

DETAIL SPECIFICATIONS
FOR
UNION CARBIDE CAMPS SWIMMING POOL
BLUE CREEK, WEST VIRGINIA
AUGUST 28, 1967

WEST VIRGINIA STATE DEPARTMENT OF HEALTH	
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National Pool Engineers
Florence, Alabama

SECTION 1

STRUCTURAL

(Prestressed Concrete)

1. WORK INCLUDED: This work shall include all labor, material and equipment to complete in accordance with the plans and specifications, all concrete work, reinforced or otherwise; all labor and equipment for making excavations and back-fill required for such construction; all labor, material and equipment required for the construction and removal of forms; and all labor, material and equipment for other work as specified.

2. LAYOUT OF WORK: Before any excavation or construction shall be commenced, the Contractor shall place batter boards permanently locating the perimeter of all structures. The site shall be excavated to an even grade and templates installed denoting the exterior line of the pool shell as applicable.

3. DIMENSION AND DESIGN: The entire construction of the pool (including deck areas, filter room or filter slab, walls, curbs or fences) or other work indicated in Section No. 1, shall be in accordance with the plans and specifications.

The concrete floor and footings shall be placed insofar as possible in one continuous operation. Construction joints, if required, shall be used between units of operation and shall be located as shown on the plans. Expansion joints where used in pool walls and floor shall be constructed as shown on the plans.

4. EXCAVATION AND GRADING: The elevations and depths indicated on the plans shall be used in computing the quantities of excavation or fill required of the Contractor, and the handling of additional unindicated quantities because of errors on or omissions from the plans shall be considered extra work.

The rough excavation and hand trim shall be carried on as one operation to aid in eliminating over-excavation as applicable. The floor area shall be fine graded by the placing of screeds as required. Any voids which may occur due to over-excavation or from boulders removed, shall be filled with a lean mixture of concrete, gravel or sand.

4. EXCAVATION AND GRADING: (Cont'd)

Hard pan, caliche or rock encountered within the limits of the pool structure, including deck areas and filter room slab requiring drilling and/or blasting unless otherwise provided for or shown on the plans shall be considered as extra work. A tolerance of one inch shall be allowed in the subgrade, but in no case shall the thickness of the floor slab or footing be less than that shown on the plans.

Upon the completion of the contract all surplus excavated material not required for rough grading shall be removed from the site or disposed of by the Contractor as indicated on the plans, or as directed by the owner, unless otherwise specified.

5. PLACING FITTINGS: The Contractor shall install before placing the concrete, all special pool and deck fittings, deck receptacles or mounting rings for underwater lights and anchors that are to be embedded in concrete, and shall be responsible for their positioning in accordance with the plans.

6. STEEL REINFORCEMENT: All reinforcing steel shall be standard size deformed bars equal to the requirements of "Specifications for Billet-Steel Bars for Concrete Reinforcement", Intermediate Grade, ASTM Serial Designation A 15-54 or "Specifications for Rail-Steel Bars for Concrete Reinforcement", ASTM Serial Designation A 16-54, The American Society for Testing Materials.

All reinforcing steel shall be in place before concrete pour is commenced, and shall be free from rust, dirt, oil and paint, shall be positioned and of the sizes as indicated on the plans, and secured by not less than sixteen gauge annealed tie wire. Metal chairs or concrete blocks shall be used to hold steel above form bottoms or earth. Slab steel shall be securely wired together at all points where bars cross and shall be lapped as shown on the plans at splices. Splices shall be staggered, and laps shall be not less than 40 bar diameters.

7. CAST IN PLACE CONCRETE: The work covered by this section includes furnishing all materials and equipment and performing all necessary labor to do all concrete work shown on the plans or incidental to the proper execution of the work.

7-a. COMPOSITION: Concrete shall be composed of cement, fine aggregate, coarse aggregate, and water so proportioned and mixed as to produce a plastic, workable mixture in accordance with all requirements under this section and suitable to the specific condition of placement.

7. CAST IN PLACE CONCRETE: (Cont'd)

7-k. AGGREGATE CONTENT: The total volume of aggregate to be used in each cubic yard of concrete shall be that necessary to produce a dense mixture of the required workability. Admixtures may be used if deficiencies in aggregate gradation or in other mix properties cannot be economically corrected otherwise. Harshness, bleeding, segregation, poor placing, and finishing qualities can be permissibly corrected by the use of more fines in the fine aggregate, changes in grading of fine aggregate, change in the sand-cement and in the sand-gravel ratio, additional cement or a combination of these variables.

7-l. MIXING AND PLACING: The pool floor shall be poured as a monolithic unit as indicated on the plans. The Contractor shall have available two or more approved batch-type concrete mixers of ample capacity in order to insure continuity of pour. The concrete shall be poured without cessation until the monolithic floor unit is completed.

