FEDERAL COURT OF AUSTRALIA

Beadcrete Pty Ltd v Fei Yu trading as Jewels 4 Pools (No 3) [2013] FCA 187

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| Citation: | | Beadcrete Pty Ltd v Fei Yu trading as Jewels 4 Pools (No 3) [2013] FCA 187 |
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| Parties: | | **BEADCRETE PTY LTD (ACN 071 743 961), DESIGNER CONCRETE COATINGS PTY LTD (ACN 102 760 234), BUYRITE STEEL SUPPLIES PTY LTD (ACN 053 173 041) and DESIGNERITE PTY LTD (ACN 146 670 706) v FEI YU TRADING AS JEWELS 4 POOLS, JEFFREY STUART MCALISTER, PEBBLE MASTERS PTY LTD (ACN 087 540 734), TWIN COAST POOLS PTY LTD (ACN 104 149 484), MELKEN DEVELOPMENTS PTY LTD TRADING AS BAYSIDE POOLS & PAVING (ACN 052 945 169) and GRIN DISTRIBUTIONS PTY LTD (ACN 133 541 563)** |
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| File number(s): | | NSD 111 of 2011 |
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| Judge: | | **JAGOT J** |
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| Date of judgment: | | 8 March 2013 |
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| Catchwords: | | **PATENTS** – validity – priority date – clarity – inventive step – manner of manufacture – infringement – supply of glass beads in size ranges referable to patent claims |
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| Legislation: | | *Patents Act 1990* (Cth)  Patents Regulations 1991 (Cth) |
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| Cases cited: | | *Apotex Pty Ltd v Sanofi-Aventis* (2008) 78 IPR 485; [2008] FCA 1194  *Australian Securities and Investments Commission v Hellicar* (2012) 286 ALR 501; [2012] HCA 17  *Blatch v Archer* (1774) 1 Cowp 63  *British American Tobacco (Investments) Ltd v Philip Morris Ltd* (1999) 47 IPR 351; [1999] FCA 1203  *Clorox Australia Pty Ltd v International Consolidated Business Pty Ltd* (2006) 68 IPR 254; [2006] FCA 261  *Commonwealth Industrial Gases Ltd v MWA Holdings Pty Ltd* (1970) 180 CLR 160  *Elconnex Pty Limited v Gerard Industries Pty Limited* (1991) 32 FCR 491  *Flexible Steel Lacing Co v Beltreco Ltd* (2000) 49 IPR 331; [2000] FCA 890  *Fresenius Medical Care Australia Pty Ltd v Gambro Pty Ltd* (2005) 224 ALR 168; [2005] FCAFC 220  *Gambro Pty Ltd v Fresenius Medical Care South East Asia Pty Ltd* (2004) 61 IPR 442; [2004] FCA 323  *General Tire & Rubber Co v Firestone Tyre & Rubber Co Ltd* (1971) 1A IPR 121  *H Lundbeck A/S v Alphapharm Pty Ltd* (2009) 177 FCR 151; [2009] FCAFC 70  *Hill v Evans* (1862) 31 LJ Ch 457  *Hill Pty Ltd v Great Western Corp Pty Ltd* (2002) 55 IPR 257; [2002] FCAFC 183  *ICI Chemicals v Lubrizol Corporation* (2000) 106 FCR 214; [2000] FCA 1349  *Insta Image Pty Ltd v KD Kanopy Australasia Pty Ltd* (2008) 78 IPR 20; [2008] FCAFC 139  *Jones v Dunkel* (1959) 101 CLR 298  *Jupiters Limited v Neurizon Pty Limited* (2005) 65 IPR 86; [2005] FCAFC 90  *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd* (2007) 235 CLR 173; [2007] HCA 21  *Minnesota Mining & Manufacturing Co v Beiersdorf (Australia) Ltd* (1980) 144 CLR 25  *Martin Engineering Co v Trison Holdings Pty Ltd* (1989) 14 IPR 330  *Nesbit Evans Group Australia Pty Ltd v Impro Ltd* (1997) 39 IPR 56  *Nicaro Holdings Pty Ltd v Martin Engineering Co* (1990 91 ALR 513  *Old Digger v Azuko Pty Ltd* (2000) 51 IPR 43; [2000] FCA 676  *Olin Corporation v Super Cartridge Co. Pty Ltd* (1977) 180 CLR 236 at 246  *Quantel Ltd v Spaceward Microsystems Ltd* [1990] RPC 83  *Radiation Limited v Galliers and Klaerr Pty Ltd* (1938) 60 CLR 36  *Ramset Fasteners (Aust) Pty Ltd v Advanced Building Systems Pty Ltd* (1999) 164 ALR 239; [1999] FCA 898]  *Re ICI Chemicals & Polymers Ltd and Lubrizol Corp Inc* (1999) 45 IPR 577; [1999] FCA 345  *Rodi & Wienenberger AG v Henry Showell Ltd* [1969] RPC 367  *Root Quality Pty Ltd v Root Control Technologies Pty Ltd* (2000) 177 ALR 231; [2000] FCA 980  *Stanway Oyster Cylinders Pty Ltd v Marks* (1996) 66 FCR 577  *Tye-Sil Corporation Ltd v Diversified Products Corp* (1991) 20 IPR 574  *Windsurfing International Inc v Petit* [1984] 2 NSWLR 196  Oxford English Dictionary Online |
| Date of hearing: | 2 - 10 October 2012 | |
|  |  | |
| Place: | Sydney | |
|  |  | |
| Division: | GENERAL DIVISION | |
|  |  | |
| Category: | Catchwords | |
|  |  | |
| Number of paragraphs: | 147 | |
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| Counsel for the Applicants: | Mr A J Bannon SC with Ms P Arcus | |
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| Solicitor for the Applicants: | Creagh & Creagh | |
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| Counsel for the Respondents: | Ms S J Goddard SC with Mr H P T Bevan | |
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| Solicitor for the Respondents: | Conditsis Lawyers | |

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| IN THE FEDERAL COURT OF AUSTRALIA |  |
| NEW SOUTH WALES DISTRICT REGISTRY |  |
| GENERAL DIVISION | NSD 111 of 2011 |

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| BETWEEN: | BEADCRETE PTY LTD (ACN 071 743 961)  First Applicant  DESIGNER CONCRETE COATINGS PTY LTD (ACN 102 760 234)  Second Applicant  BUYRITE STEEL SUPPLIES PTY LTD (ACN 053 173 041)  Third Applicant  DESIGNERITE PTY LTD (ACN 146 670 706)  Fourth Applicant |
| AND: | FEI YU TRADING AS JEWELS 4 POOLS  First Respondent  JEFFREY STUART MCALISTER  Second Respondent  PEBBLE MASTERS PTY LTD (ACN 087 540 734)  Third Respondent  TWIN COAST POOLS PTY LTD (ACN 104 149 484)  Fourth Respondent  MELKEN DEVELOPMENTS PTY LTD TRADING AS BAYSIDE POOLS & PAVING (ACN 052 945 169)  Fifth Respondent  GRIN DISTRIBUTIONS PTY LTD (ACN 133 541 563)  Sixth Respondent |

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| JUDGE: | JAGOT J |
| DATE OF ORDER: | 8 March 2013 |
| WHERE MADE: | SYDNEY |

THE COURT ORDERS THAT:

1. The parties are to confer and notify the court within 7 days of mutually convenient dates for further hearing on the form of the orders to be made and costs and are also to file within 7 days an agreed timetable for the filing and service of outlines of submissions and proposed orders.

Note: Entry of orders is dealt with in Rule 39.32 of the Federal Court Rules 2011.

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| AND: | FEI YU TRADING AS JEWELS 4 POOLS  First Respondent  JEFFREY STUART MCALISTER  Second Respondent  PEBBLE MASTERS PTY LTD (ACN 087 540 734)  Third Respondent  TWIN COAST POOLS PTY LTD (ACN 104 149 484)  Fourth Respondent  MELKEN DEVELOPMENTS PTY LTD TRADING AS BAYSIDE POOLS & PAVING (ACN 052 945 169)  Fifth Respondent  GRIN DISTRIBUTIONS PTY LTD (ACN 133 541 563)  Sixth Respondent |

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| JUDGE: | JAGOT J |
| DATE: | 8 March 2013 |
| PLACE: | SYDNEY |

**REASONS FOR JUDGMENT**

##### 1. THE PROCEEDING

1 This proceeding concerns a claim for infringement of Australian Patent No 733668 (the **patent**). The first applicant, Beadcrete Pty Ltd, is the patentee of the patent, the second applicant is the manufacturer of a product known as “Beadcrete” under exclusive licence from the first applicant, and the third and fourth applicants are the distributors of that product. The respondents supply a product known as “Jewels 4 Pools” the use of which is alleged to infringe the patent. The respondents deny infringement and contend also that the claims of the patent said to be infringed are invalid on various grounds.

##### 2. THE PATENT

###### 2.1 Background

2 The patent is a divisional of Patent No 18009/95 filed on 16 February 1995 (the **parent application**) and, pursuant to the provisions of the *Patents Act 1990* (Cth) (the **Act**) and *Patents Regulations 1991* (Cth) (the **Regulations**), claims priority from the filing of Provisional Patent Application No PM 3887 filed on 16 February 1994 (the **provisional application**).

3 The priority date of the patent is relevant only to resolution of a question of invalidity by reason of prior use. The respondents contend that the parent application and the provisional application are irrelevant to the priority date as neither application discloses the invention as claimed in the patent. Accordingly, the priority date of the patent is the date on which the application for the patent was filed, being 22 July 1999. The respondents contend by that date and in fact by no later than 1995, the claimed invention had been exploited by the first applicant and its predecessor in title in a manner which destroyed the novelty of the invention. The applicants contend that the invention is fairly disclosed in the provisional and parent applications but that, in any event, there was no relevant prior use of the invention as claimed before 22 July 1999 so the priority date issue is immaterial.

###### 2.2 The patent specification

4 The specification contains numerous typographical errors. Where the error is clear, I have corrected it in the quotes below for convenience. The field of the invention is said in the specification to relate to:

surface finishes for pathways, walls; swimming pools and other structures and more particularly relates to a surface finish which is of a cementitious nature and which includes least one aggregate type comprising glass beads.

5 In a section entitled “Background of the Invention” the specification states:

In the building industry there has been prolific use of aggregate surfaces for paving footpaths, surfacing of prefabricated building panels and slabs to provide attractive and functional facades and in and around swimming pools and the like. The known aggregate mixes have invariably utilized aggregate materials which include stones, pebbles and the like mixed in a matrix of cementitious material-selected from cement or resin.

The selection of pebbles and stones as the aggregate material usually dictates the appearance of the finish particularly with respect to its color and texture. When resins are used, the aggregate provides the final surface coloration as the cementitious resins are generally clear. An alternative surface coating may be formed by using colored mortar with pebbles and stones.

Despite the use of a wide range of aggregates to produce a variety of surface finishes successfully preparing a cementitious surface matrix using as the aggregate material glass beads either alone or with another aggregate materials selected from precious or semi precious stones, sands, quartz, marble, granites and the like has been difficult to achieve.

It was previously thought to be unsatisfactory to attempt to use other than conventional aggregates in hard-wearing surface finishes as the bonding achieved was inferior compared with conventional aggregates. In the building industry it has been considered unwise to use materials such as glass beads as aggregates as the glass is generally considered to be insufficiently porous or tough enough to establish an effective bond. The bond is also compromised by alkalinity bleeding out from the glass beads.

A number of approaches have been followed in the use of glass beads and cement formulations to provide surfaces having good light reflectivity. U.S. Patent No. 4,218,260 to Metzler discloses reflective concrete bodies in the form of slabs which can be used on road surfaces. The concrete slabs incorporate crystal balls of a uniform particle size within the range of about 0.2-0.6 millimeters. The glass balls in the reflective slabs are configured so that they are arranged in even horizontal rows through the vertical distribution of the slab. After the slabs are formed and the concrete matrix allowed to harden for a suitable period of time, for example, 29-30 days, the surface is etched with a phosphoric acidsolution to expose at least 50% of the top layer of glass balls. As an alternative to the use of glass beads of a uniform size, EP 518,854 discloses a cement formulation incorporating glass beads in which a particular particle size distribution of small and large beads is employed to ensure good reflectivity and compaction of the beads so that they are firmly incorporated into the cement matrix through the use of an adhesive agent. In EP 518,854, two particle size distributions are employed. The larger particle size component is in the range of 1.5-7 millimeters; the smaller particle size component is within the range of 1.2-1.5 millimeters. The components are employed in relative concentrations in which the smaller size component is present in a greater amount than the larger size component, preferably in a proportion of the smaller component to the larger component of about 2: 1.

Yet, another cement formulation employing glass spheres of relatively smaller particle sizes is disclosed in British Patent No. 1,397,737. Here, glass spheres approximately 0.25mm to 1.75mm in diameter, which are coated with a water-repellent material such as a silicone, are employed to form a reflectorized concrete screed laid down at a thickness of at least 1/2-inch and preferably from 1/4-inch to about 2 1/2 inches. The concrete screed can be formed from a blend of white portland cement, calcined flint particles, a titanium oxide pigment, and a binding agent which is designed to assist in preventing the reflective spheres from loosening under wear.

6 Under the heading “Summary of the Invention” the specification continues:

The present invention comprises a surface finish for application to a vertical, horizontal, or sloping surface/s of a structure or object which provides a substrate for said surface finish, the surface finish comprising a matrix formed from a combination of at least a cementitious material, water, and glass beads. The surface finish comprises a blended matrix of cementitious mortar, an aggregate of glass beads used alone or in conjunction with other aggregates selected from precious stones, semiprecious stones, or raw stones, and liquid adhesive which comprise a combination of a siliconiser and polymeriserer for enhancing the bond between the cementitious mortar and glass beads. The finish may be applied to the surface of a structure, such as a building facade as a paving surface, or to other suitable objects formed from a material capable of forming a bond with the finish.

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The cementitious material preferably is washed away such that 30-60% of the surface area of a substantial number of the glass beads on the surface of the matrix is exposed. Preferably, no more than 40% of the bead surface area is exposed at the surface of the matrix.

More specifically, in accordance with the present invention, there is provided a process for the application of a reflective surface finish to a substrate structure. In carrying out the process, there is provided a reflective cementitious composition comprising portland cement, glass beads, and a barrier-forming material selected from the group consisting of a polymerizer and a siliconizer and mixtures thereof. Preferably, the barrier forming material comprises a latex polymer. The portland cement is employed in an amount within the range of 113-213 of the total weight of the formulation. The glass beads have particle sizes within the range of 1-5 millimeters and a weight average particle size within the range of 1.5-4.5 millimeters. The beads are employed in a particle-size distribution defining a major component within a relatively large incremental size range and a minor component within a smaller incremental size range. The weight of the beads within the large incremental size range is greater than the weight within the smaller incremental size range. Preferably, this weight ratio is in the range of 2-3 and more preferably within the range of about 2-2.6. The latex polymer is present in an amount within the range of at least 2 wt% of the glass beads but less than 8 wt% of the total amount of cement and glass beads in the formulation. The cement formulation is hydrated with water in an amount to provide a water/cement ratio within the range of about 1/3-2/3 to provide a cementitious paste which is then applied to the surface of the substrate structure. Normally, the water content is near the upper end of this range to provide a water content of 65 wt.% of the cement. The paste preferably is applied to a thickness within the range of about 14-1/2-inch and, after any trowelling or other surface treatment to provide a smooth surface, is allowed to set for a time to form an initial set. Thereafter, the surface is washed with an aqueous medium to remove a small amount of cementitious material from the surface layer of the beads to form partially-exposed areas of the beads.

