Aomori Prefecture

Andes Electric Co., Ltd.  (Hachinohe City)

Mass Producer of LCD Color Filters Achieved through Original Technologies

Technical Co., Ltd.  (Hirosaki City)

Manufacturer of Specialized Optical Prisms with Original Know-how

TEFCO (Technology by Electro Forming Corporation)
Aomori  (Hirosaki City)

Unrivaled manufacturer of electrolytic sheets for timepiece figures
Andes Electric (including its 2 overseas affiliated companies) has production capacity of 2.4 million sheets of LCD color filter (equivalent for 240 million cellular phones) a year: color filters produced by Andes have been applied to approximately 30% of cellular phones in the world.

**Color Filters (CF) essential to LCD color display**

Color Filters (CF) are transparent glass substrates on which the patterns of three primary colors (RGB) are regularly arranged, available for making LCD color display.

**Andes’ original technologies enable the mass production of transflective CFs**

CFs are roughly classified into three types: transmission, reflection and transflective. For cellular phones, PDA and video games, transflective CFs are suitable because they make the display visible either in natural or poor light. On the other hand, high-level quality control and cost performance are required for the mass production of transflective CFs, as its cell structure and the formation of transflective layer are complicated. Andes Electric Co., Ltd has achieved mass production of transflective CFs with its original technologies: on 2001, Andes established AIS corporation in Rokkasho Village in Aomori as the main footing for CF production.

**Leading company in the “Aomori Prefecture Concept of Crystal Valley”**

The “Aomori Prefecture Concept of Crystal Valley” is the project for the estate of advanced LCD business and technology in Rokkasho, a village in Aomori in a clean environment, located on the 41st latitude north (similar to Madrid, Rome and New York). The establishment of AIS corporation in Crystal Valley could have never been realized without President Yasuda’s extraordinary enthusiasm for industrial development in his home Aomori. Andes Co., Ltd is also a leading company of the “research society of advanced technologies for next-generation FPD (Flat Panel Display)”, the consociation between industry, the academic world and government in developing big-screen FPD.
Technical is a prism manufacturer with original know-how established by digitizing and theorizing through the intuition and experience of craftsman in the prism processing industry for the first time.

Technical has the technologies to produce the finest prototypes of specialized optical prisms in Japan.

Technical, one of Japan’s finest manufacturers of optical prisms, supplies its products around the world.

Technical Co., Ltd designs and manufactures prisms diverse in size from large to microscopic: it processes, coats and connects the world’s smallest 0.2mm right angle triangle prisms.

Technical is one of the rare specialists of prism production and the only expert in prototype prisms in Japan. More than 300 customers including R & D departments of major companies deal with Technical.

Development of Chrovit, optical components available for multidirectional and simultaneous observation

Chrovit is a new optical component for simultaneous focusing on more than one object at different distances: it is a composition of prisms diverse in size, shape and refraction factor available for photo length correction. With Chrovit, it is possible to simultaneously observe two sides of a coin or six faces of a dice with a camera. Chrovit has been noticed by many businesses in diverse spheres e.g. medical devices, semiconductors and other manufacturers in the optical industry.

Training of young experts with manufacturing know-how established by Technical

President Yamauchi has given young technicians theoretical training on his original manufacturing know-how: that is why Technical’s young engineers of around thirty years of age are skilled in prism processing.
TEFCO’s electrolytic forming technologies are applied to timepiece figure printing, and realize a drastic saving of power and costs in manufacturing timepieces. TEFCO Aomori, with international patents for its electrolytic forming technologies, supplies its products in the global market.

**Revolutionary technologies in the analog watch industry**

For as long as 200 years, figures on watch faces had been typed one by one: even skilled workers take as long as 10 minutes to type the figures on a watch. “Timepiece figure printing,” the electrolytic forming technology originally developed by TEFCO, allows the time for making a watch faces to be reduced to as short as 5 seconds, while giving a variety of watch face designs.

**Outline of electrolytic timepiece figure printing**

The design of a watch face is photographed on a sensitized stainless plate, on which the figures are electrolytically formed with metal film. A film coated with special adhesive is put on and off a stainless plate, so that metal figures can be peeled off the plate and stuck to a film. As all the figures are printed with the film at once, the time for making a watch face can be drastically reduced. As electrolytic plating is available for fine lines up to 1,000 microns, it also enables delicate and complicated watch face designs with few technical restrictions.

In spite of a succession of hardships, TEFCO never stopped technical efforts to develop unique manufacturing technologies until it dominated the global market. Now, TEFCO has expanded the market with its new products.

The development of electrolytic forming technologies had not been satisfactory in the beginning: TEFCO was teetering on the edge of bankruptcy because of successive failures. Nevertheless, President Nakayama never gave up on the research and development of unique electrolytic printing, until TEFCO obtained patents for its technologies both in Japan and other countries for export. Now, it is estimated that TEFCO’s electrolytic printing has been applied to approximately 20% of “high-priced” watches, including quality brands well-known in the world. TEFCO has expanded business furthermore by its new product “TEFCO Mirror,” a faceplate film available for very thin plates pressed down to an “impossible” 30 microns thick.