The mixer shall be provided with adequate equipment and facilities for accurate measurement and control of the materials and water for readily changing the proportion to conform to the varying condition of the work, in order to produce concrete of the required strength and workability.

7-m. MIXING TIME: The minimum time for mixing each batch, after all materials are in the mixer shall be 1 minute for $1\frac{1}{2}$ cubic yards to $1\frac{1}{2}$ yard mixers, $1\frac{1}{2}$ minutes for mixers over $1\frac{1}{2}$ cubic yards. The mixer shall revolve a minimum of 12 revolutions after all materials have been placed therein and at a uniform speed. Neither the speed nor the volume capacity of the mixer shall exceed those recommended by its manufacturer. Excessive overmixing, requiring additions of water to preserve the required consistency will not be permitted.

7-n. CONVEYING: Concrete shall be conveyed from the mixer to forms as rapidly as practicable and by methods which will prevent segregation or loss of ingredients. It shall be deposited as nearly as practicable in its final position. Chutes used shall be such that the concrete slides in them and does not flow. Chutes, if permitted, shall have a slope of less than 1 to 2. Where vertical drop is greater than 7', placement shall be through tremies or similar devices to prevent segregation.

7-o. PLACING: Concrete shall be placed before initial set has occurred and in no event after it has contained its water content for more than fifteen minutes. Unless otherwise specified, all concrete shall be placed in the dry upon clean, damp surfaces, free from running water or upon properly consolidated fills, but never upon soft mud or dry porous earth.

7-o. PLACING: (Cont'd)

The concrete shall be compacted and worked in an approved manner into all corners and angles of the forms and around reinforcement and embedded fixtures in such a manner as to prevent segregation, of the coarse aggregate. Construction of forms for the lifts of vertical walls shall be such as to make all parts of the walls easily accessible for the placement, spading and consolidation of the concrete as specified herein.

7-p. VIBRATION: All concrete shall be placed with the aid of mechanical vibrating equipment. Vibration shall be transmitted directly to the concrete, and in no case shall it be transmitted through the forms. The duration of vibration at any location in the forms shall be held to the minimum necessary to produce thorough compaction.

7-q. FINISHING OF SLABS: No special concrete or cement mortar topping course shall be used for slab finish unless otherwise shown on the plans. Slabs shall be brought to a true and even finish by power or hand floating. Where a trowel finish is required, it shall be done with a trowel in such a manner as to produce a dense, non-skid, impervious surface free from blemishes. Care shall be taken that no excess water is present when the finish is made.

7-r. CURING AND PROTECTING: All concrete shall be kept wet for a period of seven days unless otherwise specifically prescribed. Walk slabs and other flat work shall be cured by the use of burlap or similar material kept wet for a period of seven days.

7-s. FORM MATERIALS: Forms shall be of wood or steel as hereafter specified and shall be so constructed as to finally present a smooth concrete surface free of bulges and other defects. The use of form liners of Masonite or other material will be permissible.

7-t. FORM CONSTRUCTION: Forms shall be built true to line and grade and shall be mortar tight and sufficiently rigid to prevent displacement or sagging between supports. Responsibility for their adequacy shall rest with the Contractor. Form surfaces shall be smooth and free from irregularities, dents, sags, or holes when used for permanently exposed faces. Bolts and rods used for internal ties shall be so arranged that when the forms are removed, all metal will be not less than one inch from any concrete surface.

7-u. FORM COATING: Forms, other than those having absorptive form lining for exposed surfaces, shall be coated with a non-staining mineral oil which shall be applied shortly before the concrete is placed. Forms for unexposed surfaces may be thoroughly wetted in lieu of oiling, immediately before the placing of concrete.

8. READY-MIX CONCRETE: Ready-mix concrete when used in lieu of job mixed concrete shall comply with A.S.T.M. Specifications C 94-54, "Standard Specifications for Ready-Mixed Concrete". It shall be the responsibility of the Contractor to insure the source of such concrete is adequate for the continuous placing as required.

9. PRESTRESSED CONCRETE WALLS: The work covered by this section includes furnishing all materials and equipment and performing all necessary labor to do all concrete work shown on the plans or incidental to the proper execution of the work.

9-a. PRECAST CONCRETE UNITS: The walls shall be constructed of precast concrete units and steel rods for precasting as specified on the applicable plans. The concrete units shall be National Precast Interlocking Units, 16" long, 11 5/8" high, and 2 1/4" wide.

The first layer of units shall be grouted to the concrete footing and floor with cement and sand mortar. The balance of the units are to be placed dry over the vertical steel rods.

9-b. STRESS RODS: Stress rods shall be of steel rolled from new billets of properly intensified heats of open hearth or electric furnace, with a minimum yield point of 55,000 to 65,000 psi.

