

DIESEL BURNING:

Diesel burning is recognisable as dark brown or black discoloration in a moulding, occurring either in isolated places such as recesses and pockets or in the area farthest from the gate, which indicates burning in the mould, or as random streaking spreading from the gate area, in which case burning has taken place in the barrel of the machine.

Diesel burning occurs when trapped air and volatiles are compressed, raising their temperature beyond the combustion temperature of the plastic causing carbonisation and contamination of the material.

Diesel burning in the mould is the more common occurrence and is usually due to air in the mould being unable to escape because of inadequate venting, but may in some cases be due to trapped air carried forward from the barrel. To prevent entrapment of air in the mould, vent channels should be provided round the mould cavities. If the tool has previously produced satisfactory parts, easing the locking pressure may provide sufficient venting through the mould parting surfaces. Too large a gap between these surfaces will cause flashing, however.

Diesel burning in the barrel of the machine is caused when air and volatiles are unable to escape back along the barrel and through the hopper to atmosphere, remaining trapped and gradually compressed to burning temperature. This effect is usually produced when rear zone temperatures are too high, causing melting of the granules towards the hopper before complete compression and escape of air and volatiles has taken place further forward in the barrel. Air may also be sucked forward for subsequent entrapment if the rear zone temperature or back pressure are too low, causing the screw to thread itself backwards over the cold feed faster than hot plastic is displaced at the front. Care must be taken to ensure that plastic being delivered at the front of the screw pushes it back.

To prevent entrapment of air or volatiles in the barrel the rear zone temperatures should be set low enough to allow free passage through to atmosphere whilst ensuring that these temperatures are sufficient to allow pre-heating and softening of the granules before their entry into the compression zone. Should burning persist when the rear zone temperature is as low as considered practicable, back pressure should be applied to assist in driving air and volatiles back from the melt.

If diesel burning appears during a production run immediate application of back pressure will provide a temporary cure whilst waiting for rear zone temperatures to reduce, purging may not be necessary in this instance. It is preferable however, to establish conditions that will correct the fault without permanent or excessive use of back pressure.

It is important to make sure that contaminated melt is always purged from the barrel before each alteration in moulding conditions.