AUTOMATIC LOADING OF PRIMING COMPOSITIONS

Presented jointly by

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Abstract

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AUTOMATIC LOADING OF PRIMING COMPOSITIONS

- **Background**
  - Small arms ammunition are produced on high production rates equipment
  - Loading of priming composition into primer cups continue to be done manually (100 years)
  - Workers are exposed to high explosive hazards for primer filling; primers quality depends on human skills
- **Objectives**
  - To eliminate human exposures to explosive compositions
  - To increase quality (better consistency: pressure, velocity)
  - To meet NATO criteria
- **HOW can the Objectives be achieved?**
  - By transforming the water-wetted sand (not free flowing) into an extrudable free flowing paste.

AUTOMATIC LOADING OF PRIMING COMPOSITIONS

- **Applications**
  - Conventional lead stypnate based priming compositions
  - Non toxic priming compositions
  - Caliber .38, 0.40, 0.45 ACP, 9mm, 5.56mm, 7.62mm, 0.50 caliber
- **Challenges**
  - To control the VARIATIONS of the PRIMING CHARGE WEIGHT over a long period of loading time (8h/min)
  - For experimental purposes, to develop an inert mix with the same flowability as the explosive mix.
  - To assure acceptable shelf life, etc .
- **Partnership**
  - SNC TEC for the chemical formulation(s)
  - NEW Lachaussée SA for prototyping and industrial equipment

