



*Scope: This specification is intended for use as a guideline for the construction of a new tennis court on a reinforced concrete base, finished with a cushioned grass court surface using the unique Nova'ProKramercourt XP System.*

## SECTION 02542



### **NOVA'PROKRAMERCOURT XP TENNIS SURFACE NEW CONSTRUCTION OVER REINFORCED CONCRETE**

#### **PART 1 – GENERAL**

##### **1.01 SUMMARY**

- A. This section includes and is not limited to:
  - 1. Construction of a Nova'ProKramercourt XP monolithic pavement “CushionCourt” tennis court consisting of a grass-like network of tufted, polyethylene, ultraviolet resistant fibers interlocked with select aggregates.
  - 2. Sub grade preparation.
  - 3. Steel reinforced concrete base.
  - 4. Tennis net posts, foundations and anchor straps.

##### **1.02 QUALITY ASSURANCE**

- A. The Nova'ProKramercourt XP tennis surface shall be constructed by an approved installer certified by NGI Sports (NGI). The Nova'ProKramercourt XP system shall meet manufacturing specifications set up for same.
- B. All material shall be clearly marked.
- C. Material shall not be installed when rain is imminent or the temperature is below 40°F.
  - 1. The installation of the Nova'ProKramercourt XP system shall be completed in dry weather.
  - 2. Neither surface nor aggregates may be moist or wet.
  - 3. Fabrication should be done in dry weather with the temperature above 40°F and rising.

##### **1.03 WARRANTY**

- A. Materials shall have a minimum limited warranty supplied by the manufacturer.
- B. Contractor to provide {Owner} {Architect} {Landscape Architect} {Engineer}, upon completion of warranty application, written warranty at completion of project in accordance with section [01700] [01740] of the Project Manual.

## PART 2 - PRODUCTS

### 2.01 SURFACING SYSTEM FOR TENNIS

A. The Nova'ProKramercourt XP turf system shall consist of artificial fibers that shall meet the following minimum specifications:

1. Tufting Construction	ASTM D418
2. Breaking Elongation	124%, ASTM D1682
3. Breaking Load	181 lbs., ASTM D1682
4. Grab Tear Strength	100 lbs., ASTM D1682
5. Seam Tensile Strength	55lbs./inch, minimum
6. Melting Point	334.4° F, ASTM D789
7. Flame Test	Pass, ASTM E108
8. Fiber System	Fibrillated Polyethylene
9. Pile Height	.375 inches
10. Primary Backing	Dual Polyester
11. Back Coating	Natural Urethane
12. Line System	Sportline
13. Infill	2.25 lbs psft.

B. The color shall be Irish Green or French Red and all fibers in each roll applied to the tennis court shall be from the same dye lot.

C. White lines are tufted in place at the manufacturing plant (Sportline System). Refer to product installation guideline to determine application.

D. Turf surfacing materials can be perforated during production to assist in court drainage and in the prevention of moss/algae growth on surface.

E. Granular Fill (XP-TeXFill) Material Options.

a. Option 1 – Specially selected light weight, graded and shaped granules in colors of Rubico Green or French Red shall be filtered into the fibers at the rate of 2.25 lbs psft as required by the manufacturer's detailed specifications.

b. Option 2 – Specially selected grade and shape sub-angular sand granules shall be filtered into the fibers at a rate of 2.25 lbs psft as required by the manufacturer's detailed specifications.

- F. Seams: Weather resistant polyester tape and one component moisture cured urethane adhesive as recommended by system manufacturer.

