



TDS HYDRO – HC-K20 system

HC-K20, HC-K20E (extended workability), **HC-K20-Marine** is a multi-purpose cementitious acceleration System which offers improved performance characteristics in concrete systems where desired.

Rapid, yet controlled curing allows the user to achieve desired results much faster than typically pre-scribed, common, concrete systems.

Recommended Uses

Common, non-structural applications would be:

- Fast set concrete
- Concrete repair
- Pre-cast addition
- Rapid construction
- Basement / carpark
- Mine roadways / outbye
- Highways
- Rapid pavement development

Application 1: Bulk placed concrete



HC-K20 contains dosed amounts of flow, set and workability powders. Simply add to cement mixer / agitator.



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Recommendations may be offered by the manufacturer, however, tabulated data is based on the following: *N40 concrete with a nucleus of 400kg m³ normal Portland cement, to be replaced at 30% of the total amount of cement. This ratio must be adhered to. 70% local sourced Portland cement with 30% addition of K20.*

Use local materials. Replace 30% OPC content with 30% K20. Remove plasticiser, set retarder, set accelerator.

Pak. Remove plasticiser, set retarder, set accelerator.

Short working time, client will achieve 20MPa two hours from mixing K20E Road Pak

Client can nominate desired working time up to 6 hours from mixing to allow for

transport and other contingencies

If greater than 2 hour working time is required (sleep), double the working time (dwell), and 2 hours following this point, client can expect to achieve 25-30MPa.

At 24 hours, most local concrete systems will achieve 35-40MPa.

28 days Clients will see results exceeding 60MPa for final concrete product.

Application 2: Dry spray shotcrete (guniting)



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A K20 variant has been used successfully in mines across Eastern Australia for over 12 months.

A typical 70% aggregate (sand -4mm) added to **K20** and OPC and other typical additives achieves an initial set of 15 minutes and final set of 55 minutes.

Strength gains are greater than 25MPa at 12 hours.
28-day strength greater than 60MPa

Application 3: Wet spray shotcrete and the "HC-C advantage"



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K20 used in conjunction with a low alkali set accelerator (**HC-C**) offers an instant set when accelerator is added at the nozzle, and **K20** is added in the batching sequence as per instructions. As with all **K20** additions, no special methods nor new SOP's are required.

HC-C Two versions of accelerator are currently available: **HC-C 1049** and **HC-C 958 (available as liquid and as powder)**

Both versions are economical. Both **HC-C** accelerators when used in conjunction with **K20 exceed 10MPa within 60 minutes.**

HC-C 1049 achieves these figures (typically 14MPa at 6% BWOC addition)

HC-C 958 can exceed 10MPa with an addition rate of only 1.6% BWOC making it extremely economical and appealing to the client. One IBC can yield 140-160m³ dosing compared to a typical 24-44m³ yield. Less handling, reduced consumption. Improved results. **HC-C** can be shipped as a solid and mixed close to site reducing transport costs. It is easy to use and has a longer shelf life, will not crystallize. You cannot overdose your concrete using **HC-C.**



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HC-C can be used to offer an instant set to differing binders at given water to powder ratios. Fine grade and micro cements are an example. Available from the suppliers listed.

Application 4: Precast / pre-cured concrete



K20 with a reduced working time is ideal for precast or pre-cured concrete. **K20E** is still applicable but the client has obvious time advantages over bulk concrete counterparts. Using **K20** will create the ability to remove the concrete from molds at a far greater rate (28 x) without the need and cost to steam cure.

The use of a **HC-C** accelerator will increase this 4-fold. Using high pressure spraying replicating shotcrete methods could become the standard.

Speeding up panel and other precast development can only be beneficial in a fast-paced world.

SUMMARY



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The **K20 / HC-C** System is designed to offer dramatically improved performance, without creating disruption for the end user.

Local materials can still be sourced and utilised as per SOP. In fact the system is designed to be used under all conditions, across all land masses and their marine borders.

HC-C + K20 displays new heights of speed and performance.

ENVIRONMENTAL ADVANTAGE

K20 in conjunction with OPC decreases carbon footprint of typical concrete by 15%.

The speed of combined systems offers a reduction of human energy requirement to complete tasks and projects.

HC-C / K20 combination reduces consumption and therefore waste and handling. Reduced waste will benefit energy and climate.

