



SUPPLEMENT No. 3
TO
THE SOVEREIGN BASE AREAS GAZETTE
No. 873 of 12th December, 1989.
SUBSIDIARY LEGISLATION

C O N T E N T S :

The following SUBSIDIARY LEGISLATION is published in this Supplement which forms part of this Gazette :—

The Standards and Control of Quality Ordinance, 1984—	No.
Regulations under Section 3	117

**THE STANDARDS AND CONTROL OF QUALITY
ORDINANCE, 1984
(Ordinance 4 of 1984).**

**REGULATIONS MADE BY THE ADMINISTRATOR
UNDER SECTION 3.**

In exercise of the powers vested in him under Section 3 of the Standards and Control of Quality Ordinance, 1984, the Administrator after consultation with Republican legislation dealing with the same matters in the Republic, hereby makes the following Regulations:—

1. These Regulations may be cited as the Standards and Control of Quality Regulations, 1989 and shall be read as one with the Standards and Control of Quality Regulations, 1984, as amended from time to time (hereinafter referred to as “the principal Regulations”).

2. The following Standards which are set out in detail in the Appendix hereto shall be applied without exception throughout the Sovereign Base Areas:—

- | | |
|--------------|--|
| CYS 14:1986 | — Specification for Mortars,
Plastering and Rendering. |
| CYS 64:1986 | — Specification for Aggregates from
Natural Sources for Concrete. |
| CYS 99:1986 | — Specification for Road Aggregates. |
| CYS 178:1988 | — Definitions, Classification and
Marking of Admixtures for
Concretes, Cement-Mortars and
Grouts. |

CYPRUS STANDARD

Specification for Sands for Mortars, Plastering and Rendering

1. Scope

This Cyprus Standard covers the natural and crushed sands, that are used for external renderings, internal plasterings using mixes of lime (or additive) and sand (with or without the addition of cement or gypsum plaster), mixes of cement and sand (with or without the addition of lime) and for floor screeds using cement and sand.

2. References

CYS 64 - Aggregates from natural sources for concrete.

3. Definitions

For the purposes of this standard the definitions of sub-clause 2.2 of CYS 64 apply.

4. Sampling and Testing

For the purposes of this standard, the methods referred to in clause 3 of CYS 64 for fine aggregates apply with the addition of test sieve of nominal aperture size 3.35 mm, in the series of test sieves sizes.

5. Quality of Sand

5.1 For the purposes of this Standard the quality requirements set out in sub-clause 4.2 of CYS 64 apply, unless otherwise specified in this standard.

5.2 The quantity of the material passing the 75 mm sieve shall not be greater than 3% by mass for natural sand and 15% by mass for crushed sand.

5.3 The various sizes of particles of which sand is composed shall be uniformly distributed throughout its mass.

NOTE. For uniformity control of the fine material content in sands (material passing 75 mmsieve) the "field settling test" with the use of a measuring cylinder (cleanness test) can be applied for each truck load of sand delivered at the site. The results obtained by this method can then be compared with the results obtained on an accepted sample with known fine material content, using the same method as guide. This field method is as follows; 1 kg of dry sand from a representative sample is placed in a measuring cylinder. A solution of 30g NaCl (common salt) per litre of pure water is then added to the cylinder and the cylinder is shaken vigorously. The contents of the cylinder are then allowed to settle for one hour. The clean sand rests at the bottom while at the top a layer of fine material (silt) is formed. The thickness of the silt layer must be less than $1/25$ of the height of the clean sand below the silt layer, for natural sands, or less than $1/7$ of the height of the clean sand below the silt layer for crushed sand.

6. Grading

6.1 The grading of sand when determined according to clause 4 shall be within the limits given in the following table:

Grading limits of sands

Sieve aperture	Percentage by mass passing		
	Zone 1	Zone 2	Zone 3
mm			
5.00	100	-	-
3.35	80-100	100	100
2.36	60-95	65-100	80-100
1.18	30-70	45-80	60-100
mm			
600	15-40	25-50	40-100
300	5-30	5-35	5-80
150	0-20	0-20	0-30

NOTE. A sand whose grading falls outside the above limits on sieves other than the 5.00 mm sieve in Zone 1 and the 3.35mm sieve in Zones 2 and 3 by a total amount not exceeding 5% shall be regarded as being within those limits. This tolerance may be split up, for example, as 1% on each of three sieves and 2% on another, or 4% on one sieve and 1% on another etc.

6.2 The grading of sands shall be within the desired limits required for the relevant application.

NOTE. The most suitable grading of sand for every plastering-rendering application will depend, to some extent upon the desired finishing treatment. For the "first coat" (torn texture, undercoat) sands of zones 1 or 2 or a mixture of the two can be used. For the second coat, depending on the required texture, sands of zones 2 or 3 or a mixture of the two can be used.

For finishing coat (3rd coat) using lime sand mortar (with the addition of cement or gypsum) screened sand of the following grading should be used.