## 2.02 BASE MATERIALS

- A. Crushed Aggregate Base Course: Minimum 4” aggregate base with 1” to 1-1/2” layer of stone dust screening for the leveling course constructed on a prepared sub grade.
  - 1. Materials may be a combination of crushed stone, crushed or uncrushed sand gravel, limestone gravel, or other locally qualified binder materials approved by the {Owner} {Architect} {Landscape Architect} {Engineer}.
  - 2. Materials shall be thoroughly mixed to ensure the final product will have a uniform grading and plasticity.
  - 3. Crushed stone or gravel shall conform to local specifications for rock base construction and the following:
 

a. Retained on the 2 inch sieve	-0- %
b. Retained on the 1/2 inch sieve	0-5%
c. Retained on the 3/4 inch sieve	5-30%
d. Retained on the No. 4 sieve	35-60%
e. Retained on the No. 8 sieve	45-70%
f. Retained on the No. 40 sieve	60-83%
g. Retained on the No. 200 sieve	80-92%
  - 4. If the required compacted depth of the base course exceeds 5”, the base shall be constructed in two or more layers of approximately equal thickness.
- B. Sand: ASTM C144.
- C. Vapor Barrier: Sheets, 6 mil minimum in thickness, no pinholes.
- D. Steel Reinforcement Bars: Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement ASTM A 615, Grade 60.
- E. Tie Wire: 16 gauge annealed steel wire, Federal Specification QQ-W-461.
- F. Prefabricated accessories shall comply with Product Standard PS7 and CRSI Manual of Standard Practice, Class D or E.

- G. Normal Weight Concrete: Composed of ASTM C33 aggregate, cement and water, weighing 145-150 pounds/cubic foot, cured and air dried.
1. Portland Cement (Type 1 or 1A) shall conform to one of the Standard Specifications for Portland Cement, ASTM C 150 or Specifications for Blending Hydraulic Cements, ASTM C 595, excluding slag cements Types S and SA. Do not use curing compounds.
  2. Air entrainment by total volume of concrete shall be:
    - a. 4-6% for 1 ½ inch maximum size coarse aggregate.
    - b. 5-7% for ¾ inch or 1 inch maximum size coarse aggregate.
    - c. 6 ½ to 8 ½% for 3/8 inch or ½ inch maximum size coarse aggregate.
  3. Aggregate: ASTM C 33. For concrete work, the nominal size of the coarse aggregate should not exceed 1 ½ inches.
  4. Concrete Proportioning and Mixing: Compression strength of not less than 3,000 psi at 28 days after casting. The minimum cement content shall be not less than 470 lbs per cubic yard for 1 ½ inches maximum size coarse aggregate; 520 lbs for ¾ inch, 590 lbs for ½ inch and 610 lbs for 3/8 inch maximum size coarse aggregate. In freeze/thaw environments, the minimum cement content should not be less than 560 lbs per cubic yard. The slump should not be more than 4 inches. Ready-mixed concrete should be mixed and delivered in accordance with ASTM C 94, Specification for Ready-Mix Concrete.

### 2.03 TENNIS COURT ACCESSORY MATERIALS

- A. Net Posts and Sleeves Equipment: Tennis posts shall be made out of steel, metal or wood of sufficient strength to properly support the net at a height of 42". Posts and sleeves shall be set where indicated on drawings. Posts shall be set plumb and true so as to support the net at a height of 42" above the court surface at the net posts.
- B. Center Strap Anchor: A center strap anchor shall be positioned as shown on the drawings and set in concrete footings measuring 12" X 12" X 12".
- C. Tennis Nets: Shall be polyethylene 3 mm braided body, 42' long and 3.25' wide, polyester top binding attached with four lock stitched rows. Sides shall be braced with dowels for a neat, taut appearance. Nets shall be installed, upon completion, to posts and cables.

## PART 3 - EXECUTION

### 3.01 SUB GRADE AND SURFACE PREPARATION

- A. Area is to be cleared of all trees, stumps, vegetation, and topsoil and treated with a soil sterilent.
- B. Prepare sub grade by blading, rolling and lightly scarifying a sound surface to within a finished tolerance of 1/8" in 10' when measured in any direction and a minimum overall slope of .25% to 1%.
- C. Contours of the sub grade shall conform to those of the finished grade of +/- 2 inches.
- D. Fill and Compaction
  - 1. When fill is required, it shall be placed in 6 inch lifts, maximum, with approved material and each lift shall be thoroughly compacted to a density of 95% proctor.
  - 2. Unstable or otherwise objectionable material shall be removed from the sub grade and replaced with approved material.
  - 3. All holes, ruts and depressions shall be filled, reshaped and compacted as required to place the sub grade in acceptable condition to receive base material.
  - 4. Prior to placing succeeding layers of material, the top of the under layer shall be significantly moist to ensure uniform moisture between layers.
  - 5. The edges and edge slopes of the sub grade shall be bladed and otherwise depressed to conform to the lines and the dimensions of the finished surface.
  - 6. Install a continuous, engineered 2 mm thick woven geotextile over the entire sub grade.

