



Technical Manual – Section 1 Introduction to Lytag[®] lightweight aggregate

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Introduction

Lytag Ltd has been supplying Lytag® lightweight aggregate for around 50 years and has sold in excess of 16 million tonnes of material. Manufactured within the European Union in accordance with EN 13055, the standard for lightweight aggregates, Lytag® is widely available within the UK and Europe. Supplies to other parts of the globe can easily be arranged.

Products

The main ingredient used in the manufacture of lightweight aggregate is pulverised fuel ash (fly ash). This is the waste material produced from electricity production in coal-fired power stations. The aggregate is called 'sintered pulverised fuel ash lightweight aggregate', more commonly known as Lytag®.

Lytag® is made by pelletising the fly ash. By adding a controlled amount of water in specially designed dish pelletising pans, rounded pellets are formed. The pellets are then heated on a sinter strand to a temperature of 1100°C. The result is a hard, honeycombed structure of interconnecting voids within the aggregate. The particles formed are rounded in shape and generally range in size from 14mm down to fines; these are processed to the required grading, depending on the final use.

Sustainability

Lytag® products are secondary aggregates, manufactured from a waste stream. This means that the quantity of fly ash being sent to landfill is reduced and virgin aggregate extraction is reduced. By considering the use of Lytag® products at an early stage in the design process has the potential to reduce the quantities of construction material required in a project. This leads to overall cost savings. Due to the reduced weight of Lytag® products, larger volumes can be transported, reducing vehicle movements both on the public highway and site.



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Physical Properties of Lightweight Aggregate

Density - The oven dry loose bulk density of Lytag® lightweight coarse aggregate is typically in the range of 0.75 to 0.85Mg/m³. Oven dry particle densities typically range from 1.40 to 1.50Mg/m³. Normal weight aggregates have typical oven dry loose bulk densities of ranging from 1.50 to 1.80Mg/m³ and oven dry particle densities ranging from 2.60 to 2.85Mg/m³. Therefore, the weight of Lytag® lightweight aggregate is approximately 50% that of normal weight aggregate.

Fire Resistance – Lytag® lightweight aggregate has a Class 1 fire resistance because the aggregate has been produced by a refractory process. In addition, the cellular structure of the aggregate particles relieves any pressures from expanding gases. The result is a material that is highly stable at elevated temperatures.

Freeze Thaw - The high void ratio, typically 40%, gives Lytag® lightweight aggregate excellent freeze thaw properties.

Shape – Lytag® lightweight aggregate generally has a spherical shape resulting from the pelletising technique used. This leads to minimal settlement after placing.

Applications

Lytag® lightweight aggregate is sold under a number of brands depending on the application. Aggregates are selected and graded to provide the optimum performance for each use.

Lytag® lightweight aggregate

Structural Lightweight Concrete – Lytag® lightweight aggregate has been used in lightweight concretes since the early 1960's. The reductions in concrete density have a significant effect on the dead load of the structure. Consequently foundation sizes can be reduced, additional floors can be constructed, thinner section beams and columns can be used, etc. Lytag® lightweight aggregate can be used in precast units with an associated reduction in handling and transportation costs. As well as weight reductions, Lytag® also imparts improved durability benefits to concrete.

See sections 2, 3, 4, 5, 6, 12, 13 and 17 of the Lytag® Technical Manual



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Lytag® lightweight aggregate (cont.)

Floor and roof screeds – Lytag® lightweight aggregate is widely used throughout the UK in floor and roof screeds giving a cost effective way of reducing weight, improving thermal insulation and reducing the quantity of cement required in the construction.

See sections 7, 8 and 14 of the Lytag® Technical Manual.

Structural fill - Lytag® lightweight aggregate is widely used as a structural fill to raise existing surfaces to achieve new falls or to construct ramps, provide a deep screed within which services may be buried, infill between items such as bridge beams to provide a level surface for the structural deck, formation of architectural features, infill for raised access flooring and permeable back fill for retaining walls, bridge abutments.

See section 9 of the Lytag® Technical Manual.

Refractory uses - Lytag® aggregate can be used in temperatures of up to 1050°C, such as in flue linings, ladle insulation and specialist coatings.

See section 12 of the Lytag® Technical Manual.

Geo fill® Civil Engineering Bulk Fill

Bulk Fill – Geo fill® civil engineering bulk fill is used as a bulk fill material. Oven dry densities are typically 0.75 to 0.85Mg/m³, depending on the ambient moisture content. Geo fill® will reduce pressures on both foundations and structures due to being approximately 50% of the weight of 'normal' aggregate, whereby savings in the design can be made. Due to the spherical shape of the aggregate minimal compaction is required during placing.