Threads on the ends of each rod shall be American Standard coarse thread. They shall be rolled on the rods for a length of approximately 4 inches. They shall be protected properly against damage in handling and shall be given a generous application of light oil immediately before the nuts are attached.

Nuts shall be of a size to fit the rolled threads. The nuts shall develop at least the same yield point stress as the rods.

9-c. PRESTRESSING: After the precast concrete units have been placed (prior to pouring concrete in the voids of the concrete units) the bearing plates and washers shall be placed over the rods and the nuts secured firmly. The nuts shall be initially tightened as required to secure the concrete units in place. In no case shall this initial tightening exceed 50% of that required for proper prestress in the wall.

When all nuts are in place, the work of adjustment to the proper rod stress shall begin. The wrench used for this purpose shall be a torque wrench similar or equal to that manufactured by Herbrnad; Freemont, Ohio. No one nut shall be fully tightened until all nuts have reach approximately the same tightness. The nuts shall be tightened until the torque wrench shows a reading of 65 foot pounds under a steady pull. The reading shall not be taken at the start of the pull but shall be read after the initial friction has been broken. Proper stress will be obtained in the rods when the nuts have been tightened to a reading of 65 foot pounds on the torque wrench.

9. PRESTRESSED CONCRETE WALLS: (Cont'd)

9-d. CONCRETE: After the prestressing operation, the voids in the concrete units and the upper beam form as shown on the plans shall be filled with 3000 psi concrete complying with concrete specification set forth in Section 1, Paragraph 7.

10. SCUM-GUTTER: A scum gutter of the type and dimensions shown on the plans shall be constructed and located as shown. A tolerance of 3/16" shall be allowed in the level of the gutter lip, and the bottom of the gutter shall slope uniformly to drains or as indicated on the plans.

11. COPING OR BEAM: If indicated on the plans, a coping or beam shall be installed in lieu of a scum gutter. It shall be of the type and size indicated and cast stone if required shall be of the "wet cast" type. So-called "dry tamp" cast stone shall not be acceptable.

12. POOL STEPS: Pool steps shall be incorporated into the pool as shown on the plans, and the surfaces of the steps shall be finished in the same manner as other pool interior surfaces, except that the treads shall be given a rotary non-slip surface.

13. OTHER CONCRETE: Unless otherwise noted, the Contractor shall furnish and place any concrete required for filter slabs, inside filter tanks, equipment bases, or other structures as shown on the drawings.

14. UNDERWATER LIGHT NICHES: Precast light niches shall be incorporated into the prestressed walls as shown on the plans and shall be of such size to accommodate the wet niche type underwater lights described in Section 4.

15. INTERIOR FINISH: Interior surfaces of the pool shall be thoroughly cleaned of dust, oil, paint or other loose material before application of any succeeding plaster or paint coats.

Interior wall surfaces shall consist of a $\frac{1}{4}$ inch minimum coat of brown plaster and followed by a $\frac{1}{4}$ inch coat of Marblelite unless indicated otherwise on the plans. The brown coat shall be troweled onto the concrete unit wall, floated to a uniform plane and troweled to a rough finish. The finish coat (marblelite) shall be troweled into the truing coat or the brown coat, floated to a uniform plane and troweled to a smooth dense, impervious surface, exercising extreme care to avoid stains. Application of these two coats shall be accomplished by an experienced plasterer.

Pool floor finish shall be as indicated on the plans.

15. INTERIOR FINISH: (Cont'd)

15-a. BROWN PLASTER COAT: The mix shall be 1 part cement to $2\frac{1}{2}$ parts Plaster Grade Sand. No lime shall be used.

15-b. MARBLELITE: The mix shall be 1 part white Portland Cement to 3 parts Marblelite. Equal portions of Marblelite #16 and #20 grades shall be used. No lime shall be used.

15-c. CURING FINISH COAT: After the finish coat has sufficiently dried, the pool shall be gradually filled with water. The water shall flow continuously until the pool is filled to eliminate dirt rings. When the weather is extremely hot, the walls shall be kept continuously damp while the pool is being filled.

15-d. WEATHER CONDITIONS: No concrete, plaster or paint coats shall be applied during rain, and any such material that has been newly placed shall, if necessary, be protected from the rain by means of canvas or other covering until the surface has set.

No paint or plaster coats shall be applied during high wind, and any such coat newly applied shall, if necessary, be protected from dirt that might be blown on the fresh surfaces, using canvas or other covering to so protect the surfaces until they have set.

16. TILE: Tile, of a color, size and grade as indicated on the plans shall be installed on the scum gutter or on pool walls, floors, or steps. All setting and laying of tile, and all materials and labor required for the completion of the tile work shall be in accordance with the latest basic specifications issued by the Tile Manufacturers' Association, except as otherwise noted herein or shown on the plans. All work shall be performed by workmen skilled in the trade. Tile shall be of a type suitable for the weather conditions to which it will be exposed using frostproof as necessary.