Sieve aperture	Percentage by mass passing
mm	%
2.36	100
1.18	80-100
mm	
600	55-100
300	5-50
150	0-10

For cement sand mortars, the grading of sand depends upon the thickness of the bedding and the type of the masonry e.g. brick, cementblock, stone etc. i.e. the required grading can be obtained either using sands of a single zone or in mixture with another zone. The same applies for floor screeds.

7. Supplier's Certificate of Quality

The requirements of clause 5 of CYS 64 apply.

8. Additional Information to be Furnished by the Supplier

The requirements of clause 6 of CYS 64 apply.

The Aggregates Standards Committee, CYS/TC 17, under whose direction this Cyprus Standard was prepared, consists of representatives from the following Government Departments, scientific, industrial and trade organizations.

Cyprus Association of Civil Engineers and Architects.

Cyprus Association of Building Contractors.

Cyprus Association of Professional Engineers.

Association of Crushed Aggregates Manufacturers.

Cyprus Consumers Association.

Mines Service.

Department of Town Planning and Housing.

Public Works Department.

Geological Survey Department.

Water Development Department.

Cyprus Standard Specification for
AGGREGATES FROM NATURAL SOURCES FOR CONCRETE

1. Scope

This specification covers the natural crushed and uncrushed materials used in the production of concrete for normal civil and structural engineering purposes. It does not apply to artificial materials or those employed for special purposes.

2. Definitions

For the purposes of this Cyprus Standard the following definitions apply:

2.1 Coarse aggregate. Aggregate mainly retained on a 5.00mm test sieve⁽¹⁾ containing only so much finer material as is permitted for the various sizes in this specification. Coarse aggregate may be described as uncrushed gravel, defined in 2.1.1, crushed rock or crushed gravel, defined in 2.1.2 or the blending of uncrushed and crushed gravels.

2.1.1 Uncrushed gravel. Coarse aggregate resulting from the natural disintegration of rock.

2.1.2 Crushed gravel. Coarse aggregate produced by crushing hard rock or gravel and which does not contain more than 30% of round particles when tested in accordance with the appropriate method of test⁽²⁾.

2.2 Fine aggregate. Aggregate mainly passing a 5.00mm test sieve⁽¹⁾ and containing only so much coarse material as is permitted for the various grading zones in this specification.

⁽¹⁾BS 410, ⁽²⁾BS 812

Fine aggregate may be described as natural sand, defined in 2.2.1, crushed rock and/or crushed sand, defined in 2.2.2 or mixed sand when it is the product of the blending of natural sand and crushed rock sand or crushed gravel sand.

2.2.1 Natural sand. Fine aggregate resulting from the natural disintegration of rock.

2.2.2 Crushed rock sand and crushed gravel sand. Fine aggregate produced by crushing hard rock and gravel respectively.

2.3 All-in aggregate. Material composed of a mixture of coarse aggregate and fine aggregate.

3. Sampling and Testing.

Sampling and testing of aggregate shall be carried out in accordance with the requirements of the appropriate standards⁽¹⁾. The grading of aggregates shall be determined by the methods for sieve analysis using the following nominal aperture size test sieves 75.0, 63.0, 37.5, 20.0, 14.0, 10.0, 5.0 mm⁽²⁾ made with square hole for coarse aggregate and 5.0, 2.36, 1.18mm, 600, 300, 150mm²⁾ made with woven wire for fine aggregate.

4. Quality of Aggregates.

4.1 Coarse aggregate.

4.1.1 General requirements. Coarse aggregate as defined in section 2.1 of this standard shall have hard, strong, durable and clean pieces, free from adherent coatings and conforming to the requirements of this specification.

⁽¹⁾BS 812, ⁽²⁾BS 410

4.1.2 Deleterious substances. The amount of deleterious substances in coarse aggregate shall not exceed the maximum limits specified in table 1 when determined in accordance with the requirements of the appropriate methods of test.

Table 1: Deleterious substances in coarse aggregate,

Deleterious substances,	Maximum permissible limit mass percent,
1. Clay lumps and friable particles ⁽¹⁾	5.0 [~]
2. Soft particles ⁽²⁾	5.0 [~]
3. Material passing the 75µm sieve ⁽³⁾	1.0 [~]
4. Sulphur in sulphide and/or sulphate minerals expressed as SO ₃ (4)	1.0
5. Chert and other deleterious substances	see sub-clause 4.1.10

[~] The sum of these two items should not exceed 5%.

[~] In the case of crushed aggregates, if the material finer than the 75mmsieve consists of the dust of fracture, essentially free from clay or shale, this percentage may be increased to 1.5%.

4.1.3 Specific gravity and water absorption. The specific gravity on the saturated surface dry-bases of coarse aggregate when tested in accordance with the requirements of the relevant method of test ⁽²⁾ shall be more than 2. The water absorption when tested in accordance with the requirements of the relevant method of test ⁽²⁾ shall be less than 4%.