7 The “Detailed Description of the Invention” states that:

The present invention involves a cementitious composition comprising a mixture of glass beads in a portland cement composition together with a barrier-forming material which functions once the cementitious composition is hydrated and allowed to set to protect the glass beads from the surrounding matrix environment. While the glass beads employed in the present invention can be similar to those described previously, the present invention proceeds in a fashion directly contrary to the prior art in its distribution of glass beads along a particle size distribution which results in a relatively large bead component and a relatively small bead component which functions to provide a strong surface reflective material which is not only highly reflective but also provides good integrity. Thus, rather than using a more or less uniform particle size of beads, as in the aforementioned patent to Metzler, or a particle size distribution in which relatively small beads are employed as a major component together with somewhat larger beads, in the present invention the larger size beads provide the major bead component. The surface finish of the present invention comprises a matrix of cement, water, an adhesive, and glass beads defining an aggregate material. The adhesive can be introduced into the mix with the water to facilitate bonding between the glass beads and the mortar. As described below, known adhesives may be used such as Xycrylic polymerizer mixed with a siliconiser to provide a mechanical locking, and thus binding between the beads and the mortar. In utilizing the surface finish of the present invention, many variations of aggregate mix can be achieved to provide different aesthetic, bonding, and structural effects. The blend proportions and constituents over and above the essential constituents are primarily determined by the particular application of the surface coating and, more particularly, whether it would be used on a horizontal, vertical, or sloping substrate surface. The nature and quality of the substrate material is also a determinant of the mix.

…

The polymerizer used in the present invention may be of any suitable type which is compatible with the cement, preferably while portland cement as stated above and which functions to act as a seal or barrier between the glass beads and the cement during hydration to enable good mechanical locking of the beads in place after the formulation has finally set. Polymers which are compatible with portland cement and used in special purpose concrete applications are incorporated into products commonly referred to as polymer-modified concrete (PMC) or polymer-portland cement concrete (PPCC). Such polymers can take the form of latex-type polymers which are sometimes used in so-called latex-modified concrete (LMC). Typical of such polymers are styrene butadiene rubber-type polymers, polyvinyl acetate ethylene co-polyrnerp, and polyacrylate homopolymers, including polymers of acrylic acid, methylacrylic acid, niethyl methacrylate, and butylacrylate. A particularly preferred polymerizer for use in the present invention is an acrylic hemopolymer available from Rohm & Haas Company under the designation “DRYCRYL DP-2903”.

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The polymerizer functions, upon addition of water to the mixture, to coat the glass beads and protect them from attack by cement components, such sodium or potassium-based alkalies which can lead to frosting of the glass beads thus retarding their reflectability in the final product and ultimately degrading the beads. The latex polymer provides a barrier material which is interposed between the surfaces of the bead and the encapsulating matrix material. This boundary layer will not harden so long as the adjacent cementitious mixture is hydrated. Thus, the boundary layer begins to harden after the cement achieves an initial set and begins to harden. The matrix material is partially removed from the surface to expose the beads as described below.

…

The siliconizer which can be employed as a optional component in the present invention includes materials which will include silicon-containing materials which are miscible with or emulsifiable in water and which functions to etch the surface area of glass beads exposed to the cement to facilitate bonding within the matrix. Suitable siliconizors include alkali metal, silicates such as potassium, silicate or sodium silicate (water glass) or other water-soluble sodium silicates such as sodium sesquisilicate, sodium orthosilicate, anhydrous metasilicate sodium, and sodium metasilicate pentahydrate. An especially suitable siliconizer for use in the present invention is sodium silicate available from Xypex, Australia, under the designation QUICKSET. This product which is conventionally used as a set accelerant for portland cement functions similarly here, but the accelerating effect of the siliconizer is offset by the polymerizer which provides a counterbalancing set-retarding effect.

The size distribution of the glass beads is important in providing relatively large beads to provide a good reflective surface area in the matrix while providing smaller beads which are interspersed within the larger beads so that they can be effectively interspersed between the relatively large beads. As described in greater detail below, the beads can be characterized as falling within two particle size distributions with the larger particle size being the predominant component. Overall the average particle size of the beads preferably will be within the range of 1.5-4.5 millimeters and more preferably within the range of about 2-3 millimeters. Although a differential particle size distribution is important in carrying out the present invention, the upper limit of the particle size distribution normally should be no more than three times the magnitude of the lower limit. While a few beads may be outside of this range, preferably at least 90% of the glass beads will fall within the designated particle size distribution. The major and minor components of the beads can he characterized in terms of average particle size values, the larger component having a average particle size greater than the midpoint of the upper and lower particle size distribution ranges and the minor component having an average particle size below this midpoint. The weight of the beads in the larger size range, as noted previously, is greater than the weight of the beads in the smaller incremental size range. Again considering the overall particle size distribution of the beads, preferably the upper value is from 2-3 times greater than the lower value and preferably no more than 2 1/2 times greater than the lower value.

The glass beads used in the present invention preferably have a size distribution within relatively narrow confines in which a major component of the beads is within a relatively large size range, termed the “large increment”, and a minor component of the beads in a somewhat smaller size range, termed the “small increment”. A particularly preferred particle size, distribution for the glass beads is one in which the major component of the glass beads is within a size range of about 2.5-3.5 millimeters in diameter and a minor component is within a small increment of 1.5-2.5 millimeters. The glass beads within the large increment size range are the predominant component, and preferably the weight ratio of beads within the large increment size range to those within the minor increment size range will be within the is range of about 2-3 and more preferably within the range of about 2.0 to 2.6. As described in greater detail below, where the formulation is designed for use as a “neat” cement (without the addition of aggregate), the ratio of the large increment portion of the beads to the small increment portion will be near the upper end of the range. Where it is designed for use in which it is to be mixed with an aggregate, such as sand, to form a concrete mixture, it will normally be near the lower end of this range.

…

Other bead distributions which have been found to be useful in carrying out the invention are as follows: 10 wt% at 1.4 mm; 20 wt% at 1.7 mm, and 70 wt% at 2.0 mm; 10 wt% at 2.36 mm, 20 wt% at 2.0-2.8 mm, and 70 wt% at 2.36-3.35 mm; 10 wt% at 2.8 mm, 20 wt% at 2.36-3.35 mm, and 70 wt% at 2.85-4.0 mm; 10 wt.% at 2.36-3.35 mm. 20 wt% at 2.85-4.0 mm, and 70 wt% at 5.0 mm; and 10 wt% at 2-2.8 mm, 20 wt% at 2.36-3.35 mm, and 70 wt% at 2.85-4.0 mm.

…

The average particle size of the glass beads employed in the present invention, ie, the average size taking into account both the small beads and the large beads, is preferably within the range of 2-4 millimeters and more preferably within the range of 2-3 millimeters. The average particle size, as referred to here, is the weight average particle size of the beads based upon the distribution of beads in the mixture. Thus, for example, for the second formulation described above and assuming an even distribution of beads across the major increment of 2.5-3.3 mm and the minor increment across the range of 1.5-2.5 mm the average particle size would be about 2.6 mm.

By providing the preferred particle size distribution in accordance with the present invention, a substantial proportion of the small beads as well as the larger beads are set within the cement matrix at the surface of the applied formulation so that the beads are mechanically locked in place by the encapsulating cement mortar. If substantial quantities of small beads, that is, those below the desired lower limit, are present in the formulation when the surface is washed to remove mortar from the beads, the removal of a substantial amount of mortar from the large beads would leave a substantially smaller bead exposed above the matrix surface throughout most of its surface area, thus exposing the small bead to removal from the matrix surface.

…

The polymers used in the present invention can include those polymers which are conventionally used in polymer concrete mixtures. Typically, such polymers as used in conventional polymer-modified concrete or mortar are used to effect the final properties affecting concrete structure such as increases in flexural strength and increased resistance to degradation due to freezing and thawing cycles and to reduce the permeability of the concrete structures. Such polymers, as are used in polymer-modified concrete can be used in carrying out the present invention, although, because of the different purpose to which the polymeric additives are put in the present invention, they are used in substantially lower concentrations than used in their conventional application. The amount of polymer in the glass bead cement formulation can be characterized in terms of its concentration relative to the glass beads and its concentration relative to the portland cement component. Normally, the latex polymer will be present in an amount of less than g wt% [sic – agreed to be 8] and usually in an amount of less than 5 wt% of the total amount of the cement and glass beads in the formulation. Considering the bead content alone, the polymer preferably will be used in an amount of at least 2 wt%, usually in an amount within the range of about 4-6 wt% of the glass beads, depending upon the presence of aggregate materials such as relatively fine aggregate as described below. In terms of the amount of polymerizer relative to the portland cement component, usually it will be preferred to add the polymerizer in an amount of 3-5 wt% of the cement component.

###### 2.3 The claims of the patent

8 The infringement and revocation contentions involve claims 1, 2, 3, 9, 10, 11, 12, 13, 20, 21, 23, 24, 25 and 26 of the patent.

9 Those claims are as follows:

1 In a structure having a reflective Surface finish, the combination comprising:

(a) a substrate material having an interface surface;

(b) a reflective material disposed on the interface surface of said substrate and comprising a plurality of glass beads and a cementitious material providing a matrix for said glass beads, at least a portion of said glass beads at the surface of said matrix projecting out of the exposed surface of said matrix providing an exposed surface area of said glass beads and being at least partially encapsulated within said matrix to provide an encapsulated surface area of said glass beads; and

(c) at least a portion of said glass beads having a boundary layer of a barrier material interposed between the head surfaces encapsulated within said matrix and being free of said boundary material on bead surfaces projecting upwardly from said matrix, said beads having an average Particle size within the range of 1.5-4.5 millimeters and a particle size distribution defining, major component of said beads within a relatively large incremental size range and a minor component of said beads within a smaller incremental size range wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range.

2. The combination of claim 1 wherein the weight ratio of beads within the large incremental size range to beads within the small incremental size range is within the range of 2-3.

3. The combination of claim 1 wherein the weight ratio of beads within the large incremental size range to the small incremental size range is within the range of about of 2-2.6.

…

9. The combination of claim 1 wherein no more, than about 40% of the surface area of the beads at the surface of said matrix is exposed.

10. The combination of claim 1 wherein said glass beads glass beads having a particle size distribution ranging from a lower value to an upper value having a magnitude no more than three times the magnitude of said lower value, said particle size distribution defining a major component of said beads within a relatively large incremental size range having an average value greater than the midpoint of said upper and lower values and a minor component of said beads within a smaller incremental size range having an average size below said midpoint wherein the weight of beads in the large incremental size range is greater than the weight of beads within the smaller incremental size range.

11. The combination of claim 10 wherein said upper value is from 2 to 3 times greater than said lower value.

12. The combination of claim 10 wherein said upper value is no more than 2 1/2 times greater than said lower value.

13. In a dry cement formulation adapted to be hydrated and applied to a substrate surface to provide a reflective surface, the composition comprising:

(a) portland cement in an amount within the range of 1/3-2/3 of the total weight of said formulation;

(b) glass beads having particle sizes between lower and upper values within the range of 1-5 millimeters and a weight average particle size within the range of 1.5-4,5 millimeters, said beads having a particle size distribution defusing a major component of said beads within a relatively large incremental size range having a an average value greater than the midpoint of said upper and lower values and a minor component of said beads within a smaller incremental size range having an average value below said midpoint wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range; and

(c) a latex polymer present in an amount within the range of at least 2 wt.% of the glass beads in said formulation but less than 8 wt.% of the total amount of cement and glass beads in said formulation.

…

20. In a dry cement formulation adapted to be hydrated and applied to a substrate surface to provide a reflective surface, the composition comprising:

(a) portland cement in an amount within the range of 1/3-2/3 of the total weight of said formulation;

(b) glass beads having a particle size distribution ranging from a lower value to an upper value having a magnitude no more than three times the magnitude of said lower value, said particle size distribution defining a moor [sic- agreed to be major] component of said beads within a relatively large incremental size range having an average value greater than the midpoint of said upper and lower values and a minor component of said beads within a smaller incremental size range having an average size range below said midpoint wherein the weight of beads in the large incremental size range is greater than the weight of beads within the smaller incremental size range.

(c) a barrier-forming material selected from the group consisting of a polymerizer and a siliconizer and mix ̴ thereof present in an amount within the range of at least 2 wt.% of the glass beads in said formulation but less than 8 wt.% of the total amount of cement and glass beads in said formulation, said barrier-forming material being effective upon hydration of said formulation for forming a boundary layer interposed between the surface of said beads and surrounding cementitious material.

21. The formulation of claim 20 wherein said upper value is from two to three times greater than said lower value.

…

23. In the application of a reflective surface finish to a substrate structure, the method comprising:

(a) providing a reflective cementitious composition comprising:

(i) portland cement in an amount within the range of 1/3-2/3 of the total weight of said formulation;

(ii) glass beads having particle sizes within the range of 1-5 millimetres and a weight average particle size within the range of 1.5-4.5 millimeters, said beads having a particle size distribution defining a major component of said beads within a relatively large incremental size range and a minor component of said beads within a smaller incremental size range wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range; and

(iii) a latex polymer present in an amount within the range of at least 2 wt.% of the glass beads in said formulation but less than 8 wt.% of the total amount of cement and glass beads in said formulation

(b) hydrating said formulation with water in an amount within the range of wt.% of said portland cement to provide a cementitious paste; and

(c) applying said paste to the surface of said substrate structure: and

(d) allowing said paste to form an initial set and thereafter washing the surface of said mortar with an aqueous medium to remove said cenientitious material from a surface layer of said beads to form partially-exposed areas of said beads in said surface layer to provide a reflective surface

24. The method of claim 23 wherein the surface of said mortar is washed with said aqueous medium prior to the said cement forming a final set.

25. The method of claim 24 further comprising carrying out a second washing step with an acidic solution subsequent to the formation of final set of said cementitious material.

26. The method of claim 25 further comprising the step of brushing the surface of said material during the application of said acid medium.

##### 3. CONSTRUCTION OF CLAIMS

###### 3.1 Principles

10 The principles relevant to the construction of claims were not in dispute.

11 The applicants referred to *Fresenius Medical Care Australia Pty Ltd v Gambro Pty Ltd* (2005) 224 ALR 168; [2005] FCAFC 220 at [39], [44], [52] and [91] (*Fresenius*), *Clorox Australia Pty Ltd v International Consolidated Business Pty Ltd* (2006) 68 IPR 254; [2006] FCA 261 (*Clorox*) at [20]-[22], *Root Quality Pty Ltd v Root Control Technologies Pty Ltd* (2000) 177 ALR 231; [2000] FCA 980 at [40] and [46] and *Gambro Pty Ltd v Fresenius Medical Care South East Asia Pty Ltd* (2004) 61 IPR 442; [2004] FCA 323 at [349] in support of the following propositions:

(1) The construction of claims takes place in the context of the specification as a whole and reference may be made to the body of the specification in order to understand the context in which words have been used.

(2) Claims are to be read in the context of the specification, not merely when ambiguity exists in the claim, although integers not present in the claims cannot thereby be added.

(3) The specification is to be read in the light of common general knowledge before the priority date and the essential features of the invention are to be determined in the context of the then existing knowledge, as the patent is addressed to those skilled in the art. Further, the terms of the specification must be understood in a practical, commonsense manner.

