

 Clean Xpress

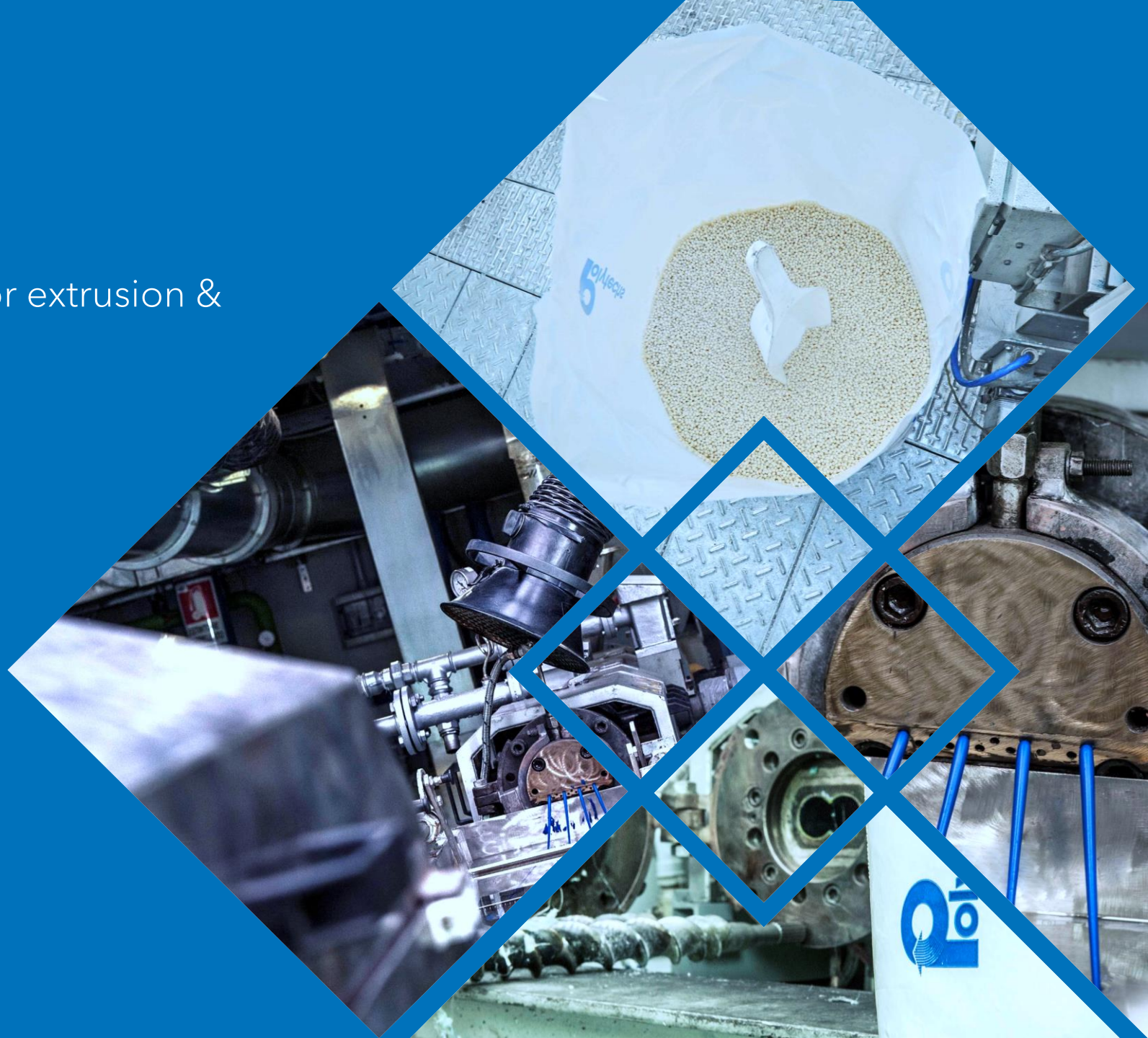


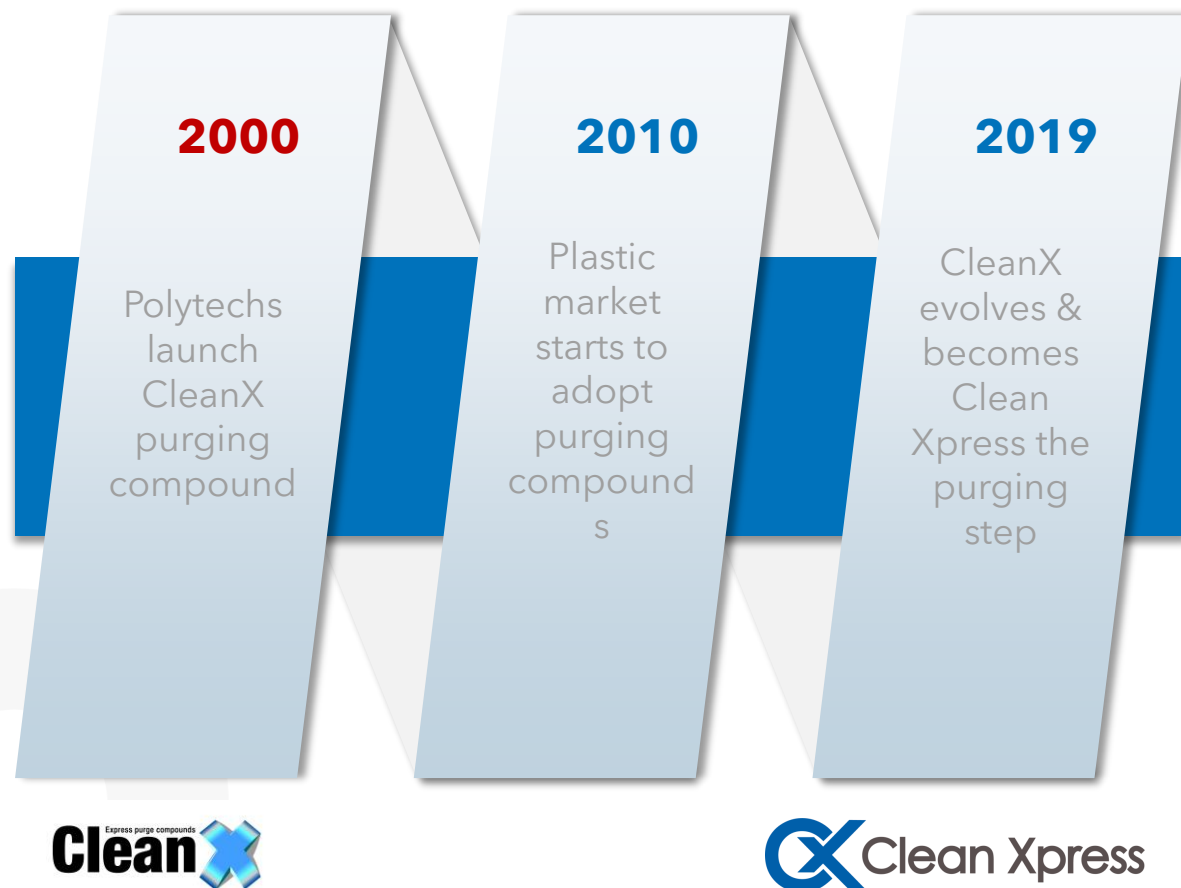
Clean Xpress

Purging compound for extrusion & injection molding

# Technology basics

The purging compound reference for extrusion & injection molding





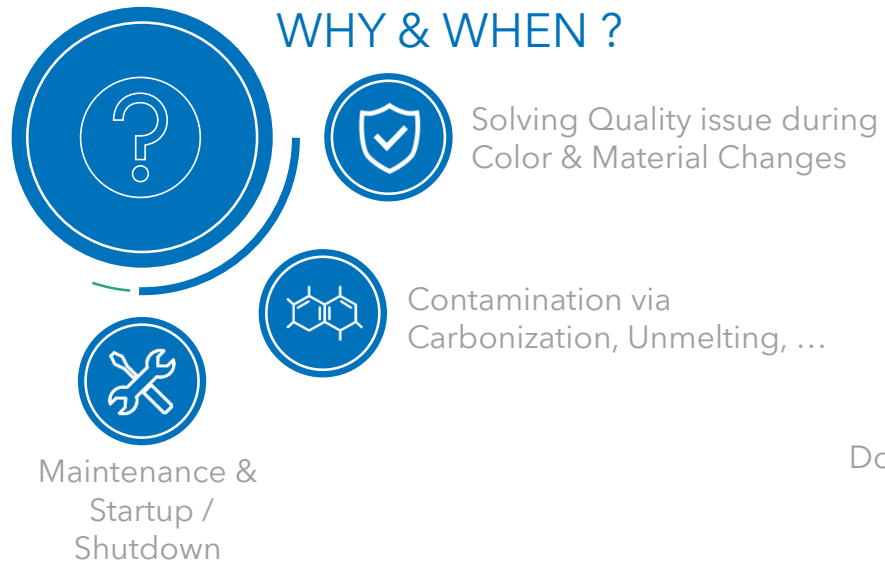
## 2019: Clean Xpress - The purging step

CleanX brand has benefited from Polytechs change. In order to integrate all the new grades, elements and knowledge that Polytechs acquired over the years and to strengthen the unique value proposition of its purging compound range, the company has decided to revamp CleanX visual identity.