See section 16 of the Lytag® Technical Manual.

Drainage media – For larger drainage applications Geo fill® should be used. The particle size and shape of Geo fill® give them excellent hydraulic conductivity properties. It can be shown that up to six times more water will pass through Geo fill® than standard gravel aggregates, reducing the risk of silt blockages.

See sections 10 and 16 of the Lytag® Technical Manual.

Pipe bedding – Geo fill® is used as a granular bedding and sidefill for rigid and flexible pipes. BS EN 1610 – Construction and testing of drains and sewers details the design requirements.

See section 16 of the Lytag® Technical manual



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Geo fill® Civil Engineering Bulk Fill (cont.)

Arrestor beds – Geo fill® is used in arrestor beds to bring run-away vehicles to a halt in a controlled manner. Risk of injury and damage to vehicles is minimized. Geo fill® does not compact over time, keeping it effective with the minimum of maintenance.

See section 11 of the Lytag® technical manual.

SUD's – Geo fill® should be considered for use in a number of SUDS systems such as trenches, soakaways, pipe bedding and tank surrounds and some pervious surfaces.

See section 21 of the Lytag® Technical Manual.

Hortag® Horticultural medium

Horticultural applications - Hortag® is used as a growing medium for plants. The moisture retention, up to 15%, of Hortag® provides a controlled water release to the plants. In addition, seedlings are not bound into the growing medium but grow between the aggregate particles. This allows for easier transplanting with minimal root damage.

See sections 10 and 19 of the Lytag® Technical Manual.

Drainage media – For smaller drainage applications Hortag® should be used. The particle size and shape of Hortag® particles give them excellent hydraulic conductivity properties. It can be shown that up to six times more water will pass through Hortag® than standard gravel aggregates, reducing the risk of silt blockages in trench systems. Finely graded lightweight aggregate can be used allowing grass to grow and 'knit' over the trench in a few days.

See section 10 and 19 of the Lytag® Technical manual

Green roofing - Hortag® horticultural medium has been used successfully for many years as a drainage medium for sports pitches, golf courses and back fill applications, by providing a lightweight fill medium that is free draining while retaining a high volume of moisture to slowly release back into the environment once drier conditions prevail. As such, Hortag® horticultural medium should be considered for use as a component in green roofing systems.

See section 22 of the Lytag® Technical manual.



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Aqualyt® Filtration Media

Filter media - Aqualyt® is an excellent medium for biological filtration. The particle shape and surface texture are ideal for bacterial films to anchor and develop. The aggregates are resistant to acids and therefore the filter media has a long life.

See section 15 of the Lytag® Technical manual

Water filtration media – Aqualyt® is suitable for all standard aquariums and garden pond filters. The particle shape and size provides optimal filtration and a good water flow capacity. The outer surface of the Aqualyt® particles are very porous supporting biological activity of bacteria colonisation.

See section 20 of the Lytag® Technical manual

Other uses include tunnel linings, piggery floors, sports surfaces, bagged material etc. Please contact us for more information on these applications.

Additional company information

Lytag Ltd offer a wide range of customer services to provide full assistance to specifiers and users of the Lytag® range of products.

Specifier Services

The Technical Department of Lytag Ltd is readily available for comprehensive technical and specification advice on Lytag® lightweight aggregate products. Our representative will be pleased to attend any meeting with the contractor; consultant and ready-mix supplier before concreting commences on site to discuss the requirements particular to the project.

CPD Technical Seminar

Our Specification Sales Managers are available to carry out CPD presentations at your convenience. The presentation considers lightweight aggregates in concrete, screeds and other construction applications. The seminar can be undertaken in your practice/office. CPD presentations can be requested through the website, www.lytag.net, or contact us direct.



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NBS Specification



Lytag® LWA is included on the NBS Plus specification service. Visit the NBS on www.ribaproductselector.com or contact us for further details, or visit our web site at www.lytag.net.

Lytag Ltd On The Internet – www.lytag.net

The Lytag® LWA web site is fully searchable and includes everything you need to know about Lytag® lightweight aggregates. There are useful downloadable files from our Technical Manual and a simple specification developer to compile specifications for lightweight concrete and screeds. There are project profiles detailing just a few of the prestigious projects and contracts that have used Lytag® products.



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