(4) The claims are to be given the meaning the hypothetical skilled addressee would give to them in the context of both the common general knowledge and the specification. Expert evidence may be relevant but is not determinative, construction being a matter for the court.

12 In addition, as the respondents noted, the claims are not to be construed in light of the particular infringement alleged. Consistent with the general principles applying to the construction of any document, the task is undertaken on an objective basis recognising that a “patent is a public instrument which grants the right to protection of a defined monopoly, for the consideration of the disclosure of the invention to the general knowledge base of society” (*Flexible Steel Lacing Co v Beltreco Ltd* (2000) 49 IPR 331; [2000] FCA 890 at [70] and see also *Clorox* at [13] and [15]).

13 The applicants also referred to *Stanway Oyster Cylinders Pty Ltd v Marks* (1996) 66 FCR 577 at 582-585 (*Stanway Oyster*), *Minnesota Mining & Manufacturing Co v Beiersdorf (Australia) Ltd* (1980) 144 CLR 253 at 274, *Elconnex Pty Limited v Gerard Industries Pty Limited* (1991) 32 FCR 491 at 512-513, *Tye-Sil Corporation Ltd v Diversified Products Corp* (1991) 20 IPR 574 at 585, *Nesbit Evans Group Australia Pty Ltd v Impro Ltd* (1997) 39 IPR 56 at 95, *Martin Engineering Co v Trison Holdings Pty Ltd* (1989) 14 IPR 330 at 338 and in support of these propositions:

(1) It is permissible for an invention to be described in a way that involves matters of degree and necessitates an exercise of judgment. Hence, the lack of precise definition in claims is not fatal to their validity, so long as they provide a workable standard suitable to the intended use.

(2) In ascertaining from the language used the true meaning of the claims the relevant issue is whether the words of the claims can bear any reasonable meaning and the court would not lightly conclude that claims are so vague or ambiguous as invalidate them. Accordingly, where reasonable, the court will try to give effect to the construction which affords the patentee protection for the invention and will not defeat the right of a patentee on the basis of mere technicalities.

(3) Because a claim is “a description of an invention which it is intended to be put to practical use and which is addressed to non-inventive readers who are nevertheless skilled in the relevant art. It will therefore be proper and necessary to read down the wide and unqualified words of a claim, if they would otherwise encompass methods or products or devices that cannot be regarded as practical and commonsense embodiments or results of the claimed invention” (*Stanway Oyster* at 582-583).

###### 3.2 Construction of the claims in question

3.2.1 Cementitious

14 The specification discloses that the patent concerns a surface finish of a cementitious nature which includes at least one aggregate comprising glass beads. There is a dispute between the parties about the meaning of “cementitious” which appears in the claims and throughout the specification. The dispute arises because the specification refers to “a matrix of cementitious material selected from cement or resin” and deals with examples of “when resins are used…”, as well as “cementitious resins”. The respondents contend that where the claims use the words “a cementitious material” they encompass a material comprising cements and resins. The applicants contend that those words refer to cements only.

15 The suffix “icious”, in the word “cementitious”, means “of the nature of” (Oxford English Dictionary Online, viewed 10 October 2012). A more common way of conveying the same meaning, in my view, would be “cement-like”, which is not a technical term but takes its ordinary meaning. Once this is recognised it becomes apparent that the claims are not confined to “cement” (strictly, “a strong mortar, produced by the calcination of a natural or artificial mixture of calcareous and argillaceous matter”, Oxford English Dictionary Online, viewed 10 October 2012) but extend to materials that are like cement in terms of form and function (that is, the broader meaning of “cement”, “[a] substance used to bind the stones or bricks of a building firmly together, to cover floors, to form walls, terraces, etc., which being applied in a soft and pasty state, afterwards hardens into a stony consistency”, Oxford English Dictionary Online, viewed 10 October 2012). If the claims had been intended to be confined to “cement” then there would have been no reason for the matrix to have been described as involving a “cementitious material”. The word “cementitious”, where used, was used to extend the scope of the claims beyond “cement” to “cement-like” materials which are materials capable of forming a “cement-like” matrix. As the specification discloses, resin is such a material.

16 Although the word “cementitious” is sufficient to reach this conclusion, it is confirmed by the specification which refers to resins as a potential cementitious material. The contrary indication in the specification on which the applicants relied, that the problem of alkalinity bleeding out from the glass beads relates only to cement and not to resins, is insufficient to support a narrower meaning of “cementitious”. The specification identified alkalinity as one problem experienced in the building industry. The fact that the problem existed for cement but not for resins (which is clear from the evidence in the case) does not indicate that where the claims use the words “cementitious material” they should be construed as referring only to cement in the strict sense of a mortar involving a mix of calcareous (that is, lime) and argillaceous (that is, clay) matter.

17 The claims of the patent which require a matrix of a cementitious material, accordingly, concern a cement-like matrix which may include a matrix formed by a resin.

3.2.2 Aggregate

18 The surface finish of a cementitious nature, according to the specification, must include one “aggregate” comprising glass beads. “Aggregate” is also an ordinary English word and not a term of art. In the context of the patent, an “aggregate” takes its ordinary geological meaning of “[a] rock or other deposit composed of distinct minerals closely adhering or combined together” (Oxford English Dictionary Online, viewed 10 October 2012). Glass beads are an aggregate in this sense.

19 The specification contends that the preparation of a cementitious matrix which includes glass beads as an aggregate has been difficult to achieve because the glass beads exhibited inferior bonding compared to conventional aggregates such as pebbles and stones due to the glass beads being insufficiently porous and not tough enough to establish an effective bond, another problem being alkalinity bleeding out from the glass beads (a problem associated only with cement matrixes not, I note, resin matrixes). The specification discloses prior art consisting of U.S. Patent No 4,218,260 (the **US patent**) and the European Patent No 518,854 (the **European patent**). The US patent involved the use of glass beads of uniform particle size. The European patent involved the use of glass beads of a larger and smaller size range in which the smaller size component is greater than the larger size component. Another patent is identified (British patent No 1,397,737) in which glass beads are coated with a water repellent material such as silicone.

3.2.3 Average particle size

20 The invention described in the specification is a surface finish comprised of a matrix formed from a cementitious material, water and glass beads and a liquid adhesive comprising a combination of a siliconiser and polymeriser for enhancing the bond between the cementitious mortar and glass beads. The glass beads are said to have particle sizes within the range of 1-5mm and a weight average particle size within the range of 1.5-4.5mm. The beads are also said to be employed in a particle size distribution in which the major component is within a relatively large incremental size range and a minor component within a smaller incremental size range, with the weight of the beads within the large incremental size range being greater than the weight within the smaller incremental size range. The specification provides preferred embodiments of the invention specifying different weight ratios of smaller to larger beads and different weights of polymer. The specification also provides information about the particle size distribution in which the larger particle size is to be the predominant component.

21 Claims 1 to 9 and 23 to 26 all involve an integer of beads “having an average particle size within” a specified range and a “particle size distribution” where the major component of the beads is within a relatively large incremental size range and a minor component of the beads is within a smaller incremental size range wherein the weight of the beads in the large incremental size range is greater than the weight of the beads in the small incremental size range.

22 Claims 1 to 9 and 23 to 26 may be contrasted with claims 10, 11, 12, 13, 14, 20 and 21 which involves a combination of claim 1 where, amongst other things, the particle size distribution defining the major component of the beads with a relatively large incremental size range has an average value greater than the midpoint of the specified upper and lower values and a minor component of the beads within a smaller incremental size range has an average size below that midpoint and wherein the weight of the beads in the large incremental size range is greater than the weight of the beads in the small incremental size range.

23 The respondents submitted that the claims lacking any specified midpoint, claims 1 to 9 and 23 to 26, were thereby unintelligible and thus incapable of infringement (and invalid). In any group of beads there may be large and smaller beads resulting from an arbitrary definition of where the boundary between the two groups is to be drawn.

24 The applicants submitted that the respondents’ approach gave no meaning to the phrase “average particle size” as it appears within the claims. The applicants identified four possible meanings of the phrase having regard to the ordinary meaning of “average” (which includes the “distribution of the aggregate inequalities…of a series of things among all the members of the series, so as to equalize them, and ascertain their common or mean quantity…” or “the determination or statement of an arithmetical mean” (Oxford English Dictionary). According to the applicants an “average particle size” can be ascertained by one of four methods as follows:

(a) identify the particle size of every single particle represented, total all those values and divide that total by the number of particles;

(b) identify every different particle size represented, total the value of all those different particle sizes and divide that total by the number of particle sizes represented;

(c) identity the largest and the smallest particle size represented, total those values and divide by two; or

(d) identify the weighted average particle size based on the weight distribution of different sizes of particles (a weighted average, unlike an average, takes into account the frequency at which each size is represented).

25 The applicants contended that the phrase “average particle size” in claim 1 of the patent (and all other claims dependent on claim 1) means the weighted average particle size based on the weight distribution of different sizes of particles. As explained below, I agree with this construction.

26 The respondents emphasised that this construction had not been suggested by any expert and, indeed, was inconsistent with the approach to the claims taken by Edward Bennett, a civil and structural engineer, who gave evidence for the applicants. Mr Bennett treated the phrase “average particle size” in claim 1 as an outcome which should be determined by the method in (c) above (that is, identity the largest and the smallest particle size represented, total those values and divide by two). The respondents also noted that this construction was inconsistent with the particulars of construction and infringement which the applicants served on the respondents. These particulars said that “average particle size” was to be mathematically determined by taking the size of the largest and the smallest beads in the sample and determining from those sizes the mean particle size.

27 Both aspects of the respondents’ submissions may be accepted. However, they are not ultimately material to the issue of construction for three reasons.

28 First, it seems to me that the hypothetical addressee of the patent is the non-inventive person with skills in the art of mixing and forming surface finishes of a cementitious nature. Mr Bennett is an engineer who specialises in the construction of swimming pools. He has extensive experience in the use and application of cement in mixes for pool surface finishes. It was not apparent from Mr Bennett’s evidence that he has similar expertise and experience in respect of the methods of mixing and forming surface finishes whether of swimming pools or otherwise. This is not to say Mr Bennett’s evidence was irrelevant. But I am not persuaded that insofar as he gave evidence which assumed a particular meaning of “average particle size” it should also be assumed that Mr Bennett represents the hypothetical skilled addressee of this patent.

29 Second, as to the particulars of construction and infringement, the applicants’ letter notifying the respondents of the particulars said that “claim construction is a matter for the Court” and that expert evidence might be relevant to claim construction insofar as it concerned terms of art or the common general knowledge. The particulars of construction provided were subject to these observations. The observations are correct. Accordingly, the applicants were not bound by the construction proposed in the particulars and the respondents could not reasonably have understood otherwise.

30 Third, the respondents had proper opportunity to deal with the construction proposed by the applicants and its consequences for infringement, including by way of leave to file further submissions after the conclusion of the hearing. Accordingly, there was no unfairness arising from the way in which the applicants conducted the case.

31 For these reasons the issues of construction fall for determination on their merits and in accordance with the conventional principles set out above.

32 This is the background against which the claims must be construed including that part of claim 1 which refers to the glass beads “having an average Particle size within the range of 1.5-4.5 millimeters [sic] and a particle size distribution defining, major component of said beads within a relatively large incremental size range and a minor component of said beads within a smaller incremental size range wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range”. The background is that the invention claimed is a surface finish in which there is a plurality of glass beads in a cementitious matrix. The description of the invention in claim 1 (the reference to the plurality of glass beads, the requirement for a portion of the glass beads to be projecting out of the matrix, and otherwise to be subject to a boundary layer of a barrier material) indicates that for any surface on which the surface finish is likely to be placed will involve a substantial number of glass beads. This is not an invention in which any defined number of glass beads is required. Nor is it an invention in which the glass beads might be few in number.

33 In this context, “average particle size” (the use of the capital “P” for particle in the claim having no significance and appearing to be nothing more than one of the many typographical errors in this patent) has to be construed in a practical and common sense manner from the point of view of the hypothetical skilled addressee having regard to both the common general knowledge and the specification. “Average particle size” is not a technical term. Contrary to the respondents’ submissions, expert evidence about the meaning of the individual words and of the phrase as a whole was not necessary, could never have been determinative, and may well have been inadmissible. It is basic arithmetic that there is more than one way in which an average might be calculated and that the purpose of the calculation might best determine the method used. Mean, median and mode are all well-known ways of expressing forms of averages which might be relevant for different purposes. The hypothetical skilled addressee of the patent in this case would read “average particle size” having regard to the purpose of the phrase in defining the scope of the invention claimed.

34 On this basis it would be apparent to the hypothetical skilled addressee that the patent pre-supposed the existence of a convenient method to determine both the size and weight distributions of the glass beads to be mixed into the cementitious matrix. As the evidence in this case discloses there is and was such a method at the earliest claimed priority date, being the use of test sieves. *Australian Standard AS 1152-1993 Specification for Test Sieves* (**AS 1152**) was approved and published in 1992 and superseded an earlier standard relating to the same subject matter published in 1973. AS 1152 specifies the requirements for test sieves. *Australian Standard AS 1141.11.1 – 2009 Methods for Sampling and Testing Aggregates* (**AS 1141**) was approved and published in 2009 but an earlier version of this standard was first published in 1974. *Australian Standard AS 2009-1991 Glass Beads for Road-Marking Materials (***AS 2009**) was published in 1991. AS 2009 specified test sieves as the method for sampling and testing various types of glass beads for use in road marking.

35 Accordingly, as at the earliest claimed priority date for the patent of 16 February 1994, the date of the provisional specification, it was common general knowledge that the appropriate method for determining the size and weight distributions of the glass beads to be used in surface finishes was test sieves. It also would have been common general knowledge at that time that test sieves functioned by the selection of appropriate sizes of sieves which were then required to be assembled in a particular way (most basically, so that they descended in a decreasing size from the largest sieve at the top to the smallest sieve at the bottom). Testing protocols covered the selection of the sample, the sieving of the sample and the reporting of results. The basic information obtained by the use of test sieves was the percentage of the total sample passing through each sieve used by weight. In other words, and unsurprisingly, nothing in the protocols about the use of test sieves apparent from AS 1152, AS 1141 and AS 2009 suggested that the exercise contemplated counting individual glass beads or identifying the size of the largest and smallest single glass beads in the sample. To do that would involve some form of visual inspection and measurement of individual beads which finds no mention in those standards. This is unsurprising because it is difficult to conceive of any surface finish for a structure which would not involve a plurality (to use the language of claim 1 of the patent) of glass beads. It would have been inconceivable to those skilled in the art of mixing an aggregate into a cementitious matrix to form a surface finish that they would concern themselves with the absolute number of glass beads or the absolute size of any particular glass bead, be it the largest or smallest, in any given matrix.

36 These considerations demonstrate why the proper meaning of “average particle size” cannot be meanings (a) or (c) above.

37 Meaning (a) requires the size of every single particle in the sample to be tested, the sizes added up and the sum of the total sizes to be divided by the sum of the total particles. While this would yield an average particle size it is nonsensical to consider that the reference in claim 1 to “average particle size” had this in mind.

