



Cured in place pipeliners, in the normal case of underground sewers, are designed to withstand hydrostatic loading due to external groundwater pressure. In addition, some liners may be designed to resist the effects of soil loading and loads superimposed on the soil loads (e.g., traffic loads).

Except in significantly out-of-round pipes (e.g., ovoid pipes) the failure mode of pipeliners is considered to be due to buckling. Further, pipeliners are designed to transmit flow in the pipe as efficiently as possible, taking into consideration the relative smoothness of the walls and loss of cross-sectional area. Pipeliners are designed to significantly reduce infiltration and exfiltration to and from the surrounding soil.

**Inversion issues** - Atypical features associated with inversion problems are creases, wrinkles or fins. Fins impact on the cross-sectional area of the pipe and hence the discharge rate.

- **Circumferential fins**, unless slight, are unacceptable due to the possibility of deposition upstream. Because they are associated with thickening of the pipe wall, such fins can be ground-off.
- **Longitudinal fins**, even moderate in nature, are not detrimental to the structural or hydraulic performance of the lining.

**Seams and patch repairs issues** - An aspect of atypical features associated with seams and patch repairs is related to leaks. Where significant resin loss has occurred then structurally, an incomplete ring of pipe exists at that point.

- **Stains seams** are often due to water passing through in small quantities and impurities filtering out. Unless significant resin loss has resulted, stained seams are a question of aesthetics.
- **Leaking seams** - Even allowing only small rates of infiltration or exfiltration are a cause for concern although hydraulically are of no consequence. If there is a fear that fines may be transported from the surrounding soil then a repair might be considered, and a grout packer may be used to correct this fault.
- **Leaking patch repairs** through which groundwater can leak are unacceptable. It is possible that after grinding away the patch, a grout packer may be used to correct this issue.