

Chapter 1.4

Cold weather working



1.4 Cold weather working

CONTENTS

DESIGN	Clause	Page
There are no specific Design implications		
MATERIALS		
There are no specific Materials implications		
SITWORK		
Sitework standards	S1	1
Temperature and weather conditions	S2	1
Protection of stored materials	S3	1
Concreting	S4	1
Masonry	S5	2
Rendering, plastering and screeding	S6	2
Use of admixtures	S7	2
Painting	S8	2
INDEX		3

SCOPE

This Chapter gives guidance on meeting the Technical Requirements and recommendations for cold weather working.

SITWORK STANDARDS

1.4 - S1 All sitework shall:
(a) meet the Technical Requirements
(b) follow established good practice and workmanship

Sitework that complies with the guidance below will be acceptable for cold weather working.

TEMPERATURE AND WEATHER CONDITIONS

1.4 - S2 Allowance shall be made for cold weather conditions during construction

Unless the precautions detailed in the following guidance are adopted, work should NOT proceed when the air temperature is below or likely to fall below 2°C. Frozen materials should not be used.

Items to be taken into account include:

(a) temperature measurement

A maximum/minimum thermometer should be available to indicate whether the temperature is falling or rising. The thermometer should be sited in the shade.

The temperature may drop rapidly after sunset.

(b) weather and local topography

FORECASTS

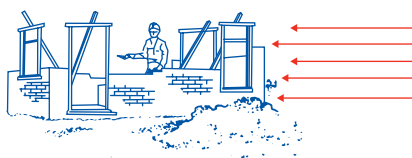
Plan ahead and take account of weather forecasting services, by either stopping work or taking adequate precautions. The following services are available:

- pre-recorded weather forecasts on the WEATHERCALL telephone service
- weather forecasts specific to contractors' needs
- an assessment of time when suitable working conditions will prevail in a given area.

All these services are provided by the Meteorological Office.

WIND CHILL

The Meteorological Office can advise on the wind chill factor. Strong winds can reduce the temperature of concrete and mortar more quickly than still conditions. Work is more likely to be affected by frost in windy freezing conditions.



TOPOGRAPHICAL FEATURES

High trees or adjacent buildings may provide permanent shade from low winter sun and slow down any temperature rise.



Frost hollows can occur where cold air is drawn into valleys.



PROTECTION OF STORED MATERIALS

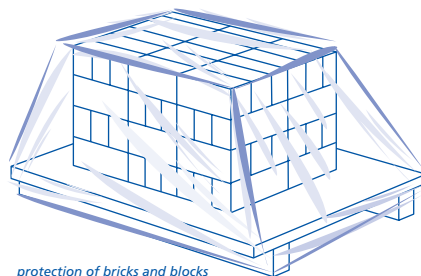
1.4 - S3 Stored materials shall be adequately protected against cold weather

Items to be taken into account include:

(a) overnight protection

During cold weather, the use of covers will protect materials from overnight snow, ice and frost. They will also reduce the effects of longer term frosts, and permit an earlier resumption of work. Frozen materials should not be used.

Appropriate covers should be provided for bricks and blocks and for sand, aggregates and cement, to prevent them from becoming saturated, and damaged by frost.



(b) longer cold periods

If it is necessary to continue building during longer periods of cold weather, the use of heaters will protect aggregates and other materials from being frozen, and prevent frost damage to newly laid masonry.

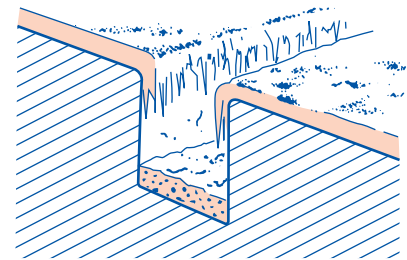
CONCRETING

1.4 - S4 Concrete shall not be placed in cold weather unless suitable precautions are taken

Items to be taken into account include:

(a) placing of foundation and oversite concrete

Concrete should not be placed if the ground or oversite is frozen. Work built on frozen ground can be severely damaged by movement when thawing takes place.



If work has to be carried out during long periods of cold weather, the whole work area should be covered, and heated if necessary, to maintain the temperature above freezing.

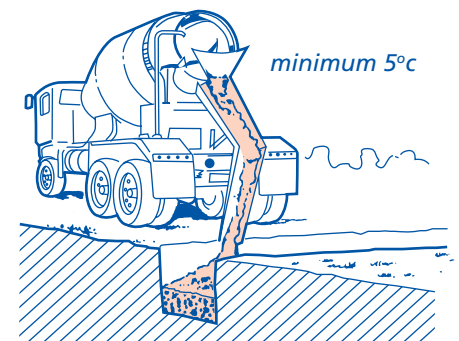
(b) placing concrete other than in foundations or oversites

All surfaces which can come into contact with fresh concrete, such as formwork, reinforcement, and other concrete surfaces should be free of snow, ice and frost. Special care is needed when small quantities of fresh concrete are placed against a large volume of hardened concrete at a lower temperature.

(c) mixing concrete

READY-MIXED

The minimum temperature of concrete when delivered should be 5°C. This is a requirement of BS 5328.