38 Meaning (c), which might appear rational, is no less nonsensical as the evidence in this case disclosed. Meaning (c) requires the largest and the smallest sized particles to be found in the sample, for their sizes to be added up and then divided by two. Put to one side the availability of test sieves and it becomes obvious that there is no way to find the largest and the smallest sized particles without measuring the size of every particle in the sample which is required by meaning (a). Test sieves do not solve this problem, however. The reason for this is that any set of test sieves will have to be based on a selection of sizes. If more than one particle is captured by the first sieve all such particles are the same as or larger than that first sieve size but without measuring the size of each particle captured by that sieve, or any subsequent sieve if none are captured by the first sieve, the largest particle size cannot be identified. A similar problem afflicts the smallest sieve. If any particle passes through the smallest sieve it will necessarily be smaller than that sieve size but without measuring each particle that passes through the smallest particle size can never be known. The same issue, moreover, affects every sieve size used in any sieve test. All that being captured by a sieve discloses is that the captured particle is larger than that particular sieve and the same size or smaller than the preceding sieve. In other words, sieve testing does not yield any absolute particle size and this the skilled addressee would have known. Because of this the skilled addressee would never have construed “average particle size” as involving some endeavour to identify the largest and smallest particle sizes in any sample, adding them up and dividing by two.

39 The same difficulty besets meaning (b). Meaning (b) also requires each particle size to be identified, for those sizes to be summed up and that total to be divided by the number of different particle sizes irrespective of the frequency of the occurrence of the different sizes in the sample. This too would yield a form of average particle size but not one that could practically be ascertained in respect of the invention claimed.

40 Given that: - (i) claims are to be given the meaning the hypothetical skilled addressee would give to them in the context of both the common general knowledge and the specification, (ii) the terms of the specification must be understood in a practical, commonsense manner, and (iii) well before the earliest possible priority date those skilled in the art of mixing and forming surface finishes of a cementitious nature would have known that the composition of an aggregate, including an aggregate such as a glass bead, ordinarily would be determined by a process of sieving, it is apparent that the hypothetical skilled addressee would not have understood “average particle size”, as it appears in the claims of the patent, to mean a particle size determined in accordance with methods (a), (b) or (c). No method other than that in (d) has been identified as available but that does not mean it should be accepted by default.

41 However, there are other indicators in the specification which support the applicants’ proposition that where the claims use the phrase “average particle size” they mean a particle size of the surface finish as described determined in accordance with the steps in (d).

42 First, and to give more detail about protocols for the analysis of aggregates as mentioned above, the evidence in this matter (AS 1141, AS 1152 and AS 2009, as well as test results issued by Boral Construction Materials, Materials Technical Services, referred to below as **Boral**), discloses the standard methods for analysing aggregate including the particle size distribution of the aggregate. Those methods include:

(1) Selecting a representative sample of the aggregate which is achieved by subjecting the aggregate to a process of repeated riffling using a riffle box.

(2) Ensuring the sample selected is the appropriate weight having regard to the test sieves proposed to be used.

(3) Ensuring the test sieves are nested in decreasing size of opening from top to bottom.

(4) Placing the appropriate weight of sample in the top sieve and agitating the sieve by hand or mechanically but without forcing materials through any sieve by hand pressure.

(5) Determining the mass (in grams) of each increment retained on each sieve and that this mass does not exceed certain specified parameters.

(6) Calculating the percentage mass of material passing through each sieve on the basis of the total mass of the sample. Accordingly, the full results of the sieving include:

(a) the initial mass of the representative sample (in grams);

(b) the mass (in grams) retained on each sieve;

(c) the mass (in grams) passing through each sieve; and

(d) the percentage of the total initial mass passing through each sieve.

43 I infer that these standard methods for analysing the particle size distribution of aggregates were well known to those skilled in the art of mixing and forming surface finishes of a cementitious nature before the earliest possible priority date of the patent. The patent would have been read and understood by the hypothetical skilled addressee at the earliest possible priority date knowing these methods and their relevance to the determination of the particle size distribution of an aggregate. None of the methods involve counting particles or attempting to identify the largest and smallest particle in the aggregate.

44 Second, the terms of the specification confirm this background of common general knowledge. It is true, as the respondents noted, that the specification does not mention the use of test sieves. However, the subject-matter of the specification is an aggregate mix of a cementitious nature including glass beads. The specification refers to the prior art including such mixes and the concepts of a “larger particle size component” and a “smaller particle size component”. These concepts concern the particle size distribution of the aggregate. The specification describes the prior art as involving the use of glass beads in the smaller particle size component in a greater amount than the glass beads in the larger particle size component (in other words, more smaller beads than larger beads). The invention described in the specification involves the use of glass beads in the larger particle size component in a greater amount than the glass beads in the smaller particle size component (in other words, more larger beads than smaller beads). The specification defines this aspect of the invention using the concept of “particle size distribution” and requires the weight of the beads in the relatively large size range to be greater than the weight of the beads in the smaller size range. The specification identifies the size distribution of the glass beads as important to providing a good reflective surface and interspersion of smaller with larger beads. The references to the size ranges of the beads, moreover, are in connection with the requirement of differential particle size distribution as important to the invention.

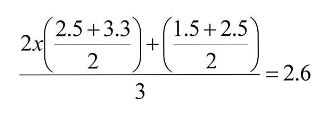
45 The specification also provides examples which confirm the nature of the invention as one in which there will be a plurality of glass beads in which the weight distribution of the beads is material. One formulation is described as involving 50 lb bags containing 25 lbs glass beads, 24 lbs cement and 1 lb polymeriser with the large increment of beads in the range 2.5-3.3 mm in an amount of 18 lbs and the smaller increment of beads in the range 1.5-2.5 mm in an amount of 7 lbs. Numerous other examples are provided in the specification using the same descriptions with the distribution of beads described in % weight terms.

46 The specification, after providing these numerous examples, contains the following further indication of the meaning to be given to the average particle size of the glass beads. The specification provides:

The average particle size of the glass beads employed in the present invention, ie, the average size taking into account both the small beads and the large beads, is preferably within the range of 2-4 millimeters and more preferably within the range of 2-3 millimeters. The average particle size, as referred to here, is the weight average particle size of the beads based upon the distribution of beads in the mixture. Thus, for example, for the second formulation described above and assuming an even distribution of beads across the major increment of 2.5-3.3 mm and the minor increment across the range of 1.5-2.5 mm the average particle size would be about 2.6 mm.

47 The second formulation to which reference is being made is a formulation in which there is a 50 lb bag containing 16.5 lbs of glass beads, 32.5 lbs of cement and 1 lb of polymer, with 1l lbs of beads in the 2.5-3.3 mm size range and 5.5 lbs of beads in the 1.5-2.5 mm size range.

48 The weight average particle size of the beads in this formulation can be calculated, assuming (as instructed by the specification) an even distribution of beads across the major and minor increments, by finding the average of each increment (2.9 and 2 respectively), multiplying the average of the larger increment by two to take into account the fact that the larger increment is double the size of the smaller increment (11 lbs compared to 5.5 lbs), which gives 5.8, adding that figure to the average of the smaller increment (the 2) and dividing the total (that is, 7.8) by three (as there are two parts of the larger increment and one part of the smaller increment). The calculation can be expressed as:



49 I acknowledge that claim 1 of the patent (and the claims which depend on claim 1) refers to “average particle size” whereas claim 13 (and the claims that depend on claim 13) refers to “weight average particle size”. This might be considered to lead to the conclusion that the reference to “average particle size” in claim 1 is intended to convey a different meaning from the meaning of “weight average particle size”. This approach to construction is an example of a form of reasoning often said to require caution. The reasoning assumes the difference in drafting is the result of some express intention of the draftsperson rather than mere oversight or failure to foresee that the terms used might be read differently. In the context of this patent as discussed above, and given that each claim functions separately, the different references provide an insufficiently persuasive basis to construe “average particle size” as meaning something other than weighted average particle size, to be calculated using the approach instructed to be used by the specification, which is a standard method of analysing the average particle size of an aggregate and would have been known to be such by the hypothetical skilled addressee at all relevant times.

50 Further, the relatively large incremental size range and the smaller incremental size range are to be identified by reference to the weighted average particle size. No other means of identification is reasonably practicable having regard to the claims as they would be read by the skilled addressee. On this basis, it is clear that beads larger than the size of the average are in the relatively large range and beads smaller than the average are in the smaller size range. However, a question remains – how are beads which are of the average size (or must be assumed to be so having regard to the onus of proof for infringement) to be treated? This can only be answered recognising that the controlling elements of the integer in question are the average particle size and the relatively large range and the smaller range. It is essential that these size and size ranges be able to be identified by the same method for every example. What is apparent is that, as a matter of construction, claims 1 to 3 and dependent claim 9 do not specify how beads which are of the average size (or must be assumed to be so having regard to the onus of proof for infringement) are to be treated. The answer to this question may or may not matter depending on the available evidence.

3.2.4 Claim 13 issues

51 There are other issues of construction arising from the claims. There are three issues concerning claim 13 and the claims dependent on claim 13. The first is whether the opening words of the claim “[in] a dry cement formulation…” qualify each of the succeeding sub-paragraphs so that the latex polymer referred to in (c) must also be a dry formulation. The second is whether the reference to “a latex polymer” means commercial products sold as a latex polymer product or the amount of actual latex polymer within any particular latex polymer product. The third is whether the reference in (c) to “a latex polymer present in an amount within the range of at least 2 wt.% of the glass beads in said formulation but less than 8 wt.% of the total amount of cement and glass beads in said formulation” means that there must be at least 2% by weight of a latex polymer in the overall dry cement formulation or in the range of 2% by weight of a latex polymer in the overall dry cement formulation so that, in the latter case, a weight percentage below 2% may nevertheless be considered to be within the range of 2% whereas in the former case the 2% functions as a minimum percentage.

52  **Dry cement formulation**: the applicants submitted that the claim extended to a latex polymer supplied in liquid form because this involves the supply of a “kit that infringes” citing *Windsurfing International Inc v Petit* [1984] 2 NSWLR 196 at 207 (*Windsurfing International*) and *Grove Hill Pty Ltd v Great Western Corp Pty Ltd* (2002) 55 IPR 257; [2002] FCAFC 183 (*Grove Hill*) at [334]-[335].

53 In *Windsurfing International* Waddell J described the evidence that “sailboards are ordinarily sold in an unassembled form as a matter of convenience and…the user assembles the board in order to use it and takes it apart after use for the purpose of transport or storage” and asked whether “in these circumstances, sale in kit form of a complete set of parts which, when assembled, will come within any of the claims of the patent is an infringement of the exclusive right given by” the patent. Waddell J held that that there was an infringement having regard to the ordinary course in which the alleged infringing product was supplied. In *Grove Hill* Gyles J (with whom French and Dowsett JJ agreed) said:

[334] In any event, there is no reason to doubt the correctness of the conclusion of the primary judge at para [30] and para [31] of the judgment below, based upon the authorities to which she refers or the application of those findings to infringement of claims 4, 10, 11 and 13. Indeed, the discussion by the Full Court in *Ramset Fasteners (Aust) Pty Ltd v Advanced Building Systems Pty Ltd* (1999) 164 ALR 239 [[1999] FCA 898] at [27]-[30] supports the decision of Waddell J in [*Windsurfing International*], at least in circumstances where the whole of the relevant assembly is sold at the one time, albeit in parts. As Gummow J pointed out in his interlocutory decision in *Martin Engineering Co v Trison Holdings Pty Ltd* (1988) 81 ALR 543 at 551, infringement by the sale of one integer of a combination (in that case, as a spare part) would require an extension of the principles applied in the cases to which the primary judge referred. No submission was made on this appeal that the ordinary position went so far. It should be clear that no case of participation by the appellant in infringement by others was pleaded or argued.

[335] The substance of the finding by the primary judge, understood in the light of the evidence, was that the normal method of sale of the Versasweep assembly was as a kit containing separately both the forward and rear components. That was a finding well open to her on the evidence, and, although there was some criticism of it in the written and oral submissions of counsel for the appellant, I do not think that there is any substantial basis upon which that finding should be disturbed. The fact that the appellant, by and large, supplies dealers rather than end users is of no relevance in relation to this kind of infringement. It follows that there was direct infringement of claims 4, 10 and 11. Although there is no express finding about it, the case for the appellant was that the row cultivator and attachments was usually provided in kit or disassembled form, rather than as a complete assembly, even when ordered as a whole. Nonetheless, it would follow that, applying the principle to which I have referred, this would constitute an infringement of claim 13.

54 The principles on which the applicants relied concern infringement not construction. As a matter of construction the terms of claim 13 are clear. The latex polymer is part of a dry cement formulation adapted to be hydrated. Claim 13 and the claims which depend on it concerns an invention said to be a dry formulation in which each of the three components (cement, beads and latex) are also dry, all adapted to be hydrated.

55  **A latex polymer**: the applicants submitted that this must be read as a reference to a latex polymer product rather than the amount of latex polymer actually present in any such product. If it were otherwise, in order to determine the percentage by weight of the latex polymer to the glass beads and cement it would first be necessary to perform gravimetric tests to determine the amount of latex present in the latex polymer product. The applicants submitted that the specification supported this construction by referring to a commercially available latex polymer as preferred (“DRYCRYL DP-2903”).

56 The applicants’ concern about this issue is generated in part by its position on the requirement that the formulation in claim 13 be a dry cement formulation. The concern is that as the evidence shows the respondents supply their polymer in liquid and not dry form, and the polymer present in the respondent’s polymer product is a small proportion of the product, any construction of claim 13 requiring a comparison of the proportions of the actual polymer with the glass beads and cement will ensure that no infringement can be established. As discussed, construction and infringement are separate issues. Once it is accepted that claim 13 is dealing with a dry cement formulation comprising three dry components (glass beads, cement and latex polymer) all adapted to be hydrated, the potentially distorting effect of the applicants’ concern may be put to one side. The consequence is that the applicants’ construction is correct in the sense that “a latex polymer” in claim 13 means the whole of any product which is a latex polymer. Accordingly, and for example, DRYCRYL DP-2903 is identified by the specification as a preferred latex polymer. Claim 13 is concerned with the amount of the latex polymer compared to the amounts of glass beads and cement. Claim 13 does not contemplate that the latex polymer must itself be analysed to exclude all compounds other than the polymer itself (fillers or the like) so that the amount of actual polymer may be compared to the amounts of the glass beads and cement. Nothing in the language of claim 13, the specification or the common general knowledge of which there is evidence in this matter would support such a construction. As the applicants submitted, such a construction would be impractical and thus does not commend itself.

57  **Within the range of at least 2 wt.%**: the applicants submitted that the range cannot be the range of between 2% by weight of the glass beads and 8% by weight of the total because the comparison is not between like and like. Accordingly, the words “within the range of at least 2 wt.%” mean within the range of the figure of 2% by weight.

58 It is true that if the intended range is 2% by weight to 8% by weight one end of the range is referring to one proportional relationship (a latex polymer of at least 2% by weight of the glass beads) and the other end of the range is referring to another proportional relationship (a latex polymer of less than 8% by weight of the total of glass beads and cement). The concept of a “range”, it may be accepted, is not particularly apt to describe such proportional relationships. The inaptness, however, is not limited to the use of the concept of a range alone. On the applicants’ construction the words “within the range of” mean something akin to “about” or “nearly” and qualify each of the 2% and the 8% figures. Accordingly, as the applicants would have it sub-paragraph (c) of claim 13 requires that there be present a latex polymer in the amount of about 2% by weight of the glass beads and about 8% by weight of the total of the glass beads and cement. If that meaning were intended it is difficult to understand the presence of language which speaks against the imprecision for which the applicants contend, being the words “at least” in connection with the 2% and “less than” in connection with the 8%. In the context of sub-paragraph (c), leaving aside the concept of “within the range of”, at least 2% by weight would mean 2% by weight or more and less than 8% by weight would mean 7.9% by weight and below. The words would not permit a construction of “about” 2% or 8% by weight in the sense of a bit more or less than 2% or 8% by weight. The entire meaning of “at least” and “less than”, on this construction, would be lost.

