisted Nuclear Reactions" or "Low Energy Nuclear Reactions" (LENR).

The discovery of the phenomenon, initially dubbed as "Cold Fusion" was first announced in 1989 by two Chemistry professors Martin Fleischmann and Stanley Pons of the University of Utah.

But, since the occurrence of such nuclear reactions, under normal laboratory conditions, defied the prevalent understanding of Nuclear Physics, upsetting many concepts held sacrosanct by physicists, there was intense skepticism and opposition in mainstream Physics circles and the claims of Cold Fusion/LENR were dismissed as nonsense!

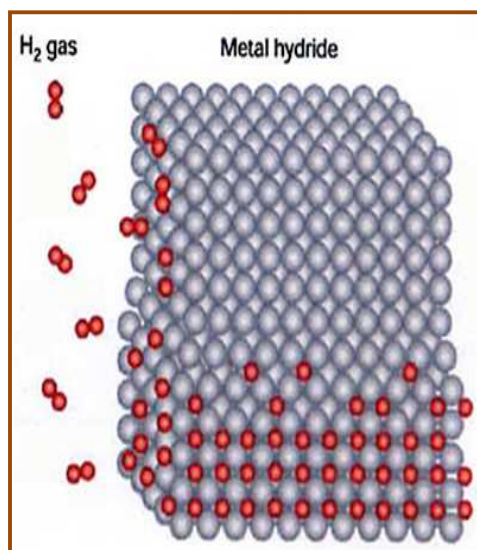
BREAKTHROUGH IN CHEMICALLY ASSISTED NUCLEAR REACTIONS : THIRD ROUTE TO NUCLEAR ENERGY

However, a minority group of researchers the world over have kept the field alive for over two decades, with 18 International Conferences having been held to date, monitoring the progress of the field (www.lenr.org, www.coldfusionnow.org, www.newenergytimes.com). The latest in the series, namely ICCF 18, was held at the University of Missouri during July 2013.

Low energy nuclear reactions (LENR)

Essentially, LENR refers to the occurrence of nuclear reactions in certain metals such as palladium, titanium, nickel etc, when they are "heavily loaded" with deuterium or hydrogen, forming the corresponding deuterides or hydrides.

Two decades of experimentation have confirmed that when such metallic hydrides/deuterides are appropriately triggered, nuclear reactions take place, both amongst the hydrogenous isotopes themselves (fusion) as well as between them and the host nuclei ("transmutation" reactions). Clearly, the special "Nuclear Active Environment" (NAE) that is created in selected locations in these hydrides/deuterides somehow catalyzes nuclear reactions.



Ni-H reactor

The Ni-H reactor breakthrough actually occurred in 2011 and the credit goes to an Italian engineer-inventor by the name of Andrea Rossi. He called his invention as Energy Catalyzer or "E-cat" for short.

On January 14th 2011, he gave a public demo of a 10 KWth E-cat reactor at the University of Bologna and later in October 2011 followed it up with a live demo of a 1 MWth reactor. (Rossi's company is already accepting orders for the 1 MWth E-cat Industrial reactor: see ecat.com or www.e-cataustralia.com.)

His invention uses nickel nano powder and hydrogen gas as fuel. But Rossi has not fully disclosed all the details regarding the secret additives incorporated in the Ni fuel powder nor the precise "triggering techniques" in his patent applications.

Meanwhile, two other companies have independently discovered the Ni-H reactor secret. All have announced expected market release of commercial multi KWth nuclear reactors during 2014/15.

BREAKTHROUGH IN CHEMICALLY ASSISTED NUCLEAR REACTIONS : THIRD ROUTE TO NUCLEAR ENERGY

This writer personally visited and witnessed a live demo of the rival Defkalion company's 5 KWth Ni-H reactor, in their Vancouver (Canada) Labs in June 2013. On 23rd July 2013, this same company webcast a demo of a similar working reactor from their Milan labs for the benefit of the ICCF 18 conference participants.

Remarkable aspect of LENR reactors

The ongoing "Silent Revolution in Nuclear Science" is thus on the verge of making available to mankind, a new and practical "Third Route to Nuclear Energy", through clean and portable nuclear power packs.

The most remarkable aspect of these LENR reactors is that they are "clean" in the sense, that there is very little nuclear radiation emitted and no radioactivity is involved.

Although the actual integration of such heat sources to an electricity generator has not yet been showcased in public, it is only a matter of time before that happens, since the technology for converting heat into electricity is readily available. (Rossi is already working on coupling his 10KWth E-cat heater unit to a Thermoelectric generator module to obtain a few KWe home power pack having no moving parts and which can run non stop without refueling for upto 6 months.)

Well before the end of the decade (2020), private industry worldwide is expected to mass manufacture and market portable LENR "nuclear gensets" in the 1 to 300 KWe range.

LENR power packs have all the advantages of Nuclear and Solar power, without their respective disadvantages.

The following is a sample of the dozens of websites which have cropped up during the last couple of years, chronicling the progress of Ni-H reactor technology :

www.ecat.com,

www.lenrnews.eu,

www.ecatreport.com;

www.ecatfusion.com,

www.e-catsite.com,

www.nickelpower.org,

www.e-catworld.com,

www.lenrproof.com,

www.andrearossiecat.com,

www.lenrftw.net.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE

RECENT GLOBAL EFFORTS

Biobased fuels and chemicals are today produced largely using sugar from corn in the U.S. or sugarcane in Brazil.

Extracting sugars from non-food biomass is much more difficult and among the most sought-after innovations in the biobased products industry.

Worthwhile efforts made in the world for the production of bio fuel from agricultural waste are discussed in this article.



Beta Renewables, Italy biofuel plant

Beta Renewables, Italy

Beta Renewables was established at the end of 2011 as a joint venture between Biochemtex (Tortona), a company of the Mossi Ghisolfi Group (Tortona) and the US fund TPG.

Novozymes, with the acquisition of 10% stake at the end of 2012, became a shareholder of Beta Renewables.

The two companies formed a strategic partnership in October 2012, making Novozymes the preferred enzyme supplier for Beta Renewables' current and future cellulosic biofuel projects.

Beta Renewables (Tortona, Italy) has facility at Crescentino, Italy, which is designed and built to produce bioethanol from agricultural residues and energy crops at commercial scale using enzymatic conversion.

Beta Renewables owns the Proesa technology, applied to the field of biofuels and chemical intermediates.

The company would build 13-million gallon per year cellulosic ethanol plant at Crescentino, Italy. The plant will be 10 times bigger than the largest demonstration facilities in operation and it will be designed to operate on a multitude of cellulosic feedstocks. The facility will consume wheat straw, energy crops and other sources of biomass.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE - RECENT GLOBAL EFFORTS

The price of the ethanol produced from the plant will be competitive with gasoline. The Crescentino plant will be self sufficient in power.

Lignin, a coproduct extracted from biomass during the ethanol production process, will be burned in an adjacent power plant. Excess electricity will be supplied to the Italian national grid.

Novozymes, the largest producer of industrial enzymes supply enzymes to the cellulosic ethanol plant.

Gruppo Mossi & Ghisolfi subsidiary Chemtex,USA

Gruppo Mossi & Ghisolfi subsidiary Chemtex has received conditional \$99-million loan guarantee from USDA to help fund an approximately \$170-million cellulosic ethanol facility. The plant is expected to be located in Sampson County, NC in USA and to produce 20 million gallons per year.



Brazil's ethanol plant

The plant is expected to come online in 2014.

Novozymes will be supplying enzymes for the new production facility.

The feedstock will be grown on low productivity, marginal land. Chemtex is working with local farmers and producer organizations to begin growing the approximately 30,000 acres of energy grass crops that will be required to supply the facility with sufficient feedstock.

Chemtex will use Proesa technology, licensed by Beta Renewables, its joint venture with TPG Capital (Fort Worth, TX).

Two plants to be built in Brazil by GraalBio will also use the Proesa technology and Novozymes enzymes.

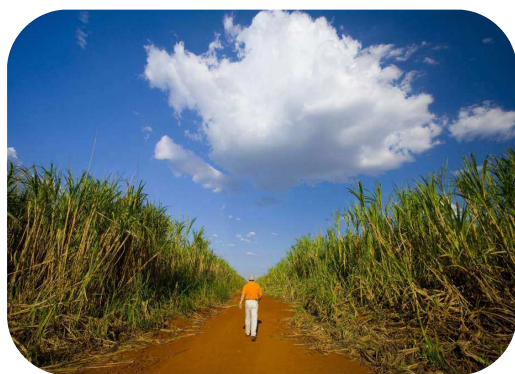
Novozymes / COFCO / Sinopec, China

Denmark's Novozymes, COFCO, a leading producer and supplier of processed agricultural products in China and China's Sinopec, the world's third largest oil refinery, signed a Memorandum of Understanding covering the next steps towards commercialisation of cellulosic biofuel in China.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE - RECENT GLOBAL EFFORTS

As part of the agreement, COFCO and Sinopec built a cellulosic ethanol demonstration plant, for which Novozymes supply with enzymes. The new plant produce three million gallons of bioethanol made from corn stover a year.

In February 2010, Novozymes launched new 'Cellic CTec2', an enzyme for producing cellulosic ethanol at a price competitive with gasoline and conventional ethanol.



Sugar Cane for BP's and Tropical BioEnergia's Sugar Cane Ethanol Venture

BP , USA / Brazil

BP currently operates biofuels research facility in San Diego, USA and a demonstration scale plant at Jennings, LA, USA. It also operates first generation ethanol refineries in Brazil using sugarcane.

BP would not move forward with plans to build a commercial scale cellulosic ethanol plant at Highlands County, FL,USA.

The company will instead refocus its US biofuels strategy on R&D and on licensing its technologies.

Shell, Canada

Shell's project, a 23-million gal per year plant in southern Manitoba, was cancelled. Shell's partner, enzyme maker Iogen, has been operating a demonstration-scale plant at its Ottawa headquarters since 2004.

DuPont, USA

DuPont has broken ground on a \$200 million cellulosic ethanol facility in Nevada, IA, USA. Slated for completion in mid 2014, the facility is expected to produce 30 million gal per year of bio ethanol from corn stover, at capital investment of about \$7 per gal.

DuPont intends to contract with over 500 local farmers to gather, store and deliver 375,000 dry tonnes of stover to the facility each year. Earlier this year, the company received a Sustainable Biofuels Award for its Stover Harvest Collection Project.

By leveraging DuPont Pioneer corn production expertise and designing an integrated technology platform, DuPont built an affordable and sustainable entry point into this new industry.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE - RECENT GLOBAL EFFORTS



INEOS Bio started production of commercial-scale bioethanol at its first facility near Vero Beach, Florida

Ineos, USA

Ineos has started commercial scale production of cellulosic ethanol at its Indian River BioEnergy center joint venture, at Vero Beach, FL, USA. Shipments from the plant, the first US facility to produce cellulosic ethanol at commercial scale, will start shortly.

The plant is a jv between Ineos and New Plant Energy (League City, TX). Plant output will total 8 million gal of cellulosic ethanol and 6 megawatts of renewable power. The plant is permitted to utilize municipal solid waste, quantities of which will be used for bioethanol production during 2014.

The plant uses hybrid of gasification and fermentation technologies to convert wood scraps, grass clippings and other waste materials into transportation fuels as well as energy for heat and power.

The plant cost over \$130 million. The facility has already converted several types of waste biomass material into bioethanol—including vegetative and yard wastes, as well as citrus, oak, pine, and pallet wood wastes.

Ceres, USA

Energy crop company Ceres (Thousand Oaks, CA) says its sweet sorghum hybrids were processed into renewable diesel by Amyris (Emeryville, CA).

Ceres says that the fast-growing sweet sorghum produced large amount of cellulosic sugars and biomass, that were fermented by Amyris into the renewable farnesene.

Amyris was awarded a DOE grant for the project, with Ceres receiving a subcontract award for the new technology that will soon be able to produce larger quantities of low cost sugars.

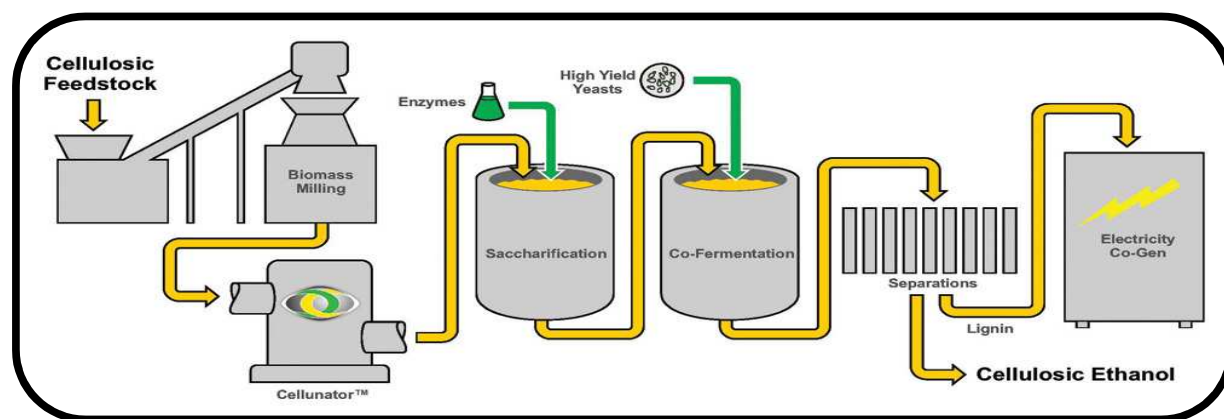
Enerkem Inc., Canada

Enerkem Inc has begun production of cellulosic ethanol from waste materials at its demonstration facility in Westbury, Quebec, Canada.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE - RECENT GLOBAL EFFORTS

The primary purpose of the Westbury facility is to validate the technology process design before full scale commercial production. to test various waste food stocks coming from customers and partners, as well as to continuously improve the technology.

The new achievement in Westbury confirms the process design of proprietary methanol to ethanol technology for its deployment at Enerkem's full-scale commercial plants in Edmonton and other locations.



Edeniq Inc's Corn to cellulose migration technology

Edeniq, USA

Edeniq (Visalia, CA) has started operations at a corn to cellulosic migration (CCM) pilot biorefinery at its headquarters at Visalia, CA, USA.

The plant has the capacity to convert two dry tonnes per day of feedstock into cellulosic sugars and 50,000 gal per year cellulosic ethanol.

Gevo / Beta Renewables, Malaysia

Gevo (Englewood, CO) and Beta Renewables (Rivalta Scrivia, Italy) have signed a joint development agreement for an integrated process for the production of biobased isobutanol from cellulosic, non food biomass.

The project would integrate Beta Renewables' Proesa technology for extracting sugar from non food biomass and Gevo's integrated fermentation and alcohol to jet fuel technologies.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE - RECENT GLOBAL EFFORTS

The agreement also includes provisions for commercialization if the collaboration is successful, with plans for isobutanol production plants to be located where cellulosic feedstocks such as switchgrass, miscanthus, agriculture residues and other biomass will be readily available.

Gevo recently started up its first biobased isobutanol production unit at Luverne, MN and recently signed a collaboration agreement with representatives from the Malaysian government's East Coast Economic Region Development Council, the Malaysian Biotechnology Corp., and the State Government of Terengganu for cellulosic biomass isobutanol manufacturing facility in Malaysia. The proposed site is in the State of Terengganu at the biorefinery complex at Kertih.

The company has the target of having a cellulosic plant operational by late 2015 or early 2016.

[BASF,USA](#)



Renmatix (King of Prussia, PA), a cellulosic sugar start up plant backed by Kleiner Perkins Caufield & Byers (Menlo Park, CA), has unveiled a low-cost pathway to extract sugar from biomass using only water, pressure and heat.

BASF has invested \$30 million in Renmatix, a Philadelphia-based company with cellulosic sugar technology, that BASF says could help it broaden its use of renewable raw materials.

Renmatix breaks down cellulose through supercritical hydrolysis, a process by which heat and pressure are applied to a slurry, until the chains of sugar break down into the smaller components usable by biofuel and biochemical producers.

Renmatix's process does not require any pre treatment or enzymes and is significantly faster and cheaper than other cellulosic sugar extraction methods

Renmatix currently uses woody biomass at its demonstration scale facility at Kennesaw, GA, and is building a technical center at King of Prussia, PA.

[Danisco and DuPont,USA](#)

Danisco and DuPont's 50-50 ethanol venture in December 2009 opened a \$50 million demonstration plant in Vonore, Tennessee, which can make 250,000 gallons a year from corn cobs and switchgrass.

The company plans to open a US plant in 2013 to make 25 million to 50 million gallons of cellulosic ethanol a year from corn cobs.

A subsequent plant will produce commercial quantities of ethanol from switchgrass.

FOCUS ON BIOFUEL FROM AGRICULTURAL WASTE - RECENT GLOBAL EFFORTS



GCB Bioenergy journal

GCB Bioenergy journal has published a study in which scientists present the findings of a study on switchgrass as cellulosic ethanol feedstock.

The scientists concluded that using switchgrass bioenergy can help reduce emissions but add that further research “to address the significant sources of uncertainty (such as what type of land is converted to switchgrass), is advisable.

According to Biofuel Daily, the research was carried out at the University of Bologna, in Italy.

Lead researcher Dr. Andrea Monti said the team reviewed over 100 articles on switchgrass and found this type of crop has a better ability to accumulate carbon in the soil compared to several other grasses, especially row crops.

Because switchgrass has not been planted as a monoculture crop until the mid 20th century, it is necessary to factor in long term predictions on carbon sequestration, which includes land use change, carbon turnover rate and the economic life cycle length. These calculations are still lacking.

HPCL, India

Hindustan Petroleum Corporation Ltd. (HPCL) has been chosen as an industry partner in the US-India consortium for development of sustainable advanced lingo cellulosic biofuel systems, under the Indo-US Joint Clean Energy Research and Development Centre (JECRDC) programme.

As an industry partner, HPCL along with other consortia members is focusing on conversion technologies with a work plan for biobutanol, scale up work, commercialization and marketing activities.

The project focuses on development of commercially scalable lingo cellulosic biofuels through: sustained feedstock cultivation and supply; efficient pre treatment and saccharification of biomass; engineered biocatalysts and novel processes for biofuel production; and environmentally and economically sustainable practices.

RED MUD – PRODUCT PROFILE

Red mud (bauxite residue) material is the by product of industrial chemical process for refining aluminium containing ores (bauxites) into alumina (aluminium oxide) via digestion with sodium hydroxide (caustic soda).

Bauxite residue material is often described as red mud due to the colour of the original bauxite ore and the iron oxide it contains.

The red mud is separated during the refining process when caustic soda and alumina solution passes into thickener tanks in the clarification section. Here, solid impurities sink to the bottom as a fine, red mud. The red mud is washed several times with water to recover caustic soda. Sea water is then added to neutralise any remaining caustic soda, before being pumped to the Residual Disposal Area (RDA).



A wide variety of potential uses of red mud have been reviewed, yet there is no economically viable and environmentally acceptable solution for the utilization of large volume of red mud that are generated.

Though methods have been developed for maximum recovery of soda and alumina from red mud, recovery of other metals should be made economical by further investigation to reduce high reaction temperature required.

The developments in dry disposal methods will certainly lead to better management of residue but neutralization of red mud will be an essential ingredient of any permanent solution.

Continuous research is required by studying residue neutralization technologies to reduce the alkalinity of red mud, which is the most important barrier for its reuse and disposal management.

Proper treatment can be made to ameliorate red mud and red mud ponds can be rehabilitated by growing suitable flora and fauna on it.

Depending upon the mud characteristics, a systematic strategy should be taken up by each alumina plant and a zero waste alumina refinery may be realized by developing a universal technique of disposal, management and full utilization of red mud.

RED MUD – PRODUCT PROFILE

Synonym:	Bauxite residue, Red mud
Appearance:	Red mud
Odour:	Earthy odour slightly pungent

Composition of red mud

Ferric oxide	45 - 55%
Aluminum oxide	15 - 25 %
Crystalline silica (Quartz)	4-15%
Titanium oxide	5 -15%
Sodium oxide	2 - 10%
Calcium oxide	1 - 5%
Sodium hydroxide	5 - 10%



Potential application areas for red mud

Considerable research has been done on the utilization of red mud, as a raw material for production of a range of products.

Building materials

Among the uses standing out are those reported on the utilization of red mud for building materials production such as cement, bricks, roofing tiles and glass-ceramics.

Use as a coagulant, adsorbent and catalyst

Red mud can be employed as catalysts for hydrogenation, hydrodechlorination and hydrocarbon oxidation.

It has also been studied as a support in catalytic wet oxidation of organic substances present in industrial wastewaters

Recovery of metals

Iron is the major constituent of red mud and hence much work has been carried out till now for its recovery. Iron can be obtained as value added product and alumina and soda can be recycled in the process.

Some red mud also contains titania in substantial amount, which if successfully recovered, has the most potential value.

Soil remediation

After adequate neutralization, red mud can be used for the remediation of contaminated sites and treatment of contaminated liquid waste.

A novel process for making radiation shielding materials utilizing red mud has been developed by adopting ceramic chemical processing route using phosphate bonding.

Efforts were made to utilize red mud for developing plasma spray coatings (ceramic and cermet) on metal substrates, stainless steel, mild steel, Cu & Al.

As red mud consists of metal oxides of iron, titanium, silicon, aluminium, it was felt that red mud can possibly be spray coated.

Building Material and Technology Promotion Council of India (BMPTC) has produced composite from red mud, polymer and natural fibres, called Red Mud Jute Fibre Polymer composite (RFPC), to replace wood in the wood based panel products in the building industry.

Red Mud Utilisation- Difficulties

- Soda content

- Leachable around 1-2 %

- Bound soda around 3-6 % in form of sodium aluminosilicate.

- High amount of soda act as a preliminary barrier for its use as a raw material for industrial application such as cement and clinker production, steel industry, constructional bricks, blocks etc

- Composition variability

- Chemical and mineralogical composition of red mud generated depend on the nature of bauxite and the processing parameters.

- Hence the utilisation of red mud cannot be uniform since it is constituent dependent

The basic properties of the waste are: very high pH (12.2) of the suspension conveyed to the dump, and extremely fine solids of the suspension. The solids are highly migrative during the slow precipitation and complex in the chemical composition (due to dissolved salts).



RED MUD – PRODUCT PROFILE

A number of applications development projects for red mud have been launched by institutions like NALCO, HINDALCO, Banaras Hindu University, CGCRI, Jadhavpur and others.

