



Technical Manual – Section 3 Mix Designs for Lytag Concrete July 2017

Introduction	2
LYTAG MIX DESIGNS INTRODUCTION	2
Skip Mix (Lytag Granular / Natural Sand)	3
Pump Mix (Lytag Granular / Natural Sand)	4
TABLE 2.3 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE	4
Skip Mix (Lytag Granular / PFA / Natural Sand)	5
Pump Mix (Lytag Granular / PFA / Natural Sand)	6
TABLE 2.7 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE	6
Skip Mix (Lytag Granular / GGBS / Natural Sand)	7
Pump Mix (Lytag Granular / GGBS / Natural Sand)	8
TABLE 2.12 TYPICAL CONCRETE DENSITIES	8
Skip Mix (Lytag Granular / Lytag Fines)	9
Pump Mix (Lytag Granular / Lytag Fines)	10



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Lytag mix designs introduction

These mixes are typically used where low density concrete is required. Weight savings of 25% over normal weight concrete can readily be achieved. This can lead to considerable cost savings, as concrete section sizes, foundations, and other structural members can be reduced in size or number.

For a given crane size, larger skips can be used, as a greater volume of Lytag concrete can be lifted compared to a given weight of normal density concrete. This leads to significant time savings.

The information given in the following tables are for guidance only, and it is recommended that trial mixes should be undertaken, and under no circumstances should it be assumed that the mix designs are prescriptive. It is recommended that laboratory trial mixes should be undertaken prior to contract supply starting.

The compressive strength classes detailed in the tables are only a selection of mixes and other strength classes can be specified. It is accepted that the cylinder strength (shown first) should be 90% of the cube strength. Cement contents for strength mixes between those shown can be interpolated from those shown. e.g. for a cube strength of 30N/mm² the cylinder strength would be 27N/mm². Therefore the designation would be LC27/30 with a cement content of 350kg/m³.

Incorporating cement replacements like pfa and GGBS as part of the cementitious component further enhances the properties of Lytag concrete. Using replacements can further help to reduce the risk of thermal cracking due to high temperature differentials and impart benefits to further improve the durability of the concrete.

Concrete containing Lytag granular and Lytag fines is used generally where there is the requirement for a very low concrete density such as in long span structures with a high ratio of dead to live loading. Lytag granular and Lytag fines pre-cast concrete will show considerable cost savings over normal weight concrete with regard to section sizes, transportation and handling.



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Skip Mix (Lytag Granular / Natural Sand)

TABLE 2.1. TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	Suitable Sand to BS EN 12620 (kg)	Lytag to BS EN 13055 4/14mm (Oven dry) (m3)	Recommended Consistence (Slump mm)
LC20/22	280	670	0.88	70
LC25/28	320	638	0.88	70
LC30/33	370	592	0.88	70
LC35/38	420	546	0.88	70
LC40/44	480	485	0.88	70
LC45/50	600	345	0.88	70

TABLE 2.2. TYPICAL CONCRETE DENSITIES

Strength Class	Fresh Wet (kg/m3)	Oven Dry (kg/m3) / Density Class
LC20/22 – LC45/50	1910 - 2000	1600 – 1800 D1.8

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Pump Mix (Lytag Granular / Natural Sand)

Lytag concrete can be pumped, both horizontally and vertically, over significant distances. Lytag 4/14 is a lightweight aggregate suitable for pumping and complies with BS EN 13055 – 1:2002.

A suitable admixture should be incorporated in the mix design to produce a workable yet cohesive concrete.

For further information contact Lytag or the admixture suppliers.

TABLE 2.3 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	Suitable Sand to BS EN 12620 (kg)	Lytag to BS EN 13055 4/14mm (Oven dry) (m3)	Recommended Consistence (Flow class)
LC20/22	315	800	0.65	F4 – F5 (520-590mm)
LC25/28	355	770	0.65	
LC30/33	410	730	0.65	
LC35/38	465	690	0.65	
LC40/44	535	620	0.65	

TABLE 2.4 TYPICAL CONCRETE DENSITIES

Strength Class	Fresh Wet (kg/m3)	Oven Dry (kg/m3) / Density Class
LC20/22 – LC40/44	1950-2010	1600 – 1800 D1.8

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Skip Mix (Lytag Granular / PFA / Natural Sand)

TABLE 2.5 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	PFA to EN 450 (kg)	Suitable Sand to BS EN 12620 (kg)	Lytag to BS EN 13055 4/14mm (Oven dry) (m3)	Recommended Consistence (Slump mm)
LC20/22	210	90	640	0.88	70
LC25/28	240	100	600	0.88	70
LC30/33	275	115	510	0.88	70
LC35/38	315	135	440	0.88	70
LC40/44	360	150	370	0.88	70
LC45/50	440	190	290	0.88	70

TABLE 2.6 TYPICAL CONCRETE DENSITIES

Strength Class	Fresh Wet (kg/m3)	Oven Dry (kg/m3) / Density Class
LC20/22 – LC45/50	1920-2000	1600 – 1800 D1.8

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Pump Mix (Lytag Granular / PFA / Natural Sand)

A suitable admixture should be incorporated in the mix to produce a workable and cohesive concrete.

