Nuclearbeton®

Heavy concretes

Nuclearbeton® is a heavy **cement mix** with a high technological content. It is especially designed to make it suitable for the construction of structures required to act as radiation barriers.

Nuclearbeton® is manufactured using special aggregates with a very high specific weight (such as granular barite) that provide an effective barrier to the propagation of nuclear radiation.

Because of these characteristics, **Nuclearbeton®** is particularly recommended for:

- shielding barriers in nuclear medicine laboratories;
- protective screens in hospital facilities;
- accelerators in health care activities (radiotherapy, cyclotrons, etc.);
- shielded rooms in nuclear physics laboratories;
- shielding barriers in nuclear power plants;
- structures designed to protect against ionising radiation and radioactivity.

It should be borne in mind that the capability of **Nuclearbeton®** is normally combined with other measures at the design stage, such as special sizing, the interposing of additional shielding materials, etc.

The use of **Nuclearbeton®** makes it possible to reduce the thickness of the shielding compared to ordinary concretes; in order to obtain a high density of the structure, it is however important to carry out adequate vibration during laying.

Table 1:
Development over time of the compressive strength of **Nuclearbeton®** in strength classes **C25/30** to **C35/45** under laboratory conditions (20°C)

TIME DAYS	COMPRESSIVE STRENGTH (MPA) C25/30	C30/37	C32/40	C35/45
7	25	32	35	40
28	35	42	44	49

DEFINITION (AND ORDER)	STRENGTH CLASS	CONSISTENCY CLASS	EXPOSURE CLASS	MAXIMUM DIAMETER
NUCLEARBETON	from C25/30	from S4 to S5	XC, XD, XA, XF	32

PHYSICAL AND MECHANICAL CHARACTERISTICS OF NUCLEARBETON C30/37		
NUCLEARBETON	Normal strength	C30/37
	Standard hygrometric shrinkage with R.H. 50% after 6 months	400 µm/m
	Secant elastic modulus at 28 days	35000 mm
	Permeability at 28 days. Penetration of water under pressure (5 atm) in accord with UNI EN 12390-8	12