Fig. 1 Influence of shelf life before loading on sensitivity

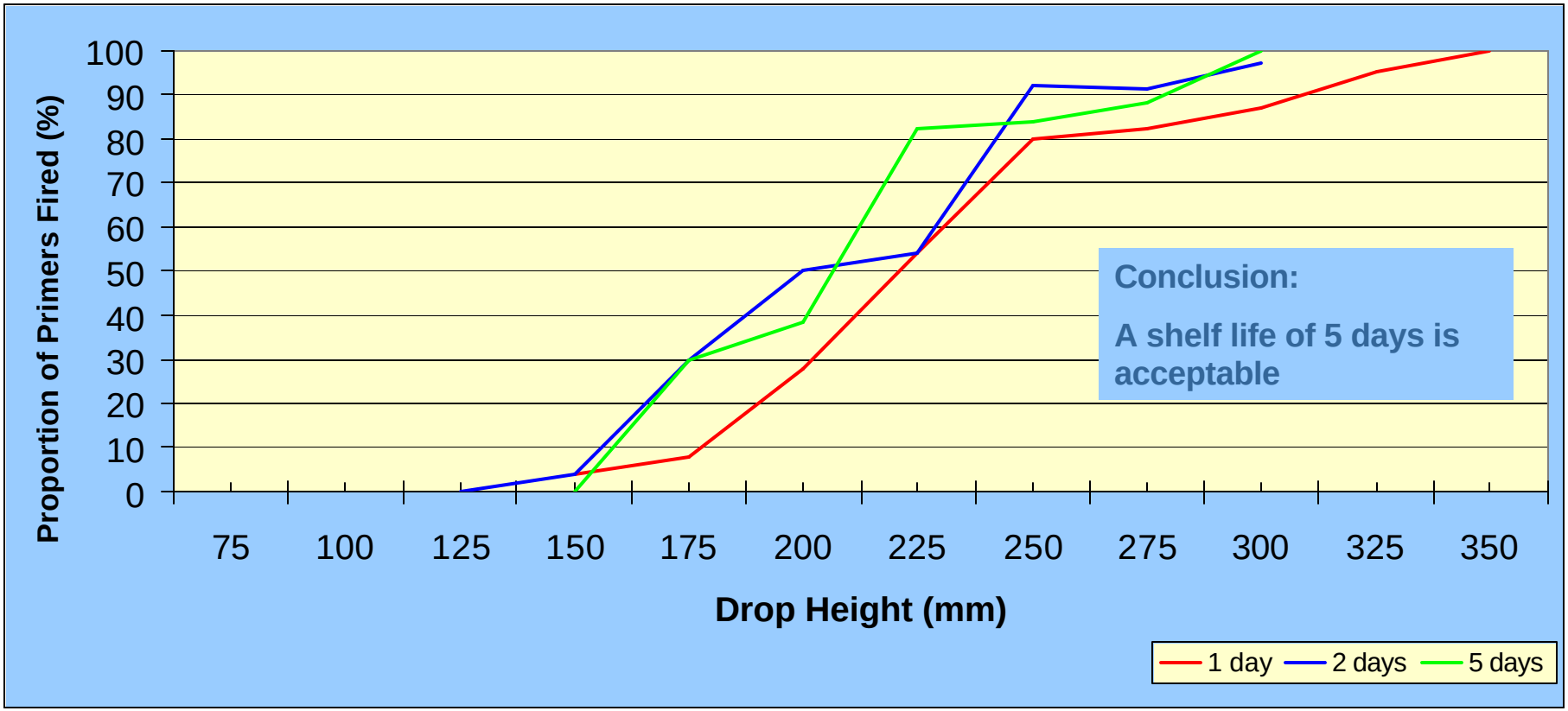

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Fig. 2 - Influence of the compacting pressure on sensitivity

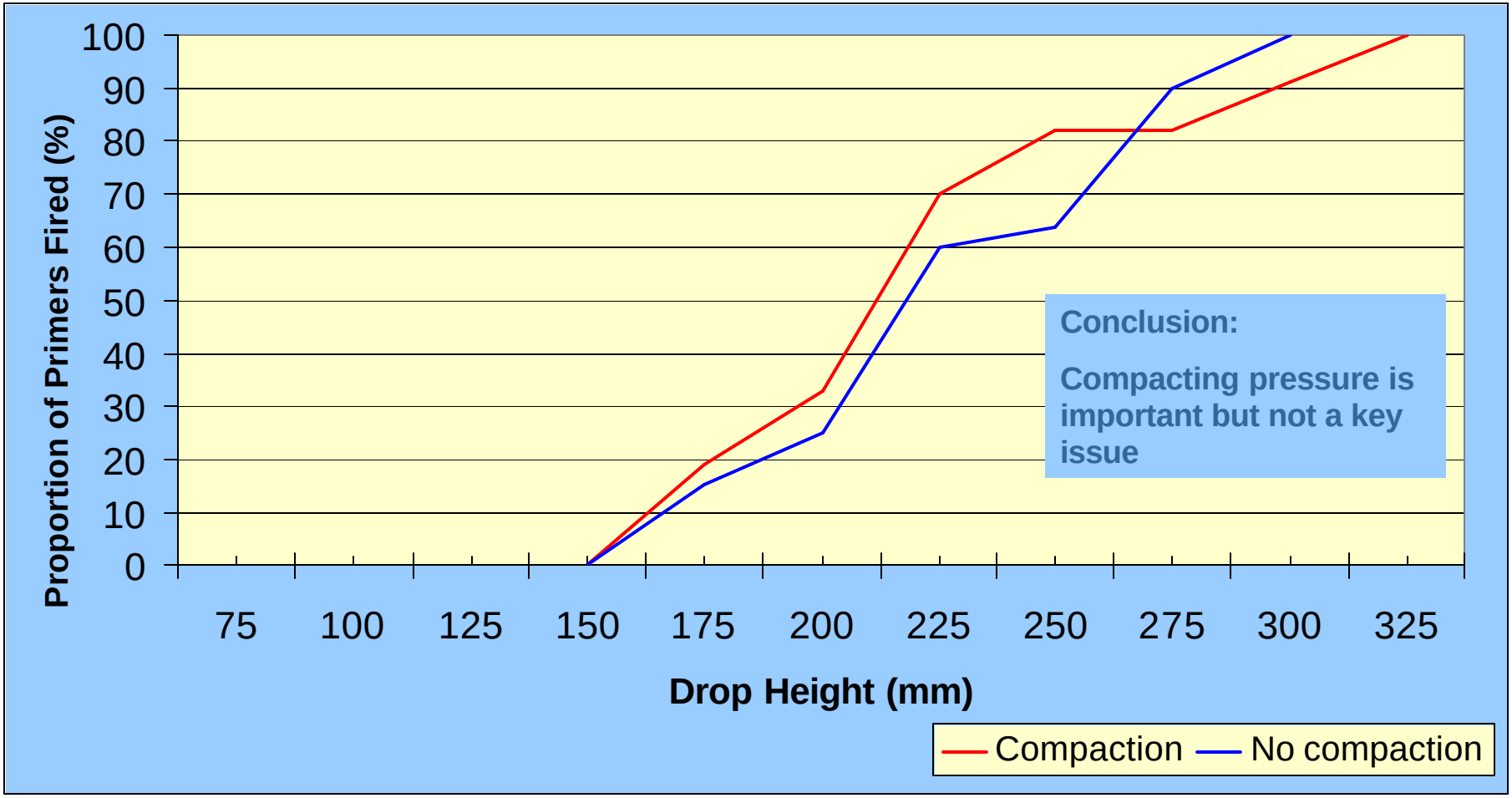

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Fig. 3 - Influence of drying time on sensitivity