# THE PURGING STEP



## WHY & WHEN ?



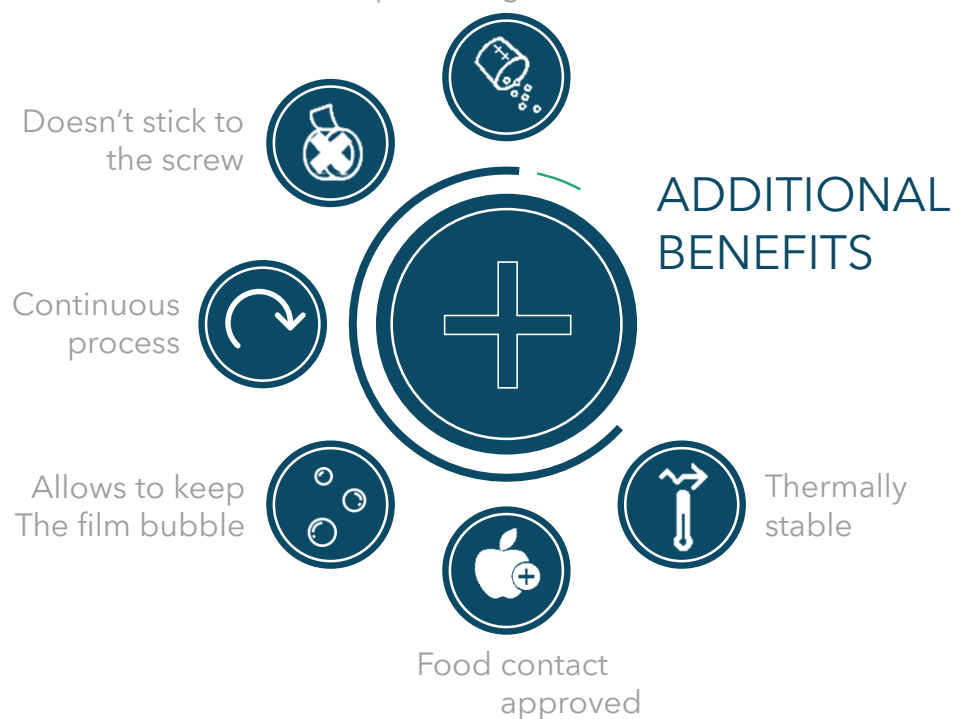
Mechanical & Chemical actions - combining non abrasive scratching for contaminants & surfactant effect for the barrel dead zones

Knowledge & Partnerships in Purging Process

Material affinity / play with MFI & Interactions

## THE 3 CLEANING STRENGTHS

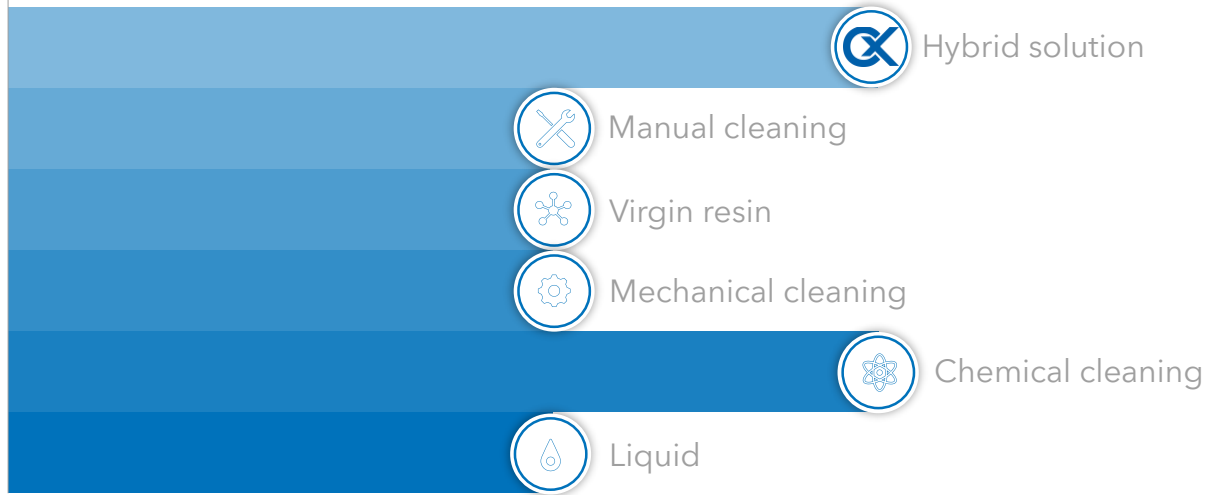
Compound - granulated material



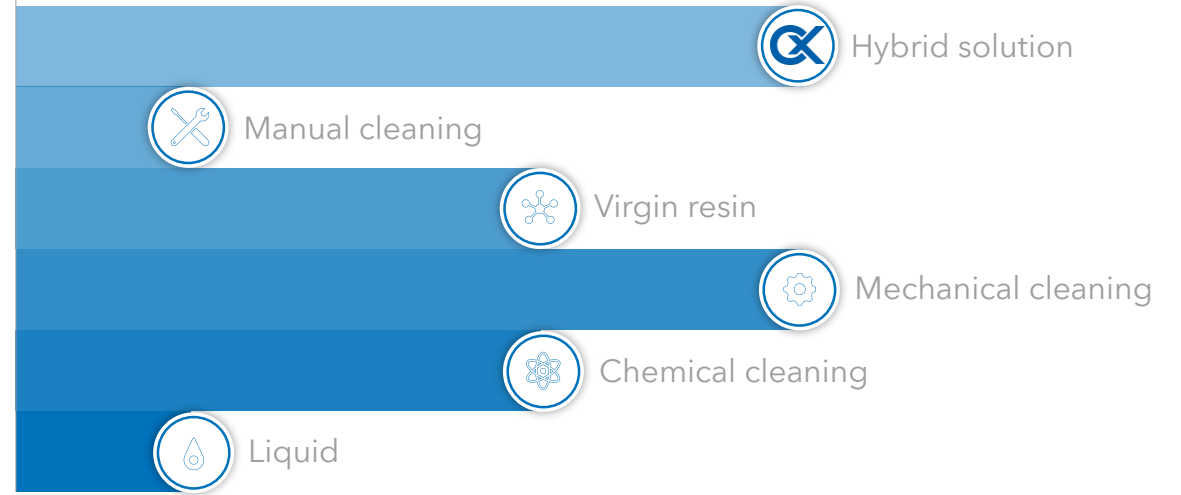


# PURGING TECHNOLOGIES COMPARISON

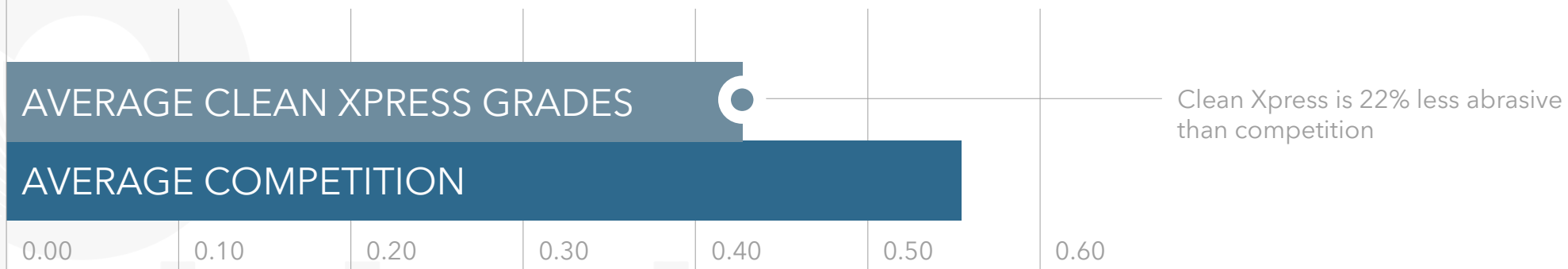
## CLEANING EFFICIENCY, QUALITY, SAFETY.