⁽¹⁾ASTM-C142, ⁽²⁾BS812, ⁽³⁾ASTM-C117, ⁽⁴⁾NF-P18-582

4.1.4 Soundness. When the coarse aggregate is subjected to five successive cycles of the sodium or magnesium sulphate soundness test as described in the relevant method of test⁽¹⁾ the weighted loss shall not exceed 12% or 18% respectively.

4.1.5 Crushing value. When tested in accordance with the requirements of the appropriate standard⁽²⁾, the loss shall be not more than 25% by mass. Aggregates produced from limestone (containing more than 85% of $\text{CaCO}_3 + \text{MgCO}_3$) and intended for use in concrete up to grade C25/30 are permitted to have a weighted loss not exceeding 30% by mass. For concrete of higher grade than C25/30 or for concrete wearing surfaces, the loss shall not exceed 25% by mass.

4.1.6 Aggregate impact value⁽²⁾. When tested for impact the loss shall be less than 23% by mass.

4.1.7 Resistance to Abrasion (use of the Los Angeles Machine)⁽³⁾. The percentage of wear shall not be more than 25% when tested in accordance with the requirements of the relevant standard. Aggregates produced from limestone (containing more than 85% of $\text{CaCO}_3 + \text{MgCO}_3$) and intended for use in concrete up to grade C25/30 are permitted to have a weighted loss not exceeding 30% by mass. For concrete of a higher grade than C25/30, or for concrete wearing surfaces, the loss shall not exceed 25% by mass.

4.1.8 Flakiness and Elongation indices⁽²⁾. When tested in accordance with the requirements of the relevant standard, the flakiness and elongation indices should not exceed 30% of the total mass for concrete up to grade C25/30. For concrete of higher grade than C25/30 these indices must be less than 25%.

⁽¹⁾ASTM-C88, ⁽²⁾BS 812, ⁽³⁾ASTM-C131 and ASTM-C535

4.1.9 Grading of coarse aggregate. The grading of coarse aggregate when tested in accordance with the requirements of clause 3 of this standard, shall be within the limits given in table 2.

Table 2: Grading limits of Coarse Aggregate.

Sieve aperture mm	Percentage by mass passing the sieves.							
	Nominal size of graded aggregate			Nominal size of single - sized aggregate				
	40mm to 5mm	20mm to 5mm	14mm to 5mm	63mm	40mm	20mm	14mm	10mm
75.0	100	-	-	100	-	-	-	-
63.0	-	-	-	85-100	100	-	-	-
37.5	95-100	100	-	0-30	85-100	100	-	-
20.0	35-70	95-100	100	0-5	0-25	85-100	100	-
14.0	-	-	90-100	-	-	-	85-100	100
10.0	10-40	30-60	50-85	-	0-5	0-25	0-50	85-100
5.00	0-5	0-10	0-10	-	-	0-5	0-10	0-25
2.36	-	-	-	-	-	-	-	0-5

4.1.10 Potential alkali-silica reactivity of coarse aggregate⁽¹⁾. Coarse aggregate for use in concrete shall not contain any materials that are deleteriously reactive with the alkalis in the cement in an amount sufficient to cause excessive expansion of mortar or concrete.

NOTE: In case that such materials are present as stated in clause XI.1.1 of Appendix⁽¹⁾ even if they passed the relevant tests, the coarse aggregate may be used with a cement containing less than 0.60% alkalis calculated as sodium oxide equivalent ($\text{Na}_2\text{O}+0.658\text{K}_2\text{O}$) or with the addition of a material that has been shown to prevent harmful expansion.

⁽¹⁾Appendix XI of ASTM-C33

4.1.11 Chloride content of coarse aggregates. When tested with an appropriate method ⁽¹⁾ the maximum chloride content expressed as percentage of chloride ion, must be less than 0.1%.

4.2 Fine aggregate

4.2.1 General requirements. Fine aggregate as defined in section 2.2 of this standard shall have hard, strong, durable particles and shall conform to the requirements of this specification.

4.2.2 Deleterious substances. The amount of deleterious substances in fine aggregate shall not exceed the maximum limits specified in table 3 when tested in accordance with the requirements of the relevant methods of test.

Table 3: Deleterious substances in fine aggregate.

	Deleterious substances.	Maximum permissible limits
		mass percent.
1.	Clay lumps and friable particles ⁽²⁾	3.0
2.	Material passing the 75mmsieve ⁽³⁾ for natural sand	3.0
	for crushed sand	7.0
3.	Sulphur in sulphide and/or sulphate minerals expressed as SO ₃ ⁽⁴⁾	1.0
4.	Chert and other deleterious substances	see sub-clause 4.2.7

⁽¹⁾BS 812, ⁽²⁾ASTM-C142, ⁽³⁾ASTM-C117, ⁽⁴⁾NF-P18-582

4.2.3 Specific gravity and water absorption. The specific gravity when tested on the saturated and surface dry bases in accordance with the relevant method of test⁽¹⁾, shall be more than 2.4. The water absorption when tested in accordance with the relevant method of test⁽²⁾ shall be less than 4%.

