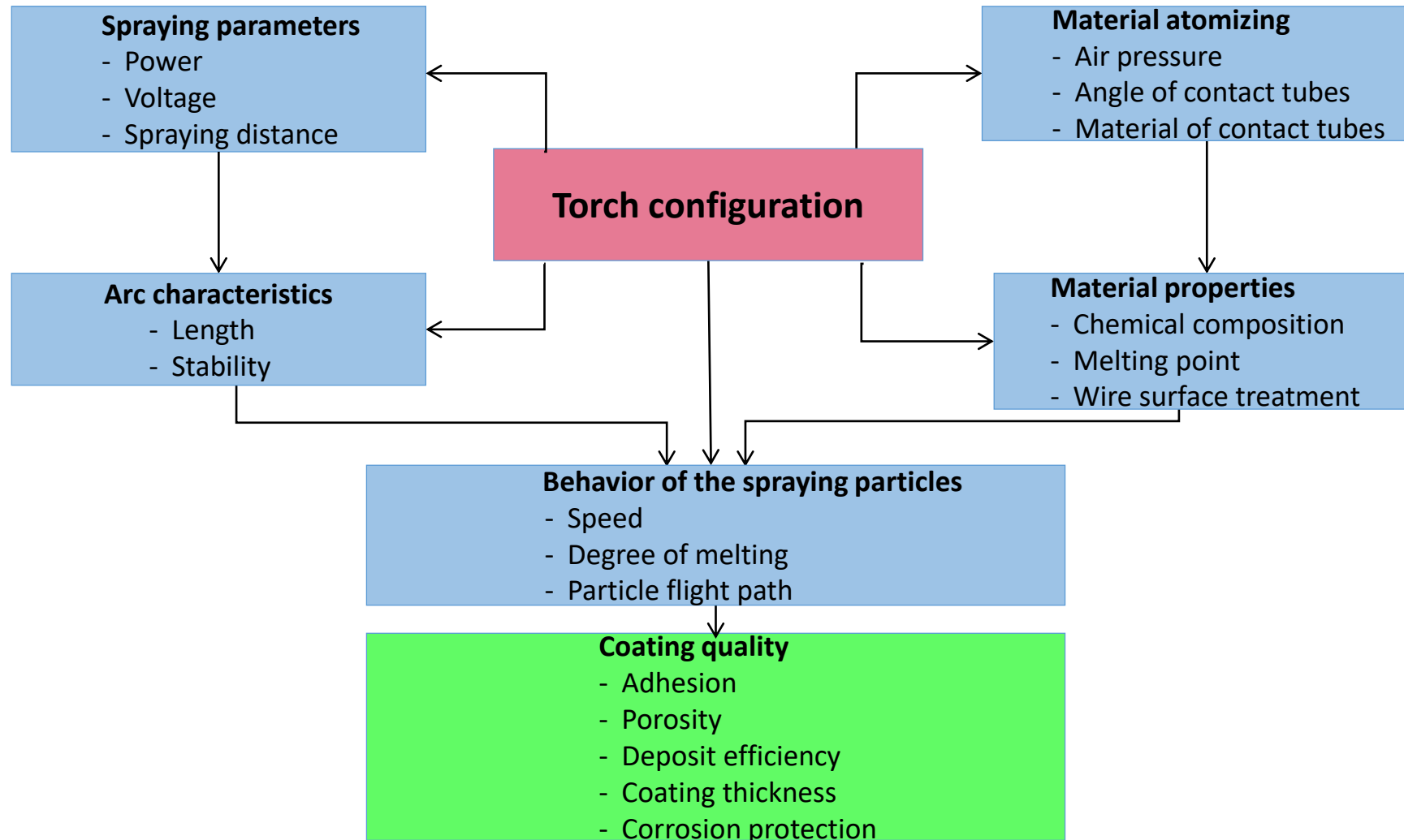


SPRAYING PROCESS AND COATING PRODUCTION

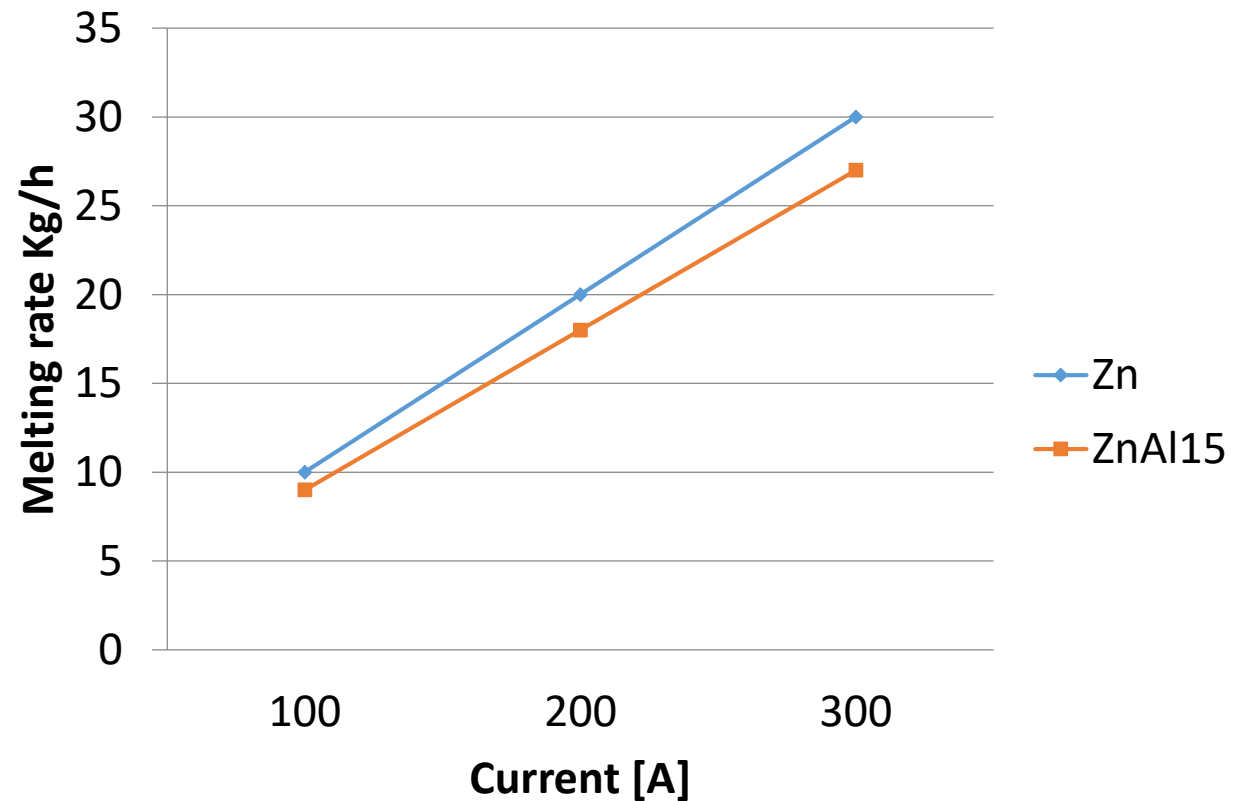
THERMAL SPRAYING PROCESS PARAMETERS AND THEIR INFLUENCES



SPRAYING PROCESS AND COATING PRODUCTION

PARAMETERS AND THEIR INFLUENCE: CURRENT (AMPERE)

- The current is controlled by the wire feed speed
- Melting rate ↔ current
- Wire speed (melting speed) → current



SPRAYING PROCESS AND COATING PRODUCTION

PARAMETERS AND THEIR INFLUENCE: VOLTAGE (VOLT)

➤ The voltage is an independent parameter and can be adjusted separately

➤ Voltage ↔ thermal energy (zinc melt)

