

Centrox



CONCRETE



MORTARS



RENDERS



SHOTCRETE



GUNITE

CENTROX™ ADD

ADVANCED CONCRETE SYSTEMS



COMPANY BRIEF

Evenrange Australia - has been successfully manufacturing specialized Products including concrete curing compounds and coatings for the civil and commercial construction industry for more than 10 years. Evenrange Australia was the FIRST Company in Australia to introduce Hydrocarbon Resin curing compounds to major civil projects.

During the past 7 years Evenrange Australia have strived to formulate products that are safe to use, environmentally friendly and yet still perform above the requirements set out by Standards and its customers. Some of these products currently being used today include XDS, Evencure BCP, Evencure AC and Evenseal NS1. These Products still have no equivalents available in the Industry.

Over the past 4 years Evenrange Australia have undertaken an extensive research program to develop and manufacture unique concrete enhancement and repair materials. This was as a result of a comprehensive market Investigation, Research and Development, lengthy testing and Trials.

The requirement was to find and develop products that were: Environmentally and User Friendly, Exhibit High performance in harsh working environments and above all be 100% compatible with Concrete. The entire curing and concrete enhancement/repair ranges will be produced in Canary Islands for European, Middle Eastern and African markets and in India for the Asian region from 2003.

CENTROX™

CENTROX™ PRODUCTS ARE TOTALLY CHLORIDE FREE.

With this New Environmentally Friendly Technology we have forged new industry alliances and with our research facilities and testing laboratories we can now Offer Our Clients technical Expertise and Custom Blended materials for any project requirements.

We hope the management of Evenrange Australia can be of Assistance to you in the near Future.

NOTE: *Products are Custom made to specific climatic requirements and cement types used.*

CENTROX™ ADD

Australian Standard
NATA approved Lab tested

ADMIXTURE

ISO 9000

DESCRIPTION

CENTROX ADD is a blend of sodium based chemicals and enhanced Portland cement used as a powder based admixture for fresh concrete.

Although the chemicals in the **CENTROX ADD** are currently used in the concrete industry, further treatment of the chemicals used in **CENTROX ADD** allow the concrete to exhibit unusual qualities in the placement and cured stage

CENTROX™ ADD IS TOTALLY CHLORIDE FREE.

ADVANTAGES

- ✱ Can be used with or without conventional admixtures
- ✱ Reduces plastic shrinkage
- ✱ Longer slump retention for delivery times
- ✱ Increases freeze/thaw durability
- ✱ Increases acid and chloride ion resistance
- ✱ Easy Flow

USES

- ✱ Waterproofing concrete for carpark, roof decks, balconies, swimming pools, concrete tanks etc.
- ✱ Acid resistance for chemical manufacturing, sewerage tanks, bunded areas, electrolyte vapour, storage tanks etc.
- ✱ Freeze/Thaw resistance ideal for freezer rooms, cool rooms and areas exposed to rapid temperature change (non toxic)
- ✱ Chloride ion resistance for CONCRETE exposed to salt water, seawall construction, wharf construction, salt manufacturing etc.
- ✱ Shotcrete easily with high build, minimal rebound

BENEFITS

- ✱ **Low** slump **HIGH** workability
- ✱ **EXCELLENT** Pumpability
- ✱ **High** early strength
- ✱ **Reduces** plastic shrinkage cracking
- ✱ **High** protection of reinforcing steel
- ✱ **Lower** temperature during hydration

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PLACEMENT

There are no special techniques required for the Placement of **CENTROX ADD** concrete.

Placement is carried out using conventional concrete Technology to AS3600 requirements. However, you must be **AWARE** that a **FALSE SET** will occur if the concrete is left without working for 45 minutes or more

As soon as Vibrating probe or Physical Force is utilized the Material will once again flow like freshly poured Concrete

POINTS TO BE AWARE OF

- All **CENTROX ADD** concretes are **WATERPROOF**
- All **CENTROX ADD** concretes are darker in colour
- All **CENTROX ADD** concretes exhibit minimal **BLEED WATER**
- All **CENTROX ADD** concretes should be placed at no greater than 60 mm **SLUMP**

ANY ADJUSTMENT TO BE MADE TO THE CONCRETE MIXTURE, SHOULD BE CONSULTED WITH YOUR EVENRANGE AUSTRALIA CONSULTANT

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TYPICAL DATA

A typical **CENTROX™** 40 MPA mix will display the following features

- **Name** CENTROX™ ADD
- **Use** Admixture
- **Colour** Extremely Dark Grey
- **Appearance** Cohesive Fry Mix
- **Slump** No greater than 60 mm
- **Initial Set** 4 hours 30 minutes at 23°C
- **Final Set** 6 hours 30 minutes at 23°C
- **Pumpable** YES
- **Sprayable** YES
- **Bleed Water** Extremely Minimal

