ABRASION AND IMPACT RESISTANCE OF SIKAFLOOR 21N PURCEM



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1.0 INTRODUCTION

This programme has been performed in response to a request made by Sika, to investigate the accelerated abrasion resistance of Sikafloor Purcem 21N (using the BCA Abrasion Tester).

2.0 ABRASION RESISTANCE OF CONCRETE

Extensive experimental work undertaken both in Europe {references (1) (2)} And North America {references (3) (4) (5)}, has demonstrated that the abrasion resistance of concrete is influenced by many factors. The main influence however may be summarised as follows:

- (i) Compressive Strength
- (ii) Physical properties of the aggregate
- (iii) Construction Procedures and Finishing
- (iv) Curing
- (v) Subsequent Surface Treatment

The role of these has been thoroughly discussed elsewhere (reference (1)), and so a similar discussion is not included in this report. Throughout this report the abrasion resistance is expressed in terms of the depth of wear produced when the surface is exposed by standard rolling wheels (reference (6)). The system, originally developed by the Cement & Concrete Association has become a widely accepted measure of abrasion resistance indeed, a classification has been suggested that limits the values of wear depth (references (7) and (8)). This original classification has been extended and is included in the latest edition of BS 8204: Part 2:2002(reference (9)).

The depth of wear is determined at the completion of 2850 revolutions which is approximately 15 minutes. The original classification is given in Table I and a more detailed classification of abrasion resistance is provided in Table 2, clearly the greater the depth of wear the lower the abrasion resistance. Table 3 shows classification according to EN 13813:2002 (E). Reference should also be made to BS EN 13813:2002(E) Paragraph 5.2.3 Wear Resistance Table 5 (reference (11)), also EN 13892-4.

3.0 ABRASION RESISTANCE TEST

The accelerated test was performed in accordance with the requirements of BS 8204: Part 2:2002 (reference (9)) and EN 13892-4. The test results are given in Table 4. The depth of wear for Sikafloor Purcem 21N was found to be less than 0.05mm. When this depth of wear, is compared with the BS 8204: Part 2:2002 (9). Classification of abrasion resistance and limiting depths of wear for the accelerated abrasion test, Table 2, it is clear that the abrasion resistance of Sikafloor Purcem 21N may be classified as "Special " i.e. the category required for floors subject to severe abrasion and impact.

When the depth of wear is classified according to Table 5 in EN 13813-4:2002 (E), it can be seen that the depth of wear is less than 0.05mm or 50μ m, and the classification is ARO,5.

4.0 CONCLUSIONS

Based on results arising from this work, the following conclusions can be presented

ABRASION RESISTANCE

Sikafloor 21N Purcem is classified as Special Class according to BS 8204: Part 2:2002(9).

Sikafloor 21 Purcem is classified as AR0.5 According to BS EN 13813:2002

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| Quality of Concrete Slab | Abrasion Depth (mm) |
|--------------------------|---------------------|
| GOOD | < 0.2 |
| NORMAL | 0.2 - 0.4 |
| POOR | > 0.40 |

Table 1: Classification of Concrete Floor Slabs in Medium Industrial Environmental

| BS 8204 Class | Duty | Type of Concrete | Concrete grade N/mm ² | Minimum cement content kg/m ³ | Maximum wear depth mm |
|------------------|-----------------------|--------------------------------|--|---|-----------------------------|
| Special | Severe Abrasion | Special Mixes and resins | Special mix | 0.05 | |
| AR1 | Very High Abrasion | High strength toppings | finishes, | 0.1 | |
| AR2 | High Abrasion | Direct finish concrete | C50 | 400 | 0.2 |
| AR3 | Moderate Abrasion | Direct finish concrete | C40 | 325 | 0.4 |

Table 2: Classification of abrasion resistance according to BS 8204: Part 2:2002 (based on reference 9)

| Class | AR6 | AR4 | AR2 | AR1 | AR0,5 |
|-------------------------------|-----|-----|-----|-----|-------|
| Maximum wear depth in μm | 600 | 400 | 200 | 100 | 50 |

Table 3: Classification according to EN 13813:2002 The wear resistance BCA is designated by an "AR" (for Abrasion Resistance) followed by the maximum depth of wear in 100µm.

| Product | Test No | Depth of Wear (mm) | Mean Depth of Wear |
|---------------|---------|-----------------------|-----------------------|
| Sikafloor 21N | 1 | 0.01 | |
| T diccini | 2 | 0.01 | 0.012 |
| | 3 | 0.01 | |
| | | | |

Table 4: Abrasion Test Result Sikafloor 21 Purcem

| Test | BS 8204: Part 2 | EN 13813:2002 | BRE |
|-------------------------|-----------------|---------------|-------------|
| | Abrasion | Abrasion | Screed Test |
| Sikafloor 21N Purcem | "Special Class" | AR0,5 | Category A |

5.0 REFERENCES

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- 11 BS EN 13813:2002 Screed material and floor screeds Screed material Properties and requirements