59 The more natural reading of sub-paragraph (c) is that for which the respondents contend. The intended “range” is a range with different criteria for its starting and end points. The expression might be infelicitous but it gives all components of the phrase their ordinary meaning. The range is the range of at least 2% by weight as defined and of less than 8% by weight as defined. At least 2% by weight as defined and less than 8% by weight as defined mean what they say. Anything less than 2% by weight as defined is outside the range. Anything that is 8% or above by weight as defined is also outside the range.

##### 4. UNCONTENTIOUS FINDINGS

###### 4.1 Admissions

60 The respondents, by their pleadings and answers to a notice to admit facts, made certain admissions about their supply of the “Jewels 4 Pools” products. The applicants summarised these admissions in the following terms which I accept.

The First and Second Respondents admit that they make, sell and use the Jewels4Pools Product for use in pool linings, have used the Jewels4Pools Products (and from time to time with the Jewels4Pools geopolymer) to line pools, and that they authorised the Third, Fourth and Sixth Respondents to use the Jewels4Pools Product to line pools in Australia.

The Third, Fourth and Sixth Respondents admit that they have promoted, advertised, sold and offer for sale the Jewels4Pools Product, and offered for sale and sold the Jewels4Pools geopolymer additive. The Third and Fourth Respondent admit to having used the Jewels4Pools Product and geopolymer additive to line pools in Australia.

Kenneth Pickersgill is a director of the Fifth Respondent and he is the owner of the registered business name “Jewels 4 Pools Victoria” which operates from the premises 14 Whyte Street Brighton, Victoria. A business of swimming pool construction and renovations is carried on from that address by the Fifth Respondent pursuant to the name “Bayside Pools & Paving”, the registration for which was transferred to the Fifth Respondent on 10 October 2003 by Kenneth Pickersgill. The Jewels 4 Pools website identifies “Ken” as the contact for “Jewels4Pools Victoria” with a telephone number “xx xxxx95”. The “Bayside Pools & Paving” website identifies that number as its contact number and that the business is run by Kenneth Pickersgill.

The Jewels 4 Pools website operates for the benefit of each of the Respondents and it instructs the use of the Jewels4 Pools geopolymer with the Jewels4Pools Product (glass beads) in the installation of pool linings and give instructions and use 500ml of the polymer for every 20kg of cement.

The Respondents admit that the Jewels4Pools Product comprises glass beads and is mixed with portland cement for use in lining pools. The Respondents recommend and use two parts of the Jewels4Pools Product (glass beads) to one part of cement.

When the instructions with respect to the use of the Jewels4Pools Product in pool linings given by the First and Second Respondents are followed, including with respect to the use of the Jewels4Pools geopolymer, cement accounts for between 1/3 and 2/3 of the total weight of the composition of cement, the Jewels4Pools Product and Jewels4Pools geopolymer prior to the addition of water.

###### 4.2 Jewels 4 Pools product fact sheet

61 A document entitled Jewels 4 Pools product fact sheet sets out “important facts you need to know about glass pool linings”. The facts specified include the following:

**Glass aggregate is the future of pool interiors**

Glass aggregate has a very high percentage of amorphous silica. So what you say? Well, this reacts with the alkali hydroxides in cement. A reaction called alkali silica reactin (A.S.R).

Glass and high silica aggregates will produce A.S.R. in cement based products and is a major drawback for its use in cementious formulations. Tests have proven that the incorporation of glass aggregates in unmodified mortars will reduce the mechanical and flexural strength’s significantly.

**A.S.R. can be eliminated**

Basic steps for mitigation would be:

1. to reduce the water cement ratio.

2. glass aggregates must be clean without clay coatings or any other fine materials that could alter the hydration and bond of cement pastes.

3. carefully selected and graded pozzilans to reduce microscopic pore size and mobility of the alkali.

4. aggregate particle size smaller than 1mm to further reduce the reaction.

5. polymerisation to help with adhesion and reduce pore liquid.

**What have we done**

Given we have had 30 years experience with pool renders and render formulations we have developed our products with these setbacks in mind. In addition to this our products have been tested for 8 years to ensure proper mitigation against this reaction.

Jewels 4 Pools is not premixed with other aggregates, clays or hydration altering powders prior to use.

Jewels 4 Pools is the only glass aggregate available specifically graded to further reduce A.S.R.

Jewels 4 Pools secret formulation is a highly modified Polymer additive only available through us.

**Jewels 4 Pools Geo Polymer Additive**

Is the only product available today specifically formulated to alleviate A.S.R. with glass/quartz aggregates in cement based pool renders. **Beware of imitations**.

Jewels 4 Pools geopolymer additive will:

1. reduce water cement ratio

2. increase mechanical and flexural strength

3. increase adhesion

4. increase workability

5. reduce permeability

6. eliminate A.S.R.

###### 4.3 Jewels 4 Pools website

62 The Jewels 4 Pools website recommends the use of the Jewels 4 Pools Geo Polymer product. The website identifies that the glass beads are sold in 20 kg bags. For the product to be applied as a render the website instructs that as a “general rule” the crystal (that is, the glass beads) is to be mixed with cement at a ratio of 2 parts aggregate (that is, glass beads) to 1 part cement and Geo Polymer is “added at 500 mls per 20 kg of cement”. The Geo Polymer is available in 20 litre pales. The glass beads are described as “100’s of colours and combinations to choose from”.

###### 4.4 Boral test results

63 There is no dispute that the applicants obtained four 20 kg bags of glass beads marked as Jewels 4 Pools and two pales of the Geo Polymer. The bags of glass beads were identified on the outside of the bag as: - (i) Jewels 4 Pools Clear 1 mm-3 mm, (ii) Jewels 4 Pools Green 1 mm-3 mm, (iii) Jewels 4 Pools Ice Blue 1 mm-3 mm, and (iv) Jewels 4 Pools Cobalt Blue 1 mm-3 mm.

64 The applicants arranged for each of the four bags to be tested by Boral, a NATA (National Association of Testing Authorities, Australia) accredited laboratory. Boral carried out two tests and presented to the applicants test results as follows:

**TEST REPORT**

CLIENT: Creagh & Creagh Solicitors FILE NO: 482/11

PROJECT: Quality Control – Testing of various Jewels 4 Pools samples REQUEST NO: 45348

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Laboratory Sample No: | | 122040 | 122041 | 122042 | 122043 |
| Date Received: | | 8.9.11 | | | |
| Sample Description: | | Jewels 4  Pools Clear  1mm-3mm | Jewels 4  Pools Green  1mm-3mm | Jewels 4  Pools Ice  Blue  1mm-3mm | Jewels 4  Pools Cobalt  Blue  1mm-3mm |
| **Test Method** | **Test** | **Results** | | | |
| AS1141.11.1 | %Passing A.S.Sieve  4.75mm  2.36mm  1.18mm  600 micron  425 micron  300 micron  150 micron  75 micron | 100  91  2  Nil  Nil  Nil  Nil  Nil | 100  69  10  1  Nil  Nil  Nil  Nil | 100  73  23  1  Nil  Nil  Nil  Nil | 100  78  21  Nil  Nil  Nil  Nil  Nil |

Samples submitted by client.

**TEST REPORT**

CLIENT: Creagh & Creagh Solicitors FILE NO: 482/11

PROJECT: Quality Control – Testing of various Jewels 4 Pools samples REQUEST NO: 45420

TEST PROCEDURE: AS1141 – Methods for Sampling and Testing Aggregates

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Laboratory Sample No: | | 122040 | 122041 | 122042 | 122043 |
| Date Received: | | 8.9.11 | | | |
| Sample Description: | | Jewels 4  Pools Clear  1mm-3mm | Jewels 4  Pools Green  1mm-3mm | Jewels 4  Pools Ice  Blue  1mm-3mm | Jewels 4  Pools Cobalt  Blue  1mm-3mm |
| **Test Method** | **Test** | **Results** | | | |
| AS1141.11.1 | %Passing A.S.Sieve  4.75mm  3.35mm  2.80mm  2.36mm  2.00mm  1.70mm  1.40mm  1.18mm  1.00mm  850 micron  75 micron | 100  99  92  63  33  5  2  1  1  Nil | 100  99  92  72  42  28  16  10  6  4  Nil | 100  99  86  74  58  47  32  23  14  9  Nil | 100  91  78  63  50  34  22  11  5  Nil |

Samples submitted by client.

###### 4.5 Dr John Scheirs

65 Dr Schiers, chemical engineer, analysed two samples, one of which is relevant, being a sample of “Jewels for Pools” polymer which I am satisfied on the evidence is the Geo Polymer product that the respondents supply. Dr Schiers’ analysis discloses that this product is 62% water, 26% polymer and 12% ash. The polymer is an acrylic polymer in the form of a latex emulsion (being an aqueous suspension of an emulsion polymer). According to Dr Scheirs the Geo Polymer product will act as a barrier material as referred to in claim 1 of the patent. I accept Dr Schiers’ evidence.

###### 4.6 Other findings

66 I will deal with the balance of the evidence and other findings in the context of the specific issues to which they relate.

##### 5. VALIDITY OF THE PATENT

###### 5.1 Priority date

67 As noted, the patent is a divisional of the parent application and claims priority from the filing of the provisional application on 16 February 1994. To take a priority date earlier than the date of filing of 22 July 1999 the claims of the patent must be fairly based on matter disclosed in the specification of the earlier applications (s 43(2) of the Act and reg 3.12(1)(c) of the Regulations).

68 The provisional application does not provide any disclosure of the integers of the invention claimed in the patent. The provisional application says that the invention relates to the coating of pre-fabricated surfaces and is based on a glass bead in sizes ranging from 1 to 10mm. It says nothing, however, about the exposure of the beads, the matrix from which the beads are exposed, the barrier material, the particle size distribution or the major or minor components of the beads. As such, the claim for priority based on the provisional application must fail.

69 The problem for the claimed priority date based on the parent application is that, as the respondents submitted, the parent application discloses the same or different size beads without any disclosure of the integers of the claims of the patent which include requirements of a particle size distribution, variously expressed. As the respondents submitted, to be fairly based the invention, even if further developed subsequently, there must be the same invention as disclosed in the earlier document. The essence of the invention claimed in the patent, in every claim albeit in different forms, is the use of glass beads with a specified particle size distribution. That invention is nowhere disclosed in the parent application.

70 Accordingly, the priority date of the claims of the patent is the date of filing of 22 July 1999.

###### 5.2 Clarity

71 Section 40(3) of the Act requires the claims of a patent to be clear. Under s 138(3)(f) a claim of a patent may be revoked on the ground that the specification does not comply with s 40(3).

72 Lack of clarity is not established by mere ambiguity capable of being resolved by the ordinary processes of construction. To not be clear as required by s 40(3), the claim must be one that cannot be given meaning. Consistent with the discussion about construction issues above, the lack of a mid-point in claims 1 to 9 and 23 to 26 does not render these claims incapable of being given meaning. It also follows from the process of construction undertaken that the alleged lack of clarity is not established by the fact that “no method of testing is put forward” or the allegation that “the question of average particle size is hopelessly complicated”. As to the former, read through the eyes of the skilled addressee it is plain that the claims assume or pre-suppose the existence of test sieves and the commonly understood methods of their use for analysis of aggregates. As to the latter, the question of average particle size is complicated but not hopelessly so. Further, the evidence of the Australian Standards relating to test sieves and their methods of use is sufficient to establish that the skilled addressee of this patent would read the patent in the way I have described. Expert evidence by an actual skilled addressee to this effect is not necessary.

73 That said, I accept that claim 1, and claims dependent on it, do not specify how beads of the average particle size (or which must be assumed to be of that average size) are to be treated. I do not consider that this has the effect of making the claims invalid for lack of clarity. Only two options are open. Either those beads are part of the relatively large particle size range or they are part of the smaller particle size range. The integer does not permit the existence of such beads, if they exist, to be ignored. They must be allocated to one or other component. I do not consider that the lack of specificity about this issue renders the claims in question uncertain. It is possible that a sample of beads may be meaningfully tested and the test results show no beads of the average particle size or such a small proportion that the relative size of the major and minor components could never be affected. In other words, the issue is not so much one of construction (the construction issues can all be resolved, as set out above) but of proof of infringement if any material proportion of the sample happens to be of the average particle size.

74 I do not accept that the claims in issue are not clear within the meaning of s 40(3) of the Act.

###### 5.3 Inventive step/obviousness

75 Section 18(1)(b)(ii) of the Act requires a patentable invention, so far as claimed in any claim, to involve an inventive step. By s 138(3)(b) a claim of a patent may be revoked on the ground that the invention is not a patentable invention. Section 7(2) provides that an invention is taken to involve an inventive step when compared with the prior art base unless the invention would have been obvious to a person skilled in the relevant art in light of the common general knowledge as it existed in the relevant patent area before the priority date whether that knowledge is considered separately or together with the information mentioned in s 7(3).

76 The applicants submitted that there was no expert evidence from any person who could be considered to be skilled in the art to the effect that the claimed invention would have been obvious in light of the common general knowledge. Even if this is so, it is not an end to the issue of obviousness. I construed the patent through the eyes of the skilled addressee on the basis of documents, being the various Australian Standards, which I am satisfied would be part and parcel of the common general knowledge of the skilled addressee in order to give the claims meaning. Without this inference being drawn, the claims could not be construed in the way I have indicated and, in particular, the respondents’ arguments to the effect that the claims lacking an express mid-point could be given no meaning at all would be persuasive. In any event, the evidence of Scott Walker, an installer of road safety marking products since 1987, supports the inference I have drawn about the content of the common general knowledge. Hence, if the various Australian Standards disclose the same invention as the claims it must be the case that the invention itself is nothing more than part and parcel of the common general knowledge.

77 The relevant Australian Standard in this regard is AS 2009 published in 1991. The respondents contend that the invention is obvious because the Australian Standard, being part of the common general knowledge of the skilled addressee, discloses the invention. The applicants deny this on a number of bases. First, the applicants submitted that “cementitious material” means cement not resins and AS 2009 is concerned with resins. I have rejected this argument above. Second, the applicants submitted that AS 2009 does not include the integer of a barrier material interposed between the bead surfaces encapsulated within the matrix. To the contrary, any polymer in the road marking use is part of the matrix itself. To use the applicants’ words:

Further, … as Dr Scheirs explains the polymer “functions as a seal or barrier between the glass beads and the cement during hydration” …. There is no hydration reaction in matrices involving paint or thermoplastics or resin or two component sets on the evidence. The hydration reaction occurs because of the addition of water.

Another way of putting the matter is that there is nothing in the road marking evidence to suggest that a skilled addressee would regard it as useful or good idea to employ a barrier material between a glass bead and the usual road marking matrix. On the contrary, the material suggests and desire that the bead be in direct and uninhibited contact with the road marking matrix being thermoplastics or two component sets or paint because that matrix provides the adhesion. The road marking evidence teaches away from the combination disclosed in the patent.

78 The applicants also submitted that:

Equally there is nothing to suggest in the road marking evidence that there is any need or desire to use a combination of small and large size beads in order to achieve an interlocking effect within a cementitious matrix. To the extent there is any evidence which suggests the possibility of using large beads with small beads, and that evidence is far from clear, it does not involve any conception of the desirability of interpersal of different bead size ranges with the features of the claims in suit.

