SPORTS&PLAY
INDUSTRY ASSOCIATION LIMITED

GUIDE SPECIFICATIONS FOR

TENNIS COURT CONSTRUCTION

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Updated May 2017

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SECTION 1.0 · TENNIS COURT CONTRACTORS

1.1 SELECTION CRITERIA

1.1.1 General

Since building or resurfacing one or more tennis courts is not only relatively expensive but also a long term investment, special care should be taken in the selection of professionals involved in the project.

1.1.2 Developing Working Practices

In the construction of a tennis court, there are many instances where problems relating to slope, layout, orientation and the like are such that to proceed without the advice and experience of a member of the Sports And Play Industry Association Limited (formerly the Sports Contractors Association and Tennis Court & Sports Field Builders Association of Australasia) who is experienced in tennis court design would be unwise. Therefore the main factors which need to be considered in the development and use of suitable specifications include:

(a) proper court size;
(b) orientation of courts;
(c) slope and drainage of courts;
(d) base and construction materials;
(e) type and speed of surface; and
(f) general information on lighting, fencing, nets, net posts, windscreens, maintenance and resurfacing.

1.1.3 Selection of Tennis Court Contractor

Once working specifications have been developed, a qualified contractor should be selected. Consideration of the following factors is recommended:

(a) Submissions should be based on similar specifications.

(b) The contractor should be knowledgeable about and have had experience in dealing with slope, drainage, base materials, types of surfaces, lighting, fencing, nets, net posts, maintenance, resurfacing and acceptable tolerances.

(c) Upon request, the contractor should provide references. First-hand inspection of courts built by the contractor is recommended. In checking these references, attention should be paid to:

    (i) experience;
    (ii) workmanship;
    (iii) ability to meet schedules;
    (iv) financial responsibility; and
    (v) previous customers' general satisfaction.

(d) The contractor should provide a guarantee against defective materials or workmanship.

SECTION 2.0 · CONDITIONS FOR CONSTRUCTION

2.1 GENERAL

Prior to construction, the contract documents should be determined and signed by the respective parties. In these documents, the scope of work, related permits, site preparation details and tennis court orientation should be included and agreed upon. Dimensions and design gradients need also to be confirmed prior to the commencement of works, with general landscaping details to be considered and mentioned to clear up any uncertainties which may arise once works have commenced.

2.2 CONTRACT DOCUMENTS

The contract documents should consist of the Sports And Play Industry Association (formerly known as the Sports Contractors Association and Tennis Court & Sports Field Builders Association of Australasia) Agreement, duly completed and signed by all parties prior to commencement of works. This agreement will include full detailed requirements relative to:

(a) pegging out the site;
(b) access requirements;
(c) completion time;
(d) payment terms;
(e) insurance details; and
(f) guarantees.

2.2.1 Scope of Work

This should include all labour, materials, and equipment as agreed by all parties, and be attached to the contract documents.

2.2.2 Permits

All permits and authorisations required for the construction as detailed in Scope of Works must be obtained prior to commencement, either by the SPORTS AND PLAY INDUSTRY ASSOCIATION LTD Member or owner as detailed in the agreement, and this to be attached to the contract documents.

2.3 GUIDELINES FOR SITE PREPARATION

2.3.1 Site Stripping and Clearance

Unless otherwise specified, grass, topsoil and other unsuitable materials shall be removed from the court area, and further removed from the site. All trees and stumps are to be similarly removed, such areas backfilled and compacted as per Australian Standards.

2.3.2 Earthworks

Where it is necessary to raise the levels of all or part of the court area, such filled material should be free of organic and/or unsuitable material and shall be placed in layers not exceeding 250mm in depth. Each layer will be suitably compacted prior to the laying of the next layer, to a minimum Australian Standard of 95% standard compaction.

The water content of the fill should be reduced by aeration or increased by adding water as necessary to achieve this required compaction.

Where the natural soil at the bottom of the sub-base course is stable, as evidenced by stability under construction equipment, hand auger or other exploration, base course materials can be placed on this soil. Soft clay areas can be stabilised by appropriate civil engineering techniques. The use of geotextile membranes may be considered for larger areas.

2.3.3 Inspection and Testing

Compliance with these guidelines can best be determined by inspection and tested by a qualified engineer or technician. Responsibility for the cost of such inspection should be agreed upon in advance between the owner and the contractor.

2.3.4 Finished Surface Levels

The proposed court levels should be detailed in the Scope of Works. The contractor should advise the client in writing if any alteration to such levels is required.

2.4 TENNIS COURT ORIENTATION

The ideal court orientation is North-South. The location in respect of property boundaries, and neighbour residences should be fully discussed and detailed in the Scope of Works.

2.5 DIMENSIONS

2.5.1 Court Lines

The playing line marking must be in accordance with the Australian Industry Standards, which is 23.77m (length) x 10.97m (width). The centre service line and centre mark line must be 50mm wide. All other lines except the baseline may be 25mm-50mm wide. The base line may be 25mm-100mm wide. All measurements are to the outside of the lines.

2.5.2 Court Area Dimensions (fence to fence)

The official Championship court area will be not less than: 36.57m (length) x 18.30m (width).
For normal competition play, these dimensions may be reduced to not less than: 33.50m (length) x 16.40m (width).
The minimum recommended court area is 30.48m (length) x 15.2m (width).

2.6 DESIGN GRADIENTS

The recommended gradients for porous courts are between 1:200 & 1:250 preferably in two planes.
The recommended gradients for non-porous courts are between 1:100 & 1:120 preferably in two planes.

2.7 GENERAL LANDSCAPE CONSIDERATIONS

Perimeter landscaping often adds dramatically to the aesthetic appearance of tennis courts. Therefore, the following items must be considered:

(a) soil level on garden beds should be such that heavy rain does not wash this soil onto the court surface;
(b) garden sprinkler systems should direct water away from court surfaces;
(c) any vines or creeper growth should be restricted to a mesh fence designed to support the weight of such creepers;
(d) overhanging trees or shrubs should be monitored, to keep playing surface clean;
(e) potential disturbance of the base due to tree root growth should be considered on a long term basis;
(f) all retaining walls must be constructed to an engineered design, and
(g) the court 'Entrance Area' should be designed to ensure dirt and debris are not tracked onto the playing surface.