## PRODUCTIVITY.

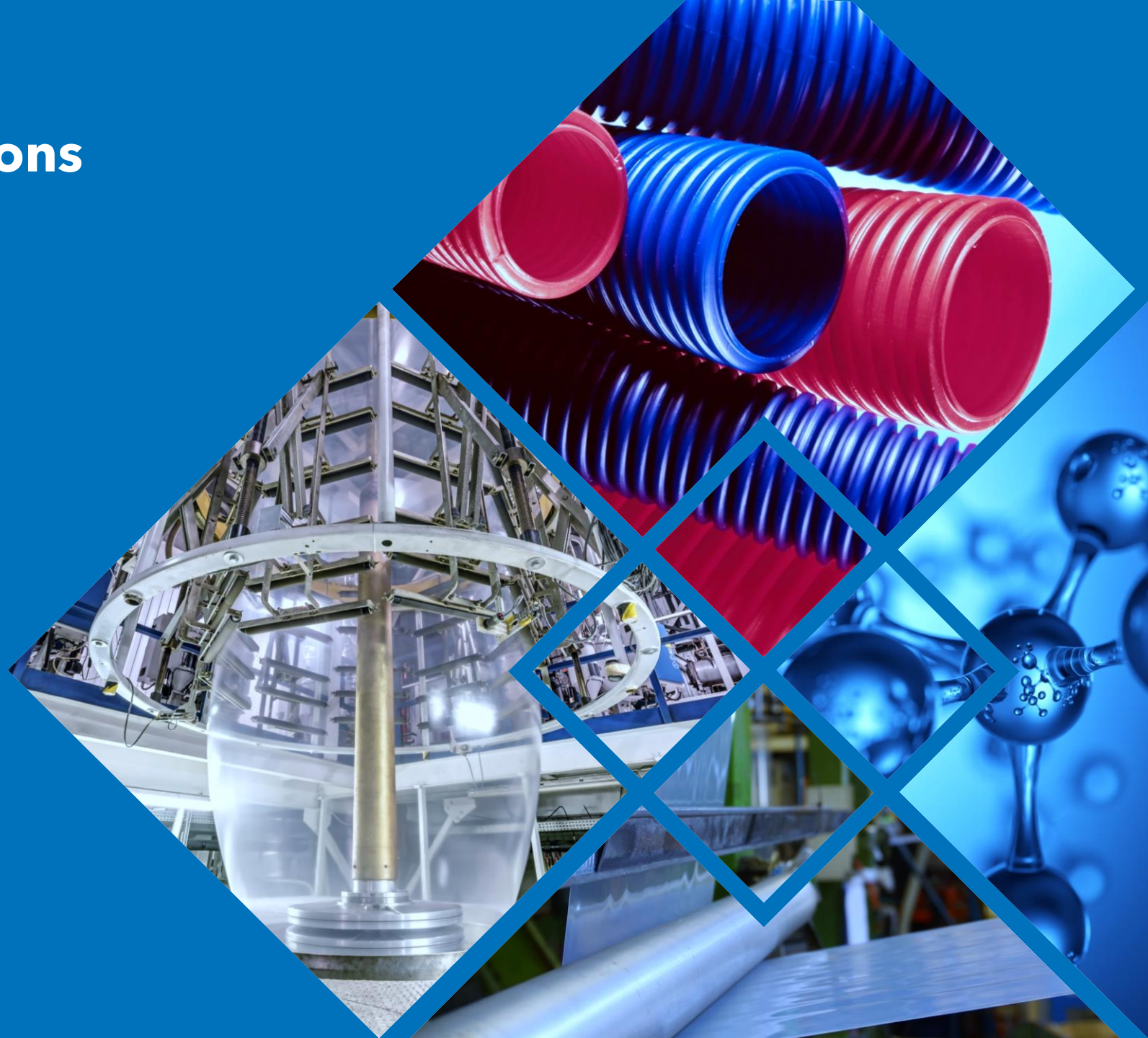


## ABRASIVITY LEVEL COMPARISON OF PURGING COMPOUNDS VIA KINETIC COEFFICIENT OF FRICTION.



# Grades, uses & applications

Clean Xpress



# CLEAN XPRESS GRADES



## STANDARD GRADES FOR EXTRUSION & INJECTION MOLDING



Broad range of applications



Premium



High temperatures



Balance cost/performances



For polypropylene

## GRADES FOR INJECTION MOLDING WITH HOT RUNNER



Injection molding with hot runner  
for high temperatures



Injection molding with hot  
runner



Polypropylene with hot  
runner

## UNIQUE APPLICATION GRADES



For fluoropolymer conversion



