

Luran[®] S - ASA

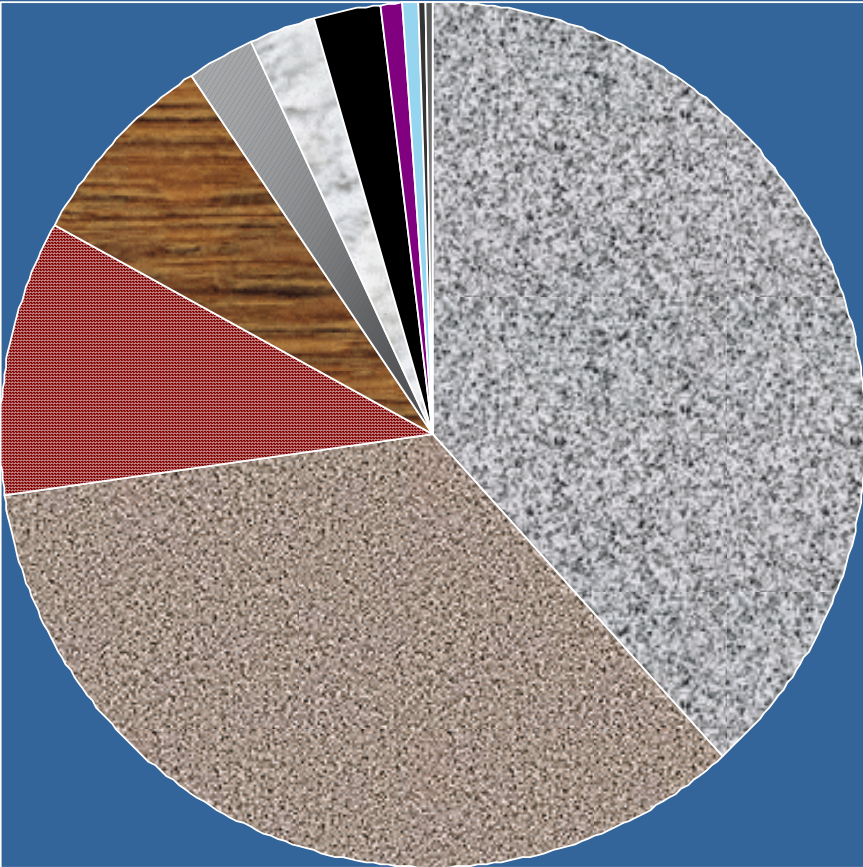
Properties & Applications

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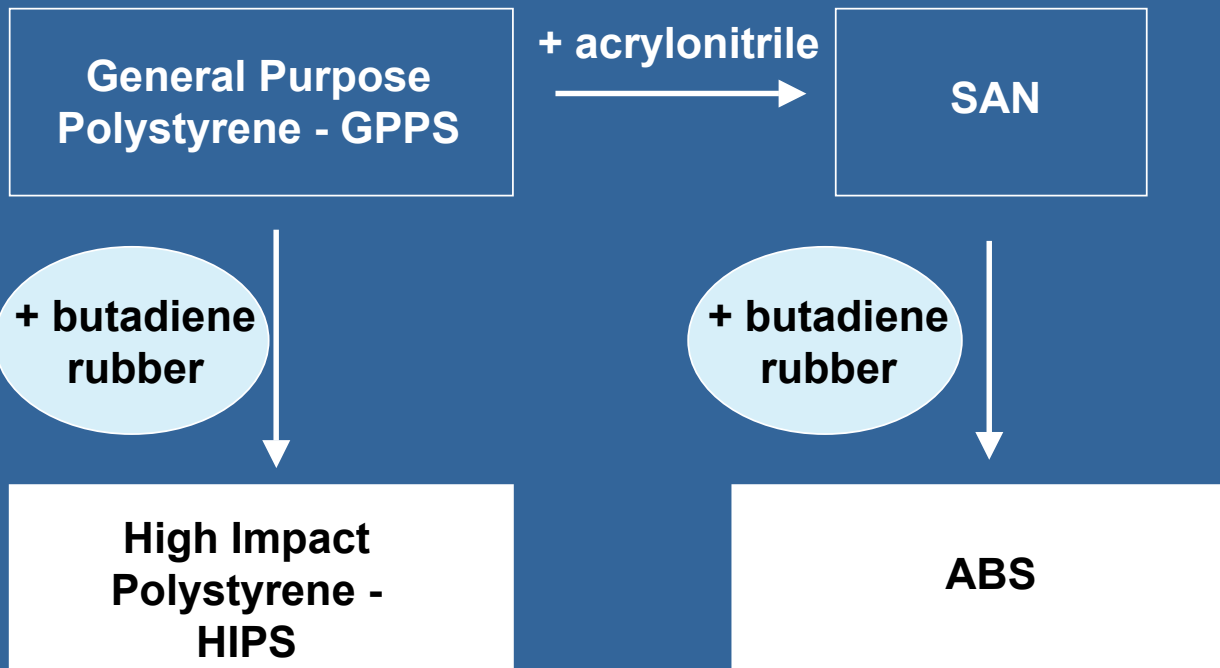
- Thermoplastics use in B & C
- Outline of styrenic polymers
- Standard & Specialty styrenic polymers
- ASA - Properties & Applications
- Existing and potential B & C Applications
- Conclusions

