

# INTECNA srl

Via Stella del Sud, 4  
20060 Mediglia (MI) – I  
Tel +39 02 90601175 Fax +39 02 90601191  
E mail [intecna@libero.it](mailto:intecna@libero.it)  
E mail ADSL [intecn00@intecnasrl.191.it](mailto:intecn00@intecnasrl.191.it)  
Web site [www.intecnachemical.com](http://www.intecnachemical.com)



AUXILIARIES FOR  
**CONSTRUCTION MATERIALS**

## INTRODUCTION

Use of auxiliaries in the preparation of concrete and mortars had one raising diffusion in the last 50 years with the aim to increase the quality, its duration and operation easiness by yard.

A wide availability exists on the market of companies and products which are especially oriented to these ends.

Products are regulated under the EN 934-2, EN 934-4 and EN 934-5 technical specifications

### **Additives for concrete - Additives for mortars**

The most common additives are just:

Super-fluidizer additives (Carboxylated - Naphtalen -sulfonates or equivalent chemical compounds)

Set retarding additives

Air entrainment

Accelerating admixtures

Water reducing additives

Mineral additions - Reactive micro-silica

Corrosion inhibitors

Viscosity modifiers

Fibers

INTECNA developed and produces a range of complementary products at disposal of formulators or final users. Such product have been developed in cooperation with primary companies who work in this sector from decades

Additives INTECNA can offer are:

Accelerating admixtures auxiliaries

Set retarding auxiliaries

Maintenance yard (equipment, lines, cement mixers...) auxiliaries

Biocides and antifouling auxiliaries

Liquid de-foamers

Powdered de-foamers

Corrosion inhibitors

## ACCELERATING CONCRETE ADMIXTURES



Accelerating concrete admixtures are used to increase the rate of concrete strength development, or to reduce concrete setting time. In the past, Calcium chloride was the most common accelerator component; however, it showed some issues regarding corrosion activity of steel reinforcement. Nonetheless, concrete best practices such as proper consolidation, adequate cover and proper concrete mix design could prevent these corrosion issues. Accelerating admixtures are especially useful for modifying the properties of concrete in cold weather. To such reason, technology, now suggests other additives.

The product INTECNA proposes (QUICKCAST 1370) is usually applied in the mechanical projection of dry cement conglomerate or on the road damp "spritz-beton or shotcreting", in the works of civil, especially tunnels engineering where the concrete distribution is required on subsequent layers and when high mechanical resistances on very short expiry are requests.

The product was studied according to the UNI 9858/UNI EN 206, it concerns the duration features, and UNI 10834; by not alkaline use accelerator strength

The product is formulated by aluminum complex salts in stable solution, acts to give high initial mechanical resistance and high superficial degree of finish and compactness.

Furthermore it is in compliance with the rules EN 934-5: T2; UNI 10834; EN14487-1 UNI.

Product uniformly distributes himself in the concrete, reacting quickly with the cement particles, allowing the cling instantaneous of the projected conglomerate, in the moment in which he reaches the application surface, ensuring a compact, homogeneous and waterproof mass.

In the dry projections: product must be added in the hydration water

In the wet projections product must be dosed with pump at the top of lance, so as to allow a homogeneous distribution in the directed with a dosage  $3 \div 8$  % on the cement weight.

### Chemical solution basis

Aspect

Specific weight (ASTM D1475-60)

Equivalent Na<sub>2</sub>O

Chloride ion content

pH to the packaging (ASTM E70-69)

Solubility in water

Customs classification

### Complex aluminum salts in solution

Opalescent liquid

1,36 +/- 0,03 kg/l

< 1,0% in weight

< 0,1% in weight

3,0 ± 0,2%

100%

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## CONCRETE ADMIXTURES – SET RETARDING