17. BACKFILL: Backfilling shall be made of suitable soil compacted to optimum density in layers approximately 6 inches in depth exercising care not to rupture pool piping.

SECTION 2

POOL PLUMBING

1. WORK INCLUDED: The Contractor shall supply and install all piping, pipe fittings, and valves from the pool fittings to the juncture point indicated on the plans at the influent and effluent sides of the filter battery; all piping, pipe fittings, and valves from the pool main drain, from scum gutter fittings (from deck and filter slab drain fittings and from other drain fittings) as indicated on the plans to the drain disposal point or points; all chemical feed lines, all fresh water lines, valves, tees, and hose bibbs, all piping and pipe fittings from the sight glass line to drain disposal points as shown; rods and supports; and other material as specified hereafter. He shall make the necessary pipe trenching and backfill as required for piping and other work as hereafter specified to complete the pool plumbing installation as shown on the plans.
2. PIPE MATERIALS: Pipe lines used in vacuum lines, recirculating lines, and raw water lines shall be as shown of standard weight galvanized steel, wrought iron, copper water tubing, or plastic. Where plastic pipe is used it shall be "Carlton" PVC or equal and shall bear the seal of the National Sanitation Foundation. Scum gutter (and deck drain) lines and gravity drain lines shall be standard cast iron soil pipe, vitrified clay pipe, or terra cotta pipe.
3. PIPE FITTINGS: Fittings in fresh water lines shall be galvanized malleable iron beaded and screwed. Fittings in vacuum and recirculating lines shall be heavily beaded cast iron, screwed if 3" in size or under, and flanged if over 3" in size, or Mueller "Streamlined" copper fittings where copper water lines are used. Fittings in drainage lines shall be the same type and weight as the line. Unions 3" and smaller shall be standard-weight galvanized, malleable iron, ground joint to brass seats. Unions larger than 3" shall be standard-weight cast iron companion flanges with 1/16" composition packing.
4. VALVES: All valves for pool piping 2" and under shall be screwed 125 lb. all bronze non-rising stem. Valves 2½" and 3" shall be 125 lb. iron body bronze mounted screwed. Valves over 3" shall be 125 lb. iron body bronze mounted NRS flanged.
5. CODES: In every case, the pipe, fittings, and valves used shall be in accordance with the prevailing codes and it shall be the responsibility of the Contractor to insure the fact that these materials are in accordance with the prevailing codes.

6. MAKING UP PIPE: All pipe shall be cleaned of scale, sand and dirt before installation, the ends of threaded pipe shall be reamed out full size, threads cut with new dies, and not more than two threads shall be left exposed when the joint is made up. All offsets shall be made with fittings, and pipe shall not be bent at any time except where copper water tubing is used, offsets may be bent but the radius of the bend must be such that no deformation of the tubing shall occur. Joints in screw piping shall be made with Grinnell Stainless Pipe Joint Cement or equal. Joints in copper water tubing shall be thoroughly cleaned and made tight with a good grade of tin-lead solder making sure that the entire joint is properly sealed throughout its entire area, and joints in cast iron pipe shall be caulked with a good grade of oakum, then filled and caulked with molten lead. Vitrified joints shall be made tight with cement mortar.

7. PITCH OF PIPES AND SUPPORTS: Horizontal drainage lines shall be supported to a uniform slope, the pitch of which shall be not less than 1 inch in 10 feet and all piping shall be so installed as to avoid unnecessary turns in order that friction loss may be kept at a minimum.

Adequate pipe supports and bracing shall be provided. Cast iron piping shall not be unsupported for length in excess of 5' - other piping in excess of 10'.

8. EXCAVATION, BACKFILL, & PIPING TESTS: The Contractor shall make the required pipe trench excavations and backfill, but no backfill of pipe trenches shall be made until piping has met the proper pressure test. All pool, filter, and water line piping shall be tested to 75 lbs. per square inch, drain lines shall be given a gravity test.

9. FRESH WATER LINES: Fresh water lines shall include a line from the juncture point indicated on the plans to the deep end of the pool and connected with the pool as indicated on the plans or in accordance with the prevailing health authority. (If fillspout required). Other lines, with tees and hose bibbs, shall be installed as indicated on the plans. A fresh water line of size indicated on the plans (if indicated) shall be connected to the chlorinator. A hose bibb of size noted on the plans shall be located adjacent to the chemical feed apparatus.

10. DRAINAGE LINES: Drainage lines shall include scum gutter lines, (deck and floor drain lines), backwash line, (and gravity main drain line). All lines to be the size shown on the plans and to be extended to point or points indicated.