SECTION 3.0 · COURT CONSTRUCTION

3.1 GENERAL

For each particular court surface type, there are different methods of construction which need to be considered and adopted to achieve the desired final result.

Considerations such as the type of drainage required, construction materials needed, surface preparation and finish, as well as maintenance of the court upon completion, need all to be allowed for in order to achieve a successful court to be built with minimum delays.

3.2 RED POROUS SURFACE

3.2.1 Subgrade Drainage System

3.2.1.1 Drains

The longitudinal drains will be an internal diameter (ID) of 90mm, in earthenware or slotted PVC pipe.
The header drain will be an ID of 90mm or 100mm, in earthenware or slotted PVC pipe.
The mitre drains and all other trenches are to be backfilled with suitable Scoria Screenings.

3.2.1.2 Trenches

The longitudinal trenches are a minimum of 100mm wide and are excavated into the subgrade. The positioning of the longitudinal trenches will evenly divide the subgrade area of the court. The two longitudinal trenches commence and terminate no further from the court edge than 1.5 metres.

The header trench is a minimum of 150mm wide and will commence no further from the court edge than 1.5 metres.

Both the longitudinal and header trenches will be excavated deep enough into the subgrade to ensure that the invert of any pipe is a minimum of 50mm below the subgrade level.

The mitre trenches are a minimum of 100mm wide, and are spaced evenly along the length of the court and adjoin the longitudinal trenches at 45 degrees.

The mitre trenches will be a minimum of 25mm to the subgrade level and enter the longitudinal trench no more than 50mm above the floor of the longitudinal trench.

All trenches will be backfilled with clean 20mm Scoria screenings, packed firmly around the pipe to the subgrade level.

3.2.2 Sump Pit

The header pipe must discharge into a sump pit constructed of concrete or mortared brick. The top of the pit will be level to the court pavement and covered with grate with a minimum dimension of 200mm x 200mm, thus allowing storm water from the surface to enter.

3.2.3 Surrounding Edging

3.2.3.1 Concrete and Solid Brick

The edging will comprise a concrete foundation 110mm in width and no less than 50mm in depth. The concrete strength must be at least 20 MPa. One course of solid bricks is to be mortared atop the foundation. Only first grade bricks are to be used.

3.2.3.2 Concrete Foundation

The concrete foundation will be situated on the court side of the court fence posts. A maximum gap of 25mm is allowable between the outside edge of the bricks and the inside face of the fence posts. The top of the foundation should be trowelled flat to ensure an even mortar joint.

The surface of the brick edge will be truly level and a minimum of 40mm above the finished court level. The final result will be a brick edge that will remain fixed and resist normal wear and minor buffeting.

3.2.4 Base Layer

Clean 25mm Scoria Minus is required, with a minimum compacted depth over the subgrade of 90mm.

One layer of clean and graded 25mm Scoria Minus will be spread over the court area. The base material will be consolidated and be a minimum of 90mm in depth. The base layer will then be appropriately levelled to the predetermined gradient of 1:200 on two planes.

3.2.5 Subsurface Layers

The first subsurface layer is 6mm Scoria Minus, which is spread over the entire base. It is levelled, watered and rolled to a well-consolidated depth of 8-12mm.

The second subsurface layer is 3mm Scoria Minus, which is spread over the entire first subsurface layer. It is levelled, watered and rolled to a well-consolidated depth of 3-5mm.

3.2.6 Red Porous Surfacing Layer

The material required is manufactured from bricks and has a maximum particle size of 2-3mm. The depth applied over the second subsurface layer is 12mm.

A quantity of 6 cubic metres (approximately) is required to be spread uniformly over the whole court area. It is levelled, watered and rolled to a well-consolidated depth of 8-12mm. It will thus be keyed into the 3mm Scoria bed.

3.2.7 Lines

Permanent white PVC lines will be 50mm wide for the base lines, centre lines and tabs. All other lines are 25mm wide.

The lines will be firmly anchored at one end and stretched between 5-15% while being laid. They will be affixed with 90mm x 4.5mm galvanised flat head nails spaced at 75mm centres.

The position of all lines will be within 10mm of their exact position. The lines will then be rolled flush to the surrounding surface.

3.2.8 Maintenance

3.2.8.1 Initial Maintenance

During the first two weeks, courts should be dragged both ways each day with a drag mat. A 1.8m extension rope or chain should be attached to the existing chain to ensure the leading edge of the mat acts as a screed thus ensuring any high spots are smoothed out. Should any low spots appear, these should be immediately filled with porous fines and smoothed out.

Court surface should then be saturated by gentle hosing in a downward direction. When completed, lines should be swept and court rolled both ways fence to fence using a 1/2 ton mechanical roller at least once per day. This procedure should continue for about 10 - 14 days.

Providing these instructions are carried out, the settlement and hardening of the surface crust will provide an excellent base when play commences. Remember water is the essential ingredient to good surface preparation.

3.2.8.2 Regular Maintenance Requirements

(a) Court Surrounds:
Screeding surplus porous material from surrounds, sieving to remove large debris and extraneous matter, redistributing porous materials evenly over the court and watering surface thoroughly. Rolling when damp would be a bonus.

(b) Removal of Weeds:
Spraying (preferably with a continuous sprayer) with weed killer (Zero/Roundup) type. Pulling weeds through porous disturbs the surface and brings Ash/Scoria to the surface resulting in soft spots.

(c) Base Lines:
These need most regular attention as they receive most wear and tear. Regular additions of new porous fines to the baselines should be made using approximately one barrow at each end every three months, spreading evenly and watering thoroughly. This will lessen the chance of hollows behind baseline tapes, etc. The area from baselines to fence requires twice the amount of water compared to the playing surface, to ensure consolidation of the base and surface materials.

