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INNOVATIVE PURGING

Efficient solution for the cleaning process

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Content

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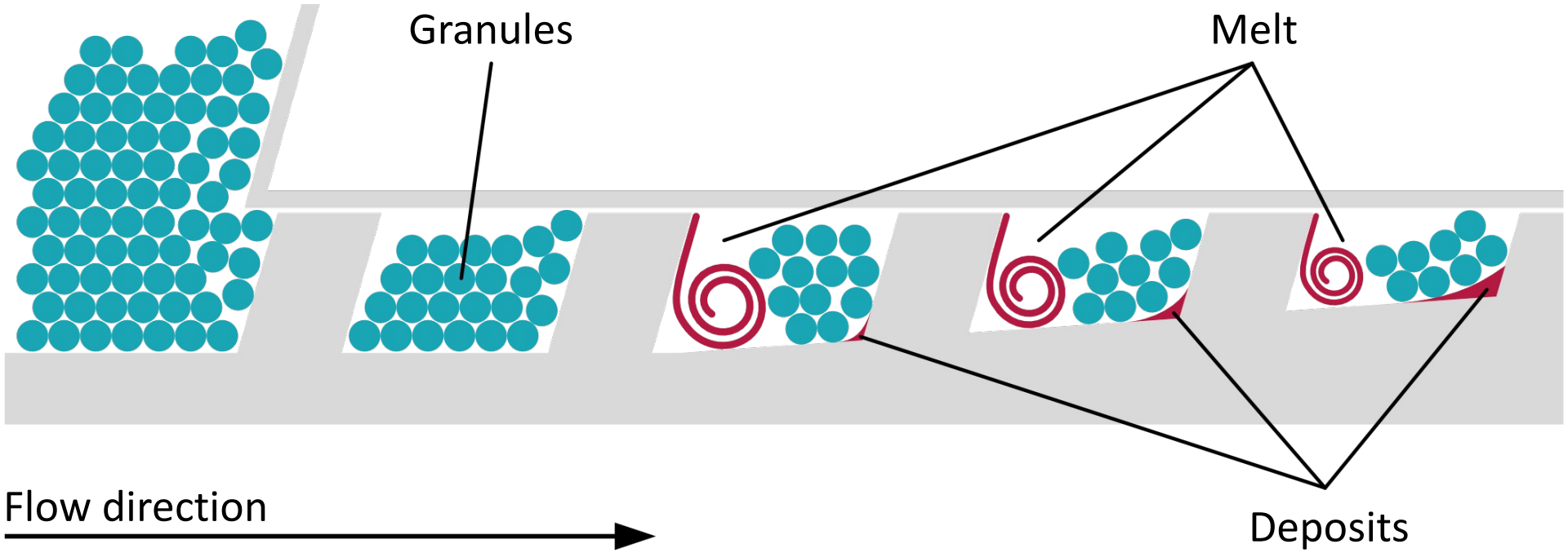
Areas without melt flow (dead zones)

Screw / Barrel

Deposits of burnt plastic occur in areas without melt flow



Areas without melt flow

Screw / Barrel

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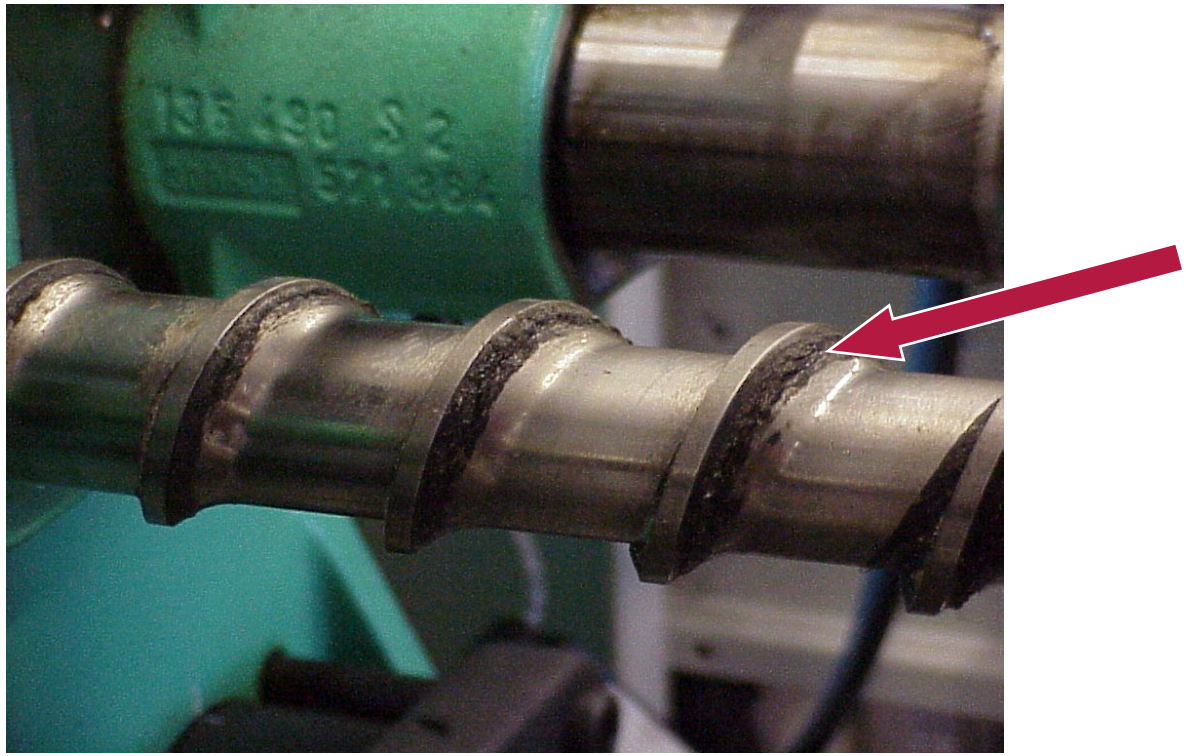
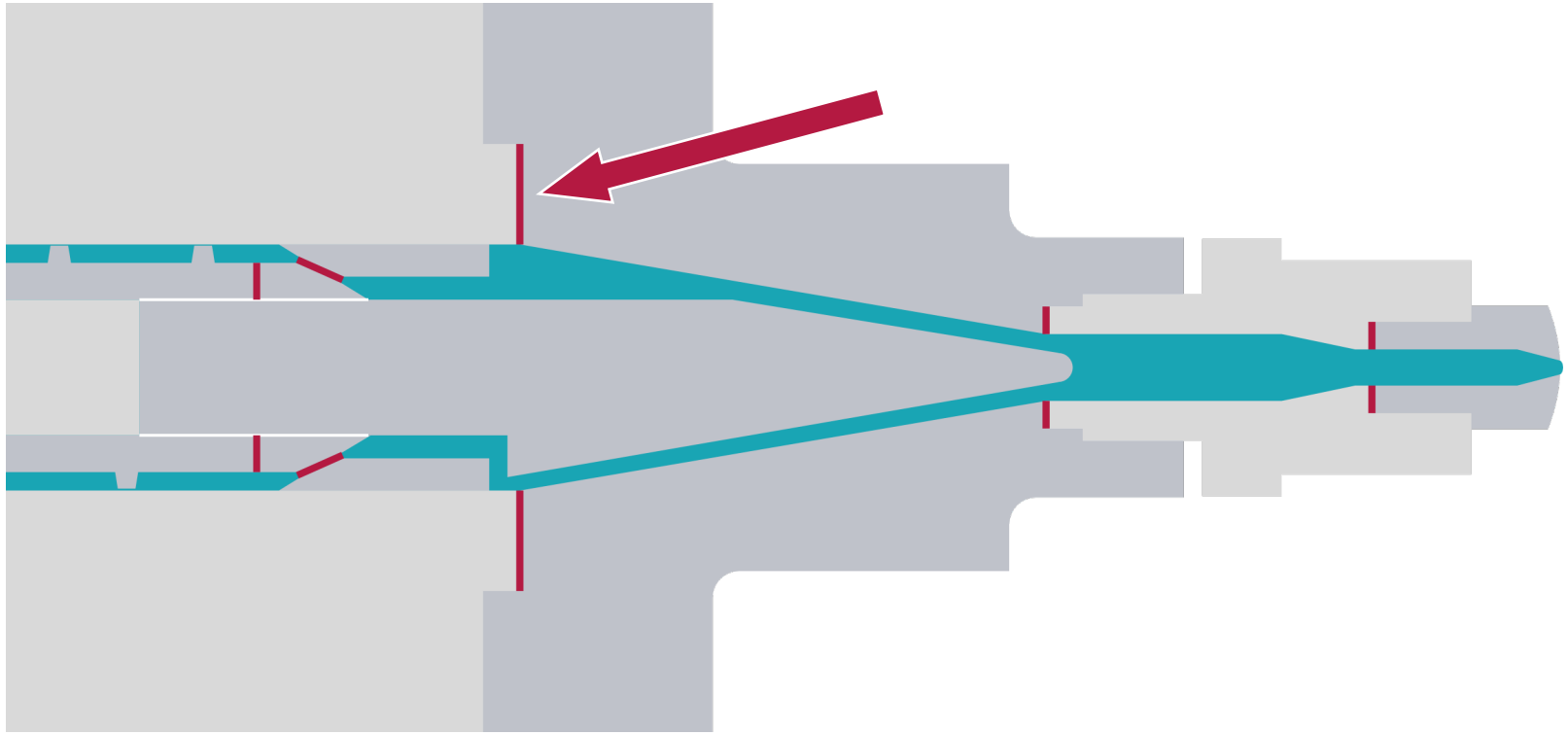