Red mud disposal practices by Indian alumina plants

Name of the plant	Red mud generation per tonne of alumina (t/t)	Dumping procedure
INDAL, Muri	1.35 to 1.45	The refinery adopted the closed cycle (wet slurry) disposal system (CCD).
INDAL, Belgaum	1.16	The plant switched over to dry disposal mode from wet slurry disposal mode in 1985. The mud after clarification passes through six stage counter current washing and after filtration (65% solids), it is disposed off by dumpers at the pond site. The dry portion of the pond is covered with a 15 cm black cotton soil for promoting green vegetation.
HINDALCO Renukoot	1.4	Traditional CCD method of impoundment was used. In late 1979, dry disposal method was implemented. After five stages counter current washing, the solid is filtered (70% solid) and disposed off into the pond.
BALCO Korba	1.3	Residue after settling, counter currently washed in four stages and filtered. The filtered cake is repulped with the pond returned water and dumped in the pond. Uses modified CCD system of disposal. The dykes of the pond have stone masonry and well protected polythene liner and clay layer.
NALCO Damanjodi	1.2	Subjected to six stage counter current washing by pond returned water (0.5 g/l Na ₂ O) and condensate from the evaporators. The washed red mud is repulped and sent to disposal sites. The bottom and sides of the pond are covered by impervious and semi pervious clay with base filters.

CCD: Closed cycle disposal; MCCD: Modified CCD; DS: dry caking

RED MUD – PRODUCT PROFILE



Filled with red mud from Vedanta Aluminium's refinery
in Lanjigarh, Orissa

Project of Vedanta Aluminium Ltd

Vedanta Aluminium Ltd., recently has commissioned a red mud powder producing unit at Lanjigarh refinery in Odisha, describing it as first of its kind in alumina industry tackling major environmental hazards.

The project of producing red mud powder has been commissioned in a fully mechanised and automatic plant. The system has been developed in-house

The project has been set up with a capital expenditure of around Rs 50 crore.

This will have advantages like savings in caustic consumption by 10-15 kg per tonne of alumina, minimising land requirement by 50 to 60 per cent and doing away with wet red mud storage, thereby eliminating environmental hazards.

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SPOTLIGHT ON SPECIALITY CHEMICAL LEVULINIC ACID

CAS#:	123-76-2
Synonym:	4-Oxopentanoic acid
Chemical Formula:	C ₅ H ₈ O ₃
Appearance:	White crystalline solid. Clear yellowish liquid after melting
Solubility	Soluble in cold water, alcohol and oil Insoluble in paraffin oil

Specification

Producer: Shandong Xinhua Pharmaceutical Co Ltd.China

	Standard	RESULT
Appearance	White crystals or colourless light yellow transparent liquid	
Content (titration), %	99 min	99.18
Water(K.F.), %	1 max	0.75
Heavy metal (Pb ₂₊ ,terbidimetry),ppm	10 max	<10
Fe (Fe ³⁺ , terbidimetry), ppm	10 max	<10
Sulphate (SO ₄) ₂ terbidimetry) ppm	20 max	<20
Chloride (Cl-terbidimetry), ppm	20 max	<20
Lactone (G.C.), %	1 max	<1

Application

Levulinic acid is a platform chemical with applications in plastics, fibers, coatings, flooring, personal care and electronics.

Levulinic ketals derived from plant biomass provide novel chemical building blocks that offer practical alternatives to petrochemicals.

Important application sector of levulinic acid include the following

- * As an acidulant in foods and beverages.
- * Precursor to pharmaceuticals, plasticizers and various other additives.
- * Used in cigarettes to increase nicotine delivery in smoke and binding of nicotine to neural receptors.

SPOTLIGHT ON SPECIALITY CHEMICAL- LEVULINIC ACID

* Derivative products include methyl tetrahydrofuran, valerolactone and ethyl levulinate.

Through catalytic processes, levulinic acid can be converted to compounds like MTHF (2-methyl tetrahydrofuran), Valeric (or Pentanoic) Acid, Diphenolic Acid and δ -Aminolevulinic Acid (DALA).

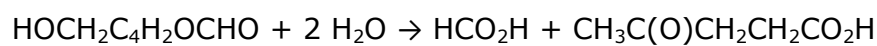
* Dehydration of levulinic acid gives angelica lactone.

Process

Levulinic acid is prepared by heating sucrose with concentrated acid. The process proceeds via the intermediacy of glucose, which isomerizes to fructose and then undergoes dehydration to hydroxymethylfurfural (HMF).

HMF hydrolyzes to formic acid and levulinic acid.

Other sugar derivatives can be used in this process including levulose (D-fructose), inulin and starch.



Levulinic ester ketals is formed from the reaction of a levulinic acid ester (LAE) with an alcohol.

Facility of Segetis

Renewable chemicals firm Segetis (Golden Valley, Minnesota, USA) has successfully demonstrated the viability of its proprietary process to convert biomass to levulinic acid at its Golden Valley pilot facility. The pilot plant has a nameplate capacity of 80 metric tonnes per year and currently uses corn sugar as feedstock.

The company claims that its process has broad capability and is intended to be used to explore many other feedstocks, as Segetis' technology develops.

The company claims that it is equipped to advance the efforts to build the first fully integrated levulinic acid and derivatives biorefinery, using a variety of carbohydrate feedstocks to meet the global demand for high performing, safer, non-toxic end use products.

Segetis has been active in the production and marketing of downstream derivatives from levulinic acid via the company's levulinic ketal technology; trade marked JAVELIN (TM). Segetis has been sourcing its levulinic acid from China.

SPOTLIGHT ON SPECIALITY CHEMICAL- LEVULINIC ACID

Segetis produces levulinic ketals using its process, combining esters of levulinic acid with alcohols derived from vegetable oils (such as glycerol). The properties of levulinic ketals are modified and tailored through the R1 and R2 functionalities, allowing the compounds to be used alone or as a building block.

Segetis is planning for a commercial facility (most likely for levulinic ketals and downstream derivatives) by around 2015/2016.

Producers of levulinic acid and its salts in China

- * Hebei Yanuo Chemical Industry Co Ltd.,
- * Langfang Triple Well Chemicals Co., Ltd (LTW)

Products: Levulinic acid, butyl levulinate, ethyl levulinate, diphenolic acid and ACVA series

- * Linzi Organic Chemical Inc

Products: Furfural and its derivatives including furfural, furfuryl alcohol, 2-methyl furan and levulinic acid.

- * Shanghai Parling Pharma Tech Co Ltd.

Products: Dorzolamide HCl, (\pm) 5,6-dihydro-4-oxo-6-methyl-4H-thieno (2,3B) thiopyran-2-sulfonamide, brimonidine tartrate, 5-aminolevulinic acid HCl (5-ALA)

- * Shanghai Apple Flavor & Fragrance Group Co., Ltd

Product: Ethyl levulinate

- * Jiangsu Yancheng China Flavour Chemicals

Shandong Zibo Shuangyu Chemical Co., Ltd.

Shandong Zibo Shuangyu Chemical Co., Ltd. China has production facility for furfuryl alcohol, levulinic acid. It can produce 5,000 metric tonnes of furfuryl alcohol (liquid phase hydrogenation method) every year; the annual output of levulinic acid is 1,000 metric tonne.

The company claims that it is the largest manufacturer in China for levulinic acid.

SPOTLIGHT ON SPECIALITY CHEMICAL- LEVULINIC ACID

Biofine Technology LLC,

In the US, Biofine Technology LLC has the capability at its Gorham, Maine, pilot facility to produce 600 pounds per day of levulinic acid from one tonne of dry biomass (ex. paper mill sludge) per day

The Biofine process is owned by Biofine Technology, LLC, of Framingham, Massachusetts, a joint company owned by Biofine Inc. and a group of financial investors.

In 2006, Biofine 's pilot plant at Gorham, Maine successfully completed a long duration validation test run demonstrating sustained high yields of the main product, levulinic acid. In 2010, the pilot plant was moved to its present location in Old Town, ME and, again, significantly re tooled.

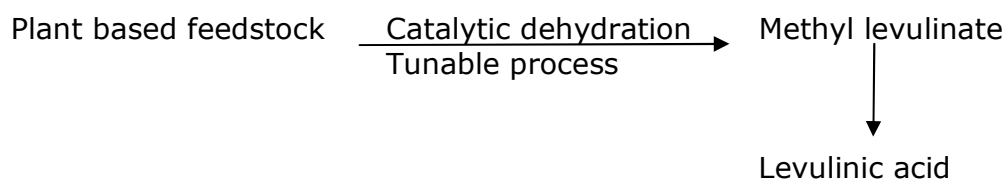
In 2012, Biofine was granted its patent on the technology. (U.S. Patent 5,608,105). This was based on process conditions that give simultaneously high yields of formic acid and levulinic acid.

The projects presently under development will use forest biomass and organic waste to produce levulinic acid for use in levulinate fuels.

Avantium

Avantium said the company's technology platform included methyl levulinate (ML), an intermediate that can be further converted into levulinic acid . ML can reportedly be produced cost effectively in tunable volumes ranging from kilo metric tonne to around 10,000 metric tonne from a commercial FDCA (furan dicarboxylic acid) plant

This innovative process provides for the first time cost competitive and high volume access to Levulinics.



Levulinic acid extraction process – Technology development

Paul Marie Ayoub of Amsterdam, Netherlands, has developed levulinic acid extracting process.

SPOTLIGHT ON SPECIALITY CHEMICAL- LEVULINIC ACID

According to the U.S. Patent & Trademark Office: "A process for the reactive extraction of levulinic acid from an aqueous mixture having levulinic acid, wherein the aqueous mixture is contacted with a liquid esterifying alcohol, the alcohol having at least four carbon atoms and is substantially water immiscible, at esterification conditions in the presence of a catalyst to form a levulinate ester, wherein the amount of the alcohol is such that the alcohol extracts the levulinate ester from the aqueous mixture.

Further, an aqueous phase, having the catalyst and a reduced levulinic acid content and an organic phase, having the alcohol and the levulinate ester, are formed."

The inventors were issued U.S. Patent No. 7,378,549.

The patent has been assigned to Shell Oil Co., Houston, USA.

NANDINI CONSULTANCY (S) PTE.LTD.,SINGAPORE

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NEWS ROUND UP - INTERNATIONAL

BASF, Yara ammonia JV

BASF and Yara (Oslo) are evaluating a possible joint investment into a world scale ammonia plant in the US Gulf Coast.



BASF is currently a major user of ammonia for its US downstream manufacturing activities and intends to further strengthen its backward integration. Yara, with its global ammonia network and market expertise, aims to strengthen its presence in the United States.

Organic peroxide



Arkema, the world's second-largest producer of organic peroxides and investment company Watan Industrial Investment (Riyadh) have agreed jointly to construct an organic peroxide plant at Al Jubail.

The joint venture will be majority owned by Arkema, which will oversee operational management and sales. The plant's start-up is slated for early 2015.

PP catalyst

W.R. Grace has agreed to acquire Dow Chemical's Unipol polypropylene (PP) licensing and catalyst business for \$500 million.

This deal would make Grace the number-two player in PP catalysts, behind LyondellBasell.

The deal includes Dow's PP catalysts manufacturing facility at Norco, LA, and customer contracts, licenses, intellectual property, and inventory. Grace currently markets its PP catalyst systems and catalysts under the Polytrack trade name.

Dow announced plans to divest the PP catalysts business in March.

Butene based facility

Perstorp (Perstorp, Sweden) is investing about 1 billion Swedish kronor (\$153.8 million) to develop a production platform at Stenungsund, Sweden—the largest investment the company has made.



The platform will be based on butene and receive feedstock from Borealis's ethane cracker at Stenungsund. Perstorp's new plant, with initial capacity for 60,000 metric tonnes per year of valeric aldehyde, is expected to be onstream in 2015. The plant's capacity can be scaled up later.

The valeric aldehyde will feed production of Perstorp's Prevalen-branded polyvinyl chloride plasticizer.

Biobased BDO

DSM announced that it has tested and approved the use of Genomatica's (San Diego) biobased 1,4-butanediol (BDO) for use in DSM's Arnitel thermoplastic copolyester, allowing DSM to increase biobased content in the high-performance engineering plastic to as much as 73%.

DSM plans to start transitioning its Arnitel portfolio to biobased BDO as soon as supplies are readily available.



Non phthalate plasticizers

Eastman has announced that it is expanding capacity of non phthalate plasticizers at its Texas City, TX, manufacturing facility.

The expansion will increase overall capacity by approximately 15% and is expected to be operational by mid-2014.

NEWS ROUND UP – INDIA

Plight of mines in Odisha

Government of India owned Orissa Mineral Development Co. with estimated reserves of 208 million metric tonnes of iron ore is sitting on them.

The top management of Orissa Minerals Development Company (OMDC) and the Odisha government are blaming each other for the delay in renewing the PSU's mining leases that had begun to expire roughly a decade ago.

OMDC's mining activities have come to a standstill despite its huge cash reserves of Rs.678 crore as of end March. The lease areas mentioned above are also estimated to hold manganese ore reserves of 44 million tonnes.

OMDC's ore production is now almost negligible, while in its heydays a decade ago, it was the country's third largest ore producer with an output of roughly 3.2 million tonnes. Only public sector NMDC and private miner Sesa Goa used to produce more than OMDC, which is a step down subsidiary of RINL, India's second largest steel PSU.

The impasse is despite the fact that renewal of the leases would give OMDC access to mineral rich areas aggregating 4365.262 hectares, located at Barbil in Keonjhar district of Orissa. If Orissa Mineral Development Co, were to resume its mining activity and regains its past glory, the country's iron ore production and exports would receive a boost.

India's iron ore production plummeted from 219 million tonne in 2009-10 to 140 million tonne in FY13 owing to a ban following the illegal mining scam. Export earnings from ore have come down to a trickle from \$6 billion in 2009-10.

Output from Reliance's KG-D6 block

The Government of India has slapped an additional penalty of \$792 million on Reliance Industries, for producing less than targeted natural gas from its eastern offshore KG-D6 block.

A notice disallowing \$792 million out of the cost already incurred on the Bay of Bengal fields was sent to RIL on November 14.

With this, a total of \$1.797 billion penalty, in the form of cost being disallowed, has been levied on RIL for producing less than targeted output during the past three years.

NEWS ROUND UP – INDIA

The company has till date spent \$10.76 billion on the block, which it can contractually recover from sale of oil and gas. It is obliged to share the profits with the government only after recouping those expenses.

The official said the cost has been disallowed, as RIL and its partners BP of UK and Canada's Niko Resources did not drill the committed number of wells, which led to output dropping by over 80% from the main Dhirubhai-1 and 3 (D1&D3) gas fields in the KG-D6 block.

D1&D3 fields have, in the first four years(2009-10 to 2012-13), produced a total of 1.853 trillion cubic feet of gas, 1.196 Tcf short of the 3.049 Tcf that RIL had committed to produce in the 2006 development plan.

But for the first year, the output has lagged the targets in all subsequent years, which has led to a huge chunk of facilities built lying utilised.

RIL had built facilities to handle 80 million standard cubic metres per day of gas from D1&D3 but the present output is just 8.78 mmscmd.

As per the production sharing contract, RIL and its partners BP and Niko Resources are allowed to deduct all of the capital and operating expenses from sale of gas, before sharing profits with the government.

The creation of excess or unutilised infrastructure impacts government's profit share and this is being sought to be corrected by disallowing part of the cost.

According to the approved field development plan, the output should have reached 80 mmscmd last fiscal.



Explosion in Tata Steel plant

Eleven Tata Steel employees and contract workers were injured after an explosion in a gas holding chamber at its factory.

The explosion caused a fire to break in the adjoining gas pipeline.

A portion of the gas holder's roof was badly damaged by the explosion.

Explosion in the LD gas holder inside its factory.

TECHNOLOGY DEVELOPMENT

Ethylene glycol process technology

Eastman Chemical and Johnson Matthey Davy Technologies (JM Davy) have developed technology for the production of ethylene glycol (EG) from synthesis gas (syngas)-based feedstocks.

Eastman says the new technology enables the production of EG from a variety of raw materials including coal, natural gas or biomass and is based on proprietary catalysts and process design developed by Eastman and JM Davy. Unlike other recent syngas based processes, this new technology does not go through oxalate intermediates. An extensive pilot plant demonstration of the new process is nearing completion and "dialogue is underway" for the first demonstration.

By eliminating oxalate intermediate, the process could also eliminate a alkyl nitrite regeneration step, which could significantly lower capital expenditure. The direct process could also avoid many side products during the oxalate hydrogenation process, which often cause product purity problems. The process could also find a foothold outside of the rapidly growing, coal based chemicals industry in China. Even in the United States, this direct syngas route starts from natural gas or C₁ chain, which could be very competitive to the ethylene or C₂ chain, based processes.

New technology for production of acetic acid

In the UK, BP announced two new technologies for the production of key petrochemical feedstocks. SaaBre™ is a new route for the production of acetic acid from syngas and Hummingbird® directly converts ethanol to ethylene through dehydration.

SaaBre's breakthrough is a process for the conversion of synthesis gas (carbon monoxide and hydrogen derived from hydrocarbons such as natural gas) directly to acetic acid in a proprietary, integrated three step process, that avoids the need to purify carbon monoxide (CO) or purchase methanol. SaaBre™ is expected to deliver a significant reduction in variable manufacturing costs and lead to capital efficiencies, compared to the carbonylation of methanol route, which has been the leading technology for several decades.

BP has a long history of successfully optimizing methanol carbonylation chemistry and the associated process, but BP believe that methanol carbonylation has reached the limits of its fundamental chemistry. So, BP decided some years ago that, to make a significant difference to the economics of manufacturing acetic acid at scale, it needed a fresh start.

Ethylene from ethanol at lower cost

`Hummingbird' is a newly developed proprietary process by BP, by which ethanol is dehydrated to produce ethylene. The new technology has lower cost and is simpler, compared to existing ethanol to ethylene technologies.

`Hummingbird' is a next generation technology, clearly differentiated from the competition. The `Hummingbird' process with its proprietary catalyst and its milder operating conditions is ultra selective, resulting in a market leading conversion of ethanol to ethylene.

Both `SaaBre' and `Hummingbird' were developed over a number of years at BP's advanced laboratories at the Hull Research and Technology Centre (HTTC), alongside its acetic acid manufacturing site, Europe's largest, at Saltend, Hull in the UK.

BP said it is actively exploring options for commercializing both technologies. `SaaBre' is planned for deployment in future acetic acid investments, whilst `Hummingbird' is a licensing play for BP.

Anti virus protein biological pesticides

The Plant Protection Institute of the Chinese Academy of Agricultural Sciences says that a team at the institute led by Researcher Qiu Dewen has successfully developed "6% oligosaccharide catenin wettable powder," the first protein biological pesticide in China that can control viral diseases of plants.

It is a protein biological pesticide that is safe for the environment and the human body and has low toxicity and no pollution. The product can help achieve the sustainable development of agriculture.

According to the Researcher Qiu Dewen, research workers have screened pathogenic fungi with weak virulence and found that alternaria tenuissima can improve the immunity of plants.

Six percent oligosaccharide catenin wettable powder is produced through the separation and purification of high activity thermal stability protein, with a high effect protein production and process and the addition of synergistic factor amino oligosaccharide.

Such protein biological pesticides can stimulate the metabolism and the immune system of plants through the induction of the resistance of plants themselves and therefore increase the resistance of farm crops.

CHINA NEWS

COAL TO OLEFIN PROJECTS IN CHINA

Today's coal to olefin (CTO) process includes coal gasification, purification of the synthesized gas, methanol synthesis, methanol to olefin (MTO), olefin separation and the preparation of saleable olefin based products.

PE and PP are the main products of most of these new plants.

At present, China has five CTO plans in operation and their combined capacity to make olefins is 2.36 million metric tonne per annum. Together, their capacities to make the olefin based products polyethylene (PE), polypropylene (PP) and MEG (mono ethylene glycol) are 400 000 metric tonne per annum, 1.76 million metric tonne per annum and 500 000 metric tonne per annum respectively.

China has around 40 CTO plants either under construction or in a preparatory state. If all of these are built and put into production on schedule, China's CTO capacity is forecast to reach 15 million metric tonne per annum by 2015 and 19 million metric tonne per annum by 2017.

Large state owned enterprises include coal enterprises such as Shenhua Group, China National Coal Group, Shaanxi Coal and Chemical Industry Group Co Ltd and Datong Coal Mine Group, oil companies like Sinopec Group and Shaanxi Yanchang Petroleum (Group) Corporation and power enterprises including Datang International Power Generation Co Ltd and China Power Investment Corporation. Private enterprises include Legend Holdings Limited and Fude Energy Co Ltd.

China's CTO plants new in operation

Producer	Capacity (kt/a)	Startup time	Process technology	Remarks
Shenhua Baotou Coal Chemical Co Ltd	600	Aug 2010	DMT	The plant was put into commercial operation on January 1, 2011 and its polyolefin output has reached 500 000 metric tonne in 2011 and 546 000 metric tonne in 2012
Datang Inner Mongolia Duolun Coal Chemical Co Ltd	460	Oct 2010	MTP	A plant using inferior lignite as raw material was put into trial production in March 2012 and gradually achieved an operating rate of 70% in the second half of 2012
Shenhua Ningxia Coal Industry Group	500	Oct 2010	MTP	Plant was put into trial production in April 2011 and its PP output was 170 000 metric tonne in 2011 and 405 000 metric tonne in 2012.
Sinopec Zhongyuan Petrochemical Co Ltd	200	Oct 2011	SMTO	The plant uses outsourced methanol as raw material
Ningbo Heyuan Chemical Co Ltd	600	Feb 2013	DMTO	This Fude Energy Co Ltd subsidiary uses outsourced methanol as raw material and its olefin based products are MEG and PP

Some of China's CTO plants being built or planned for construction

Producer	Location	Capacity (kt/a)	MTO technology	Downstream products
Pucheng Clean Energy Chemical Co Ltd	Pucheng of Shaanxi province	700	DMTO-II	PE and PP
Wison (Nanjing) Clean Energy Co Ltd	Nanjing of Jiangsu province	295	MTO / OCP	Butanol and octanol
ZhonAn United Coal & Chemical Industry Co Ltd	Huainan of Anhui province	600	S-MTO	PE and PP
Zhongtian Hechuang Energy Co Ltd	Erdos of Inner Mongolia	650 x 2	SMT0 / OCC	PE and PP
Sinopec Zhongyuan Petrochemical Co Ltd	Hebi of Henan province	600	S-MTO	PE and PP
Sinopec Guizhou Bijie Zhijin	Zhijin of Guizhou province	600	S-MTO	PE and PP
China Power Investment Corporation / Total	Erdos of Inner Mongolia	800	MTO / OCP	Polyolefin
Yili Coal Electrochemistry Co Ltd of China National Coal Group	Yili of Xinjiang region	600	DMTO	PE and PP
Mengda New Energy Chemical Co Ltd of China National Coal Group	Erdos of Inner Mongolia	600	DMTO	PE and PP
Shaanxi Yulin Energy Chemical Co Ltd of China National Coal Group	Yulin of Shaanxi province	600	DMTO	PE and PP
Zhongmei Yulin Energy Chemical Co Ltd of Shaanxi Yanchang Petroleum (Group) Co Ltd	Yulin of Shaanxi province	600	DMTO / OCT	PE and PP
Dow-Shenhua Shaanxi Yulin Project	Yulin of Shaanxi province	2 200	MTO	Butanol, octanol, EO/EG, PE,PP, n-propanol, ethanalamine, acrylic acid, etc
Shenhua Shaanxi Methanol Downstream Processing Project	Yulin of Shaanxi province	600	DMTO	PE and PP
Shenhua Ningxia Coal Industry Group	Yinchuan of Ningxia region	500	MTP	PP
Shenhua Baotou Coal Chemical Co Ltd	Baotou of Inner Mongolia	600	DMTO	-
Shenhua xinjiang coal based New Material Project	Urumqi of Xinjiang region	680	DMTO	PE and PP
Zhejiang Xingxing New Energy Technology Co Ltd	Jiaxing port of Zhejiang province	600	DMTO	PE and PP
Jiutai Energy (Zhungeer) Co Ltd	Erdos of Inner Mongolia	600	UOP	PE and PP
Shanxi Coking Co Ltd of Shanxi Coking Coal Group Co Ltd	Hongdong of Shanxi Province	600	DMTO	PE and PP
Datong Coal Mine Group	Datong of Shanxi Province	600	DMTO	PE and PP

Courtesy: China Chemical Reporter

Melamine plant

Eurotecnica, Italy, the world leading technology provider for melamine production plants, has been selected for the implementation of a 180 000 metric tonne per annum high pressure melamine complex in China's Xinjiang region, to be made in steps. With an initial capacity of 60 000 metric tonne per annum, single reactor Eurotecnica sets a new frontier in the melamine industry.