(d) Removal of Dips in Surface:
These form puddles commonly referred to as "bird baths". These can be repaired by screeding off all porous material breaking the court surface for about 60mm and applying medium then fine Scoria until levels are correct, lightly flooding with water and rolling both ways to consolidate. Lines can also be replaced at this time if necessary. In cases where deep hollows exist, it is necessary to build up with Ash/Scoria and then follow earlier procedure.

(e) Removal of Water from Courts:
Never sweep or drag off water with brooms, bags or mats as this removes topping and exposes the Ash/Scoria and causes the dip to become worse. Use of a fork to make holes in the surface should be discouraged. It must be done only by experienced persons and needs extreme care. Water is best removed with sponges or absorption rollers, which remove relatively small amounts of topping only.

3.2.8.3 Maintenance Equipment Items Considered Standard

(a) drag mats plastic matting 1.8m - 2.7m;
(b) court scrapers for levelling;
(c) court line sweep flicker type or hand broom;
(d) heavy roller split type weight 250kg;

(e) absorbent type roller – sponges; and
(f) leaf sweeper with rotating brushes and catcher.

The most important element of court maintenance is correct watering. If watering by hand, a good length of 20mm reinforced hose service is required together with correct water pressure and sprays or nozzles to provide a fine spray. Heavy watering breaks court surface and exposes the Ash/Scoria foundation. Sprinkler watering is preferable with automatic controls set at night on a two-cycle programme in summer, single cycle in winter, thus enabling better penetration of surface and low water loss due to evaporation. Normal maintenance of court surfaces requires 1 tonne (20 bags) of fine porous per court each year. Rolling should be carried out every three months.

3.3 SYNTHETIC GRASS

3.3.1 Base Requirements

To be a quality base construction - refer to Section 4.0 for Base Specification.

3.3.2 Product Specifications

The current availability of synthetic grass surfaces is extensive, and subject to technological advances. As such, surfaces should be based on the following criteria:

Denier:	weight of fibre, in grams, of 9000 metre length.
Pile Height:	length of fibre above backing.
Total Carpet Weight:	weight of fibre, plus primary and secondary backing.
Stitch Rate:	number of stitches per metre width (sometimes calculated as number of tufts per 1 m^2).
Face Weight:	weight of fibre above backing, in grams.
Gauge:	number of rows per metre width.
Primary Backing:	polypropylene fabric into which fibre is tufted.
Secondary Backing:	rubber latex or similar to lock fibres into place.
Lines:	to be manufactured from the same specification as synthetic grass material.
Carpet Rolls:	each roll to be manufactured from the same production run, to ensure uniformity.

3.3.3 Seaming Tolerances

(a) Rib gap (longitudinal seams) - where the gap between the two ribs forming the seam is no greater than the gap between any other two ribs forming the carpet.

(b) Stitch gap (cross-cut seams) - a join where green grass meets cross lines or a join running at 90 degrees approximately to the roll of carpet. The gap tolerance from the base of one rib to the base of another should be no more than 4mm max.

(c) Court measurements - +/- 10mm. (Note: lines must appear aesthetically straight.)

(d) Adhesion - it should be expected that a SPORTS AND PLAY INDUSTRY ASSOCIATION LTD Member will guarantee that seams will not fail within a specified period.

(e) Ties - following installation of tufted carpet, numerous free strands surface from the secondary backing of the grass. These strands, called ties, should be carefully clipped off, and not pulled out.

(f) Ripples - (the result of carpet folds) in the grass material may be evidenced and appear as lines protruding above the normal surface level. Ripples must be removed prior to hand over of the completed surface.

(g) Court fixtures - rib gap tolerance applies in areas where synthetic grass abuts court fixtures such as net and fence pets, golf cups and such items. Poor installation is masked by mounding sand to disguise rough cutting in these areas.

(h) Adhesive spillage - small adhesive spillages are frequent and must be removed prior to court completion. They may appear as odd shapes and generally give the impression of overly sanded spots on the surface.

3.3.4 Sand Infill

Sand infill is to be kiln dried sub angular silica, spread by mechanical means in uniform layers throughout the fibre. The height of the finished sand infill to be specified in the contract documents and in accordance with manufacturers specifications (usually not more than 4mm).

3.3.5 Maintenance

3.3.5.1 General

Maintenance requirements should be determined by site position and characteristics (ie drainage properties of court, surrounding foliage, the amount of winter sunlight the court receives etc.). An average court can generally be kept in premium condition with four treatments per year.

3.3.5.2 Potential Problems

A damp climate, foliage and debris, leaves, shaded areas, and inadequate drainage (ie inadequate design falls) etc. induce moss and algae growth. As the synthetic surface ages, the sand infill may compact, creating greater water retention, and additional moss and algae growth.

3.3.5.3 Recommended Maintenance Procedure

(a) Removal of foliage and debris from surface, cleaning of silt pit and tennis court drains.
(b) Scraping back of any moss/algae affected areas.
(c) Adjustment of sand levels to provide optimum playing surface, maintain aesthetic values while complying with grass manufacturer's recommendations of the pile height exposure above sand infill.
(d) Total grooming of synthetic area.
(e) Treatment of surface so as to kill and deter future growth of moss and algae. Poisoning of grass and weed growth on court.

NOTE: It is far more economical to have a regular maintenance program on your court long before a problem becomes apparent to you. PREVENTION IS FAR CHEAPER THAN THE CURE.

3.3.5.4 Recommended Treatments

(a) Cleansing Treatment. A cleansing treatment is one that removes contaminated sand infill material from a minimum depth of 5mm.

THE EFFECTIVENESS OF THE TREATMENT INCREASES DIRECTLY PROPORTIONAL WITH THE AMOUNT OF SAND REMOVED AND REPLACED.