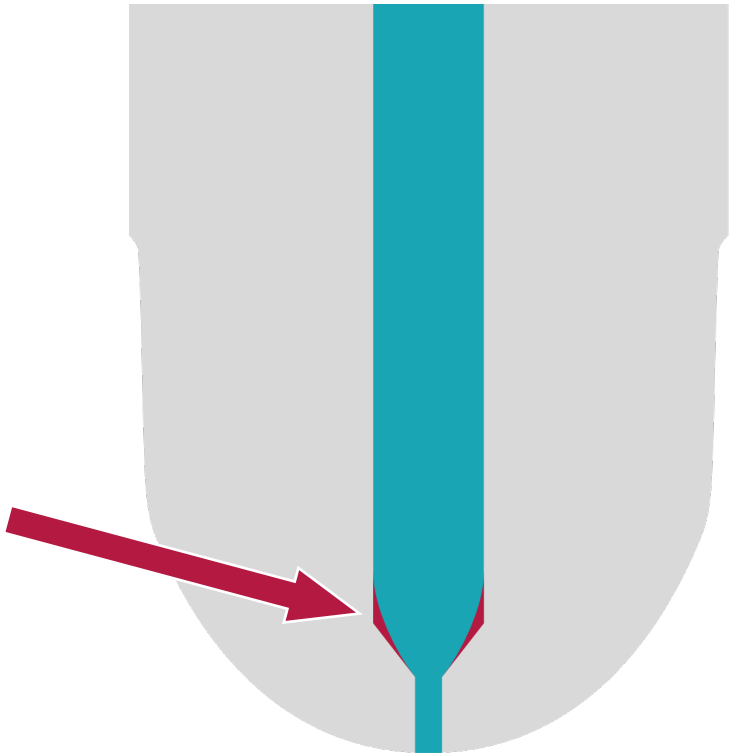
Screw / Barrel

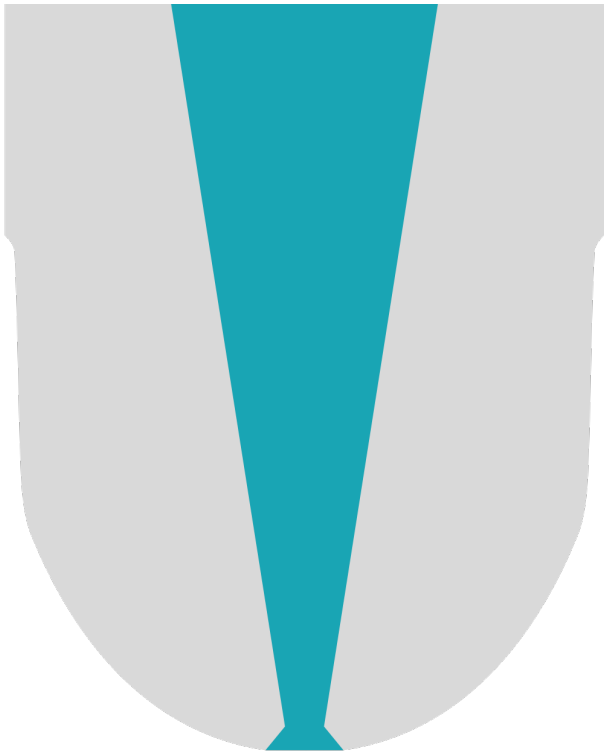
Material deposits on sealing surfaces in the platicizing unit



Machine nozzle

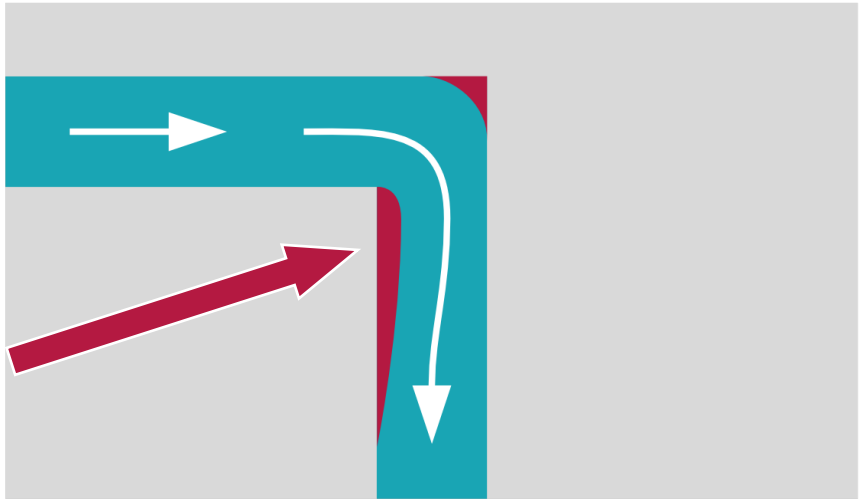
The correct nozzle hole prevents areas without melt flow (dead zones)

