



## Liners Troubleshooting Manual :: Unevenness On Liners

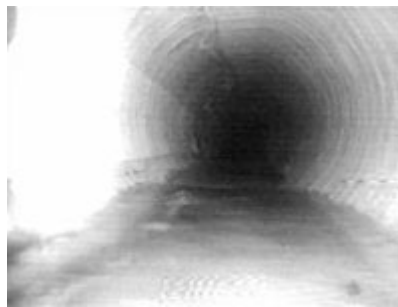
An uneven finish has been observed on finished liners. Unevenness is characterized by an undulating surface with circumferential "ridges" and/or "furrows".

**Causes:** The formation of an uneven surface on the internal surface of liners is characterized by a rippled surface which can be seen in the close-up in Figure 4 below.

The coating surface can become uneven after impregnation if the lining is retained without sufficient refrigeration. Under these conditions the styrene monomer can cause the coating to swell relative to the underlying felt resulting in an uneven surface. Air pockets can occur behind the seam (see Figure 6) due to a number of factors.



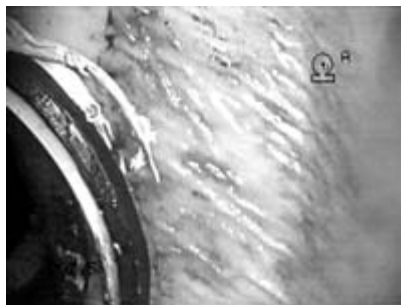
**Figure 1 :: Slightly uneven finish at 7 o'clock pulling across a seam.**



**Figure 2 :: Almost complete circumferential undulations.**



**Figure 3 :: Almost complete circumferential undulations.**



**Figure 4 :: Close-up view of uneven surface.**



**Figure 5 :: Increasingly severe undulating surface.**



**Figure 6 :: Example of air pockets behind the seam.**

**Solutions:** An uneven finish on the surface of a liner may be a function of the coating thickness and the properties of the underlying felt. This is an issue which may require a fundamental examination of these material properties. Air pockets behind liners are avoided by ensuring that the liner or calibration hose is kept tight during inversion.