(b) Chemical Treatments. A chemical treatment would be regarded as any treatment that removes the visual and/or surface layer of moss and algae growth to any depth between 1mm to 5mm. This may incorporate resanding with new sand. A chemical treatment may also follow with a saturation *poisoning* to attempt to kill any moss and algae spores or seeds below the physically treated depth.

NOTE: Chemical treatments generally MASK a problem, not suitably cure it.

It is extremely important for the customer to be aware that chemical treatment will remove the visual signs of moss and algae growth, and overcome problems such as algae slipperiness. However, over time it will lead to a clogging up to the surface, resulting in hardness and slow drainage as well as increased service costs.

3.4 ACRYLIC SURFACES

3.4.1 General

The two most common surfaces to which acrylic court surfaces are applied are asphalt and concrete.

The basic application of the acrylic onto these surfaces is very similar, however the baseworks preparation for each is different, thus the need for advisable recommendations for the respective bases.

3.4.2 Siteworks

In order to determine what siteworks are involved for the excavation and earthworks for the tennis court construction, the concerned parties should refer to the relevant SPORTS AND PLAY INDUSTRY ASSOCIATION LTD standard guidelines for tennis court construction.

3.4.3 Baseworks Preparation

3.4.3.1 Asphalt

(a) The Asphalt base will be prepared to coincide with the adopted design gradients for a nonporous court, namely 1:100 along two planes or 1% in two directions.

(b) The subgrade needs to be prepared in accordance with the subgrade specification and be fully proof rolled prior to any further works.

(c) The base layer should be a thickness of 100mm using a 20mm Class 2 F.C.R. The crushed rook should conform to the following Vic Roads Standard Specification (Section 407):

Sieve Size (Aggregate size mm)	Limits of Grading (% Passing)
26.5	100
19.0	95-100
13.0	78-92
9.5	63-83
4.75	44-64
2.36	30-48
0.425	14-22
0.075	6-10

This rock is to have a Max P.I. of 8 and a Max CBR of 25.

The crushed rock layer is to be:

i. placed to achieve an even grade;
ii. placed to the given line and level +/- 8mm;
iii. compacted to reach 95% standard at optimum moisture content;
iv. impervious, dense and uniform; and
v. not holding water greater than 5mm in depth

(d) The hot-mix Asphalt is to be machine laid (where practical) using a self-propelled paver, equipped with hoppers, and distribution screws of the counter rotation type to place Asphalt evenly in front of the heated screed.

The Asphalt will be placed such that upon rolling, the Asphalt layer will achieve a design thickness of 30mm (minimum). The hot-mix Asphalt used will have a 7mm aggregate grading and conform to the following grading standard:

Sieve Size (Aggregate size mm)	Limits of Grading (% Passing)
9.5	100
6.70	80-100
4.75	70-90
2.36	45-65
1.18	34-55
0.600	22-45
0.300	14-33
0.150	8-18
0.075	5-8
Total mineral matter	100

Bitumen content to be between 5 - 7.5%.

(e) After the completion of the asphalting works, a curing period of 10 - 14 days is required prior to the application of the acrylic finish.

3.4.3.2 Concrete

(a) The Concrete base will be prepared to coincide with the adopted design gradients for a non-porous court. Namely: 1:100 along two planes or 1% in two directions.

(b) On this sub-base, a black or orange grade polythene of 200 micron thickness shall be placed.

(c) The reinforcing fabric shall be overlapped to a minimum of one square in each direction and securely tied at 1.5m centres the mesh shall be accurately placed in the concrete to ensure a minimum cover of 30mm.

(d) The concrete slab thickness should be 100mm with a minimum strength of 20MPa. No additives are to be used in the concrete mix.

(e) The final tolerance on the finished surface shall be +/- 4mm such that no point on the court shall vary greater than 4mm under a 3.0m straight edge on any two points on the court. Surface tolerances should be checked within 30 days of the pavement installation and prior to the installation of any surfacing onto the pavement.

(f) The concrete is to have a light broom surface finish and exhibit the following properties:
   i. N20 grade (min);
   ii. 80mm slump (max); and
   iii. 20mm max size aggregate.

(g) Within 48 hours of the concrete pour, a full construction Joint should be installed under the net line of the court, to create two independent slabs. A series of 3mm x 30mm saw cuts shall be cut along the base lines and up the centre of the court to minimise random cracking.

(h) A minimum of 28 days of curing of the concrete shall be allowed prior to applying the Acrylic surface.

3.4.4 Drainage

For both Concrete and Asphalt base systems, the drainage applications are the same, namely:

(a) Concrete spoon drains to perimeter;
(b) Gatic type grated pit in low comer (200mm x 200mm) minimum; and
(c) Subsurface Agricultural drains to toe of batters or excavation.

3.4.5 Acrylic Surfacing

3.4.5.1 General

Prior to applying an Acrylic to the base surface, there needs to be a quick check of the surface to ensure that there will not result any areas which hold water after the application of the Acrylic. The process is to flood the court with water and test for drainage and bird baths. Any areas which do hold water in excess of what the specifications allow need to be patched with an approved patching compound.

3.4.5.2 Asphalt

The steps involved for applying the Acrylic to a prepared Asphalt surface are as follows:

(a) apply one coat of 'resurfacer' product;
(b) supply and place one or two coats of 'filler' product;
(c) supply and place one or two coat of 'finish' product; and
(d) mark one set of playing lines using some Acrylic line product.

3.4.5.3 Concrete

In the case of a concrete base, the following steps should be used in applying an Acrylic:

(a) acid etch concrete surface and high pressure hose off all residue material;
(b) supply and place concrete 'slurry' or primer coating;
(c) supply and place one or two coats of 'filler' product;
(d) supply and place one or two coats of 'finish' product, and
(e) mark one set of playing lines using Acrylic line product.

3.4.6 Points to Note

In between coatings of Acrylic products, the surface should be checked and remedied for voids, irregularities, roller or squeegee ridges and cleaned of any loose surface materials.

