

# trial concrete mixes proportions & quantities for ordering

This table was drawn up when only 50 kg bags of cement were available in SA. Mass/bag and Volume/bag quantities are given for 50 kg bags of cement.

If bags containing a different mass of cement are used then the "per bag" quantities should be adjusted proportionately.

Concrete strength at 28 days, MPa	Mass or volume	9,5 or 13,2 mm stone			19,0 or 26,5 mm stone		
		Cement	Sand	Stone	Cement	Sand	Stone
10	Mass/50 kg bag	50 kg	238 kg	128 kg	50 kg	230 kg	196 kg
	Volume/50 kg bag	50 kg	0,175 m <sup>3</sup>	0,095 m <sup>3</sup>	50 kg	0,170 m <sup>3</sup>	0,145 m <sup>3</sup>
	Mass/m <sup>3</sup>	250 kg	1 190 kg	640 kg	225 kg	1 030 kg	890 kg
	Volume/m <sup>3</sup>	5,0 bag	0,88 m <sup>3</sup>	0,47 m <sup>3</sup>	4,5 bag	0,76 m <sup>3</sup>	0,66 m <sup>3</sup>
15	Mass/50 kg bag	50 kg	175 kg	106 kg	50 kg	170 kg	164 kg
	Volume/50 kg bag	50 kg	0,130 m <sup>3</sup>	0,080 m <sup>3</sup>	50 kg	0,125 m <sup>3</sup>	0,120 m <sup>3</sup>
	Mass/m <sup>3</sup>	315 kg	1 100 kg	670 kg	280 kg	950 kg	920 kg
	Volume/m <sup>3</sup>	6,3 bag	0,82 m <sup>3</sup>	0,50 m <sup>3</sup>	5,6 bag	0,70 m <sup>3</sup>	0,68 m <sup>3</sup>
20	Mass/50 kg bag	50 kg	138 kg	92 kg	50 kg	130 kg	138 kg
	Volume/50 kg bag	50 kg	0,100 m <sup>3</sup>	0,070 m <sup>3</sup>	50 kg	0,095 m <sup>3</sup>	0,100 m <sup>3</sup>
	Mass/m <sup>3</sup>	375 kg	1 030 kg	690 kg	340 kg	880 kg	940 kg
	Volume/m <sup>3</sup>	7,5 bag	0,76 m <sup>3</sup>	0,51 m <sup>3</sup>	6,8 bag	0,65 m <sup>3</sup>	0,70 m <sup>3</sup>
25	Mass/50 kg bag	50 kg	114 kg	84 kg	50 kg	106 kg	125 kg
	Volume/50 kg bag	50 kg	0,085 m <sup>3</sup>	0,060 m <sup>3</sup>	50 kg	0,080 m <sup>3</sup>	0,090 m <sup>3</sup>
	Mass/m <sup>3</sup>	425 kg	970 kg	710 kg	385 kg	820 kg	960 kg
	Volume/m <sup>3</sup>	8,5 bag	0,72 m <sup>3</sup>	0,53 m <sup>3</sup>	7,7 bag	0,61 m <sup>3</sup>	0,71 m <sup>3</sup>
30	Mass/50 kg bag	50 kg	95 kg	78 kg	50 kg	90 kg	114 kg
	Volume/50 kg bag	50 kg	0,070 m <sup>3</sup>	0,055 m <sup>3</sup>	50 kg	0,065 m <sup>3</sup>	0,085 m <sup>3</sup>
	Mass/m <sup>3</sup>	475 kg	910 kg	730 kg	430 kg	770 kg	980 kg
	Volume/m <sup>3</sup>	9,5 bag	0,67 m <sup>3</sup>	0,54 m <sup>3</sup>	8,6 bag	0,57 m <sup>3</sup>	0,73 m <sup>3</sup>
35	Mass/50 kg bag	50 kg	80 kg	72 kg	50 kg	75 kg	105 kg
	Volume/50 kg bag	50 kg	0,060 m <sup>3</sup>	0,055 m <sup>3</sup>	50 kg	0,055 m <sup>3</sup>	0,080 m <sup>3</sup>
	Mass/m <sup>3</sup>	525 kg	850 kg	750 kg	475 kg	710 kg	1 000 kg
	Volume/m <sup>3</sup>	10,5 bag	0,63 m <sup>3</sup>	0,56 m <sup>3</sup>	9,5 bag	0,53 m <sup>3</sup>	0,74 m <sup>3</sup>
40	Mass/50 kg bag	50 kg	68 kg	68 kg	50 kg	64 kg	98 kg
	Volume/50 kg bag	50 kg	0,050 m <sup>3</sup>	0,050 m <sup>3</sup>	50 kg	0,045 m <sup>3</sup>	0,075 m <sup>3</sup>
	Mass/m <sup>3</sup>	575 kg	780 kg	770 kg	520 kg	650 kg	1 020 kg
	Volume/m <sup>3</sup>	11,5 bag	0,58 m <sup>3</sup>	0,57 m <sup>3</sup>	10,4 bag	0,49 m <sup>3</sup>	0,76 m <sup>3</sup>

## notes

- Recommended concrete strengths for various uses are shown in the table below.

Concrete strength at 28 days, MPa	Use
10	Mass filling
15	Foundations for houses
20	Floors on the ground (surface beds) for houses
25	Reinforced concrete Home driveways
30	Reinforced concrete Floors on the ground for heavy duty – e.g. factories Farm roads
35	Floors on the ground for heavy duty – e.g. factories Precast concrete
40	Precast concrete

- Mix proportions in the table overleaf are based on the assumption that a CEM II/A 32,5 cement will be used. CEM I 42,5 or higher cements will give a stronger concrete but may be less economical. Cements with higher extender contents (e.g. CEM II/B or CEM III) may develop strength more slowly and will require particular care with curing. Masonry cements complying with SABS ENV 413-1 are **not recommended** for use in concrete.
- The amount of water required is not given in the table. The mix should contain enough water to achieve the required consistence. Consistence may be assessed by eye or measured by carrying out the slump test (SABS Method 5862-1:2006). Recommended slumps are:
  - 50–100 mm for compaction by mechanical vibration
  - 100–150 mm for compaction by hand
- $0,001 \text{ m}^3 = 1 \text{ litre}$

The capacity of a builder's wheelbarrow is 65 litres.

- A mix made according to this table, and to the required consistence, should be assessed for stone content before being used on a large scale. This can be done by compacting some of the concrete in a container, e.g. a bucket, by the means (vibration or hand tamping) to be used on the job.

If stones protrude from the surface, stone content is too high.

If not, scratch the surface of the compacted concrete (before it hardens) with a nail or screwdriver. If the stone content is right, stones should be found two or three millimetres below the surface. If they are deeper than this, the stone content is too low.

If stone content is too high, reduce it by 10 % and increase sand content by the same amount, i.e. volume or mass. Then reassess.

If stone content is too low, increase it by 10 % and reduce sand content by the same amount, i.e. volume or mass. Then reassess.

- The mix proportions given in the table overleaf are conservative. If the quantity of concrete to be made exceeds about  $100 \text{ m}^3$ , it is probably possible to save costs by selecting materials and having a mix designed. For information on the choice of materials consult the C&CI.
- The quantities given overleaf do not include any allowance for wastage.

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published by the cement & concrete institute, midrand, 2010  
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