Set retarding concrete admixtures are used to delay the chemical reaction that takes place when the concrete starts the setting process. These types of concrete admixtures are commonly used to reduce the effect of high temperatures that could produce a faster initial setting of concrete. Set retarding admixtures are used in concrete pavement construction, allowing more time for finishing concrete pavements, reducing additional costs to place a new concrete batch plant on the jobsite and helps eliminate cold joints in concrete. Retarders can also be used to resist cracking due to form deflection that can occur when horizontal slabs are placed in sections. Most retarders also function as water reducers and may entrain some air in concrete. Chemical composition of well known set retarding are generally the simple sugars (mono-saccharides and disaccharides), gluconates and carbohydrates or poly-hydroxylated mixtures like the glycols. Also lignin-sulphonates, often containing as manufacturing by-product more or less complex sugar mixtures, can have a retardant action.

The delay action comes from the adsorption of the delaying mixtures on the cement granule surface. These mixtures are able to form stable complexes on the cement surface which can to be delayed or be completely blocked the hydration for a certain period of time.

INTECNA proposes the following auxiliaries :

**DELYNT P : products containing phosphorus**

**DELYNT GL : products gluconates based**

**DELYNT LS : products lignin-sulfonates based**

## YARD EQUIPMENT/ LINES WASHING AND CEMENT MIXERS MAINTENANCE



Pre-mixed concrete production often involves many problems like yard equipment washing and further water draining besides to the not used material loss.

INTECNA nearby proposes the conventional acid products which perform the dissolving concrete deposits and a new philosophy product line, which has as action mechanism the block the cement hydration through the creation of one barriers about the granules of the cement itself.

In a second phase when it's required to restore the normal hardening conditions, the simple water addition causes the break of this barrier allowing the normal cycle of concrete action ( strength) .

Therefore advantages are remarkable:

SMALLER WATER CONSUMPTION

CONSERVATION AND RE-USE OF NOT USED CONCRETE

NO WASHING WATER PRODUCTION AND DRAINING

The proposed products are

Acid cycle

**HYCOR SFTW TO 1**

**HYCOR SFTW TO 2**

Hydration block

**HYCOR SFT 32**

## BIOCIDES – BACTERIAL INDUCED CORROSION INHIBITORS



The surfaces of concrete provide an ideal corrosion resistant, physically and chemically stable environment for exposure to potable or waste water but prolonged exposure of any solid surface to water results in a series of physical, chemical, and biological events at the surface that form a community of microorganisms referred to as biofilm. The process starts with initial settlement of planktonic (free float-ing) microorganisms on the surfaces followed by the accumulation of an organic material layer (generally the extra-cellular polymeric substances (EPS) excreted by the attached microorganisms). The biofilm formation is influenced by types of microorganisms (biotic) and nature of surfaces and environmental conditions (abiotic) factors (Brachybacterium, Flavobacterium, Lysinibacillus e Thiomonas)

In some cases, Algae are among the most abundant and prolific microorganisms found in water bodies in the regions with sufficient sunlight and nutrients (nitrates and phosphorous). Growth of algae is quite common in irrigation canals that transport water to utilities .

This makes it difficult for the water utilities to provide drinking water that is not affected by algae and their byproducts. In addition to reduced flow rate in channels, algal growth results in the release of undesirable taste and odor compounds into the water during the summer months.

Antifouling chemical agent or biocides with a specific activity on bacteria influencing growth can be applied by using different strategies.

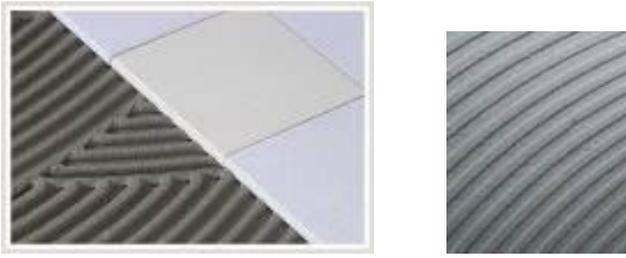
The use of suitable biocides can be suggested as added into mortar mix or latex based paint can provide long lasting (residual) algaecidal effect and will provide a cost effective antifouling strategy for fresh water environments.