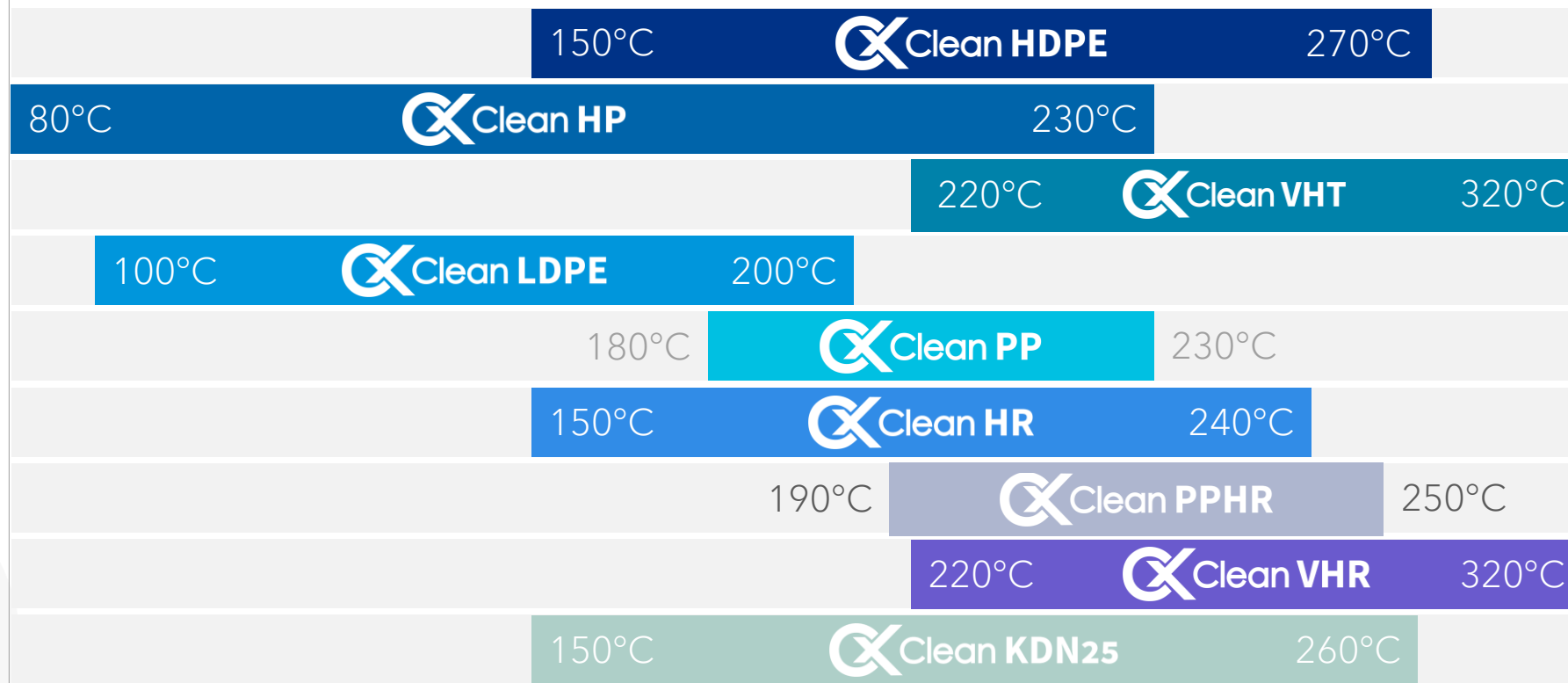
100% additives blend

# PROCESSING TEMPERATURE



Higher  
mechanical  
effect 80°C

Lower  
mechanical  
effect 270°C



Temperature  
min for  
Clean Xpress

Temperature  
max for  
Clean Xpress





# VISUAL EXAMPLE

## CLEAN XPRESS HDPE VS HDPE RESIN

HDPE resin (MFI (190°C/5kg) = 0.15 g/10min) + 2% Blue pigments



WITH POLYTECHS  
CLEAN XPRESS



WITH STANDARD  
RESIN



# VISUAL EXAMPLE

## CLEAN XPRESS VHT VS PA6.6 at 300°C

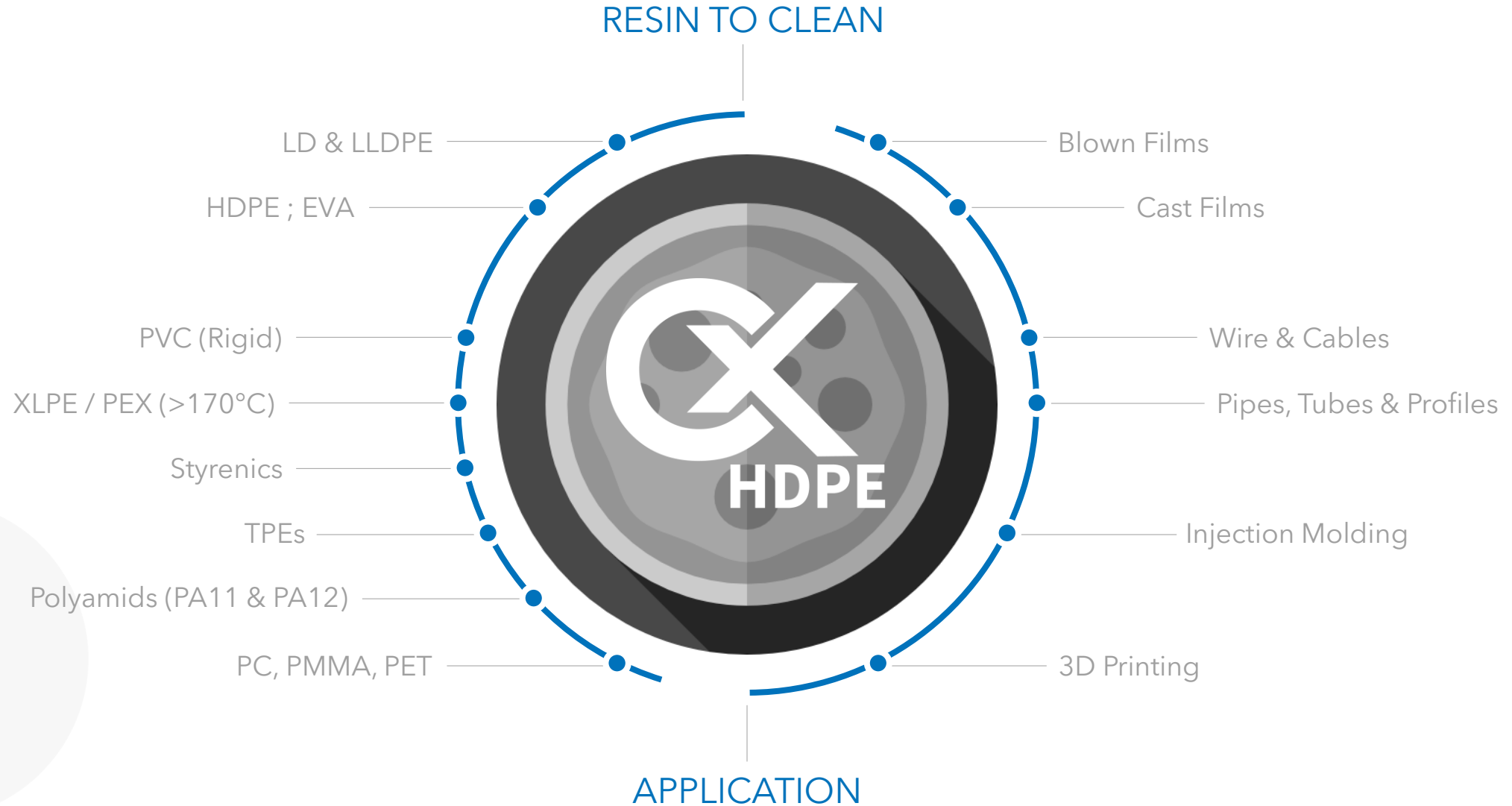
MFI (230°C/2.16kg) = 12 g/10min



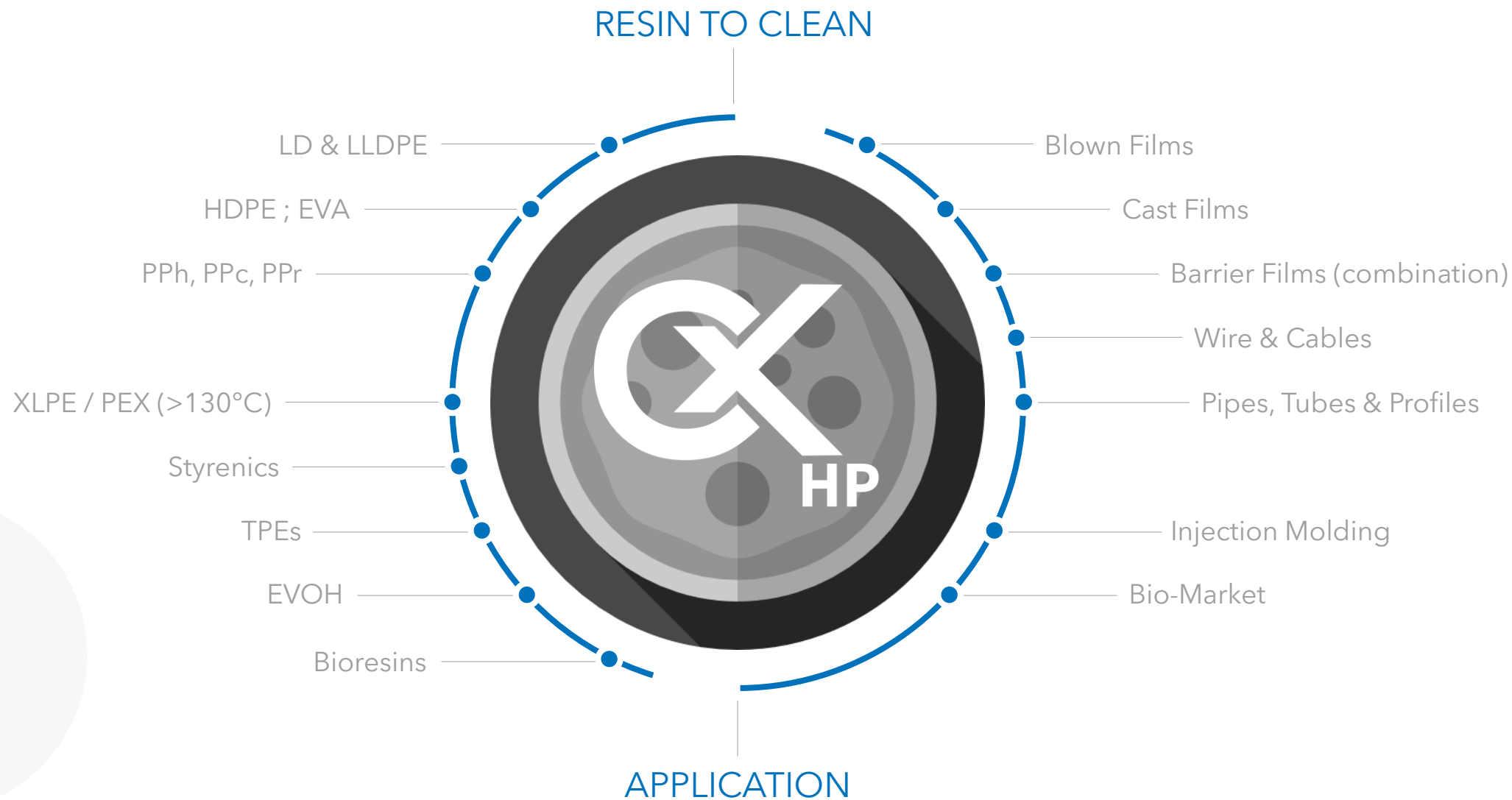
WITH POLYTECHS  
CLEAN XPRESS



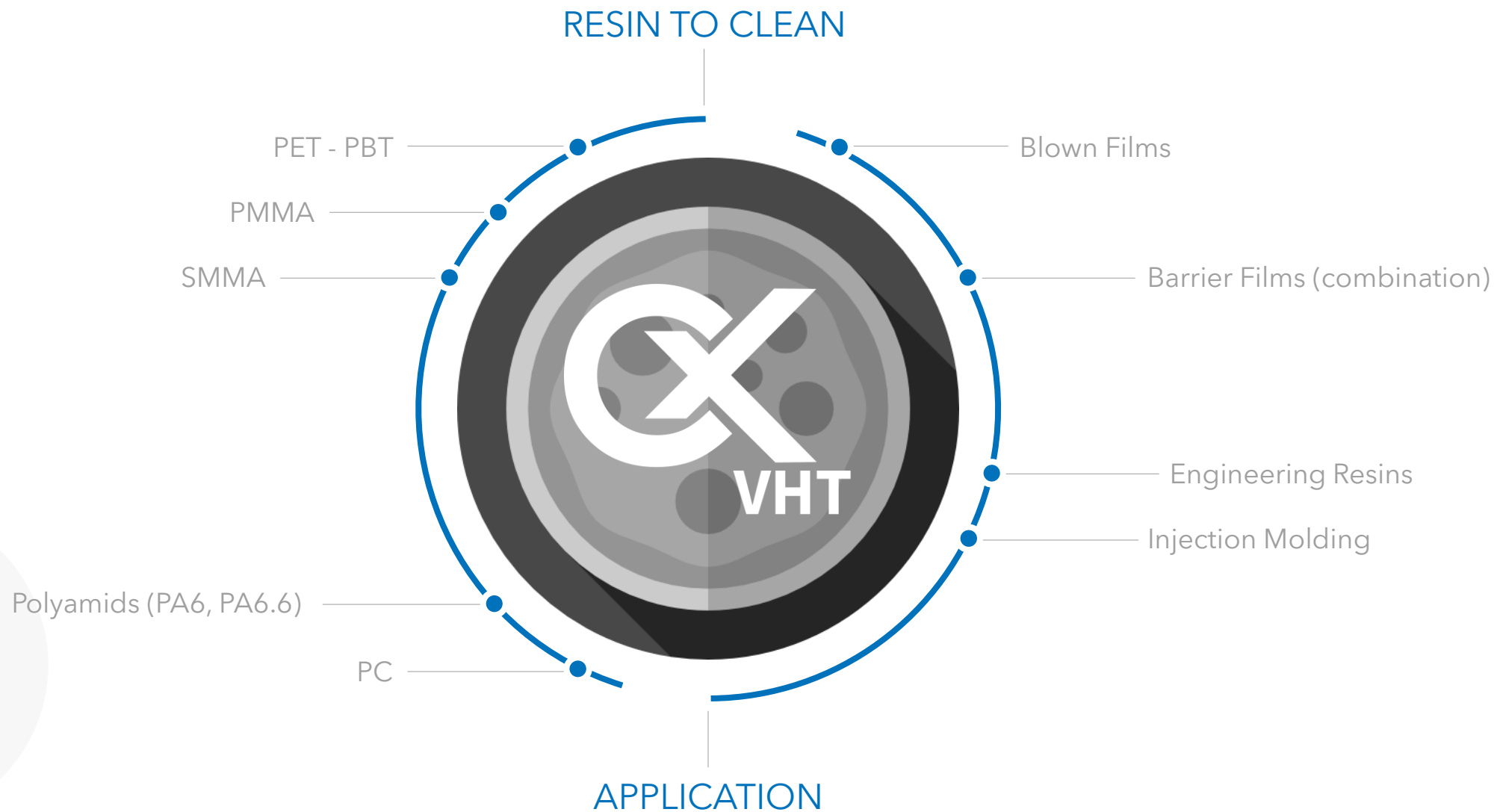