Within the frame of the implementation of this complex, Eurotecnica will supply license, basic engineering design, proprietary equipment and technical assistance.

After having signed a deal for two melamine plants in Brazil and in China, Eurotecnica high pressure melamine technology has been once again, chosen for its efficiency, reliability and zero pollution.

Eurotecnica began to commercialise its proprietary high pressure non catalytic melamine technology in 1998, when the first contract with Zhong Yuan Da Hua was signed.

Since then, Eurotecnica has signed 10 melamine contracts with 7 different clients / end users.

Methanol to gasoline plant

In mid October, a 100 kt/a methanol to gasoline project in Xinjiang Xinye Energy Chemical Group was put into operation and started to produce 93 octane gasoline.

The project adopts patented one step methanol to gasoline technology of the Sedin Engineering Co Ltd., of China National Chemical Engineering Co Ltd, and it is also constructed by Sedin Engineering Co Ltd under an EPC contract.

Sedin Engineering Co., Ltd located in Taiyuan city of Shanxi province, focuses on engineering design, engineering investigation, project supervision, project contracting, etc.

Nitric acid

On October 26, a 150 kt/a nitric acid expansion project in Shandong Liaherd Chemical Industry Co., Ltd came on line. Construction on the project was started in 2012 and it has expanded Liaherd's capacity for nitric acid from the original 320 kt/a to the current 470 kt/a.

AGRO CHEMICAL PAGE

New grass to curb greenhouse gas emissions

A new kind of grass has been developed with the joint efforts of scientists from Japan and Colombia to curb **greenhouse gas emissions** caused by chemical fertilisers.



Scientists from Japan's International Research Centre for Agricultural Sciences and the Colombian International Centre for Tropical Agriculture found a species of grass that originated in **Africa** and grows in **Latin America** called brachiaria.

This grass releases substances from its roots that curb activities of micro organisms and sharply cuts the amount of nitrous oxide emitted.

The new species of grass, which was developed based on hybridisation between brachiaria and its relative species, has the emission curbing function. It also provides more nutrition to cows compared to existing grass species and promotes their growth, said the researchers.

Most of the widely used nitrogen fertilisers could turn into nitric acid in soil and some of this nitric acid turns into nitrous oxide, a greenhouse gas with 300 times more warming power than carbon dioxide.

Researchers have already started to plant the grass in South America.

New wrapping paper to grow vegetables

A UK based company has developed a wrapping paper that can be used to grow vegetables by simply placing the paper into some soil, adding water and waiting for nature to take its course.

The wrapping paper, called Eden's Paper, contains seeds which grow into vegetables once planted.



Currently, there are five wrapping papers to choose from, these have the seeds of carrots, tomato, broccoli, chilli and onion all embedded into them.

For the past 12 months the company has been testing and refining Eden's Paper. The product is made from 100 per cent recycled paper. The seeds are embedded on the back of the wrapping paper in seven layers of biodegradable tissue paper.

The Wrapping paper and tissue paper layers use no glues to hold them together, as glues are harmful to the soil.

The layers of printed paper with the wrapping paper designs on, and layers of tissue paper containing the seeds are held together through an embossing process carried out during manufacture.

Each layer of paper is interlocked with the one above it, sandwiching the seeds between them. This means no seeds can fall out of the paper and ensures that no glues are used in the manufacturing process to bind the layers together.

Even the ink used in the printing process is vegetable based, so this is an entirely eco friendly product.

MOLASSES & STARCH BASED CHEMICAL PROJECTS

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PHARMA PAGE

ARTIFICIAL BLOOD SUBSTITUTE

Scientists have created an artificial blood substitute with a protein extracted from marine worms, rather than based on synthetic haemoglobins.

Researchers led by Professor Radu Silanghi-Dumitrescu from Babes-Bolyai University have been testing the blood substitute in both mice and in cultured cells.



Initial findings suggest that many of the adverse effects normally associated with either perfluorocarbon or haemoglobin based oxygen carrier substitutes can be eliminated or at least minimised by using hemerythrin protein. Human blood only has a shelf life of a few weeks. It also needs to be matched to the recipient's blood type and while the risks of disease transmission can be minimised by testing, dangers still present if the donor has been recently infected.

These facts have led to huge efforts to build a better blood substitute, Medical Xpress reported. The new efforts from researchers, which instead uses the hemerythrin, has much lower free radical stress related reactivity than haemoglobin.

The researchers looked at these effects both in human leukocytes and human umbilical cells. When compared with standard glutaraldehyde polymerised bovine haemoglobin, their new substitute resulted in much healthier cultures.

Researchers said their goal is not to develop a permanent replacement solution but rather something that could be used to bridge a critical situation for the few hours or days it takes for the body's natural mercenaries to take over.

Hemerythrin itself is not actually a heme molecule in the strict sense. It is virtually colourless when deoxygenated, but when bound with oxygen, it turns a violet to pink. Hemerythrin has many other unique properties which still need to be explored.

ENERGY PAGE

TECHNOLOGY FOR FUEL FROM CITY GARBAGE

US-based Solena Fuels claims that through plasma gasification and vitrification process, a technology developed by NASA, the garbage could be converted to fuel.

The 5,000 tonnes of garbage generated in a city per day has the potential to be converted to 12 crore litre of aviation fuel and 4.5 crore litre of diesel per year.

The technology uses a mixture of feedstock to power its systems, including agricultural wastes, urban wastes or any other matter that is carbon based.

Under the technology, segregation of garbage at source is not necessary. It is a complete recycling process without producing any harmful products.

The feedstock is prepared and fed into a plasma reactor, which holds one or more plasma torches, which heat the reactor to roughly 5,000 degree celsius. The high temperature plasma field is used to transform all organic components into a clean and useful synthetic gas" (biosyngas).

Since the chemistry of the reactor is controlled, the major gases formed are carbon monoxide and hydrogen. Once formed, biosyngas is sent to a gas conditioning island, where it is quenched very quickly and rapidly cooled. This cooling causes precipitation of volatile metals into the slag. This first cleaning stage removes any residual sulphur and chlorides and the next step removes mercury.

Almost 99 per cent of the particulate matter will be removed. Once this phase is completed, the syngas would be compressed and sent to a gas turbine to produce renewable power and steam in a combined cycle or the biosyngas would be delivered to a Fischer Tropsch process to produce biofuels, including biojet fuel, bio naphtha and biodiesel.

It is a complete recycling process without production of any harmful by products. All processes are indoor and so there is no disturbance to the surroundings. The fuel produced is 'ready to use' and no modifications to engines would be required.

This could significantly reduce greenhouse gas emissions, emanating from open land dumps and the project would eliminate the need for landfills or garbage dumps.

POWER FROM GARBAGE – EFFORTS OF JINDAL ITF

Having processed a million tonnes of garbage since January 2012 in Timarpur in the Okhla area of New Delhi and generated useful electricity, Jindal ITF has set its eyes on replicating the model in other cities.

Efforts are on to take up initiatives in Punjab.

Jindal ITF, part of the Rs 7,500-crore listed Jindal SAW, has sourced German technology to efficiently get rid of as much of the city's solid waste as possible and in the bargain come up with some energy.



In the case of the Timarpur Okhla solid waste management plant, a daily processing of 1,300 tonnes of solid waste is on. Since January last year, 190 million units of electricity have been generated and 158 million units supplied to the national grid, Negi told Business Line here recently.

The company's efforts in integrated waste management have recently won it the excellence in solid waste management award from the Confederation of Indian Industry and A.P. Technology Development Corporation.

The project is on a private public partnership mode with the Ministry of Renewable Energy and the Municipal Corporation of Delhi involved. It is registered with the United Nations Framework Convention on Climate Change for earning carbon credits.

A total investment of Rs 285 crore has gone into the project so far.

SOLAR POWER PROJECTS IN JAPAN

Japan's government banked on solar power to help meet the shortfall in electricity supply after the Fukushima disaster in 2011 .

To encourage solar investment ,Government of Japan introduced generous subsidies more than a year ago, sparking a rush from developers, who came forward with plans, that would have supplied the equivalent to 21 nuclear reactors.

In contrast to the experience in countries such as Spain and Britain, where subsidies sparked solar booms that strained government finances, in Japan developers are struggling to deliver.



The failure of solar developers to deliver on planned projects in Japan will cost the country's utilities close to \$3.5 billion annually in additional coal and gas imports to generate power.

The promise of turning a quick profit from subsidized solar power encouraged speculative developers lacking the experience and expertise needed to deliver in Japan, industry experts say.

Less than a fifth of the projects the government deemed fit for subsidies are supplying power to the grid, as developers struggle with problems ranging from lack of funds, grid capacity limitations, land permit issues, wait lists for Japanese brand equipment and a shortage of qualified technicians.

Solar projects can take up to three years to complete, so some are still being built. But more than half of the approved projects may never be built.

As of July 2013, only 3,916 megawatts of the 22,068 megawatts of solar capacity approved since subsidies were introduced in July 2012, is selling power to the grid, according to data issued on Monday by Japan's Ministry of Economy, Trade and Industry (METI).

Hydel projects of up to Rs 1,000 cr to be exempted from CEA clearance



All hydel projects with investment requirement of up to Rs 1,000 crore may soon be exempted from the mandatory techno economic clearance of the Central Electricity Authority.

The power ministry is set to authorise state governments to undertake an appraisal of such hydropower projects on their own.

Currently, exemption is available only to projects with investment requirement of up to Rs 500 crore as per the existing policy implemented in 2006.

The proposal to delegate more powers to states in appraisal of hydropower projects is part of the Centre's policy to deregulate the sector.

India has the potential to generate 1.5 lakh mw of electricity from its hydro resources. However, it has harnessed only a quarter of that potential. The proposed policy change will help states, including Himachal Pradesh, Uttarakhand, Arunachal Pradesh, Sikkim and J&K to expedite implementation of hydropower projects.

Niko to abandon fully exploited gas block in Surat

Canadian oil and gas exploration company Niko Resources is set to abandon its gas block in Surat, Gujarat, as the fields have been fully exploited.

This was one of the three producing blocks from the contracts signed under the country's nine oil and gas auctions. The other two are Reliance Industries operated D6 block and Gujarat State Petroleum Corp. operated Cambay onshore block. So far, 254 contracts have been signed.

Officials at both the Directorate General of Hydrocarbons and Niko said that the process to abandon the block had been initiated. It is a long process, as a lot of issues, including returning the land to the owners.

This block, which was awarded to Niko in the second round of the New Exploration Licensing Policy (NELP), started production in 2004, making it the first NELP block to go into production.

Niko has made investments of close to \$70 million in the block and produced 24.8 billion cubic feet of gas since 2004.

Niko will now be left with interests in three blocks, of which, two are in partnership with Reliance Industries and BP.

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**PUBLICATION ON
"RECENT PROCESS DEVELOPMENT EFFORTS
FOR BIO BASED CHEMICALS FROM RENEWABLE SOURCES"**

Nandini Consultancy Centre, a renowned organization of chemical engineers and chemical business consultants based at Chennai and Singapore (www.nandiniche.com) has released an investigative and updated publication on "Recent Process Development Efforts For Bio Based Chemicals from renewable sources".

Background

In recent times, bio technology based process routes are being developed across the world for several chemicals, which are presently produced from petrochemical feedstock. Such new process routes are eco friendly and find better consumer acceptance and therefore, they are bound to become popular with steady increase in demand in the coming years.

Nandini Consultancy Centre has identified the following 29 products for which bio technology routes have been developed or are being developed by organizations abroad.

Bio 1,3 propanediol	Bio metha methyacrylate
Bio 1,4 butanediol	Bio methanol
Bio acetic acid	Bio monoethylene glycol & Bio polyethylene terephthalate
Bio acrylic acid	Bio n butanol
Bio adipic acid	Bio n propanol
Bio butadiene	Bio para xylene
Bio caprolactum	Bio Poly hydroxyl alkanoates
Bio dicarboxylic acid	Bio polybutylene terephthalate
Bio epichlorohydrin	Bio polylactic acid
Bio EPDM	Bio propylene
Bio ethylene	Bio propylene glycol
Bio formic acid	Bio succinic acid
Bio fuel from agricultural waste	Bio syngas
Bio levulinic acid	Bio thermoplastics
Bio glycolic acid	

Highlights of process development efforts and selected patent details for the above products are discussed in this book.

This book would be of immense benefit to the research and development organizations as well as chemical and biotech industries, which are interested in venturing into new projects based on modern, eco friendly bio technology based process routes, appropriate to the Indian conditions.

The book is available in hard copy (spiral bound).

Delivery The book would be sent on receipt of order along with the payment by courier.

Price Rs.3000/-(Rupees three thousand only) inclusive of courier charges.

The cheque should be drawn in favour of Nandini Consultancy Centre Pvt.Ltd., payable at Chennai and sent to the following address;

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Email:mail@nandiniche.com, nsvnkatchennai@gmail.com

EX FACTORY PRICE OF CHEMICALS IN CHINA

IN NOVEMBER 2013

Product	Top	Bottom	Average
RMB per tonne			
1,2-Dichlorobenzene	10800	10500	10600
Acetic Acid, Glacial	5200	5200	5200
Acetone	11400	6300	9009
Acetonitrile	100000	12000	27292
Acrylamide	45000	16500	29100
Acrylic Acid	17000	16500	16750
Acrylonitrile-Butadiene-Styrene	24000	5000	16074
Acrylonitrile-Styrene	15800	14200	15000
Active Carbon	3500	3500	3500
Adipic cid	12000	12000	12000
Aluminum Hydroxide	5500	3300	4075
Aluminum Potassium Sulfate	1400	1400	1400
Ammonium Chloride	10000	1300	2591
Antimony Trioxide	50000	45000	47500
Bakng Soda	2400	1450	1836
Barium Carbonate	16000	1700	4514
Barium Chloride	2400	2400	2400
Barium Stearate	11800	6600	8600
Barium Sulfate	2200	2200	2200
Bisphenol A	17800	10500	13478
Borax (Sodium Borate)	4900	2750	3642
Boric Acid	7400	4700	5667
Butyl Acetate	9000	7770	8385
Butyl Acrylate	16500	16500	16500
Calcium Carbonate	5000	300	1610
Calcium Hydroxide	5000	1500	3250
Calcium Hypochlorite	7200	6800	7000
Caprolactam	28500	19700	22000
Carbon bisulfide	4050	4050	4050
Carbon Tetrachloride	11000	11000	11000
Castor Oil	12700	11500	12067
Caustic Soda	3300	2450	2817
Chloroform	5800	3500	4833
Citric Acid	7000	7000	7000
Cleanser AES	9300	8500	8900
Copper Sulfate	18000	18000	18000
Coumarone	10800	5000	7900
Cyclohexanone	13500	13500	13500
DBP	12500	12500	12500
Decabromodiphenyl Oxide	29000	29000	29000
Dichloroethane	6500	3500	4356
Dichloromethane	7000	3200	4521

EX FACTORY PRICE OF CHEMICALS IN CHINA IN NOVEMBER 2013

Product	Top	Bottom	Average
	RMB per tonne		
Dicyan Diamide	16500	13000	14300
Diethanol Amine	13000	11200	12300
Diethylene Glycol	10200	5800	8638
DMF	7600	6000	6750
Dodecanic Acid	8300	8200	8250
DOP	10400	10400	10400
EDTA	32000	32000	32000
EDTA, Tetrasodium Salt	21800	10500	18343
Emulsifier	28000	9000	17500
Epichlorohydrin	18500	11500	13213
Epoxy Soybean Oil	12800	9800	11400
Ethanol	6300	6300	6300
Ethyl Acetate	7300	5700	6663
Ethyl Acetoacetate	17000	11000	13383
Ethyl Vinyl Acetate	15000	12500	13433
Ethylene Diamine	31000	15500	23680
Ethylene Glycol Monobutyl Ether	14300	12000	13180
Ethylene Glycol Monoethyl Ether	13100	12500	12800
Ethylene Glycol Monomethyl Ether	13200	10500	11440
Formaldehyde	4000	1600	2313
Formic Acid	8500	6500	7500
Glycerin Ind.grade	5200	5000	5100
Glycerin Pharma grade	8500	4500	6546
Glyoxal	8200	6900	7367
High Density Polyethylene 5502	12100	11600	11900
High Density Polyethylene 5000S	12300	12300	12300
High Impact Polystyrene	14000	14000	14000
Hydrazine Hydrate	33000	20000	25573
Hydrochloric Acid	600	450	513
Hydrofluoric Acid	4500	4200	4400
Hydrogen Peroxide	1600	1350	1475
Hydroquinone	56000	34000	45250
Iodine, Purified	700000	225000	385000
iso-Propanol	7800	7800	7800
Kaolin	2500	1680	2090
Lactic Acid	8500	8500	8500
Linear Low Density Polyethylene	12300	10000	11150
Lithopone	4800	4800	4800
Low Density Polyethylene N150	20000	11500	14494
Low Density Polyethylene Q200	20000	11500	14494
Magnesium Carbonate	28000	5000	15250
Magnesium Oxide	52000	13500	30850
Maleic Anhydride	12000	11800	11900
MDI	21800	21800	21800

EX FACTORY PRICE OF CHEMICALS IN CHINA IN NOVEMBER 2013

Product	Top	Bottom	Average
RMB per tonne			
Methanol	5000	3200	3880
Methyl Acetoacetate	15500	14000	14750
Methyl Ethyl Ketone (MEK)	11500	8900	10033
Monoethanol Amine	12500	12000	12250
Monoethylene Glycol	10500	6200	8690
n-Butanol	12500	11500	12000
Nickel Sulfate	34000	34000	34000
Nitric Acid	4000	1000	2629
Oxalic acid	6500	3500	5200
Paraffine	12000	9000	10412
Pentaerythritol	10500	10500	10500
Phenol	12000	12000	12000
Phosphoric Acid	5500	5300	5400
Phthalic Anhydride	12500	7800	10860
Polyamide 6	31000	2800	21267
Polyamide 66	33000	23500	29500
Polycarbonate	29000	23000	26000
Polyethylene Glycol	18800	12000	13290
Polypropylene T30S	10500	10500	10500
Polypropylene T300	11900	10800	11350
Polypropylene J340	12000	12000	12000
Polyvinyl Alcohol	12800	12800	12800
Polyvinyl Chloride	15000	7500	10260
Potassium Carbonate	7100	5450	6275
Potassium Chloride	3400	1800	2800
Potassium Dichromate	18000	16300	17150
Potassium Hydroxide	8900	5600	7675
Potassium Iodide	280000	54000	188500
Potassium Nitrate	7500	4300	5600
Potassium Permanganate	13000	13000	13000
Propionic Acid	13000	12500	12750
Propylene Glycol Ind, grade	13500	10600	12050
Propylene Glycol PHARMA GRADE	16500	9800	12983
PS, GPPS 666D	14200	12800	13500
PS, GPPS PG33	14200	12800	13500
Pure Benzene	11500	9000	10250
Pure Pyridine	37000	24500	31500
Resorcinol	53000	53000	53000
Rosin	17000	7200	12283
Rubber Antioxidant 4010NA	13000	13000	13000
Rubber Antioxidant 264	36000	32000	34000
Rubber Antioxidant MB	300000	300000	300000
Rubber Curing Accelerator DM	12000	12000	12000
Rubber Curing AcceleratorD	200000	200000	200000

EX FACTORY PRICE OF CHEMICALS IN CHINA IN NOVEMBER 2013

Product	Top	Bottom	Average
RMB per tonne			
Salicylic Acid	15000	12500	13750
Silica White	56000	4000	25420
Soda Ash	3900	1300	1878
Sodium Acetate	1400	1400	1400
Sodium Benzoate	12300	9800	11050
Sodium Bromide	25500	16000	21667
Sodium Dichromate	11800	11800	11800
Sodium Hexametaphosphate	8500	3400	6920
Sodium Hydroxide	6800	5500	6150
Sodium Nitrate	3800	2300	2700
Sodium Nitrite	3700	2500	3133
Sodium Sulfate	650	650	650
Sodium Sulfide	3300	2250	2775
Sodium Tripolyphosphate	9000	3800	6054
Stearic Acid	9000	7800	8660
Styrene	14000	10500	12250
Sulfonic Acid	12000	12000	12000
Sulfuric Acid	730	600	660
Talcum Powder	1000	550	717
Tetrachloroethylene	6800	6800	6800
Tetrahydrofuran (THF)	33000	2100	21569
Thiourea	10500	10500	10500
Titanium Dioxide R902	22000	22000	22000
Titanium Dioxide R930	30000	20500	24500
Toluene	10000	8600	9300
Tributyl Phosphate	16000	15000	15500
Trichloroethylene	8500	7000	7550
Triethyl Amine	12000	12000	12000
Trimethylolpropane (TMP)	19000	14500	16825
Trisodium Phosphate	2800	1500	2367
Turpentine Oil	14800	10500	12767
Urea	2700	2300	2575
Urotropine	7500	7000	7250
UV Absorber	78000	65000	70333
Vat Powder	7200	7200	7200
Xylene	10400	10400	10400
Zinc Oxide	26000	6500	16914
Zinc Stearate	14500	6800	9533
Zinc sulphate	8000	3000	4740

