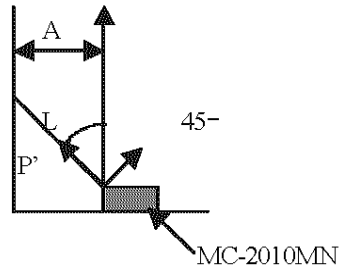


Calculations for MC-2010MN Concrete Coverage

1. Purpose: Determine minimum amount of concrete coverage to avoid concrete breakage



$$P = \frac{A}{\sin 45^\circ}$$

$$P' = P \cos 45^\circ$$

$$L = P' \sin 45^\circ$$

$$A = L \sin 45^\circ$$

- a) P Water swelling pressure of MC-2010MN (kgf/cm)
 b) P' Water swelling pressure of MC-2010MN (kgf/cm²)
 c) B Width of MC-2010MN (cm)
 d) P' 45- 45- direction force (kgf/cm)
 e) L 45- 45- direction length(cm)
 f) a Allowable shearing of concrete (kgf/cm²)
 g) A Minimum coverage length (cm)

<Case Study>

(Water swelling pressure of MC-2010MN) = 40 (kgf/cm²)

B = 2(cm)

a = 5.3 (kgf/cm²)

In case of 180(kgf/cm²) standard strength of concrete design

P = $\frac{40 \times 2}{5.3}$ = 15.1 (kgf/cm)

P' = $15.1 \cos 45^\circ$ = 10.7 (kgf/cm)

L = $10.7 \sin 45^\circ$ = 7.6 (cm)

A = $7.6 \sin 45^\circ$ = 5.3 (cm)

Taking 30% safety factor into consideration, A(concrete coverage requirement) 9.9 10(cm) (7.67 1.3 9.9) . To prevent concrete damage or lifting, MC-2010MN must be placed between two rows of rebar

Case No.	1	2	3	4	5
Concrete Strength	180 (kgf/cm ²) 2556 (psi)	210 kgf/cm ² 2982 (psi)	240 kgf/cm ² 3408 (psi)	270 kgf/cm ² 3834 (psi)	300 kgf/cm ² 4260 (psi)
a (kgf/cm ²)	5.3	5.6	5.9	6.1	6.4
P' kgf/cm	56.6	56.6	56.6	56.6	56.6
L (cm)	10.7	10.1	9.6	9.3	8.8
A (cm)	7.6	7.1	6.8	6.6	6.2
* Required Concrete Coverage	10 (cm) 4 (inch) * 5"	9.3(cm) 3.7 (inch) * 4"	8.9(cm) 3.5 (inch) * 4"	8.6(cm) 3.4 (inch) * 4"	8.1(cm) 3.2 (inch) * 4"

$$1(\text{kgf/cm}^2) = 14.2 \text{ (psi)} \quad 1 \text{ (cm)} = 0.3937 \text{ inch}$$

**** Due to variations in concrete strength and other factors
REQUIRED MINIMUM COVERAGE = 4~5 INCHES***

Recommend using MC-2010MN in below grade applications or where water is present.

- * Recommend 4" minimum coverage of good quality concrete from edge of MC-2010MN to face of concrete. Because of unknown installation procedures and for safety ADK recommends 5" coverage for 2600 psi or less concrete strength. ADK recommends 4" concrete coverage for concrete strength 2600+.

The application and the data in this brochure do not warrant final function of your application.

* Basic document provided by Asahi Denka Kogyo

Language modified for English usage.