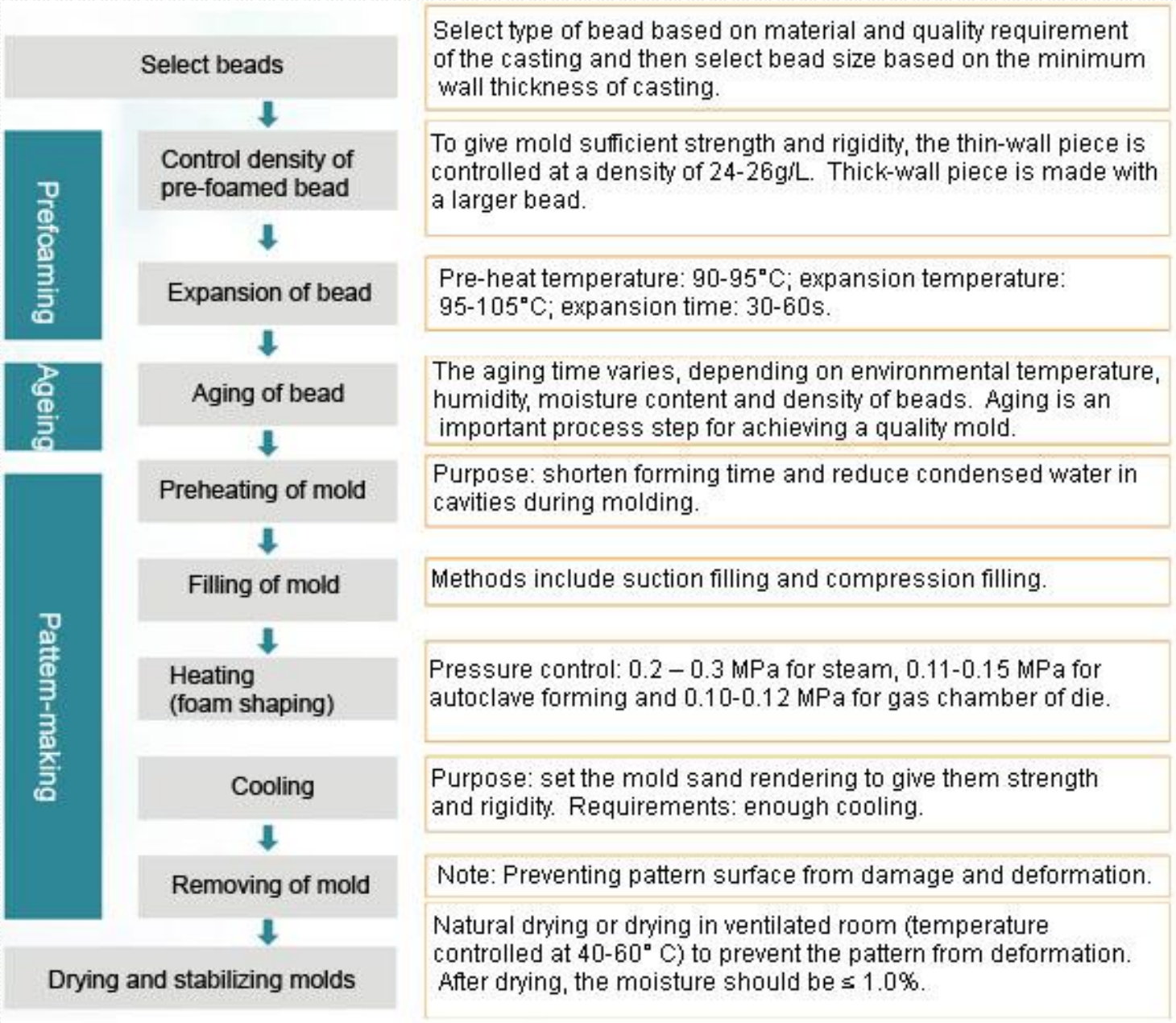
Copolymer of STMMA

Expandable Styrene/MMA copolymer beads

Pattern making of STMMA copolymer resin series

- For the lost foam casting process, the making of the foamed mold is a very important link. No matter which resin granules are used, the mold-making process is basically the same and is shown as follows


Select beads
Select type of bead based on material and quality requirement of the casting and then select bead size based on the minimum wall thickness of casting.
Prefoaming
Control density of pre-foamed bead
To give mold sufficient strength and rigidity, the thin-wall piece is controlled at a density of 24-26g/L. Thick-wall piece is made with a larger bead.
Expansion of bead
Pre-heat temperature: 90-95°C; expansion temperature: 95-105°C; expansion time: 30-60s.
Ageing
Aging of bead
The aging time varies, depending on environmental temperature, humidity, moisture content and density of beads. Aging is an important process step for achieving a quality mold.
Pattern-making
Preheating of mold
Purpose: shorten forming time and reduce condensed water in cavities during molding.
Filling of mold
Methods include suction filling and compression filling.
Heating (foam shaping)
Pressure control: 0.2 – 0.3 MPa for steam, 0.11-0.15 MPa for autoclave forming and 0.10-0.12 MPa for gas chamber of die.
Cooling
Purpose: set the mold sand rendering to give them strength and rigidity. Requirements: enough cooling.
Removing of mold
Note: Preventing pattern surface from damage and deformation.
Drying and stabilizing molds
Natural drying or drying in ventilated room (temperature controlled at 40-60° C) to prevent the pattern from deformation. After drying, the moisture should be ≤ 1.0%.

