PRODUCT INFORMATION

Pieri® DRC 6

Architectural surface retarder for formed concrete

Description

Creates exposed aggregate concrete surfaces in precast factories via new technology for both bottom of mould or top of mould applications. 10 grades are available depending on cement type, aggregate grading and surface finish desired, 6/01, 6/02, 6/10, 6/25, 6/50, 6/80, 6/100, 6/130, 6/200, 6/300.

- For mould face applications, Pieri® DRC dries to form a waterproof adherent coat, which reacts with cement alkalinity. Its excellent adhesion properties ensure the desired performance on all types of elements (vertical, horizontal, or inclined).
- Its application to the finished wet concrete surface at the top of mould, by spray application also permits easy washing of the element the next day.

Applications

- Architectural concrete facade elements
- Concrete walls for industrial buildings
- Anti-noise walls, sound barriers
- Town amenities
- Precast concrete of all types.
- Difficult Construction joint work

Directions for use

Mould Face:

Clean moulds must be uniformly coated with Pieri DRC 6 using a brush, a roller or an airless spray gun. The normal application rate is about 8 - 12 m²/litre. Depending on temperature and humidity, drying time of the product is between 5 and 30 minutes.

Depth of etch achieved is determined by type of Pieri DRC 6 used, aggregate grading, type of sand, proportion and type of cement.

Panels can be stoved or heated, subject only to avoiding severe thermal shocks.

The length of time the concrete is in the mould is also not a problem. Pieces can remain 3 or 4 days in the mould without surface appearance modification.

Brushing and washing off panels can be successfully accomplished with delays of up to several hours.

On certain mould types, plastic, rubber, fibre glass, it will be necessary to use Pieri DRC 6 Primer to prevent Pieri DRC 6 sticking to the mould surface.

Topface:

Pieri DRC 6 may be applied to the concrete surface as soon as the 'surface bleed water' has disappeared. However in this application we would recommend the use of Pieri Top due to its integrated curing effect.

Precautions:

When using any electrical equipment with this product i.e. spray equipment, always ensure it is of flame proof standard and also that all seals are solvent resistant, Teflon or similar.

Technical Specifications

- Partly volatile and flammable when liquid
- Flash point: 6°C (SETAFLASH method)
- Density: 1 to 1.1 depending on grade
- Viscosity: 110 ± 10 cSt Iso cup 2431 N°4 at 20°C.
- After solvent evaporation: adherent, hydrophobic coat.
- Application rate: 8 - 12 m²/litre depending on the grade and the application.
- Not affected by freezing
- Normal storage in closed containers, even after partial use, provided that containers have been closed after each use.
- Stir thoroughly the product before every use: otherwise light sedimentation takes place.
- Differentiation of each grade with colour:

6/01: blue	6/80: turquoise
6/02: brown	6/100: mustard
6/10: green	6/130: white
6/25: yellow	6/200: orange
6/50: pink	6/300: purple

Storage

18 months from manufacturing date in unopened original packaging.

Packaging

20 litre pail with re-sealable lid.

Safety

Flammable product

For further information, please consult our Safety Data Sheet.

Transport

Class : 3.2.

UN N° : 1263.

web **Visit our web site at: www.graceconstruction.com**

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DRC SERIES 6

Formwork Retarders

Application Notes

This information has been written and translated most carefully from results of tests done in our laboratories and on site. This information is not a guarantee or pledge of our responsibility.

Users must perform their own tests to verify that use conditions of our products are satisfactory to them

PIERI

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1. PRODUCT APPLICATIONS

Pieri DRC Retarder is a Deactivator that provides controlled retardation to temporarily and uniformly delay the curing of a selected surface layer of concrete while the remainder of the concrete cures normally. The DRC retarder is designed for use in any type of form (wood, steel, PVC, fibreglass, or concrete). This abrasion – resistant chemical compound contains strong resins, which cling to precast or poured-in-place formwork until the retarder is activated by freshly placed concrete. It also performs well in face-down, face-up and tilt-up applications.
Pieri DRC is a very versatile product that is marketed in nine separate formulations. The exact depth of the etch is chemically controlled to assure clean, consistent and uniform results. As the concrete cures, the retarder acts to halt the set of concrete at a predetermined penetration depth without interfering with the normal hardening of the mass of concrete underneath. When the concrete has reached desired strength, the formwork is stripped and the unset cement paste is scoured, washed, or pressure washed away to expose the natural beauty of the exposed aggregate surface.

While most people use Pieri DRC to produce an aesthetically pleasing surface, it also can be used to produce a roughened sub-surface to receive ceramic tile, metallic or other cement coat waterproofing, and applied plaster or stucco.
Another application is to prepare the surface for bonding new concrete placed against hardened concrete at construction joints without the problems of residues causing subsequent debonding or damage to the environment.