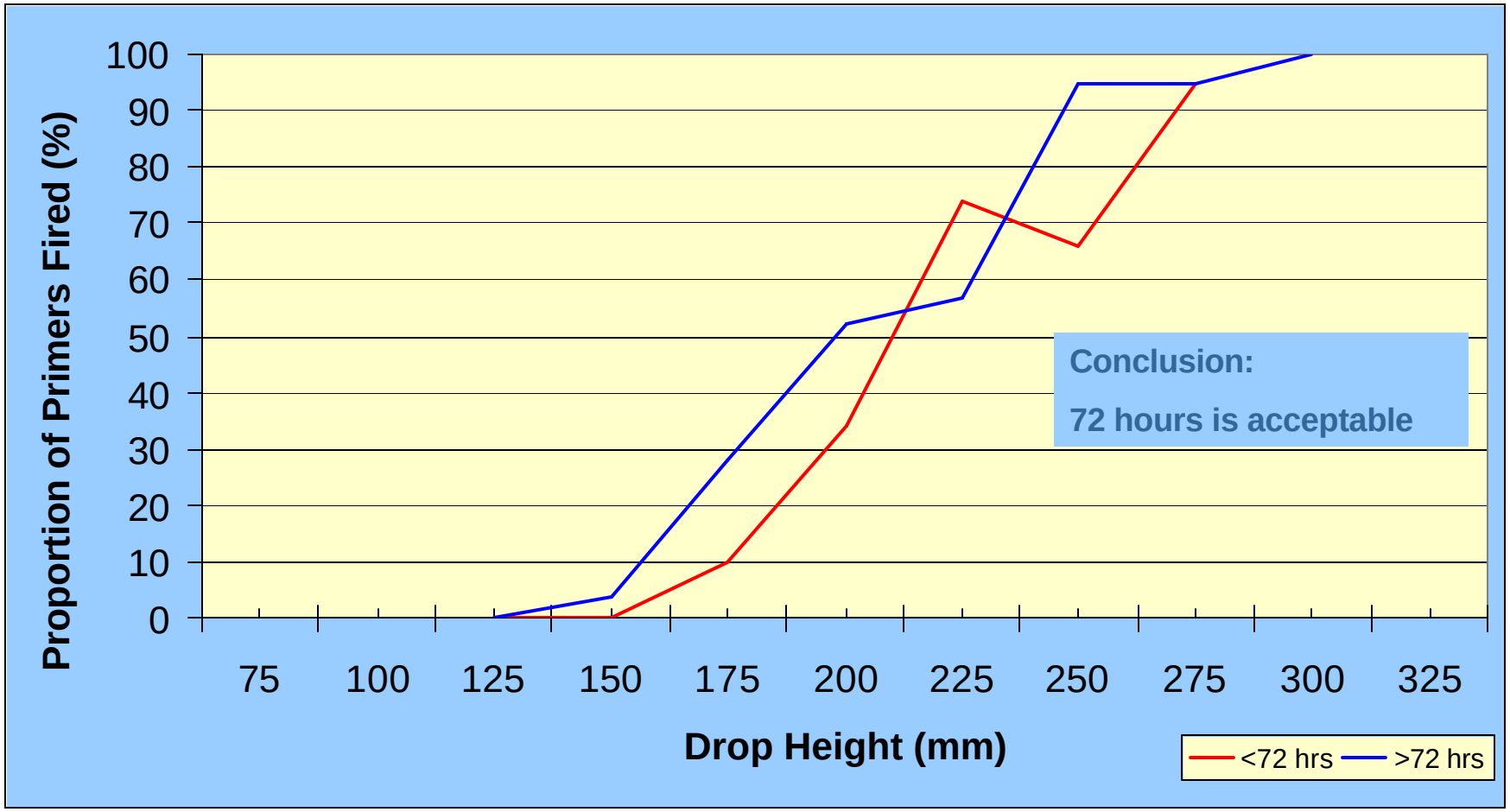

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Fig. 4 - Influence of temperature variations on sensitivity