# GRADE SELECTION



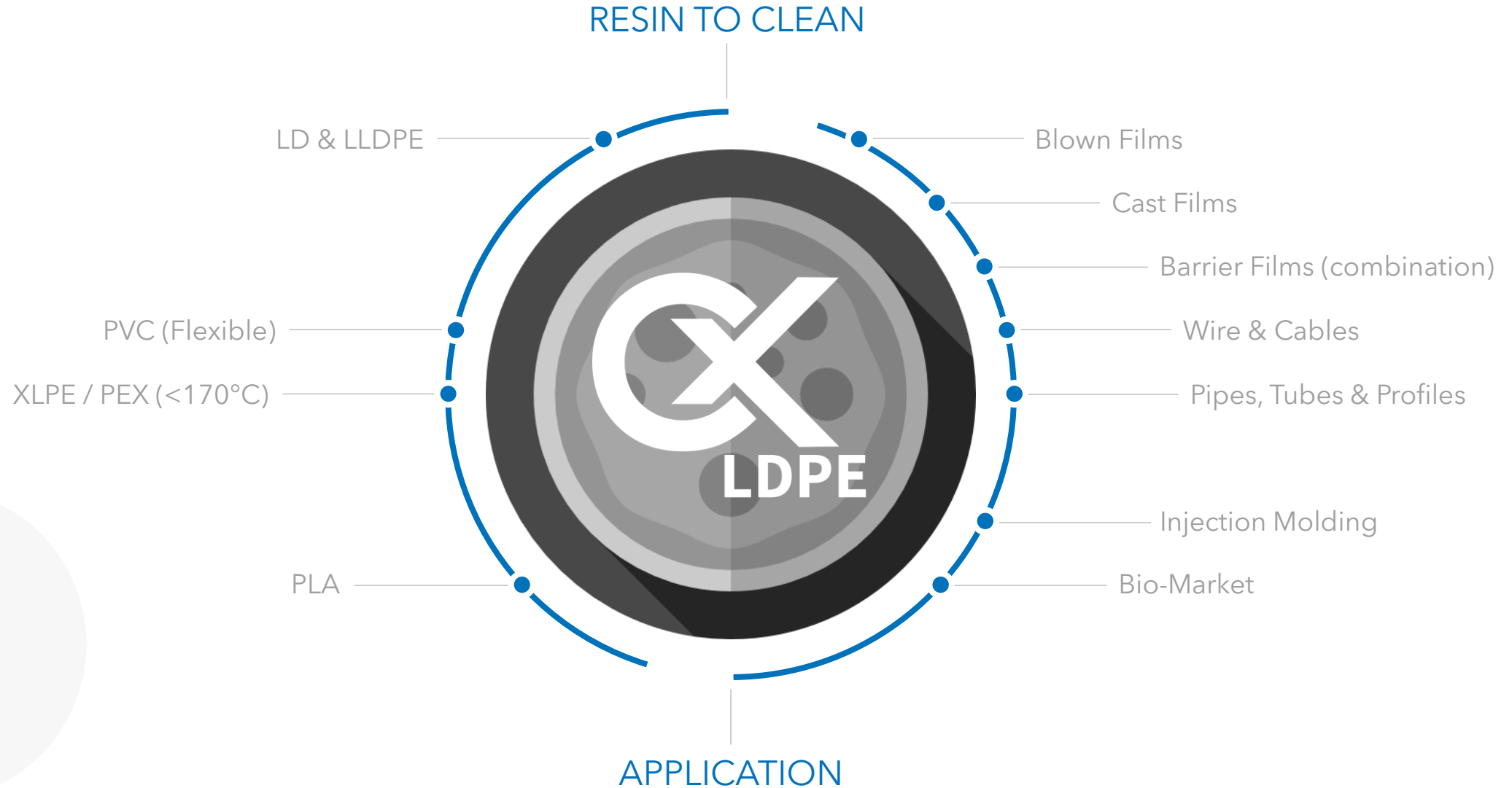
# GRADE SELECTION



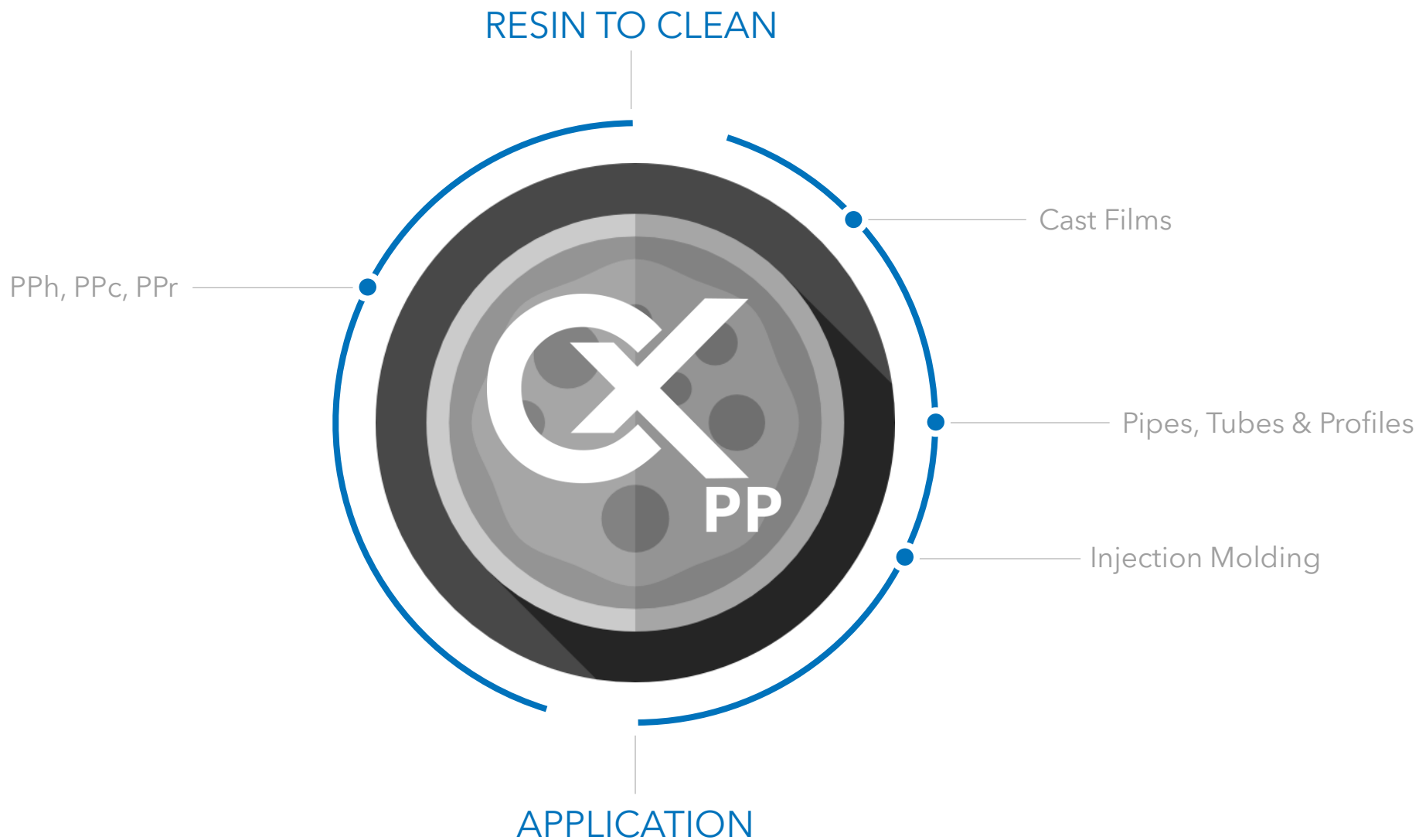
# GRADE SELECTION



# GRADE SELECTION

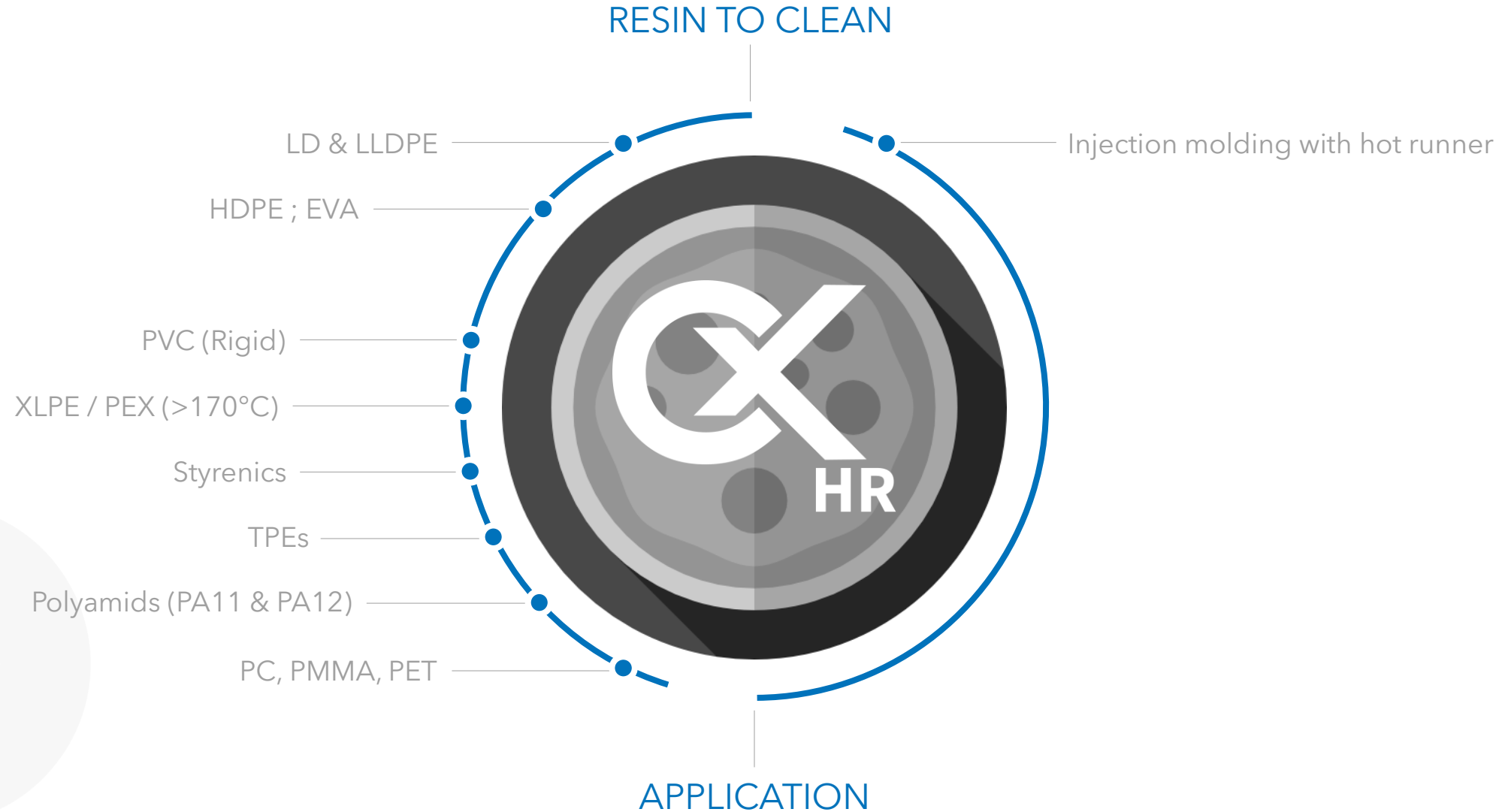


# GRADE SELECTION



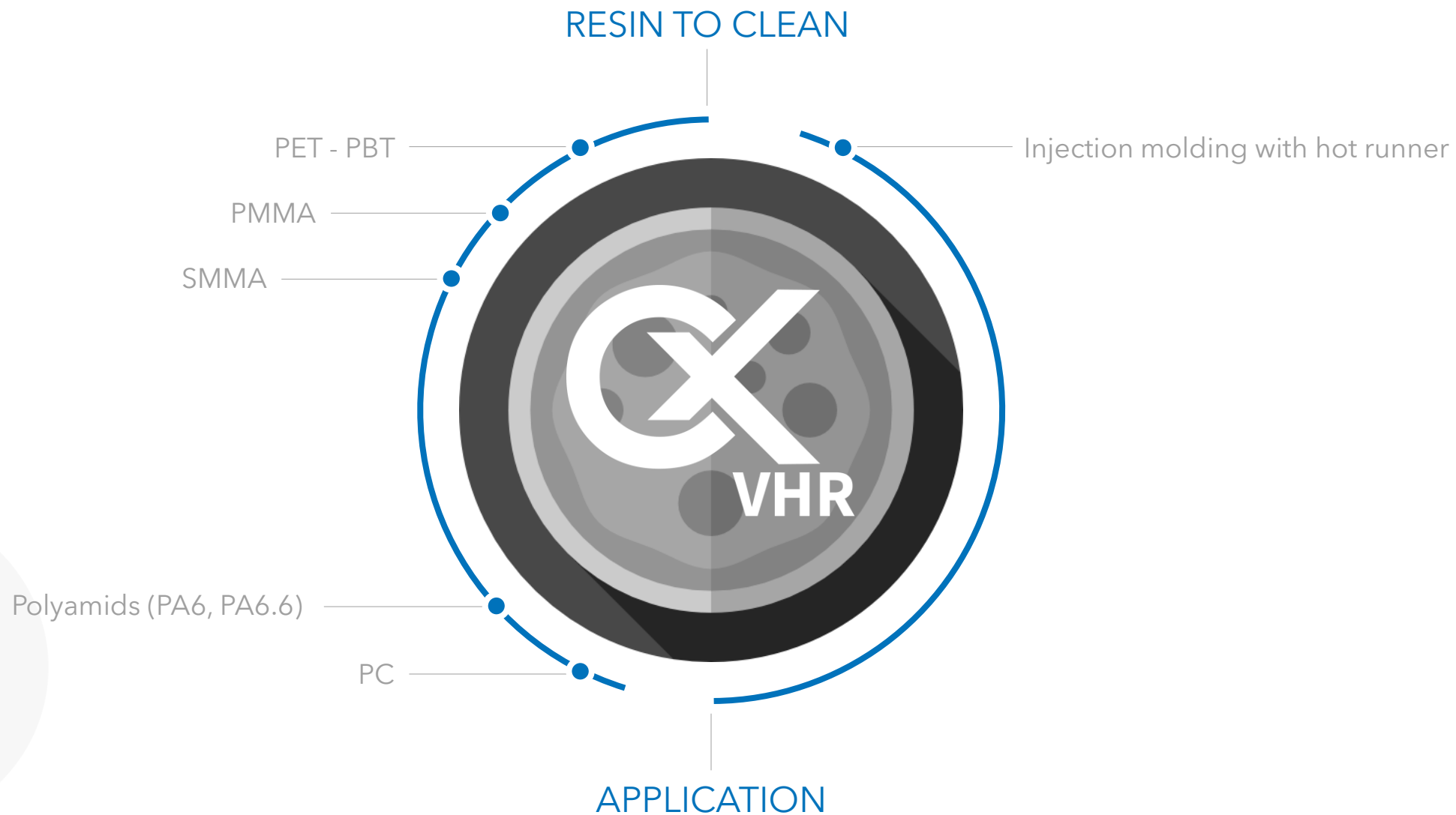


# GRADE SELECTION





# GRADE SELECTION





# CLEAN XPRESS FOR BLOWN FILMS



- Clean HDPE** — 150°C to 270°C — Low MFI polyolefin & other polymers
- Clean HP** — 80°C to 230°C — All thermoplastics - TPEs - Biopolymers
- Clean VHT** — 220°C to 320°C — Barrier films - PA6.6 - PA6
- Clean LDPE** — 100°C to 200°C — LL & LLDPE - Flexible PVC - Bioresins
- Clean PP** — 180°C to 230°C — BO & BOPP