Material Use in B & C Western Europe : APME. Total 730M tonnes

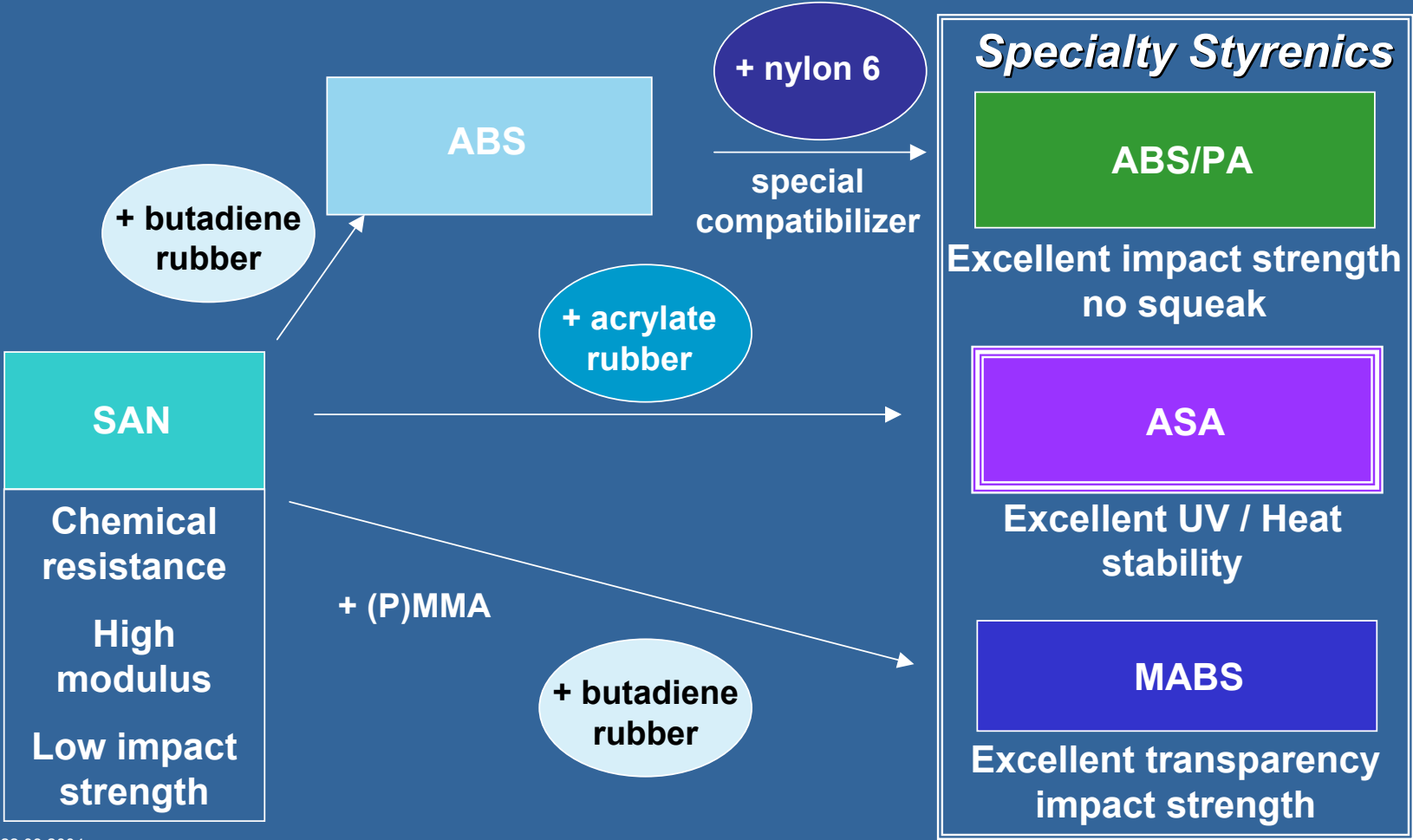


- Concrete
- Precast concrete
- Brick & Tile
- Wood
- Iron & Steel
- Stone
- Asphalt & Bitumen
- Plastics
- Flat Glass
- Mineral Wool
- Aluminium

Standard Styrenic Polymers



Specialty Styrenic Polymers

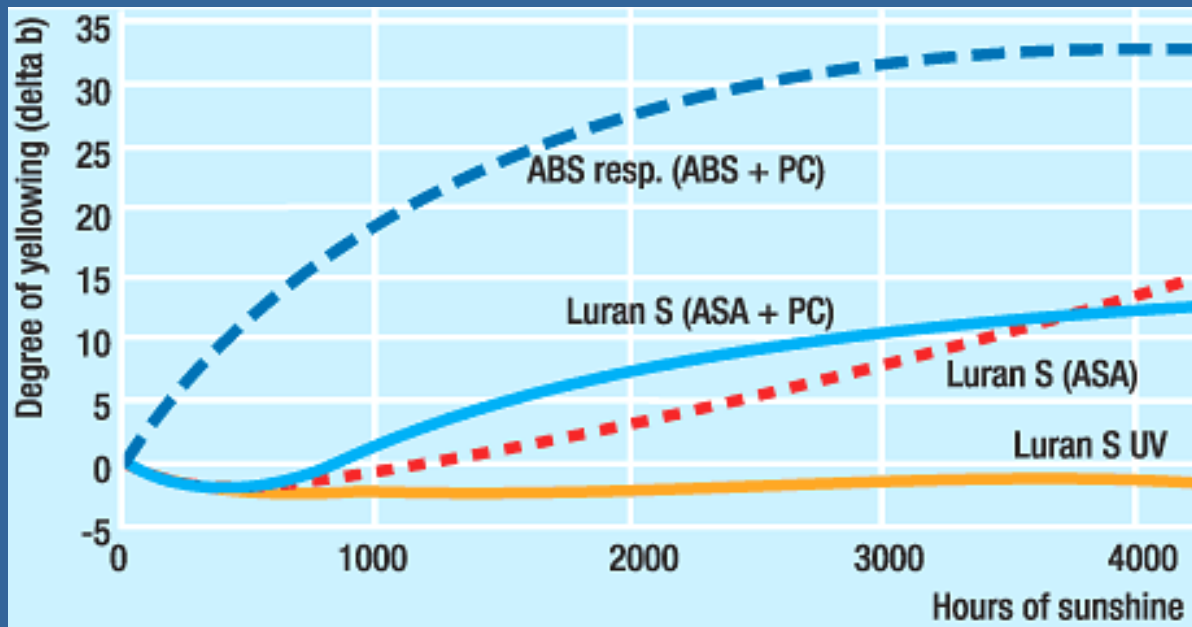


ASA – Property Profile

Acrylonitrile / Styrene / Acrylate

- Excellent UV-resistance, excellent colour stability
- No painting necessary – cost saving
- Good impact strength even after weathering
- Excellent chemical resistance
- Resistance against various cleaning agents
- High dimensional stability (amorphous material)
- Superior long term performance
- Good adhesion to soft components
- Outstanding heat aging resistance