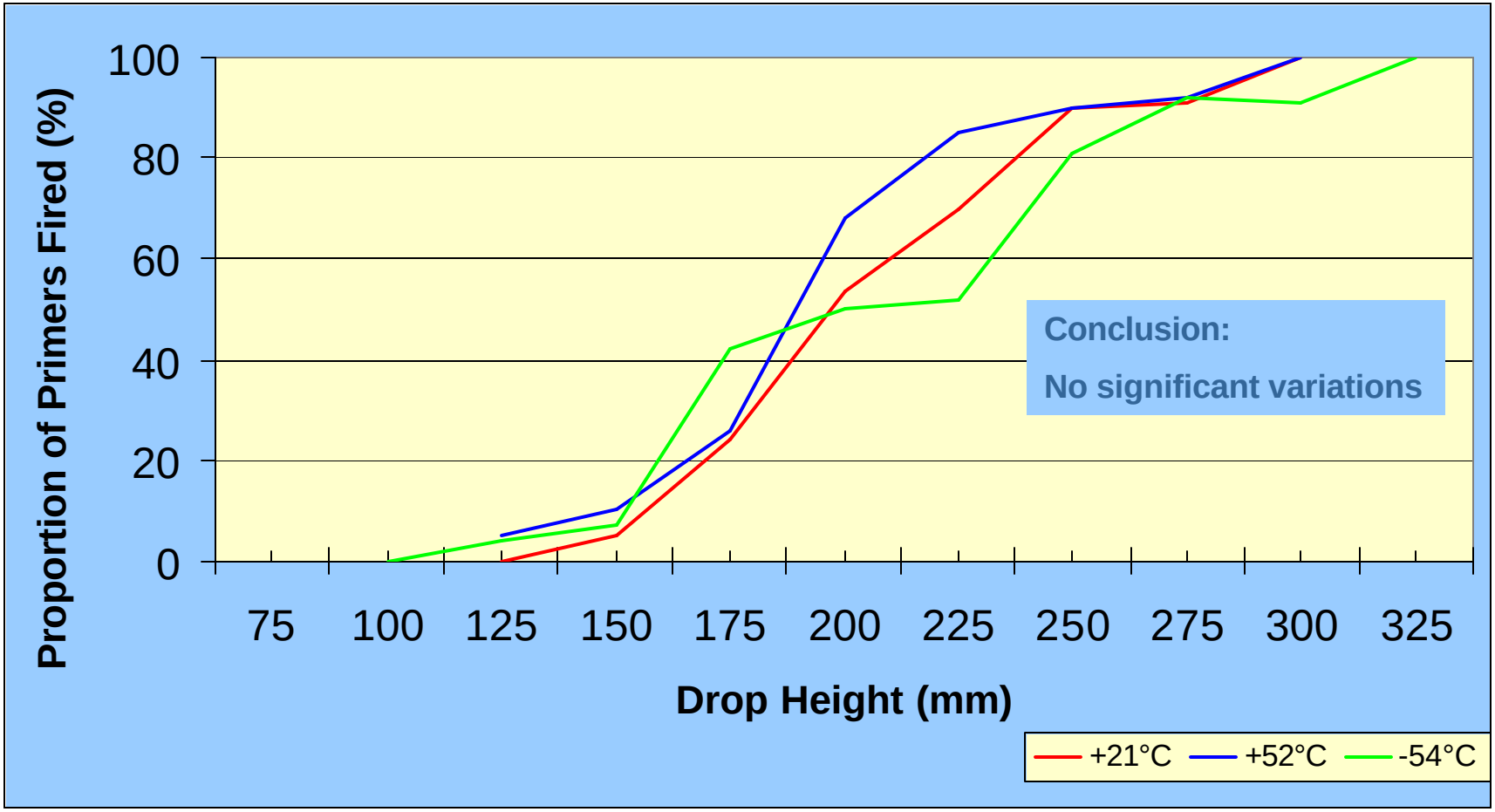

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Fig. 5 - Ballistic Evaluation