Diameter classification & proportion table

Specifications	Diameter	Proportion
STMMA-1#	0.60~0.90mm	
STMMA-2#	0.45~0.60mm	19~21g/L
STMMA-3A#	0.40~0.55mm	20~22g/L
STMMA-3#	0.35~0.50mm	21~23g/L
STMMA-4#	0.25~0.35mm	23~26g/L

Difference of STMMA and EPS

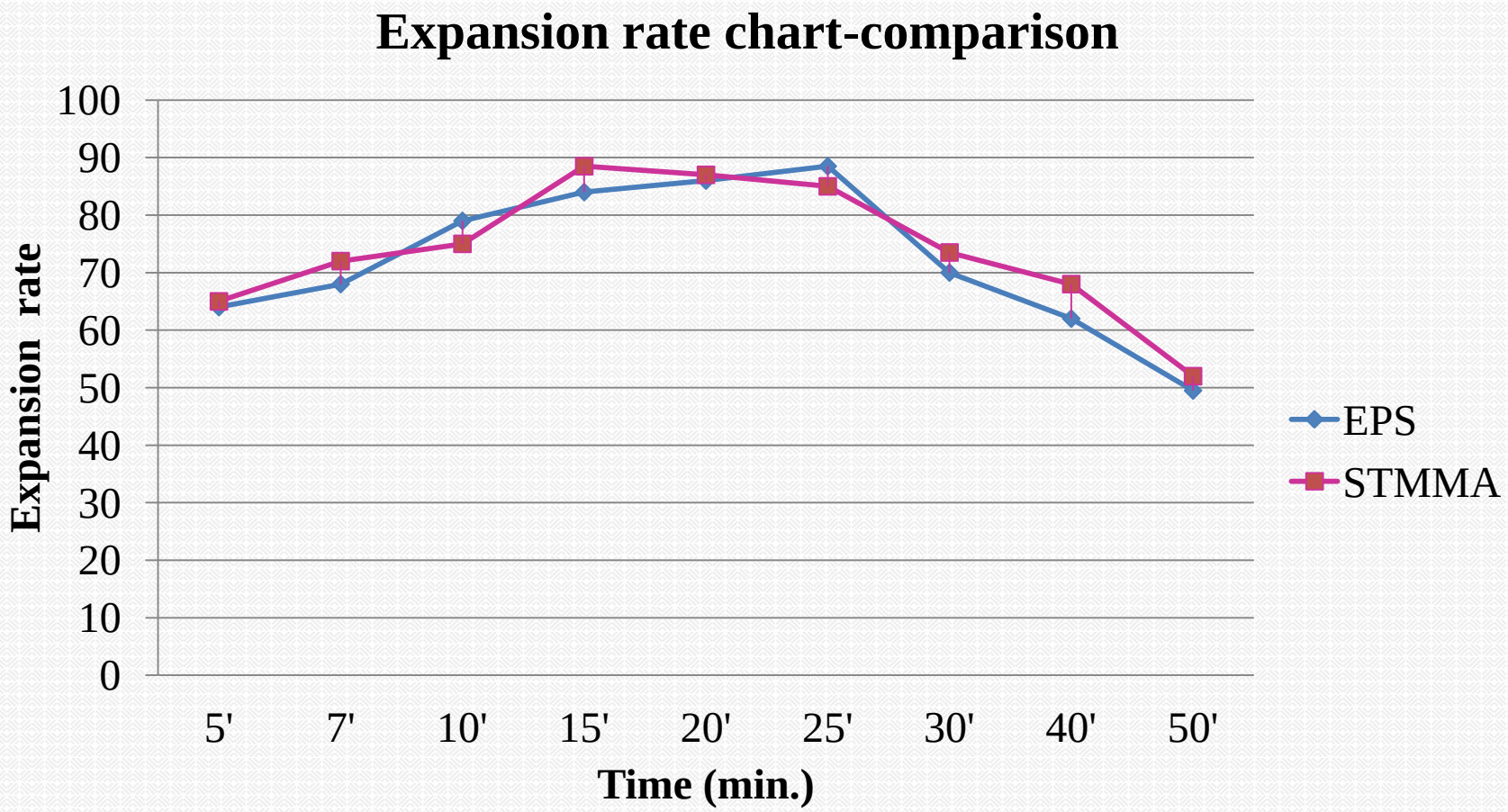
- By STMMA is composed of methyl methacrylate and styrene.
- **Compared with EPS, STMMA series foamable copolymer resin beads have much excellent casting performances:**
  - ✓ Reducing carbon defect of castings;
  - ✓ Reducing carburization defect on surface of steel castings;
  - ✓ Reducing smoke carbon;
  - ✓ Improving surface finish of castings.