TABLE 2.7 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	PFA to EN 450 (kg)	Suitable Sand to BS EN 12620 (kg)	Lytag to BS EN 13055 4/14mm (Oven dry) (m3)	Recommended Consistence (Slump mm)
LC20/22	235	100	820	0.65	F4 – F5 (520 –590mm)
LC25/28	265	110	790	0.65	
LC30/33	300	130	750	0.65	
LC35/38	350	145	680	0.65	
LC40/44	395	170	590	0.65	
LC45/50	440	190	290	0.88	

TABLE 2.8 TYPICAL CONCRETE DENSITIES

Strength Class (N/mm ²)	Fresh Wet (kg/m ³)	Oven Dry (kg/m ³) / Density Class
LC20/22 – LC40/44	1950-2010	1600 – 1800 D1.8

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Skip Mix (Lytag Granular / GGBS / Natural Sand)

TABLE 2.9 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	PFA to EN 450 (kg)	Suitable Sand to BS EN 12620 (kg)	Lytag BS EN 13055 4/14mm (Oven dry) (m3)	Recommended Consistence (Slump mm)
LC20/22	140	140	670	0.88	70
LC35/38	210	210	546	0.88	70
LC45/50	300	300	345	0.88	70

TABLE 2.10 TYPICAL CONCRETE DENSITIES

Strength Class (N/mm ²)	Fresh Wet (kg/m ³)	Oven Dry (kg/m ³) / Density Class
LC20/22 – LC45/50	1920-2000	1600 – 1800 D1.8

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Pump Mix (Lytag Granular / GGBS / Natural Sand)

A suitable admixture should be incorporated in the mix design to produce a workable and cohesive concrete.

TABLE 2.11 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM1 (kg)	GGBS to BS 6699 (kg)	Suitable Sand to BS EN 12620 (kg)	Lytag to BS EN 13055 4/14mm (Oven dry)(m3)	Recommended Consistence (Slump mm)
LC20/22	160	160	800	0.65	F4 – F5 (520-590mm)
LC30/33	205	205	730	0.65	
LC40/44	270	270	620	0.65	

TABLE 2.12 TYPICAL CONCRETE DENSITIES

Strength Class (N/mm ²)	Fresh Wet (kg/m ³)	Oven Dry (kg/m ³) / Density Class
LC20/22-LC40/44	1940-2030	1600 – 1800 D1.8

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Skip Mix (Lytag Granular / Lytag Fines)

TABLE 2.13 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	Lytag BS EN 13055 4/14mm (Oven dry) (m3)	Lytag BS EN 13055 0/4mm (Oven dry) (m3)	Recommended Consistence (Slump mm)
LC20/22	280	0.75	0.51	70
LC25/28	320	0.75	0.48	70
LC30/33	360	0.75	0.45	70
LC35/38	400	0.75	0.42	70
LC40/44	460	0.75	0.38	70

TABLE 2.14 TYPICAL CONCRETE DENSITY OF LYTAG / LYTAG FINES MIXES

Strength Class (N/mm ²)	Fresh Wet (kg/m ³)	Oven Dry (kg/m ³) / Density Class
LC20/22 – LC40/44	1800-1850	1400 – 1600 D1.6

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Pump Mix (Lytag Granular / Lytag Fines)

Lytag concrete can be pumped, both horizontally and vertically, over significant distances. Lytag 0/4 and 4/14 are lightweight coarse and fine aggregate suitable for pumping and comply with BS EN 13055 – 1:2002.

Suitable admixtures should be incorporated in the mix design to produce a workable yet cohesive concrete. It is recommended that a superplasticiser and a viscosity modifier are used to pump Lytag coarse and fine concrete. Depending on the particular admixture used will govern whether 1 or more admixtures are required.

For further information contact Lytag or the admixture suppliers.

TABLE 2.14 TYPICAL MIX DESIGN PER M3 OF COMPACTED CONCRETE

Compressive Strength Class	Cement to BS EN 197-CEM 1 (kg)	Lytag BS EN 13055 4/14mm (Oven dry) (m3)	Lytag BS EN 13055 0/4mm (Oven dry) (m3)	Recommended Consistence (Slump mm)
LC20/22	400	0.60	0.53	F4 – F5
LC25/28	460	0.60	0.50	F4 – F5
LC30/33	520	0.60	0.46	F4 – F5
LC35/38	600	0.60	0.41	F4 – F5
LC40/44	Contact Lytag			

TABLE 2.14 TYPICAL CONCRETE DENSITY OF LYTAG / LYTAG FINES MIXES

Strength Class (N/mm2)	Fresh Wet (kg/m3)	Oven Dry (kg/m3) / Density Class
LC20/22 – LC40/44	1800-1880	1400 – 1600 D1.6

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