WELD LINES:

Weld lines result from separation and re-joining of the melt in the mould and represent weakened areas in the moulding.

This separation can be due to a variety of design features incorporated into specific components. The most common of these are pins or plugs designed to produce holes or slots in the moulding. Typical examples are - (1) Telephone finger wheels. (2) Instrument panels or radio panels with slots or holes for switches or spindles.

The less obvious design features that can result in weld lines are where thick and thin sections are combined in a shape or in such a way that allows the thicker sections to separate, fill and the thinner sections till they meet and re-join.

Examples of this type of moulding are - (1) Tap tops - the thick and thin sections of the flutes will invariably produce weld lines in the thinnest section at the bottom of the flute. (2) Open frame sections, windows, instrument faces and lenses that incorporate a thick bezel or frame surrounding the thin centre or window. (3) Weld lines may also be produced in large components where it is found necessary to have more than one gate.

DESIGN CONSIDERATIONS:

The possibility of weld lines can usually be foreseen by the tool designer and in some cases eliminated by correct location of the gate, by using an alternative design of gate or possibly modification of the part - see illustrations.
Selection of an easier flow grade material will assist in improving the bond and strength of part.

ADJUSTMENT OF MACHINE CONDITIONS:

It is inevitable that on some components welds will occur. If all conditions are favourable it should be possible to set the machine so that the melt will re-join and bond - so the weld line is not visible. If a combination of component design, tool design or machine capability prevent elimination of weld lines it should still be possible to adjust machine conditions to produce a part of improved appearance by using the following guidelines: -

1. Increase injection pressures.

2. Adjust injection speed - high injection speeds maintain melt temperature and Improve weld. **CAUTION** if speed is too high other faults may result.

3. Adjust screw delay - this holds pressure on the part for a longer period.

4. Increase back pressure - this compacts the melt and tends to drive volatiles back through feed zone and out through hopper.

5. Adjust screw speed to give higher melt temperatures - assists in maintenance of melt temperatures and pressures.

6. Increase cylinder temperatures - assists in maintenance of melt temperature, pressure and improves bond.

7. Increase mould temperatures - particularly for large thin parts - assists in maintaining melt temperature and improves bonding of weld.

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