Influence of temperature conditions on the shrinkage of wax patterns for investment casting

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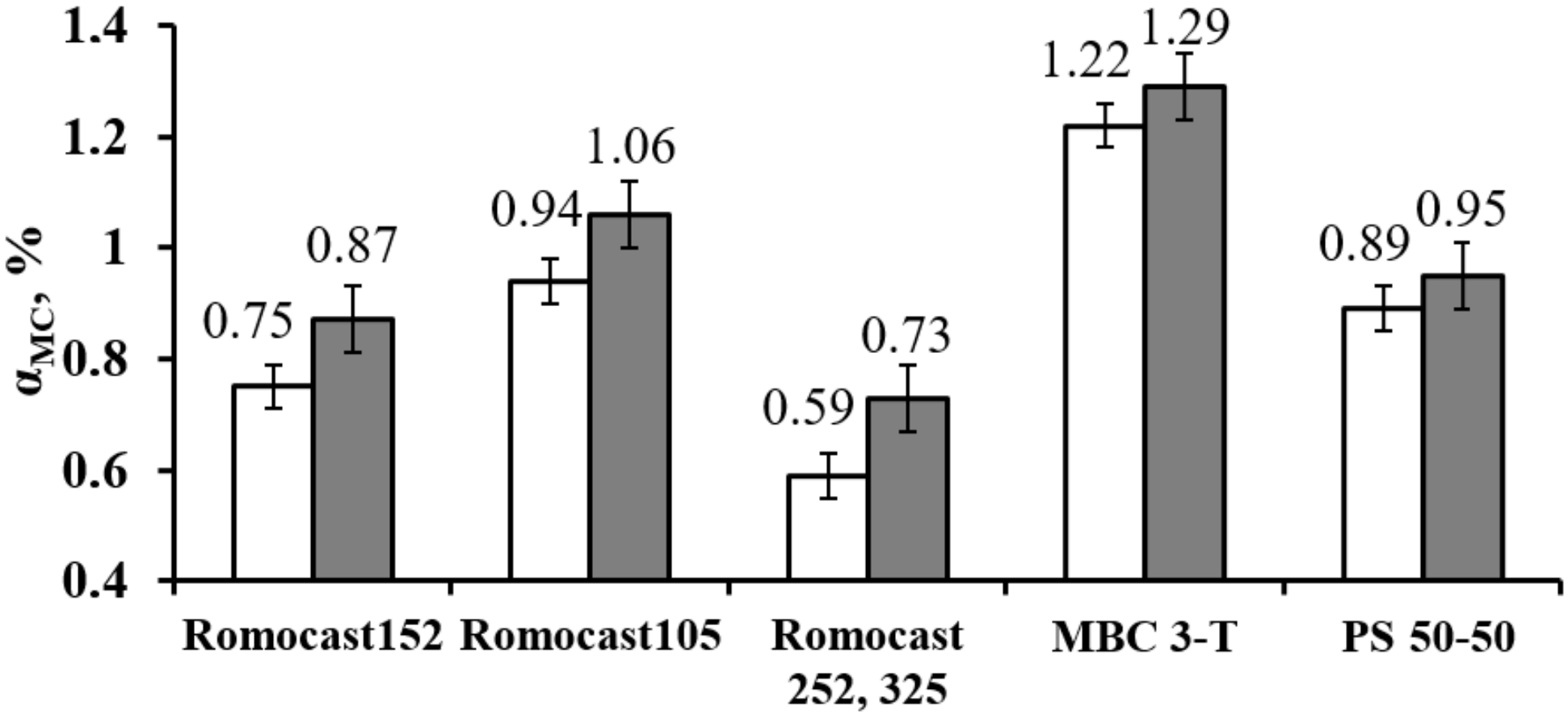
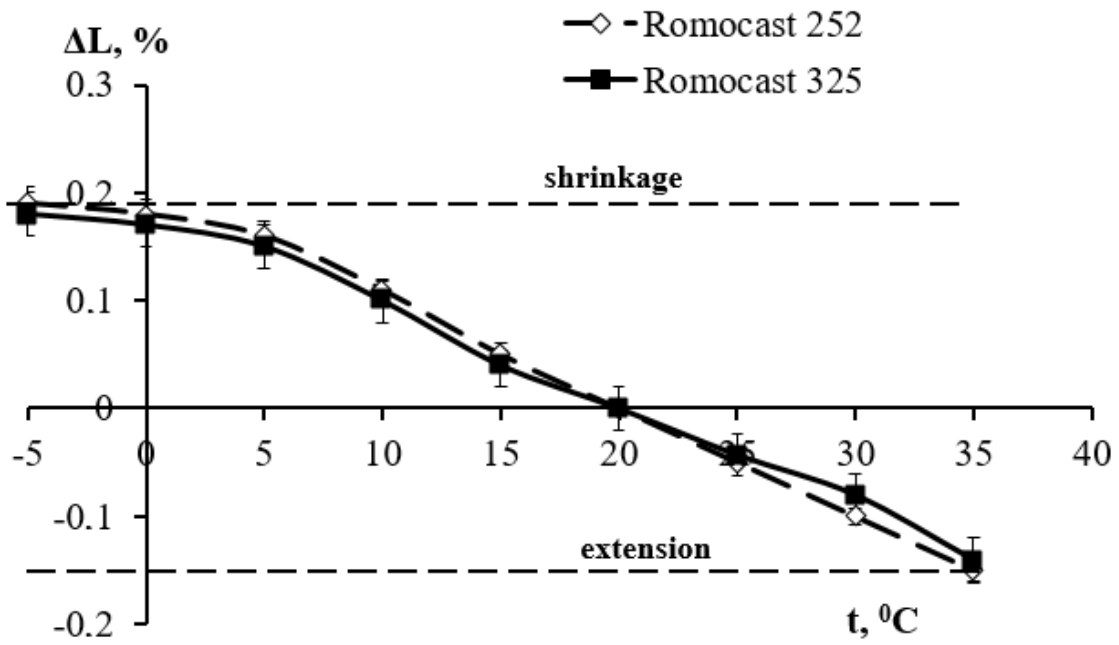
The studied model compositions and their main properties