79 There is no doubt that AS 2009 discloses:

 “a substrate material having an interface surface”;

 “a reflective material disposed on the interface surface of said substrate and comprising a plurality of glass beads and a cementitious material providing a matrix for said glass beads, at least a portion of said glass beads at the surface of said matrix projecting out of the exposed surface of said matrix providing an exposed surface area of said glass beads and being at least partially encapsulated within said matrix to provide an encapsulated surface area of said glass beads”;

 “at least a portion of said glass beads having…the head surfaces encapsulated within said matrix and… bead surfaces projecting upwardly from said matrix”; and

 a particle size distribution for the beads.

80 As to the boundary material point, the difficulty for the applicants is that the claims must be construed as whole. Meaning must be given to all of the words of the claims recognising that the “cementitious material” may be a resin, which is a form of polymer. On this basis there is no need to construe the “boundary material” as being a material different in nature from the matrix itself. On the wording of this part of claim 1, the function of the boundary layer of barrier material is to ensure that the parts of the beads which are free from the matrix are not to have anything on their surface whereas the part of the beads encapsulated are to be separated from each other by the barrier material. Provided that the parts of the beads free from the matrix have no material separating them (that is are free from any barrier material) and the parts of the beads encapsulated within the matrix have material separating them (that is, the boundary layer of barrier material), the integer is satisfied. There is no additional integer relating to the effects of hydration as discussed by Dr Scheirs.

81 Accordingly, the only integers of claim 1 of the patent not disclosed in AS 2009 in precisely the combination as claimed thus far are those as follows:

said beads having an average Particle size within the range of 1.5-4.5 millimeters and a particle size distribution defining, major component of said beads within a relatively large incremental size range and a minor component of said beads within a smaller incremental size range wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range.

82 AS 2009 identifies what it describes as intermix glass beads in a size range of 0.425 mm to 1.18 mm and also discloses the use of large glass beads in road marking materials, such large beads being normally four to five times larger than so-called standard drop-on glass beads, which range in size from 0.075mm to 0.85mm. In other words, the use of large beads in the range of 0.3mm to 4.25mm is disclosed. However, AS 2009 does not disclose either the average particle size within the range of 1.5-4.5 millimeters, the use of a combination of small and larger beads, or such a use with the major and minor components as specified.

83 It follows that AS 2009 does not establish that the claimed invention was nothing more than part of the common general knowledge of a person skilled in the art at the priority date.

84 The evidence of Mr Walker also does not satisfy me that these aspects of the invention were part of the common general knowledge as at the priority date. Mr Walker’s evidence about his observations of road marking in Campbelltown was insufficient to infer that he observed anything to suggest an average particle size or size distribution as claimed. His evidence about the sample he was provided with was beset by numerous difficulties making it impossible to be satisfied that the sample he found for the purposes of his evidence was the sample with which he was initially provided or was relevant in any way to what he saw at Campbelltown. That said, the evidence of Mr Bennett that he did not know about elements of the invention does not satisfy me it was not obvious because I am not persuaded that Mr Bennett represents a person skilled in the relevant art.

85 What can be concluded is that, leaving aside s 7(3), the invention as claimed was not part of the common general knowledge. Nor can it be said that the invention does not expose a scintilla of ingenuity in light of the common general knowledge. I cannot be satisfied on the evidence that the person skilled in the art would be led as a matter of course to the invention as claimed in the reasonable expectation that it might work or produce a useful result because it is not apparent that any such expectation would have arisen in respect of the average particle size or particle size distribution.

86 In terms of s 7(3) of the Act, the difficulty is that of the respondents. The fact that Mr Walker found certain information in the course of preparing evidence for these proceedings does not establish that the skilled addressee, as at the priority date, could have been reasonably expected to ascertain, understand and regard as relevant any of the earlier patents referred to in the specification at all, let alone in combination with one another. Moreover, the specification does not suggest that those patents, or the information contained therein, itself formed part of the common general knowledge.

87 For these reasons the challenge on the basis of lack of inventive step or obviousness must fail.

###### 5.4 Novelty

5.4.1 General

88 Section 18(1)(b)(i) of the Act requires that a patentable invention be novel. As noted, if an invention is not a patentable invention the claims for the invention may be revoked under s s 138(3)(b) of the Act. By s 7(1) an invention is taken to be novel when compared with the prior art base unless it is not novel in light of the kinds of information in s 7(1)(a) to (c) which must be considered separately. This information includes prior art information made publicly available in a single document or though doing a single act.

89 The applicants’ description of the relevant principles about lack of novelty is sufficient for present purposes. The applicants submitted as follows:

A prior publication will not deprive an invention of novelty unless what it discloses is sufficient to permit a person with ordinary knowledge of the subject to be able to read, understand and practically apply the information disclosed without the necessity of making further experiments or gaining further information before the invention can be useful: *Hill v Evans* (1862) 31 LJ Ch 457. In *General Tire & Rubber Co v Firestone Tyre & Rubber Co Ltd* (1971) 1A IPR 121 at 138 the Court of Appeal (UK) stated that ‘the prior publication must contain clear and unmistakeable directions to do what the patentee claims to have invented … A signpost, however clear, upon the road to the patentee’s invention will not suffice. The prior inventor must be clearly shown to have planted his flag at the precise destination before the patentee*.*’ This passage was applied in *ICI Chemicals v Lubrizol Corporation* (2000) 106 FCR 214 [[2000] FCA 1349], and in numerous other cases.

Gyles J in *Apotex Pty Ltd v Sanofi-Aventis* (2008) 78 IPR 485 [[2008] FCA 1194] at 525 stated ‘anticipation is deadly but requires the accuracy of a sniper, not the firing of a 12 gauge shotgun.’ Further, where the invention claimed comprises a combination of integers, the prior publication must clearly disclose each of the integers: *Re ICI Chemicals & Polymers Ltd and Lubrizol Corp Inc* (1999) 45 IPR 577 [[1999] FCA 345] at 588 per Emmett J.

5.4.2 Prior art documents

90 The respondents rely on UK Patent GB 2,255,099A published on 28 October 1992 (the **UK patent**) and patent CH 665665 published on 31 May 1988 (the **Swiss patent**). Although put as part of a prior act, the respondents also refer to the parent application in this context.

91 I do not accept the applicants’ submissions that the UK patent cannot destroy the novelty of the patent because it relates to road marking compositions. The claims of the patent are not limited to use in swimming pools and must be construed as extending to road marking. I also do not accept the applicants’ submissions that the UK patent cannot destroy the novelty of the patent because it relates to resins. As discussed, “cementitious material” includes resins. Finally, I do not accept the applicants’ arguments to the same effect based on the requirement for a boundary layer of barrier material, my reasons for this being as set out above.

92 The UK patent discloses an invention comprising a road marking composition containing glass beads, a synthetic resin and aggregate. In other words, the UK patent discloses an invention comprising a cementitious material providing a matrix for glass beads. The glass beads are preferably to be retained on a 1.18 mm sieve (that is, be larger than 1.18 mm) in specified weight ratios including up to 55% being so retained. Further, the glass beads may include larger glass beads in the size range of 1.5 to 3.5 mm, the proportion of larger glass beads to aggregate being in a specified weight ratio range wherein the larger glass beads exceed the weight of the aggregate. The UK patent also discloses the use of any suitable plasticiser, which from the evidence I infer must be understood to mean a polymer. As such, leaving aside my preferred construction of the patent it is clear that the UK patent discloses the combination of an aggregate and a polymer as well as glass beads.

93 However, the respondents accepted that the UK patent does not anticipate claims 13 and following of the patent. Further, the respondents submitted that the UK patent does anticipate claims 1 to 9 on the basis that, because those claims do not define a mid-point, “any collection of beads including those disclosed in the UK patent will equally possess this feature or not”. I disagree for the reasons already given. I consider that the UK patent does not literally disclose either the particular average particle size range or particle size distribution integers of the patent. I say “literally disclose” because there is a principle that something less than a literal disclosure may suffice (referred to as “enabling” disclosure). If the disclosure is not complete but it is sufficient to enable the skilled addressee, in the ordinary course and without invention, to add what is missing in the prior publication to obtain the claimed invention, then the invention is not novel (*H Lundbeck A/S v Alphapharm Pty Ltd* (2009) 177 FCR 151; [2009] FCAFC 70 at [181]-[183]).

94 The respondents’ case is that the size range and particle size distributions in the patent are simply arbitrary and there is nothing inventive in the ranges and distributions claimed. I do not consider that this argument can be dismissed merely because the expert evidence in this case was not particularly helpful in disclosing the perspective of an uninventive person skilled in the art at the priority date. First, the UK patent discloses the use of glass beads in the size range of 1.5 to 3.5 mm. The only difference between that size range and the range claimed in the patent is the 1 mm at the upper end of the range (that is, 4.5 mm). Otherwise all of the size ranges claimed are within the disclosure of the UK patent. Given the nature of the invention, which involves relative proportions of large numbers of glass beads, the notion that there is anything inventive at all about adding one millimetre to the size range of the glass beads cannot possibly be accepted. The skilled addressee, in the ordinary course and without invention, would add what is missing in the prior publication to obtain the claimed invention. I cannot reach the same conclusion about the particle size distribution. The UK patent discloses a particle size distribution where more (55%) of the glass beads are larger than 1.18 mm. Hence, it discloses an invention where the major component of said beads within a relatively large incremental size range and a minor component of said beads is within a smaller incremental size range wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range, in accordance with the claimed invention. However, this does not relate to the larger glass beads. Insofar as the larger glass beads are concerned what is disclosed is a relationship between the beads and the aggregate, not the larger and smaller beads themselves.

95 For these reasons the UK patent does not destroy the novelty of the invention claimed in the patent.

96 The Swiss patent relates to road markings using glass beads embedded in the marking mass. The invention involves the use of glass beads at least 1.5 mm in diameter, preferably 2 to 3 mm, projecting from the surface of the marking mass. The specification identifies large glass beads as those of at least 1.5 mm in size, with conventional glass beads being smaller, between 0.15 and 0.8 mm. According to the specification the proportion by weight of the large glass beads can be between 25% and 60%, preferably 30% and 50%. The marking mass can be thermoplastic (that is, a polymer).

97 The difficulty for the respondents is that the Swiss patent identifies any glass bead of 1.5 mm or above as large, with those up to 60% (that is, the majority) by weight being large beads as opposed to smaller beads, such beads being between 0.15 and 0.8 mm. In other words, the combination of the size range and size distribution for the Swiss patent is different from the size range and size distribution for the patent in this case, the latter involving beads ranging from 1.5 to 4.5 mm with the particle size distribution wherein the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range.

98 From the evidence I cannot be satisfied that the disclosure in the Swiss patent, as at the priority date, would be sufficient to enable the skilled addressee, in the ordinary course and without invention, to add what is missing in the prior publication to obtain the claimed invention.

99 The respondents’ case in respect of the parent application cannot be understood as an argument to the effect that the parent application itself is a document that anticipates and thus destroys the novelty of the patent. This is because the respondents concede that the parent application does not disclose the particle size distribution integer of the patent. This is sufficient to reject the case to the extent that it involved a suggestion of lack of novelty by reason of the parent application. The role of the parent application in the respondents’ case more concerns the arguments about prior use.

5.4.3 Prior use

100 As the applicants submitted, in assessing the arguments of lack of novelty by reason of prior use, it is appropriate to have in mind a number of principles which emerge from the terms of s 7(1)(a) and (b) of the Act. As the applicants put it:

Pursuant to section 7(1)(b) of the Act, novelty may be lost in light of *‘prior art information.. made publicly in 2 or more related documents, through doing 2 or more related acts, if the relationship between the documents or acts is such that a person skilled in the relevant art would treat them as a single source of information.’* The Respondents have not pleaded that any of the identified separate acts are related acts or that a person skilled in the art would treat them as a single source of information. There is no evidence showing that any of the acts would be so understood by a person skilled in the relevant art, which would be required: *Ramset Fasteners (Aust) Pty Ltd v Advanced Building Systems Pty Ltd* (1999) 44 IPR 481 [[1999] FCA 898] at [13]. Thus, the acts must be treated separately and cannot be assembled into a mosaic: *Minnesota Mining & Manufacturing Co v Beiersdorf (Aust) Ltd* (1980) 144 CLR 253 at 292-3.

The test for anticipation by use is no less stringent than in the test for anticipation in a published document: *British American Tobacco (Investments) Ltd v Philip Morris Ltd* (1999) 47 IPR 351 [[1999] FCA 1203].

Importantly, information made publicly available by the doing of an act must be such as to enable a person skilled in the relevant art to put the claimed invention into practice if it is to amount to an anticipation of a patent claim for the purposes of English law: *Quantel Ltd v Spaceward Microsystems Ltd* [1990] RPC 83 (English Patent Court). A full court in *Jupiters Limited v Neurizon Pty Limited* (2005) 65 IPR 86 [[2005] FCAFC 90] referred to *Quantel* and held that to be novelty destroying the prior public use had to be such as enable disclosure of the essential features of the use which were said to anticipate the claimed invention (at [136]-[147]). The effect of that requirement is that any alleged prior use of a Beadcrete product must have been such as to enable the observation of the essential features of that product being features reflected in the claims in the Patent.

…

In *Old Digger v Azuko Pty Ltd* (2000) 51 IPR 43; [2000] FCA 676 at [156] von Doussa J said:

**[156]** The onus of proof is on the respondents to establish a clear case of invalidity: see *Montecatini Edison SpA v Eastman Kodak Co* (1971) 45 ALJR 593 at 595-6; 1B IPR 656 per Gibbs J. The evidence adduced by the respondents as to the prior use of the invention is the oral evidence of witnesses to the alleged use based on their recollections of events years beforehand. The alleged use is said to have taken place in the course of trialling reverse circulation percussive hammers incorporating prototype face sampling drill bit assemblies. The particular assemblies have not been produced in evidence. Oral evidence led in these circumstances must be viewed with particular caution, partly for the reason that the memory of the witnesses is likely to have been influenced by other products seen in the meantime, and to reflect reconstruction on the basis of these later observations: see *Commonwealth Industrial Gases Ltd v MWA Holdings Pty Ltd* (1970) 180 CLR 160 at 165-6 ; 1A IPR 113 at 119 and *Nicaro Holdings Pty Ltd v Martin Engineering Co* (1990 91 ALR 513 at 525; 16 IPR 545 at 549 per Gummow J.

As that passage records, the onus of proving prior use lies squarely on the cross claimants. There is no principle of patent law nor of evidence that a party challenging the validity of the patent need not fully establish a novelty destroying act of prior use or need only lead evidence up to a certain point and thereafter shift the onus to the patentee. *Blatch v Archer* is not such a principle. The plurality judgment said as much in *ASIC v Hellicar* (2012) 286 ALR 501; [2012] HCA 17:

**[165]** Disputed question of fact must be decided by a court according to the evidence that the parties adduce, not according to some speculation about what other evidence might possibly have been led. Principles governing the onus and standard of proof must faithfully be applied. And there are cases where demonstration that other evidence could have been, but was not, called may properly be taken to account in determining whether a party has proved its case to the requisite standard. But both the circumstances in which that may be done and the way in which the *absence* of evidence may be taken to account are confined by known and accepted principles which do not permit the course taken by the Court of Appeal of discounting the cogency of the evidence tendered by ASIC.