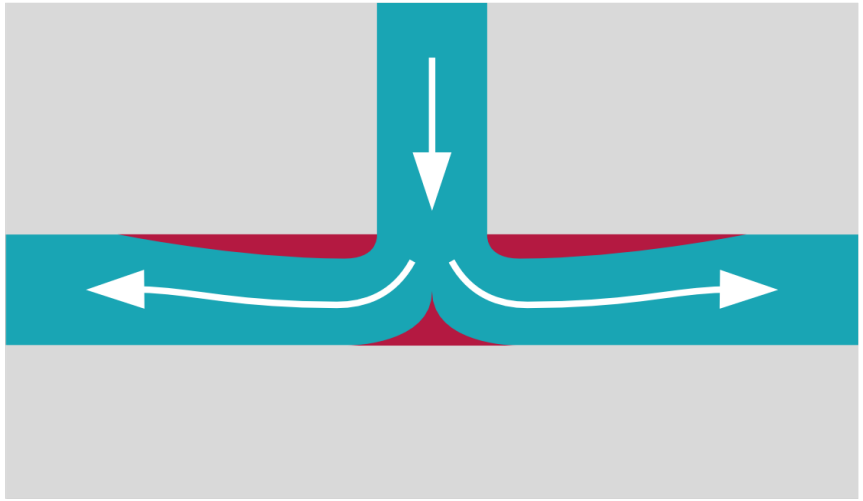




Hot runner

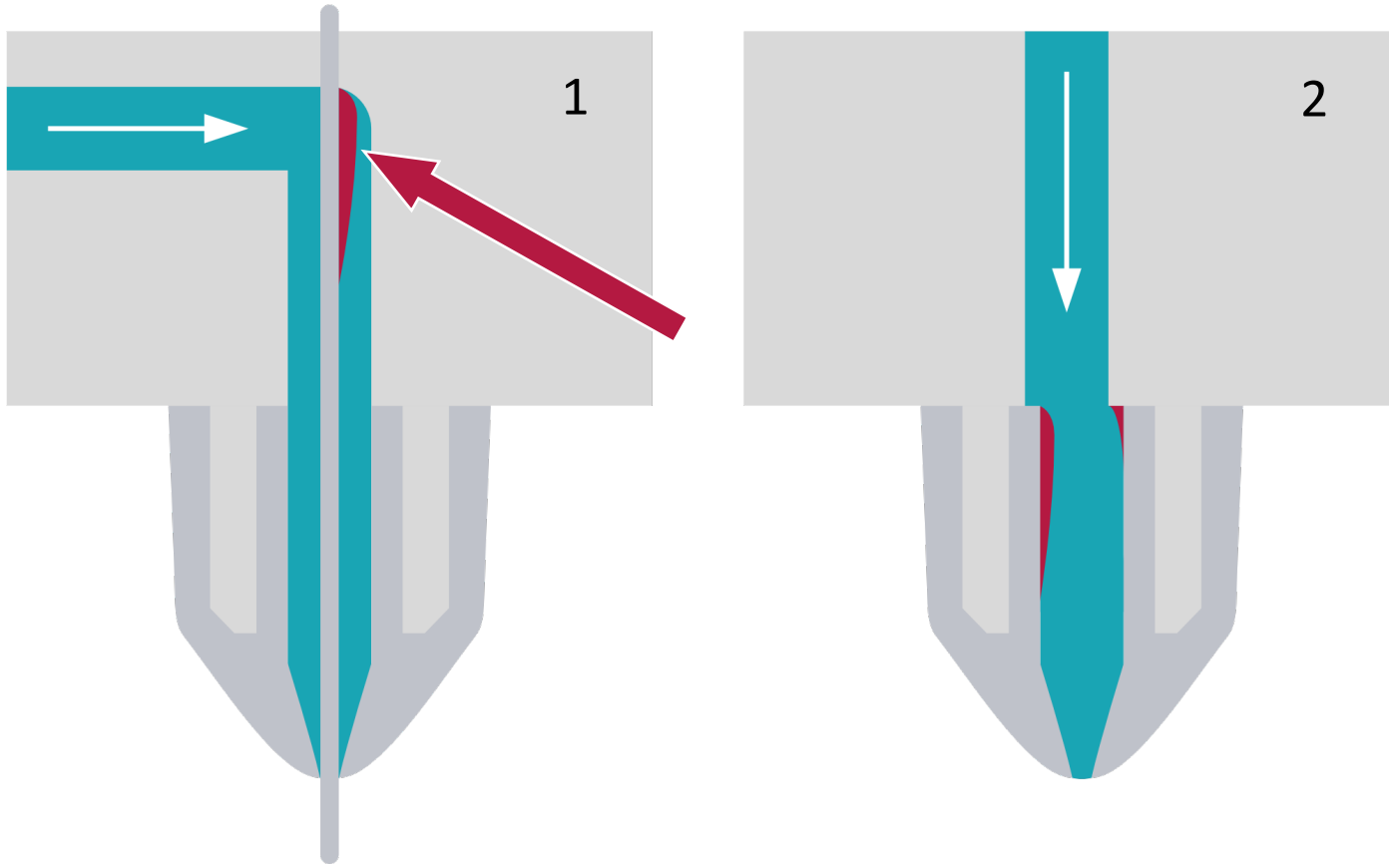
In areas without melt flow (dead zones) deposits of burnt plastic are formed





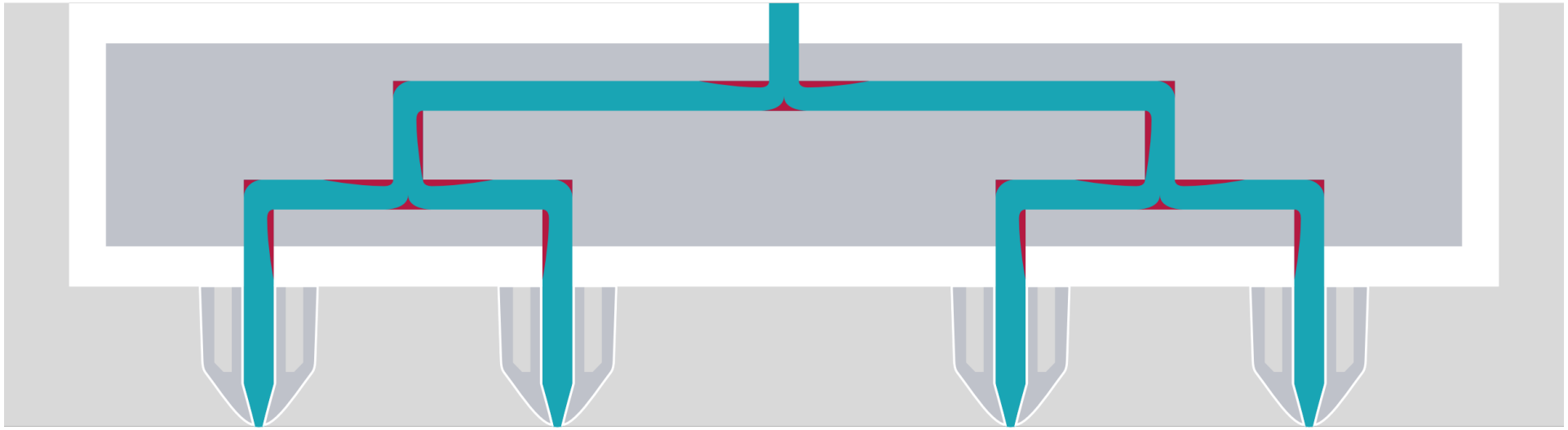
Hot runner

1. In areas without melt flow (dead zones) deposits of burnt plastic are formed
2. Due to the differernt thermal expansion, areas without melt flow (dead zones) are formed. The plastic burns



