

# TB-0801 — Cold Temperature Performance of POLARSET® Non-Chloride Accelerator Technical Bulletin

/ concrete / mix design

## Introduction

POLARSET® is an ASTM C494, Type C, non-chloride, noncorrosive accelerator specifically formulated to work in concrete over a wide variety of temperature conditions. This technical bulletin summarizes the laboratory performance of POLARSET® over a range of different mix designs, cement compositions and temperature exposure conditions.

## Use of POLARSET® in General Concreting Applications

The data below show that dramatic reductions in set time and significant increases in early strength can be achieved in cold-weather concreting through the use of POLARSET® without compromising the 28-day compressive strengths. This type of performance is extremely important since it will enable contractors to speed up production and reduce costs.

## Test Series 1: Normal Concrete at Low Temperature (W/C = 0.47)

POLARSET® DOSAGE RATE ML/100 KG (OZ/100 LBS_)	TIME OF INITIAL SETTING % OF CONTROL	COMPRESSIVE STRENGTH	
		3 DAY % OF CONTROL	28 DAY % OF CONTROL
0 (0)	100	100	100
525 (8)	81	112	98
1045 (16)	64	113	98
1565 (24)	56	119	106
2350 (36)	45	120	108

Mix Temperature: 10°C (50°F)

Cure Temperature: 10°C (50°F) through 28 days of age

## Test Series 2: Normal Concrete at Low Temperature (W/C = 0.58)

POLARSET® DOSAGE RATE ML/100 KG (OZ/100 LBS)	TIME OF INITIAL SETTING % OF CONTROL	COMPRESSIVE STRENGTH	
		3 DAY % OF CONTROL	7 DAY % OF CONTROL
0 (0)	100	100	100
2935 (45)	53	140	127
3915 (60)	45	164	118

Mix Temperature: 16°C (60°F)

Cure Temperature: 4.5°C (40°F) through 7 days of age

## Use of POLARSET® in Concrete Containing Fly Ash

Although fly ash is an excellent quality enhancer for concrete, its use in cold weather can lead to significant retardation in terms of setting and strength development. With the use of POLARSET®, these drawbacks can be overcome. The following data shows how POLARSET® can be used to make fly ash concrete at 16°C (60°F) set faster and gain strength faster than the same mix at 22°C (72°F); or how it can enable the use of fly ash concrete at temperatures as low as 4.5°C (40°F) with almost the same set and strength performance as at 22°C (72°F).

## Test Series 3: Fly Ash Concrete at Low Temperature (W/C = 0.58)

CURING TEMPERATURE °C (°F)	POLARSET® DOSAGE RATE ML/100 KG (OZ/100 LBS)	TIME OF INITIAL SETTING % OF CONTROL	COMPRESSIVE STRENGTH		
			3 DAY % OF CONTROL	7 DAY % OF CONTROL	28 DAY % OF CONTROL
22 (72)	0 (0)	100	100	100	100
16 (60)	1960 (30)	87	103	103	92
4.5 (40)	3915 (60)	120	63	76	91

Note: These results represent an average of 4 mixes – 2 different cements with Class C and Class F fly ashes.

Mix Temperature: 22°C (75°F).

Specimen cured at specified temperature through 28 days of age.

gcpat.com | North America Customer Service: +1 (877) 423 6491

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for consideration, investigation and verification by the user, but we do not warrant the results to be obtained. Please read all statements, recommendations and suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation, or suggestion is intended for any use that would infringe any patent, copyright, or other third party right.

POLARSET is a trademark, which may be registered in the United States and/or other countries, of GCP Applied Technologies Inc. This trademark list has been compiled using available published information as of the publication date and may not accurately reflect current trademark ownership or status.

© Copyright 2018 GCP Applied Technologies Inc. All rights reserved.

GCP Applied Technologies Inc., 2325 Lakeview Parkway, Suite 475, Alpharetta, GA 30009, USA

GCP Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6

This document is only current as of the last updated date stated below and is valid only for use in the United States. It is important that you always refer to the currently available information at the URL below to provide the most current product information at the time of use. Additional literature such as Contractor Manuals, Technical Bulletins, Detail Drawings and detailing recommendations and other relevant documents are also available on [www.gcpat.com](http://www.gcpat.com). Information found on other websites must not be relied upon, as they may not be up-to-date or applicable to the conditions in your location and we do not accept any responsibility for their content. If there are any conflicts or if you need more information, please contact GCP Customer Service.

Last Updated: 2024-06-21

[gcpat.com/solutions/products/polarset-non-corrosive-non-chloride-set-accelerator/tb-0801-cold-temperature](http://gcpat.com/solutions/products/polarset-non-corrosive-non-chloride-set-accelerator/tb-0801-cold-temperature)