



The base curve of a soft contact lens is cut on a lathe. (Photo: Trans-Canada Contact Lens Ltd.)

La base convexe des verres de contact souples est taillée sur un tour. (Photo: Trans-Canada Contact Lens Ltd.)

cause they absorb water-soluble chemicals from the environment. Users therefore require two care solutions — one to sterilize (before each insertion) and one to clean the lenses — in order to prevent eye infection, irritation or poor visual acuity. At the present time, 80 per cent of these solutions is imported, none has been developed here, and there is no Canadian manufacturer of the plastics used to make contact lenses.

"Since little had been done in Canada to develop the technology of contact lenses," says Elias Hawa, President of the company, "it presented both an opportunity and a challenge for us to become active in the field in order to replace imports with 'home grown' products. We therefore formed a separate company, TC Ophthalmics Ltd., to carry out research and development."

"The company first approached us with a two-part proposal," says George Fraser, Project Manager of NRC's Industrial Research Assistance Program (IRAP). "One was to develop a type of plastic for soft contacts, and the second to develop a lens care solution. At that time, the Company had no technical staff, which made it difficult to present

a really good IRAP proposal although the company's basic ideas seemed sound. I thought short-term assistance under MINI-IRAP and STEP, rather than IRAP, would be more suitable."

Under STEP (Scientific and Technical Employment Program), two professionals were hired to develop two types of hydrophilic plastics for the making of soft contact lenses. "In-house and field tests have proved highly successful," says Mr. Hawa, "and steps have now been taken to mass-produce the blanks for commercial use. It is expected that sales in both domestic and foreign markets will exceed \$100,000 in the first year." STEP was designed in collaboration with the Ministry of State for Science and Technology to stimulate the creation of permanent jobs in the private sector for scientific or engineering graduates engaged in technological projects which are new initiatives for a company. In the two years that the program has been in operation, approximately 850 scientists, engineers and technicians have found employment in some 500 Canadian companies, and almost two-thirds of these positions have become permanent.

The next step for TC Ophthalmics Ltd. was to develop solutions for the care of soft contact lenses, one a soaking solution which they called TCO Soft Soak and the other a cleaning solution called TCO Clensol. The Company car-

ried out the research with the support of the Ontario Research Foundation, the University of Waterloo's School of Optometry, and NRC's MINI-IRAP program. (MINI-IRAP encourages small companies, with limited or no technical staff, to solve specific problems through the use of external R & D facilities in a selected research organization.) Studies to determine the stability, shelf-life and clinical safety of the two products are now being carried out. If results are favorable, Clensol will be ready for marketing early this year and Soft Soak later in the year.

"Last spring, the company again came to us, this time to develop a more advanced type of plastic," says George Fraser. "With STEP and MINI-IRAP support, the company was now in a position to lay out a well-defined IRAP project, which was subsequently approved."

"Most of the plastics used for both hard and soft contacts still have some disadvantages," says Mr. Hawa, "but we believe that these can be overcome and that we can develop a novel type of plastic which can breathe, is wettable, dimensionally stable and scratch-resistant. Financial assistance under IRAP is playing the major part in bringing this about."

The objective of the company's research will be to first synthesize a suitable material and then to achieve a higher oxygen permeability than is currently available in existing products. Primary application will be for hard contact lenses since they can be machined with greater tolerance (0.01 - 0.02 mm as compared with 0.1 - 0.3 mm for soft); too, they can be used to correct for astigmatism and are better for bifocal lenses.

Contact lens sales in Canada are forecast to more than double by 1982 (from \$21 million in 1979 to \$44 million) and it is expected that worldwide sales will exceed \$800 million by that time.

"Our new lens, with adequate oxygen permeability for both daily wear and extended (can be left in at night) wear could capture a major share of this expansion," concludes Elias Hawa. "In addition, we could use the new material in lens blanks to be sold to any manufacturer at home or abroad. Our aim is to develop and maintain a Canadian expertise in contact lens plastics and accessories. However, if it hadn't been for NRC's support, we couldn't even have gotten started."

Joan Powers Rickard