The INTECNA program suggests the use of biocides in liquid or powder form to be used in mixture with the concrete according to the operation conditions and of installation

Proposed products are :

**HYCOR OPH**  
**HYCOR OPH/S**  
**HYCOR SB**

## DEFOAMERS IN LIQUID AND POWDER FORM



When concrete is formed, it requires mixing of the various components such as hydraulic cement, sand, gravel, water, and possibly additives to form a substantially uniform mixture. During mixing, air becomes entrapped in the composition, and much of this air remains in the resultant cured composition in the form of air voids. If air void size is small, the mix is said to be "air entrained." In most instances, a small amount of air entrainment is tolerated, and, in other instances, this is desirable for enhancing durability of the concrete in terms of resisting freeze/thaw cycles.

Water-reducing admixtures (including superplasticizers) are particularly known to entrain excessive air in the concrete slurry. The industry has attempted to correct this by using air-detraining agents (Defoamers) in the concrete mix in LIQUID FORM. As with the cement grinding additives (e.g., TIPA), common admixtures include hydrophobic materials such as nonionic surfactants with low hydrophilic-lipophilic balance (HLB), silicone derivatives, tributylphosphate, and alkyl phthalates.

In other applications, Defoamers are recommended for the use in dry powder mixtures which are mixed with water before use. In these cases, the addition POWDER Defoamers results in low foaming dispersions and aqueous pastes and masses with controlled air content.

In mortar systems Powdered Defoamers show a plasticising effect, meaning that the spreading values is increased.

In conclusion, main Defoamers applications in construction materials are as follows :

- Putties
- Levelling compounds
- Screeds (cement and anhydrite based)
- Joint fillers
- Gypsum
- Cement
- Mortars
- Powder paints
- Adhesives

INTECNA's production range consists in the following types :

DEFOAMERS IN LIQUID FORM : :

**Line NYAFOAM S ( silicon based defoamers)**

**Line NYAFOAM P ( Phosphoric esters based defoamers)**

DEFOAMERS IN POWDER FORM

**HYFOAM PWPH**

**HYFOAM PWSX**

## CORROSION INHIBITORS



The corrosion is an electrochemical nature process. And the presence of an electrolyte requires like all the electrochemical processes to be able to produce himself. In concrete case the electrolyte is the solution present in his capillary pores which is substantially a sodium and potassium hydroxide solution with a pH included between 13 and 14.

In this very basic environment, a metal stable, dense, compact and sticking to the support iron hydroxide which protects him from the oxidation process developing an impenetrable barrier to the oxygen and the damp is formed.

When the environment gets down of alkalinity  $\text{pH} < 11$ , the iron hydroxide becomes porous, permeable to the oxygen and the damp. This involves an iron de-passivation and the corrosion process starts quickly. This phenomenon looks when, inside the concrete, the carbonation process started by the carbon dioxide diffusion or the chloride ion presence with consequent decrease of the pH (pH value about 8,5) occurs.

The corrosion of reinforced concrete involves a decreasing of the reinforcing steel rod section and bars cover detachment take (*spalling*) because of the following expansions to the formation of the rust.

To stop or control the corrosion in steel rods it's possible to use steel corrosion protections of passive type and/or active type.

The **passive protection** insulates the metal surface from the outside environment by an opportune covering executed with suitable applicatory cycle (protective painting films, bituminous mantles, anodic oxidation products, zinc-plating, chromium-plating, corrosion inhibitors).

Instead the **active protection** is used to remove the phenomena of corrosion of the underground installation by cathodic protection.

INTECNA's program consists in a wide series of Corrosion Inhibitors in liquid or solid form

**HYCOR N ( Nitrites based)**

**HYCOR PHA ( Poly-phosphates based )**

**HYCOR FA ( Organic / Inorganic mixture based )**