## REAL CUSTOMER CASES

**MEDICAL BAGS**

- Case for cleaning solution : Color change
- Processing temperature : 180°C
- Resin to clean : LD - LLDPE
- Clean Xpress grade : Clean LDPE
- Quantity & time to purge : 25kg - 20min

**FOOD WRAPING & BARRIER FILMS**

- Case for cleaning solution : Color change
- Resin to clean & MFI : LLDPE - MFI 2
- Clean Xpress grade : Clean LDPE
- Quantity & time to purge : 50/100kg - 25min
- With virgin resin : 200kg - 1h



# CLEAN XPRESS FIR CAST FILMS



- Clean HDPE** — 150°C to 270°C — Low MFI polyolefin & other polymers
- Clean HP** — 80°C to 230°C — All thermoplastics - TPEs - Biopolymers
- Clean VHT** — 220°C to 320°C — Barrier films - PA6.6 - PA6
- Clean LDPE** — 100°C to 200°C — LL & LLDPE - Flexible PVC - Bioresins
- Clean PP** — 180°C to 230°C — BO & BOPP

## REAL CUSTOMER CASES

**HAND GLOVES**

- Case for cleaning solution : Color change
- Processing temperature : 240°C
- Resin to clean : LDPE
- Clean Xpress grade : Clean LDPE
- Quantity & time to purge : 25kg - 15min

**FOOD MEDICAL E&E PACKAGING**

- Case for cleaning solution : Color change
- Resin to clean & MFI : PP - MFI 8
- Clean Xpress grade : Clean PP
- Quantity & time to purge : 100/150kg - 30min
- With virgin resin : 500kg - 1h



# CLEAN XPRESS FOR WIRES & CABLES



- Clean HDPE** — 150°C to 270°C — Polyolefins - TPOs TPU's SEBs - COPA COPE - Engineering polymers
- Clean HP** — 80°C to 230°C — All thermoplastics - TPEs - Biopolymers
- Clean LDPE** — 100°C to 200°C — XLPE PEX (<170°C)

## REAL CUSTOMER CASES

**FIBER OPTIC EVA CABLES**

Case for cleaning solution : Color change

Resin to clean & MFI : EVA - MFI 0.45

Clean Xpress grade : Clean HDPE

Quantity & time to purge : 10kg - 10min

With virgin resin : 25/50kg - 30/60min

**XLPE CABLES**

Case for cleaning solution : Color change

Resin to clean & MFI : EVA - MFI 0.45

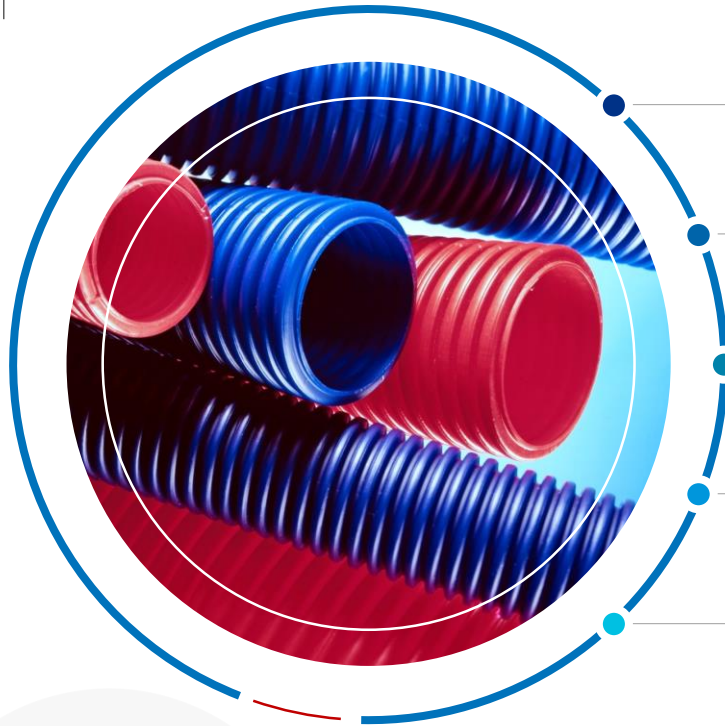
Clean Xpress grade : Clean HDPE

Quantity & time to purge : 10kg - 10min

With virgin resin : 25/50kg - 30/60min



# CLEAN XPRESS FOR PIPES TUBES & PROFILES



Clean <b>HDPE</b>	170°C to 250°C	Rigid PVC - HDPE - PA11 & PA12
Clean <b>HP</b>	100°C to 200°C	All polymers
Clean <b>VHT</b>	220°C to 320°C	XLPE PEX
Clean <b>LDPE</b>	80°C to 230°C	LD & LLDPE - Flexible PVC
Clean <b>PP</b>	180°C to 230°C	PPc - PPc - PPr

## REAL CUSTOMER CASES

**PIPES FOR  
AUTOMOTIV  
E**

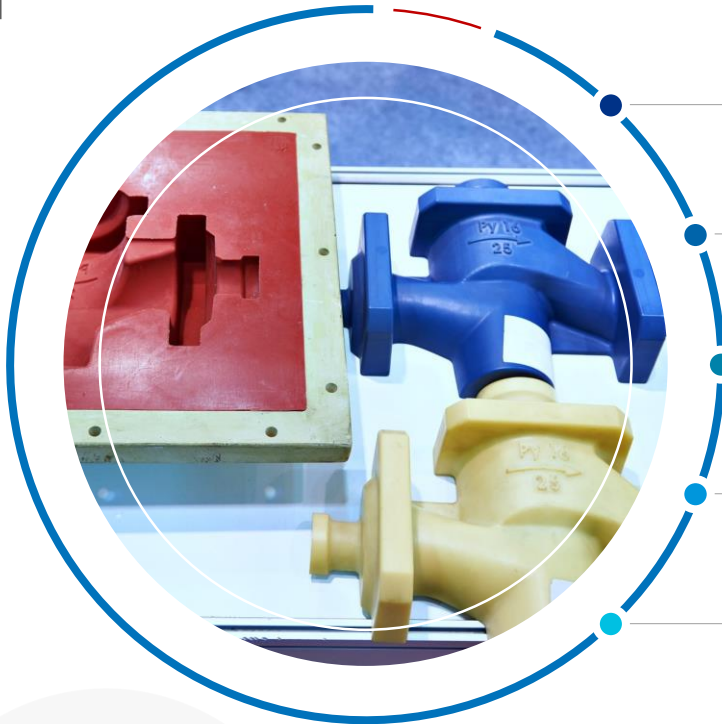
- Case for cleaning solution : Material change
- Processing temperature : 230°C
- Resin to clean & MFI : PA11 & PA12 - MFI 1.4
- Clean Xpress grade : Clean HDPE
- Quantity & time to purge : 20kg - 20min

**ELECTRONI  
C  
PIPES**

- Case for cleaning solution : Material change
- Resin to clean & MFI : Rigid PVC - MFI 2
- Clean Xpress grade : Clean HDPE
- Quantity & time to purge : 25kg - 15min
- With virgin resin : 200kg - 1h



# CLEAN XPRESS FOR INJECTION MOLDING



Clean **HDPE** — 150°C to 270°C — HDPE - Polyolefins

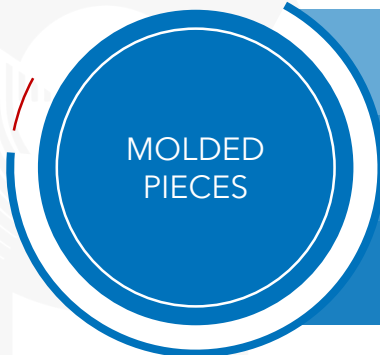
Clean **HP** — 100°C to 200°C — Engineering polymers - Styrenics