Applications of 100% Acrylic coatings generally should not be made when ambient temperature is 10 degrees Celsius or less, rain is imminent and always within the manufacturers specifications and recommendations.

Tolerances: the surface tolerances should be no greater than 4mm over a three meter straight edge in any direction.

SECTION 4.0 · BASE OPTIONS

4.1 ASPHALT BASE

4.1.1 General

The general material supply requirements are as follows for the construction of a hot-mix Asphalt base. This base can be used under Synthetic Acrylic or Synthetic grass. It can also act as a final playing surface.

4.1.2 Preparation of Subgrade

The subgrade will be prepared in accordance with the specification subgrade and will be fully proof rolled prior to any further works.

4.1.3 Installation of Concrete Border

A concrete kerb/border is to be installed along the high side of the courts(s). This kerb is to be installed to design line and level +/- 5mm, with the top of the kerb flush with finished surface level. Concrete is to be a minimum width of 150mm and 150mm deep using 20MPa 20mm concrete.

A concrete spoon drain is to be installed along the lower sides of the court(s). This drain will be laid true to line and level +/- 5mm with the top of the drain flush with finished surface level. The spoon drain is to be a minimum width of 450mm and 25mm deep. The spoon drain is to empty into corner sump pit of dimensions 200 x 200mm. This pit is to discharge to local storm water pipes.

4.1.4 Installation of Crushed Rock

The crushed rock base is to be built to achieve an even grade to design line and level +/- 8mm and compacted to reach 95% standard. The crushed rock is to be placed and compacted at optimum moisture content. It is advisable that the rock be delivered plant mixed at this moisture level.

The method for achieving design tolerance shall be by use of motorised grader. Compaction shall be by use of mechanical roller with a minimum static weight of 3.0 tonnes.

When crushed rock placement is completed, the finish should be dense and uniform, and basically impervious with no area holding water greater than 5mm. The crushed rock used should conform to the following grading:

Sieve Size (Aggregate size mm)	Limits of Grading (% Passing)
26.5	100
19.0	95-100
13.2	78-92
9.5	63-83
4.75	44-64
2.36	30-48
0.425	14-22
0.075	6-10

This rock is to have a max PI of 8 and a max CBR of 25. All rock covered under this specification is to be supplied in accordance with Vic Roads Standard Specification (Section 407).

4.1.5 Prime

Hot cutback bitumen shall be sprayed if specified at a minimum rate of 0.8 Litre/m2. Where possible, this bitumen shall be applied by means of a calibrated road sprayer. Where access does not allow for this method, a hand lance may be used, but extreme care must be taken to avoid ponding of bitumen. Where ponding does occur, this area shall have a thin layer of sand or dust applied to soak up excessive bitumen. Care should be taken to protect all concrete and adjoining surfaces from overspray.

4.1.6 Hot Mix Asphalt

Asphalt shall be delivered hot to site and placed in paver with minimum delay. The paver shall be self-propelled, equipped with hoppers, distribution screws of the counter rotation type to place asphalt evenly in front of its heated screed.

The asphalt shall be rolled while hot to achieve design thickness (minimum 30mm) with a self-propelled roller capable of reversing without backlash.

When completed, the total area shall be checked to ensure a tolerance of +/- 5mm under a 3.0m straight edge on any two points on the court is achieved with no machine or tool marks. Where such blemishes are found, the area shall be heated and rerolled or tamped with mechanical compactor. Surface tolerances should be checked within 30 days of the pavement installation and prior to the installation of any surfacing onto the pavement.

The entire area is to have size 7mm type L hot mix asphalt machine-laid to design grade.

The aggregate grading will conform to the following:

Sieve Size (Aggregate size mm)	Limits of Grading (% Passing)
9.5	100
6.70	80-100
4.75	70-90
2.36	45-65
1.18	34-55
0.600	22-45
0.300	14-33
0.150	8-18
0.075	5-8
Total mineral matter	100

Bitumen content to be between 5 - 7.5%.

4.2 CONCRETE

4.2.1 Preparation of Sub Base

A layer of crushed rock or packing sand shall be used to present a uniform sub base to line and level within a tolerance of +/- 10mm. It is recommended that a laser controlled grader or land plane is used to achieve this tolerance.

4.2.2 Polythene

Black or Orange grade Polythene of 200 micron thickness shall be used under all Rebound Ace and Acrylic slabs. This shall be held in place with 50mm plastic adhesive tape.

4.2.3 Installation of Reinforcement

The reinforcing fabric shall be overlapped to minimum of one square in each direction and securely tied at 1.5m centres. Where possible, consecutive rows of fabric should be "offset" to avoid clusters of welded mesh. A minimum F52 (or F62 Synthetic Acrylic) welded reinforcing mesh shall be used. All mesh should be clean and free of oil, mud or rust and placed accurately in the concrete to ensure a minimum cover of 30mm.

4.2.4 Installation of Concrete

All concrete shall be pumped into place by means of a "Squeeze" type pump. Sufficient labour shall be on hand to roughly place the concrete to desired line and level. A minimum of two "screed hands" shall be on the site to quickly screed an accurate finish to the slab and avoid overworking and segregation of concrete. The final tolerance on the finished surface shall be +/-4mm such that no point on the court shall vary greater than 4mm under a 3.0m straight edge when placed on any two points on the court. Surface tolerances should be checked within 30 days of the pavement installation and prior to the installation of any surfacing onto the pavement.

It is imperative to arrange for a constant supply of concrete to avoid cold joints in slab. No additives are to be placed in concrete mix when Synthetic Acrylic surfacing is intended to be used.

The concrete is to have a dense steel trowelled finish when synthetic grass is used and wood float or broom finish is preferred for Synthetic Acrylic.

Concrete to be:

(a) N20 grade (min);
(b) 80mm slump (max); and
(c) 20mm max size aggregate.

4.2.5 Joints

4.2.5.1 Synthetic Grass

It is not imperative to construct joints when the slab is to be overlaid with synthetic grass, however sometimes it is desirable to place 3mm saw cuts in the slab to isolate sections of the pavement.