Hot runner

Deposits in dead zones

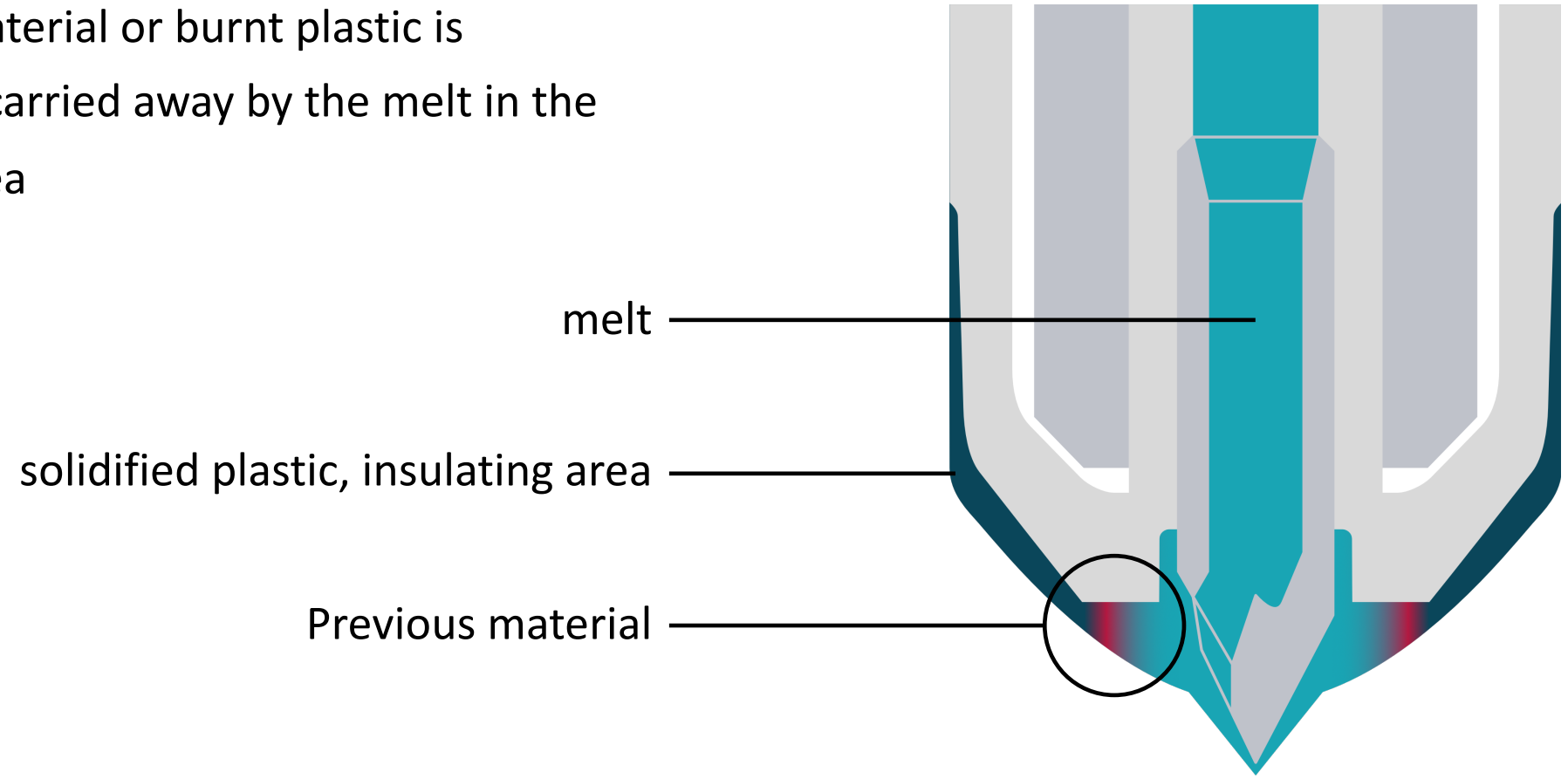


Hot runner

Optimized flow channel without deposits

Hot runner nozzles

Preceding material or burnt plastic is sporadically carried away by the melt in the insulating area