Clean **VHT** — 220°C to 320°C — XLPE PEX

Clean **LDPE** — 80°C to 230°C — LD & LLDPE

Clean **PP** — 180°C to 230°C — PPh PPc PPr - BOPP

## REAL CUSTOMER CASES

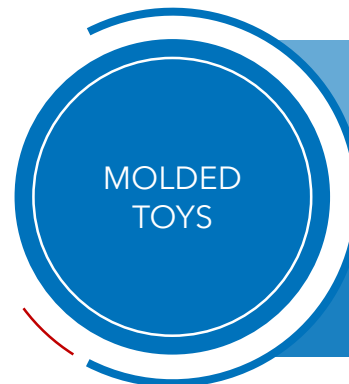


Case for cleaning solution : Color change

MOLDED  
PIECES

Resin to clean : PP

Clean Xpress grade : Clean PP



Case for cleaning solution : Color change

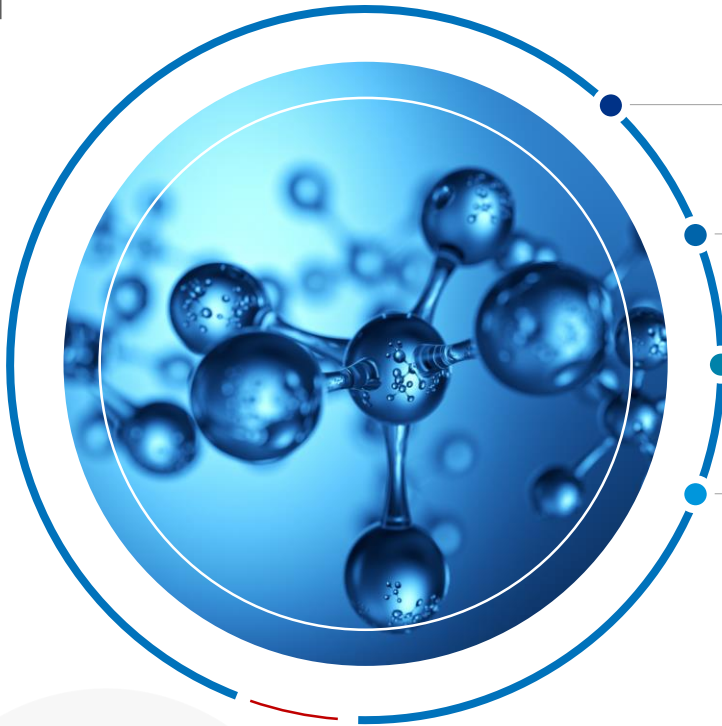
MOLDED  
TOYS

Resin to clean : ABS - HDPE - PP

Clean Xpress grade : Clean HDPE

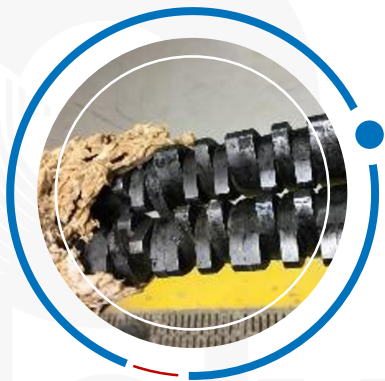


# CLEAN XPRESS FOR COMPOUNDING AND TECHNICAL POLYMERS



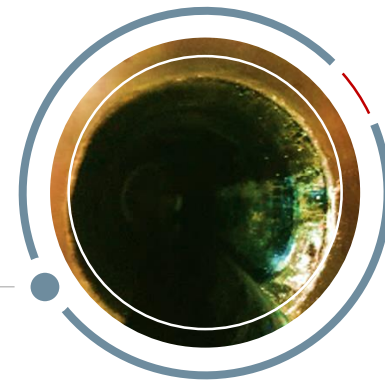
- Clean HDPE** — 150°C to 270°C — Polyolefins - Cleaning grafted operations
- Clean HP** — 100°C to 200°C — TPV compounding - Bio polymers
- Clean VHT** — 220°C to 320°C — PA6, PA6.6 - PC - SMMA - PMMA - PET
- Clean LDPE** — 80°C to 230°C — Polyolefins - Cleaning grafted operations

## VISUAL EXEMPLES



Solve Cleaning issue of PA 6 adhesion to screw metal

Fully Clean the barrel for next production batch



# Real case studies & cost savings study

Clean Xpress



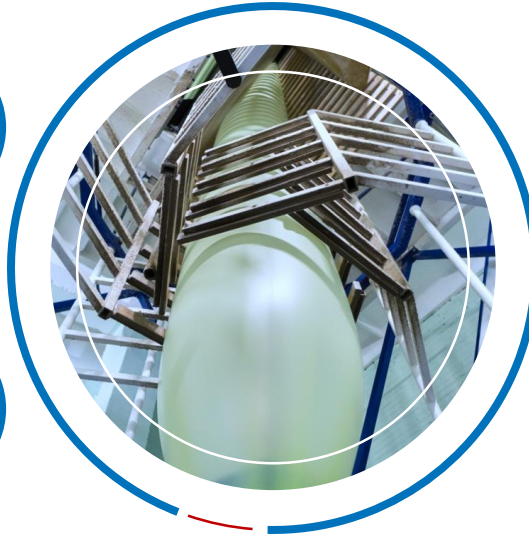




# REAL CASES RESULT : FOR BLOWN FILMS

## Company profile

One of the worldwide film packaging leader



## Market & application

Food wrap films

## Processing, production & application profile

Dark to light color - LLDPE (MFI : 2) - 180°C



## Case to clean

Issue with color transition

## Clean LDPE for PO blown films



CLEAN LDPE : 75KG

3X less Material

VIRGIN LLDPE : 250KG



CLEAN LDPE : 25MIN

3X Faster

VIRGIN LLDPE : 75MIN

Once a month - 12 Color Changes/Year  
Number of Lines - 30 Extrusion Lines

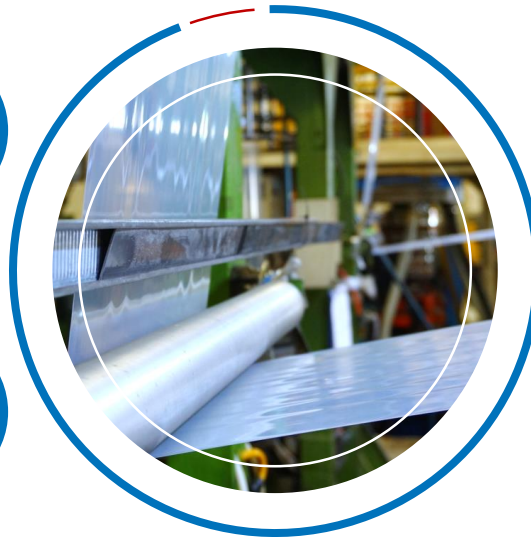
10h saved per line / year  
300h of saved production / year



# REAL CASES RESULT : FOR CAST FILMS

## Company profile

international manufacturer of plastic color-printing and laminating flexible packaging materials



## Market & application

Food Wrap Films, Medical & E&E packaging

## Processing, production & application profile

PP to LLDPE / Dark To light color - PP (MFI=8)  
LLDPE (MFI=2) - 240°C



## Case to clean

Issue with Material & Color Transitions

## Clean PP for PP PO TE cast films



CLEAN LDPE : 125KG

VIRGIN LLDPE : 550KG

4X less Material



CLEAN LDPE : 30MIN

VIRGIN LLDPE : 60MIN

3X Faster

Twice a month - 24 Color Changes/Year  
Number of Lines - 2 Extrusion Lines

12h saved per line per year  
24h of saved production per year

# PRODUCTION HOURS



VIRGIN RESIN PP



CLEAN PP



ID COMPANY CARD

Down time in hours	0.5	0.25	● Machine costs
Machine cost per hours	100	100	
Machine down time costs	50€	25€	● Material costs
Quantity cleaning material	60	15	
Price cleaning material	1.12	4.65	● Total costs
Total material costs	67.20€	69.75€	
Total cleaning costs (machine + material)	117.20€	94.75€	● Savings
<b>Costs savings</b>	22.45€		
<b>% costs savings</b>	19%		● Golbal savings
Number of cleaning procedures per day	2		
Number of lines	1		
Number of cleaning procedures per month	50		
Number of cleaning procedures per year	600		
<b>Cleaning procedures cost savings per year</b>	13 470€		
<b>Number of hours saved per month</b>	12.5		
<b>Number of hours saved per year</b>	150		
<b>Productivity won per year</b>	50%		