11. RECIRCULATING LINES: Recirculating lines shall include pool main outlet lines, vacuum lines, and return lines, all of which shall be installed and connected from the pool fittings to the influent and effluent sides of the filter battery as shown on the plans.

SECTION 3

RECIRCULATION AND PURIFICATION EQUIPMENT

1. WORK INCLUDED: The Contractor shall supply all equipment as hereinafter specified. The Contractor shall assemble and install the entire filter system complete, chlorination system, and other mechanical equipment as shown on the plans, and in accordance with the instructions furnished by the manufacturer of such equipment. The drawings indicate in diagram form, the desired arrangement of the principal apparatus, piping, and equipment, and shall be followed as closely as practicable, exercising care in the work to secure proper headroom and spacing conditions and a neat, workmanlike arrangement of piping and valving. The filter manufacturer shall furnish, ready for installation, all filter face piping between the limits as shown on the plans. The Contractor shall install such face piping.

The Contractor shall paint exterior surfaces of filter tanks, valves, and all exposed piping with two coats of approved metal paint, and shall paint other mechanical equipment whose factory finish may have been marred or damaged in shipment or installation. The filter manufacturer shall furnish metal tags for marking all valves furnished by same, and furnish complete instructions for installing and operating all mechanical equipment. All of the mechanical equipment is to be guaranteed in writing, except as otherwise specified, for a period of one year from the date of shipment.

2. FILTER REQUIREMENTS: The filter plant shall consist of one (1) Horizontal Sand Pressure Filter (s), National No. NSH121 having a combined capacity of 312 GPM when operating at a filtration rate of three (3) GPM per square foot of filter area and a backwash rate of 384 GPM when operating at a backwash rate of 12 GPM per square foot of filter area (backwashing one unit at a time). The plant shall be capable of recirculating the entire contents of the pool, approximately 144,000 gallons in an 8 hour period when operated at this rate. The face piping shall be so designed that any one filter may be backwashed separately, filtration to pool may be accomplished with any one filter or with all filters as a unit, and the vacuum cleaning operation may be accomplished either to the filter or to waste.

3. FILTER TANKS: The tank shall be 96 inches in diameter. Shell height (or length) 12 Ft., minimum shell thickness 1/4 inches, minimum head thickness 1/4 inches. They shall be built for a working pressure of 50 p.s.i. and a test pressure of 75 p.s.i. They shall be fabricated of quality hot rolled steel, using butt joints except that a lap joint may be used where shell and heads are joined. Heads shall be flanged and dished convex with the radius of the dish equal to the diameter of the shell. There shall be provided one 11"x15" manhole, complete with flanged steel cover, gasket, bolts, and yokes for each unit or cell.

3. FILTER TANKS: (CONT'D.)

Tank openings for pipe fittings shall be extra heavy couplings or pipe sleeves welded inside and outside. A coupling for air release shall be welded to the top of each unit or cell. Air releases shall be performed as indicated on the plans. There shall be installed in the top of each tank, a distributor system, so designed that incoming water will be diverted to prevent water from falling directly onto the filter media.

The underdrain distributing and collecting system shall consist of a black steel header not less than 4 inches IPS and so constructed that there shall be on approximately 6 inch centers at 180 degree taps for 3/4 inch IPS, black steel laterals. The laterals shall be provided with orifices spaced approximately six inches on centers, pointing downward and the ends of the laterals shall be capped. The bottoms of the filters shall be filled with 3000 psi concrete as indicated on the plans.

There shall be supplied adjustable tank jacks which, upon installation, will support the bottom of the tank approximately 2" above the filter slab.

4. FILTER MEDIA: The filter media shall be of size and depth as indicated on the plans and shall be rounded, hard, clean gravel and silica sand. Top layer of fine sand shall have effective size particles from 0.45 mm to 0.55 mm in diameter, and with a uniformity coefficient of 1.45 to 1.69. Coarse sand (if required) shall be as indicated on the plans.

The filter media shall be supplied in separate bags containing approximately one cubic foot each, and shall be placed in the tanks at the site of the work by the Contractor in accordance with the plans.

5. GAUGES: There shall be supplied two standard dial pressure gauges, one each for installation on the inlet and outlet sides of the filter battery, National No. 56452. Pressure gauge shall be provided with standard sampling cocks and piping or tubing for connection to filter piping.

There shall be supplied one (1) rate of flow indicator, Mercury Manometer type, with an indicating capacity of 0 to 400 GPM of water in a 4 inch line. The indicator shall be of Meriam manufacture or equal.

6. SIGHT GLASS: There shall be supplied one straight-through reading type glass, having an easily removable glass, for installation on the backwash line. The sight glass shall have a 1 1/2 inch IPS threaded outlet, National No. 56435.