4.2.4 Soundness⁽²⁾. When the fine aggregate is subjected to five successive cycles of the sodium or magnesium sulphate soundness test, the weighted loss shall not exceed 10% or 15% respectively.

4.2.5 Organic impurities. All fine aggregate shall be free from organic impurities. Aggregate subjected to the colorimetric test for organic impurities as described in the appropriate method of test⁽³⁾ and producing a colour darker than the standard, shall be rejected unless the relative strength of mortar cylinder/cube at 7 days is not less than 95% of the normal strength.

4.2.6 Grading of fine aggregate. The grading of fine aggregate, when determined by a test according to the requirements of clause 3 of this standard, shall be within the limits of one of the grading zones given in table 4, except that a total tolerance of up to 5% may be applied to the percentages given underlined. This tolerance may be split up; for example, it could be 1% on each of three sieves and 2% on another, or 4% on one sieve and 1% on another etc. The fine aggregate shall be described as fine aggregate of the grading zone into which it falls, e.g. CVS 64 Grading Zone 1.

NOTE: It is intended that individual zones should not be specified in contract documents relating to concrete; the concrete mixes should be modified to make the best use of the materials readily available.

(1) BS812, (2) ASTM-C88, (3) ASTM-C40 and C87

Table 4: Grading limits of fine aggregate.

Sieve aperture.	Percentage by mass passing the sieves.			
	Grading Zone 1	Grading Zone 2	Grading Zone 3	Grading Zone 4
mm				
10.00	100	100	100	100
5.00	90-100	90-100	90-100	95-100
2.36	60- <u>95</u>	<u>75</u> -100	<u>85</u> -100	<u>95</u> -100
1.18	30- <u>70</u>	<u>55</u> - <u>90</u>	<u>75</u> -100	<u>90</u> -100
mm				
600	15-34	35-59	60-79	80-100
300	5- <u>20</u>	<u>8</u> - <u>30</u>	<u>12</u> - <u>40</u>	<u>15</u> - <u>50</u>
150	0- <u>10</u>	0- <u>10</u>	0- <u>10</u>	0-15

NOTE: The commonly used proportions of one part of fine aggregate to two parts of coarse aggregate, i.e. a fine aggregate percentage of about 33% by volume of the total aggregate, are not always the most suitable for making concrete of high strength and good durability.

To make concrete of the best quality with the grading limits of aggregate allowed, the mix should be suitably designed and the proportion of fine aggregate in the mix should be reduced as the fine aggregate grading becomes finer.

The most suitable proportion of fine aggregate to be used for a particular cement/aggregate ratio will, however depend on the actual grading, the particle shape and the surface texture of both the fine and the coarse aggregates. In particular, the correct design of the mix becomes increasingly important as the grading of the fine aggregate approaches the coarser limit of Grading Zone 1 or the finer limit of Grading Zone 4. The suitability of a given fine

aggregate for use with the available coarse aggregate should always be ascertained by mix design, this being especially important in respect of reinforced concrete structures.

4.2.7 Potential alkali-silica reactivity of fine aggregate⁽¹⁾. Fine aggregate for use in concrete shall not contain any materials that are deleteriously reactive with alkalis in the cement in an amount sufficient to cause excessive expansion of mortar or concrete.

NOTE: In case that such materials are present as stated in clause XI.1.1 of Appendix⁽²⁾ even if they passed the relevant tests the fine aggregate may be used with a cement containing less than 0.60% alkalis calculated as sodium oxide equivalent ($\text{Na}_2\text{O}+0.658\text{K}_2\text{O}$) or with the addition of a material that has been shown to prevent harmful expansion.

4.2.8 Chloride content of fine aggregate. When tested with an appropriate method⁽²⁾ the maximum chloride content expressed as percentage of chloride ion must be less than 0.1%.

4.3 All-in-aggregate.

4.3.1 General requirements.

All-in-aggregate, as defined in section 2.3 of this standard, shall have hard, strong, durable particles and shall conform to the requirements of this specification.

The coarse and fine aggregates constituting the all-in-aggregate shall conform to all the requirements of clauses 4.1 and 4.2 of this standard respectively, except those referring to the grading of the aggregate which should be within the limits specified in subclause 4.3.2 of this standard.

⁽¹⁾Appendix XI of ASTM-C33

⁽²⁾BS 812

4.3.2 Grading of all-in-aggregate

The grading of all-in-aggregate when determined by a test according to the requirements of clause 3 of this standard, shall be within the limits given in table 5.