4.2.5.2 Synthetic Acrylic

A full construction joint should be installed under the net line of court to create two independent slabs. Within 48 hours of the concrete pour a series of 3mm x 30mm saw cuts shall be cut along the base lines and up the centre of the court to minimise random cracking.

4.3 BITUMEN SEAL

4.3.1 General

The general material supply requirements are as follows for the construction of a Bitumen Seal base.

This type of construction will give a low cost, medium quality flexible base upon which a Sand Filled Artificial Grass surface can be laid.

4.3.2 Preparation of Sub Grade

The sub grade will be prepared in accordance with the specification sub grade and will be fully proof rolled prior to any further works.

4.3.3 Installation of Concrete Border

A concrete kerb/border is to be installed along the high sides of court. This kerb is to be installed to design level +/- 5mm, with the top of the kerb flush with finished surface level. Concrete is to be a minimum width of 150mm and 150mm deep using 20 MPa 20mm concrete.

A concrete spoon drain is to be installed along the lower sides of the court. This drain will be laid to line and level +/- 5um with the top of the drain flush with finished surface level. The spoon drain is to be a minimum width of 450mm and I50mm deep.

The spoon drain is to empty into corner sump pit of minimum dimensions 200 x 200mm. This pit is to discharge to local storm water pipes.

4.3.4 Installation of Crushed Rock

The crushed rock base is to be built to achieve an even grade to design line and level +/- 8mm and compacted to reach 95% standard.

The crushed rock is to be placed and compacted at optimum moisture content (it is advisable that the rock be delivered plant mixed at this moisture level).

The method for achieving design tolerance shall be by use of motorised grader with a central grading blade of minimum width 2.4m. Compaction shall be by use of mechanical roller with a minimum static weight of 3.0 tonnes.

When crushed rock placement is completed the finish should be dense and uniform and basically impervious, with no area holding water greater than 5mm.

4.3.4.1 Crushed Rock Base

The crushed rock used for the crushed rock base should conform to the following grading:

Sieve Size (Aggregate size mm)	Limits of Grading (% Passing)
26.5	100
19.0	95-100
13.2	78-92
9.5	63-83
4.75	44-64
2.36	30-48
0.425	14-22
0.075	6-10

This rock is to have a max Pl of 8 and a max CBR of 25. All rock covered under this specification is to be supplied in accordance with Vic Roads Standard Specification (Section 407).

4.3.5 Prime

Hot cutback bitumen shall be sprayed if specified at a minimum rate of 0.8 litre/m2. Where possible this bitumen shall be applied by means of calibrated road sprayer. Where access does not allow for this method a hand lance may be used but extreme care must be taken to avoid ponding of bitumen. Where ponding does occur, this area shall have a thin layer of sand or dust applied to soak up excessive bitumen. Care should be taken to protect all concrete and adjoining surfaces from overspray.

4.3.6 Hot Mix Asphalt

The entire surface shall be sprayed with hot cutback prime (SP 1000) at a rate of approximately 0.8 litre/m2 . Over this a thin layer of sand or 5mm aggregate shall be evenly spread at a rate of 50kg/m2. This sand or aggregate shall be fully rolled into the surface using a roller of minimum weight 3 tonnes. All loose material shall be swept from surface to achieve a tight homogenous surface.

SECTION 5.0 · FENCING

5.1 COMMERCIAL TENNIS COURTS COMPLYING WITH AS1725-2010-PART-2

5.1.1 Fence Design Options

(a) Top and bottom pipe rail with 3 mid cables (preferred option)
(b) Top pipe rail only with 3 mid and 1 bottom cable (4 cable wires)
(c) Bottom pipe rail only with 3 mid and 1 top cable (4 cable wires)
(d) Rail-less with corner bracing with 3 mid and 1 top and 1 bottom cable (5 cable wires)

5.1.2 Pipe and Footing Tables for Commercial Tennis Court Fencing

Nominal Height of Chain Link Fabric (mm)	Type of Post / Rail or Stay	Nominal Size Pipe (DN)	Outside Diameter (OD)	Wall Thickness (mm)	Pipe Grade	Minimum Concrete Footing Diameter (mm)	Minimum Concrete Footing Depth (mm)
3600 preferred or optionally 3000	Draw Net Posts	DN100	114.4	4.5	Medium	300	1200
	Corner Posts	DN80	88.9	4.0	Medium	300	900
	End Posts	DN80	88.9	4.0	Medium	300	900
	Intermediate Posts	DN50	60.3	3.6	Medium	250	750
	Pipe Rails	DN40 or DN32	48.3	3.2 3.2	Medium	N/A	N/A
	Bracing Rail for braced panel	DN40 or DN32	48.3 42.4	3.2 3.2	Medium	N/A	N/A
	Diagonal Bracing Stay for braced panel	DN40	48.3	3.2	Medium	250	750
	Optional Back Stays (Twin Leg)	DN40	48.3	3.2	Medium	250	600
	Pedestrian Single Gate 1000 to 1200 width	DN25	33.7	2.6	Light	N/A	N/A
	Vehicle Double Gates 3000 to 4000 width	DN32	42.4	2.6	Light	N/A	N/A

NOTES:
1. Extra Light Wall Pipe is not permitted to be used with Commercial Tennis Court Fencing with AS1725-2010-Part-2.
2. Post spacing shall be evenly spaced, not exceeding 3.330m.
3. Light poles, where required, must comply with manufacturers' requirements and supported with engineering design.
4. Powder coating of pipe when specified shall comply with AS4506 to same colour as chain link.

5.1.3 Preferred Range of Chain Link Fabric for Commercial Tennis Courts

(a) Heavy duty 3600mm high x 45 pitch x 3.15mm wire fabric is preferred.
(b) Chain link fabric shall comply with AS2423.

