

## **CASE STUDY 2 – TPE / Thermoset co-extrusion**

### Brief

ARTIS were tasked with developing a product for the milk tubing market, which would allow an inert, milk friendly lining to be used with a vulcanised, protective rubber sheath for durability.

### Solution refinement

Several design and material combinations were proposed initially from thin walled, convoluted, rigid designs to multiwall co-extrusions. A final combination based on an FDA compliant thermoplastic vulcanisate (TPV) inner with an EPDM rubber outer was selected following extensive laboratory trials.



*Picture of tubing*

### Factory Trial

A 'proof of principle' factory trial was conducted using a TPV inner sheath, which was covered with an EPDM outer using a crosshead extrusion technique. The sample was vulcanised in a steam autoclave under optimum cure conditions.

### Production phase

A dual co-extrusion technique was recommended for full rate production. ARTIS acted as technical adviser for the £40,000 development, working closely with a leading die designer to develop a custom die to co-extrude two materials with vastly differing rheology and temperature sensitivity. A major challenge proved to be optimisation of the cure for the conventional outer compound whilst not allowing the inner, thermoplastic material, to soften and deform and maintaining the interfacial bond between the two materials.