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CLAIMS

1. Use of calcium nitrate to modify the permeability of a hardened cementitious composition, wherein the cementitious composition comprises between 1 weight% to 4 weight% of calcium nitrate of the cement content of the cementitious composition, depending on the type of cement.

2. Use according to claim 1, wherein the cementitious composition is a concrete composition.

3. Use according to claim 2, wherein the concrete composition comprises 300 – 500 kg cement per m^3 hardened concrete, preferably Portland cement.

4. Use according to claim 3, wherein an amount of the cement is replaced by a cement replacement material at a concentration of between 0.1 weight% to 50 weight% of the cement content of the cementitious composition.

5. Use according to claim 4, wherein the cement replacement material is chosen out of any one of fly ash, ground granulated slag, lime stone or a combination thereof.

6. Use according to claim any one of the claims 2 to 5, wherein the concrete composition comprises 150 – 300 kg water per m^3 hardened concrete.

7. Use according to any one of the claims 2 to 6, wherein the concrete composition comprises between 1.500 – 1.800 kg aggregate per m^3 hardened concrete.

8. Use according to claim 7, wherein the aggregate comprises sand, gravel and stones.

9. Use according to any one of the claims 1 to 8, wherein calcium nitrate increases the density of voids with a void diameter below 300 µm by at least 10%; preferably at least 20%; more preferably at least 30 %; most preferably at least 40%.

10. Use according to any one of the claims 1 to 9, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 30 µm to at most 300 µm by

at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

11. Use according to any one of the claims 1 to 10, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 50 µm to at most 150 µm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

12. Use according to any one of the claims 1 to 11, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 60 µm to at most 100 µm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

13. Use of calcium nitrate as an admixture for a steel reinforced concrete composition to increase the resistance towards carbonation of the steel reinforced hardened concrete, wherein the concrete composition comprises cement and the calcium nitrate at a dosage of 1 weight% to 4 weight% of the cement content of the concrete composition.

14. Use according to claim 13, wherein the concrete composition is a pourable and curable concrete composition, comprising per m^3 cured concrete
    - between 300 and 500 kg cement;
    - between 150 and 300 kg water;
    - between 1.500 and 1.800 kg aggregate; and
    - between 1 weight% to 4 weight% of the cement content of the concrete composition, depending on the type of cement, of calcium nitrate.

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15. Use according to any of claims 13 or 14, wherein calcium nitrate increases the density of voids with a void diameter below to at most 300 µm by at least 10%; preferably at least 20%; more preferably at least 30 %; most preferably at least 40%.

16. Use according to any of claims 13to 15, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 30 µm to at most 300 µm by at least 5%

to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

17. Use according to any of claims 13 to 16, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 50 µm to at most 150 µm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

18. Use according to any of claims 13 to 17, wherein calcium nitrate increases the density of voids with a void diameter ranging from at least 60 µm to at most 100 µm by at least 5% to at most 50%; preferably at least 10% to at most 45%; more preferably at least 20 % to at most 45%; most preferably at least 30% to at most 45%.

19. Steel reinforced concrete solid having an elevated resistance towards carbonation obtained from hardening a pourable and curable concrete composition, comprising per m^3 cured concrete
    - between 300 and 500 kg cement;
    - between 150 and 300 kg water;
    - between 1.500 and 1.800 kg aggregate; and
    - between 1 weight% to 4 weight% of the cement content of the concrete composition, depending on the type of cement, of calcium nitrate.

20. Method for producing a steel reinforced concrete solid having an elevated resistance towards carbonation, comprising the steps of:

    (I) preparing a pourable and curable concrete composition, comprising per m^3 cured concrete
        - between 300 and 500 kg cement;
        - between 150 and 300 kg water;
        - between 1.500 and 1.800 kg aggregate; and
        - between 1 weight% to 4 weight% of the cement content of the concrete composition, depending on the type of cement, of calcium nitrate;

    comprising mixing the water, the cement, the aggregate and the calcium nitrate;

(II) casting the concrete composition into a form provided with a steel reinforcement; and

(III) having the concrete composition hardened into the steel reinforced concrete solid with the elevated resistance towards carbonation.