Preferred Fabric Height (mm)	Pitch or Mesh Size (mm)	Core Wire Diameter (mm)	Wire Coating	Selvedge edge of chain link fabric	Fabric Service Duty
3600	45	3.15	Heavily Galvanized W10Z (HG)	Knuckled both ends (KK)	Heavy Duty
3600	45	3.15	Polyvinyl Chloride (PVC)	Knuckled both ends (KK)	Heavy Duty
3600	45	3.15	Fusion Bonded Coated (FBC)	Knuckled both ends (KK)	Heavy Duty

NOTES:
1. Standard colours for PVC coatings are Black or Evergreen. PVC is an extruded plastic coating over the base core wire.
2. Standard colour for Fusion Bonded coating is Black. Fusion Bonded is a polymer coating glued to the base core wire.
3. Chain Link shall be secured to the playing side of posts and strained taut between 1.0 to 1.2 kN to ensure the chain link diamonds cannot separate more than 5mm with a hand squeeze test.
4. Chain link or bottom rail must be set close enough to playing surface to retain tennis balls.

5.2 DOMESTIC TENNIS COURTS COMPLYING WITH AS1725-2010-PART-3

5.2.1 Fence Design Options

(a) Top and bottom pipe rail with 2 mid cables (preferred option)
(b) Top pipe rail only with 2 mid and 1 bottom cable (3 cable wires)
(c) Bottom pipe rail only with 2 mid and 1 top cable (3 cable wires)
(d) Rail-less with corner bracing with 2 mid and 1 top and 1 bottom cable (4 cable wires)

5.2.2 Pipe and Footing Tables for Domestic Tennis Court Fencing

Nominal Height of Chain Link Fabric (mm)	Type of Post / Rail or Stay	Nominal Size Pipe (DN)	Outside Diameter (OD)	Wall Thickness (mm)	Pipe Grade	Minimum Concrete Footing Diameter (mm)	Minimum Concrete Footing Depth (mm)
3000 preferred or optionally 3600	Draw Net Posts	DN100	114.4	4.5	Medium	300	1200
	Corner Posts	DN65	76.1	3.6	Medium	300	900
	End Posts	DN65	76.1	3.6	Medium	300	900
	Intermediate Posts	DN40	48.3	3.2	Medium	250	600
	Pipe Rails	DN32	42.4	2.6	Light	N/A	N/A
	Bracing Rail for braced panel	DN32	42.4	2.6	Light	N/A	N/A
	Diagonal Bracing Stay for braced panel	DN40	48.3	3.2	Medium	250	750
	Optional Back Stays (Twin Leg)	DN32	42.4	2.6	Light	250	600
	Pedestrian Single Gate 1000 to 1200 width	DN20	26.9	2.3	Light	N/A	N/A
	Vehicle Double Gates 3000 to 4000 width	DN25	33.7	2.6	Light	N/A	N/A

NOTES:
1. Extra Light Wall Pipe is not permitted to be used with Domestic Tennis Court Fencing with AS1725-2010-Part-3.
2. Post spacing shall be evenly spaced, not exceeding 3.330m.
3. Light poles, where required, must comply with manufacturers' requirements and supported with engineering design.
4. Powder coating of pipe when specified shall comply with AS4506 to same colour as chain link.

5.2.3 Preferred Range of Chain Link Fabric for Domestic Tennis Courts

(a) Light duty 3000mm high x 45 pitch x 2.50mm wire fabric is preferred.
(b) Chain link fabric shall comply with AS2423.

Preferred Fabric Height (mm)	Pitch or Mesh Size (mm)	Core Wire Diameter (mm)	Wire Coating	Selvedge edge of chain link fabric	Fabric Service Duty
3000	45	2.50	Heavily Galvanized W10Z (HG)	Knuckled both ends (KK)	Light Duty
3000	45	2.50	Polyvinyl Chloride (PVC)	Knuckled both ends (KK)	Light Duty
3000	45	2.50	Fusion Bonded Coated (FBC)	Knuckled both ends (KK)	Light Duty

NOTES:
1. Standard colours for PVC coatings are Black or Evergreen. PVC is an extruded plastic coating over the base core wire.
2. Standard colour for Fusion Bonded coating is Black. Fusion Bonded is a polymer coating glued to the base core wire.
3. Chain Link shall be secured to the playing side of posts and strained taut between 1.0 to 1.2 kN to ensure the chain link diamonds cannot separate more than 5mm with a hand squeeze test.
4. Chain link or bottom rail must be set close enough to playing surface to retain tennis balls.

5.3 GENERAL FENCING REQUIREMENTS APPLICABLE TO BOTH COMMERCIAL AND DOMESTIC TENNIS COURTS

5.3.1 Fittings

Fittings for connection of posts, rail and stays shall be either Downee / Elgate or equivalent (hot dip galvanized) clamp-on fittings and shall be firmly secured to posts, rail and stays with all nuts facing away from playing side of fence.

5.3.2 Cable and Lacing Wires

Cable and lacing wires shall be the same coating quality as per Chain Link Fabric.

5.3.2.1 Single Strand Helicoil Cable Wires

Shall be 4.0mm core wire strained taut between 1.0 to 1.2 kN and double cross tied to posts with 2.00mm core wire**.**

5.3.2.2 Optional Twin Twist Cable Wires

Shall be two strands of 3.15mm core wire twisted together taut between posts to achieve 1.0 to 1.2kN.

5.3.2.2 Lacing Wire

Shall be 2.00mm core wire laced taut through each diamond to all Top and Bottom rails, plus Gate, End and Corner posts.

5.3.2.3 Ties to Posts

Wire ties to posts shall be 2.00mm core wire single strand or twin 1.57mm to tie chain link firmly to all intermediate posts, ties shall be located centrally between all cable wires , twisted twice with ends cut short and folded back flat to posts to avoid risk of injury.

5.3.2.4 “C” Clips to Secure Chain Link to Cable Wires

Either 2.00mm or 2.30mm wire “C” clips are preferred with blunt ends only (to avoid risk of injury). Clips shall be clipped to all cable wires at 320mm maximum spacing (each 4th diamond).