TENDER

S. NO	NAME OF THE COMPANY	PRODUCT NAME	QUANTITY IN MT/KL/NOS	TENDER NO. & DATE
1	Mishra Dhatu Nigam Ltd P.O:Kanchanbagh, Hyderabad-500 058,Andhra Pradesh	Pure cold rolled niobium strips Hafnium metal: end trims fromsheets/strips Ferro silicon (lumps) Ferro vanadium (FeV) Ferro Molybdenum (FeMo)	3650 kgs 370 kgs 30 tonnes 5 tonnes 25 tonnes	
2	The Kerala Minerals and Metals Ltd Sankaramangalam, Chavara-691 583 Kollam,Kerala	Sodium silicate		Sodium silicate_KMML_10519_1
3	Tamil Nadu Industrial Explosives Ltd Factory-TEL Post,Vellore-632 059	Ammonium nitrate	500 tonnes	
4	Oil India Ltd P.O. Duliajan-786 602 Assam	Potassium chloride, clay inhibition agent Oil soluble demulsifier (OSD) for regular use at oil field	250 tonnes 144 tonnes	SDG1308P14/01 (08/01/2014) SSG1550P14/01 (08/01/2014)
5	Karnataka Soaps & Detergents Ltd Sandal City, P B NO.5531,Bangalore Highway, Bangalore-560 055	Diethyl phthalate (DEP) Palm fatty acid distillate Palm kernel fatty acid distillate Oil of vetiver Caustic soda lye	54 tonnes 1000 tonnes 600 tonnes 1000 kgs 400 tonnes	
6	Travancore Titanium Products Ltd Post Box No.1, Kochuveli, Thiruvananthapuram-21, Kerala	Caustic potash / Potassium hydroxide flakes Atomised aluminium powder	5000 Kgs 6000 Kgs	2013_TTPL10611_1 2013_TTPL_10622_1
7	Tamil Nadu Newsprint And Papers Ltd Kagithapuram-639 136 Karur Dist.Tamil Nadu	Sodium silicate	900 tonnes	1314 305191
8	Rail Refractory Company Ltd Salem-636 005	Graphite-92% FC Graphite-93% FC	218 tonnes 100 tonnes	S/T-18/13-14
9	The Mysore Paper Mills Ltd Materials Division,Paper Town, Bhadravati-577 302,Karnataka	DAP Urea	38 tonnes 56 tonnes	1406-13 FMT/PLZ 1407/13 FMT/PLZ
10	Tamilnadu Newsprint And Papers Ltd Kagithapuram-639 136 Karur Dist. Tamil Nadu	Bleached hardwood sulphate pulp with min 85% brightness (Non FSC) Alkating sizing chemicals (AKD) Morpholine -PH booster	2000 ADMT As per tender 9,300 ltrs	1314 305767 1314 305653 1314 305718
11	Oil India Ltd 4, India Exchange Place, Kolkata-700 001	Bitumen hard grade 30/40		SKI1885P14
12	Hindustan Paper Corporation Ltd Nagaon Paper Mill, Kagajnar-782 413,Morigaon, Assam	Alkyl ketene dimer (AKD)		

CHEMICALS IMPORTED AT THE CHENNAI PORT

DURING THE MONTH OF OCTOBER 2013

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CATEGORY: ORGANIC CHEMICALS				
1-Chloro-6,6-Dimethyl-2-Hepten-4-Yne	1000	Kgs	5306742	China
1,1,3,3-Tetramethylguanidine	1020	Kgs	350115.49	China
1,1-Cyclohexane Diacetic Acid Monoamide	30000	Kgs	19524714	China
1,1-Cyclohexane Diacetic Acid Monoamide	15000	Kgs	9279072	China
1,1-Cyclohexane Diacetic Acid Monoamide	15000	Kgs	9097272	China
1,1-Cyclohexane Diacetic Acid Monoamide	15000	Kgs	9097272	China
1,1-Cyclohexane Diacetic Acid Monoamide	24000	Kgs	14555635.2	China
1,1-Cyclohexane Diacetic Acid Monoamide	24000	Kgs	14555635.2	China
1,1-Cyclohexane Diacetic Acid Monoamide	5000	Kgs	2984045	China
1,2 Dimethoxy Ethane	5760	Kgs	1037059.92	China
1,3-Dicyclohexyl Carbodiimide	12800	Kgs	5256201.6	China
1,3-Dicyclohexyl Carodiimide	12800	Kgs	5256201.6	China
1,3-Dicyclohexyl Carodiimide	12800	Kgs	5256201.6	China
2-Butyl-4-Chloro-5-Formyl Imidazole	5000	Kgs	7030011.7	China
2-Chloronicotinic Acid	6000	Kgs	5101303.46	China
2-Ethyl Anthraquinone	2000	Kgs	785998.16	Singapore
2-(Ethylsulfonyl)H-Imidazo[1,2-A] Pyridine-3-Sulfonamide 99%	2000	Kgs	10761146	China
2-Heptanol	1600	Kgs	1082558.4	China
2-Methoxy-5-Sulfamoyl Methyl Benzoate	1000	Kgs	701823.75	China
2-Methyl-2-Butanol	990	Kgs	280242.48	China
2-Thiophene Ethylamine	5000	Kgs	13740671.25	China
2-Hydrazine-4-Methyl Benzothiazole 98 Pct Min (Hmbt)	16000	Kgs	8557366.4	China
2,2-Dibromo-3-Nitrilopropionamide	5000	Kgs	1816295.63	China
2,2-Dibromo-3-Nitrilopropionamide(Dbnpa)	10000	Kgs	2937660.75	China
2,2-Dithiosalicylic Acid	3000	Kgs	1725544.6	China
2,3-Difluoro-5-Chloropyridine 96% Min	6250	Kgs	8598445.63	China
2,4-Dichloro-5-Fluoro Acetophenone 99.5% Min	4000	Kgs	2270520.4	China
2,4-Dichloro-5-Fluoro Acetophenone 99.5% Min	10000	Kgs	5676301	China
2,4-Dichloro-5-Fluoro Acetophenone	18000	Kgs	9799846.82	China
2,5-Dihydroxy-1,4-Dithiane	5000	Kgs	3045150	China
2,6-Dichloro-5-Fluoro-3-Pyridinecarbonit	925	Kgs	3659756.21	China
2,6-Dichloro-5-Fluoro-3-Pyridinecarbonit	200	Kgs	791298.64	China
2,2(1,1,1,2-Tetrafluoroethane)(Iso Tank Container)	15985.8	Kgs	3774053.21	USA
3,4-Difluoronitrobenzene	2000	Kgs	1985175.2	China
3,4-Dichlorophenyl Isocyanate 98 % (Industrial Chemical)	3000	Kgs	1118206.35	China
3,4-Dihydroxy 5 Nitrobenzaldehyde	550	Kgs	2206404.34	China
4,5-Dimethyl-1,3-Dioxol-2-One	300	Kgs	695930.4	China
4-Bromomethyl -2-Cyano Biphenyl(Br-Otbn)	1500	Kgs	1203493.28	China
4-Bromomethyl -2-Cyano Biphenyl(Br-Otbn)	1000	Kgs	802328.85	China
5 Amino-3-Cyano-1-(2,6 Dichloro-4-Trifluoro Methylphenyl) Pyrazole 96%	500	Kgs	1482074	China
5-Amino-1h-Imidazole-4carboxamide Hydrochloride	100	Kgs	1363323.25	China
5-Fluoro Cytosine	1000	Kgs	4201170.75	China
5,6-Dimethoxy-1-Indanone	1000	Kgs	4703974	China
Acetonitrile 99.9% Min	1.28	Mts	203697.45	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Acetophenone 0546503 (Organic Chemical)	400	Kgs	115209.11	Germany
Acetyl Chloride Adc S.No.219	15200	Kgs	1101935.86	Germany
Acetyl Chloride Adc S.No.219	15200	Kgs	1101935.86	Germany
Acetyl Chloride Adc S.No.219	15200	Kgs	1101935.86	Germany
Acetylene Black 50% Compressed	6160	Kgs	817238.27	South Africa
Acrylamide (Organic Chemicals)	4000	Kgs	728735.2	China
Adipic Acid	15	Mts	1593984.53	China
Alkyl Ketene Dimer - Flakes	32000	Kgs	4064477.01	Hong Kong
Alkyl Ketene Dimer - Flakes	8000	Kgs	1016020.78	Hong Kong
Alkyl Ketene Dimer - Flakes	16000	Kgs	2032238.51	Hong Kong
Allyl Cyclohexyl Propionate (2-Propenyl 3-Cyclohexylpropanoate)	720	Kgs	511728.2	China
Allyl Cyclohexyl Propionate (2-Propenyl 3-Cyclohexylpropanoate)	720	Kgs	511728.2	China
Benzothiazyl-2-Cyclohexyl-Sulfenamide	30000	Kgs	5932179.45	China
Benzothiazyl-2-Cyclohexyl-Sulfenamide	15000	Kgs	2949492.9	China
Benzotrichloride	60000	Kgs	5219478	China
Bis(Trimethylsilyl)Trifluoroacetamide	1500	Kgs	3601003.5	China
Coated Sodium Butyrate	6000	Kgs	1583478	China
Cyclohexane 1,1 Diacetic Acid Monamide	15000	Kgs	9046368	China
Cysteamine Hcl (Flakes)	17280	Kgs	3629972.97	China
Denakup 400-1100 (Calcium Meta Silicate)	4000	Kgs	1154805.49	Japan
Desmodur 0118 I Fused(Isocyanate)	15750	Kgs	2636787.43	China
Desmodur 3133 (Di Isocyanate)	18000	Kgs	2729181.6	China
Desmodur 3133 (Di Isocyanate)	18000	Kgs	2729181.6	China
Desmodur 3133 (Di Isocyanate)	18000	Kgs	2729181.6	China
Desmodur 3133 (Di Isocyanate)	18000	Kgs	2729181.6	China
Di Methyl Formamide 99.8%	15.2	Mts	1003479.64	China
Dichlorofluoroethane	40	Mts	4781982.36	China
Dichlorofluoroethane Hcfc-141b	40	Mts	4781982.36	China
Dicyandiamide	20000	Kgs	2436120	China
Dicyandiamide	20000	Kgs	2436120	China
Dicyandiamide	19250	Kgs	2210028.98	China
Dicyanodiamide (Dicyandiamide)	20000	Kgs	2371318.4	China
Dicyanodiamide (Dicyandiamide)	20000	Kgs	2362763.7	China
Dicyanodiamide (Dicyandiamide)	20000	Kgs	2362763.7	China
Diethyl Malonate	3400	Kgs	635154.66	China
Diethyl Malonate (Intermediate Chemicals)	16000	Kgs	2845582.08	China
Diisopropylcarbodiimide	3	Kgs	25130.82	China
Dimethyl Carbonate- [Adc List S.No:570]	15900	Kgs	1101406.52	China
Dimethyl Carbonate- [Adc List S.No:570]	100	Kgs	6927.09	China
Dimethyl Acetamide	30400	Kgs	2644535.52	Korea
Dimethyl Acetamide	30400	Kgs	2592722.52	Korea
Dimethyl Carbonate	2600	Kgs	184479.78	China
Dimethyl Formamide	1800	Kgs	121536.94	Belgium
Dimethyl Formamide	14200	Kgs	958791.38	Belgium
Dimethyl Formamide	1800	Kgs	121536.94	Belgium
Dimethyl Formamide	12000	Kgs	706247.55	Saudi Arabia
Dimethyl Formamide	15200	Kgs	989252.18	China
Dimethyl Formamide	15200	Kgs	989252.18	China
Dimethyl Formamide	15200	Kgs	964443.34	China
Dimethyl Formamide - Dmf	16	Mts	1010808	Saudi Arabia
Dimethyl Formamide - Dmf	8	Mts	505404	Saudi Arabia
Dimethyl Formamide 99.9 Pct Min	30400	Kgs	1939740.55	China
Dimethyl Formamide 99.9 Pct Minimum	7600	Kgs	437217.28	China
Dimethyl Formamide 99.9 Pct Minimum	6080	Kgs	359577.61	China
Dimethyl Formamide 99.9 Pct Minimum	15200	Kgs	874434.57	China
Dimethyl Formamide 99.9 Pct Minimum	4180	Kgs	240469.51	China
Dimethyl Formamide 99.9 Pct Minimum	7600	Kgs	437217.28	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS	COUNTRY
CHEMICALS IMPORTED				
Dimethyl Formamide 99.9 Pct Minimum	11020	Kgs	633965.06	China
Dimethyl Formamide,	7000	Kgs	483163.8	Saudi Arabia
Dimethyl Sulfoxide	8280	Kgs	817520.06	China
Dmapma-Dimethylaminopropylmethacrylamide	1900	Kgs	882245.86	China
Dyhard 100s (Dicyandiamide)	1.8	Mts	617477.34	Germany
Dyhard 100s (Dicyandiamide)	1.8	Mts	617477.34	Germany
Ethyl Amyl Ketone	5.28	Mts	2977035.6	Germany
Ethyl Butyrate (Aroma Chemical)	1700	Kgs	349044.64	China
Ethyl Cellulose N10	900	Kgs	830126.07	China
Ethyl Cellulose N20	2200	Kgs	2029197.06	China
Ethyl Cellulose N7	981.12	Kgs	904948.1	China
Ethyl Cellulose N7	2018.88	Kgs	1862138.8	China
Formamide	6380	Kgs	486015.23	China
Furfuryl Alcohol	19200	Kgs	2049918.62	Thailand
Glyoxylic Acid	20000	Kgs	1821484.5	China
Glyoxylic Acid	20000	Kgs	1821484.5	China
Hardner C-26 (Isocyanate)	7665	Kgs	3317045.42	China
Hardner Hc-175 (Isocyanate)	1000	Kgs	559103.18	China
Hdo 1,6-Hexanediol Flakes	8000	Kgs	1572287.2	Germany
Hexamethyldisilazane (Hmds)	1395	Kgs	499772.38	China
Hexyl Salicylate (Aroma Chemical)	800	Kgs	247142.56	China
Humic Acid Pure (65%) Pottassium Humate	2	Mts	137639.57	China
Humic Acid With Pulwic Acid Pure	2	Mts	191896.36	China
Hydrazine Carbonate (Di Hydrazine Carbonate)	80	Kgs	95866.31	Japan
Hydrophilic Pyrogenic Silica	1600	Kgs	484573.76	China
Hydroquinone	800	Kgs	352655.64	Japan
Hydroxy Propyl Cellulose (Hpc Lh-21)	2000	Kgs	1275630	China
Hydroxy Propyl Cellulose (Hpc Lh-11)	2000	Kgs	1020504	China
Hydroxy Propyl Methyl Cellulose (Hpmc) E5	10500	Kgs	4736193	China
Hydroxy Propyl Methyl Cellulose E15	21000	Kgs	9472386	China
Hydroxy Propyl Methyl Cellulose E15	3400	Kgs	1482097.23	China
Hydroxy Propyl Methyl Cellulose E3	2300	Kgs	1249611.39	China
Hydroxy Propyl Methyl Cellulose E5	19040.7	Kgs	8300036.55	China
Hydroxy Propyl Methyl Cellulose E5	1959.33	Kgs	854093.4	China
Hydroxy Propyl Methyl Cellulose E50	3000	Kgs	1322922.24	China
Hydroxy Propyl Methyl Cellulose K 100m	10500	Kgs	4736193	China
Hydroxy Propyl Methyl Cellulose K4m	3100	Kgs	1410077.16	China
Hydroxycitronellal	180	Kgs	207911.03	Germany
Hydroxycitronellal	1620	Kgs	1871199.23	Germany
Hydroxypropyl Methyl Cellulose (Hpmc)	24000	Kgs	7286786.4	China
Imidazole Ethanol	900	Kgs	1523793.06	China
Isoborneol	15000	Kgs	3601003.5	China
Isoborneol	15000	Kgs	3601003.5	China
Isobutane	12000	Kgs	1732929.63	Spain
Isocyanate	18400	Kgs	2798155.71	Korea
Isocyanate B4002 230kg Steel Drums (Polymeric Mdi)	36800	Kgs	5596311.42	Korea
Isocyanates	20000	Kgs	3157462	Taiwan
Isononanoic Acid	2960	Kgs	878659.97	Netherlands
Isopropyl Isocyanate	300	Kgs	649440.1	China
Isovaleric Acid (Aroma Chemical)	540	Kgs	295891.62	USA
Lactose Ip	40000	Kgs	3924338.46	Canada
Lactose Ip	60000	Kgs	5885101.66	Canada
Lactose Monohydrate /Pharmatose	10000	Kgs	1689588.6	Germany
Lactose Monohydrate /Super Tab	120	Kgs	37047.2	Netherlands
Lactose Supertab 11 Sd	200	Kgs	48783	Netherlands

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Lauric Acid 99% Min	80	Mts	5277048	Indonesia
L-Camphor Sulphonic Acid	2000	Kgs	2615465.7	China
L-Camphor Sulphonic Acid 99% Min(	1000	Kgs	1295097.75	China
L-Cysteine 99% (Amino Acid)	750	Kgs	1563593.63	China
Linalyl Acetate Coeur	740	Kgs	344079.04	USA
L-Threonine 98.5% Feed Grade	18000	Kgs	2103744.15	China
Maleic Anhydride	21.6	Mtr	2449675.01	Malaysia
Metamino - DI-Methionine Feed Grade 99%	80000	Kgs	17269384	Belgium
Methane Sulfonyl Chloride(Msc)	2000	Kgs	330017.5	China
Methyl Cedryl Ketone	1000	Kgs	750228	China
Methyl Cinnamate 3913001 (Organic Chemical)	150	Kgs	151866.55	Germany
Methyl Dihydrojasmonate	200	Kgs	92779.61	China
Methyl Dihydrojasmonate	200	Kgs	92779.61	China
Methyl Dihydrojasmonate	200	Kgs	92779.61	China
Methyl Ethyl Ketone (Part Of Invoice)	18.172	Mts	1607032.62	Singapore
Methyl Isobutyryl Acetate	6000	Kgs	3904942.8	China
Methyl Isobutyryl Acetate	3000	Kgs	1952471.4	China
Methyl Isobutyryl Acetate	3000	Kgs	1952471.4	China
Methyl Methacrylate Polymers)	16000	Kgs	2760516.65	Singapore
Methylcellulose (Chemicals)	300	Kgs	529487.05	Japan
Methylene Bis - Acrylamide (Organic Chemicals)	500	Kgs	354944.3	China
Methylene Bis (Dibutyl Dithiocarbamate))	816.48	Kgs	376497.96	Netherlands
Molyvan A 100 Fdm(Molybdenum Di-N-Butyl Dithiocarbamate)	272.16	Kgs	562875.29	Netherlands
Monosodium Glutamate	46000	Kgs	4001599.8	China
Monosodium Glutamate	46	Mts	3853392.4	China
Monosodium Glutamate	40	Mts	3415214	China
Monosodium Glutamate (Ajinomoto Brand)	13140	Kgs	1600291.95	Thailand
Monosodium Glutamate (Ajinomoto Brand)	2160	Kgs	427301.27	Thailand
N N Butylbenzene Sulfonamide Nbbsa(Softening Agent)	2250	Kgs	572692.73	Belgium
N-(2-Amino-4,6-Dichloro-5-Pyrimidinyl)Formamide(Fadcp)	4850	Kgs	16611572.77	China
N-(2-Amino-4,6-Dichloro-5-Pyrimidinyl)-Formamide(Fadcp)	4000	Kgs	14058745.5	China
N, N Dimethyl Acetamide	30400	Kgs	2568665.94	Turkey
N,N Diethyl 2 Cyano Acetamide	1000	Kgs	1130841.45	China
N,N,-Dicyclohexyl Carbodiimide	11400	Kgs	4825344.69	China
N,N-Dicyclohexyl Carbodiimide	500	Kgs	215319.38	China
N,N-Dicyclohexyl Carbodiimide	500	Kgs	215319.38	China
N,N'-Dicylohexylcarbodiimide	11400	Kgs	4798344.36	China
N,N-Dimethyl Acetamide	30400	Kgs	2583119.84	Turkey
N,N-Dimethyl Acetamide	30400	Kgs	2583119.84	Turkey
N,N-Dimethyl Acetamide	30400	Kgs	2583119.84	Turkey
N,N-Dimethyl Formamide(Dmf)	10070	Kgs	684844.08	China
N,N-Dimethyl Formamide(Dmf)	10070	Kgs	684844.08	China
N,N-Dimethyl Formamide(Dmf)(	10070	Kgs	684844.08	China
N,O-Bis-(Trimethylsilyl) Trifluoro Acetamide	1500	Kgs	3957786	Germany
N,O-Bis-(Trimethylsilyl) Trifluoro Acetamide (30 Drums)	1050	Kgs	2770450.2	Germany
N,O-Bis-(Trimethylsilyl) Trifluoro Acetamide (30 Drums)	450	Kgs	1187335.8	Germany
Nbs (Morpholiniothio Benzothiazole)	500	Kgs	154779.97	Korea
N-Butyl Benzene Sulfonamide Nbbsa (Softening Agent)	3000	Kgs	736874.04	China
N-Butyl Chloride	14400	Kgs	1902209.76	Germany
N-Heptane	5004	Kgs	1051402.05	Germany
N-Methyl Piperazine	4320	Kgs	1795827.67	China
N-Methyl Pyrrolidone (N-Methyl-2-Pyrrolidone)	16000	Kgs	2989338.31	China
N-Methylpyrrolidone Dist	7140	Kgs	1357257.59	USA
N-N-Carbonyl Di Imidazole	3825	Kgs	4700020.29	China
N-Octyl -D- Glucamine	9000	Kgs	5458363.2	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
N-Propyl Bromide (Intermediate Chemical)	18000	Kgs	4014325.8	USA
N-Propyl Bromide (Intermediate Chemical)	18000	Kgs	4014325.8	USA
N-Propyl Bromide (Intermediate Chemical)	15000	Kgs	2921223	USA
N-Propyl Bromide (Intermediate Chemical)	9000	Kgs	1710828.9	USA
N-Propyl Bromide (Intermediate Chemical)	18000	Kgs	4036914.45	USA
N-Propyl Bromide (Intermediate Chemical)	18000	Kgs	4036914.45	USA
N-Propyl Bromide (Intermediate Chemical)	15000	Kgs	2795515.88	USA
N-Propyl Bromide (Intermediate Chemical)	6000	Kgs	1140552.6	USA
N-Tert-Butyl-Benzothiazole Sulphenamide	10000	Kgs	2305905.75	China
N-Tert-Butyl-Benzothiazole Sulphenamide	10000	Kgs	2305905.75	China
N-Tert-Butyl-Benzothiazole Sulphenamide	20000	Kgs	4586006	China
N-Tert-Butyl-Benzothiazole Sulphenamide	20000	Kgs	4586006	China
O,O-Dimethyl Phosphoramidothioate (Dmpat)	20	Mts	3221900	Japan
O,O-Dimethyl Phosphoramidothioate (Dmpat)	20	Mts	3221900	China
Octamethylcyclotetra Siloxane Sht206	20500	Kgs	3571882.99	Thailand
Oj Glycerine Tech	22000	Kgs	1004899.5	Sweden
Para Amino Phenol	90000	Kgs	18763123.5	China
Para Amino Phenol 98.5%	18000	Kgs	3724195.73	China
Para Chloro Benzyl Cyanide	18	Mts	4150630.35	China
Paraformaldehyde 91 Percent	20000	Kgs	1173514.96	Spain
Phenyl 4,6-Dimethoxy Pyrimidin-2-Ylcarbamate 95%	2000	Kgs	4832850	China
Phenyl Ethyl Alcohol	1000	Kgs	306343.1	China
Phenyl Ethyl Alcohol	1000	Kgs	306343.1	China
Phenyl Ethyl Alcohol	1000	Kgs	306343.1	China
Phenyl Ethyl Alcohol (Aroma Chemical)	4000	Kgs	1258662	China
Phenyl Ethyl Alcohol (Aroma Chemical)	4000	Kgs	1258662	China
Phenyl Ethyl Alcohol (Aroma Chemical)	3000	Kgs	943996.5	China
Phenyl Hydrazine Hcl	17000	Kgs	4252974.66	China
Piperazine Anhydrous	7600	Kgs	2066801.38	Singapore
Piperazine Anhydrous	7600	Kgs	2066801.38	Singapore
Pmma Acrypet Vh001(Polymethyl Methacrylate) (Actualuser)	16000	Kgs	2268217.6	Korea
Polyacrylamide - TI-Heab	1000	Kgs	47646.56	China
Polybor Disodium Octaborate Tetrahydrate	116.12	Mts	9536720.78	USA
Polyethelene Glycol	100	Kgs	42298.11	Japan
Polyisocyanate	17600	Kgs	2835272	Korea
Polymethane Polyphenyl Isocyanate	80	Mts	10464731.2	China
Polymethane Polyphenyl Isocyanate (Pm-2010)	40	Mts	5129850.6	China
Polymethylene Polyphenyl Polyisocyanate	20	Mts	2657537.25	Japan
Polymethylene Polyphenyl Polyisocyanate	20	Mts	2657537.25	Japan
Polyphenylene Ether Powder	5000	Kgs	1240431.5	Singapore
Polyphosphoric Acid	20000	Kgs	2035432.8	China
Polypropylene Glycol	4	Mts	599546.1	Korea
Polypropylene Glycol	4	Mts	580411.65	Korea
Polypropylene Glycol	3	Mts	435308.74	Korea
Polypropylene Glycol	5	Mts	725514.56	Korea
Polyvinyl Alcohol - Bulk	2125	Kgs	130835.4	Singapore
Polyvinyl Alcohol Jp-20y (Part Of Invoice)	5000	Kgs	676700	Japan
Polyvinyl Alcohol Jp-20y (Part Of Invoice)	7600	Kgs	1028584	Japan
Polyvinyl Alcohol Jt-13y (Part Of Invoice)	5000	Kgs	676700	Japan
Polyvinyl Alcohol Jt-13y (Part Of Invoice)	5000	Kgs	676700	Japan
Precipitated Barium Sulfate	500	Kgs	104738.17	Japan
Premium Grade Soda Ash (Natural Sodium Carbonate)	99	Mts	1484502.89	Kenya
Premium Grade Soda Ash (Natural Sodium Carbonate)	99	Mts	1484502.89	Kenya
Primojel (Sodium Starch Glycolate)	200	Kgs	69617.28	Netherlands
Propiophenone	2200	Kgs	632386.76	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Propiophenone	3600	Kgs	1034814.69	China
Propylene Glycol Usp/Ep	17.2	Mts	1873179.33	Singapore
Propylene Glycol Usp/Ep	17.2	Mts	1810118.97	Singapore
Propylene Glycol Usp/Ep	17.2	Mts	1810118.97	Singapore
Pvi (Phthalimide) (	500	Kgs	139778.95	Korea
R(+)-Alpha Methyl Benzylamine	2090	Kgs	1948260.1	China
R(+)-Alpha Methyl Benzylamine	1900	Kgs	1771604.64	China
Rhovea Vanillin (Vanillin	4500	Kgs	3002540.63	France
R-Propylene Carbonate	12000	Kgs	5168008.6	China
S (+)-2- Amino Butyramide Hcl	10000	Kgs	17398260	China
S (+)-2- Amino Butyramide Hcl	5000	Kgs	8528692.5	China
S (+)-2- Amino Butyramide Hcl	5000	Kgs	8528692.5	China
S (+)-2- Amino Butyramide Hcl	5000	Kgs	8528692.5	China
S (+)-2- Amino Butyramide Hcl	5000	Kgs	8480970	China
S(+)-2-Amino Butyramide Hcl	2500	Kgs	4441187.78	China
S(+)-2-Amino Butyramide Hcl	2500	Kgs	4441187.78	China
S(+)-2-Amino Butyramide Hcl	5000	Kgs	8550014.23	China
S(+)-2-Amino Butyramide Hcl	5000	Kgs	8550014.23	China
S(+)-2-Aminobutyramide Hydrochloride	3000	Kgs	4879966.5	China
S(+)-2-Aminobutyramide Hydrochloride	3000	Kgs	4879966.5	China
Sodium - Carboxymethyl Cellulose	5500	Kgs	1105667.2	China
Sodium Carboxy Methyl Cellulose -Intermediate	60000	Kgs	9173082.6	China
Sodium Carboxy Methyl Cellulose -Intermediate	20000	Kgs	3114552.15	China
Sodium Diacetate	15000	Kgs	937572.9	China
Sodium Diacetate	15000	Kgs	919203.53	China
Sodium Dicyanamide	8000	Kgs	5000388.8	Switzerland
Sodium Dicyanamide	8000	Kgs	5000388.8	Switzerland
Sodium Formate	20000	Kgs	473816.25	Taiwan
Sodium Gluconate	26	Mts	1241777.63	China
Sodium Gluconate	25	Mts	1201470.75	China
Sodium Gluconate	25	Mts	1294397.82	Australia
Sodium Gluconate 98% (Industrial Grade)	25000	Kgs	1216128.38	China
Sodium Trifluoro Methane Sulfonate 68%	500	Kgs	869913	China
Suprasec 2030 (Isocyanate)	19200	Kgs	2783721.6	Netherlands
Suprasec 2085 (Isocyanate)	20000	Kgs	2603295.2	Netherlands
Suprasec 2444 (Isocyanate)	19200	Kgs	3115206.31	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	3005563.05	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	3005563.05	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	3005563.05	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	3005563.05	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	3005563.05	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	3005563.05	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	2832855.32	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	2862013.77	Netherlands
Suprasec 2449 (Isocyanate)	16450	Kgs	2862013.77	Netherlands
Tertiary Butyl Alcohol (Tba)	12400	Kgs	1518159.28	Japan
Tertiary Butyl Hydro Peroxide	15.2	Mts	1598845.55	Netherlands
Tertiary Butyl Hydro Peroxide	15.2	Mts	1630796.9	Netherlands
Tertiary Butyl Hydro Peroxide	15.2	Mts	1524718.42	Taiwan
Tetrahydrofuran (Adc Ref:1551)	14400	Kgs	2456263.44	Taiwan
Tetrahydrofuran (Adc Ref:1551)	14400	Kgs	2456263.44	Taiwan
Tgic Tris (2,3-Epoxy Propyl) Isocyanurate	1200	Kgs	410625.6	China
Tgic Tris (2,3-Epoxy Propyl) Isocyanurate,	1200	Kgs	410625.6	China
Toluene Di Isocyanate Cosmonate T-80	20	Mts	2969248.5	Japan
Toluene Di Isocyanate Cosmonate T-80	20	Mts	2969248.5	Japan