### 3.02 BASE INSTALLATION

- A. A true vapor barrier shall be installed prior to installation of any steel and/or cables. Once in place no vehicular traffic shall be allowed on the vapor barrier nor any other object which could puncture the barrier or otherwise compromise the integrity of the surface.
- B. Forms and screeds should be set accurately and secured to prevent settlement or movement during placing of concrete. Forms shall remain in place until the concrete has taken its final set.

C. Steel Reinforcement Bars: #4 size at 18” on center in both directions.

1. Bars shall be accurately positioned at mid-depth, terminating 2” away from edges and joints, and should be adequately supported by chairs with sand plates provided to prevent bar supports from sinking into the sub base.
2. Bars shall be lapped at 18” and should also be securely tied or otherwise secured so that there is no possibility of displacement when concrete is placed.
3. At the time of concrete placement, reinforcement shall be free of loose, flaky rust and other coatings or films that could interfere with bonding to the concrete.

D. Joints

1. Non-extruded expansion joint filler material  $\frac{3}{4}$  inch thick should be installed at the net line if the two halves of the court are cast separately, and between courts if there is more than one court.
2. The bottom edge of the filler material shall extend to or slightly below the bottom of the slab; the top edge should be held  $\frac{7}{8}$  inch below the surface of the slab by a tack strip of wood, its top flush with the finished slab surface.
3. Edges of joints should be tooled with an edging tool having a radius of  $\frac{1}{4}$  inch. After the concrete has cured the tack strips should be removed and the joints sealed with an elastomeric sealing compound to within  $\frac{1}{8}$ ” of the surface.
4. If the two halves of the court are cast separately, a concrete grade beam 6 inches thick and 18 inches wide, minimum with two #4 reinforcing bars run continuous shall be cast across the center of the court.
  - a. Grade beam shall support the two slabs at the expansion joint under the net.
  - b. Top of grade beam shall be at the elevation of the bottom of the court slab.
  - c. Grade beam shall be placed 48 hours prior to the court concrete.
  - d. Bonding between the grade beam and the court concrete shall be prevented by painting the top of the beam with an asphaltic or other bond preventing material.
  - e. Thicken grade beam to 12 inches at the net posts to provide additional stability for the posts. *(CAUTION: All Working Joints May Close and Re-Open.)*

E. Concrete shall be pumped, not driven onto court.



- F. Reinforced concrete slab shall be 6 inches thick. Overall dimension of an individual court shall be no less than 61 feet by 121 feet to provide for a 6 inch apron around the court. *(62 feet by 122 feet if want to provide a 1 foot apron. This additional footage helps prevent vegetation intrusion, facilitates landscape maintenance and adds to the overall cosmetics. Fencing should remain at 60 feet by 120 feet. Fence posts, net posts, sleeves and center anchor should be installed prior to or during concrete placement. Fencing should be completed prior to surfacing.)*
- G. Concrete Placing and Finishing
1. At least a full half court shall be placed in one continuous operation without intervening joints of any kind.
  2. Uninterrupted concrete placing operations without intervening joints shall be limited to one full court with continuous reinforcement.
  3. Concrete shall be spread, consolidated, screeded, bull-floated and finished in accordance with Section 7.2 of ACI (American Concrete Institute) Standard 302, Recommended Practice for Concrete Floor and Slab Construction.
  4. When concrete is sufficiently set to withstand foot pressure with only about ¼ inch indentation and the water sheen has left the surface, the slab shall be uniformly finished by power floating and troweling.
  5. Final finish texture shall be a medium broom finish unless otherwise specified by the surface manufacturer.
- H. Surface Tolerances: Finished surface of the court shall not vary more than 1/8 inch in 10 feet when measured in any direction with a 1% continuous slope.
- I. Curing: Immediately after finishing, the concrete shall be kept continuously moist for 7 days by covering with polyethylene film, waterproof curing paper, sprinkling, or other acceptable coverings. No curing compounds shall be used.

