

Multibeton® XC

Concretes with guaranteed performance

Exposure class XC: Carbonation induced corrosion

Multibeton® XC is a durable concrete for the construction of structures containing reinforcement exposed to air and moisture with a risk of corrosion of the reinforcement bars induced by carbonation.

Multibeton® XC concretes comply with the provisions of UNI EN 206 and UNI 11104 standards as laid down in the current "Technical Standards for Construction" issued by the Italian Ministry of Infrastructure and Transport and have characteristics that may vary within a wide range

depending on the mechanical resistance required, the environment in which the construction takes place and the complexity of the pour.

For the risk of carbonation-induced corrosion, the UNI EN 206 and UNI 11104 standards provide for exposure classes XC1, XC2, XC3 and XC4 depending on the environmental humidity conditions. The correct exposure class must be specified at the time of order in accordance with the design requirements.

TYPES OF ENVIRONMENT		EXAMPLES OF USAGE	MAXIMUM W/C	MINIMUM RCK
XC1	Permanently dry, wet or saturated with water	Concrete inside buildings with low relative air humidity. Concrete permanently immersed in water or exposed to condensation	0,60	C25/30
XC2	Predominantly wet or saturated with water, rarely dry	Concrete in contact with water for a prolonged period. Concrete of water containment structures. Concrete of many foundations.	0,60	C25/30
XC3	Moderately or highly humid air	Outdoor concrete with external surfaces sheltered from rain, or indoors with moderate to high air humidity.	0,55	C30/37
XC4	Cycles of dry and wet or saturated with water	Outdoor concrete with surfaces subject to alternately dry and wet or water-saturated environments. Concrete cyclically exposed to water in conditions not falling into class XC2.	0,50	C32/40

Multibeton® XC is available in four versions with differing consistencies: S3, S4, S5 and SCC (self-compacting concrete) and with a minimum strength class that is dependent on the exposure class. The consistency class and the strength class must be specified at the time of order in accordance with the design requirements.

The choice of consistency class is of fundamental importance to avoid internal/external cavities and depends on the difficulty of execution and the reliability of the workforce on site.



**MULTIBETON®
XC-S3**



**MULTIBETON®
XC-S4**



**MULTIBETON®
XC-S5**



**SCC-MULTIBETON®
XC-SCC**

Table 1:

The development over time of the compressive strength of **Multibeton® XC** under laboratory conditions (20°C) and in a cold (5–10°C) or hot (30–35°C) climate. The strength class considered is the minimum class for each exposure class.

TIME (DAYS)		COMPRESSIVE STRENGTH (MPA)		
		20°C	5–10°C	30–35°C
3	XC1 e XC2 C25/30	15	5	16
	XC3 C30/37	20	7	21
	XC4 C32/40	25	8	27
7	XC1 e XC2 C25/30	25	15	25
	XC3 C30/37	32	20	32
	XC4 C32/40	35	21	35
28	XC1 e XC2 C25/30	35	33	33
	XC3 C30/37	42	40	39
	XC4 C32/40	45	43	42

Note:

The values were obtained with wet curing (R.H. = 95%) in the laboratory and on specimens compacted to minimise trapped air content. The values actually obtainable on site depend on the temperature and relative humidity conditions to which the structure is exposed, as well as the degree of compaction of the structure.

Attention: do not rely on these data alone to establish the formwork striking time.

Table 2:

Main physical and mechanical characteristics of **Multibeton® XC**

EXPOSURE CLASS	STRENGTH CLASS	CONSISTENCY CLASS	STANDARD HYGROMETRIC SHRINKAGE AFTER 6 MONTHS (R.H.=50%)	DYNAMIC ELASTIC MODULUS AT 28 DAYS	WATER PENETRATION IN ACCORD WITH UNI 12390-8	HEATING UNDER ADIABATIC CONDITIONS
			$\mu\text{m/m}$	MPa	mm	$^{\circ}\text{C}$
XC1 , XC2	C25/30	S3, S4, S5	500	30000	30	30
		SCC	550	28000	30	32
XC3	C30/37	S3, S4, S5	400	33000	15	32
		SCC	420	32000	15	36
XC4	C32/40	S3, S4, S5	300	36000	10	33
		SCC	320	35000	10	38