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Manol[®]

Quick-Hardener

PERFECT WATER-STOPPING, QUICK-HARDENING AGENT FOR MORTAR & CONCRETE

FOR CIVIL ENGINEERING, BUILDING CONSTRUCTION
& PLASTERING WORKS

SOLE MANUFACTURER & DISTRIBUTOR



Manol Co., Ltd.

TOKYO JAPAN <Since 1921>

PERFECT WATER-STOPPING, QUICK-HARDENING AGENT FOR MORTAR & CONCRETE

Manol Quick-Hardener

Cut-off and protection against moisture, water pressure, and aggressive subsoil water are playing a key role in underground construction and foundation works for both building and heavy construction projects.

As buildings rise higher and higher, sub-base structures tend to require more depth. As for heavy construction works, such concrete structures as tunnels, dams, canals, and retaining walls are constructed at numerous job-sites on every kind of loose foundation and soft ground. As a result, waterproofing and cut-off treatments using concrete admixtures are assuming ever-greater importance. MANOL Quick-Hardener tightly seals spring water leaks or cracks, and simplifies cut-off operations by accelerating the setting of cement. This was achieved by a close study of the characteristics of cement and mortar.

Furthermore, MANOL Quick-Hardener most effectively improves cement work in plumbing and plastering jobs, as well as in filling cracks and remedying other defects in mortar and concrete structures.



- MANOL accelerates the setting of cement in several minutes through interaction with its hydrolytic derivatives. The time for hardening may be freely controlled by the volume of water mixed.
- MANOL counteracts any strong water pressure exerted by leaks from existing structures. Due to its rapid-hardening and solid composition, the cement paste can be applied to achieve waterproofing in the smallest areas. Quick-setting cement milk can be poured into leaks over wide surfaces by making full use of its quick-hardening and gelation properties.
- Rich-mixed quick-hardening mortar-concrete can be poured into spring water or other large diameter holes for cut-off purposes.
- MANOL provides protection against salt water after hardening of concrete by the chemical interaction of cement and MANOL.

Description

Composition	Appearance	PH	Specific Gravity	Viscosity	Surface Tension	Packaging
Sodium Silicate	Green Color Liquid	12.2±0.5	1.35±0.01	18±5 (CPS)	50±5 (dyne/cm)	18kgs can 180kgs drum





MANOL requires speedy and complete mixing since it reacts instantly with the hydrolytic derivatives of cement.

1. Cement Paste

Cement should be rapidly mixed with MANOL using a semispherical measure-cup and rubber gloves. It should be applied immediately before hardening.

2. Mortar

When the standard mixing ratio of mortar is C : S = 1 : 3, MANOL should be quickly mixed in accordance with the required hardening time and applied to the moist surface. After the setting begins, remixing or any addition of water must be carefully avoided since this retards the setting of cement.

The prepared mixture should not be allowed to stand for long hours. Thus, MANOL should be regularly mixed in small amounts, batch by batch, or bucket by bucket.

3. Concrete

Concrete should be proportioned in the mixing ratio of C : S : G = 1 : 2 : 4 or more, to produce a rich mixture. According to the specified hardening time, MANOL should be used.

SETTING TIME OF MANOL (Test Temperature : 20°C)

■ Setting time of Cement Paste (minutes)

Mixing Ratio	Raw Liquid	1/2 Dilution Raw Liquid : Water 1 : 1	1/3 Dilution Raw Liquid : Water 1 : 2	1/4 Dilution Raw Liquid : Water 1 : 3	1/5 Dilution Raw Liquid : Water 1 : 4
Setting Time	40 ~ 60 (seconds)	2 ~ 3	30 ~ 40	50 ~ 60	70 ~ 90
Workable Time	20 ~ 30 (seconds)	20 ~ 30 (seconds)	3 ~ 4	5 ~ 6	8 ~ 10

■ Setting Time of Mortar • Concrete (minutes)

Mixing Weight	CX5% of MANOL	CX10% of MANOL	CX20% of MANOL
Setting Time	70 ~ 90	40 ~ 60	20 ~ 30
Workable Time	15 ~ 20	7 ~ 8	4 ~ 5

* C = Weight of Cement

CUT-OFF METHOD**1. Leakage Stop or Waterproofing in the Smallest Areas of Concrete and Masonry**

Before pouring, the moist surface of concrete structures should be thoroughly cleansed of dirt, paint, grease and any other loose particles. Honeycomb parts will be filled with MANOL-mix materials and made completely solid.

● Leakage Stopping under Low Water Pressure

The moist surface should be chipped off smooth according to the degree of leakage and the cement paste should be filled or grouted into cracks or leaks.