**[166]** Lord Mansfield’s dictum in *Blatch v Archer* [(1774) 1 Cowp 63 at 65; 98 ER 969 at 970] that “[i]t is certainly a maxim that all evidence is to be weighed according to the proof which it was in the power of one side to have produced, and in the power of the other to have contradicted” is not to be understood as countenancing any departure from any of these rules. Indeed, in *Blatch v Archer* itself, Lord Mansfield concluded that the maxim was not engaged for “it would have been very improper to have called” the person whose account of events was not available to the court.

101 There is one fundamental difficulty with all of the evidence said to establish prior use of the invention. It is that the evidence depends on an inference that all references to a product “Beadcrete” involve all integers of the invention claimed in the patent including, in particular, the particle size distribution integer. The inference is not supported by direct evidence of the particle size distribution involved in any of the prior uses. It is said to be supported by the evidence of prior use together with the evidence which establishes that:

(1) The inventor and applicant for the provisional application, parent application and the patent was Luke Kelly.

(2) On 16 February 1994 Mr Kelly applied for a trade mark “Beadcrete” in class 19 for goods described as “glass bead finish in swimming pool and spa construction…”.

(3) Mr Kelly was the director of Beadcrete International Pty Ltd and Beadcrete Australia Pty Ltd. He also was the director of the first applicant, Beadcrete Pty Ltd, from December 1995. Shortly thereafter he assigned his interests in the patents and trade mark to the first applicant. The assignment, dated 21 December 1995, included the invention, know-how and prior business of Beadcrete International Pty Ltd and Beadcrete Australia Pty Ltd. Before this date there is evidence that Mr Kelly exploited the Beadcrete product by supplying it for use to Burleigh Pools in 1995, who used it in construction of a spa at the premises of Burleigh Pools, and construction of two pools later in 1995 at Parkinson and Ashmore. The documents for the spa construction include a brochure from Beadcrete International which describes the use of glass beads, pebbles, white cement, and “other” for use in a swimming pool finish.

(4) The first applicant thus acquired a fully operational business on 21 December 1995, the business involving the exploitation of the invention the subject of the patent. This is confirmed by the first applicant’s website saying it has been in business since 1995.

(5) Mr Kelly, who remained with the business until 1998, arranged testing of the Beadcrete product in 1997, the samples being glass bead and aggregate blocks.

(6) The first applicant granted licences to third parties to exploit the Beadcrete product including to Mr Samuels between 1997 and 2005.

(7) The first applicant obtained further test results in 1998, the samples having been supplied by “Beadcrete Staff” and comprising “polymer-modified topping mortar impregnated with glass”. These test results are still used to promote the product today on the applicants’ websites.

(8) The parent application filed in February 1995 had all of the integers of the invention except the particle size distribution. The application for the patent was not the result of any further testing or development of the product. There was a negative examiner’s report on the parent application on the basis of lack of novelty. The application for the patent narrowed the claimed invention to avoid the prior art by, amongst other things, introducing the particle size distribution. It should be inferred that this reflects the actual product Beadcrete had been supplying since 1995 not any new invention.

(9) The person best placed to give evidence contrary to the inference which should be drawn that the product had been in use since 1994/1995 would be Mr Carden, the director of the first applicant since 1995 who remains a director today. Mr Carden did not give evidence to the contrary of the inference the respondents said should be drawn.

102 There is no doubt from this evidence that from about February 1995 there was used a product known as “Beadcrete”, supplied by a company which Mr Kelly established, the product involving glass beads in a surface finish for swimming pools which may be inferred to involve a matrix of a cementitious material. There is some, albeit not much, evidence which might support an inference that the product involved use of a polymer as required by some of the claims of the patent or as a barrier material in accordance with other claims including claim 1. That evidence involves a form of reasoning I find unpersuasive – namely, that if a polymer had not been used then the evidence of Dr Scheirs and Mr Bennett would suggest that the beads would have popped out or the matrix would have cracked. I would not be prepared to draw the inference of use of a polymer from 1995 onwards in the “Beadcrete product”. Even if I had been prepared to draw that inference the problem of the particular particle size distribution remains. The basis for that inference is extremely weak; indeed, it involves a speculative leap based on the notion that the respondents had adduced sufficient evidence to raise a suspicion that the “Beadcrete product” used from 1995 onwards involved the same particle size distribution as the invention claimed so that the applicants had the onus of disproving that suspicion.

103 First, and as the applicants noted, there is no evidence that the applicants’ current “Beadcrete product” involves all of the integers of the invention claimed in the patent. Hence, the notion of a continuance of use from 1995 to today’s date involved an unfounded assumption about the current product.

104 Second, even if the current product does use all of the integers of the claimed invention, that does not support an inference that the earlier uses, including any of those before the filing of the patent application, involved all of the integers of the claimed invention. In this regard, Mr Bennett’s evidence that he was only aware of limited and unsuccessful experimentation with glass bead surface finishes in swimming pools before 2000, after which he became aware of the successful commercialisation of this product, is relevant. It supports the inference that there was further development in this area in or around 2000.

105 Third, and as stated in *Australian Securities and Investments Commission v Hellicar* (2012) 286 ALR 501; [2012] HCA 17, at [232], “two consequences can flow from the unexplained failure of a party to call a witness whom that party would be expected to call. One is that the trier of fact may infer that the evidence of the absent witness would not assist the case of that party. The other is that the trier of fact may draw an inference unfavourable to that party with greater confidence. But *Jones v Dunkel* [(1959) 101 CLR 298] does not enable the trier of fact to infer that the evidence of the absent witness would have been positively adverse to that party”. Applying these principles, it is not apparent why the applicants would have been “expected” to call Mr Carden given that the respondents bore the onus of proof on this issue. Even if any such expectation could arise given the evidence adduced by the respondents, lack of evidence from Mr Carden does not fill the obvious gap in the respondents’ case, as to the particle size distribution of the uses in question, which the evidence leaves in the realm of mere suspicion and speculation rather than available inference from evidence.

106 Fourth, in *Insta Image Pty Ltd v KD Kanopy Australasia Pty Ltd* (2008) 78 IPR 20; [2008] FCAFC 139 at [124] the Full Court identified that for information to be “publicly available” through the doing of a prior act the information “said to destroy novelty must “enable” the notional person skilled in the art at once to perceive, to understand, and to be able practically to apply the discovery, without the need to carry out further experiments in order to arrive at that point”. The evidence of prior use, each act of which must be considered separately, does not establish that the person skilled in the art would have perceived and understood and been practically able to apply the invention including, in particular, the particle size distribution integer.

107 For these reasons, it is not necessary to traverse the evidence of each alleged prior use. All of the evidence of prior use fails on at least two grounds as specified, the first being the lack of a proper foundation for an inference that the “Beadcrete product” the subject of the prior use evidence contained all of the integers of the claimed invention (particularly the particle size distribution) and the second being that even if the uses did contain that integer the lack of a proper foundation for an inference that the person skilled in the art would have perceived and understood and been practically able to apply the invention including that integer.

###### 5.5 Manner of manufacture

108 Section 18(1)(a) of the Act requires that a patentable invention involve a manner of manufacture. As noted, if an invention is not a patentable invention the claims for the invention may be revoked under s s 138(3)(b) of the Act.

109 The respondents made the following submissions:

The specification describes the known use of modified cement with glass beads of different sizes in surface applications, including but not limited to road markings. In this context the patent discusses the known use of glass beads as aggregate mixed with cementitious materials (p.1 lines 18-22) and the known difficulties of bonding with glass due to its insufficient porosity and toughness as well as the compromise to the bond by “*alkalinity bleeding out from the glass beads*” (p.1 line 23 to p.2 line 5). Prior art approaches are discussed from pages 2 to 3 including in particular EP 518854 which describes “*a cement formulation incorporating glass beads in which a particular particle size distribution of small and large beads is employed to ensure good reflectivity and a compaction of the beads so that they are firmly incorporated into the cement matrix through the use of an adhesive agent*”. The glass components are employed in large particle size components of 1.5 – 2mm and small particle size components of 1.2 – 1.5 mm, having relative concentrations in which the smaller size component is present in greater amount than the large size component, preferably by 2:1.

The alleged invention of the Beadcrete patent, read in the light of the discussion on the face of the specification, in particular the EP 518854, lacks the quality of inventiveness necessary for there to be a proper subject of letters patent. It simply adopts an unremarkable range of bead sizes and inverts the requirement of small beads than big beads. No particular advantage is stated by this simple inversion. The Respondents submit that there is none.

The Respondents submit this is not a manner of manufacture.

110 The applicants, citing *Lockwood Security Products Pty Ltd v Doric Products Pty Ltd* (2007) 235 CLR 173; [2007] HCA 21 at [106], said that this ground was not available as the specification contained no admission on its face that the invention is not novel or involves no inventive step.

111 The position of the applicants should be accepted. The specification does not disclose on its face any lack of novelty or inventive step compared to the prior art. To the contrary it indicates that the particular particle size range and distribution of the invention claimed is an advance over the prior art. It cannot properly be inferred on the state of the evidence that the particle size distribution was obvious, for the reasons already given. It follows that this ground of challenge to the validity of the patent also cannot succeed.

###### 5.6 Conclusions about validity

112 Accordingly, I do not accept that the respondents have established that the patent should be revoked. It is therefore necessary to consider whether the applicants have established infringement of the patent as alleged.

##### 6. INFRINGEMENT

###### 6.1 Test for infringement

113 The test for infringement was not in dispute.

114 To establish infringement it must be proved that the respondents have taken “each and every one of the essential integers” of the claim (*Olin Corporation v Super Cartridge Co. Pty Ltd* (1977) 180 CLR 236 at 246 citing *Rodi & Wienenberger AG v Henry Showell Ltd* [1969] RPC 367 at 391). In considering infringement, it is “the substantial idea disclosed by the specification and made the subject of a definite claim” that is relevant (*Radiation Limited v Galliers and Klaerr Pty Ltd* (1938) 60 CLR 36 at 51 cited in *Fresenius* at [50]).

115 The applicants rely on s 117 of the Act to establish infringement. Section 117 is in these terms:

(1) If the use of a product by a person would infringe a patent, the supply of that product by one person to another is an infringement of the patent by the supplier unless the supplier is the patentee or licensee of the patent.

(2) A reference in subsection (1) to the use of a product by a person is a reference to:

(a) if the product is capable of only one reasonable use, having regard to its nature or design--that use; or

(b) if the product is not a staple commercial product--any use of the product, if the supplier had reason to believe that the person would put it to that use; or

(c) in any case--the use of the product in accordance with any instructions for the use of the product, or any inducement to use the product, given to the person by the supplier or contained in an advertisement published by or with the authority of the supplier.

116 The applicants contend that each of ss 117(2)(a)-(c) is satisfied on the facts of this case in respect of the alleged infringements, being infringements of claims 1 to 3, 9 to 13, 20, 21, and 23 to 26.

###### 6.2 Discussion

117 A number of contentions on behalf of the applicants and the respondents can be dismissed with relative ease.

118 As to the applicants, claims 13, 20, 21 and 23 to 26 all require the presence of a latex polymer “in an amount within the range of at least 2 wt.% of the glass beads in said formulation but less than 8 wt.% of the total amount of cement and glass beads in said formulation”. According to the applicants this integer is present in the product supplied because:

 the respondents instruct users of their product that for every 500 ml of the Geo Polymer, 20 kg of Portland cement and 40 kg of glass beads are to be used;

 according to the evidence, the specific gravity of the Geo Polymer is 1: 2 to water so that 500 ml of Geo Polymer equates to 0.6 kg of polymer;

 0.6 kg of polymer divided by 40 kg of glass beads equals 1.5% by weight of polymer to glass beads.

119 The applicants submitted that 1.5% by weight of polymer to glass beads satisfies the integer in circumstances where: - (i) the products are used in large quantities for swimming pool linings so that only approximate quantities are involved in any event, and (ii) the product information sheets indicate that the 500 ml is a guide only and as the Geo Polymer is the key means to prevent the alkalinity bleeding out from the glass beads, it is likely that more rather than less than 500 ml would be used.

120 I do not accept these submissions. For the reasons given in respect of the construction of the claims, I am satisfied that the integer in question requires there to be there must be at least 2% by weight of a latex polymer in the overall dry cement formulation. Even on the best view of the facts from the applicants’ perspective, there is only 1.5% latex polymer in the formulation supplied by the respondents. Recourse to speculation that more than 500 ml of Geo Polymer might be used given the large quantities involved in the on-site mixing process is unpersuasive. The respondents supply glass beads and a polymer (in a liquid form) and instruct the proportions of each to be used. The fact that the proportions are a guide leaves open the mere possibility that a person to whom a supply is made might use more polymer than recommended. But this falls far short of establishing proof of infringement based on s 117(2)(a) – (c) of the Act.

121 In addition, and also as discussed, claim 13 and its dependent claims concern an invention said to be a dry formulation in which each of the three components (cement, beads and latex) are also dry, all adapted to be hydrated. The respondents do not supply a dry polymer. They supply a liquid polymer. The notion that the integer contemplates the calculation of the specific gravity of a liquid polymer to obtain a weight ratio to glass beads is unpersuasive. The contention of infringement must also fail for this reason.

122 This leaves for resolution the allegations of infringement of claims 1 to 3 and 9 to 11.

123 As to the respondents, the evidence referred to above establishes that each is responsible for the supply of the Jewels4Pools glass beads and Geo Polymer and the instructions to customers for its use as a surface finish for pools by mixing with Portland cement. It is true that there is no evidence that any particular person has used their product (the glass beads and Geo Polymer) in lining a swimming pool with only one colour of the glass beads. Nevertheless it may and should be inferred that people have used the products supplied by the respondents in accordance with the instructions. It is also true that the evidence establishes that the colours of glass beads which the applicants subjected to testing by Boral are but four colours available from a range of hundreds of colours which, to the respondents’ knowledge, have been previously used in combination with other colours and not in isolation. Contrary to the applicants’ contentions I accept that these facts are relevant to proof of infringement under s 117(2)(a) and (b) of the Act.

124 In terms of s 117(2)(b) I do not accept that the alleged infringing products, the glass beads and Geo Polymer, are capable of only one reasonable use. Although sold by the respondents primarily for use in constructing linings for swimming pools and spa pools, the evidence indicates that these products would be suitable for other uses in common with the invention claimed by the applicant which is said to be suitable as a surface finish on a variety of surfaces. The evidence indicates that the product supplied by the respondents would be able to be used as a surface finish in a wide range of applications not just swimming pools and spa pools. For example, a website description says the product has “100’s of applications, pools, gardens, ponds and many more”. Hence, s 117(2)(a) is inapplicable.

125 In terms of s 117(2)(b), the evidence is that customers have not to date requested supply of only one colour of glass beads. Accordingly, it is difficult to accept that the respondents have had, or would have, reason to believe that any one of the four colours of glass beads which the applicants arranged for Boral to test would be used in isolation from other colours. The relevant point, however, is that the evidence from the respondents’ own documents is that its glass beads are “selectively graded for pool linings in grades of 1-3 mm and 3-5 mm”. This must be inferred to apply to all colours offered for sale. It follows that the four colours selected for testing must be inferred to be representative of the respondents’ product in the 1-3 mm grade. When this is taken with the evidence referred to in the context of s 117(2)(c) below, I consider that the respondents do have reason to believe that a person would put their product to use by selecting a single colour of glass beads. Hence, if one of the four colours tested by the applicants infringes the patent, infringement is established under s 117(2)(b).