The product can be safely used without movement during casting to ensure controlled aggregate exposure, and leaves no retarder residues.

	FEATURES	BENEFITS
A	Attractive finish	Innumerable aesthetic effects
B	Finite etch and depth control.	Stays where you put it to produce finish similar to acid washing, sand blasting, and exposing medium to large aggregate.
C	Single thin coat application.	Increases coverage rate and saves money two ways: Less material and less labour.
D	10m² for Formwork use. 6-8m² for Topface use.	Conventional retarders require up to three times more material.
E	Versatile	Handles all applications including intricate, vertical or inclined forms, face-up and construction joint production.
F	Abrasion resistant.	Stays in place during concrete pour and vibration period.
G	Ease of application and Extended stripping times.	All formulas can be applied by roller, brush, or airless power sprayer. Concrete panels can remain over the retarder for three days without significantly changing the appearance of the retarded surface.
H	Temperature resistance.	Works well in temperature extremes – up to 93°C. Panels can be cured or heated by conventional construction methods. Is not affected by frost in storage.
I	Works well without form release in precast applications.	Saves on additional cost of special form release materials.
J	No problem with retarder residues.	Rinsing with water removes last traces of Pieri DRC so no need to worry about effect on reinforcement, aging, adherence of joints, surface treatments, such as water repellents or other sealants.
K	Flexibility in use.	It is preferable to strip concrete when set, but DRC Form Retarder is very forgiving. It is possible to pour on Friday and strip on Monday, or to work two shifts in one day with no appreciable difference in concrete apperance.
L	Fast clean up and environmentally safe.	DRC Form Retarder traces can be removed easily from a casting slab with a water blaster, a wire brush or scraper. Residues are not harmful to environment.

Packaging – Packaged in heavy duty 20 litre pails.

2.TECHNICAL DATA

Formula selection

Ten formulations are colour coded for quick recognition, visual inspection and easy application:

DRC Type	Product Colour	Effect on concrete	Approx. Aggregate size
DRC 6/01	Blue	Sandblasting aspect	1 – 3 mm
DRC 6/02	Brown	Light etch	1 – 3 mm
DRC 6/10	Green	Light etch	1 – 3 mm
DRC 6/25	Yellow	Light etch	3 – 6 mm
DRC 6/50	Pink	Medium	3 – 6 mm
DRC 6/80	Turquoise	Medium	10 – 12 mm
DRC 6/100	Mustard	Medium	10 – 12 mm
DRC 6/130	White	Deep etch	12 – 15 mm
DRC 6/200	Orange	Deep etch	12 – 15 mm
DRC 6/300	Purple	Deep etch	15 – 20

Flash point minimum 6°C. Tag closed cup.
A Non-toxic product.
When utilising white, instead of grey cement, use one grade stronger of DRC 6 for a similar depth of retardation, in a standard mix design. The choice of the appropriate formula will depend on the size of the aggregate and the amount of the surface area to be exposed. The lightest etch can be used to lightly roughen the surface so as to prevent surface glare and eliminate or disguise possible surface discolouration or imperfection. Highly suitable to produce non-slip surfaces.

While selection of the proper formula is the major consideration in determining the exact depth of the retardation, other factors also come in to play. These include such variables as setting time, curing rate, stripping time, ambient temperature, humidity, cement content, etc.

Aggregate gradings have a marked effect on finished product so as a rule, light etch finishes (6/01 to 6/80 retarder grades) work with a 'continuous grading curve' of aggregates. With medium to deep etch finishes (6/50 to 6/300) use 'gap graded curve' of aggregates; medium etch 6/50 and 6/80 can be used with both systems.
The concrete itself, of course, a significant participant in the process, and its characteristics will affect the depth of the etch. Concrete must be carefully mixed (watching for segregation) and properly vibrated. Depth of etch is also influenced by 'set time' of concrete, generally, the slower setting mixes will allow greater time for Pieri DRC Retarder to be absorbed and penetrate the concrete resulting in a deeper etch.

Factors which affect concrete set time are.

a) Type of cement

The variations of cement types, the use of replacement material (GGBS, PFA, etc) or cement fondu will affect the results of retarder depth; the slower the 'set' the deeper the etch.

b) Slump

Depth of etch will be reduced with stiff mixes as they set faster than more fluid ones. Workability of 60 to 90mm slump should be achieved to reduce the necessity for excessive vibration. NB. Self compacting concretes give excellent results.

c) Water/Cement Ratio

The recommended water/cement ratio range is 0.3 to 0.6. It is important to use a workable mix that will not segregate, segregation adversely affects the appearance of the retarded surface. Once a ratio is selected, it should not be varied at any time during the project.

d) Admixtures

The addition of admixtures which accelerate or retard setting time will effect the etch. Pieri strongly recommends that calcium chloride or other proprietary accelerators should not be used in conjunction with Pieri DRC Retarders, without first consulting with your Pieri representative. Superplasticisers or retarding admixtures may be used but the depth of etch will be affected and strict control must be maintained on their use. Refer to our Technical Department for assistance.