Comparison of ASA & other styrenic polymers after outdoor weathering



Yellowing of ABS, Luran S and blends on outdoor weathering (white pigmentation)

Comparison of the greying of ASA & UV-stabilized ABS after outdoor weathering

7 months

9 months

1 year

2 years

3 years

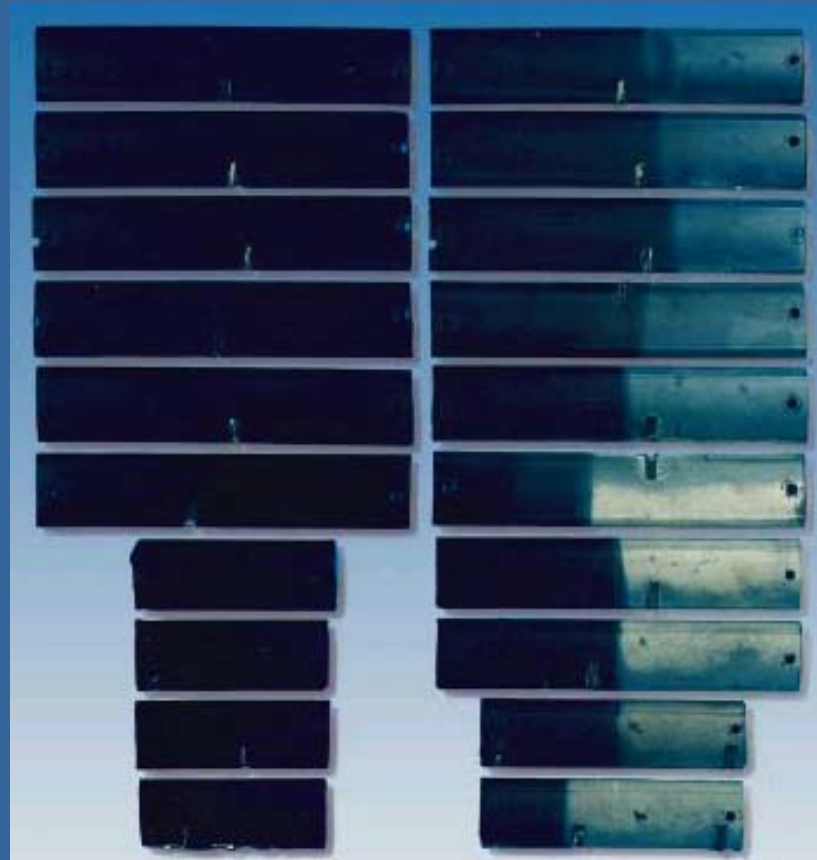
4 years

5 years

6 years

7 years

8 years



ASA

ABS-UV

ASA Grade
(Luran® S 778T)

ASA in Automotive Industry

1. Radiator grills



2. Cowl vent grills

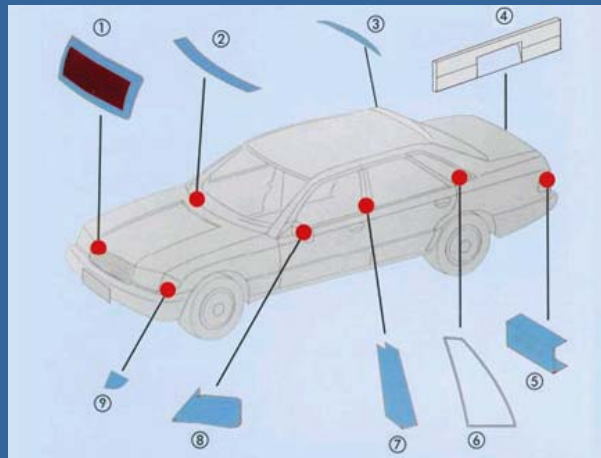
3. Spoilers



9. Indicator lamp housings



8. Exterior mirror housings



4. Rear trim panels



5. Rear lamp housings

7. B-pillar appliqué



6. Window frames

(Specific examples are Luran® S)