CENTROX™ADD concrete Grade 40 has been tested with the following aggressive media

ACID	CONCENTRATION	NOTES
SULPHURIC	25%	When Acid comes into contact Concrete with Centrox ADD the surface will appear as if sand blasted. This Effect is the CENTROX ADD Concrete creating a greater surface area to counter balance the aggressive medium. It has no detrimental effect on the concrete's surface.
NITRIC	20%	
PHOSPHORIC	20%	
SALT	20%	
AMMONIA	15%	No Effect
HEAVY ALKALI	35%	No Effect
SUGAR	20%	No Effect
SULPHATES	30%	No Effect
LOW TEMP.	-34°C	No Effect 100 Cycles
HIGH TEMP	400°C	Slight Cracking 75 Cycles

REFER TO MATERIAL SAFETY DATA SHEET FOR PRECAUTIONS AND PERSONAL PROTECTION

Disclaimer: Any Advice, Recommendation, Information, Assistance or Service provided by Evenrange Australia in relation to goods manufactured or supplied by them or their Use and Application are in Good Faith and is believed by Evenrange Australia to be appropriate and reliable. However, any Advice, Recommendation, Information, Assistance or Service provided by Evenrange Australia is provided without Liability or responsibility.

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Quick Facts

1. Centrox Add dose rates are set at: 5kgs per cubic mt of concrete for waterproofing. 10 kgs per cubic mt of concrete for high acid resistance.
2. Centrox Add can be mixed with the concrete at the batch plant or added to the concrete agitator upon arrival at site. Mixing time is 5 minutes,
3. Centrox ADD is not filler. Centrox Add dissolves and becomes active immediately upon contact with water.
4. Centrox Add does not require a minimum cementitious content to waterproof the concrete.
5. Centrox Add does not grow crystals in the pores of the concrete.
6. Centrox Add will not, under any circumstances 'decrease' the performance of the concrete.
7. Centrox Add is formulated to reduce the size of the pores in the concrete to aid, waterproofing, acid resistance and to increase durability.
8. Centrox Add is not dangerous and is non-toxic, and carries the same classification as GP cement.
9. Centrox Add contains NO chlorides.
10. Centrox Add can be used in all types of concrete mixes, wet and dry shotcrete and gunite spray.

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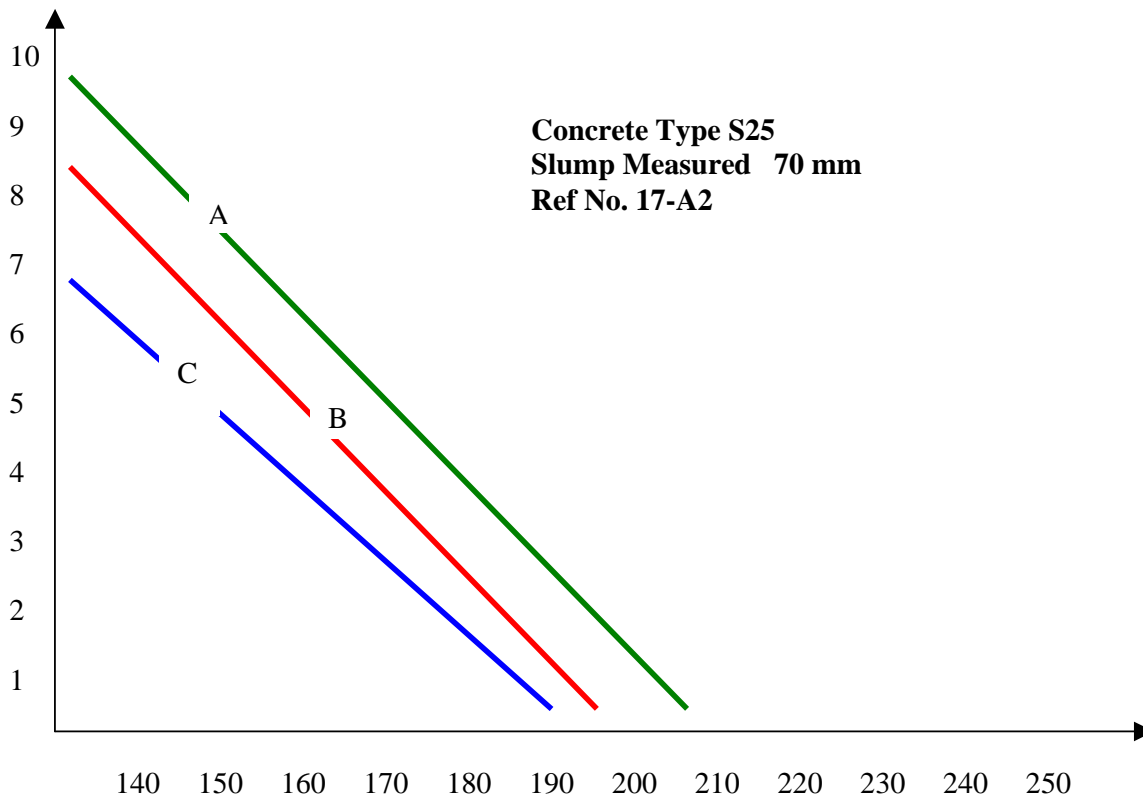
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Other mixtures and cement blends (effects)