Name	Unit	EPS	STMMA
Molecule		-(C8H8)n-(C8H8O2)m-	-(C8H8O2)-m
Carbon	%	92	60
Crumble	j/g.k	-912	-842
Tg	°C	80-100	100-105
Evaporation (start)	°C	270-300	250-260
Evaporation (end)	°C	460-500	420-430

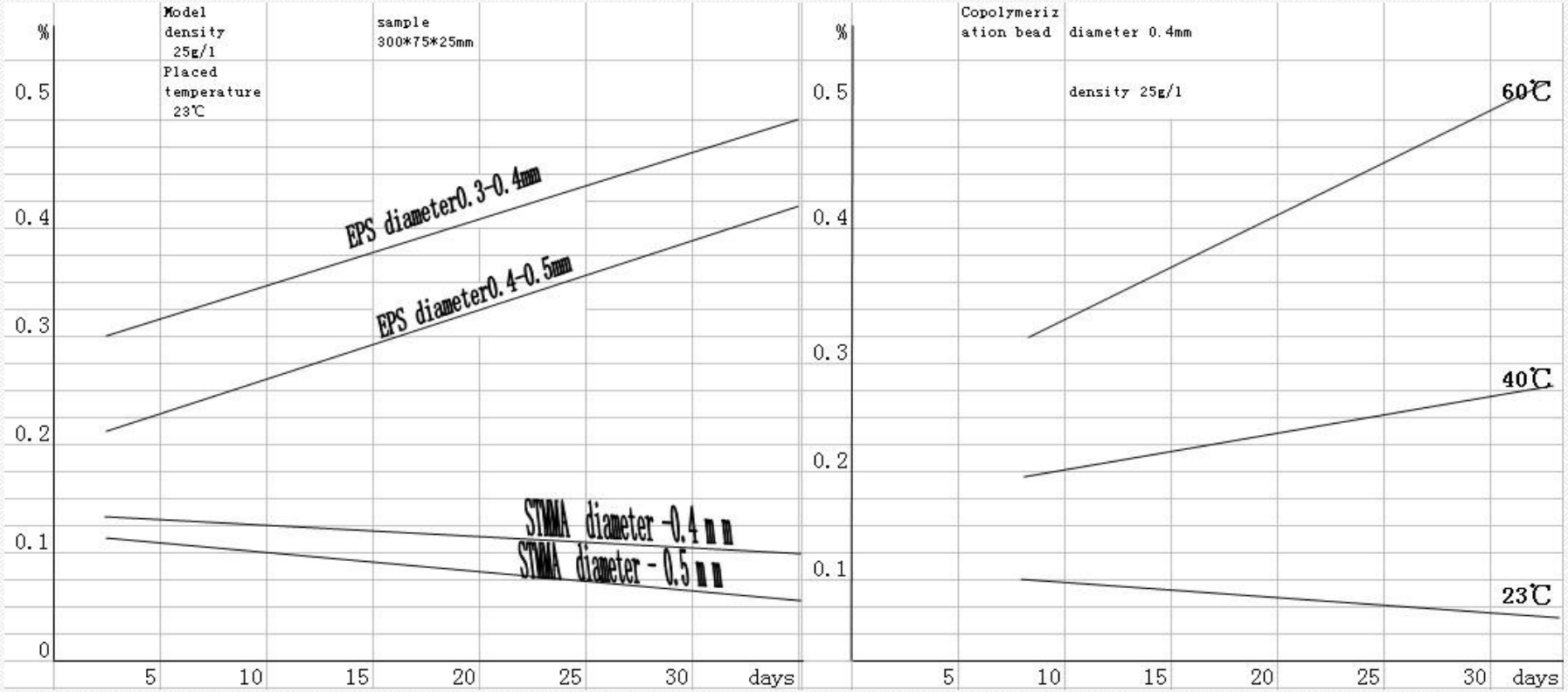
- STMMA is through Styrene and methyl methacrylate polymer one-step polymerization generated. These products are really have application in lost foam erea.
- STMMA's carbon usually ≤ 0.06%, carburetting defects much less than EPS.
- Best use date in three months on 25℃ normal temperature.

	Diameter	Add carbon	Applicable scope
EPS	≥0.9mm	≥0.1%	Gray iron, aluminum alloy
STMMA	0.25~0.9mm	≤0.06%	Ductile iron , steel castings, gray iron

Expansion curve graph on 105℃



The relation between model shrinkage and temperature



Burning