High voltage ⇒ high temperature at the arc

Low voltage ⇒ low temperature at the arc

Important is the voltage attended at the spraying torch, not at the power source

➤ A too high temperature (Voltage) for low melting materials as e.g. ZnAl can lead to lower deposit efficiency

Material	Melting point [°C]	Boiling point [°C]	Voltage [V]
Zn/ZnAl15	419 / 380-450	906	18 - 20
Al	660	2467	25 – 27
Inconel 625 (CrNi)	1300	--	35

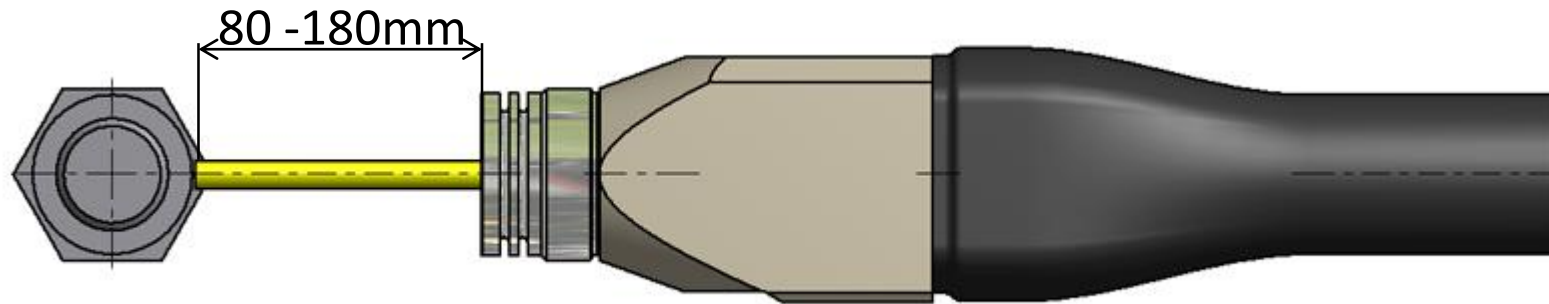
SPRAYING PROCESS AND COATING PRODUCTION

PARAMETERS AND THEIR INFLUENCE: ATOMIZED GAS PRESSURE (BAR)