GWR (General Water Reducer)

Tests have confirmed when ligno based water reducers are used in conjunction with Centrox Add, slump increase while workability decreases.



- A ——— CENTROX 10kgs + GWR
- B ——— CENTROX 5 kgs + GRW
- C ——— Control - General Water Reducer

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This phenomena is very important to understand when formulating concrete containing Centrox Add. The cause of this reaction is that the Lignosulphate based water reducers and the Centrox Add both exhibit a similar electrical charge. The water reducer still controls the slump but the unbalanced charges decrease the workability when Centrox Add is used. This reaction does not affect the performance of the Centrox Add in relation to waterproofing or acid resistance. GWR's can also still be used to control slump but the concrete formulator should test all mixes prior to batching.

Accelerators

Standard concrete accelerators (nitrate based), such as those produced by major admixture suppliers can be enhanced in their performance by the addition of Centrox Add. The addition of both the conventional accelerator and Centrox Add incorporated into the concrete mix will not inhibit water proofing or acid resistance properties.

The following results are on a standard mix containing accelerator and a mix containing Centrox Add and accelerator. Both these mixes were placed on the Sydney Rd tramlines. Concrete for the tramlines require high early strength to enable the trams to recommence service.

Client: Geotechnical Engineering
Location: Sydney Road Tram Lines Brunswick
Concrete Type: S50 (50mpa)

	Control	Control	Centrox	Control
Slump (mm)	80	80	65	65
Moist cure (days)	1	7	1	1
Lab cure (days)	1	7	1	1
Height (mm)	199	200	200	201
Diametre (mm)	100.6	100.4	100.4	100
Mass (kg/m³)	2340	2360	2360	2360
MPa	16.5	48.0	21.0	48.0

Geotech conducted these tests in their NATA approved facilities.

Air Entrainers

Air Entrainers are not required when using Centrox Add as freeze/thaw stability and workability are both greatly increased in the concrete mix. However "air" admixtures can be used if required.

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Superplasticizer

Currently no research work has been done in the field of superplasticizers (Naphthalene Formaldehyde) and Centrox Add. If you require the use of both these products in a concrete mix please contact our technical department.

GP and Blended Cements

The following tests were completed by pioneer testing laboratory, Marleston in South Australia. The purpose of these was to confirm that Centrox Add would inhibit the performance of varying concrete mixes.

Mix 1

Whiterock aggregate
Mix Design: S32
Slump: 60mm
Admixture: Centrox Add 10kg/m³
Results: (average)

Day	MPa	kg/m ³	Notes:
3	20.0	2320	
7	31.0	2300	Mix design weight: 2270 kg/m ³
14	37.5	2300	Air content: 1.8%
28	45.0	2300	Ref: 849
56	52.5	2320	
91	57.5	2320	

Mix 2

Blended Slag 35%
Mix Design: S32
Slump: 65mm
Admixture: Centrox Add 5kg/m³
Results: (average)

Day	Mpa	kg/m ³	Notes:
3	15.0	2260	
7	26.5	2280	Mix design weight: 2250 kg/m ³
14	35.5	2280	Air content: 2.6%5
28	45.0	2280	Ref: 931
56	47.0	2280	

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Mix 3

BGS 80/20
Mix Design: S32
Slump: 65mm
Admixture: Centrox Add 5kg/m³
Results: (average)