Chemical vs. abrasive cleaning

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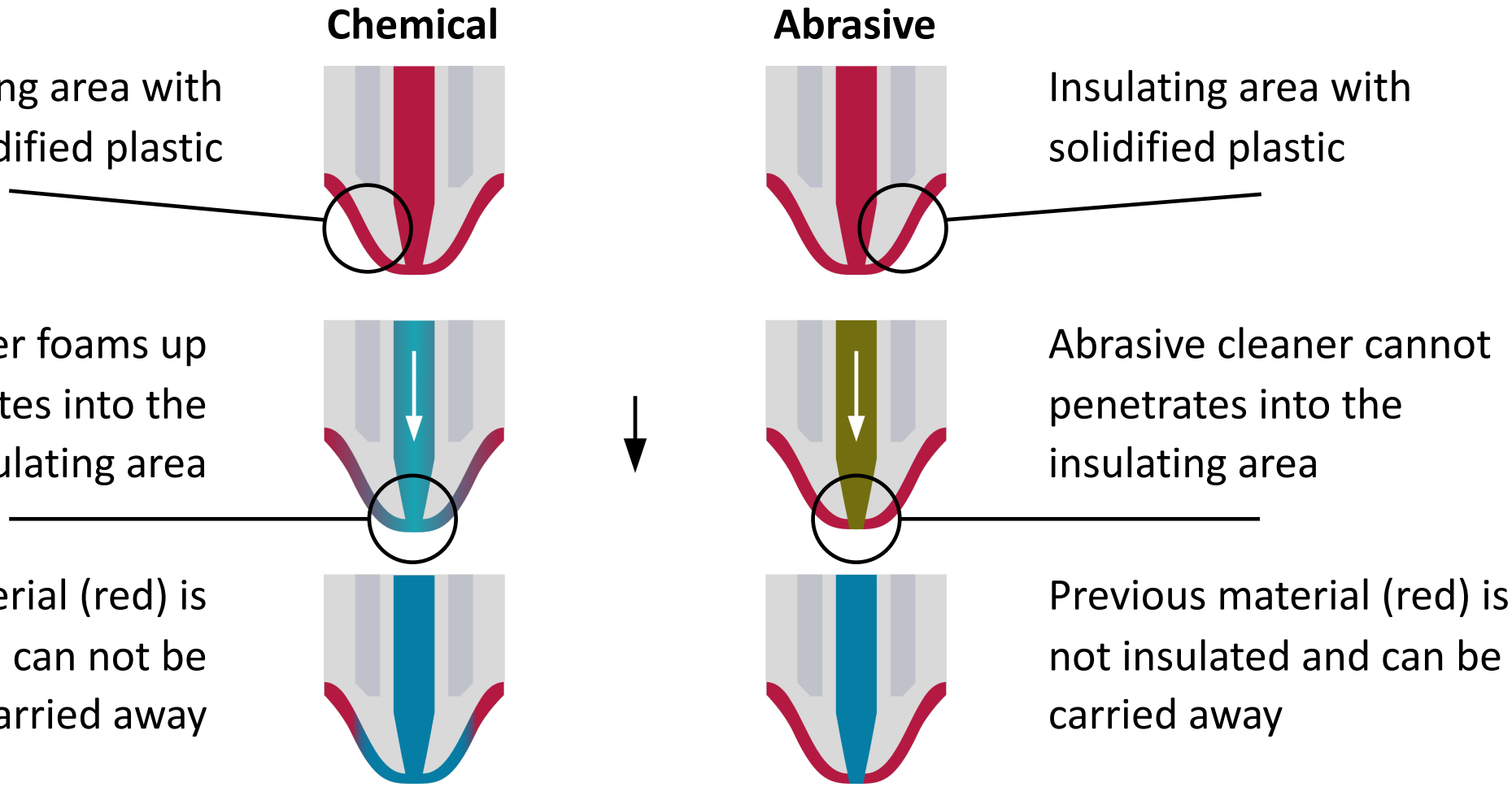
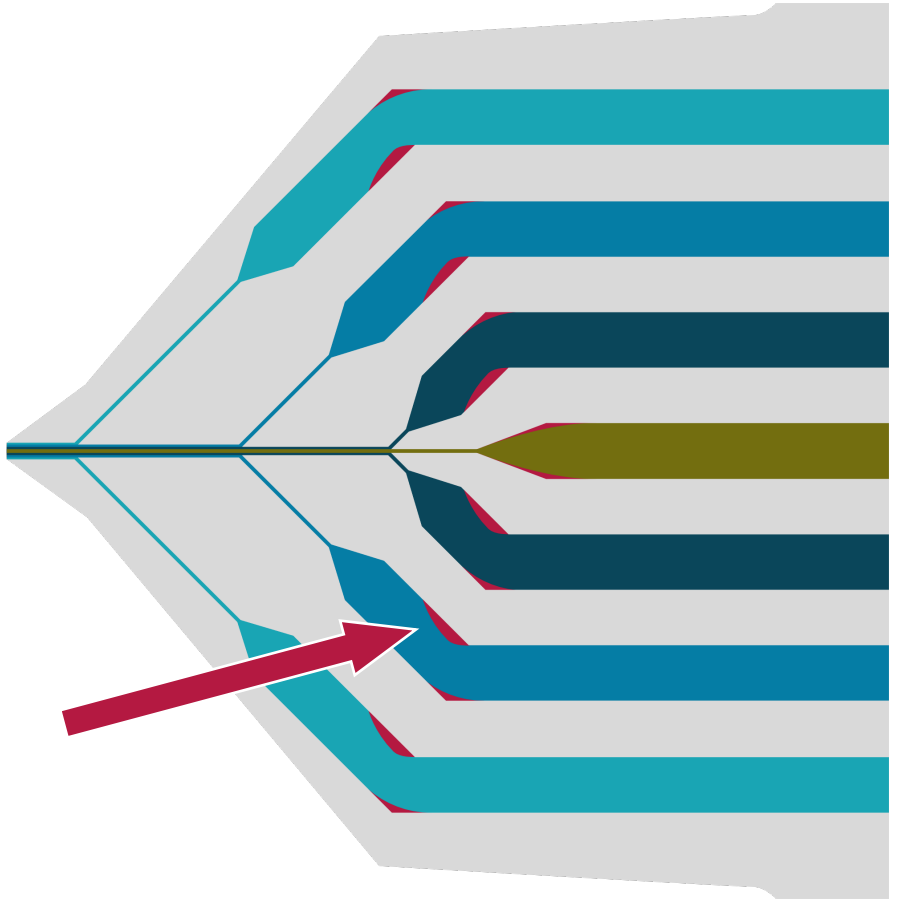


Extrusion die

Wherever the plastic melt is redirected, flow dead zones are created in which the plastic burns

Deposits in dead zones



Areas without melt flow

Extrusion die

Burning residues released by the cleaner in the extrudate

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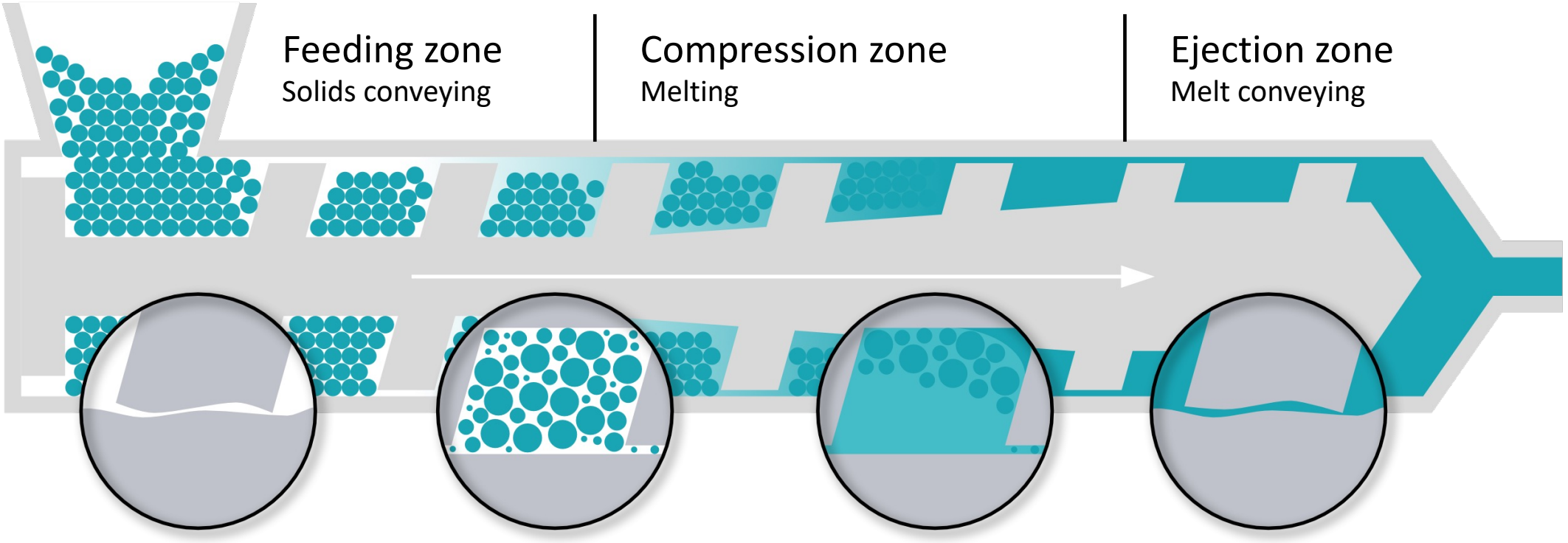
Wear