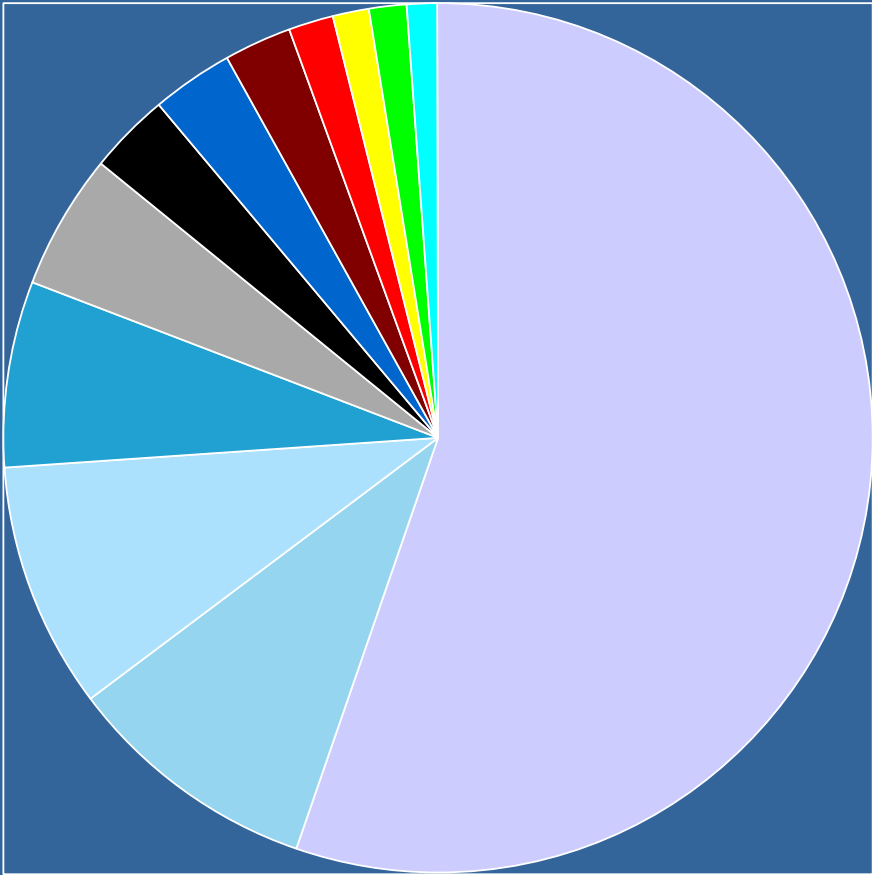
ASA in E/E Sector



Advantages:

- Colour stability and resistance to yellowing
- Impact resistance and stiffness
- High scratch resistance
- High gloss
- Good chemical resistance (e.g. against cleaning agents)
- Heat aging resistance

Thermoplastics Use in B & C Western Europe : APME. Total 5M tonnes



- PVC
- PU
- EPS
- HDPE
- LDPE
- PS
- XPS
- PP
- PU
- PC
- PMMA
- POM, PA, ABS

ASA compared to PVC in B & C

- 30 % Lower density
- Non-corrosive melt
- Higher weatherability in dark colors
- Higher heat deflection temperature
- Easy processability:

Extrusion - single and twin screw extruders

Injection Molding - universal screws, broad processing window

ASA & PVC working together: Applications: Doors, window frames, shutters, siding & fencing