Day	Mpa	kg/m ³	Notes:
3	20.5	2260	
7	32.5	2280	Mix design weight: 2240 kg/m ³
14	38.0	2280	Air content: 3.6%
28	44.5	2280	Ref: 912
56	50.0	2280	

Mix 4

Standard
Mix Design: S32
Slump: 80mm
Admixture: Centrox Add 10kg/m³
Water Reducer (300ml/100kg)
Results: (average)

Day	Mpa	kg/m ³	Notes:
3	23.0	2300	
7	33.5	2300	Mix design weight: 2260 kg/m ³
14	35.5	2300	Air content: 3.0%
28	42.0	2300	Ref: 626
56	50.0	2300	
91	51.0	2300	

Mix 5

Standard
Mix Design: S32
Slump: 80mm
Admixture: Centrox Add 10kg/m³
Results: (average)

Day	Mpa	kg/m ³	Notes:
3	23.0	2280	
7	32.0	2300	Mix design weight: 2270 kg/m ³
14	39.0	2300	Air content: 2.0%
28	46.0	2300	Ref: 635
56	54.0	2320	
91	56.0	2300	

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Mix 6

Calcareous aggregate
Mix Design: S32
Slump: 80mm
Admixture: Centrox Add 5kg/m³
Water Reducer (300ml/100kg)
Results: (average)

Day	Mpa	kg/m ³	Notes:
3	22.5	2360	
7	31.5	2380	Mix design weight: 2330 kg/m ³
14	35.5	2380	Air content: 3.0%
28	41.0	2380	Ref: 639
56	48.0	2380	
91	53.0	2380	

The above testing was based on local (S.A) raw materials and confirms that Centrox Add had no detrimental effect to strength when added to various concrete mixes. However Centrox Add should always be tested with the design mix intended to be used as per standard work practice.

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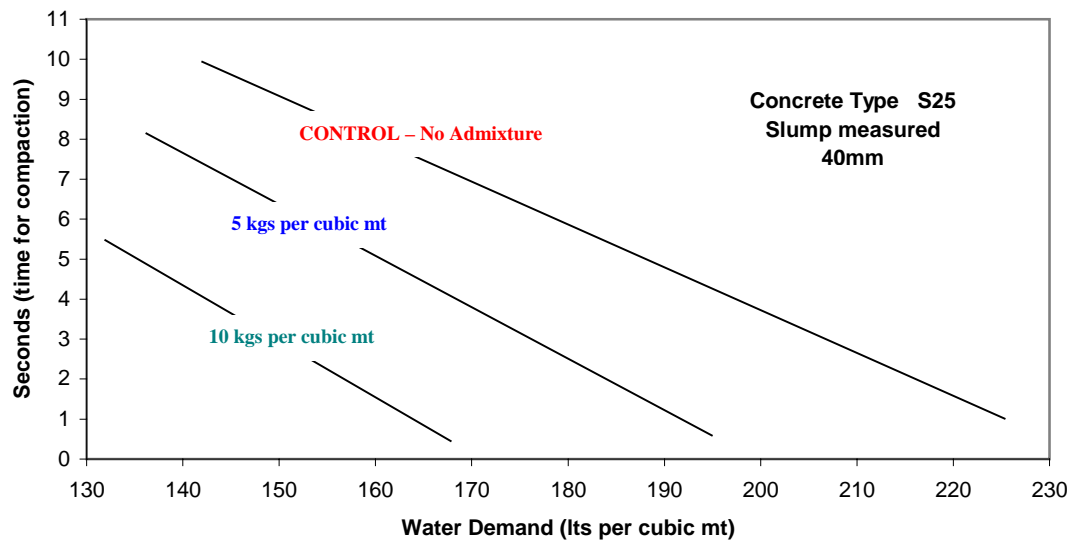
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Workability Testing

An independent laboratory was consulted to undertake workability testing of concrete with and without the Centrox admixture. The mix design chosen was a standard 25mpa concrete containing GP cement. The method of testing chosen is known as the VBee Test Method (Vibrating Bench Test).

This test involved a standard concrete mix v's two Centrox Add concrete mixes, each mix containing a different amount of admixture. The VBee test involves "Seconds for compaction v's Water Demand". The following chart represents the results found.



This knowledge of increased workability is essential when formulating high performance concrete and wet shotcrete mixes. For example field experience has shown that a 60mm Centrox Add concrete mix has the same workability as a conventional 80mm slump mix.