Types of wear



Dry wear
Adhesion + Abrasion
- Scuffing
- Scoring

Grain sliding wear
Abrasion
- Scoring
- Embedding
- Breakouts

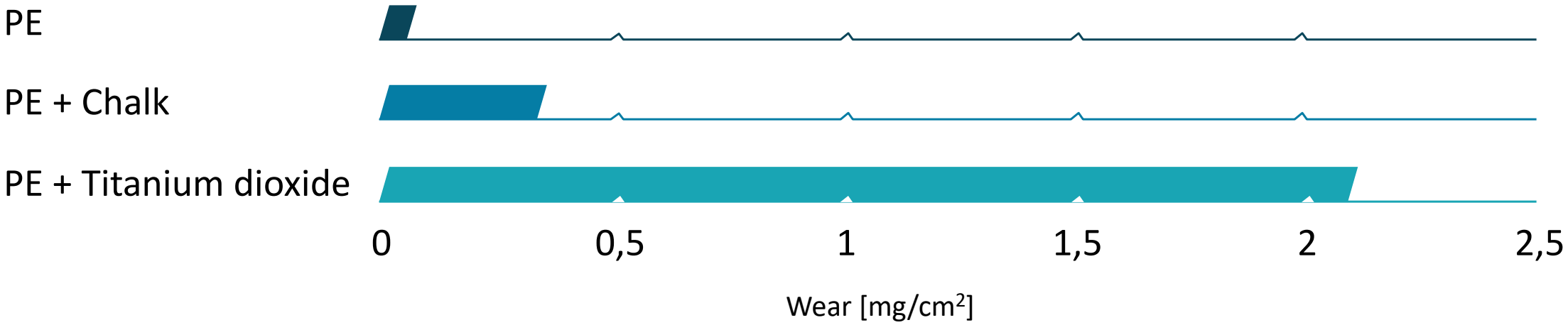
Corrosion
Abrasion + Corrosion
- Shafts
- Hollows
- Holes

Wet sliding wear
Abrasion + Corrosion
- Scuffing
- Scoring

Abrasion due to …

- … Fillers (chalk, talc, …)
- … Reinforced materials (glas fiber, glas ball, …)
- … Color pigments (titanium dioxide (white), aluminium oxid, …)

Steel: 750 HV
Titanium dioxid: 2400 HV



Different plastics

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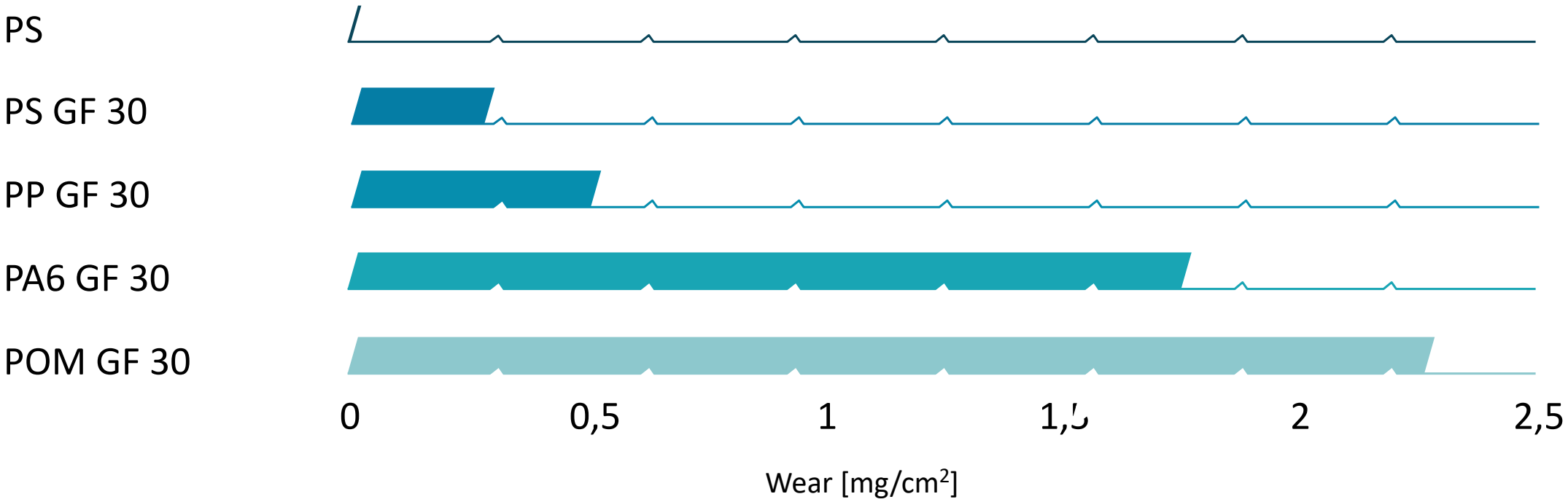
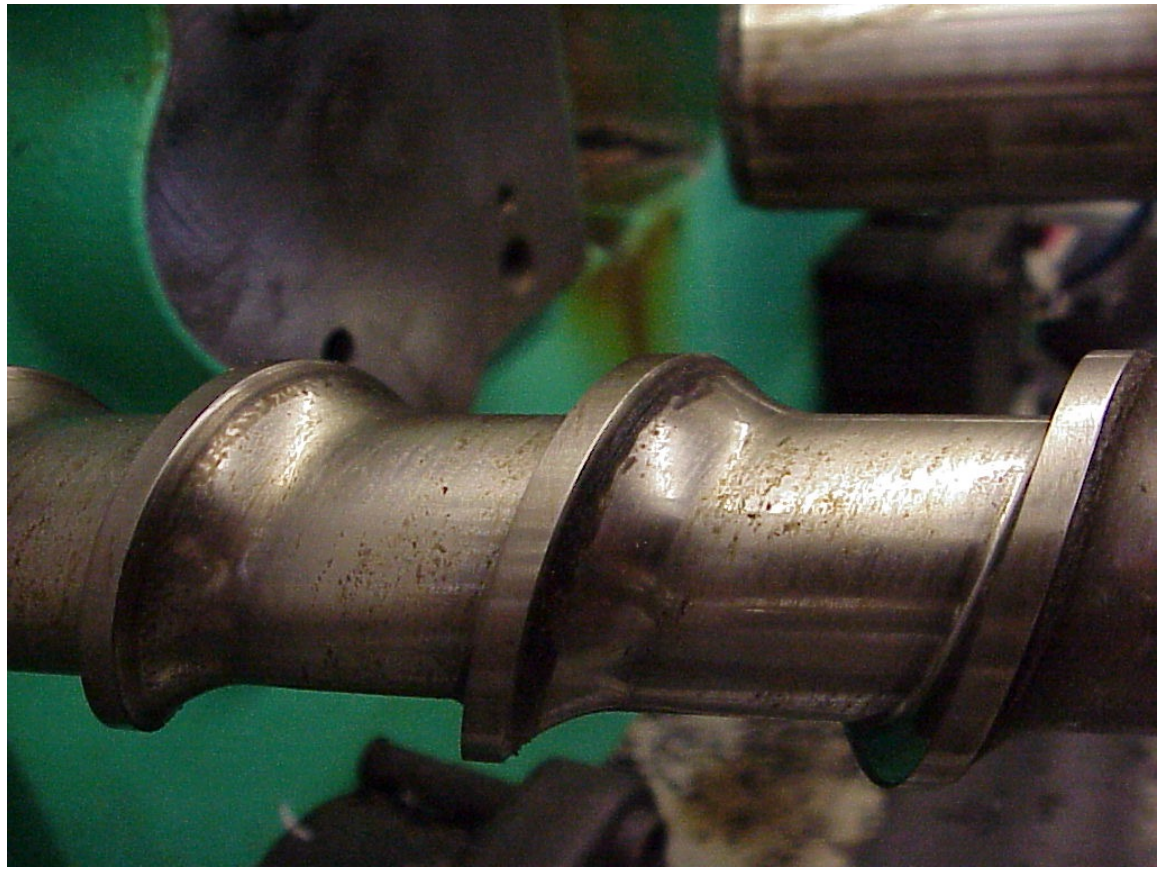
Wear when using different plastics