- ASA on PVC

Improved colour stability, less fading

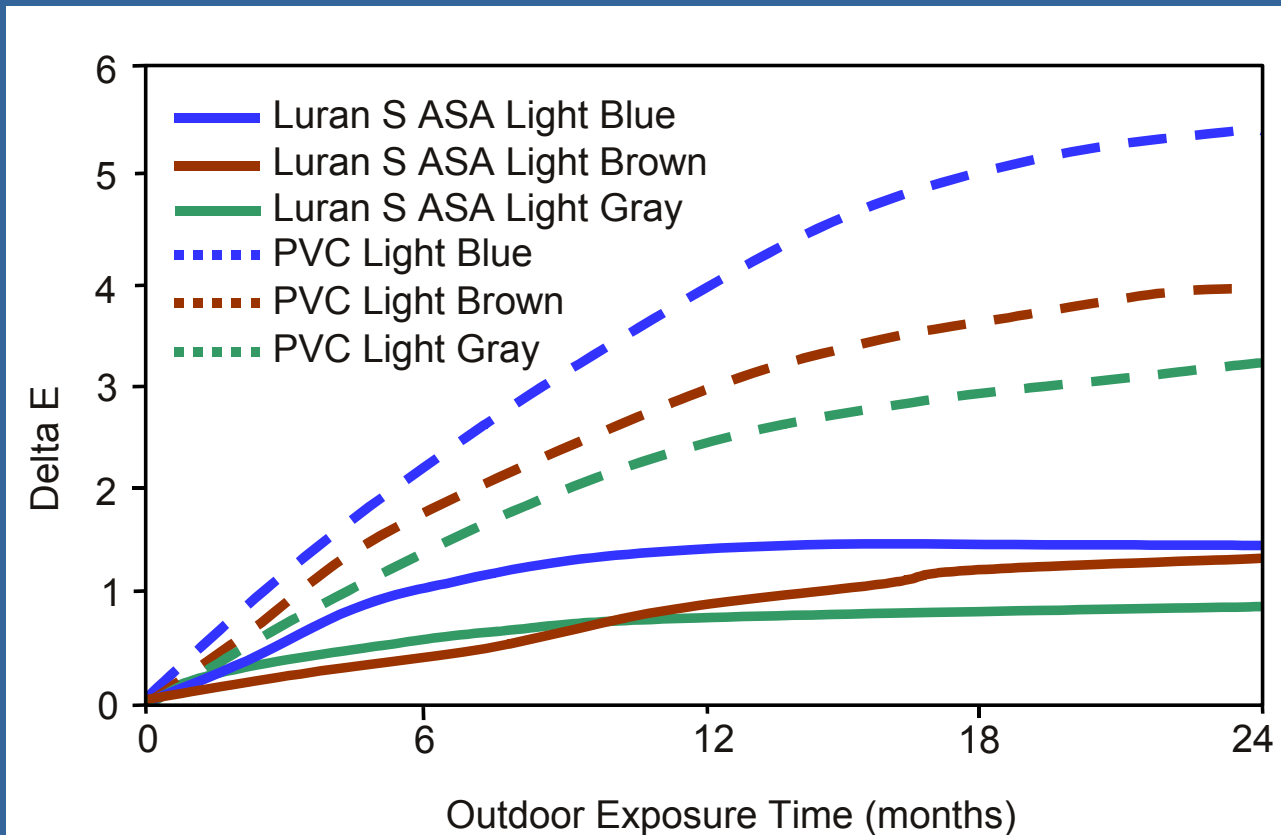
- ASA in PVC

Adds increased Vicat / HDT for hot outdoor conditions & dark colours

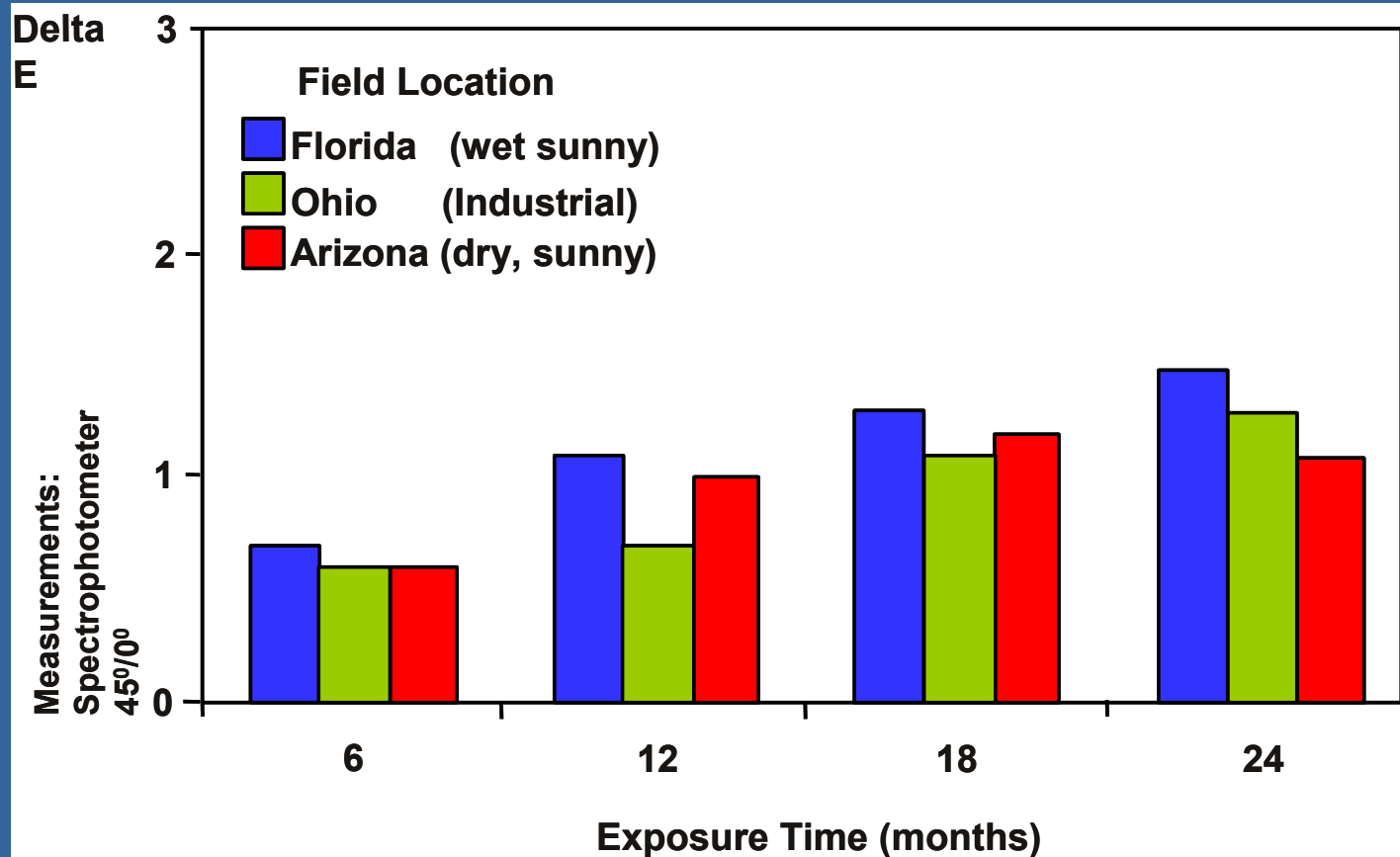
- ASA instead of PVC

For applications needing stiffness at even higher temperature

Comparison of ASA & PVC after outdoor weathering - Ohio USA



Luran S field color retention - light blue

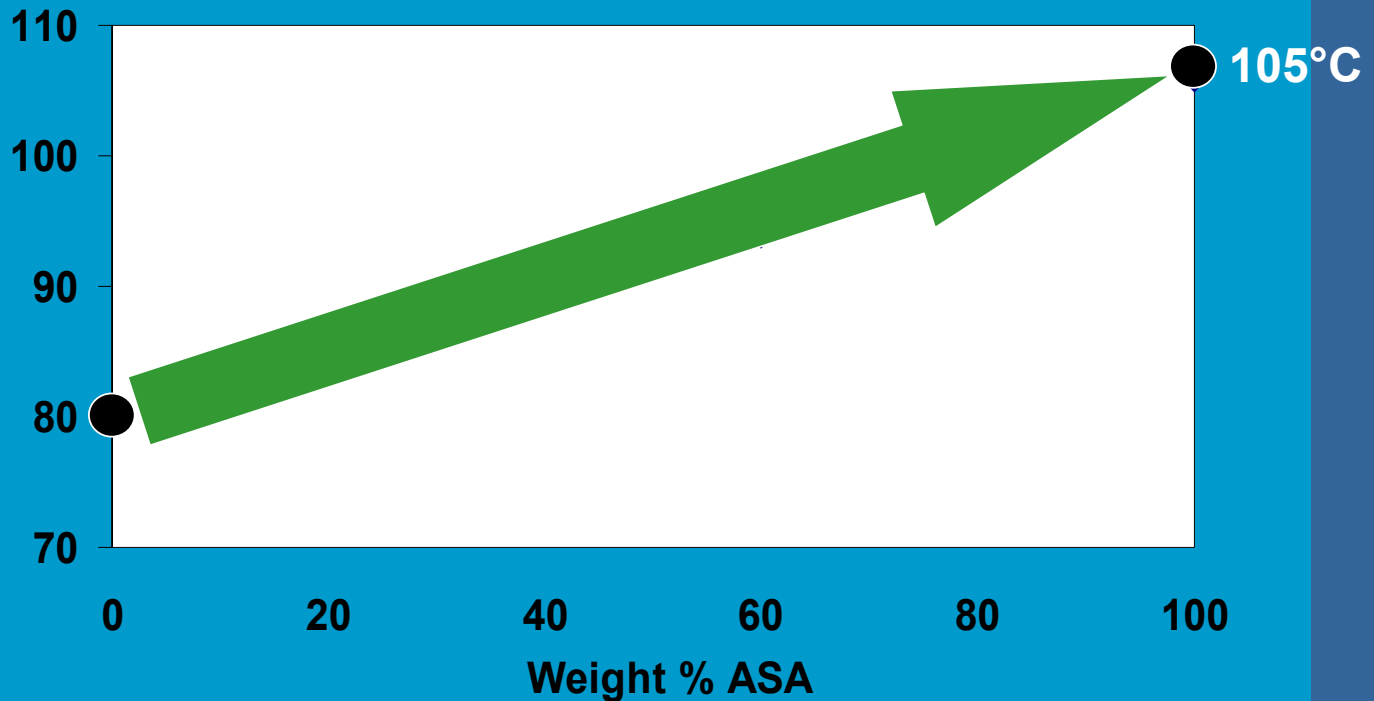


ASA Property Comparison

Property	PMMA	PVC	PP	ASA
Toughness-Stiffness ratio	-	+	0	++
Weathering resistance	++	+	0	++
Dimensional heat resistance HDT/Vicat	+	0	0	+
Chemical resistance	0	+	++	+
Dimensional stability/ Low warpage	+	+	-	+
Gloss – Long-term	++	0	-	+

ASA in PVC

Vicat B50 (°C)



ASA Applications in B & C



 **BASF**
The Chemical Company

- ASA offers much higher Vicat than PVC, enabling use in hot countries and darker colours
- Doors made of ASA
- Solar panel housings that must withstand intense UV and remain rigid under high temperature
- As a cap layer for PVC and other less stable polymers (fencing, siding, decking, roof-tiles etc.)
- Storm doors, exterior trim, garage doors

Applications of ASA on PVC or ABS



Conclusions

- Plastics are used in B & C due to their versatility, attractive properties and cost
- Styrenics are used for insulation, pipes, ducts and fitted furniture
- ASA offers excellent mechanical properties like those of ABS with the bonus of superb heat and UV resistance
- ASA is well proven in the automotive and E&E sectors
- The qualities lend themselves very well to adoption in B & C
- Existing applications are window profiles, siding, roof tiles, electrical switch covers and more
- Let your imagination find the rest!