SECTION 6.0 · LIGHTING

6.1 GENERAL

A Town Planning permit may be required for residential tennis court lighting. (Refer to the Code of Practice Private Tennis Court Development).

To minimise light spillage, environmental style box lights are recommended for residential tennis court lighting.

6.2 THE TUNGSTEN HALOGEN SYSTEM

Pole locations: Six light poles are required, either side mounted or corner mounted.

Required footings: The required reinforced foundation varies with pole height, fencing, soil conditions etc., and should be established by a qualified engineer. As a guide, a reinforced concrete foundation of 300mm diameter by 1000mm depth in normal ground conditions should be satisfactory.

Luminaries: General wide distribution – 1500W Tungsten halogen floodlights. Either 6-8 units may be incorporated into the light design, depending on desired light levels.

Mounting height: 6.7m (minimum).

Pole Specifications: 65-80mm inside diameter tubular steel pipe.
Weight Per unit: 7 - 10 kg.

6.3 THE METAL HALIDE SYSTEM

Pole locations:
(a) two per side, each 7m from net line, or
(b) three per side, two opposite net line, and two per side each 11 metres from netline.

Required footings: The required concrete foundation varies with pole height, fencing, soil conditions etc., and should be established by a qualified engineer. A concrete foundation of 400mm diameter by 1000mm depth in normal ground conditions is recommended for this system.

Mounting Height:
(a) 6.5m (min) for 3 per side system, and
(b) 6.7m (min) for 2 per side system.

Pole Specifications: 80mm minimum, inside diameter tubular steel pipe or square section tubing.

Weight per unit: 30-35kg with control gear.

SECTION 7.0 · ACCESSORIES

7.1 NET POSTS

Net posts should be round or square, with internal or external winding mechanisms. The centre of the posts shall be 0.91m outside the court side lines. The height of the posts shall be such that the top of the metal cable shall be 1.07m above the playing surface at the net post location, and 900mm above the playing surface at the court centre.

Net posts (or sleeves for net posts) shall be placed in a 20MPa concrete footing, being 350mm diameter and 600mm depth (minimum), but may vary relative to subgrade conditions.

7.2 NET

Generally 760mm drop or full drop. Refer to manufacturers guidelines relative to various net qualities, and attachment to net posts.

7.3 NET CENTRE STRAP

Woven centre strap with suitable steel attachment set in concrete footing (200mm diameter, 150mm depth), central to net line.

SECTION 8.0 · TENNIS COURT DRAW CURTAINS

8.1 GENERAL DESCRIPTION

Netting curtains around tennis courts are primarily used to divide adjacent courts or keep balls within the playing area in a landscaped garden situation, which would aesthetically suffer from the provision of a chain wire mesh fence.

The curtains should be designed with a height to suit the location, generally 3.05m or 3.65m and with appropriate splits or gaps to suit the court's access points and support structure. The number of individual splits in the curtains should be minimized to eliminate potential points where balls will travel beyond the court perimeter.

Net curtains can be made to any size (height and length) and any shape. For example, if a curtain was running along a sloping wall the base could be tailored to match the slope. All curtain lengths are made 15% longer than the opening width to allow for the 'curtaining' effect. Longer curtains those exceeding 15m - can allow 10%.

Nets will come with support clips allowing them to be clipped to the upper support cable after the cable has been installed and fully tensioned. This connection feature also allows for the nets to be easily removed for repairs, entertainment or seasonal requirements.

The bottom cord will generally be supplied with a lead core rope, which has been machine attached to it, in order to minimize movement in windy conditions. Under certain circumstances when high winds are expected, the lead weighting of the bottom cord must be increased or the bottom cord has to be restrained by a ground cable and attachment clips.

8.2 NET MATERIAL & MANUFACTURE

Invariably black or dark green polyethylene netting is used with a maximum 44mm square hole in a minimum of 36 ply.

The machine made netting will be always converted to 'the square' and cut into the sizes specified by the designer. Each individual net will have a machine overlocked edge which includes a polypropylene rope on all sides except the bottom cord, which will have a lead core polypropylene rope spliced to the side rope at each bottom corner. The lead core rope will then be overlocked at least twice for improved life and wear resistance.

Nets are supplied with Velcro ties to join them when deployed. Additional Velcro ties are available to tie the nets back when not in use.

8.3 SUPPORT STRUCTURES

In most applications, the draw curtains are supported on a highly tensioned cable which should be from a minimum of 5mm diameter fibre core galvanised steel wire rope. (Single strand fencing wire can be used but it is not recommended as it tends to fatigue over time.)

Support cables are generally terminated on galvanised or painted, powder coated square or round posts. The termination points on the pole will generally be a welded half chain link or similar fixing point. In some applications steel wall plates with a connection loop and a minimum of four masonry fixings can be used to fix a cable to a wall or column.

When wall plates are used they should be a minimum of 100mm square and 10mm thick, with four fixing holes. The fixing method and selection of fastener will be the decision of the site engineer. Caution must be applied to any wall fixing to block, brick or cavity walls. In general, suitable masonry fixings can be found for concrete slab walls.

On a tennis court, pole spans can be around 16m maximum, which will allow a single span base line net. The sideline nets will require at least one central support for the net cable. This can be achieved by using a saddle or similar fixing mechanism on a light pole in line with the cable run or a secondary pole.

The main corner support poles will be a minimum of 100mm square or round heavy walled tube a minimum of 1m into the ground. The foundation design must be approved by the site engineer and be suitable for the site ground structure. Rocky or uncompacted fill conditions will require specific variation to ensure the support cable can be tensioned to approximately 500kgs load.

Installers should angle the poles away from the cable centre at least 2 degrees to allow for flexing when the cable is tight. This will ensure the poles are as vertical as possible when the cable is fully tensioned.

The best results will come from minimum cable sag when the net is installed and covering the opening. This minimum should be around 100mm at maximum span.

Secondary support poles could be from 65mm NB material or the same material as selected for the main corner poles.