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Toluene Di Isocyanate Cosmonate T-80(	20	Mts	2964148	Japan
Toluene Diisocyanate	20000	Kgs	3158775	Korea
Toluene Diisocyanate (Tdi) (Cosmonate)	20000	Kgs	3221900	Singapore
Toluene Diisocyanate Cosmonate T-80	20000	Kgs	2969248.5	Japan
Toluene Diisocyanate Cosmonate T-80	20000	Kgs	3028586	Japan
Toluene Diisocyanate Cosmonate T-80	20000	Kgs	3158775	Japan
Toluene Diisocyanate Cosmonate T-80	18008	Kgs	2844161.01	Japan
Toluene Diisocyanate Cosmonate T-80	1992	Kgs	314613.99	Japan
Toluene Diisocyanate Cosmonate T-80	9252	Kgs	1373574.36	Japan
Toluene Diisocyanate Cosmonate T-80	10748	Kgs	1595674.14	Japan
Toluene Diisocyanate Cosmonate T-80 (	20000	Kgs	2906073	Japan
Triallyl Isocyanurate Taic	60	Kgs	117127.38	Japan
Triallyl Isocyanurate Taic	60	Kgs	117127.38	Japan
Tricalcium Phosphate (Tcp)	10500	Kgs	1326685.5	Japan
Triethyl Ortho Formate	14400	Kgs	2180733.41	China
Trimethyl Ortho Butyrate 98% Min	250	Kgs	377473.61	China
Trimethyl Orthobutylrate	500	Kgs	747581.8	China
CATEGORY INORGANIC CHEMICALS				
Acticarbone Eno Pc(Activated Carbon)- (924 Bags) [Adc List S.No:228]	5910	Kgs	1469592.42	France
Acticarbone Eno Pc(Activated Carbon)- (924 Bags) [Adc List S.No:228]	1065	Kgs	264825.03	France
Acticarbone Eno Pc(Activated Carbon)- (924 Bags) [Adc List S.No:228]	1455	Kgs	361803.21	France
Acticarbone Eno Pc(Activated Carbon)- (924 Bags) [Adc List S.No:228]	13860	Kgs	3502449.72	France
Activated Carbon	10000	Kgs	837694	China
Activated Carbon	20000	Kgs	1675388	China
Activated Carbon " Sc 40 Grade"	210	Kgs	52219.02	China
Activated Carbon " Sc 40 Grade"	3780	Kgs	939942.36	China
Activated Carbon " Sc 40 Grade"	7365	Kgs	1861150.23	China
Activated Carbon (10kg/Cartron)	40	Kgs	12478.45	Hong Kong
Activated Carbon (Ph4-5) (Type 1)	36000	Kgs	3707411.94	China
Activated Carbon (Ph4-5) (Type 1)	18000	Kgs	1817949.73	China
Activated Carbon Carbochem (R) Dc-50	24000	Kgs	4340449.75	China
Activated Carbon -Carbopal Sc40 G	17000	Kgs	2902931.9	China
Activated Carbon Mb320	2100	Kgs	240383.54	China
Activated Carbon Mmk 8 X 25	4800	Kgs	1543503.82	Korea
Activated Carbon Powder Type (Shirasagi T1w50c)	20010	Kgs	2798007.5	Japan
Activated Carbon Type Shirasagi MI-11	7000	Kgs	1894477.2	Malaysia
Activated Carbon Wv-A 1100 8x25	6000	Kgs	1833577.23	USA
Activated Colloidal Calcium Carbonate - N-Sp (Neolight)	32000	Kgs	1142964.48	Malaysia
Alumina Cl5000 Q01/H01; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	2118399.25	Netherlands
Alumina Cl5000 Q01/H01; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	2076894.56	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1353198	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1353198	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1353198	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1326685.5	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1326685.5	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1326685.5	Netherlands
Alumina Ct800; 1250kg Sb Ds -(Calcined Alumina)	25000	Kgs	1326685.5	Netherlands
Aluminium Oxyde L Grade (Calcined Alumina)	60.96	Mts	1078530.08	France
Aluminium Oxyde L Grade (Calcined Alumina)	2.04	Mts	36092.54	France

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Aluminium Oxide L Grade (Calcined Alumina)	20	Mts	336587.55	France
Ammonium Chloride 99.5% Min (Technical Grade)	24	Mts	341147.7	China
Barium Nitrate	150000	Kgs	6116053.49	China
Calbatec Viscolite-Os (Precipitated Calcium Carbonate)	2000	Kgs	120716.73	Japan
Calcined Alumina Ct700 40x25kg Pb	2	Mts	128833.11	Netherlands
Calcined Alumina Ct700 H02 1000kg Sb Ds	18	Mts	1159497.99	Netherlands
Calcite Powder (Calcium Carbonate Ground Uncoated Powder)	54	Mts	318385.26	Vietnam
Calcium Carbide	22.5	Mts	975752.42	China
Calcium Carbide	22.5	Mts	975752.42	China
Calcium Carbide	22.5	Mts	955213.56	China
Calcium Carbide	22.5	Mts	945263.42	China
Calcium Carbide	22.5	Mts	955213.56	China
Calcium Carbide	270	Mts	11545633.2	China
Calcium Carbide	112.5	Mts	4894268.86	China
Calcium Carbide	270	Mts	11797448.93	China
Calcium Carbide	270	Mts	11797448.93	China
Calcium Carbide (Size:50-80mm)	135000	Kgs	5628937.05	China
Calcium Carbide Size : 50-80mm	22.5	Mts	797432.75	China
Calcium Carbide Size : 50-80mm Gas Yield 295l/Kg	45	Mts	1739853.27	China
Calcium Carbide Size : 50-80mmgas Yield 295l/Kg	22.5	Mts	852869.25	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size 25-50 Mm (Adc List No:374)	45	Mts	2018456.97	China
Calcium Carbide Size: 50-80mm	45	Mts	1563593.63	China
Calcium Carbide Size: 50-80mm	45	Mts	1563593.63	China
Calcium Carbonate	23000	Kgs	305130.7	China
Calcium Carbonate - 2t-lp	96	Mts	897597.5	Malaysia
Calcium Carbonate - 2t-lp (	96	Mts	915535.1	Malaysia
Calcium Carbonate (Caco3)(For Manufacturing Car Rubber Beading)	10000	Kgs	266600.61	Korea
Calcium Carbonate 50 (Raw Materials For Brake Lining)	480	Kgs	30080.46	Japan
Calcium Carbonate 56 (Raw Materials For Brake Lining)	14000	Kgs	269053.03	Japan
Calcium Carbonate Coated Powder Grade Msha1	23000	Kgs	183082.6	Vietnam
Calcium Carbonate Coated Powder Grade Msha3	130000	Kgs	788430.24	Vietnam
Calcium Carbonate Coated Powder Msha2pl	52	Mts	355182.25	Vietnam
Calcium Carbonate Coated Powder Msha3	52	Mts	321674.5	Vietnam
Calcium Carbonate In Pure White Colour Ah Mikhart 5	10	Mts	156259.97	Spain
Calcium Carbonate In Pure White Colour Ah Mikhart 5	13.75	Mts	214857.46	Spain
Calcium Carbonate Kz Kal 2061 (Not Intended For Medicinal Use)	72	Mts	630976.9	Malaysia
Calcium Carbonate Kz Kal 2061not Intended For Medicinal Use	96	Mts	843839.09	Malaysia
Calcium Carbonate Lh2300 (Not For Medical Use)	20	Mts	203261.49	Taiwan
Calcium Carbonate Lh2300 (Not For Medical Use)	20	Mts	203261.49	Taiwan
Calcium Carbonate Lh2300 (Not For Medical Use)	20	Mts	203261.49	Taiwan
Calcium Carbonate Lh2300 (Not For Medical Use)	20	Mts	203261.49	Taiwan
Calcium Carbonate Omyacarb 1-lp ("Not Intended For Medicinaluse")	120	Mts	1144418.88	Malaysia
Calcium Carbonate Omyacarb 2t-lp Not For Medicinal Use	144	Mts	1391860.8	Malaysia
Calcium Carbonate Omyacarb 2t-lp Not For Medicinal Use	192	Mts	1819454.4	Malaysia
Calcium Carbonate Omyacarb 2t-lp (Not Intended For Medicinal Use)	120	Mts	1137159	Malaysia
Calcium Carbonate Omyacarb 2t-lp ("Not Intended For Medicinal Use")	120	Mts	1159884	Malaysia
Calcium Carbonate Omyacarb 2t-lp (Not Intended For Medicinaluse)	120	Mts	1137159	Malaysia
Calcium Carbonate Omyacarb 2t-lp(Not For Medicine Use)	72	Mts	695930.4	Malaysia
Calcium Carbonate Powder Grade Imercarb 2t (Not For Medicinal Use)	48	Mts	424539.36	Malaysia

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Calcium Carbonate Sm-700 ("Not Intended For Medicinal Use")	120	Mts	634069.92	Malaysia
Calcium Carbonate(Omyalite 75t-lp)	24000	Kgs	264820.79	Malaysia
Calcium Carboxymethyl Cellulose(Usp,Bp,Ep,Kp)	3274.86	Kgs	2521753.87	Korea
Calcium Carboxymethyl Cellulose(Usp,Bp,Ep,Kp)	3925.14	Kgs	3022491.65	Korea
Calcium Cmc (Chemicals)	180	Kgs	255792.6	Japan
Calcium Gluconate (Granular)	24	Mts	2971775.52	China
Calcium Hydroxide	400	Kgs	15880.03	Germany
Calcium Hydroxide	400	Kgs	15880.03	Germany
Calcium Hydroxide	18.14	Kgs	595.11	USA
Calcium Hydroxide Nicc 3000	100	Kgs	82128.15	Japan
Calcium Metal	3	Mts	659552.22	China
Calcium Nitrate 100% Water Soluble Fertilizer For Agricultural Use	50	Mts	1385417	China
Calfort Tp (Calgon Sodium Hexa Phosphate) Cc0174bv	500	Kgs	255045.2	France
Caprolactam	250	Mts	37696230	Russia
Caprylic Acid 99% Liquid	0.528	Mts	140097.99	Malaysia
Caprylic Acid 99% Liquid	5.952	Mts	1579286.42	Malaysia
Caprylic Acid 99% Liquid	0.528	Mts	140097.99	Malaysia
Caprylic Acid 99% Liquid	5.952	Mts	1579286.42	Malaysia
Carbonate De Potasse 99.5% En Sacs (Potassium Carbonate)	1000	Kgs	154801.28	France
Carboxy Methyl Cellulose - (Carbocel Mm3)	1000	Kgs	264382.67	Italy
Carplex 1120 (Silicon Dioxide)	3500	Kgs	970506.59	Japan
Carplex 1120 (Silicon Dioxide)	3500	Kgs	970506.59	Japan
Ca-St(Calcium Stearate) (For Manufacturing Car Rubber Beading)	100	Kgs	15193.71	Korea
Chlorosulfonyl Isocyanate [Adc Ref No : 424]	2700	Kgs	935326.91	Switzerland
Chlorosulfonyl Isocyanate [Adc Ref No : 424]	2700	Kgs	935326.91	Switzerland
Citronellol	510	Kgs	243052.51	China
Coated Calcium Carbonate Powder Zancarb 2ts(Not For Medicine Use)	150	Mts	1256541	Malaysia
Coated Ground Calcium Carbonate Lsp-3c	108	Mts	681721.77	Vietnam
Coated Ground Calcium Carbonate Msj-2c	104	Mts	672439.58	Vietnam
Coated Ground Calcium Carbonate Msj-3c	416	Mts	2417760.31	Vietnam
Coated Calcium Carbonate lokalit 10 C	10.8	Mts	100979.72	Greece
Coated Calcium Carbonate lokalit 15 C (	16.2	Mts	139188.26	Greece
Coated Calcium Carbonate Powder Zancarb 2t	50	Mts	372735.45	Malaysia
Coated Calcium Carbonate Powder Zancarb 2ts	75000	Kgs	797420.25	Malaysia
Coated Calcium Carbonate Powder Zancarb 2ts(Not For Medicine Use)	200	Mts	1675388	Malaysia
Coated Calcium Carbonate Tkn 2c (Not For Medical Use)	50	Mts	383689.15	Malaysia
Coated Calcium Carbonate Tkn 2c (Not For Medical Use)	75	Mts	564505.64	Malaysia
Coated Calcium Carbonate Tkn 3c (Not For Medical Use)	50	Mts	322570.52	Malaysia
Coated Calcium Carbonate Tkn 3c (Not For Medical Use)	75	Mts	474584.38	Malaysia
Cosmonate 80/20(Tdi) T80 (Toluene Diisocyanate)	20000	Kgs	3158775	Korea
Cosmonate 80/20(Tdi) T80 (Toluene Diisocyanate) (	20000	Kgs	3158775	Korea
Cosmonate80/20(Tdi) T80 (Non-Adc/List No:1588)	20000	Kgs	3221900	Singapore
Cristal 113 Rutile Titanium Dioxide (20 X 25 Kg Paper Bags)	5	Mts	845748.75	Saudi Arabia
Cristal 113 Rutile Titanium Dioxide (40 X 25 Kg Paper Bags)	10	Mts	1691497.5	Saudi Arabia
Cristal 128 Rutile Titanium Dioxide (Actual User Not For Sale)	40000	Kgs	6822954	Saudi Arabia
Cristal 128 Rutile Titanium Dioxide (Actual User Not For Sale)	20000	Kgs	3411477	Saudi Arabia
Cristal 128 Rutile Titanium Dioxide (Actual User Not For Sale)	20000	Kgs	3411477	Saudi Arabia
Cristal 128 Rutile Titanium Dioxide (Actual User Not For Sale)	40000	Kgs	6822954	Saudi Arabia
Cristal 813 Titanium Dioxide Rutile (20 Kg Paper Bags)	16	Mts	2708965.44	Australia
Cristal 813 Titanium Dioxide Rutile (20 Kg Paper Bags)	16	Mts	2708965.44	Australia
Cristal 813 Titanium Dioxide Rutile (20 Kg Paper Bags)	16	Mts	2708965.44	Australia
Di Calcium Phosphate 18% - Feed Grade	25	Mts	660489.5	China
Di Sodium Octaborate Tetrahydrate	56	Mts	4600873.2	Malaysia
Dicalcium Phosphate Anhydrous	17145.8	Kgs	1867203.3	USA
Dicalcium Phosphate Anhydrous	17145.8	Kgs	1867203.3	USA