When spring water is massive and aggressive, the moist surface should be chipped smooth rather deeply and a rubber hose should be fixed with cement paste into a leak by which water will be introduced to the outside. The space between the hose and the leak's surface should be gradually filled with rapid-hardening mortar.

After the filler completely hardens, the hose should be pulled out and the hollow cylindrical space should be plugged with cement paste.

● Leakage Stopping under High Water Pressure

Chipping will be made according to the degree of leakage. Lead or steel pipes should be firmly fixed with cement paste into leaks or cracks. Water will be conveyed to the outside through these pipes. Immediately after this operation, mortar should be filled, in good order, to spacing between the pipes and the leaks' surfaces. After the filler dries up, wooden plugs will be hammered in the openings of lead or steel pipes. Otherwise, the projected ends of lead pipes should be crushed and the tubular hollow spacing will be filled with rapid-hardening cement paste or mortar.

● Leakage Stopping of Large Area

According to the size of basement area and the volume of spring water, well-points will be installed and the subsoil water will be pumped up through those well-points so as to lower the water level. Thus, the surface of walls and other structures will be cut-off by the methods described above.

After the cut-off work has been finished, a suction pump complete with the check valve should be used to pump up water so as to make the water level lower than the slab surface and then, quick-hardening concrete should be placed. At the same time, spring water conveying pipes will be cut below the slab surface and quick-setting or early strength mortar should be filled.

Finally, the moist surface should be finished by waterproofing using MANOL-mixtures.

NOTE: Details are specified in cut-off methods on Page (3 ~ 4)

2. Leakage Stopping over Wide Surfaces of Concrete Structures

Whenever the concrete surface has honeycomb and its large area is affected by leakage, pipes should be inserted into the drilled holes through the rear surface of concrete mass and fixed with quick-setting cement paste and mortar.

After the fixer sets completely, early-setting cement milk should be pressed in the leaks by a grout pump.

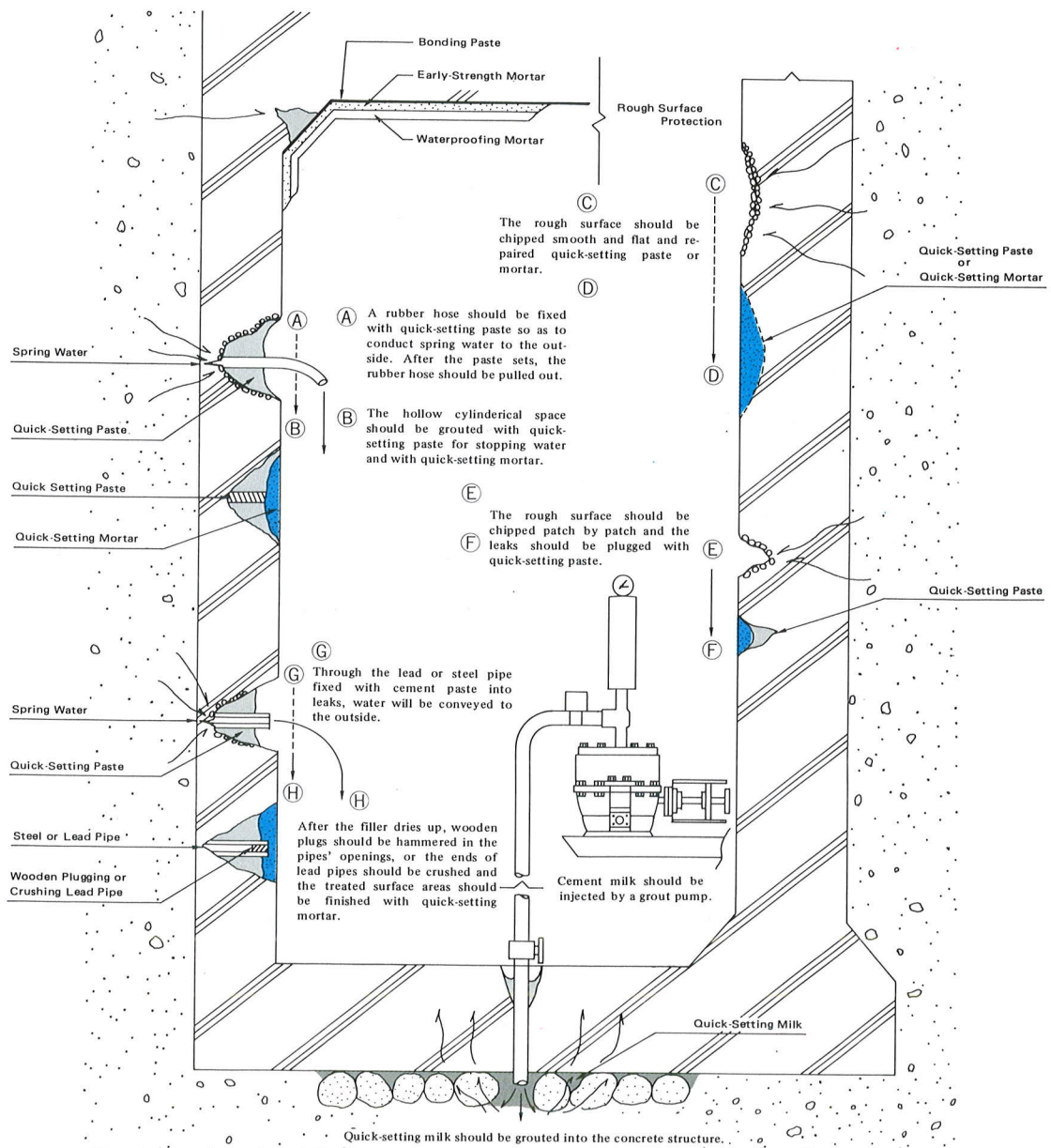
After the grouted cement milk fills and seals the set water conduits from the rear side of concrete mass, the cocks of pipe-conduits should be closed and left untouched to the perfect setting. Finally, the spacing all around the pipes including the crown cavity outside the pipes should be filled with early-setting mortar.