- The atomized gas pressure (usually compressed air) is an independent parameter and can be adjusted separately
- Gas/air consumption : 70 – 110 m³/h (depending on the spraying process)
- Atomized gas/air pressure ↔ coating structure
 - high atomized gas pressure → fine spraying coating structure and surface
 - low atomized gas pressures → rough spraying coating structure and surface
- Other influence on the coating properties:
 - level of porosity
 - coating adhesion
 - adhesion properties of following organic coatings
 - roughness of following organic coatings

SPRAYING PROCESS AND COATING PRODUCTION

PARAMETERS AND THEIR INFLUENCE: SPRAYING DISTANCE (MM)

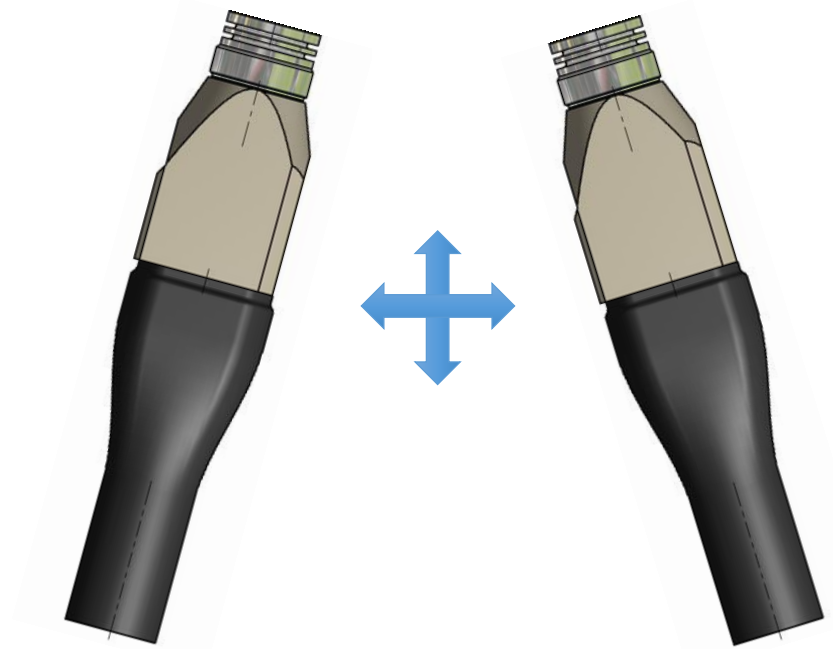


- **Less distance** => **higher coating thickness**
- **Less distance** => **overvalue coating thickness => less adhesion**
- **Less distance** => **higher temperature of the substrate**
- **Higher distance** => **colder spraying particles => less adhesion**
- **Higher distance** => **colder spraying particles => less adhesion => more overspray**

SPRAYING PROCESS AND COATING PRODUCTION

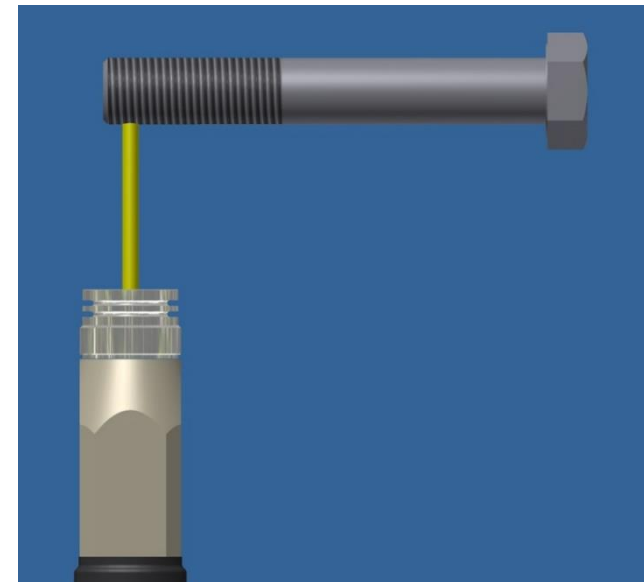
PARAMETERS AND THEIR INFLUENCE: SPRAYING ANGLE (DEGREE)

Manual spraying



- Lagging and irregular spraying distance causes irregular coating thickness and coating adhesion
- Less deposit efficiency

Automated spraying



- Optimal spraying angle = 80-90°
- Can be guaranteed only in case of automated spraying

SPRAYING PROCESS AND COATING PRODUCTION

ENVIRONMENT CONDITIONS ACCORDING TO ISO 2063:2017

- **Surface temperature** : **3°C above dew point temperature**
- **Relative air humidity** : **< 85%**
- **Air temperature** : **> 5°C**

Before starting and during the thermal spraying process, the environmental conditions (air humidity, temperature, dew point, surface temperature) must be measured and documented.

Thermal spraying shall start as soon as possible after blasting.