7. FACE PIPING: The filter manufacturer shall supply all face piping for the filter battery between the limits as shown on the plans. Face piping shall be galvanized steel with cast iron fittings and valves shall be as indicated on the plans.
8. PUMP AND MOTOR: There shall be supplied a centrifugal pump connected to an electric motor similar or equal to Marlow 3N2SC. The pump shall have a 3 inch discharge and a 4 inch suction and shall have a capacity of 384 gallons per minute against a total head capacity of 56 feet at a speed not to exceed 1750 RPM. The motor supplied shall be a 7½ H.P., 3 phase, 230/460 voltage, 60 cycle, 1750 RPM, ball-bearing, drip-proof, low-starting current, normal starting torque, induction motor of Marlow manufacture or equal. There shall be supplied a full magnetic low voltage release protection switch with push-button stop-and-start station of General Electric manufacture or equal. Such protection switch to be included in the electrical contract unless indicated otherwise.
9. PUMP STRAINER: There shall be supplied one 5 inch pump strainer, National No. 53725, with quick-removable cover, gasket, yoke, and bolt. Type strainer shall be that which directs the water downward through the basket.
10. CHEMICAL FEEDING APPARATUS: There shall be supplied one (1) double head chemical feed pump complete with accessories and 2 - 30 gallon fiberglass chemical solution tanks. The chemical feed pump shall have a capacity rating of 0 to 86 gallons per head per twenty four hour period and shall be of Mec-O-Matic manufacture or equal.
11. GAS MASK: There shall be supplied one (1) Nat. No. 85375 Gas Mask complete with chlorine cannister.

CHLORINATOR: The Chlorinator shall have a maximum capacity of 50 ppd (pounds chlorine per 24 hours).

The chlorinator shall be of the manually adjusted, solution fed, vacuum type and shall be constructed of materials completely resistant to the corrosive attack of wet or dry chlorine gas, chlorine solution and chlorinator room atmosphere.

The chlorine flow rate through the chlorinator shall be manually set by use of a needle valve directly throttling the chlorine flow. The regulators shall automatically maintain the flow rate constant at any manually selected rate within the operating range.

The linear-scale, variable-area flow meter shall indicate the quantity of chlorine being fed through the chlorinator. The meter shall be readily removable from the front of the chlorinator for cleaning or change of capacity, and shall be direct reading in pounds of chlorine per 24 hours. The meter shall be accurate within 4% of the indicated flow rate.

The vacuum breaker shall prevent excess vacuum and water flooding in the system. Loss of vacuum shall positively shut off the flow of chlorine. Chlorine pressure in the vacuum system shall be automatically vented to an external vent system.

Chlorinator shall be Fischer and Porter Model 70C3010 "Super C" or equal.

PLATFORM SCALE: There shall be supplied one (1) platform scale of Howe manufacture, or equal, National No. 21575 of 1000 lbs. capacity with a metal platform approximately 18" x 27".

SECTION 4

POOL FITTINGS, DECK EQUIPMENT, AND ACCESSORIES

1. WORK INCLUDED: The Contractor shall furnish and install all equipment as hereinafter specified.

2. MAIN POOL FITTINGS: There shall be supplied all special swimming pool fittings as shown on the drawings and as specified hereunder. All exposed surfaces shall be chrome plated except as noted.

- A. Main Outlet Fittings: Shall be National No. 72712B
frame and grating of cast brass.

- B. Scum Gutter or Overflow Fittings: Shall be National No. 72302FB
of cast brass with removable grate of cast brass.

- C. Pool Inlet Fittings: Shall be National No. 72354 of cast brass with removable adjustable grate of cast brass.

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- E. Deck Drain Fittings: Shall be National No. 72830 of cast
iron with removable grill.

- F. Pool Fillspout: Shall be National No. 72615B, 1½ x 18 inches.

- G. Surface Skimmers: Shall be National No. 36200B, of plastic

- H. Life Line Anchors: Shall be National No. 85393B with 3/4
eyebolt.

- I. Racing Line Anchors: Shall be National No. 85363-B with
1/2 eyebolt.

- J. . Hydrostatic Relief: Shall be National No. 72842

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4. LADDERS: The ladders shall be supplied as shown on the plans. The ladders shall be National No. 44836 & 44837 respectively, progressive bend and removable. They shall be fabricated of $1\frac{1}{2}$ " ~~xxxxxxx~~ (stainless steel) with non-slip patterned treads 3 inches in width and the ends of the treads shall not encircle the uprights. ~~xxxxxxx~~ Anchors shall be wedge type, of cast iron with bronze wedges.