WATERPROOFING METHOD

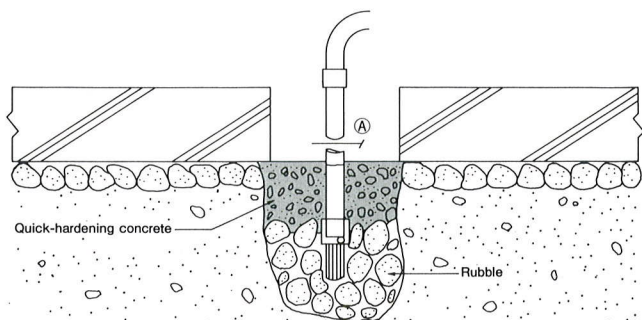
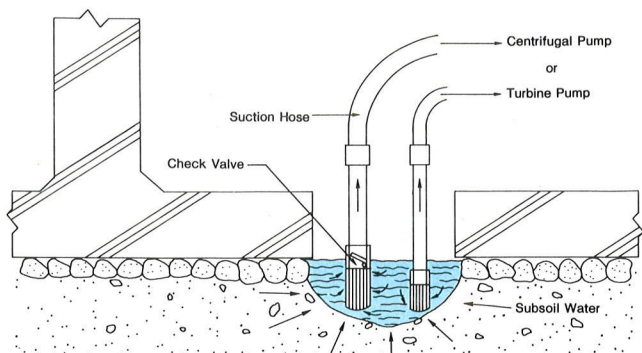
After the surface water of concrete structures is perfectly stopped by the cut-off methods above-mentioned, MANOL BONDING PASTE should be coated. Early-strength mortar should be applied next as the second coat and the moist surface should be finished by waterproofing using MANOL-mixtures.

NOTE: Details are specified in the separate-covered MANOL WATERPROOFING STANDARD SPECIFICATIONS.

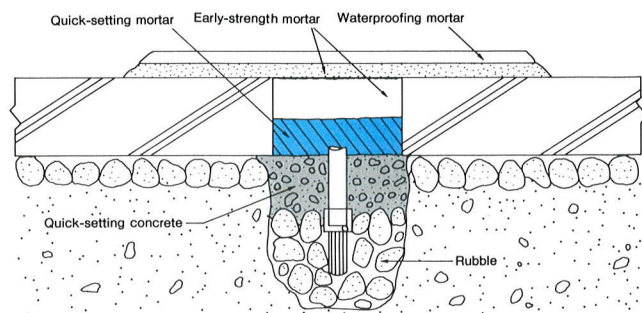
Spring Water Protection : MANOL Water-Stop and Grouting Methods



Manol Quick-Hardener



The suction pump complete with a check valve should be cut at Section A, and then, quick-setting mortar should be placed.



The volume of quick-hardening concrete, mortar and early-strength mortar to be placed may be decided, depending on the volume of spring water and also on the size of leaking area requiring for the cut-off treatment. Those MANOL mix materials should be placed up to the 1/2 thickness of a concrete structure to be treated.

 **Manol Co., Ltd.**

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