126 In terms of s 117(2)(c) I do not accept the respondents’ characterisations of their instructions to use the product. The respondents said that people are instructed to use the glass beads in different colour combinations. In fact, the instructions are to the effect that there are “hundreds of colours and combinations”, “a magnificent range of colours and combinations”, there being “100’s of colours and combinations to choose from and a person may select “any combination of colours you wish to choose”, there being “freedom of choice with colour”. In other words, the respondents instruct that the product may be used as the customer sees fit, either with a single colour or any combination of colours from those available. This satisfies the requirement for instructions to use the product in both these ways; that is, by use of a single colour or a combination of colours. It follows that if one of the four colours tested by the applicants infringes the patent, infringement is established under s 117(2)(c).

127 I also do not accept the respondents’ case that the applicants could only prove infringement by locating a pool in which the respondents’ product has been used and testing the product as used in that application. That is one way the applicants might have proved infringement. But ss 117(1) and (2) do not require proof of that kind. It is clear that the respondents supply a product comprising glass beads and Geo Polymer instructed for use and which the respondents believe will be used, and in fact has been used by many people, in swimming and spa pool linings. As noted, if the applicants can prove any colour of glass beads as tested, when used as instructed with the Geo Polymer, would infringe the patent, then infringement is established by operation of ss 117(2)(b) and (c).

128 The fact that the respondents supply only the glass beads and Geo Polymer is not to the point. The respondents direct the use of those products with cement, which is a “cementitious material” within the meaning of the claims of the patent. It is also clear from the evidence that at least a portion of the glass beads will project out of the cementitious matrix. Based on Mr Bennett’s experience it should also be inferred that it is likely that no more than 40% of the glass beads will be exposed. Given their own experience in lining swimming pools I infer that the respondents have reason to believe that their product would be used in this way.

129 The real issue between the parties is the construction of the claims and the evidence of infringement of the particle size distribution requirement. I have resolved the construction issues above in favour of the applicants in this regard. The remaining question is whether the evidence establishes infringement.

130 In respect of the weight that can or should be given to the Boral test results, I do not accept the thrust of the respondents’ case. The respondents made much of the fact that the applicants obtained one set of test results from Boral which used one set of sieve sizes and another set of test results from Boral which used a different set of sieve sizes. There is no question that the second test was obtained by the applicants on instructions from Mr Carden and using additional sieves which Mr Carden purchased and asked Boral to use. The respondents’ submission is that the second test results must be disregarded for these reasons and also because the test sieves used on the second occasion are not sizes in accordance with AS 1141.

131 I disagree with these submissions. There was nothing improper about the conduct of the applicants, including Mr Carden. The fact that Mr Carden was not called to give evidence is immaterial. It is obvious that the test seizes initially used by Boral, in accordance with AS 1141, could provide little if anything meaningful about the issue to which the tests were intended to relate, being possible infringement of the claims of the patent. It is the parameters set by the claims of the patent which dictate, or should dictate, the relevant sieve sizes used. Provided the sieves are standard sieves properly calibrated (and in this case the evidence is that they were) it was open to the parties to perform tests using any sieve size they liked. The question would then be whether such a test provides anything meaningful to the integers of the claims in issue. Given that the integer in issue involves an average particle size within the range of 1.5-4.5 mm and a particle size distribution where the major component of the beads is within a relatively large incremental size range and a minor component of the beads is within a smaller incremental size range and the weight of beads in the large incremental size range is greater than the weight of beads within the small incremental size range, testing the respondents’ product using sieves of 75, 150, 300, 425, and 600 microns and 1.18 mm, 2.36 mm and 4.75 mm was always unlikely to produce any meaningful result. The sieve size of 4.75 mm is larger than the largest size in the integer and unsurprisingly 100% of the beads passed through that sieve. Ninety one per cent passed the 2.36 mm sieve and 2% passed the 1.18 mm sieve. The sieve sizes are unsuitable for providing meaningful information about the possible infringement of the claims.

132 The second test, however, involves the use of standard sieves suited to analysis of the issue of potential infringement of the claims. It uses sieve sizes of 75 and 850 microns and 1, 1.18, 1.40, 1.70, 2.00, 2.36, 2.80, 3.35 and 4.75 mm. The fact that these sizes do not accord with AS 1141 is immaterial. The product in this case is a form of aggregate of a particular kind. It is being tested for the purpose of these proceedings and not otherwise. The sieves used are proper standard sieves in accordance with AS 1152 and testing was properly carried out by Boral. Accordingly, the results of the second test should be seen as reliable and properly able to be used in resolving the question of infringement.

133 I have already explained that I consider that the particle size distribution integer must be construed as requiring identification of the weighted average particle size based on the weight distribution of different sizes of particles assuming (as instructed by the specification) an even distribution of beads across the major and minor increments.

134 It can be seen from the second Boral test results that the percentage by weight of each sample of the respondents’ products (four products as described) which passed through and were retained on the test sieves were as set out in the following table, as provided by the applicants:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lab Sample** | **122040** | **122040** | **122041** | **122041** |
| AS1141.11.1 Sieve | Jewels 4 Pools Clear  1-3mm | Jewels 4 Pools Clear  1-3mm | Jewels 4 Pools Green  1-3mm | Jewels 4 Pools Green  1-3mm |
|  | **% Passing** | **% Retained** | **% Passing** | **% Retained** |
|  |  |  |  |  |
| 4.75mm |  |  | 100 | 0 |
| 3.35mm | 100 | 0 | 99 | 1 |
| 2.80mm | 99 | 1 | 92 | 7 |
| 2.36mm | 92 | 7 | 72 | 20 |
| 2.00mm | 63 | 29 | 42 | 30 |
| 1.70mm | 33 | 30 | 28 | 14 |
| 1.40mm | 5 | 28 | 16 | 12 |
| 1.18mm | 2 | 3 | 10 | 6 |
| 1.00mm | 1 | 1 | 6 | 4 |
| .850mm | 1 | 0 | 4 | 2 |
| 75micron | Nil | 1 | Nil | 4 |
|  |  | 100% |  | 100% |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lab Sample** | **122042** | **122042** | **122043** | **122043** |
| AS1141.11.1 Sieve | Jewels 4 Pools Ice  Blue 1-3mm | Jewels 4 Pools Ice  Blue 1-3mm | Jewels 4 Pools Cobalt  Blue 1-3mm | Jewels 4 Pools Cobalt  Blue 1-3mm |
|  | **% Passing** | **% Retained** | **% Passing** | **% Retained** |
|  |  |  |  |  |
| 4.75mm | 100 | 0 |  |  |
| 3.35mm | 99 | 1 | 100 | 0 |
| 2.80mm | 86 | 13 | 91 | 9 |
| 2.36mm | 74 | 12 | 78 | 13 |
| 2.00mm | 58 | 16 | 63 | 15 |
| 1.70mm | 47 | 11 | 50 | 13 |
| 1.40mm | 32 | 15 | 34 | 16 |
| 1.18mm | 23 | 9 | 22 | 12 |
| 1.00mm | 14 | 9 | 11 | 11 |
| .850mm | 9 | 5 | 5 | 6 |
| 75micron | Nil | 9 | Nil | 5 |
|  |  | 100% |  | 100% |

135 The weighted average particle size of each sample is then obtained by multiplying the percentage retained on the sieve by the sieve size, adding up the results of this calculation and dividing by 100. It is true that this method of identifying the weighted average particle size assumes that the beads retained on the sieve are the same as the size of the sieve when, in fact, the beads will be between that sieve size and the next sieve size up. Hence, for the respondents’ clear beads, using the standard rounding that Boral used (as appropriate), none of the beads were retained on the 3.35 mm sieve so all of the beads were less than 3.35 mm in size. One percent was retained on the 2.80 mm sieve so 99% of the sample was less than 2.8 mm in size. Of that 99%, 7% was retained on the 2.36 mm sieve so 7% must be between 2.36 mm and 2.80 mm in size but the distribution of beads within this range (that is, the between sieve sizes range) is unknown. Given that the skilled addressee would know that sieve testing is the only practical way to identify the average particle size of the beads it must be accepted that the calculation of the average size and distribution is to be done on this basis. In the present cases, moreover, there are five sizes of sieve within the range of 1.5 to 4.5 mm, being the relevant integer of the claims of the patent. And as the applicant said, even if it were possible to test within that range at every 1 mm size interval (which it is not) the effect on the available results could not be to reduce the average particle size. The effect could only be to increase the average particle size in circumstances where, in no case on the results, could it be possible for the average particle size to exceed or even come close to the top of the range at 4.5 mm.

136 On this basis the weighted average particle size is 1.72 mm for the clear beads, 1.84 mm for the green beads, 1.64 mm for the ice blue beads and 1.83 mm for the cobalt blue beads. The calculation for the clear beads is provided as an example, being:

**Step 1**

1% = 0.01 x 2.80 mm x 100 = 2.8

7% = 0.07 x 2.36 mm x 100 = 16.52

29% = 0.29 x 2.00 mm x 100 = 58

30% = 0.3 x 1.70 mm x 100 = 51

28% = 0.28 x 1.40 mm x 100 = 39.20

3% = 0.03 x 1.18 mm x 100 = 3.54

1% = 0.01 x 1.00 mm x 100 = 1.00

1% = 0.01 x 0.075 mm x 100 = 0.075

**Step 2**

Add up 2.8 + 16.52 + 58 + 51 + 39.20 + 3.54 + 1.00 + 0.075

Equals 172.135

**Step 3**

Divide 172.135 by 100 = 1.72 mm.

137 The same calculation for each sample results in the average particle size of 1.84 mm for the green beads, 1.64 mm for the ice blue beads and 1.83 mm for the cobalt blue beads. Accordingly, all of the respondents’ samples satisfy the integer of an average particle size within the range of 1.5 to 4.5 mm.

138 As to the particle size distribution, the large incremental size range and the smaller incremental size range in claims 1 to 3 are to be identified, and can only be identified, by reference to the average particle size for each sample. Where, as here, the integer speaks in terms of larger and smaller size ranges the relevant defining point is the average size.

139 For the clear beads the evidence establishes that of the total sample, 37% by weight of the beads are of 2 mm in size or above, 30% is somewhere in the size range of 1.7 mm to less than 2 mm, and 33% is less than 1.7 mm. The problem, accordingly, is that a material proportion of the beads, 30%, are in the size range of 1.7 mm to less than 2 mm. The sizes within that range are unknown. As the applicants bore the onus of proof it cannot be inferred that any of those beads are greater than 1.72 mm. All of those beads might be 1.7 mm, which is less than the average particle size for the clear beads. If that 30% is allocated to the smaller size range then the integer is not satisfied as the major component of the beads is not within a relatively large incremental size range and the minor component of the beads is within a smaller incremental size range and the weight of beads in the large incremental size range is not greater than the weight of beads within the small incremental size range. It follows that the applicants have not proved any infringement of claims 1 to 3 or any claim dependent on claim 1 by the test results they adduced. In this regard, I do not accept the applicants’ submissions to the contrary that a skilled addressee would not assume that beads retained on the 1.70 mm sieve should be allocated to the smaller size range. This is an issue of proof of infringement. The applicants have not proved that any bead retained on the 1.7 mm sieve in fact exceeds 1.7 mm in size. No rational inference can be drawn to that effect. If all those beads are 1.7 mm in size then there is equally no rational reason to place those beads in the larger as opposed to the small incremental size range.

140 For the green beads, the average particle size is 1.84 mm. At 2.00 mm and above (by definition, all part of the relatively larger size range) 58% by weight of the beads were retained on the sieves. For the ice blue beads, the average particle size is 1.64 mm. At 1.7 mm and above (by definition, all part of the relatively larger size range) 53% by weight of the beads were retained on the sieves.

141 For the cobalt blue beads, the average particle size is 1.83 mm. At 2.00 mm and above (by definition, all part of the relatively larger size range) 37% by weight of the beads were retained on the sieves. The amount retained on the 1.7 mm sieve is 13% by weight. This would mean that even if all beads between 1.7 mm and 2.00 mm were assumed to be of at least 1.83 mm in size (an unjustifiable assumption in the applicants’ favour) the percentage by weight of beads would still only be 50% when the integer requires that the weight of the large size beads be greater than the weight of the small size beads.

142 Accordingly, the applicants have not proved infringement of claims 1 to 3 or 9 in respect of the supply by the respondents of the clear or cobalt blue products. They have proved infringement of claim 1 for the green and ice blue product. As to the claims 2 and 3, which require a weight ratio (2-3 and 2-2.26 respectively), for the green beads the weight ratio is 58% to 42% or 1.6. For the ice blue beads the weight ratio is 53% to 47% or 0.6. It follows that the applicants have not proved any infringement of claims 2 and 3.

143 Claim 10 remains.

144 The first problem for the applicants is that claim 10 requires “[t]he combination of claim 1 wherein said glass beads glass beads having a particle size distribution ranging from a lower value to an upper value having a magnitude no more than three times the magnitude of said lower value”. The actual particle size distribution for all products tested exceeds the three times limit. It is not apparent to me why the beads above 2.8 mm are required to be excluded from consideration as the applicants submitted. Even if beads less than 1.00 mm are treated as “dust”, as the applicants said would be appropriate, the distribution exceeds the three times limit for the green and ice blue products but not necessarily for the clear and cobalt blue products. I say not necessarily, because some of those beads may be larger than 3.00 mm given the sieve sizes of 2.8 mm and 3.35 mm. As the applicants bear the onus, this issue would not be assumed in their favour and claim 10 also would not be infringed for these products. In this regard I do not accept that the reference in the specification to preferably at least 90% of the distribution falling within the designated ranges can be read into the claims.

145 The second problem for the applicants is that the midpoint of the upper and lower values, on this basis, is 1.9 mm for the clear and cobalt blue beads (the lower value being 1 mm and the upper value being 2.8 mm) and 2.175 mm for the green and ice blue beads (the lower value being 1 mm and the upper value being 3.35 mm). On these midpoints, the average values above and below the midpoints do not result in a greater weight of beads in the relatively large as opposed to the smaller size range. The applicants’ approach appears to disregard at least the actual upper value (accepting, for the purposes of this analysis, that anything below 1 mm may be disregarded as “dust”) and to treat the reference to an “average value” as an invitation to an arbitrary allocation to the larger and smaller ranges. However, it seems to me that the ranges come first and whether the average value satisfies the description is then to be assessed. As the respondents noted, the applicants’ approach treats everything retained on the 1.7 mm sieve as in the relatively large size range. However, the sieve sizes straddle the actual midpoints of 1.9 mm and 2.175 mm. The result is to include beads smaller than the midpoints in the relatively large size range.

146 For these reasons I do not accept that the applicants have established any infringement of claim 10.

##### 7. CONCLUSIONS

147 The respondents have not established invalidity of the patent. The applicants have established infringement but on a more limited basis than claimed, being infringement of claim 1 by supply for use of the Jewels4Pools 1-3 mm green and ice blue products if those products are used in isolation (or in combination with each other) but have not proved infringement if these products are used in combination with any other Jewels4Pools glass beads. Otherwise the applicants have not proved infringement of any of the claims of the patent by the respondents. It seems to me that orders should reflect the limited extent of the infringements proved. However, I propose to hear the parties further on the form of the orders which should be made and the question of costs. Directions will be made accordingly.

|  |
| --- |
| I certify that the preceding One hundred and forty seven (147) numbered paragraphs are a true copy of the Reasons for Judgment herein of the Honourable Justice Jagot. |

Associate:

Dated: 8 March 2013