Traces of wear

- Traces: scores, furrows, holes, scuffing
- Due to: abrasion, corrosion



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Corrosion

Corrosion by …

- Additives
- Fillers
- Stabilizers
- Flame retardants
- Degradation products
- …

Result

The result of corossion due to contact with stabilizers, additives, flame retardants, …

Deposits on a screw

In each groove, furrow, scuff markes, holes plastic is deposited. Due to the long temperature exposure the plastic burns

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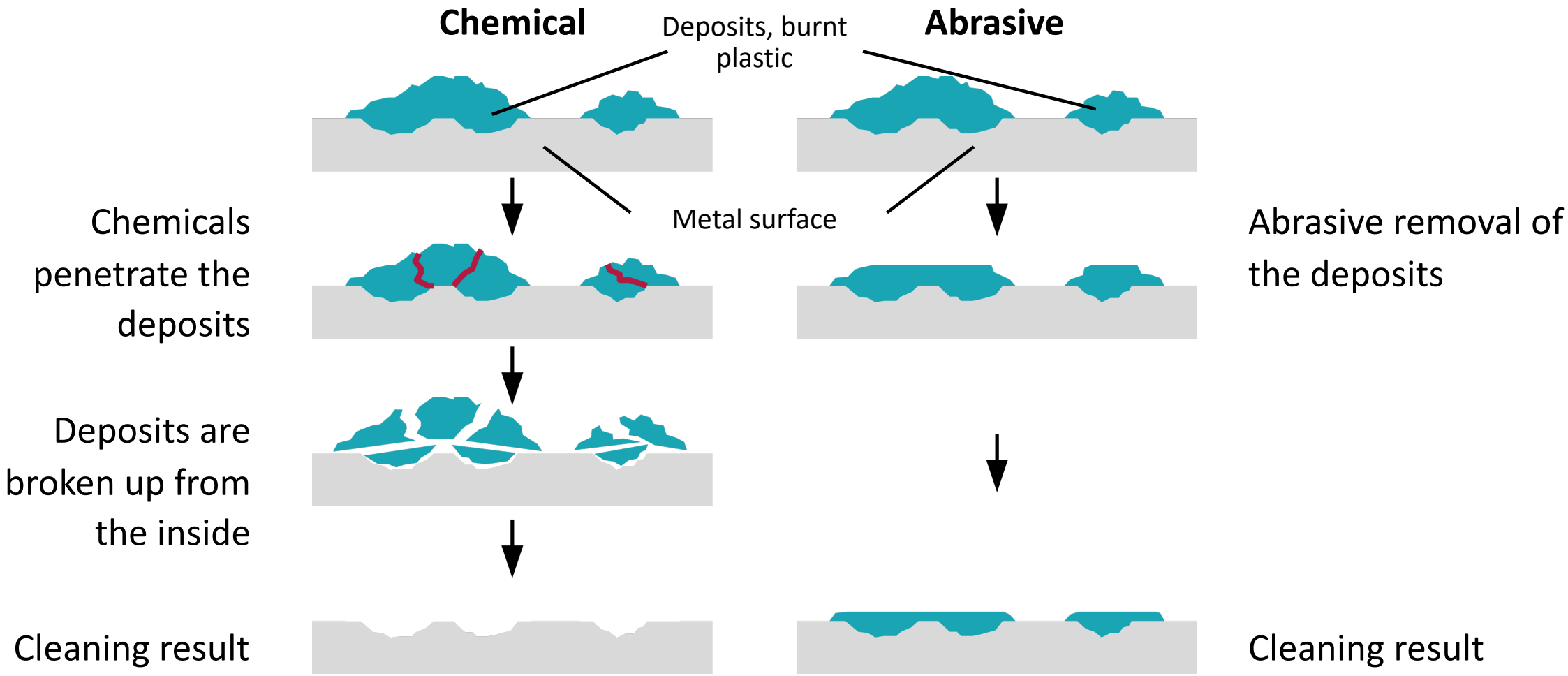
Remedial action

Chemical vs. abrasive cleaning



Facts

- Only a foaming chemical cleaner can completely remove the burnt deposits
- The chemicals penetrate the deposits and break them up from the inside
- All burnt deposits are removed from the metal surfaces
- Abrasive cleaners can only remove a part of the deposits
- They cannot penetrate the deposits and break them from the inside
- Our chemical cleaner per~tas has the greatest foaming power
- per~tas consists of many chemicals that penetrate into the deposits
- Therefore, it has the greatest power to break up the deposits from the inside

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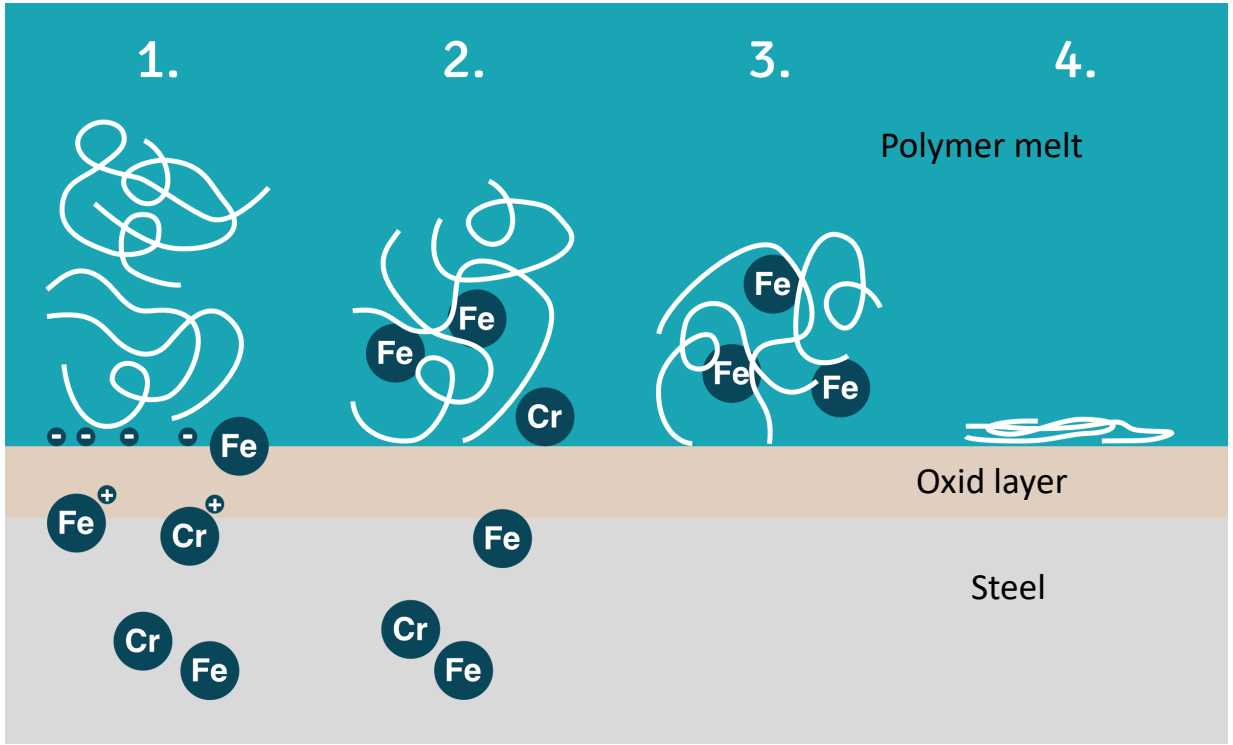
Stipping (black specks)