1.4 Cold weather working

SITE-MIXED

If the air temperature drops to 2°C, concrete work should NOT proceed unless:

- the aggregate temperature is above 2°C, and the aggregate is free of frost and snow, and
- water for mixing is heated, but not in excess of 60°C, and
- the cement is not heated, and
- the cast concrete can be properly protected, taking account of the cross sectional area and location, and
- the ground into which the concrete is to be placed is not frozen.

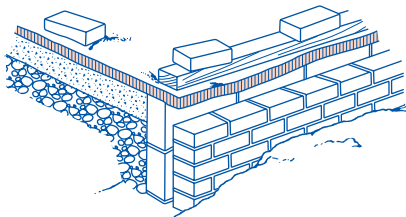
Covers will not stop severe frost penetrating the aggregate. If work is to continue, it may be necessary to steam heat aggregate or use hot air blowers below covers.

Heated mixing water cannot be relied upon to thaw frozen aggregates. The amount of water in a mix is only a small proportion of the total mix volume. Very cold aggregate can absorb heat from water while remaining frozen.

(d) curing

Curing periods may need to be extended at low temperatures. Advice on minimum periods is given in BS EN 13760 Table 4 Curing class 2. Table F1 gives the minimum curing period for Curing class 2.

50mm of insulation held down firmly at the edges will give protection to oversite concrete from slight overnight frosts. If very severe frosts are expected, insulation alone is inadequate, and heating should be provided.



MASONRY

1.4 - S5 Masonry shall not be laid in cold weather unless suitable precautions are taken

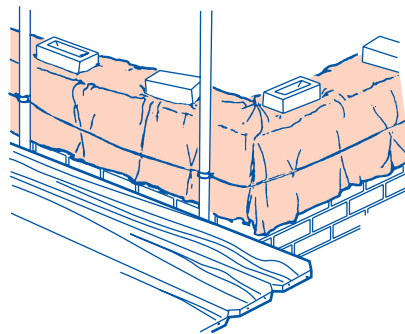
MINIMUM TEMPERATURES

Materials which have been damaged by frost or are frozen should NOT be used.

When the temperature is below or likely to fall below 2°C, masonry should NOT be laid unless heating is provided. The temperature should be checked throughout the day on a maximum and minimum thermometer.

PROTECTION

Newly laid masonry will need protection when the temperature is below or likely to fall below 2°C.



Polyethylene will provide weather protection and prevent work from becoming saturated.

An air gap between the masonry and the covers will enable new masonry to cure.

Additional insulation will be necessary at very low temperatures. If very severe frosts are expected, heaters would be required.

Protection against frost may be required for up to 6 days depending on the severity of the conditions.

RENDERING, PLASTERING AND SCREEDING

1.4 - S6 Rendering, plastering and screeding shall not be carried out in cold weather unless suitable precautions are taken

RENDERING

Rendering should NOT be carried out if:

- the temperature is below or likely to fall below 2°C, or
- backgrounds are saturated or frozen, or
- there is a possibility that new work will be subjected to frost before it has set.

PLASTER AND SCREED

Plastering and screed laying should NOT be commenced unless the structure is free of frost. The temperature of the structure should be kept above freezing during the curing period.

It is important that heaters used for this purpose do not produce water vapour. While heaters are in use, the building should be ventilated to disperse moisture.

Because warm air rises, ground floors and walls near to floor level may be slow to respond to heating after a prolonged cold period. Warm air heaters should be placed in the room a day before plastering is to start, to allow sufficient time for the structure to warm up. Heating should continue for at least 48 hours after completion of work.

To avoid damage to screeds, plaster finishes and woodwork, heating should not be excessive.

USE OF ADMIXTURES

1.4 - S7 Admixtures shall be used correctly

PLASTICISERS AND ACCELERATORS

No admixture will prevent frost damage to immature concrete or mortar.

Plasticisers (which entrain air during mixing) can provide improved frost resistance to mature mortar and concrete.

Additives should only be used strictly in accordance with manufacturers' recommendations.

The use of accelerators may assist the mortar or concrete to set before temperatures fall.

RETARDERS AND BONDING AGENTS

Retarding agents should NOT be used in cold weather as their use can seriously delay setting times of the cement. Bonding agents may be ineffective in cold weather.

CALCIUM CHLORIDE

Calcium chloride and additives based on it do not prevent frost damage to mortars. These additives should NOT be used. They are also likely to have undesirable side effects.

PAINTING

1.4 - S8 Painting shall not be carried out when there is a risk of damage due to cold weather

Painting should NOT be carried out:

- on surfaces that are affected by damp, frost or condensation
- where the air temperature is below or likely to fall below 2°C
- when condensation is likely to occur before paintwork is dry
- when snow or rain is likely before the paintwork is dry.

INDEX

A		M		T	
Accelerators	2	Masonry	2	Temperature	1, 2
Admixtures	2	Materials	1	Topographical features	1
Aggregates	2	Minimum temperatures	2	W	
Air temperature	1	O		Water	2
B		Oversite concrete	1	Weather	1
Bonding agents	2	P		Wind chill	1
C		Painting	2		
Calcium chloride	2	Plastering	2		
Cast concrete	2	Plasticisers	2		
Cement	2	Protection	1, 2		
Concreting	1	R			
Curing	2	Ready-mixed concrete	1		
F		Rendering	2		
Forecasts	1	Retarding agents	2		
Foundations	1	S			
Frozen materials	1	Screeding	2		
H		Sitework standards	1		
Heaters	2	Site-mixed concrete	2		