

EXECUTIVE SUMMARY

- 1] Polyacetal resins has been established worldwide as engineering polymer material in the last 37 years. Polyacetal resin offers a unique combination of high tensile and shear strength, stiffness, toughness, abrasion resistance, chemical resistance, predictable stress-strain relationship and dimensional behaviour, light weight and comparative ease of operation; at a very competitive price.
- 2] The characteristics of Polyacetal resin makes it useful as engineering material in industrial machinery, electrical and electronic devices, automotive and plumbing applications, consumer goods, and many other miscellaneous applications.
- 3] Polyacetal resin is produced in two forms namely homopolymer and copolymer. Homopolymer has greater mechanical strength while copolymer is easier to process and is more durable.
- 4] Polyacetal homopolymer was the result of R.N. Macdonald's pioneering discovery of a high molecular weight polymer of formaldehyde. M/s. DuPont pioneered the production of polyacetal homopolymer in 1960.
- 5] M/s. Celanese came out with a copolymer of trioxane and cyclic ether. This led to the commercial production of polyacetal copolymer by Celanese in 1962.
- 6] M/s. Asahi Chemicals modified the processes of manufacturing homopolymer and copolymer.
- 7] Homopolymer and copolymer of polyacetal are being produced worldwide by DuPont, Hoechst Celanese, BASF, Mitsubishi, Asahi and their collaborators worldwide. Homopolymer is being produced mainly by DuPont's process and by a process modified by Asahi Chemicals. Copolymer is being produced mainly by Celanese's process and a process modified by Asahi Chemicals.
- 8] The present manufacturing capacity of Polyacetal resin in the world is about 600,000 tonnes per year and capacity utilization is about 80%. The demand is expected to grow at a rate of 5% per year. Many of the present manufacturers are expanding their capacities, and the expanded capacity is expected to be about 756,000 tonnes per year, by the

end of this century.

- 9] The consumption of Polyacetal resin in India at present is only 4600 tonnes per year, which is only about 1% of the world consumption. However, the demand is expected to grow at the rate of about 15% per year. The total demand is being met by imports, and at present there is no manufacturer of Polyacetal resin in India.

A number of manufacturers have letters of intent to produce Polyacetal resin in India. However, no progress has been made so far, and setting up of a polyacetal resin manufacturing plant is not likely in the near future.

DuPont is setting up a Polyacetal homopolymer compounding plant (9000 TPA) in India. The capacity is likely to be doubled in the next 6 years. DuPont is also setting up an Application Development Centre' in India.

- 10] As the demand of polyacetal resin in India is small, the plant capacity will be limited.

A comparison of the performance of plants with different processes, set up in India at 10,000 and 20,000 TPA, indicates that :

- i] Homopolymer process will be best suited for lower capacities.
- ii] Asahi's homopolymer process will have an edge over DuPont's homopolymer process.
- iii] It will not be economically feasible to set up a copolymer plant at capacities equal to or lower than 20,000 TPA.
- iv] Multinationals may find it more profitable, to export Polyacetal resin to India, rather than set up a manufacturing plant in India.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1. Polyacetal resin is a versatile engineering material with steady growth all over the world.
2. There is a good scope to set up a Polyacetal resin plant of 8000 TPA capacity immediately and this capacity can be doubled in the next 6 years, as there is potential for large growth in its demand and use in India.
3. Homopolymer technology will be the best choice for this capacity. Asahi's homopolymer technology may have an edge over that of DuPont. DuPont technology is proven for higher capacities.
4. Multinational companies may find it more profitable to export Polyacetal resin to India, rather than setting up a manufacturing plant in India.
5. 'Applications Development Centre' will be useful for developing those grades of Polyacetal resin required for Indian users and for exploring new applications. This will facilitate growth of Indian user industries in the area.

RECOMMENDATIONS

1. A Polyacetal resin homopolymer plant may be established in India, keeping in view the scope of the future demand.
2. The possibility of getting technology by the same from a suitable source *i.e.* Asahi or DuPont or developing the technology in association with national R&D laboratories and/ or academic institutes, may be explored by Indian industry.
3. Applications Development Centres and compounding facilities may be set up in India.
4. Indian manufacturers should insist to get those grades of Polyacetal resin developed which will suit their requirements.
5. Indian manufacturers of end products application using Polyacetal resin, may take necessary measure to export these products.
6. Independent testing facilities for Polyacetal resins need to be set up jointly by industry in association with existing facilities available in Industry / National Laboratories / Academic Institutes.
7. Indian standards are to be laid for Polyacetal resins by the BIS.
8. Research and Development work needs to be taken up for development and indigenisation of Polyacetal resin technology and development of new applications.