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Fertilizer For Agricultral Use - Potassium Nitrate Water Soluble Fertiliser	25	Mts	1607816.48	Jordon
Fzo1528/01 Zirconium Oxide	1000	Kgs	2602287.75	USA
Hydrated Lime (High Purity Calcium Hydroxide)	180	Mts	1681764.64	Malaysia
Hydrated Lime (High Purity Calcium Hydroxide)	270	Mts	2578630.5	Malaysia
Hydrated Lime-High Purity Calcium Hydroxide	233.76	Mts	2272936.95	Malaysia
Hydrated Lime-High Purity Calcium Hydroxide	36.24	Mts	352375.24	Malaysia
Hydrogen Peroxide	49.01	Mts	1288190.34	Indonesia
Hydrogen Peroxide 50% Std	38400	Kgs	1067413.25	Thailand
Hydrogen Peroxide 50% Std "	38400	Kgs	1067413.25	Thailand
Insolube Sulphur- Hd Ot 20e, 20kg (44.0 Lb) Bag 2700 Bg	18000	Kgs	2557926	USA
Insolube Sulphur- Hd Ot 20e, 20kg (44.0 Lb) Bag 2700 Bg	18000	Kgs	2557926	USA
Insolube Sulphur- Hd Ot 20e, 20kg (44.0 Lb) Bag 2700 Bg	18000	Kgs	2557926	USA
Insolube Sulphur- Hd Ot 20e, 20kg (44.0 Lb) Bag 2700 Bg	18000	Kgs	2410940.7	USA
Insoluble Sulphur (Hd Ot 20e)	20000	Kgs	2653371	Germany
Molybdenum Disulfide 415 (Raw Materials For Brake Lining)	200	Kgs	510666.86	Japan
Mono Potassium Phosphate (00:52:34) Fertilizer Use Only	25	Mts	2041715	China
Mono Potassium Phosphate (00:52:34) Fertilizer Use Only	25	Mts	2041715	China
Mono Potassium Phosphate (00-52-34)	25	Mts	2029512.94	China
Mono Potassium Phosphate 00 52-34	10	Mts	865687.16	UAE
Mono Potassium Phosphate 00 5234 100%	2	Mts	192859.5	UAE
Monocalcium Phosphate (Mcp) In Bags Of 50kgs	104000	Kgs	4303515.06	Tunisia
Nano Precipitated Calcium Carbonate (Npcca-206)	14000	Kgs	469108.64	China
Natural Manganese Ore-(50000 Kgs)	50	Mts	2452188.09	Singapore
Nickel Hydroxide Type M5	15000	Kgs	11361338	China
Nickel Sulphate (Hydrated Nickel Sulphate/6h20 Niso4)	20000	Kgs	5201904	China
Nickel Sulphate(Hydrated Nickel Sulphate)	20000	Kgs	5473594	China
Nipsil Er (Silicon Dioxide)	6400	Kgs	1362357.92	Japan
Nipsil Vn3 (Silicon Dioxide)	3520	Kgs	750299.26	Japan
Norit Dx Ultra (Activated Carbon)	3600	Kgs	886510.33	Netherlands
Norit Gac 830w - Activated Carbon	6000	Kgs	866306.29	China
Ns Soap (Sodium Stearate)	600	Kgs	196585.49	Japan
Ns Soap (Sodium Stearate)	200	Kgs	62060.24	Japan
Ns Soap (Sodium Stearate)	600	Kgs	196585.49	Japan
Potassium Aluminium Fluoride(Raw Material For Grinding Wheel)	4	Mts	338620.68	China
Potassium Bromide Photo Grade	100	Kgs	26530.18	China
Potassium Caprylate (Alkon 8627)	400	Kgs	196004.64	Malaysia
Potassium Carbonate	24	Mts	1693430.64	Thailand
Potassium Carbonate Fine Powder 99.5 Pct Minimum	20	Mts	1520736.8	Korea
Potassium Carbonate Powder	20000	Kgs	1617292.8	Korea
Potassium Carbonate Powder	20000	Kgs	1559399.6	Korea
Potassium Carbonate Powder 99.5 Pct Min.	3	Mts	214478.55	Korea
Potassium Carbonate Powder 99.5 Pct Min.	5	Mts	352442.03	Korea
Potassium Carbonate Powder 99.5 Pct Min.	3	Mts	214478.55	Korea
Potassium Chlorate	100000	Kgs	6479417.65	China
Potassium Chlorate	25000	Kgs	1619854.92	China
Potassium Chlorate	50000	Kgs	3239674.49	China
Potassium Chlorate	50000	Kgs	3239674.49	China
Potassium Chlorate	75000	Kgs	4832388.43	China
Potassium Chloride Fine Grade For Industrial Use	490200	Kgs	13816570.39	Jordon
Potassium Chloride For Industrial Use	69.0772	Mts	1952357.62	Jordon
Potassium Chloride For Industrial Use	201.565	Mts	5696918.23	Jordon
Potassium Chloride For Industrial Use	204.873	Mts	5790399.48	Jordon
Potassium Chloride For Industrial Use	505.945	Mts	14299736.72	Jordon
Potassium Humate 25% Soil Application	125	Mts	1317653.38	China
Potassium Humate 25% Soil Application	75	Mts	790592.03	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Potassium Humate Liquid(Humic Acid)(Adc.Sr.No-1300)	16000	Kgs	4774472	China
Potassium Hydroxide Flakes	20	Mts	1417636	Taiwan
Potassium Hydroxide Flakes (Koh) 90 Percent Min	20000	Kgs	1503576.9	Korea
Potassium Iodide	1000	Kgs	2960209	UAE
Potassium Nitrate (13-00-45) 100%	25	Mts	1516212	China
Potassium Nitrate (13-00-45), 100%	50	Mts	3048217.88	Jordon
Potassium Nitrate 100 & Water Soluble Fertilizer For Agricultural Use Only	3	Mts	208085.25	UAE
Potassium Pyrophosphate (Tetrakal Tg)	20000	Kgs	2545972.65	China
Potassium Sulphate (00:00:50) 100%	25	Mts	1050292.69	UAE
Potassium Sulphate (100:00:50) Fertilisers Use Only	100	Mts	3788166.6	Jordon
Potassium Sulphate (Sop) Fertilisers Use Only	100	Mts	3788166.6	Jordon
Potassium Sulphate Powder (Sop) Water Soluble Fertiliser Grade	150	Mts	5876745.6	Taiwan
Potassium Titanate (Raw Materials For Brake Lining)	4000	Kgs	2603295.2	Japan
Potassium Titanate (Raw Materials For Brake Lining)	4000	Kgs	2666541.4	Japan
Potassium Titanate 344 (Raw Materials For Brake Lining)	200	Kgs	245984.69	Japan
Potassium Titanate 574 (Raw Materials For Brake Lining)	20	Kgs	12382.25	Japan
Premium Grade Soda Ash (Natural Sodium Carbonate)	99	Mts	1484502.89	Kenya
Premium Grade Soda Ash (Natural Sodium Carbonate)	99	Mts	1484502.89	Kenya
Prepared Calcium Carbonate (Technical Grade)	32000	Kgs	1010387.84	Taiwan
Prepared Calcium Carbonate (Technical Grade)	32000	Kgs	1016831.64	Taiwan
Slaked Lime 2 (Calcium Hydroxide) (Raw Materials For Brakelining)	800	Kgs	22129.97	Japan
Soda Solvay Dense-Sodium Carbonate Dense(Soda Ash)	247.5	Mts	3809369.03	Belgium
Soda Solvay Dense - Sodium Carbonate Dense (Soda Ash)	630000	Kgs	9751138.43	Bulgaria
Soda Solvay Dense-Sodium Carbonate Dense	462	Mts	7566943.23	Bulgaria
Soda Solvay Light - Sodium Carbonate Light In Bags	513	Mts	8181143.17	Bulgaria
Soda Solvay Light Sodium Carbonate Light	236.906	Mts	3675982.75	Bulgaria
Soda Solvay Light Sodium Carbonate Light	230.979	Mts	3584015.68	Bulgaria
Soda Solvay Light -Sodium Carbonate Light	1.72	Mts	26688.6	Bulgaria
Soda Solvay Light -Sodium Carbonate Light	456	Mts	7134546.47	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	494	Mts	7738147.77	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	13.597	Mts	210979.62	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	9.203	Mts	142799.55	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	8.886	Mts	137880.77	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	11.709	Mts	181684.22	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	494	Mts	7729092.01	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	513	Mts	8026364.78	Bulgaria
Soda Solvay Light-Sodium Carbonate Light	380	Mts	5945455.4	Bulgaria
Sodasolvay Sodium Carbonate Dense - Soda Ash	350000	Kgs	5417299.13	Bulgaria
Sodasolvay Sodium Carbonate Dense - Soda Ash	280000	Kgs	4333839.3	Bulgaria
Sodasolvay-Sodium Carbonate Dense -Soda Ash	336250	Kgs	5204476.66	Bulgaria
Sodasolvay-Sodium Carbonate Dense -Soda Ash	293750	Kgs	4546661.77	Bulgaria
Sodium Azide	4300	Kgs	2191955.53	China
Sodium Azide	13200	Kgs	6565852.02	China
Sodium Azide	6000	Kgs	3247372.2	China
Sodium Azide	4300	Kgs	2191955.53	China
Sodium Azide	13000	Kgs	6860162.4	China
Sodium Azide	5000	Kgs	2418647	China
Sodium Bi Carbonate0399030601	26000	Kgs	435600.88	China
Sodium Bicarbonate	50	Mts	789365.5	China
Sodium Bicarbonate (Industrial Grade)	50	Mts	775541.13	China
Sodium Bicarbonate (Industrial Grade)	150000	Kgs	2281105.2	China
Sodium Bicarbonate For Industrial Use Only	54913	Kgs	781153.09	China
Sodium Bicarbonate For Industrial Use Only	87	Kgs	1237.6	China
Sodium Boro Hydride	4000	Kgs	5066675.1	China
Sodium Boro Hydride	3000	Kgs	3800006.33	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Sodium Borohydride	4000	Kgs	4643980	USA
Sodium Borohydride	4000	Kgs	4643980	USA
Sodium Borohydride	2000	Kgs	2706800	USA
Sodium Borohydride	3000	Kgs	4060200	USA
Sodium Borohydride	1200	Kgs	1624080	USA
Sodium Borohydride	6000	Kgs	7600012.65	China
Sodium Borohydride	2000	Kgs	2533337.55	China
Sodium Borohydride	6000	Kgs	7600012.65	China
Sodium Borohydride	8000	Kgs	10051520	USA
Sodium Borohydride	900	Kgs	1125342	USA
Sodium Borohydride	1400	Kgs	1764066	China
Sodium Borohydride (Adc List - S.No.1427)	4000	Kgs	5283916	China
Sodium Borohydride (Adc Ref No:1427)	2000	Kgs	2634418.35	China
Sodium Borohydride [Sb200 (Tm) Powder] [Adc List S.No: 1428]	8000	Kgs	9855378	USA
Sodium Borohydride [Sb200 (Tm) Powder] [Adc List S.No: 1428]	8000	Kgs	9855378	USA
Sodium Borohydride [Sb200 (Tm) Powder] [Adc List S.No: 1428]	3300	Kgs	4065343.4	USA
Sodium Borohydride [Sb200 (Tm) Powder] [Adc List S.No: 1428]	1000	Kgs	1231922.25	USA
Sodium Borohydride(Adc.List3.S.No:1427)	4000	Kgs	5180391	China
Sodium Borohydride(Adc.List3.S.No:1427)	1900	Kgs	2460685.73	China
Sodium Borohydride	8000	Kgs	10310080	USA
Sodium Carbonate Dense (Soda Ash)	495000	Kgs	7069492.74	Kenya
Sodium Carbonate Dense (Soda Ash)	495000	Kgs	6287469.21	Kenya
Sodium Carbonate Light (Soda Ash Light)	513	Mts	8190728.57	Bulgaria
Sodium Carbonate Light (Soda Ash Light)	513	Mts	8181143.17	Bulgaria
Sodium Chlorate	132	Mts	6252708	China
Sodium Chlorate	110	Mts	4911176.01	China
Sodium Chlorate	110	Mts	4961726.51	China
Sodium Chlorate Fc08 Bb	24346	Kgs	1055330.44	Finland
Sodium Chlorate Fc08 Bb	90654	Kgs	3929595.26	Finland
Sodium Chloride Pure	1000	Kgs	72608.11	Germany
Sodium Chloride Pure	1000	Kgs	72608.11	Germany
Sodium Chloride Pure Sanal P (Industrial Salt)	3000	Kgs	192954.52	Germany
Sodium Chlorite	20000	Kgs	818362.6	Hong Kong
Sodium Dichromate Crystals	42500	Kgs	4027438.13	South Africa
Sodium Dichromate Crystals	6250	Kgs	592270.31	South Africa
Sodium Dichromate Crystals	6250	Kgs	592270.31	South Africa
Sodium Dichromate Crystals	42500	Kgs	4027438.13	South Africa
Sodium Dichromate Crystals-	36250	Kgs	3435167.81	South Africa
Sodium Dichromate Crystals-	42500	Kgs	4027438.13	South Africa
Sodium Ligno Sulphanate	26	Mts	632595.72	China
Sodium Lignosulphonate	48000	Kgs	1243293.84	Germany
Sodium Lignosulphonate Packed In Flexitanks	48.26	Mts	624324.47	Hong Kong
Sodium Lignosulphonate Packed In Flexitanks	47.8	Mts	603706.73	Austria
Sodium Metabisulphite	54	Mts	1057557.87	China
Sodium Nitrate 99% Min Tech -Grade	50	Mts	1341610.71	China
Sodium Nitrite Hq	21000	Kgs	796011.3	Germany
Sodium Nitrite Hq	21000	Kgs	796011.3	Germany
Sodium Pyrophosphate	375	Kgs	218547.68	Japan
Sodium Salt (Nf-1 Non Phosphate) ()	22000	Kgs	1984690.4	Thailand
Sodium Salt Of Poly-Naphthalene - Sulfonic Acid	33000	Kgs	1688681.12	China
Sodium Salt Of Poly-Napthalene Sulfonic Acid	40000	Kgs	2188165	China
Sodium Stearyl Fumarate	75	Kgs	575109.15	Taiwan
Sodium Sulphate Anhydrous	123637	Kgs	852616.8	China
Sodium Sulphate Anhydrous	81570.3	Kgs	562520.9	China
Sodium Sulphate Anhydrous	20226.1	Kgs	139482.03	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Sodium Sulphate Anhydrous	488.6	Kgs	3369.46	China
Sodium Sulphate Anhydrous	499.64	Kgs	3445.59	China
Sodium Sulphate Anhydrous	667.34	Kgs	4602.08	China
Sodium Sulphate Anhydrous	42411.5	Kgs	292475.83	China
Sodium Sulphide Flakes 60% Min., Fe 150ppm Max	25	Mts	744258.9	China
Sodium Tripolyphosphate (Masking Agent)	105500	Kgs	6165139.11	Russia
Sodium Tripolyphosphate (Masking Agent)	104800	Kgs	6124232.97	Russia
Sodium Tripolyphosphate (Stpp Na5p3o10) White Dense	46	Mts	2616990.8	Tunisia
Sodium Tripolyphosphate (Stpp Na5p3o10) White Dense	92	Mts	5233981.6	Tunisia
Sodium Tripolyphosphate (Stpp Na5p3o10)White Dense	23	Mts	1334630.16	Tunisia
Super Expansive Mortar (Cracking) (Calcium Hydroxide Composition)	27	Mts	365363.46	China
Super Expansive Mortar (Cracking) (Calcium Hydroxide Composition)	27	Mts	365363.46	China
Super Potassium Humate Shiny Powder	15000	Kgs	914465.36	China
Tiona 696 Titanium Dioxide Rutile Graco:Pt1706 (Actual User Not For Sale)	10000	Kgs	1872428.9	Australia
Ti-Pure Rutile Titanium Dioxide R902+ 4w22 (Actual User, Notfor Sale)	140000	Kgs	25299288	Taiwan
Titanium Dioxide - Tiona 595	20000	Kgs	3672966	Australia
Titanium Dioxide 98 Pcnt Anatase B101	21	Mts	2571076.2	Hong Kong
Titanium Dioxide Anatase Grade A101	5	Mts	612302.4	China
Titanium Dioxide R-996 Graco Code:Pt0364 (Actual User Not For Sale)	10000	Kgs	1439891.35	China
Titanium Dioxide Rutile Blr-631 Graco :Pt0720 (Actual User Not For Sale)	20000	Kgs	2873934.8	China
Titanium Dioxide Rutile Blr-631 Graco:Pt0720 (Actual User Not Sale)	20000	Kgs	2873934.8	China
Titanium Dioxide Rutile R-345	20	Mts	2899710	China
Titanium Dioxide Rutile Tisure & R-104	10000	Kgs	2072898.75	USA
Titanium Dioxide Rutile Tisure R-104	10000	Kgs	1913457.63	Singapore
Titanium Dioxide Rutile Ti-Pure R105	2000	Kgs	429022.75	Taiwan
Titanium Dioxide Rutile Tisure R706 [Actual User Not For Sale]	20000	Kgs	3916881	Taiwan
Titanium Dioxide Rutile Tisure R706 [Actual User Not For Sale]	20000	Kgs	3916881	Taiwan
Titanium Dioxide Rutile Tisure R-900	20000	Kgs	4060200	Taiwan
Titanium Dioxide Rutile Ti-Pure R902+	20000	Kgs	4191222.25	USA
Titanium Dioxide Rutile Ti-Pure R902+	4000	Kgs	858045.5	Taiwan
Zinc Acetate Anhydrous	9000	Kgs	1724463.9	China
Zinca#20 (Zinc Oxide)	500	Kgs	177351.31	Japan
Zirconium Nitrate Sol	250	Kgs	85444.86	UK
Zirconium Oxide Grade Rsz-24md	100	Kgs	131315.31	Japan
Zirconium Oxide Grade Rsz-S24md	100	Kgs	111754.93	Japan
Zirconium Oxide Grade Tsz-3b-65	500	Kgs	713301.62	Japan
CATEGORY: DRUGS				
3-Amino Pyridine	1000	Kgs	1353198	China
Acyclovir	174.61	Kgs	438809.25	China
Acyclovir	6825.39	Kgs	17152764.75	China
Alginate Rt (Sodium Alginate)	3000	Kgs	678265.5	China
Amoxicillin Trihydrate Compacted Oral	10000	Kgs	18042640	Austria
Azithromycin Amine	500	Kgs	2786943.5	China
Azithromycin Amine	500	Kgs	2786943.5	China
Azithromycin Ip/Usp	500	Kgs	2931929	China
Benzyl Penicillin G Potassium Ip	37500	Kgs	28049922	China
Benzyl Penicillin Potassium Ip	37500	Kgs	28049922	China
Benzyl Penicillin Sodium Sterile Bp	195	Kgs	324606.39	China
Ceftriaxone Sodium (Non Sterile)	100	Kgs	404323.2	China
Ceftriaxone Sodium (Non Sterile)	5900	Kgs	23855068.8	China
Ceftriaxone Sodium (Non Sterile)	837	Kgs	3384185.18	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED'				
Ceftriaxone Sodium (Non Sterile)	5163	Kgs	20875206.82	China
Ceftriaxone Sodium (Non Sterile)	100	Kgs	404323.2	China
Ceftriaxone Sodium (Non Sterile)	5900	Kgs	23855068.8	China
Ceftriaxone Sodium (Non Sterile)	837	Kgs	3384185.18	China
Ceftriaxone Sodium (Non Sterile)	5163	Kgs	20875206.82	China
Croscarmellose Sodium Usp/Ph.Eur	3500	Kgs	1939583.8	Taiwan
Croscarmellose Sodium Usp/Ph.Eur	5500	Kgs	3047917.4	Taiwan
Croscarmellose Sodium/Primellose/ Usp.Nf.Ph.Eur.Jp	2835	Kgs	2859326.99	Germany
Croscarmellose Sodium/Primellose/ Usp.Nf.Ph.Eur.Jp	490	Kgs	494204.67	Germany
D-Calcium Pantothenate Bp/Usp/lp	3000	Kgs	1753120.13	China
Erythromycin Stearate Bp	1000	Kgs	2842897.5	Thailand
Erythromycin Stearate Bp	1000	Kgs	2842897.5	Thailand
Ibuprofen Bp/Ep Sn Grade -	150	Kgs	101187.31	Indonesia
Ibuprofen Bp/Epsn Grade -	3650	Kgs	2611390.95	Indonesia
Ibuprofen Bp/Epsn Grade	5000	Kgs	3577247.88	Indonesia
Ibuprofen Bp/Epsn Grade	200	Kgs	143088	Indonesia
Ibuprofen -	8000	Kgs	5224508.79	USA
Ketoconazole S.B.No.1234476dt. 08.08.2012 (Re-Import)	200	Kgs	1419192.83	Cyprus
Ketoconazole S.B.No.1234476dt. 08.08.2012 (Re-Import)	200	Kgs	1419192.83	Cyprus
Kollidon 30	700	Kgs	609221.9	Singapore
Levofloxacin Hemihydrate Ip	175	Kgs	421597.36	China
Levofloxacin Hemihydrate Ip	175	Kgs	421597.36	China
Lincomycin Hcl 11% Premix	8000	Kgs	3464704	China
Maduramicin- Ammonium 1% Granular Feed Grade	5000	Kgs	307691.45	China
Maduramicin 1% [Zamidan Animal Feed Premix]	10000	Kgs	934351	China
Maduramicin Ammonium 1% Granular Feed Grade	14300	Kgs	840098.18	China
Maduramicin Ammonium 1% Granular Feed Grade	14300	Kgs	840098.18	China
Methylopa Bp/Usp	1000	Kgs	3443064.75	China
Oxacillin Sodium Compacted S.B.No.4012430/16.2.2013	175	Kgs	578683.62	India
Paracetamol Bp	34000	Kgs	7958655.57	China
Paracetamol Bp	17000	Kgs	3746425.32	China
Paracetamol Bp	34000	Kgs	8040573.64	China
Paracetamol Bp	17000	Kgs	3758942.25	China
Penicillin G Potassium First Crystal	37500	Kgs	30324240	China
Penicillin G Potassium First Crystal	37500	Kgs	30930240	China
Penicillin G Potassium First Crystal	37500	Kgs	30324240	China
Penicillin G Potassium First Crystals Ip	37500	Kgs	30324240	China
Penicillin V Potassium	585	Kgs	1714587.62	Slovak
Penicillin V Potassium	65	Kgs	190509.74	Slovak
Plasdone K-29/32 (Povidone K 30 (29/32) (Polyvinyl Pyrrolidone)	1996	Kgs	1764642.36	USA
Polyplasdone XI -10 (Crospovidone Usnf)	99.8	Kgs	131833.7	USA
Praziquantel Usp 36	475	Kgs	3444796.9	China
Pyrrolydine	4930	Kgs	2108733.55	Netherlands
Pyrrolydine	4930	Kgs	2108733.55	Netherlands
Resorcinol	16000	Kgs	5000388.8	China
Resorcinol	16000	Kgs	5000388.8	China
Resorcinol	16000	Kgs	5206702.51	Japan
Resorcinol	16000	Kgs	5048985.96	China
Resorcinol	16000	Kgs	5000388.8	China
Resorcinol	16000	Kgs	4902418.8	China
Resorcinol	32000	Kgs	9804837.6	China
Resorcinol (1,3-Dihydroxybenzene)	4000	Kgs	1218146.26	Japan
Salicylamide Usp	250	Kgs	158678.58	China
Salicylamide Usp	250	Kgs	158678.58	China
Salicylamide Usp	250	Kgs	158678.58	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Salicylic Acid Usp	250	Kgs	157873.1	China
Salicylic Acid Usp	250	Kgs	157873.1	China
Salinomycin-12% Premix Feed Grade [Animal Feed Supplement]	10000	Kgs	989123.3	China
Salinomycin-12% Premix Feed Grade [Animal Feed Supplement]	10000	Kgs	989123.3	China
Sodium Starch Glycolate	3000	Kgs	881298.23	Taiwan
Sodium Starch Glycolate (Explosol A)	14400	Kgs	4139827.34	Brazil
Sodium Starch Glycolate/Primojel/Usp.Nf.Ph.Eur.Jp	2250	Kgs	930997.8	Germany
Sodium Starch Glycolate/Primojel/Usp.Nf.Ph.Eur.Jp	800	Kgs	331021.44	Germany
Sodium Starch Glycolate/Primojel/Usp.Nf.Ph.Eur.Jp	750	Kgs	310332.6	Germany
Sulfamide (Adc List S.No. 1492)	1500	Kgs	1175475.57	China
Sulphadoxine Bp/Usp	2000	Kgs	4749444.2	China
Sulphadoxine Bp/Usp	2000	Kgs	4749444.2	China
Trimethoprim Bp/lp	4000	Kgs	5619761.2	China
Trimethoprim Bp/lp	100	Kgs	140494.03	China
CATEGORY: DYESTUFF				
Ablan Black Mgt (Dyes)	1000	Kgs	406603.78	Taiwan
Ablan Black Rt (Dyes)	500	Kgs	230365.85	Taiwan
Basic Violet 10 (Cationic Dyes)	25	Kgs	20847.91	China
Cationic Black Fbl (Cationic Dyes)	50	Kgs	28744.85	China
Cationic Black Fdl (Cationic Dyes)	25	Kgs	14372.43	China
Cationic Black Rl (Cationic Dyes)	25	Kgs	12034.93	China
Cationic Blue Frl (Cationic Dyes)	25	Kgs	17689.14	China
Cationic Blue Xbl (Cationic Dyes)	50	Kgs	18889.47	China
Cationic Blue Xgrl (Cationic Dyes)	25	Kgs	10502.93	China
Cationic Brill.Red X5gn (Cationic Dyes)	25	Kgs	13582.73	China
Cationic G.Yellow Xgl (Cationic Dyes)	75	Kgs	46670.9	China
Cationic Pink Fg (Cationic Dyes)	25	Kgs	13867.02	China
Cationic Red 3r (Cationic Dyes)	25	Kgs	10502.93	China
Cationic Red Gtl (Cationic Dyes)	25	Kgs	14719.89	China
Cationic Red Xgrl (Cationic Dyes)	50	Kgs	27418.17	China
Cationic Turq.Blue Xgb (Cationic Dyes)	25	Kgs	16931.03	China
Corene Blu Pr (Dyes)	5	Kgs	8412.18	Italy
Corene Rosso Pjn (Dyes)	5	Kgs	6593.21	Italy
Disperse Dyes - Disperse Black Gk	100	Kgs	24486.44	China
Disperse Dyes - Disperse Black Gr	500	Kgs	96657	China
Disperse Dyes - Disperse Blue Gr	250	Kgs	68465.38	China
Disperse Dyes - Disperse Blue Rs	250	Kgs	61216.1	China
Disperse Dyes - Disperse Green 2g	200	Kgs	46395.36	China
Disperse Dyes - Disperse Violet Br	2000	Kgs	470397.4	China
Disperse Dyes - Disperse Violet Rs	300	Kgs	77325.6	China
Disperse Dyes - Disperse Violet Sn	400	Kgs	113410.88	China
Levaderm Black Brown(Liquid Dyes)(Net.Wt.30kgs)(1kg=1.2ltr)	36	Ltr	19559.13	Singapore
Levaderm Blue(Liquid Dyes)(Net.Wt.60kgs)(1kg=1.2ltr)	72	Ltr	30058.9	Singapore
Levaderm Bordeaux(Liquid Dyes)(Net.Wt.30 Kgs)(1kg=1.2ltr)	36	Ltr	16924.72	Singapore
Levaderm Green Exp 2080(Liquid Dyes)(Net.Wt.30kgs)(1kg=1.2ltr)	36	Ltr	19786.57	Singapore
Levaderm Lemon (Liquid Dyes)(Net.Wt.30kgs)(1kg=1.2ltr)	36	Ltr	18952.65	Singapore
Levaderm Medium Brown Exp 2086(Liquid Dyes)(Net.Wt.30 Kgs)	36	Ltr	19710.76	Singapore
Levaderm Navy Blue(Liquid Dyes)(Net.Wt.60 Kgs)(1kg=1.2ltr)	72	Ltr	32712.28	Singapore
Levaderm Orange Exp 2087(Liquid Dyes)(Net.Wt.30 Kgs)(1kg=1.2ltr)	36	Ltr	17057.38	Singapore
Levaderm Red Exp 2084 (Liquid Dyes)(Net.Wt.30kgs)(1kg=1.2ltr)	36	Ltr	20165.62	Singapore
Levafix Brilliant Red Ca Batch; Dc10731 (Dyestuffs For Textile)	105	Kgs	175915.74	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Malachite Green (Cationic Dyes)	25	Kgs	11529.53	China
Melioderm Brown D2gl P (Dyes)	300	Kgs	227843.88	Spain
Moderlan Black Ngr (Lot No.L92f13g07) (Liquid Dyes)	120	Kgs	54583.63	Thailand
Moderlan Brown R (Acid Dyes)	289.091	Kgs	222617.33	Thailand
Moderlan Brown R (Acid Dyes)	10.909	Kgs	8400.58	Thailand
Moderlan Dark Brown B (Lot No.L7bb13z02) (Liquid Dyes)	420	Kgs	297177.55	Thailand
Moderlan Dark Brown B (Acid Dyes)	1020	Kgs	772478.09	Thailand
N.Corene Arancio Gl(Dyes)	5	Kgs	6022.9	Italy
N.Corene Avana Lgh/E (Dyes)	10	Kgs	3983.58	Italy
N.Corene Beige Rg (Dyes)	5	Kgs	2769.5	Italy
N.Corene Blu Cob Rn(Dyes)	5	Kgs	6636.42	Italy
N.Corene Bordeaux Br (Dyes)	5	Kgs	4160.72	Italy
N.Corene Bruno Cg/E (Dyes)	5	Kgs	3771.87	Italy
N.Corene Bruno Chiaro Br(Dyes)	10	Kgs	7526.46	Italy
N.Corene Bruno Medio R (Dyes)	10	Kgs	11907.53	Italy
N.Corene Bruno Rn (Dyes)	10	Kgs	13860.44	Italy
N.Corene Bruno Rosso Vr(Dyes)	10	Kgs	11639.66	Italy
N.Corene Bruno Scuro R (Dyes)	10	Kgs	9652.19	Italy
N.Corene Bruno Tm (Dyes)	10	Kgs	10550.87	Italy
N.Corene Fuxia Rb (Dyes)	5	Kgs	5318.64	Italy
N.Corene Giallo Go(Dyes)	5	Kgs	3465.11	Italy
N.Corene Nero 3g E.C (Dyes)	10	Kgs	4346.51	Italy
N.Corene Nero Gt (Dyes)	5	Kgs	2212.14	Italy
N.Corene Nero Xb5 (Dyes)	10	Kgs	5634.04	Italy
N.Corene Rosso Rs (Dyes)	5	Kgs	4320.59	Italy
N.Corene Scarlatto2g (Dyes)	5	Kgs	3227.48	Italy
N.Corene Verde Oliva Vg(Dyes)	5	Kgs	6753.08	Italy
N.Corene Verde Olivia Vg (Dyes)	5	Kgs	6753.08	Italy
N.Corene Verde Scuro B (Dyes)	5	Kgs	4411.32	Italy
Remazol Brilliant Blue Rn Batch;Dx11050 (Dyestuffs For Textile)	500	Kgs	866691.1	China
Supronil Hk Black W Liq 0030 (Liquid Dyes) (324ltr)	270	Kgs	66877.36	Germany
Supronil Hk Black As-01 Liq(Liquid Dyes) (936 Ltrs)	780	Kgs	247055.26	Spain
Supronil Hk Blue 01 Liq(Liquid Dyes) (360 Ltrs)	300	Kgs	200329.51	Germany
Supronil Hk Blue 01 Liq(Liquid Dyes) (60ltrs)	50	Kgs	23647.43	Spain
Supronil Hk Dark Brown 01 Liq (Liquid Dyes) (150 Ltr)	125	Kgs	86304.5	Spain
Supronil Hk Fuchsia(Liquid Dyes) (90ltrs)	75	Kgs	39549.04	Spain
Supronil Hk Ruby Liq (Liquid Dyes)(60 Ltrs)	50	Kgs	43583.77	Spain
Supronil Hk Yellow 01 (Liquid Dyes)(90 Ltrs)	75	Kgs	56313.69	Spain
Supronil Hk Yellow 01(Liquid Dyes)(360 Ltrs)	100	Kgs	71704.19	Germany
CATEGORY FABRIC, FIBER & YARN				
Aquamid 66vom Nat Nylon Chips	2000	Kgs	683164	Italy
Aquamid 6av Nat Nylon Chips	10000	Kgs	1964096.5	Italy
Durethan B 30 S 000000(Nylon Chips)	10000	Kgs	1610950	Germany
Finish Oil For Nylon Monofilament - N-Butyl Benzene Sulfonamide	1000	Kgs	270518.86	China
Finish Oil For Nylon Monofilament N-Butyl Benzene Sulfonamide	1600	Kgs	454334.9	China
Nylon 6 Chips Ultramid B33 L (Nylon Chips)	30000	Kgs	5050881.23	Netherlands
Plastic Raw Material (Pa66) (Nylon66) Polyamide Regenerated	17650	Kgs	2213427.37	Taiwan
Ultramid C40 L 07 (Nylon Chips) Nylon 6/66 Copolymer Chips	30000	Kgs	6558616.8	Belgium

