The air temperature will depend on the recipe and cooler length and zoning, but for milk chocolate should ideally be 14–18 °C (57–64 °F) at the inlet, 10–12 °C (50–54 °F) in the centre section and 12–16 °C (54–61 °F) at the outlet. Lauric compounds especially need more aggressive initial cooling at 6–8 °C (43–46 °F), with a gentler second stage preventing any problems with the dew point. For non-lauric coatings the recommended temperatures are in between that of chocolate and lauric coatings, that is 8–12 °C (46–54 °F; Talbot, 2009).

14.3.13.1 Suggested cooling times

The minimum total cooling time required depends on the coating composition and thickness (Sollich, 2014). Below are some guidelines for the different chocolate masses:

Dark chocolate	4–6 min
Milk chocolate	6–9 min
Milk chocolate with high milk fat, nut oil or softer CBE	9–12 min
Lauric coating	2–3 min
Non Lauric coating	4–6 min

14.3.14 Troubleshooting enrobed product faults

Below is an overview of potential problems with enrobing and their possible causes (Webb, 1996). They are by no means all that there may be, and as anybody skilled in the art knows, an enrobing defect can often be the result of a combination of several causes.

Chocolate is not setting in the cooling tunnel:

- Poorly tempered product masse, not enough seed,
- Reheat stage of temperer too warm,
- Too much soft fat in the product masse (nut oil, soft CBE or milk fat),
- Cooling time too short or temperatures not set correctly,
- Enrober hood or blower air too warm.

Coating chocolate has a grey sheen and/or develops fat bloom:

- Untempered or over-tempered chocolate,
- Centres too cold or too warm,
- Enrober hood or blower air too high a temperature which de-tempers the chocolate,
- Shear heat from an overheating circulation pump de-tempers the chocolate,
- Cooling in tunnel too intensive, setting the chocolate in one of the unstable crystalline forms,
- Contamination of coating with incompatible fat,
- Incompatible fat in centre and fat migration,
- Pieces below dew point or RH too high in tunnel or wrap room (condensation leading to sugar bloom),

Incomplete coating:

- Chocolate viscosity too high,
- Overtempered masse, so too high viscosity,

- Dusty surface on centres,
- Excessively oily surface on centres.

Uneven weight distribution across the belt:

- Blower blocked or not positioned evenly,
- Curtain thickness or vibration is uneven.

"Foot" around the bottom edge:

- Too much coating on centre,
- Chocolate yield value too low,
- Licking roll or shaker incorrectly adjusted,
- Vibration of cooling belt.

Conclusions

Although the basic components of a moulding or enrobing plant have not changed significantly in recent years, manufacturers and also end users are continually introducing variations to improve their automation, hygiene, flexibility and efficiency.

The machines described in this chapter enable good quality chocolate goods to be made, often at high speed, and generally using very few operators. They are however equally capable of making large amounts of waste and rework. The difference lies in the skill and knowledge of this small workforce responsible for its installation, maintenance and operation, and in ensuring that this knowledge is passed on as the workforce is renewed.

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