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Although the Centrox Add mix appears dry, in reality the concrete remains highly workable and mobile. Naturally the lower slump caused by a water reduction exhibits benefits such as higher early strength and lower shrinkage in the concrete. Field-testing has also shown that Centrox Add dosed concrete has greater slump retention than a conventional concrete mix. Testing showed a slump loss of 10mm during a 75min delivery trip to site.

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Waterproofing

All good concrete should be waterproof. A typical 40mpa grade concrete mix from a reputable ready mix company such as Boral, Pioneer, CSR etc already exhibits waterproofing properties. Centrox Add will waterproof concrete from 20mpa upwards. This is due to the chemicals in Centrox Add having the ability to reduce the concrete pore diameter during the hydration phase of the initial concrete mix.

The closing or minimizing of the concrete pores is a chemical reaction between the Centrox Add and the “free” water available in the concrete “wet” mix. The reaction between the Centrox and the water causes a gas to form. This process commences and continues during the hydration phase. Instead of bleed water passing through the concrete leaving behind interconnecting voids, Centrox Add “degasses” the concrete. Naturally these minute gas bubbles are all independent of each other and are a fraction of the size of a “bleed” water particle. This reduction of pore size still allows the concrete to “breathe” while preventing the ingress of water.

Testing for water uptake was completed at a leading Sydney University with the following results.

Introduction Grade 40 mix design 5kg per cubic mt.

Investigation was carried out to determine the water penetration in Centrox Add dosed concrete. The specimens used for the test consisted of mature concrete more than 6 months old. The test procedure involved the following: A Centrox Add concrete prism (75mm by 75mm by 300mm) was drilled with a 12.5 mm diameter bit to a depth of 115mm into the middle of the prism. A tube was inserted and sealed into this hole capable of carrying a 3-meter head pressure of water. The testing for penetration was carried out for varying periods with the result tabled below.

The water penetration test results are as follows

The water head dropped with time at a decreasing rate with the elapsed time.

As expected the initial water penetration rate decreased due to the saturation of fine pores in the concrete components.

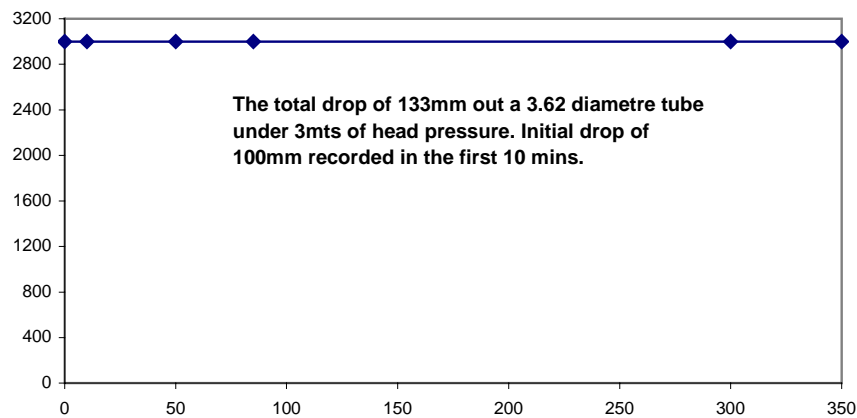
Repeated tests showed significant reduction in water penetration.

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The left column represents the head pressure solution height. The bottom column represents the total time of the test.

After 350 minutes (5.83hrs) the head of water dropped by 133mm in a capillary tube with a diameter (internal) of 3.12mm. Although the head drop seems to be significant it must be remembered that the smallest diameter manometer tube was used and the exact volume of water penetration is very small.

The rate of water penetration between 1-6 hrs corresponds to 540ml per square per day under 3 mts of head pressure. This indicates a water penetration of 5mm for the initial time.

Recommendations

Centrox Add concrete has low permeability characteristics and is comparable to similar grade concrete containing silica fume. Based on the results it is recommended that a 5kg per cubic dose of Centrox Add be used to limit water penetration. * single dose = 5kg per cubic mt.

Technical note

The issue of testing concrete for waterproofing, absorption and uptake of water is difficult and dependent on many factors including concrete design, curing placement and the raw materials used. Most testing procedures for waterproof concrete require a head pressure of water applied to the concrete surface or a static absorption test done by ponding the concrete and measuring the variance of weight. Both these test methods can be influenced by the surface finish of the concrete samples used or provided for testing. The test method used for Centrox Add is testing the water absorption and tightness of the concrete core, this method is not dependent on the concrete finish.

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New Tramways



Waterproof Roof

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Waterproof Pipes



Tilt Slab Wall

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Water Tank

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