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
CATEGORY: METAL				
Calcium Metal Granules	1050	Kgs	254265.48	China
Selenium Granule 99.95% Min Puirty	865.15	Kgs	3456095.59	Korea
Selenium Granule 99.95% Min Puirty	134.85	Kgs	538697.83	Korea
Silicon Metal - Grade 553	24	Mts	3017261.88	China
Silicon Metal #441 Size:10-100mm 90pct Min	24	Mts	3060687.84	Marshall Islands
Silicon Metal 3303	10	Mts	1327233.43	China
Sodium Metal Adc S.No.1449	24000	Kgs	3654180	China
Sodium Metal Adc S.No.1449	14000	Kgs	2012139.68	France
Sodium Metal Adc S.No.1449	24000	Kgs	3371396.16	China
Sodium Metal Adc S.No.1449	7175	Kgs	1031221.58	France
Sodium Metal Adc S.No.1449	14000	Kgs	2155289.5	France
Sodium Metal Adc S.No.1449	6825	Kgs	980918.09	France
Sodium Metal Adc S.No.1449	14000	Kgs	2000880.7	France
Sodium Metal Adc S.No.1449	24000	Kgs	3286847.04	China
Sodium Metal Adc S.No.1449	24000	Kgs	3325000.8	China
Sodium Metal Adc S.No.1449 (Part Consignment)	12000	Kgs	1629927.9	China
Sodium Metal Adc S.No.1449 (Part Consignment)	12000	Kgs	1629927.9	China
Sodium Metal (Adc List Sl.No. 1449 Dt 02-01-2012)	20000	Kgs	2739039.2	China
Sodium Metal 2kg Ingots	16.39	Mts	2206536.79	China
Sodium Metal -2kg Ingots	18600	Kgs	2493021.26	China
Sodium Metal -2kg Ingots	18600	Kgs	2493021.26	China
Sodium Metal S+/Oil.Ing.3.2kg	21760	Kgs	3075765.12	France
Sodium Metal(Adc.List3.S.No:1449)	18600	Kgs	2523936.67	China
Sodium Metal(Adc.List3.S.No:1449)	18600	Kgs	2523936.67	China
Sodium Metal-[Adc List S.No:1449]	24000	Kgs	3241615.2	China
Sodium Metal-2 Kg Ingots	58.01	Mts	7809713.2	China
Wrought Molybdenum Metal Bar	3000	Kgs	5665571.77	China
Zinc Ingots	25.318	Mts	3262882.57	Singapore
CATEGORY: PAINT				
Apex Duracast Venezio - Asian Paints	7920	Kgs	802535.62	Italy
C Glassflake Gf007c (Pigment)	440	Kgs	137040.29	China
Cam-3(Industrial Pigments)	10000	Kgs	1129860.65	Spain
Cational Nero Rn2 (Pigments)	5	Kgs	4813.13	Italy
Color Concentrated Resin Pellet Cool Aqua [Pigment Preparation]	40	Kgs	35232.8	Korea
Contex Lt Bianco White Pigment	70	Kgs	19634.27	Italy
Heliogen Blue L 6700 F - Pigment	150	Kgs	478472.15	Belgium
Heliogen Blue L 6975 F - Pigment	150	Kgs	263056.12	Belgium
Idropal Nero Ct (Pigment)	200	Kgs	32188.91	Italy
Indinor Black 3422 (Pigment)	510	Kgs	110038.24	Portugal
Iron Oxide Dark Black	2000	Kgs	145303.65	China
Iron Oxide Red 110	4000	Kgs	267864.12	China
Iron Oxide Red 110a	1500	Kgs	100449.05	China
Iron Oxide Red 120	3500	Kgs	225536.54	China
Iron Oxide Red 130	4000	Kgs	257756.04	China
Iron Oxide Yellow 920	2000	Kgs	131405.04	China
Iron Oxide Red 110e	2.5	Mts	160354.7	China
Iron Oxide Red 120e	2.5	Mts	160354.7	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Iron Oxide Red 120e	2.5	Mts	160354.7	China
Iron Oxide Red 130e	1.25	Mts	80177.35	China
Iron Oxide Red H130	1.25	Mts	80177.35	China
Iron Oxide Red Lx120	8.75	Mts	502201.19	China
Iron Oxide Red R-2530	5	Mts	354072.43	China
Iron Oxide Red R-2541	2	Mts	150743.71	China
Iron Oxide Red Sa110	1.25	Mts	80177.35	China
Iron Oxide Yellow 311	1.25	Mts	81020.78	China
Iron Oxide Yellow 313	1.25	Mts	81019.13	China
Kappa Nero (Pigments)	90	Kgs	24467.33	Italy
Lustratop Black Ds(Pigment)	115	Kgs	19536.07	Italy
Lustratop Black Ds(Pigment)	285	Kgs	48415.49	Italy
Master Batch Ppm 0267 Black - Pigment	25	Kgs	16502.37	Japan
Master Batch Ppm 0267 Black - Pigment	25	Kgs	16502.37	Japan
Microperse Iii Naphthol Red (Pigment)	2045	Kgs	1183933.4	USA
Neosan 2000 Yellow 01 Liq (Pigments)	30	Kgs	21132.2	Germany
Neosan Lucido Black Liq(Pigments)	90	Kgs	23690.59	Germany
Neosan Lucido Dark Brown Liq (Pigments)	120	Kgs	113404.11	Germany
Neosan Lucido Deep Black Liq(Pigments)	150	Kgs	56960.97	Germany
Nubifer M-4781 (Iron Oxide)	500	Kgs	66659.36	Columbia
Nubifer Y-805k (Iron Oxide)	2000	Kgs	621049.94	Columbia
Nubiperf Ar (Inorganic Pigments)	500	Kgs	233551.25	Spain
Nubix V-10 (Inorganic Pigments)	1000	Kgs	437467.23	Spain
Oilwell Chemicals - Potassium Chloride-1000kg Bag(80bag)	80000	Kgs	4683031.65	Singapore
Paint (Finished Paint) (928c.A (M.E.K.P.O)	38.25	Kgs	7490.72	Korea
Paint (Finished Paint) (Yy900)	80	Ltr	8844.57	Korea
Paliogen Red L 3885 - Pigment	90	Kgs	672268.9	Belgium
Paliotol Yellow L 2140 Hd -Pigment	120	Kgs	341765.82	Belgium
Palmstar Cast 325 Calcium Stearate	13	Mts	1207416.61	Malaysia
Pearl Pigment Cr 5300	100	Kgs	47381.63	China
Pearl Pigment Cr 5500	200	Kgs	90972.72	China
Phthalocyanine Blue Crude (Organic Pigment)	20000	Kgs	6696603	Korea
Pp-25-884(Pigments)	180	Kgs	39697.51	Singapore
Pp-8027 Torotex(Pigments)	120	Kgs	132143.13	Spain
Pp-8058 Torotex(Pigments)	30	Kgs	31548.9	Spain
Pp-8058 Torotex(Pigments)	90	Kgs	93423.14	Spain
Pp-8080 Torotex(Pigments)	25	Kgs	19329.45	Spain
Pp-8080 Torotex(Pigments)	75	Kgs	57920.76	Spain
Ppm 9031 Black - Pigment	25	Kgs	17346.44	Japan
Pt-42-6609 (Kr-Odct-7780/E/18k) (Pigment)	198	Kgs	136347.61	Korea
Pu Pigment Paste 1902/124 Grey For Shoes -	50	Kgs	58521.4	France
Sarkol Ct 1021 Black [Pigments]	360	Kgs	97065.89	Turkey
Sarkol K Black 300 [Pigment]	360	Kgs	58557.78	Turkey
Sicotrans Red L 2817 - Pigment	150	Kgs	131916.43	Belgium
Sicotrans Red L 2817 - Pigment	250	Kgs	219860.71	Belgium
Skin Color Black E (Pigment)	120	Kgs	23328.7	Italy
Skin Color White E (Pigment)	60	Kgs	13371.33	Italy
Titanium Dioxide Rutile TiOxide Tr92 (Pigments)	10000	Kgs	1772045	Malaysia
Titanium Dioxide Rutile TiOxide Tr92 (Pigments)	20000	Kgs	3737404	Italy
Titanium Dioxide Rutile TiOxide Tr92 (Pigments)	10000	Kgs	1813051	Italy
Titanium Dioxide Rutile TiOxide Tr92 (Pigments)	10000	Kgs	1813051	Italy
Titanium Dioxide Rutile Ti-Pure R902+ (Pigments)	20000	Kgs	4207801.4	Singapore

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
CATEGORY: PLASTIC				
(Ldpe) Granules Lupolen 3020k	23175	Kgs	3328128.6	Italy
(Lidpe) Granules Grade Total Supertough 32st05	2750	Kgs	407264.93	Italy
Bj368mo Bag Polypropylene	16.5	Mts	1584441.54	UAE
Dow Ldpe 352e	24750	Kgs	2440105.97	Spain
Dow Ldpe 352e	24750	Kgs	2440105.97	Spain
Dow Ldpe 352e	24750	Kgs	2440105.97	Spain
Dow Ldpe 352e	24750	Kgs	2440105.97	Spain
Dow Ldpe 410 E	99000	Kgs	9569192.99	Netherlands
Dow Ldpe 410 E	123750	Kgs	11961491.23	Netherlands
Expanded Polypropylene Beads (Arpro5319-30p W)	1677.4	Kgs	589081.24	Singapore
Expanded Polypropylene Beads Arpro5911-5p W	3200	Kgs	1081564.56	Singapore
Exxonmobil Ap3aw Polypropylene Co- Polymers	48	Mts	5010698.88	Singapore
Exxonmobil Ap3aw Polypropylene Co Polymers(Polypropylene Granules)	48	Mts	5010698.88	Singapore
Exxonmobil Ap3aw Polypropylene Copolymers (Po No.Ppo/00520)	72	Mts	7516048.32	Singapore
Exxonmobil Lidpe LI 1001 Xv	19.875	Mts	1993965.74	Singapore
Exxonmobil Pp7033e3 5050823 (Polypropylene Copolymer)	16.5	Mts	1646985.29	Singapore
Exxpol Enhance Pp8224e1 (Polypropylene)	18.75	Mts	2584037.03	USA
Hdpe Granules (High Density Polyethylenegrade: Marlex Hxm Tr571)	32000	Kgs	3018024.43	Qatar
Hdpe Granules Grade Hxm Tr-571	48000	Kgs	4607236.2	Qatar
Hdpe Granules Grade Hxm Tr-571	48000	Kgs	4519947.96	Qatar
Hdpe Recycled Granules	54	Mts	3263845.5	Malaysia
Hdpe Sabic M80064 (High Density Polyethylene)	17	Mts	1610975.25	Saudi Arabia
Hdpe White Regrinding Chips	24.13	Mts	1725367.01	Korea
High Density Polyethylene (Hdpe) - He6062	33000	Kgs	3402326.4	UAE
High Density Polyethylene (Hdpe)-Borstar-He6062	49500	Kgs	5103489.6	UAE
Hj311mo Bag Polypropylene	16.5	Mts	1584441.54	UAE
Hj325mo Bag Polypropylene	16.5	Mts	1594840.5	UAE
Hj325mo Bag Polypropylene	16.5	Mts	1563593.63	UAE
Ldpe - Polyethylene	16249.9	Kgs	1487670.29	USA
Ldpe Lotrene Fe8004	16500	Kgs	1626137.37	Qatar
Ldpe Lupolen 2426f	48000	Kgs	4904721.6	Saudi Arabia
Ldpe Lupolen 2426f	48000	Kgs	4763256.96	Saudi Arabia
Ldpe Off Grade (Ldpe Granules)	85210	Kgs	7984266.37	USA
Ldpe Recycled Granules	27	Mts	1780322.51	Malaysia
Ldpe Recycled Granules	81	Mts	5296503.83	Malaysia
Ldpe Recycled Granules	81	Mts	5340947.32	Malaysia
Ldpe Reprocessed Granules	49.75	Mts	3088432.51	Malaysia
Ldpe) Granules Polybatch F20n	300	Kgs	107706.43	Italy
Linear Low Density Polyethylene (Lidpe) - Le3362	66000	Kgs	6251774.76	UAE
Linear Low Density Polyethylene (Lidpe) "Lotrene" Q1018h	34500	Kgs	3478576.35	Qatar
Linear Low Density Polyethylene (Lidpe)"Lotrene" Q1018h	69000	Kgs	6495073.16	Qatar
Lidpe - Polyethylene	17354.4	Kgs	1588786.47	USA
Lidpe Exxonmobil LI1001kw	16.327	Mts	1567828.91	Singapore
Lidpe Exxonmobil LI1001kw	159.362	Mts	15303016.53	Singapore
Lidpe Exxonmobil LI1001kw	16.311	Mts	1566292.48	Singapore
Lidpe Fc21hn (Linear Low Density Polyethylene) ("Qamar")	24750	Kgs	2354090.52	Saudi Arabia
Lidpe Innoplus LI7410d	54	Mts	5140285.61	Thailand
Lidpe Reprocessed Pellets	26.39	Mts	1956009.73	Saudi Arabia
Lidpe Reprocessed Pellets	25.33	Mts	1877435.57	Saudi Arabia