Table 5: Grading limits of all-in-aggregate;

Sieve aperture	Percentage by mass passing the sieves	
	40mm nominal size	20mm nominal size
mm		
75.0	100	-
37.5	95-100	100
20.0	45-80	95-100
5.0	25-50	35-55
mm		
600	8-30	10-35
150	0-6	0-6

5. Supplier's Certificate of Quality

The supplier shall satisfy himself that the aggregate at the source of production complies consistently with the requirements of this Cyprus Standard and shall give a certificate to this effect to the purchaser or his representative. Additionally the supplier is obliged to mark each stockpile with a sign on which the quality of the material in respect to the standard it will be clearly written.

If the purchaser or his representative requires independent tests or the certification of individual consignments, the samples shall be taken before or immediately after delivery

at the option of the purchaser or his representative, and these tests shall be carried out in accordance with the appropriate requirements of this Cyprus Standard or the written instructions of the purchaser or his representative.

Unless otherwise specified with the enquiry and order, the supplier shall supply free of charge the material required for testing and the cost of the tests shall be borne:

- (a) by the supplier, in the event of results showing that the material does not comply with the standard;
- (b) by the purchaser, in the event of results showing that the material does so comply with the standard.

6. Additional Information to be furnished by the supplier. When requested by the purchaser or his representative, the supplier shall provide any of the following additional particulars.

6.1 Source of Supply

6.1.1 District

6.1.2 Area

6.1.3 Name of quarry

6.2 Type of rock⁽¹⁾

6.3 External Characteristics⁽¹⁾

6.3.1 Shape

6.3.2 Surface Texture

6.4 Physical Properties

6.4.1 Specific gravity and water absorption⁽¹⁾

6.4.2 Bulk density ⁽¹⁾ in kilograms per cubic metre (kg/m³)

5.5 Grading. A typical sieve analysis determined according to the requirements of clause 3.

The following organizations collaborated in the preparation of this Standard Specification:

Cyprus Association of Civil Engineers and Architects.

Cyprus Association of Building Contractors.

Cyprus Association of Professional Engineers.

Association of Crushed Aggregates Manufacturers.

Cyprus Consumers Association.

Mines Service.

Department of Town Planning and Housing.

Geological Survey Department.

Public Works Department.

Water Development Department.

⁽¹⁾BS 812

Cyprus Standard specification for
Road aggregates

1. Scope and Field of Application

This Cyprus Standard specification covers the quality and grading analysis of crushed aggregates suitable for use in road construction. Such materials are, the graded mixture of crushed coarse and fine aggregates used as a base for roads with either the dry or wet macadam methods, and the coarse and fine aggregates as well as filler used in the production of asphaltic macadam (by the penetration or premixed methods) for both base and wearing courses on roads.

NOTE: Coarse aggregate shall contain at least 75% by mass of crushed particles having two or more fractured faces and 85% having at least one fractured face. The area of each face shall be equal to at least 75% of the smallest cross-sectional area of the particle. The angle between two adjacent faces should be at least 30° to be considered as two fractured faces. Fractured faces shall be obtained by artificial crushing.

2. References.

CYS 64 - Aggregates from natural sources for concrete.
CYS 14 - Sands for mortars plastering and rendering.

3. Definitions.

In addition to the definitions mentioned in CYS 64, excluding paragraphs 2.1.1 and 2.1.2 the following definitions apply:

3.1 Graded mixture of crushed coarse and fine aggregates.
Graded mixture of crushed coarse and fine aggregates having a specified grading analysis and being used for the production of wet or dry bound macadam.

3.2 Asphaltic macadam.

Graded mixture of crushed coarse and fine aggregates filler in a small quantity and emulsion, cutback or straight run bitumen.

4. Sampling and Testing.

The methods used are those mentioned in the Cyprus Standards CVS 61 and CVS 14. The sieves with square openings and apertures of 50mm and 25mm are being included in the sieve series for coarse aggregates and the sieve with 425mm mesh in the sieve series for fine aggregate.

5. Quality characteristics.

5.1 Graded mixture of crushed coarse and fine aggregates.

5.1.1 General requirements. These aggregates must originate from suitable rock and shall have hard, strong, durable and clean particles free from deleterious substances and adherent coatings.

5.1.2 Flaky and elongated particles. The percentage by mass of flaky and elongated particles shall not exceed 25%.

5.1.3 Soundness Value. When the aggregates subjected to five successive cycles of the Sodium Sulphate or Magnesium Sulphate Soundness test the weighted loss shall not exceed 15% and 22.5% respectively.

5.1.4 Aggregate Impact Value. When the aggregate is subjected to the impact test the loss shall not exceed 25%.

5.1.5 Crushing Value. When the aggregate is subjected to the crushing test the loss shall not exceed 25%.

5.1.6 Resistance to abrasion (use of the Los Angeles Machine). The percentage of wear shall not exceed 25% (by mass).

5.1.7 Sand Equivalent. The material passing through the 5mm sieve shall have a Sand Equivalent Value greater or equal to 35.

5.1.8 Grading composition. The grading analysis of the graded mixture of crushed coarse and fine aggregates shall be within the limits given in Table 1.