The ability of the **K20** (and if desired a **HC-C** combination) to hydrate in cold environments also reduces heat energy needed to maintain the desired ambient temperature. Heat energy reduction will result in reducing our carbon footprint.

Features & Benefits

- Pourable, typical slump, typical flow
- Rapid early strength
- Improved late strength
- Lower CO₂ output (compared to 100% OPC)
- Lowered pH
- Controlled performance
- Can be slowed to improve workability
- Increased mine development
- It sets without hindrances at -10°C (up to - 28C in the lab)
- available as an underwater marine variation. Typical concrete design can reach strengths of 10MPa at 2 hours from mixing. Work was done between the tides!
- It can set in high heat / high humidity without shrinkage, cracking or water loss.

K20 can aid concrete to cure up to 56 times faster than traditional methods. When you add our proprietary liquid set accelerators - **HC-C 958** or

HC-1049 it can offer early strength gains at 1 hour 5-10 times greater than current industry standards.



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Performance Data

For chemical properties please refer to the relevant SDS.

	COMPRESSIVE STRENGTH (UCS) *
2 hours	20MPa
4 hours	30MPa
1 day	40MPa
7 days	60MPa
28 days	(Greater than) 60MPa

W:P Ratio @ 0.43; AS1478.2. 100mm cubes at 23 °C (± 2 degrees)

Set Times*

Initial set: 30 minutes.

*Note: *from mixing.*

Please note these are laboratory generated test results under controlled conditions, and this testing cannot replicate in-situ or field/practical results.

Using the Marine mix **HC-K20 Marine** be aware early strength will be reduced by 20%-50% in the first 2-6 hours, after, the normal strength gain is applied with no change to the final >60MPa

In cases of extended work time needs the following times and strength will apply:

Set Times* HC-K20E

Initial set: E1 - E6 indicates extended working time in hours. (HC-K20E)

*Note: *from mixing.*

Extended work time HRS	Time from mixing	UCS
E1	2	>20
E2	4	>20
E3	8	>28
E4	10	>30
E5	12	>30
E6	14	>30

Water:Powder ratio [W:P]

A water powder ratio of 0.40-0.46:1 by weight of total binder content. Alternatively, 0.07:1 total water content based on mass. Excess water may negatively affect overall product performance



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Bleed / Shrinkage

None observed

Wet Density

At W:P 0.43, wet density is 2400kg³

Yield / Addition rate

Addition of **HC-K20** will not alter final yield of fresh concrete under normal conditions.

Application

HC-K20 is designed to partially replace OPC, and achieve excellent early strength. The use of; and application of, may be treated the same as typical concrete placement. The expectation would be agitated concrete ex plant, and add **K20** on site. Packaging will be water soluble as a minimum.

Surface Preparation Surface should be prepared using the same or current industry methods. No special preparation is required that is not normally current practice.

Mixing should be undertaken in an efficient mixer, agitator or volumetric mixer, by adding the powder to water. Clean potable water required.

Product Options

For further **road and road repair options**, please contact the Flux Design Australia.

Storage & Shelf Life

If kept in its original packaging in a dry environment, shelf life of at least 6 months is to be expected. This time may be reduced if the product is subject to elevated temperatures or humidity. Bulk bags are expected to remain covered in plastic until use.

Packaging

K20 is packaged in **20kg** bags or **1.0/1.2** tonne bulk bags. Other packaging options are available on request. Pneumatic tanker options may be available at a later date. Packing slips will state batch manufacture date.

Health And Safety

- Avoid contact with skin and eyes. Wear suitable protective clothing.
- Avoid inhalation or ingestion.
- In case of contact with skin or eyes, rinse immediately.
- Seek medical attention immediately if ingested.

Please refer to the relevant SDS for further information. Further information please contact us through mailbox:fluxdesignaustralia.com



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Notice to reader

While the Information provided in this TDS is believed to provide a useful summary of the hazards of this product as it is commonly used, the safety data sheet cannot anticipate and provide all of the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product. In particular, the data furnished in this sheet do not address hazards that may be posed by other materials mixed with this product to produce cementitious products or similar. We accept no responsibility for loss or injury caused by improper use, incompetent preparation or ordinary wear and tear. Users should review other relevant material Safety Data Sheets before working with this product or its mixed state.

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