Cold Weather Concrete & Accelerator Use Guide

Non-Chloride

- Mostly commercial applications
- When quicker set times are desired
- When concrete contains embedded steel
- When early strengths are desired
- When specifications don't allow for chlorides
- Colored or architectural concrete

USES

Chloride Based

- Mostly residential applications
- When quicker set times are desired
- When concrete contains no reinforcement Including post-tension tendons
- Should not be used in architectural concrete, as it may cause color variations

Plastic Concrete Benefits

- Accelerates set times
- Improves workability
- Improves placing and finishing characteristics
- Reduces cost by allowing decreased finishing times

Hardened Concrete Benefits

- Increases early age compressive and flexural strengths
- Reduces permeability, increases watertightness
- Provides improved finished appearance
- Enables earlier stripping time of forms and framing, allows earlier structural use of concrete

Value

- Reduces finishing labor costs
- Improves productivity through earlier form removal
- Reduces time on project
- Can reduce some heating cost during curing period
- Eliminates potential of corrosion of embedded steel (non-chloride only)

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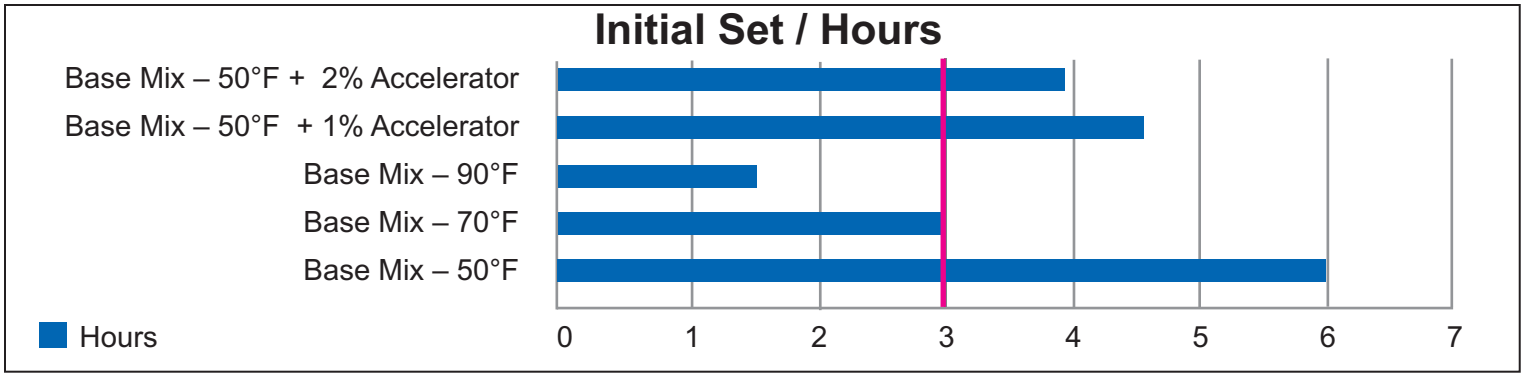
Cold Weather Notes

1. Concrete is a cold blooded animal, it's body temperature rises and falls in direct harmony with it's surroundings. Around 55°F it becomes sluggish and about 40°F it goes to sleep and hibernates, awaiting the return of spring.
2. To reduce set times in cold weather, concrete temperature must be maintained after concrete is discharged into the form or on the ground.
3. Not maintaining concrete temperature wastes the effects of adding hot water and accelerators. Concrete must be incubated.
4. The addition of what we call 1% should reduce set times of the concrete by approximately 20% to 25% when compared to nonaccelerated concrete at ***equal temperatures***. The 2% equivalent will normally reduce set times by approximately 30 to 35%.
5 Actual time performance is dependent upon local materials 5. set and their chemistry, i.e. cements, fly ash, slag, admixtures, etc.
6. **Rule of Thumb for setting times verses temperatures:** For every 18°F change in concrete temperatures, setting times will either be cut in half or double, depending on whether temperatures go up or down.

Refer to *hypothetical example* below to see the impact of temperature and accelerators on set times:

- If concrete sets up in 3 hours @ 70°F, then @ 90 degrees it will be 1.5 hours or @ 50°F, it will be 6 hours.
- Assuming a 25% reduction with addition of 1% equivalent, set time @ 50°F would be 4.5 hours.
- Assuming a 35% reduction with addition of 2% equivalent , set time @ 50°F would be 3.9 hours.
- Notice that with accelerators the set times @ 50°F are not equal to the set times @ 70°F
- Bottom–line is we will not make concrete set up at colder temperatures like it does in the summer time, without extreme high dosages of accelerators.



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