Table 1. Grading/^{limits}of graded mixture of crushed coarse and fine aggregates.

sieve aperture mm	Percentage by mass passing		
	ZONE 1	ZONE 2	ZONE 3
	Nominal Size 63mm	Nominal Size 37.5mm	Nominal Size 28mm
75	100	-	-
63	90-100	-	-
50	75-100	100	-
37.5	-	95-100	100
28	50-80	-	85-100
20	-	60-80	70-92
10	30-55	40-60	50-70
5	22-45	25-40	35-55
2.36	15-35	15-30	-
600µm	-	8-22	15-25
425µm	5-20	5-20	10-22
75µm	0-8	0-8	0-8

* The material passing this sieve must be non plastic, and have a liquid limit of less than 25. Material having a liquid limit less than 30 and plasticity index less than 6 can be used if it is suitably modified/stabilised. The percentage of the modifying/stabilising agent will be determined by the designer according to the uses.

Material produced from limestone (containing more than 85% of $\text{CaCO}_3 + \text{MgCO}_3$) can be excluded from the modification/stabilization procedure if it is proved to have self-cementing properties, when wetted and compacted to a specified density.

NOTE: The graded mixture of crushed coarse and fine aggregates produced from limestone (containing more than 85% of $\text{CaCO}_3 + \text{MgCO}_3$) is permitted to have a resistance to abrasion (Los Angeles), and a crushing value, of not more than 35% by mass.

5.2 Aggregates for asphaltic layers.

5.2.1 General requirements. Aggregates, as defined in Cyprus Standard specification CYS 64, shall have hard, strong, durable and clean particles free from adherent coatings and conforming to the quality characteristics stated in Table 1 of CYS 64.

5.2.2 Flaky and elongated pieces. The percentage by mass of flaky and elongated particles shall not exceed 30%.

5.2.3 Soundness Value. When the coarse aggregate is subjected to five successive cycles of the Sodium or Magnesium Sulphate soundness test the weighted loss shall not exceed 12% and 18% respectively.

5.2.4 Aggregate Impact Value. When the aggregate is subjected to the Impact test the loss shall not exceed 23%.

5.2.5 Crushing Value. When the aggregate is subjected to the crushing test the loss shall not exceed 25%. Aggregates produced from limestone (containing more than 85% of $\text{CaCO}_3 + \text{MgCO}_3$) and intended for use in base course layer are permitted to have a loss not exceeding 30%.

5.2.6 Resistance to abrasion (use of the Los Angeles Machine). When the aggregate is tested by the Los Angeles Machine the percentage of wear shall not be more than 25%. Aggregates produced from limestone (containing more than 85% of $\text{CaCO}_3 + \text{MgCO}_3$) and intended for use in base course layer are permitted to have a loss not exceeding 30%.

5.2.7 Water Absorption. The water absorption of aggregates shall not exceed 3.5% for base course layers and 3.0% for wearing course layers.

NCTE. In cases of roads constructed in mountainous areas, where the temperatures are low, it is advisable to use aggregates with a lower water absorption, up to 2%, as decided by the designer.

5.2.8 Stripping test. When the aggregates are tested by the Stripping test there shall be no more than 6 pieces stripped from the sample of 150 pieces.

5.2.9 Grading composition. The grading analysis for aggregates used in the preparation of premixed asphaltic concrete is the same as those given in Table 2 of CYS 64. In the preparation of both penetration macadam courses as well as premixed asphaltic concrete courses the zones given in Table 2 of this standard shall be used.

Table 2. Grading limits of aggregates for asphaltting layers.

sieve aperture mm	Percentage by mass passing.					
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
	63-37.5 mm	50-28 mm	28-10 mm	20-10 mm	14-5 mm	10-2.36 mm
75	100	-	-	-	-	-
63	90-100	100	-	-	-	-
50	35-70	90-100	-	-	-	-
37.5	0-15	35-70	100	-	-	-
28	-	0-15	90-100	100	-	-
20	0-5	-	40-70	90-100	100	-
14	-	0-5	15-35	20-55	90-100	100
10	-	-	0-15	0-15	40-70	85-100
5	-	-	0-5	0-5	0-15	10-35
2.36	-	-	-	-	0-5	0-10
1.18	-	-	-	-	-	0-5

NOTE

The following combinations are being suggested for penetration macadam courses:

Base Material	Zone 1	Zone 2
Choke Material	Zone 3 or 4	Zone 4 or 5
Sealing Material	Zone 5 or 6	Zone 5 or 6

5.3 Fine Aggregate.

5.3.1 General Requirements. Fine aggregate, as defined in CYS 64, shall have hard strong, durable particles and shall conform to the other quality characteristics of this specification.

5.3.2 Deleterious substances. The amount of deleterious substances in fine aggregate shall not exceed the maximum limits specified in Table 3 of this Standard.