Type	Case mouth	Pressures (Mpa) Case mouth + 3s	Port - 3s	Velocity (m/s) @ 24 meters	Action time (ms)
Extrudable	333	355	96	909	0.92
Extrudable	340	359	95	910	0.92
Extrudable	335	342	94	919	0.98
Wet loading process	324	344	95	902	0.97
Wet loading process	321	335	93	904	0.98
NATO SPEC	£ 380	£ 420	³ 88	910 ± 15	4.0

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Fig. 6 - Influence of ageing on sensitivity

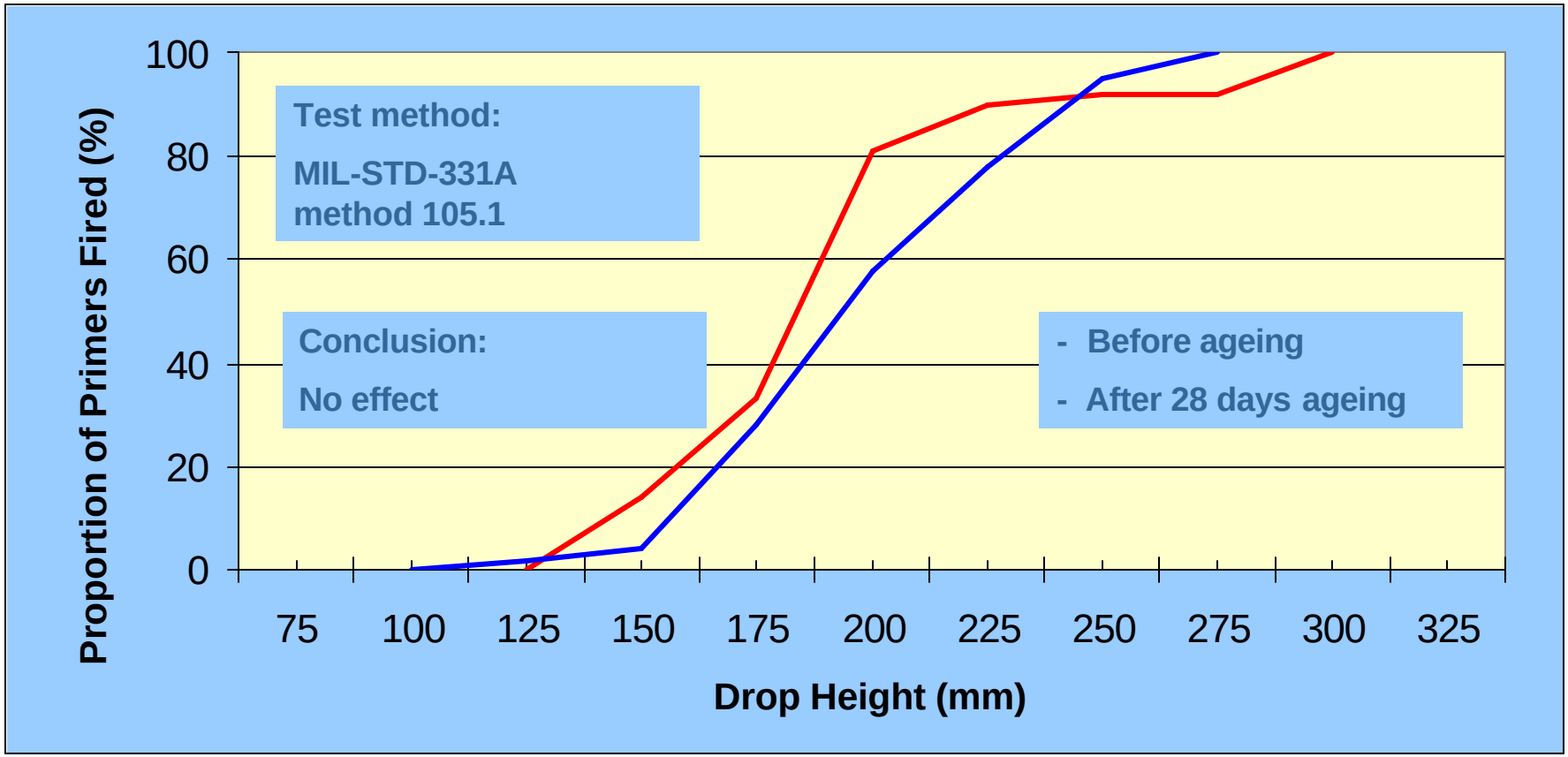