Test sample
Because of the inter-related nature of all the variables listed, it is imperative that a trial sample be produced to verify the correct choice of Pieri DRC Retarder grade. It is recommended that the exposure of aggregate depth should not exceed approximately a third (33%) of the size of aggregate otherwise effects of weathering, freeze-thaw cycles, etc, may cause loss of surface aggregate in the long term.

Produce a sample panel with the same thickness as the proposed final unit, approximately 1 metre by 1 metre, reproducing the conditions of final manufacturing process so that the greatest degree of accuracy and consistency can be attained.

The sample panel should remain in the form the same length of time as the production panels will before they are exposed. The mix design must be constant once it has been determined but should it be altered due to unforeseen circumstances, produce a second test panel.

3. METHOD OF USE – FORMWORK Application

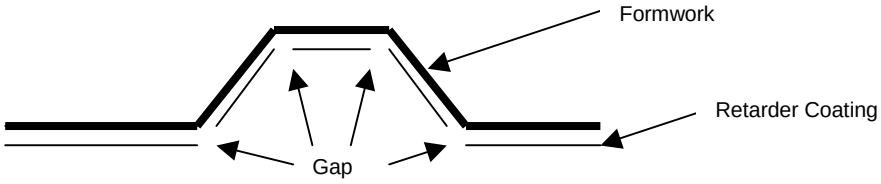
Surface preparation
For the correct application of DRC Retarders and maximum reuse of forms, use non porous plyform ie; resin impregnated types. If using new standard ply always seal with FORMCOAT CLEAR or an equivalent product. ENSURE these coatings are fully cured before use as per manufacturers instructions.

Steel, plastic or other non pourous forms must be clean, free from dirt, release agent, water, concrete build up or other surface contaminants before applying DRC retarders.
In most applications Pieri DRC Form Retarder performs well without the use of a special release agent for mould cleaning purposes. If bond breakers or other release agents are to be used in conjunction with DRC retarders, please verify their compatability with your supplier before use.

Mixing of Retarder
Thorough mixing is critical to achieve the desired performance. Stir DRC retarder **before each application** with a mechanical mixer or by pouring from pail to pail and stir well.

Due to DRC retarders unique viscosity properties it is important to verify solids and pigments are distributed evenly **prior to each application.** Particularly in warm temperatures. If there are any signs of any coagulation, please advise your supplier before use. Always replace lid of drum between uses to prevent solvent loss.

Application
For normal panels, one coat of DRC Form Retarder is sufficient. Apply thin single coat of undiluted DRC ensuring the correct grade is used for depth of exposure required. NB: Do not use heavier coating of a 'lighter grade', this will cause unnecessary 'build up' on the mould of unused retarder. To remove this 'build up', allow to dry for 20 minutes, then simply brush off to remove. Even application should be by use of a very short nap roller, brush or airless power sprayer (8-10 bar pressure). Nozzle and filter sizes must be 100 micron or more. The application rate should achieve 10-14 sq. metres per litre at an approximate thickness of 0.1 to 0.15mm. Extra thick coverage only wastes the material and unnecessarily increases the cost of labour. For oversize or complicated panels it may be preferable to apply two thin coats, but there is no advantage to making the total thickness more than 0.15mm. If applying two coats, wait until the first one is completely dry, then apply the second coat at right angles to the first coat. At corners, arises etc. to ensure a sharp, clean finish apply DRC retarder just short of the corner, etc. by approximately 1 to 2mm. If this is not achieved, it can cause aggregate within the corner etc. to be removed due to localised excess of retarder.



Mould Filling and Vibration
DRC retarders have a built-in time delay protection of 30 minutes before they start reaction with concrete. This is to ensure that the filling and vibration processes are completed without damaging the retarder coating. NB. Correct mix workability (slump) will help minimise the amount of vibration necessary: DO NOT RE-VIBRATE after 30 minutes.

4. METHOD OF USE – TOPFACE Application to concrete

For use on a monolithic element where a matching decorative aggregate finish is also required on the topface, it is important to ensure the 'cement rich' mortar and uneven density of aggregate (usually caused by excessive vibration) is counteracted by one of the following techniques.

(a) Selective aggregate seeding by placement following initial vibration using a 'floating' technique to ensure additional aggregate completely covered by cement paste.

(b) Alternatively, overfill of the mould and subsequent removal of the layer of 'cement rich fats' will achieve the same result. For architectural elements, sometimes a double layer system is used, the final topping mix being the most expensive component. This can be a higher strength, low slump mix and not prone to aggregate settlement during vibration, thus eliminating the need for 'seeding'.