Composition	Filler	Filler content, %	Free linear shrinkage, %	Drop point, °C	Ash residue, %	Viscosity at 100 °C, mPa · s
Romocast 105	-	-	n/a	78–82	0.05	50-100
Romocast 152	-	-	n/a	67–71	0.05	120-180
PS50-50	-	-	0.8-1.0	48–53	0.02	438
MBC 3-T	-	-	1.1-1.5	76.9	0.02	784
Romocast 252	PTA	35	n/a	67–72	0.05	300-600
Romocast 325	XLPS	30	n/a	73–82	0.05	200-500

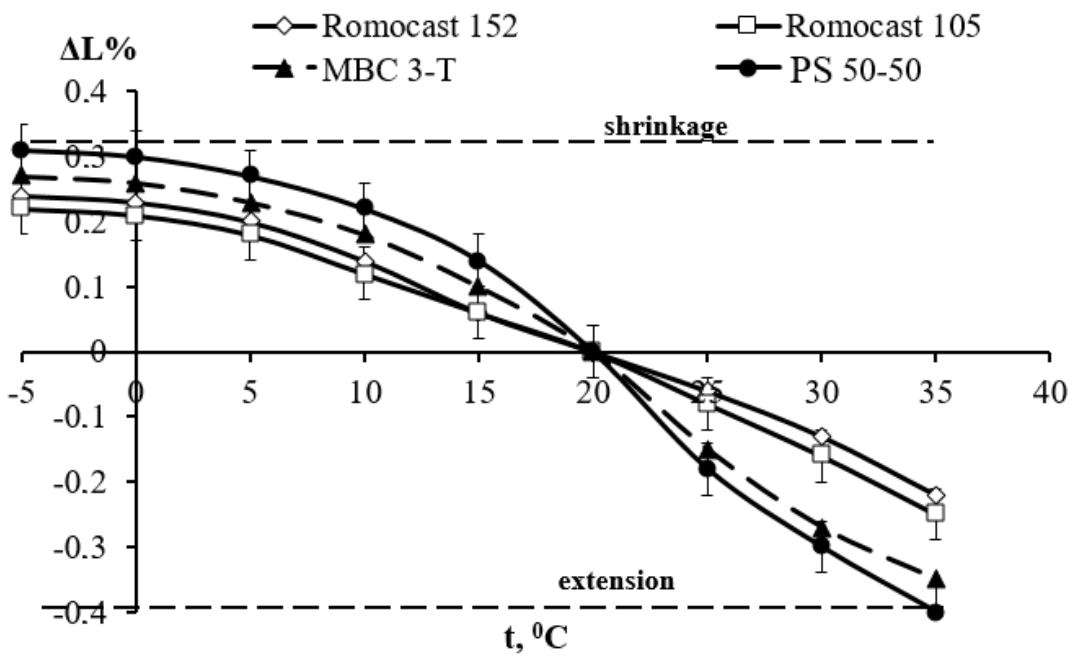
The effect of the model compositions exposure time after solidification on the free linear shrinkage of the samples



The influence of ambient temperature on the change in the size of samples from filled (a) and unfilled (b) model compositions



a



b

Conclusion

A change in the linear dimensions of the samples is observed for a long time after the solidification of the model compositions (up to 24 hours). Unfilled compositions of the Romocast 105, 152, MBC 3-T and PS 50-50 grades are characterized by the maximum value of free linear shrinkage. When the temperature is varied in the range –5 ... + 35 °C, the lengths of the samples from unfilled model compositions change in the range ΔL = + 0.3 ... –0.4%, for filled ones + 0.2 ... –0.15% . The cooling of samples from unfilled compositions to –5 °C and subsequent heating to +20 °C cause a decrease in their initial length by an average of 0.2 mm. Heating to +35 °C and subsequent cooling to +20 °C cause an increase in the initial size by an average of 0.2–0.3 mm. Under the same conditions, for samples from filled compositions, the change in lengths to the side of both decrease and increase is no more than 0.1 mm. The established facts indicate greater dimensional stability of the samples from filled model compositions.