Company profile  
Color masterbatcher producer



Rason to clean  
Color change



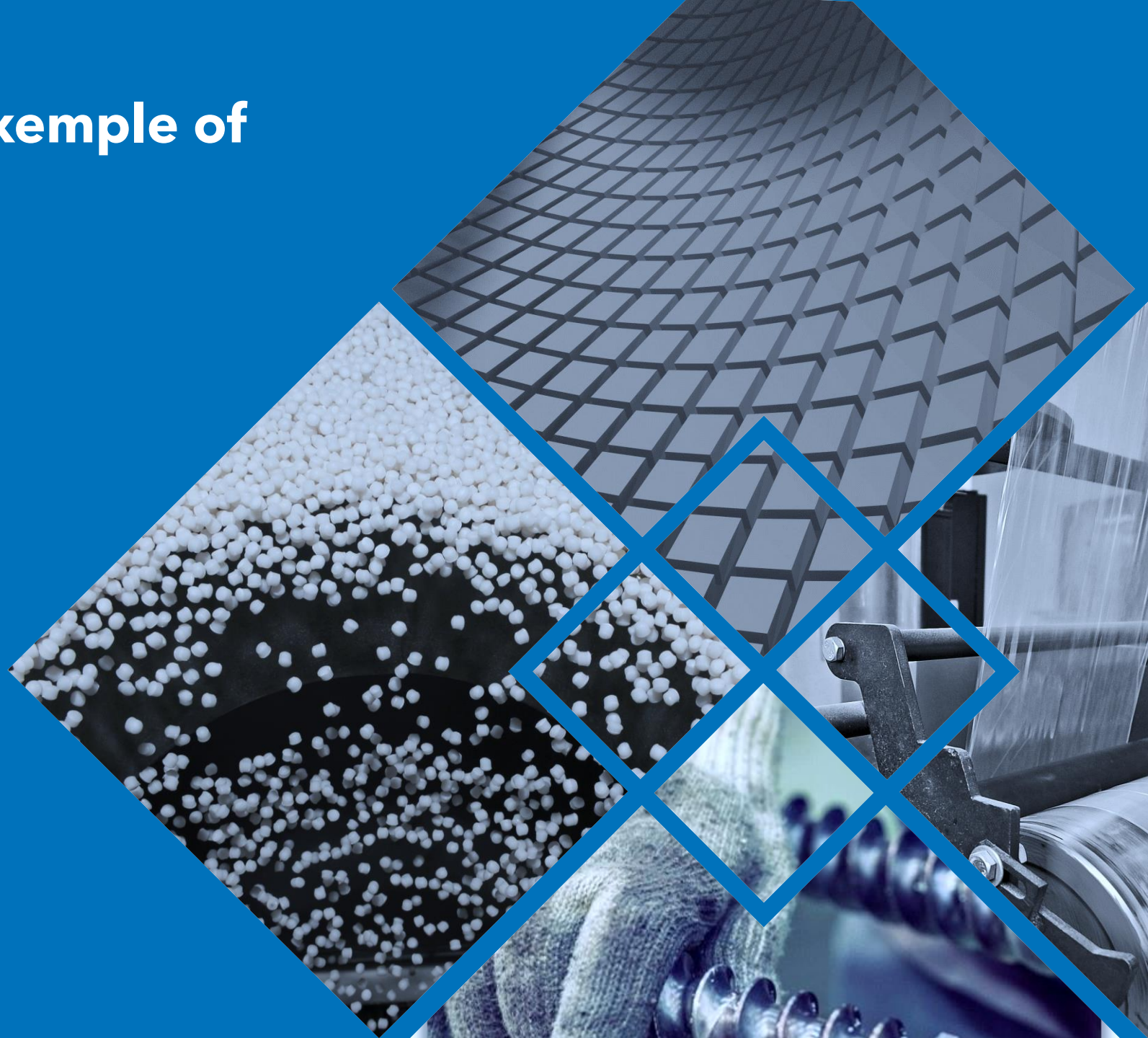
Application  
PP compounds



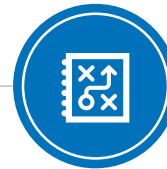
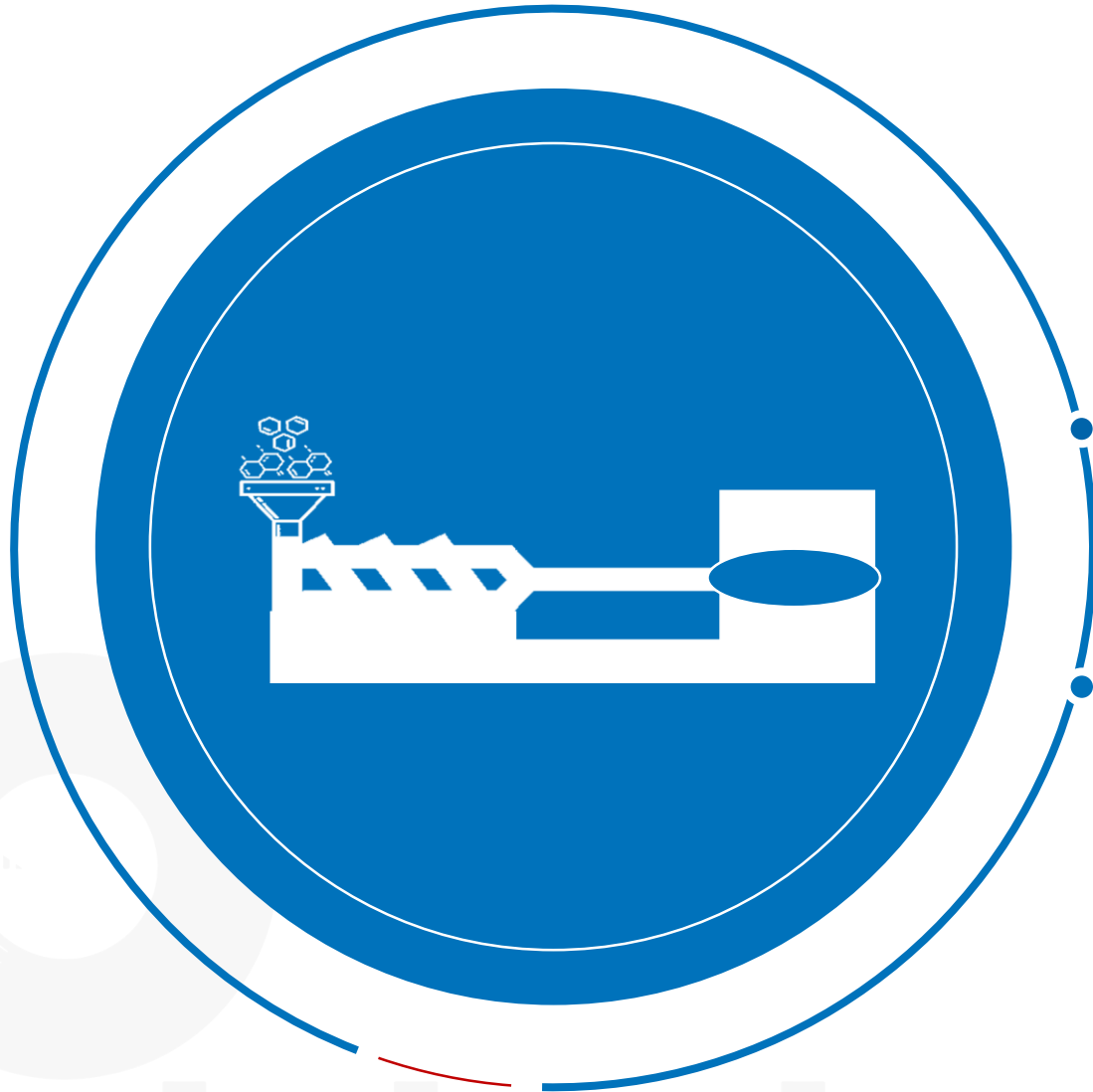
Conditions  
PP - 240°C - 10g/10min

# Quantity to be used & exemple of processing guideline

Clean Xpress

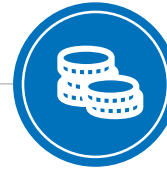


# WHAT TO CLEAN & HOW MUCH



## WHAT & WHERE ?

Barrel & Single or Twin Screw + (Extrusion Dies ; Cavities & Hot Runners for Injection ; Blow molding Dies)



## HOW MUCH ?

Quantity of resin to fill in barrel + die

**X 2** on average



# CONTINUOUS PROCESS - FILMABLE PROCESSING METHOD

- 1 • After finishing production, mix 50% of CLEAN LDPE with 50% of Resin A and fill the hopper.
- 2 • While continuing blown film extrusion, reduce screw speed and temperatures, keeping the bubble stable.
- 3 • When low temperatures are reached, continue blown extrusion with 100% CLEAN LDPE until the previous polymer or colour pigments are dislodged from the extruder.
- 4 • To improve effectiveness of cleaning, increase and reduce screw speed during extrusion
- 5 • If there is a significant difference in viscosity (MFI) between CLEAN LDPE and the next resin, mix CLEAN LDPE and the next resin B at 1/1 ratio.
- 6 • Extrude the blend for some minutes and adapt the temperatures and screw speed to the new resin B.
- 7 • The cleaning procedure is finished; the resin B can be added at 100% and production can start.



## PROCESSING INFOS

Example with CLEAN LDPE

Maintain the bubble for blown film process

Allow Color & Formulation Changes

Will clean at 50% loading with Clean LDPE





# DISCONTINUOUS PROCESS - NON-FILMABLE PROCESSING METHOD

- 1 • After finishing production, empty the hopper and fill it with 100% CLEAN LDPE while continuing extrusion.
- 2 • When CLEAN LDPE comes at the die, reduce the temperature.
- 3 • At the lowest possible melt temperature, stop extrusion for [5 minutes / 1 hour / 1 night ].
- 4 • After that, continue extrusion with CLEAN LDPE until the previous polymer or colour pigments are dislodged from the extruder.
- 5 • To improve effectiveness of cleaning, increase and reduce screw speed during extrusion
- 6 • When the CLEAN LDPE is extruding clear at the die, adapt temperatures and screw speed to the next resin B.
- 7 • When temperatures are reached, remove CLEAN LDPE from the hopper and fill it with the new resin B.
- 8 • When CLEAN LDPE has been flushed out, new production can start

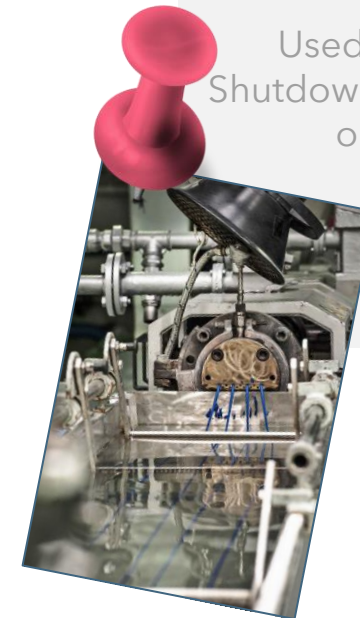


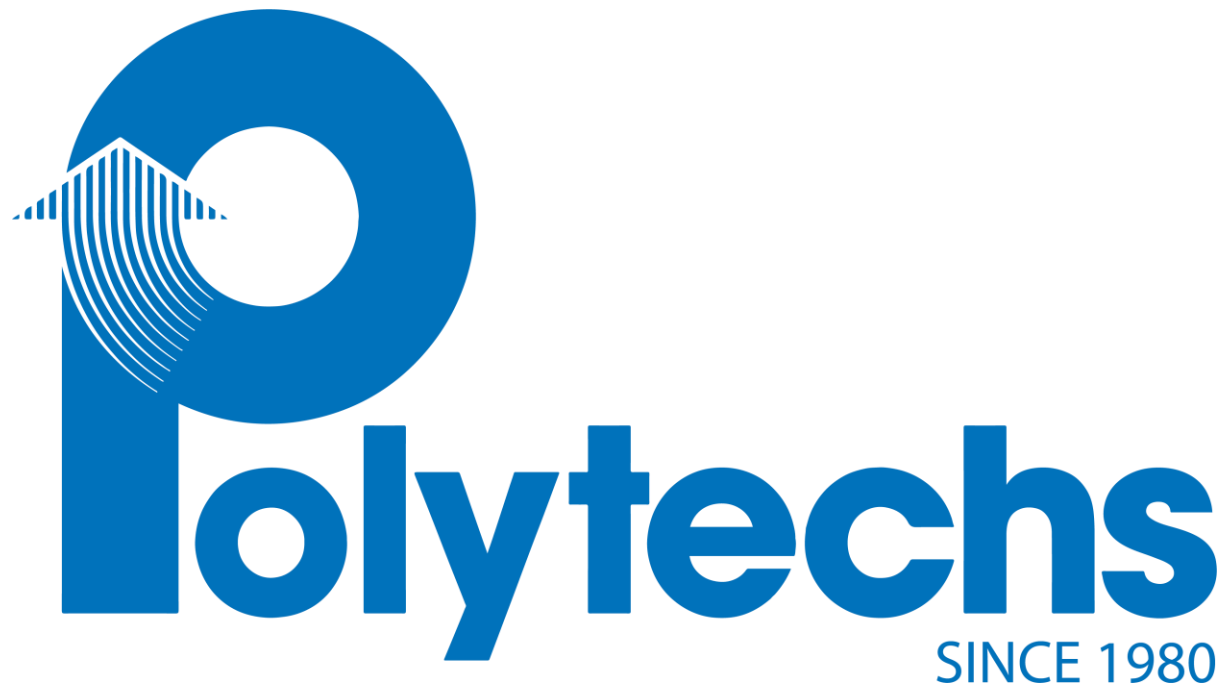
## PROCESSING INFOS

Example with CLEAN  
LDPE

In-depth cleaning

Used for Startup /  
Shutdown & Maintenance  
operations





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[www.cleanxpress-polytechs.com](http://www.cleanxpress-polytechs.com)



[www.polytechs.fr](http://www.polytechs.fr)