NB: If a retarder is to be used for topface exposure in exposed conditions, ie. Construction joints, please refer to product data on PN2 RETARDER which incorporates a curing membrane and weather protection capability.

Surface preparation
Trowel the concrete surface smooth to ensure even application of the DRC Retarder, as rough surfaces will give inconsistent depths of retardation. Apply DRC Retarder by airless spray for best results but standard paint spray can be utilised at a pressure of 8 to 10 bar (110-142 psi). Nozzle and filter sizes must be 100 micron or more. Mask off untreated areas of concrete or rebar during the spraying process, if necessary removal of unwanted material can be achieved by solvent cleaning. The rate of spread required is 6 to 8 m²/litre to achieve optimum results. After 24 hours remove retarded matrix, if left longer exposed depth will be reduced progressively. As with the formwork casting process, always produce a test panel programme to ascertain the correct grade of retarder needed to achieve the correct results with a defined mix design and procedure.

5. GENERAL USE

DRC Form Retarder will dry to a tough abrasion-resistant coating in 15 to 45 minutes depending on the thickness of the application, the ambient temperature and relative humidity. On complex form faces, wait for the retarder to dry completely before starting to place concrete. **To prevent premature activation of the retarder, the forms or casting slab should not be exposed to rain, excessive condensation or other sources of water or cement residues.**

6. STRIPPING & EXPOSING the AGGREGATE

Once the panel or concrete member has achieved the desired safe strength for stripping, all the retarder coated formwork should be removed at the same time and immediately 'washed off' for best results.
If there is a requirement for a retarder coated support shutter to remain in place for more than 12 to 24 hours, leave all the forms in place up to a period of 48 hours and protect from rain. Then remove all forms together and carry out normal 'wash off' procedure.

Should you have cause to remove any individual retarder coated form in advance of the others, dry brush off the retarded matrix or use the minimum of water to ensure that no excess water contaminates the remaining forms, as this will cause premature re-hydration of the retarded matrix.
If DRC Retarder is over applied, some of the uncongealed paste may remain on the form, but this can be easily removed by brushing after being left to 'dry' for a short period. (20 mins plus)

Retarded matrix around the aggregate should be removed immediately after the forms have been stripped.
The retarder residues are water soluble and non harmful to the environment.
Pieri recommends one of the following methods.

Water Blasting – The matrix can be very easily and satisfactorily removed with a high- pressure water blaster equipped with a fan tip and set at a pressure level of 60 to 120 bar (850 – 1700 psi).

Brushing – A low pressure water hose aided by manual brushing with a stiff bristle brush is an effective and controlled method of removing the matrix surrounding the aggregate. Avoid use of a wire brush as it can cause aggregate damage.

Sandblasting – Sandblasting has the same economical appeal as waterblasting, but it produced a slightly different surface. A sandblasted surface will be of good quality although it will have a more rugged appearance than a waterblasted surface. Sandblasting also will lighten the colour of the concrete very slightly and the aggregate surface can also be damaged.

SPECIAL FINISHES
After cleaning processes are completed, to enhance and protect the appearance of the exposed aggregate products Pieri OXIFILM 25, CHROMOFUGE EMULSION or RESIN, PU50 or GRAFFISTOP sealers and coating systems should be considered.

Cleaning procedure

For removal of DRC Retarder or to clean equipment easily and thoroughly use DRC cleaner. White spirit or any other 'clean' solvents can be used with care.
(Do not contaminate retarder with these products.)

7. CAUTION

This product is HIGHLY FLAMMABLE. Keep away from heat, sparks and open flame. Use with adequate ventilation.
SEE OUR SAFETY DATA SHEET.

8. STORAGE & TRANSPORT CLASSIFICATION

Product storage – 1 year from manufacturers date stamp in closed original container.
SEE MATERIAL SAFETY DATA SHEETS

9. WARRANTY

Pieri products will perform according to specifications only if the directions of use are followed correctly.
Pieri are not responsible for improper use, such as incorrect application, storage, weather conditions; or unsafe engineering practices.

The product warranty is valid only if a proper test panel is manufactured to method statement and made available for Pieri's inspection. In the event of any product problems, the Pieri company must be notified immediately in writing.
Pieri's liability is limited to the refund of the purchase price or replacement of the product as specified in their standard terms and conditions of sale.

Concrete Formulations

From 6/01 to 6/70 use continous grading of aggregates
From 6/50 to 6/300 use gap grading of aggregates
(NB. 6/50 and 6/70 can be used with either system)

Suggested Basic Mix Design

Aggregate – 1200 kg/m³
Sand – 600 kg/m³
Cement – 350 kg/m³
Slump – 60mm minimum, 90mm maximum without admixture, higher slumps with selected admixtures are recommended.

DO NOT USE ACCELERATING ADMIXTURES – for information on acceptable admixtures or mix design variations, please refer to our technical department for assistance.