### 3.03 INSTALLATION OF TENNIS COURT ACCESSORIES

- A. At least 24 hours prior to placing concrete base, place 12” diameter holes in the base, 36” deep. Place net post sleeves in position with the top approximately ¼ “ below the finished court elevation and pour 6” of concrete around the bottom to hold in position. Be sure sleeve remains plumb.



1. Foundations shall be so designed and poured, and the posts so set, as not to cause cracking or other damage to the finished court surface.
  2. Post foundations shall be not less than 24" in diameter at the top, not less than 30" in diameter at the bottom, and not less than 36" in depth.
  3. Concrete for sleeve foundations shall be mixed in ratios of six standard 94 pound sacks of cement per cubic yard of concrete, with one such sack of cement to not more than six U.S. gallons of water, attaining a compressive strength of not less than 3,500 psi at 28 days after pouring.
- B. Foundations shall be situated so as to provide a clear distance between posts of 33' on single courts and 42' on double courts.
  - C. Posts shall be set plumb and true so as to support the net at a height of 42 inches above the court surface at the net posts.
  - D. The metal anchor strap, located at the center of the net, shall be set in a concrete footing measuring 12" in diameter and 12" deep.
  - E. Square footings and foundations are not acceptable.
  - F. Tennis nets shall be installed, upon completion, to posts and cables for a neat, taut appearance.

### **3.04 TENNIS COURT SURFACE PREPARATION**

- A. Nova'ProKramercourt XP tennis surfacing system shall be installed on a sound base surface tolerance not exceeding 1/8" in 10' when measured in any direction with a minimum slope of .25% to a maximum of 1%.
- B. The entire surface shall be checked for any depressions. Depressions 1/16" or deeper shall be filled or leveled.
- C. The entire surface shall be thoroughly cleaned to remove dust, dirt and foreign debris.

### **3.05 NOVA'PROKRAMERCOURT XP SURFACING SYSTEM**

- A. Confirm that all center strap anchors and net post sleeves are in place prior to surface installation.
- B. The surface course shall be installed according to manufacturer's specifications.



- C. All surface course materials are to be installed after the surface has been inspected and approved by the {Owner} {Architect} {Landscape Architect} {Engineer}.
- D. The Nova'ProKramercourt XP cushioned base sheet shall be placed over subbase in accordance with manufacturer's instructions.
- E. Sections of the cushioned base sheet layer are to be laid out according to manufacturer's instructions for Sportline System.
- F. Lines are to be factory tufted in place (Sportline System). Refer to system installation guidelines from system manufacturer for installation.
- G. All joints may be attached with Nova'XP-Bond, a special combination of a one-component moisture cured urethane adhesive and a weather resistant polyester tape. Heat seaming methods shall not be allowed. All seams and lines to be cut shall be cut without damaging tops of the fibers.
- H. Base Sheet Infill: Using a special mechanical device to filter the material into the fabric, the Nova'XP-Textfill material in fill shall be filtered into the cushioned base sheet mat in several light layers and shall be brushed in to allow for compaction and a level finish.
- I. Once leveled and filled, surface is to be mechanically treated to achieve proper compaction. Once process is completed, court shall be top dressed and tested for ball bounce. Court(s) will not require an extended break-in period if treatment is completed properly.
- J. CAUTION: Do not allow petroleum products to be spilled on the Nova'ProKramercourt XP surface.

### **3.06 CLEAN UP**

- A. Upon completion of the work, the contractor shall remove all containers, surplus materials and debris and have the site in a clean and orderly condition acceptable to the [Owner], [Architect], [Landscape Architect], [Engineer].
- B. Provide [Owner], [Architect], [Landscape Architect], [Engineer] with Nova'ProKramercourt XP Maintenance Manual at completion of project in accordance with Section [01700] [01730] of the Project Manual.

### **END OF SECTION**

[Revised 12/18/07]