Table 3. Deleterious substances in fine aggregate

Type of Impurity	Maximum permissible limit
	Mass percent
1. Clay lumps and friable particles	3.0
2. Sulphur in sulphide and/or sulphate minerals expressed as SO ₂	1.0

5.3.3 Water Absorption. The water absorption of the fine aggregate shall not exceed 3.5% for base course layers and 3% for wearing course layers.

5.3.4 Soundness Value. When the fine aggregate is subjected to five successive cycles of the Sodium or Magnesium Sulphate soundness test the weighted loss shall not exceed 10% or 15% respectively.

5.3.5 Organic Impurities. Same as in sub-clause 4.2.5 of CYS 64.

5.3.6 Grading of fine aggregate. For the purpose of this standard the grading limits for fine aggregate are the same as described in sub-clause 4.2.6 table 4 of CYS 64 and table 1 of CYS 14.

5.4 Filler

5.4.1 The filler used shall be either cement or lime or limestone dust or dust produced by the crushing of the material used, as decided by the buyer.

5.4.2 Grading composition. The grading of the filler is given in Table 4.

Table 4. Grading limits of filler.

sieve aperture mm	Percentage by mass passing	
	Minimum	Maximum
300	100	-
75	85	100

NOTE 1 This material (excluding cement and hydrated lime) shall not be plastic.

NOTE 2 The addition of a small quantity (1% to 2% by weight of total aggregates) of cement or lime minimises the danger of asphalt stripping in the presence of water.

6. Supplier's Certificate of Quality

The Supplier shall satisfy himself that the aggregates at the source of production comply consistently with the requirements of this Cyprus Standard and shall give a certificate to this effect to the purchaser or his representative. Additionally the supplier is obliged to mark each stockpile with a sign on which the quality of the material in respect of the Standard will be clearly written.

If the purchaser or his representative requires an independent test or the certification of individual consignments, the samples shall be taken before or immediately after delivery at the option of the purchaser or his representative, and these tests shall be carried out in accordance with the appropriate requirements of this Cyprus Standard or the written instructions of the purchaser or his representative. Unless otherwise specified with the inquiry and order, the supplier shall supply free of charge the material required for testing and the cost of the tests shall be borne:

- (a) By the supplier in the event of results showing that the material does not comply with the standard.
- (b) By the purchaser, in the event of results showing that the material does so comply.

7. Additional Information to be furnished by the supplier. When requested by the purchaser or his representative the supplier shall provide any of the additional particulars as described in clause 6 of CYS 64.

NOTE. For the purposes of this Standard and for all cases where a Cyprus Standard is currently under preparation, reference may be made to the relevant Standards as follows:

Test sieves - BS 410
 Methods for Sampling - BS 812
 Flaky and elongated pieces - BS 812
 Soundness test - ASTM-C39
 Impact test - BS 812
 Crushing test - BS 812
 Los Angeles test - ASTM-C131, ASTM-C535
 Water absorption - BS 812
 Stripping test - PSA - 434440, Jan. 1979
 Deleterious Substances - BS 812, ASTM C-117
 Clay lumps or friable particles - ASTM-C142
 Sulphates and sulphides - NF P 13-582
 Plastic Properties - BS 1377
 Sand Equivalent - ASTM - D2419

The Aggregates Standards Committee, CYS/TC 17, under whose direction this Cyprus Standard was prepared consists of representatives from the following Government Departments, Scientific, industrial and trade organizations:-

Cyprus Association of Civil Engineers and Architects.

Cyprus Association of Building Contractors.

Cyprus Association of Professional Engineers.

Association of Crushed Aggregates Manufacturers.

Mines Service.

Department of Town Planning and Housing.

Public Works Department.

Geological Survey Department.

Water Development Department.

Standard for**Definitions, classification and marking
of Admixtures for concretes,
cement - mortars and grouts**

1. General

1.1 Scope-field of application. The purpose of this standard is to specify the definitions, provide a classification and describe the marking of admixtures for concretes, cement-mortars and grouts based on hydraulic binders.

It applies to those products complying with definition 1.2 below, intended for preparation of concretes, cement-mortars, and grouts (other than soil injection grouts).

1.2 Definition of an admixture. Admixture is a material other than water, aggregates and portland cement (including blended cement) that is used as an ingredient of concrete and/or cement-mortar and/or grout and is added to the batch in controlled amounts immediately before or during its mixture to produce some desired modification to the properties of the concrete and/or cement-mortar and/or grout.

Comments:

- a) The admixture will modify one or more properties of hydraulic cement concrete and/or cement-mortar and/or grout and the particular standard for the admixture shall fix the limits.
- b) The use of an admixture for reinforced or prestressed concrete, shall not alter the characteristics of any reinforcement may be in contact with.
- c) Except in specific cases, the term "small quantity" means an amount which does not exceed 5% by weight of the cement.

1.3 Instructions for use. The procedure for incorporating the admixture is described in each particular standard.

1.4 Function of admixtures

1.4.1 Main function. Each admixture is defined by one or two main functions only; these describe the major changes which the admixture has on the properties of the concrete and/or cement-mortar and/or grout, in the fresh or hardened condition.