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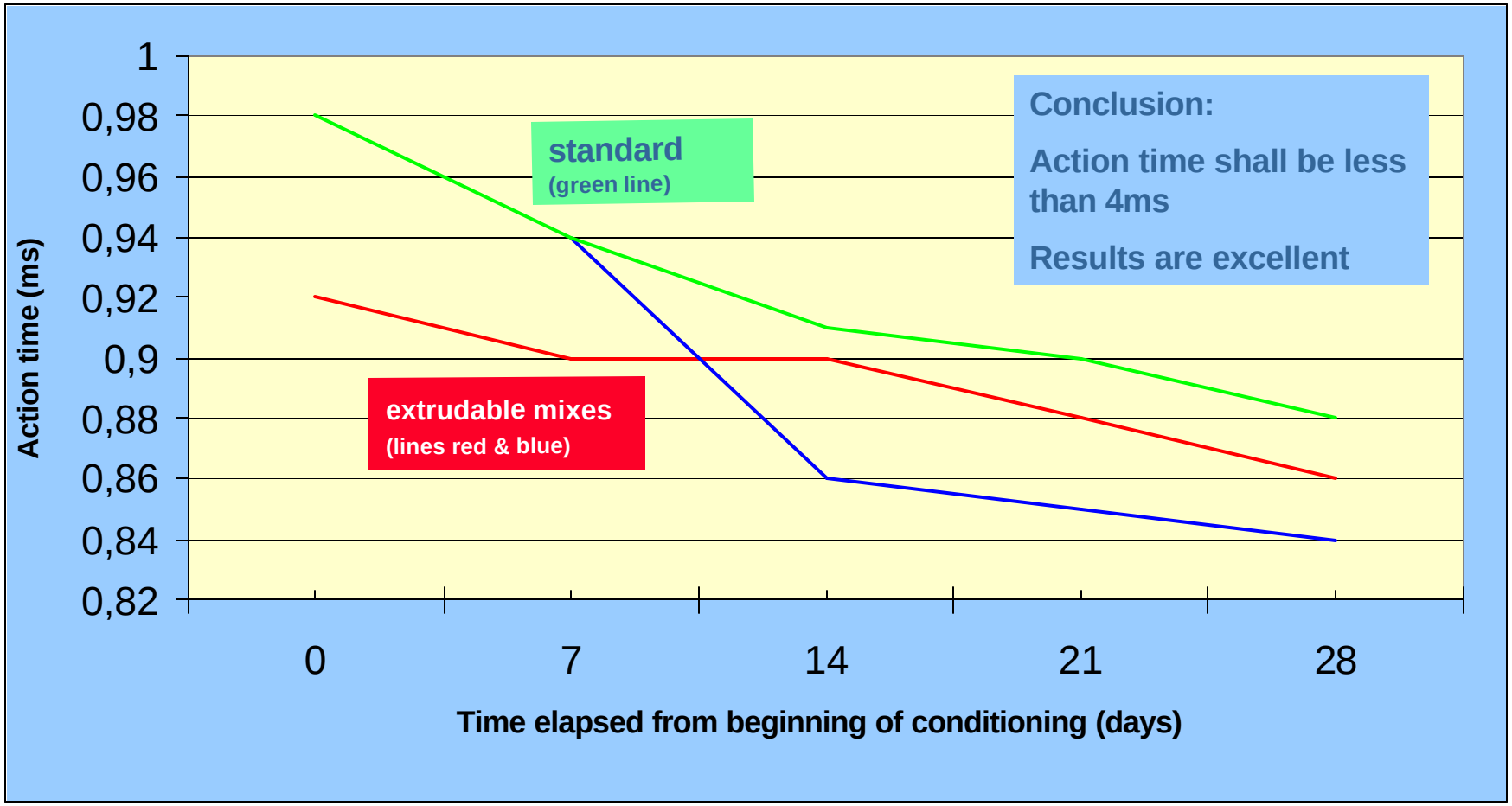
Fig. 7 - Influence of ageing on action time



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CONCLUSION

- **Ballistic characteristics of "extruded primers" are equivalent to that of "plate loaded" primers**
- **Extrudability of priming compositions has been demonstrated**
- **The extrusion process could be automated**