

## Particular Specification for designed mix concrete with 20% recycled coarse aggregates

This Particular Specification is only applicable to designed mix concrete of 25 to 35 MPa grade strength.

Concrete with 20 % recycled coarse aggregates is for general application except in water retaining structures or otherwise precluded in the contract.

Only ordinary Portland Cement to BS 12 shall be used.

Coarse aggregates shall consist of 80% natural rock aggregates as defined in the General Specification (GS) and 20% recycled coarse aggregates.

Recycled coarse aggregates shall be produced by crushing old concrete and shall meet the requirements in Table 1.

Tests on recycled aggregates from a particular source, with the exception of Government source, shall be carried out by the aggregates producer at weekly intervals in compliance with Table 1.

Fine aggregates shall be as defined in the GS.

Fine aggregates recycled from old concrete shall not be used.

The grading of the coarse aggregates shall comply with the limits as defined in the GS for single-sized 20 mm and 10 mm aggregates.

Recycled coarse aggregates shall be thoroughly wetted before being used.

The concrete shall have a minimum slump of 75 mm when it is ready to be compacted to its final position.

Before any concrete is produced for use in the works, trial mixes must be performed in accordance with the GS.

Compliance criteria in cube strength shall be as defined in the GS.

Recycled aggregates shall be stored in separate stockpiles or silos to prevent inadvertent mixing with natural aggregates.

A separate compartment must be provided for recycled aggregates in the batching plant.

Natural aggregates shall be used in lieu of the recycled aggregates in case of supply shortage of recycled aggregates.

**Table 1**

<b><u>Mandatory Requirements</u></b>	<b><u>Limits</u></b>	<b><u>Testing Method</u></b>
Minimum dry particle density (kg/m <sup>3</sup> )	2000	BS 812: Part 2
Maximum water absorption	10%	BS 812: Part 2
Maximum content of wood and other materials less dense than water	0.5%	Manual sorting in accordance with: BRE Digest 433
Maximum content of other foreign materials (e.g. metals, plastics, clay lumps, asphalt and tar, glass etc)	1%	
Maximum content of fines	4%	BS 812: Section 103.1
Maximum content of sand (<4mm) (% m/m)	5%	BS 812: Section 103.1
Maximum content of sulphate (% m/m)	1%	BS 812: Part 118
Flakiness index	40 %	BS 812: Section 105.1
10% fines test	100 KN	BS 812: Part 111
Grading	Table 3 of BS 882:1992	
Maximum chloride content	Table 7 of BS 882 – 0.05% by mass of acid soluble chloride ion of combined aggregates	

## Particular Specification for prescribed mix concrete with 100% recycled coarse aggregates

This Particular Specification is only applicable to concrete of 20 MPa grade strength.

Concrete with 100 % recycled coarse aggregates shall only be used in benches, stools, planter walls, concrete mass walls and other minor concrete structures where specifically permitted in the contract.

Concrete shall comply with Section 8 of the General Specification (GS) and the additional requirements given below. In case of discrepancies, the requirements in this Particular Specification shall take precedence.

Recycled coarse aggregates shall be produced by crushing old concrete and shall meet the requirements in Table 1.

Fine aggregates shall be as defined in the GS.

Fine aggregates recycled from old concrete shall not be used.

The grading of the coarse aggregates shall comply with the limits as defined in the GS for single-sized 20 mm and 10 mm aggregates.

Concrete shall be mixed in the following proportions :

Ordinary Portland Cement	:	100 Kg
Fine Aggregate	:	180 Kg
20 mm Coarse Aggregate	:	180 Kg
10 mm Coarse Aggregate	:	90 Kg

Recycled coarse aggregates shall be thoroughly wetted before being used.

The concrete shall have a minimum slump of 75 mm when it is ready to be compacted to its final position.

4 concrete cubes shall be made on each concreting day, 2 for crushing tests at 7 days and the other 2 for crushing tests at 28 days. The minimum concrete cube strength shall be 14 MPa and 20 MPa at 7 and 28 days respectively.

Before any concrete is produced for use in the works, trial mixes must be performed in accordance with the GS. The 28 day strength of each of the 3 cubes in the trial shall not be less than 26 MPa.

Natural aggregates shall be used in lieu of the recycled aggregates in case of supply shortage of recycled aggregates.

**Table 1**

<b><u>Mandatory Requirements</u></b>	<b><u>Limits</u></b>	<b><u>Testing Method</u></b>
Minimum dry particle density (kg/m <sup>3</sup> )	2000	BS 812: Part 2
Maximum water absorption	10%	BS 812: Part 2
Maximum content of wood and other materials less dense than water	0.5%	Manual sorting in accordance with: BRE Digest 433
Maximum content of other foreign materials (e.g. metals, plastics, clay lumps, asphalt and tar, glass etc)	1%	
Maximum content of fines	4%	BS 812: Section 103.1
Maximum content of sand (<4mm) (% m/m)	5%	BS 812: Section 103.1
Maximum content of sulphate (% m/m)	1%	BS 812: Part 118
Flakiness index	40 %	BS 812: Section 105.1
10% fines test	100 KN	BS 812: Part 111
Grading	Table 3 of BS 882:1992	
Maximum chloride content	Table 7 of BS 882 – 0.05% by mass of acid soluble chloride ion of combined aggregates	