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Lldpe Reprocessed Pellets (Blue / Red Pellets)	7.61	Mts	588579.57	UAE
Lldpe Reprocessed Pellets (Natural Pellets)	17.4	Mts	1513987.53	UAE
Lldpe Sabc 118w (Linear Low Density Polyethylene)	6.75	Mts	605603.83	Saudi Arabia
Lldpe Sabc 118w (Linear Low Density Polyethylene For Blown Film)	16.5	Mts	1563593.63	Saudi Arabia
Lldpe Sabc 118w (Linear Low Density Polyethylene)	74250	Kgs	7033356.84	Saudi Arabia
Lldpe Sabc 218w (Linear Low Density Polyethylene)	49500	Kgs	4688904.57	Saudi Arabia
Lldpe Sabc R50035 (Linear Low Density Polyethylene)	49500	Kgs	4815868.37	Saudi Arabia
L-Lysine Monohydrochloride Feed Grade (For Feedsupplement Only)	18000	Kgs	1879329.32	Indonesia
Low Density Polyethylene (Ldpe) "Lotrene" Fb5026	12	Mts	1221744.48	Qatar
Low Density Polyethylene (Ldpe) " Lotrene" Fb3003	4.5	Mts	458154.18	Qatar
Low Density Polyethylene (Ldpe) "Lotrene" Fb5026	10	Mts	998172.9	Qatar
Low Density Polyethylene (Ldpe) "Lotrene" Fe8004	33000	Kgs	3461320.5	Qatar
Low Density Polyethylene (Ldpe)"Lotrene" Fb3003	6.5	Mts	648812.39	Qatar
Low Density Polyethylene (Ldpe)"Lotrene" Fe8004	33000	Kgs	3274739.16	Qatar
Low Density Polyethylene (Ldpe)"Lotrene" Fb5026	16500	Kgs	1679898.66	Qatar
Mr2022 Trek-2-T (B-01) Polypropylene	125	Kgs	32082.73	Thailand
Mr2036 Trek-2-T (Gy-138) Polypropylene	50	Kgs	10479.28	Thailand
Mr5031 Aw564natural Polypropylene	100	Kgs	14703.24	Thailand
P7-45fg-0790 Bk711 Polypropylene (Actual User)	5115.9	Kgs	849859.26	USA
Plastic Reprocessed Granules (Fine Lldpe Quality)	31	Mts	2027040.91	Thailand
Plastic Reprocessed Granules (Lldpe Fine Quality)	54	Mts	3530786.08	Malaysia
Polyethylene " Qamar " (Lldpe) Fc21 Hn	16.75	Mts	1570358.04	Saudi Arabia
Polyethylene "Qamar" (Lldpe) Fd21hn	16.75	Mts	1570358.04	Saudi Arabia
Polypropylene	24.75	Mts	2456054.37	UAE
Polypropylene Bi870	7000	Kgs	698657.4	Korea
Polypropylene Exxtral Bmv21210000	24	Mts	2842897.5	Singapore
Polypropylene Adstif Ea5076	16000	Kgs	1816416.32	Korea
Polypropylene Adstif Ea5076	10000	Kgs	1135260.2	Korea
Polypropylene Block Copolymer Yuhwa Grade: Sb9230	16000	Kgs	1804264	Korea
Polypropylene Block Copolymer Yuhwa Grade: Sb9230	16000	Kgs	1804264	Korea
Polypropylene Bmu140h30602	10	Mts	1073983.5	Singapore
Polypropylene Bmu140h30602	12.9459	Mts	1561301.81	USA
Polypropylene Bmu140h30602	5.8041	Mts	699986.24	USA
Polypropylene Copolymer (B380g)	38037.5	Kgs	3871294.35	Korea
Polypropylene Copolymer (B380g)	38433.6	Kgs	3911607.71	Korea
Polypropylene Copolymer (B380g)	8528.9	Kgs	868035.03	Korea
Polypropylene Copolymer (Bj368mo)	1375	Kgs	133339.79	UAE
Polypropylene Copolymer (Bj368mo)	7683.5	Kgs	745102.74	UAE
Polypropylene Copolymer (Bj368mo)	27573.5	Kgs	2673923.41	UAE
Polypropylene Copolymer (Bj368mo)	12868	Kgs	1247866.48	UAE
Polypropylene Copolymer (Bx3920)	102000	Kgs	10703319.56	Korea
Polypropylene Copolymer (Ep540v)	32227.7	Kgs	3400121.77	Korea
Polypropylene Copolymer (Ep540v)	18772.3	Kgs	1980535.56	Korea
Polypropylene Copolymer (Ep547u)	12402	Kgs	1284944.18	Korea
Polypropylene Copolymer (Ep547u)	4000	Kgs	414431.28	Korea
Polypropylene Copolymer (Ep547u)	39725	Kgs	4115820.65	Korea
Polypropylene Copolymer (Ep547u)	87508	Kgs	9066513.11	Korea
Polypropylene Copolymer (Ep547u)	77365	Kgs	8015619	Korea
Polypropylene Co-Polymer-Bj520	50	Mts	4080684.28	Korea
Polypropylene Co-Polymer-Bj520	30	Mts	2566725.12	Korea
Polypropylene Co-Polymer-Bj520	21.75	Mts	1860875.71	Korea
Polypropylene D-10: Gsf-79 (Pp-Gf-25) - Black	10975	Kgs	1951184.25	Thailand
Polypropylene D-10: Gsf-79 (Pp-Gf-25) - Black	10975	Kgs	1951184.25	Thailand
Polypropylene Exxonmobil Pp7032e3	16.5	Mts	1678257.16	Singapore
Polypropylene Exxtral Bmv212w30602 Zct Mid Grey	12.1	Mts	1502092.28	Singapore

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Polypropylene Exxtral Bmv212w30602 Zct Mid Grey	11.9	Mts	1477264.3	Singapore
Polypropylene Exxtral Bmv212w30602 Zct Mid Grey	24	Mts	2979356.58	Singapore
Polypropylene Film- Type-R 10.1mic*200mm (For Capacitor)	2000	Kgs	889244.4	Japan
Polypropylene Film- Type-R 10.1mic*320mm (For Capacitor)	3500	Kgs	1556177.7	Japan
Polypropylene Film- Type-R 14.5mic*320mm (For Capacitor)	2000	Kgs	846715.32	Japan
Polypropylene Grade: 3155e3 (Add Notfn 119/2010 S.No.19aapplicable)	45000	Kgs	4614018.55	Singapore
Polypropylene Grade: 3155e3 (Add Notfn 119/2010 S.No.19aapplicable)	45000	Kgs	4614018.55	UAE
Polypropylene Grade: 5722e1 (Add Notfn 119/2010 S.No.19aapplicable)	95450	Kgs	9658913.39	Singapore
Polypropylene Grade:	48000	Kgs	4825117.44	Saudi Arabia
Polypropylene Grade:	24750	Kgs	2519847.99	UAE
Polypropylene Grade:	24750	Kgs	2470477.93	UAE
Polypropylene Granuels(Grade:Ppcc B350f)	6247.5	Kgs	714386.97	Korea
Polypropylene Granuels(Grade:Ppcc B350f)	11752.5	Kgs	1343870.82	Korea
Polypropylene Granules (Moplen Hp456j)	48000	Kgs	4825117.44	Saudi Arabia
Polypropylene Granules (Moplen Hp456j)	48000	Kgs	4825117.44	Saudi Arabia
Polypropylene Granules (Moplen Hp456j)	46839	Kgs	4708409.91	Saudi Arabia
Polypropylene Granules (Moplen Hp456j)	1161	Kgs	116707.53	Saudi Arabia
Polypropylene Granules Grade 7033e3	33000	Kgs	3359797.32	Singapore
Polypropylene Granules Grade Be961mo	24750	Kgs	2361026.37	UAE
Polypropylene Pp7855e1	22.5	Mts	2380926.66	USA
Polypropylene Pp7855e1	22.5	Mts	2380926.66	USA
Polypropylene Rafia Grade Ht031	5772.5	Kgs	559420	Kuwait
Polypropylene Rafia Grade Ht031	22839.5	Kgs	2213403.74	Kuwait
Polypropylene Rafia Grade Ht031	169388	Kgs	16415597.23	Kuwait
Pp (Polypropylene) Exxtral Cmv 208 10601	12	Mts	1237228.99	Singapore
Pp (Polypropylene) Exxtral Bmv212w30602 Zct Mid Grey	24	Mts	3038896.08	Singapore
Pp (Polypropylene) Exxtral Bmv212w30602 Zct Mid Grey	24	Mts	2979356.58	Singapore
Pp (Polypropylene) Exxtral Cmv 208 10601	12	Mts	1237228.99	Singapore
Pp (Polypropylene) Exxtral Cmv 208 30601	12	Mts	1237228.99	Singapore
Pp Filament, Dia:0.18mm, Black(Bk069),	1000	Kgs	199072.76	China
Pp Talc 20% Black- Dsc502m4 Bk (Polypropylene)	6000	Kgs	403077.87	Korea
Pp Talc 20% Black- Dsc502m4 Bk (Polypropylene)	6000	Kgs	403077.87	Korea
Pp Talc 30% Black- Dsc501m6 Bk (Polypropylene)	15000	Kgs	1024564.2	Korea
Pp Talc 30% Black- Dsc501m6 Bk (Polypropylene)	4500	Kgs	307369.26	Korea
Regrind Lldpe	52.16	Mts	3272323.97	UAE
Reprocessed Ldpe Plastic Granules	81	Mts	5663505.52	Malaysia
Reprocessed Lldpe Plastic Granules	26.5	Mts	1676739.87	Malaysia
Reprocessed Lldpe Plastic Granules	26.5	Mts	1662511.22	Malaysia
Reprocessed Lldpe Plastic Granules	54	Mts	3387758.71	Malaysia
Reprocessed Polypropylene Granules	23152	Kgs	1421548.61	Saudi Arabia
Sumitomo Polyethylene Hdpe F0554	49500	Kgs	4782607.69	Saudi Arabia
Sumitomo Polyethylene Hdpe F0554	16000	Kgs	1545893.4	Saudi Arabia
CATEGORY: RESIN				
D10751857 - Zytel (R) 1011 Nc010 Nylon Resin	8000	Kgs	1567132.16	USA
D10751857 - Zytel (R) 1011 Nc010 Nylon Resin	8000	Kgs	1536428.16	USA
D10751857 - Zytel (R) 1011 Nc010 Nylon Resin	18000	Kgs	3456963.36	USA
D10751874 - Zytel (R) 70g33hs1l Nc010 Nylon Resin	1000	Kgs	157938.75	China
D10786558 - Zytel (R) 101f Nc010 Nylon Resin	3000	Kgs	579951.09	USA
D10789152 - Zytel (R) 153hs1 Nc010 Nylon Resin	1000	Kgs	614399.16	USA
D10790340 - Zytel (R) 70g50hs1 Nc010 Nylon Resin	1000	Kgs	169619.4	Korea
D10792224 - Zytel (R) 73g30l Nc010 Nylon Resin	1000	Kgs	111194.94	Thailand
D10792665 - Zytel (R) Efe7374 Bk416 Nylon Resin	2000	Kgs	367681.41	China

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
D10792665 - Zytel (R) Efe7374 Bk416 Nylon Resin	1000	Kgs	183840.71	China
D10792925 - Zytel (R) 70g13hsl Bk031 Nylon Resin	1000	Kgs	139464.84	Korea
D10793004 - Zytel (R) 70g30hsl Nc010 Nylon Resin	6000	Kgs	826335.54	China
D10793004 - Zytel (R) 70g30hsl Nc010 Nylon Resin	1000	Kgs	137722.59	China
D10793058 Zytel(R) 70g30hslr Bk099 Nylon Resin	12000	Kgs	2706396	Korea
D10793369 - Zytel (R) 70g43l Nc010 Nylon Resin	2000	Kgs	219850.74	China
D10793369 - Zytel (R) 70g43l Nc010 Nylon Resin	4000	Kgs	437241.12	China
D10796642 - Zytel (R) Fr50 Nc010 Nylon Resin	4000	Kgs	1014540.96	China
D10796642 - Zytel (R) Fr50 Nc010 Nylon Resin	4000	Kgs	1208856.88	China
D10796642 - Zytel (R) Fr50 Nc010 Nylon Resin	2000	Kgs	592586.19	China
D10810516 - Zytel (R) 70g33l Nc010 Nylon Resin	5000	Kgs	666501.53	China
D10906520 - Zytel (R) 103hsl Nc010 Nylon Resin	2000	Kgs	464971.68	USA
D10906520 - Zytel (R) 103hsl Nc010 Nylon Resin	3000	Kgs	693554.88	USA
D10919887 - Zytel (R) Mt409ahs Bk010 Nylon Resin	2000	Kgs	382843.53	China
D10919887 - Zytel (R) Mt409ahs Bk010 Nylon Resin	3000	Kgs	574265.3	China
D10939871 - Zytel (R) Wrf403 Nc010 Nylon Resin	1000	Kgs	559744.02	Japan
D11077430 - Zytel (R) 3189hsl Bkb010 Nylon Resin	4000	Kgs	1051240.32	Korea
Hdpe Resin Novatec Hj221 Natural	950	Kgs	162991.05	Japan
Hdpe Resin Novatec Hj221 Natural	50	Kgs	8268.41	Japan
Ldpe - Pel - Low Density Polyethelene Resin Natural (Off Grade)	14868	Kgs	1340719.43	USA
Ldpe - Pel - Low Density Polyethelene Resin Natural (Off Grade)	14861	Kgs	1340088.21	USA
Ldpe - Resin Polymer-E Grade C7100	32000	Kgs	3681086.4	Taiwan
Marlex High Density Polyethylene Resin Hhm 5502bn	128	Mts	11406226	Saudi Arabia
Natural Nylon Chips 21spc Pa66 Vydyne + Resin	19000	Kgs	3460753.39	USA
Nylon Resin (Zytel (R) 70g30hsl Nc010 25 Kg Bag) (Part No: 18222-1)	1000	Kgs	288765.74	China
Nylon Resin (Zytel (R) 77g33l Bk031 25kg Bag) (Part No: 703146-1)	1000	Kgs	603083.92	Thailand
Nylon Resin (Zytel (R) 79g13hsl Bk039 25kg Bag) (Part No: 702596-2)	1000	Kgs	328443.63	China
Poly Vinyl Chloride Resin Suspension Grade Ls 100 (Powder Form)	51.9	Mts	3508325.04	Korea
Polyacetal Resin Kepital Af-11 Nat (	0.5	Mts	273861.5	Korea
Polyacetal Resin Kepital F10-03h	11.25	Mts	1109139.08	Korea
Polyacetal Resin Kepital F20-03 Bk	3.5	Mts	372129.45	Korea
Polyacetal Resin Kepital F20-03 Nat	18	Mts	1542645.72	Korea
Polyacetal Resin Kepital F25-03 Nat	18	Mts	1560043.98	Korea
Polyacetal Resin Kepital Fg2025 Nat	2	Mts	287393.48	Korea
Polyamide [Nylon] 12 Resin Grilamid Xt4514 Black 9015	10420	Kgs	9742672.91	Korea
Polyamide Resin Grade	16000	Kgs	3521923.33	Thailand
Polypropylene Resin 6331	9318	Kgs	978706.25	Taiwan
Polypropylene Resin 6331	7682	Kgs	806870.73	Taiwan
Polypropylene Resin 6331	51000	Kgs	5348437.83	Taiwan
Polypropylene Resin Black (H100t)	2720.42	Kgs	189293.59	Thailand
Polypropylene Resin Black (H100t)	14565.1	Kgs	1013473.12	Thailand
Polypropylene Resin Black (H100t)	13294.2	Kgs	925040.04	Thailand
Polypropylene Resin Black (H100t)	7108.37	Kgs	494618.07	Thailand
Polypropylene Resin Black (H100t)	10958	Kgs	762483.52	Thailand
Polypropylene Resin Black (H100t)	11354	Kgs	790040.96	Thailand
Polypropylene Resin Black (H100t)	60000	Kgs	4174828.12	Thailand
Polypropylene Resin Black (H100t)	60000	Kgs	4151501.28	Thailand
Polypropylene Resin Copolymer (0103-001846)	15000	Kgs	1525686.02	Thailand
Polypropylene Resin Desp Pp Grade No.Hlg74b P9	30	Mts	4321204.2	Korea
Polypropylene Resin Desp Pp Grade No.Hlg74b P9	30	Mts	4321204.2	Korea
Polypropylene Resin Desp Pp Grade No.Mt62cpa P9	0.5	Mts	58753.22	Korea
Polypropylene Resin Desp Pp Grade No.Mt62cs2 P5	3	Mts	352519.29	Korea
Polypropylene Resin Desp Pp Grade No.Mt62cs3 P9	10	Mts	1175064.3	Korea
Polypropylene Resin Desp Pp Grade No.Mt62cs3 P9	9.5	Mts	1116311.09	Korea
Polypropylene Resin Desp Pp Grade No.Mt62cs5 P5	20	Mts	2350128.6	Korea

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Polypropylene Resin Desp Pp Grade No.Mt62cs5 P5	17	Mts	1997609.31	Korea
Polypropylene Resin Gray (H200t)	15000	Kgs	1323047.31	Thailand
Polypropylene Resin Gray (H200t)	11511.2	Kgs	1015290.27	Thailand
Polypropylene Resin Gray (H200t)	3488.85	Kgs	307718.64	Thailand
Polypropylene Resin Gray (H200t)	15000	Kgs	1315616.6	Thailand
Polypropylene Resin St868m	17000	Kgs	1900950.8	Taiwan
Polyvinyl Chloride Resin Suspension Grade: S-65d(Powder Form)	108000	Kgs	7376862.24	Taiwan
Pp Resin Cosmoplene Az564g	48	Mts	4781815.1	Singapore
Pp Resin Prime Polypro J705ug Natural	1500	Kgs	253220.08	Japan
Pp Resin Prime Polypro J705ug Natural	1500	Kgs	253220.08	Japan
Pp Resin Prime Polypro J705ug Natural	2000	Kgs	337626.78	Japan
Pp Resin V7000 Natural	700	Kgs	223316	Japan
Vydyne Resin 21spc (Nylon Chips Natural)	19000	Kgs	3645571.32	USA
Vydyne Resin 21spc (Pa66 Nylon Chips Natural)	19000	Kgs	3489372.39	USA
Vydyne Resin 21spc (Pa66 Nylon Chips Natural)	13000	Kgs	2387465.32	USA
Zytel (R) 101f Nc010 25 Kg Bag Nylon Resin	12000	Kgs	2299904.33	Singapore
Zytel(R) E51hsb Nc010 25kg Bag (Nylon Resin)	19975	Kgs	5044692.08	Belgium
Zytel(R) E51hsb Nc010 25kg Bag Nylon Resin	20000	Kgs	5022795.65	Belgium
CATEGORY: WAX				
Fully Refined Paraffin Wax (M.P. 58/60 Deg.C)	21.5	Mts	1911202.3	China
Fully Refined Paraffin Wax 58/60 (M.P. 58/60 Deg.C)(Kunlun Brand)	61.5	Mts	5190639.98	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C	21.5	Mts	1921956.65	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C(Kunlun Brand)	61.5	Mts	5215796.55	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C.(Kunlun Brand)	61.5	Mts	5479940.59	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C.(Kunlun Brand)	61.5	Mts	5479940.59	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C.(Kunlun Brand)	61.5	Mts	5295459.04	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C.(Kunlun Brand)	61.5	Mts	5295459.04	China
Fully Refined Paraffin Wax M.P. 58/60 Deg.C.(Kunlun Brand)	61.5	Mts	5479940.59	China
Fully Refined Paraffin Wax - Type I	17472	Kgs	2679755.34	Japan
Fully Refined Paraffin Wax 125/130	15736	Kgs	2020680.82	Japan
Fully Refined Paraffin Wax 140/145	17472	Kgs	2165056.13	Japan
Fully Refined Paraffin Wax 140/145	17472	Kgs	2231511.83	Japan
Fully Refined Paraffin Wax 140/145	1736	Kgs	217376.76	Japan
Fully Refined Paraffin Wax 58/60	100000	Kgs	8889313	China
Fully Refined Paraffin Wax 58-60 Oil Content 0.5% Max.	7465	Kgs	669679.25	Hong Kong
Fully Refined Paraffin Wax 58-60 Oil Content 0.5% Max.	14035	Kgs	1259068.77	Hong Kong
Fully Refined Paraffin Wax 62/64	60000	Kgs	5741425.8	China
Fully Refined Paraffin Wax 62/64	42500	Kgs	4066843.28	China
Fully Refined Paraffin Wax M.P 58/60 Deg.C	21500	Kgs	1908373.92	China
Fully Refined Paraffin Wax M.P.: 58/60 Deg.C. Oil Content: 0.5% Max	20.5	Mts	1753713.5	China
Fully Refined Paraffin Wax M.P.: 58/60 Deg.C. Oil Content: 0.5% Max	20500	Kgs	1884367.23	China
Fully Refined Paraffin Wax M.P.58/60 Deg.C	20000	Kgs	1849370.6	China
Fully Refined Paraffin Wax M.P.:58/60 Deg.G	43	Mts	3843913.3	China
Fully Refined Paraffin Wax, Mp:58/60 Deg C, Oil Content: 0.5%	20500	Kgs	1884367.23	China
Microcrystalline Wax (Microcrystalline Petroleum Wax)	15902.7	Kgs	2551591.66	USA
Microcrystalline Wax 2580	10000	Kgs	1036764.49	Hong Kong
Microcrystalline Wax 2580	26000	Kgs	2695587.69	Hong Kong
Microcrystalline Wax Blend Redezon 503	2000	Kgs	311282	Spain
Microcrystalline Wax Blend Redezon 503	2000	Kgs	311282	Spain
Microcrystalline Wax Redezon C-251 Saco 25 (Mc Wax)	5000	Kgs	558530	Spain
Multiwax W445 (Microcrystalline Wax)	15241	Kgs	2166424.35	USA
Multiwax W445 (Microcrystalline Wax)	15241	Kgs	2166424.35	USA

NAME OF THE CHEMICAL	QTY	UNIT	VALUE IN RS.	COUNTRY
CHEMICALS IMPORTED				
Multiwax W445 (Microcrystalline Wax)	15241	Kgs	2166424.35	USA
Multiwax W445 (Microcrystalline Wax)	15241	Kgs	2166424.35	USA
Multiwax W-445 (Microcrystalline Wax) (Iso Tank Cntr)	20000	Kgs	2653371	USA
Paraffin Wax (Fully Refined)	43000	Kgs	3769094.27	China
Paraffin Wax Fully Refined 58/60 Degree C Oil Content 0.5% Max	20	Mts	1863300.52	China
Polyalkylenes Waxes	50	Kgs	12221.3	Korea
Redezon C-250 P Saco 25 (Paraffin Wax)	500	Kgs	77820.5	Spain
Semi Refined Paraffin Wax	50.73	Mts	3312688.05	UAE
Semi Refined Paraffin Wax Grade A	37040	Kgs	3073520.58	Iran
Shell Gtl Sarawax Sx55r - Paraffin Wax	20000	Kgs	1614077.44	Malaysia
Shell Gtl Sarawax Sx60s - Paraffin Wax	3000	Kgs	248863.73	Malaysia
Shell Gtl Sarawax Sx60s - Paraffin Wax	26000	Kgs	2156819.02	Malaysia
Shell Gtl Sarawax Sx60s - Paraffin Wax	31000	Kgs	2571591.91	Malaysia
Shell Gtl Sarawax Sx60s - Paraffin Wax	60000	Kgs	4957073.59	Malaysia
Shell Gtl Sarawax Sx60s - Paraffin Wax	30000	Kgs	2449755	Malaysia
Shell Gtl Sarawax Sx60s - Paraffin Wax	30000	Kgs	2449755	Malaysia
Shell Gtl Sarawax Sx55r - Paraffin Wax	20000	Kgs	1607526.45	Malaysia
Unhydrotreated Alexwax 600 (Unhydrotreated Fully Refined Paraffin Wax	40000	Kgs	3462017.4	Egypt
Unhydrotreated Alexwax 600 Fully Refined Paraffin Wax)	40000	Kgs	3462017.4	Egypt
Varazon 5998 (Paraffin Wax) (162502)	22.4	Mts	2814651.84	Germany
Varazon 5998 (Paraffin Wax) (162502)	22.4	Mts	2814651.84	Germany