~~5. SPRINGBOARDS: There shall be supplied two (2) official diving boards, National No. 40302 & 40506 fabricated of laminated fir. Dimensions shall be: Length 12' & 16', width 20"; base end thickness 2 1/4"; off-shore end thickness 1 1/2".~~

~~6. SPRINGBOARD COVER: Springboards shall be supplied with non-skid covering similar to Minnesota Mining and Manufacturing Co. (or equal) safety walk.~~

7. SPRINGBOARD SUPPORTS: There shall be supplied two (2) springboard support (s) 24" high and one (1) meter National No. (s) 41248-B & 41765 respectively. Handrails shall be of ~~xxxxxxx~~ construction. Anchors shall be as shown on the plans. ~~xxxxxxx~~ stainless steel

8. LIFE GUARD CHAIR: There shall be supplied two (2) lifeguard chair (s) National No. 85511 with the handrails basically stainless steel construction. Anchors shall be as shown on the plans. There shall be as provided a foot rest, which shall be constructed of No. 1 clear hardwood, (plywood) planed smooth, all edges eased. The foot-rest assembly shall be treated with a moisture repellent sealer. Footrest shall be covered with a non-skid material. The seat shall be of fiberglass.

15. INSTRUCTIONS: The Contractor shall supply complete drawings and printed instructions for the installation and operation of all equipment specified herein and shown on the plans. A qualified Engineer or representative of the pool contractor shall visit the site of the work after installation of such equipment has been completed, shall put into operation all mechanical equipment, and shall for a period of not to exceed one day, assist and instruct the Owner's representative in the operation of all such equipment.

16. LIFE RING: There shall be supplied two (2) Nat. No. 85320 Life Rings.

17. Life Hook: There shall be supplied one (1) Nat. No. 85378 Life Hook complete with 16 Ft. handle.

SECTION 5

FENCE

1. GENERAL: All fence shall be chain link type, fabric height as shown on the drawings.
2. FABRIC: Fabric shall be No. 11 gauge steel wire woven in a 2 inch mesh and both edges of the fabric shall have a twisted and barbed finish. All fabric shall be heavily galvanized after fabrication.
3. MATERIALS: Line posts, end posts, corner posts, gate posts, gate frames, top rail, and braces shall be steel tubing, heavily galvanized inside and out. Fittings shall be malleable, cast iron or prestressed steel and hot-dip galvanized. All posts shall be fitted with tops. All other materials entering into the construction of the fence shall be heavily galvanized.
4. LINE POSTS: Shall be of size as follows:

4 Ft. fabric height	1 5/8" O.D.
5 Ft. fabric height	2" O.D.
6 Ft. fabric height	2" O.D.
5. END, CORNER, AND GATE POSTS: Shall be of size as follows:

4 Ft. fabric height	2 1/2" O.D.
5 Ft. fabric height	3" O.D.
6 Ft. fabric height	3" O.D.
6. TOP RAIL: Shall be of size as follows:

4 Ft. fabric height	1 3/8" O.D.
5 Ft. fabric height	1 5/8" O.D.
6 Ft. fabric height	1 5/8" O.D.
7. GATE FRAMES: Shall be of size as follows:

4 Ft. fabric height	1 3/8" O.D.
5 Ft. fabric height	2" O.D.
6 Ft. fabric height	2" O.D.
8. BRACES: Shall be of size as follows:

4 Ft. fabric height	1 5/8" O.D.
5 Ft. fabric height	1 5/8" O.D.
6 Ft. fabric height	1 5/8" O.D.

9. DEPTH OF POSTS: Posts shall be set in concrete bases the same depth of the post with minimum diameter 6". Depth of posts shall be as follows:

	<u>Line Posts</u>	<u>End, Corner, & Gate Posts</u>
4 Ft. fabric height	24"	36"
5 Ft. fabric height	24"	36"
6 Ft. fabric height	24"	36"

SECTION 6

POOL ELECTRICAL

1. SCOPE: The work to be done under this section shall include the furnishing of all labor, material, appliances, equipment, tools, transportation, supervision and services required to construct and install a complete and operative electrical system as specified herein and as shown on the plans; distribution system, fittings, supports, outlets, all fixtures, lamps, motor wiring, and starting equipment for both the swimming pool, the filtration system, the underwater lighting system and flood lighting system for pool unless specified otherwise.

2. PLANS AND SPECIFICATIONS: The plans indicate the general arrangement of electrical apparatus and are for assistance and guidance, but exact locations, distances, levels, etc. will be governed by field conditions. The Contractor shall review plans for the entire project and adjust his work to conform with all conditions shown thereon. All adjustments shall be made without additional cost to the Owner.

If discrepancies are found between the plans and specifications, or between the plans and actual field conditions, they shall be promptly brought to the attention of the Owner or Engineer for a decision. The Contractor shall comply with this decision without undue cost to the Owner.