The effectiveness of the main functions for each additive, may vary, depending on the quantity of additive used and the materials used.

1.4.2 Secondary functions. An admixture may also have one or more secondary functions, also applicable to the concrete and/or cement-mortar and/or grout.

The effectiveness of secondary functions is, generally, independent of that for the main functions.

1.4.3 Secondary effects. The use of an admixture may have results, called "secondary effects" and which, although not required as secondary functions, will still occur.

2. Classification of admixtures

The classification of admixtures is based on their main function/functions. However, this may take into account, for certain types of products, the secondary functions or effects normally associated with the main function / functions.

2.1 Accelerating admixture. A material that increases the initial rate of reaction between cement and water and thereby accelerates the setting and early strength development of concrete and/or cement - mortar and/or grout.

2.2 Retarding admixture. A material that decreases the initial rate of reaction between cement and water and thereby retards the setting of concrete and/or cement mortar and/or grout.

2.3 Normal water-reducing admixture. A material that increases the fluidity of the cement paste without significantly affecting the air content and thereby increases the workability of concrete and/or cement-mortar and/or grout at constant water/cement ratio, or permits concrete and/or cement-mortar and/or grout to be made with a decreased amount of water, while maintaining equal workability with a consequent increase in strength.

2.4 Accelerating water-reducing admixture. A material that combines the functions of an accelerating admixture (2.1) and normal water-reducing admixture (2.3).

2.5 Retarding water-reducing admixture. A material that combines the functions of a retarding admixture (2.2) and a normal water-reducing admixture (2.3).

2.6 Superplasticizer, (Water-reducing admixture, highrange). A material that reduces the quantity of mixing water required to produce concrete of a given consistency by 12% or greater, when tested by VEBE method (CYS 155).

2.7 Superplasticizer and retarding admixture. A material that combines the functions of a superplasticizer (2.6) and a retarding admixture (2.2).

2.8 Air entraining agent. A material whose main function is to form fine micro-bubbles of air in the concrete, cement - mortar or grout, these being uniformly distributed throughout its mass.

NOTE: The main effect of air bubbles, uniformly distributed throughout the mass of the material, is to improve the resistance of concrete, cement-mortar or grout, under freezing and thawing conditions.

2.9 Waterproofing agent. A material whose main function is to reduce the capillary absorption of hardened concrete, mortar or grout and also the movement of water through a hardened concrete, cement-mortar, or grout which is saturated and subjected to a hydraulic gradient.

3. Marking

The marking used for an admixture, irrespective of its packing (sachet with a predetermined quantity, bag, drum, tanker vehicle) shall comply with the following specifications.

3.1 Standard information

3.1.1 Location. A well fixed or printed label (see 3.1.3) shall be provided for each package containing the admixture. If these admixtures are delivered in bulk, this label shall accompany the waybill.

The minimum dimensions of the label, for receiving this standard information, are minimum 105 mm X 148 mm (A6 format).

3.1.2 Standard information. It is mandatory for the following standard information to be shown:

- the commercial description of the admixture
- the name and address of the manufacturer or distributor
- the main function and, if necessary, the secondary functions and/or the secondary effects
- if applicable, the mark of conformity to the standard
- the quantity required: limits without undesirable effects
- the chloride content, if it exists
- the form (liquid, paste, powder)
- the weight per unit volume
- the colour
- the instructions for use
- the storage precautions
- the precautions and restrictions on use (in particular, relating to the standards for cements, where the admixture may not satisfy the standard)
- handling precautions
- expiring date
- manufacturing code

3.1.3 Label. The information must be written, in a legible and permanent manner, within a frame which completely fills the space specified in Clause 3.1.1.

Example of label

Commercial description of product		
Manufacturer and/or distributor		
Main function	Standard (if any)	
Secondary function	Mark of conformity to the standard (if applicable)	
Secondary effect		
Quantity required: limits without undesirable effects	Chloride content	
Form	Weight per unit volume	Colour
Instructions for use		
Storage precautions		
Precautions and restrictions in use		
Handling precautions		
Expiring date	Manufacturing code	

3.2 Optional information. The manufacturer has, in addition, the option of supplementing the standard information with any other information which he may consider necessary for correct use of the product.

This additional information shall not cause any confusion with the standard information.

The Concrete Admixtures Standards Committee, CYS/TC40, under whose direction this Cyprus Standard was prepared, consists of representatives of the following Government Departments, Scientific, Industrial and Trade Organizations.

Public Works Department
 Water Development Department
 State General Laboratory
 Cyprus Association of Civil Engineers and Architects
 Cyprus Association of Professional Engineers
 Cyprus Building Contractors Association
 Cyprus Chamber of Commerce and Industry
 Cyprus Industrialist and Employes Federation

Dated this 7th day of December, 1989.

By the Administrator's Command,
 A.J.H ADAMS,
 Chief Officer,
 Sovereign Base Areas.

(105/14)