Black Specks

Most likely mechanism of coating and speck formation in plastic processing machines and tools:

1. Diffusion of metal ions into the polymer melt
2. Interaction of FE compounds with the polymer melt
3. Crosslinking, adhesion and growth of the coating
4. Thermal degradation and formation of specks



(Dissertation Maria Sonnenberg 2018 Universität Clausthal)

Without black specks? — Is that possible?

- Granules cannot be produced without black specks (manufacturer's statement)
- Cause are the flow dead zones in the manufacturing process
- Remedy: Cleaning with chemical, foaming cleaners
- Due to the foaming effect, the chemicals reach and clean the flow dead zones

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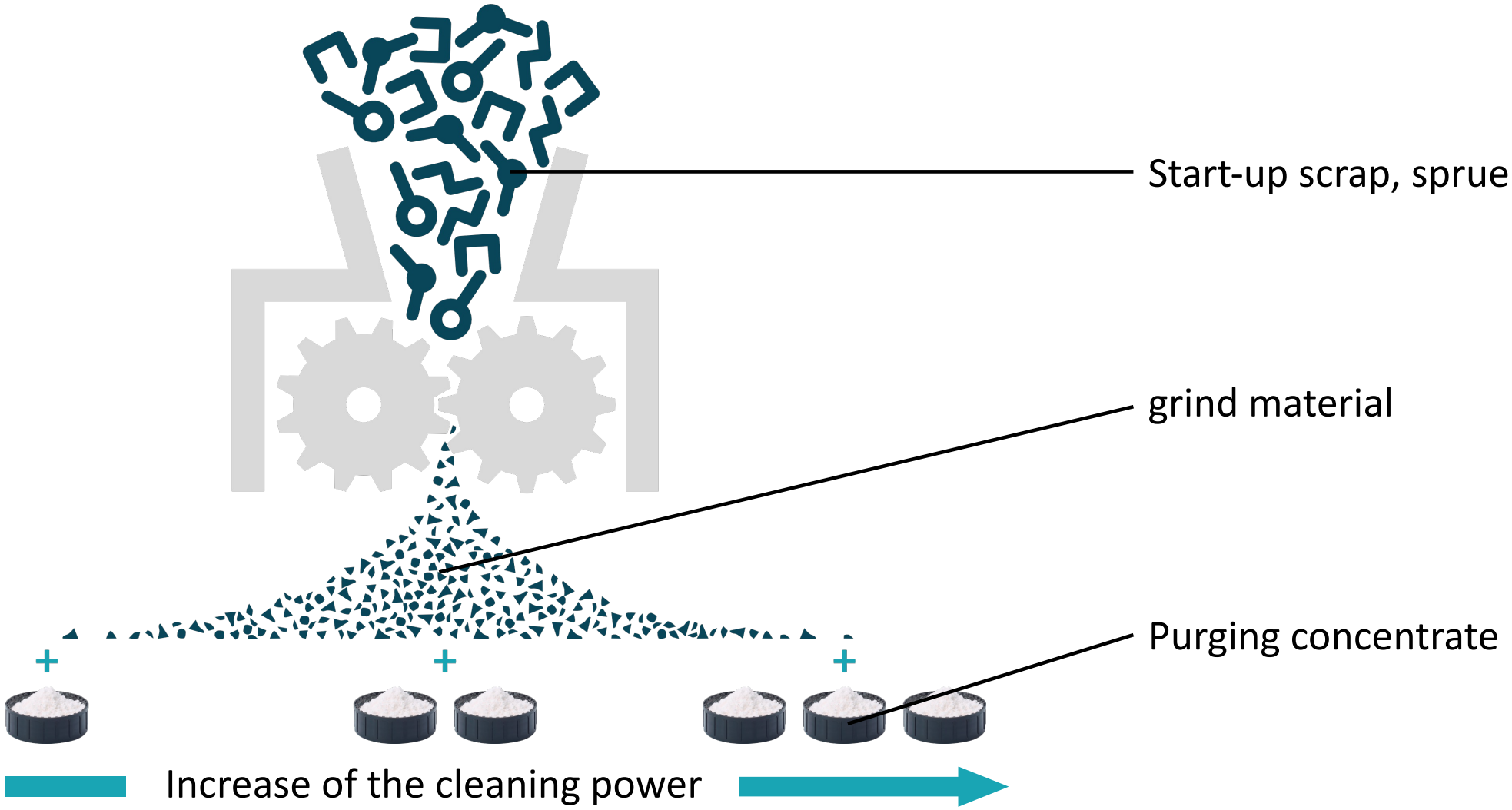
Environmentally friendly and resource-saving

Environmentally friendly and resource-saving

„Recycling“



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Advantages at a glance

Advantages at a glance

Advantages 1/2

	Chemical cleaning concentrate	Abrasive cleaning granules
Cleans flow dead zones due to the foaming of the chemical cleaner, flow dead zones are reached and cleaned	✓	X
Adjustable cleaning power by more (3.0%) or less (0.5%) dosage of the concentrate depending on the difficulty level. Easy 0.5%. Difficult 3.0%	✓	X
Shortest cleaning processes by cleaning the flow dead zones and adjusting the cleaning force	✓	X
Lowest material consumption through shortest cleaning processes	✓	X
Cleans all surfaces due to the chemical, non-corrosive and non-abrasive effect of the cleaner	✓	X

Advantages at a glance

Advantages 2/2

	Chemical cleaning concentrate	Abrasive cleaning granules
Low maintenance costs due to non-abrasive, non-corrosive cleaning	✓	X
Low storage and transport costs as up to 200 kg of cleaning granulate can be produced from 1 kg of cleaning concentrate (container 13 x 13 x 20 cm)	✓	X
No third component available as the cleaning concentrate is mixed with the plastic to be used for production. After cleaning, omit concentrate and produce	✓	X
Costs for mixing by adding the cleaning concentrate to the granulate or regrind (negligible)	✓	X
Environmentally friendly and resource-saving by using regrind (e.g. ground start-up scrap / sprues) . Simply mix regrind and cleaning concentrate to the ready-to-use cleaning material	✓	X

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Cleaning concentrate for the efficient cleaning process
for machines and tools in plastics processing