CHEMITHON ENGINEERS PVT. LTD.

Engineering an environmental makeover with innovative equipment

Chemithon Engineers P. Ltd. is a part of Chemithon Enterprise Inc, a privately held group of technology companies offering air pollution control systems, process development, engineering, plant equipment manufacturing and other services. Through its group companies, Chemithon provides integrated and comprehensive service to its customers — right from sulphonation & environmental equipment, surfactant raw materials trading, marketing support services to project advisory & consultancy services.

Sulphonation — traditional business

Chemithon has for long been associated with the surfactant industry. Surfactants from its sulphonation plants are key ingredients in detergents, shampoos, toothpaste, oil additives and other consumer & industrial products. Chemithon's sulphonation systems business emerged from the company's invention of the continuous oleum sulphonation process in the mid-1950s.

Its wide range of sulphonation reactors offers a breadth of options for each specific need. Its 'impact jet reactor' is used for alkylbenzene sulphonation for laundry detergent or other products that don't require extremely low colour. Its innovative annular falling film reactor has become the world standard when high product quality is desired.

The company has recently developed the 'TurboTube' reactor, which is suited for speciality feedstock that becomes highly viscous during sulphonation and eliminates the use of solvents & subsequent recovery systems.

Elaborating on the facilities offered by the company, Mr. S. N. Trivedi, Managing Director, Chemithon Engineers says, "For the sulphonation businesses, we have a $3-million pilot plant facility in Seattle, USA. We have a semi-commercial facility established in India, where we can run upto 50-kgs or 100-kgs an hour for evaluation purposes".

Product development activities

In these pilot plant facilities, recent product development work has been focused on the development of systems to process speciality feedstock from renewable resources like tallow, coconut, palm oil and palm stearate. "We work on basic chemical engineering principles of improving contact, improving reaction characteristics, minimising by-product formation and to have reactors, which are designed to operate on these principles.

We basically offer things, which are safe and which promote effective capital utilisation and minimum energy conservation," adds Mr. Trivedi. The company's product development work has resulted in commercial applications in the areas of:

- Dryer for concentrated detergent actives
- Powder production systems
- 1,4-Dioxane removal and destruction
- Lubricating oil sulphonation
- Methyl ester sulphonation
- Speciality chemical production
- Drying organic and inorganic materials
- Solvent extraction
- Sulphonation for enhanced oil recovery
- White oil purification

Flue gas conditioning

Apart from the sulphonation systems, Chemithon also designs and fabricates custom process equipment for various process industries; provides equipment, process and supplies to the surface finishing & printed circuit board industries and designs & manufactures pollution control systems for the power generation industry.

In the past few years, its environmental equipment business — primarily flue gas conditioning (FGC) plants — has started to bring in more revenues than all other businesses. Explains Mr. Trivedi, "Before 2002, all our engineering revenues came from sulphonation jobs. We built our first FGC plant in 2002. After that, revenues from our environmental equipment business have been increasing. In the next few years, we expect our environmental engineering services to overtake all other businesses and constitute about 65 per cent of the group turnover."

The FGC technology is of particular relevance to the thermal power industry in India, which faces the problem of high particulate emissions due to burning of high-ash coal. In response to clean air regulations, power generating utilities with coal-fired boilers use low-sulphur

coal. But lower sulphur trioxide levels in boiler flue gases make fly ash more resistant to collection in the precipitator. Chemithon's FGC systems restore or dramatically improve precipitator performance. These systems generate and inject a precisely controlled amount of sulphur trioxide (SO_3) into the flue gas stream. The SO_3 reacts to form compounds that condense on the fly ash, lowering its resistivity.

Chemithon's SO_3 generation process operates at a higher concentration, so the process air requirement is less than one-third of other systems. And, unlike conventional systems, the process air doesn't require heating during normal operation.

These design features result in significant cost savings. Chemithon, which is aiming to install FGC plants at more than 15 coal-fired power stations by the end of 2005, has successfully designed, supplied, installed and commissioned the system at nine such stations of Electricity Boards of states like Gujarat, Punjab and West Bengal. It recently bagged an order worth Rs. 9.75-crore for supplying four FGC plants for the Maharashtra State Electricity Board.

In addition to offering the SO_3 FGC systems, Chemithon has signed an MoU with the Heavy Water Board (HWB) of the Department of Atomic Energy, Govt. of India for commercialising the Ammonia FGC (AFGC) technology developed by HWB.

The company also supplies both anhydrous and aqueous ammonia systems for dual FGC (SO_3 and NH_3), and for the removal of nitrogen oxide (NOx) air pollutants using the selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) processes.

Chemithon is also developing a process to generate ammonia, as needed, using urea feedstock to eliminate the requirement for on-site storage of anhydrous or aqueous ammonia.

Expanding applications

Realising the tremendous potential of environmental services sector, last year Chemithon had focused all its resources on expanding the FGC business. The company is also exploring the possibility of extending the use of the technology beyond thermal power stations into sectors like sponge iron, refineries, cement and the aluminium for controlling emissions.

"We have a separate team to look at other applications. In the years to come, these applications will sustain the growth of our environmental businesses. So we don't restrict ourselves to FGC, but we will also look at environmental equipment like air pollution control systems," avers Mr. Trivedi.

Air pollution control equipment

Currently, Chemithon offers a wide range of air pollution control technologies to control volatile organic compounds, odours and particulate (blue haze) emissions, based on Geo-energy International Corporation designs. It also offers custom gas coolers designed to cool gas streams from cement kilns and clinker coolers.

CONCLUSION

With environmental regulations all over the world getting increasingly stringent, the future prospects for Chemithon indeed appear very bright. This is evident when Mr. Trivedi says, "Based on the growth in the environmental equipment sector, we hope to reach a turnover of Rs. 100-crore in next few years from the current level of around Rs. 10-15-crore."

With almost 70% of the power generation in the country expected to be from coal-based plants, that target could be achieved sooner rather than later.