



**TOTAL**

COMMITTED TO BETTER ENERGY



# PERSONAL CARE PP & PE PRODUCT RANGE

# POLYETHYLENE PRODUCT RANGE

# REQUIREMENTS FOR HDPE BLOW MOULDING MATERIALS

## • Processability

- Sufficient melt strength (parison)
- High Line output
- Low sagging during shaping
- Even Wall thickness distribution

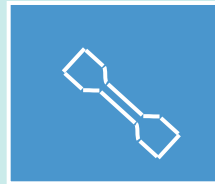


## • Chemical resistance

- High Environmental Stress Crack Resistance (ESCR)
- Barrier Properties (Oxygen, CO<sub>2</sub>, Oil)

## • Mechanical performance

- High stiffness
- Good Impact properties



## • Optical performance

- Good surface appearance
- High transparency,
- No frozen-in stress

# HDPE 5502

<u>TYPE</u>	<u>DENSITY</u>	<u>MI2</u>	<u>HLMI</u>	<u>ESCR</u>	<u>FLEX MOD</u>
5502	0.954	0.30	22	60	1200

Bottles and medium-size containers for **solids and liquids** (liquid food, household products, cleaning liquids, detergents, etc ...)

- general multi purpose HDPE materials
- very easy processing on all equipments
- nice surface finish
- food approved
- ESCR ok for majority of applications

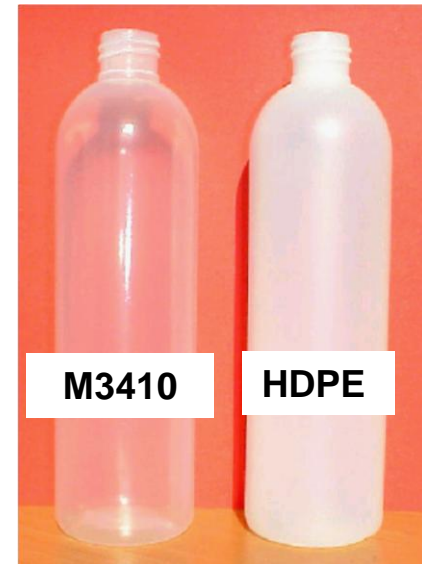


# LUMICENE M3410

<u>TYPE</u>	<u>DENSITY</u>	<u>MI2</u>	<u>HLMI</u>	<u>ESCR</u>	<u>FLEX MOD</u>
M3410	0.934	0.9	27	> 1000	600

Flexible bottles with high ESCR, excellent gloss, transparency and contact clarity

- flexible, squeezable bottles in monolayer
- high contact clarity in blend with HDPE
- high gloss rigid bottles in co-ex with HDPE / PP
- very high resistance to stress cracking
- high impact resistance
- excellent transparency
- nice surface finish (gloss)
- food approved



# INJECTION STRETCH BLOW MOULDING

To optimise production process

To reduce cost

To improve bottle quality

To reduce environmental impact



## ISBM Process

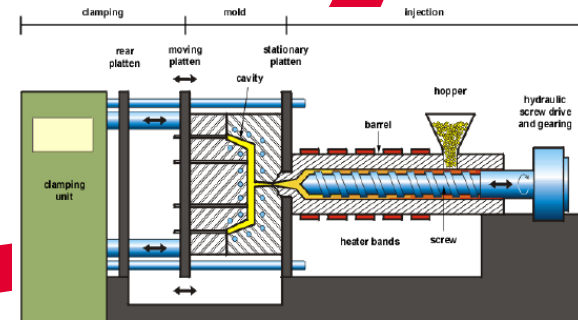
### Injection stage



### Blowing stage



### Preforms

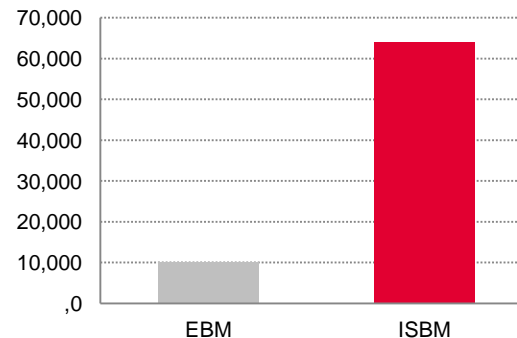


# ISBM HDPE SB1359

<u>TYPE</u>	<u>DENSITY</u>	<u>Charpy (23°C)</u>	<u>ESCR</u>	<u>FLEX MOD</u>
<b>SB1359</b>	<b>0.959</b>	<b>8</b>	<b>&gt; 200</b>	<b>1300</b>

Lightweight bottles (< 5 L) for HIC, Lubricants, Personal care, Dairy, Food

- Excellent combination of Injectability (preform) & blowability
- Good processing on existing 1 & 2-stage ISBM lines
- Much higher throughput versus Extrusion BM
- Fulfilling same mechanical requirements at strongly reduced bottle weight (ESCR, Impact, top load ..)
- Food approval
- Overall cost reduction



# POLYPROPYLENE PRODUCT RANGE



# POLYPROPYLENE IN BLOW MOULDING

- Homopolymer
  - Excellent stiffness
  - Best heat resistance (hot filling)
  - Best scratch resistance
- Random Copolymer => Most used
  - High transparency if clarified & excellent gloss
  - Good impact
  - Good compromise melt strength & processability
- Impact Copolymer
  - Best impact resistance
  - High stiffness
  - Opaque



# PP GRADES FOR EXTRUSION BLOW MOULDING

Grade	MFI g/10'	Flex. Modulus MPa	IZOD notched, 23°C, kJ/m <sup>2</sup>	
PPH 3060	1.8	1300	6	-
PPC 2660	0.8	1100	>50	-
PPC 3060	1.3	1200	>50	
PPR 3221	1.8	900	22	clarified
PPR 3260	1.8	1000	7.5	-



# LUMICENE MR10MX0 FOR ISBM

<u>TYPE</u>	<u>MI2</u>	<u>Flex Mod</u>	<u>Izod, 23°C</u>	<u>Haze, %</u>
MR10MX0	10	1250	5	5

- Easy processing on 1-stage (IBM) and 2-stage (ISBM) machines
- Outstanding transparency
- Food approved
- Very low level of extractable
- Typical application: Baby bottles