All ceiling, wall-hung, and convenience outlets shall have fixtures as indicated on the drawings by letters (A, B, C, etc.) and specified herein. All fixtures shall be complete with all hanging devices, glassware, boxes, lamps, etc. Items not specifically mentioned herein which are necessary to put the electrical system into complete working operation shall be included.

3. CODES: All work shall conform with all requirements of the National Electrical Code and shall meet the approval of the local inspector and the local Power Distributor.

Any item not shown on the drawings required by local or National Electrical Code is to be furnished and installed by the Contractor.

4. PERMITS AND INSPECTIONS: The Contractor shall obtain all permits and inspections required, the cost of which shall be paid by the Contractor.

Inspections shall be made by a duly authorized inspector, and a certificate of final approval shall be submitted to the Owner.

5. MATERIALS: The Contractor shall furnish a complete list of materials which he intends to furnish and install. Written approval must be obtained before any final purchase is made of any materials, apparatus or appliance.

All material used shall bear the inspection label of the National Board of Underwriters.

6. SUBSTITUTIONS: In these specifications, one or more types material, apparatus or appliance has been specified as a convenience to fix a standard of workmanship, finish, and design required. The performance, guarantee, etc., of substitutive materials shall be approved as conforming to these standards. Where no specific type of material is mentioned, any first class product by a reputable manufacturer may be used, provided it conforms to the requirements and specifications.

7. CUTTING & PATCHING: Shall be held to a minimum; where necessary shall be done so as to provide a workmanlike finish.

8. SERVICE: The service shall be as directed by the owner and local power distributor.

9. PANELS: Lighting and distribution panels shall be dead front, circuit breaker type of Walker "Square D" manufacture or equal. Size as indicated on the plans.

10. PUMP AND MOTOR CONTROL: To be of size noted on the plans, magnetic across the line controller with push button start and stop station of General Electric manufacture or equal.

11. DISCONNECT SWITCHES: Disconnect switches shall be of "Square D" manufacture or equal. Size and number of poles to be as indicated on the plans.

12. CONDUIT: All conductors shall be run in conduit as shown on the plans. All conduit to be standard weight, threaded, rigid galvanized, except as noted on the plans. Conduit shall be installed in such a manner as to insure against trapped moisture or condensation, and conduit shall be locked to junction and pull boxes providing expansion joints where needed. Conduit shall be carefully reamed at the ends and closed with plugs or caps during construction. Iron preserving paint shall be used on threads, at joints, and wherever galvanizing has been damaged by tools or from other causes.

All conduit shall be run concealed when possible except in filter room or as directed. All exposed conduit shall be run parallel to the building walls or beams and shall be fastened securely by ample clamps or clips. "Condulet" fittings shall be used on exposed work to make right-angle turns so as to present a neat and workmanlike appearance.

13. CONDUCTORS: Unless otherwise specified, all conductors shall be Type R, TW, or RH rated for 600 volts and shall not be smaller than AWG #12.

Home runs for multiple circuits may be combined in one circuit, provided all connections are in accordance with Code requirements and the maximum unbalance in the neutral does not exceed the capacity of the conductor. Conductors shall be continuous, outlet to outlet, and no splices shall be made except with outlets or junction boxes.

14. JUNCTION BOXES: Provide a junction box for each outlet, and where necessary to pull wire. Boxes to be of code gauge galvanized metal, furnished with screw fastener cover.

15. LIGHTING FIXTURES: The Contractor shall furnish and install, connect and complete all lighting fixtures, including hangers, boxes, sockets, reflectors, ballasts, gaskets, lenses, louvers, lamps, etc., as follows:

<u>FIXTURE</u>	<u>DESCRIPTION</u>
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A	400 watt underwater light mounted in the pool wall as indicated on the plans. Complete with deck junction box and conduit and conductors from underwater light to deck junction box. "National" manufacture or equal.
B	Same as Type "A" except 500 watt.
C	Same as Type "A" except 1000 watt.
D	Same as Type "A" except 1500 watt.
E	Area lighting fixture. Type and size as indicated on plans.
F	100 watt keyless porcelain receptacle. "Bryant" No. 5228 or equal.

16. LIGHT SWITCHES: To be tumbler type with the number of poles as indicated on the drawings. Switches shall meet Underwriters' "T" rating and shall be so marked. Unless noted otherwise, switches shall be 20 amp, 125 volts, "Bryant" No. 5861 or equal.

17. CONVENIENCE RECEPTACLES: To be duplex 15 amp, 125 volt unless otherwise noted, "Bryant" No. 9260 or equal.

18. COVER PLATES: Cover plates shall be provided for each outlet to suit the devices installed and shall be stainless steel. Gang plates shall be used as required.

19. TESTING: Upon completion of the work, a thorough test shall be made in the presence of the owner or his representative, and the entire system shall be shown to be in perfect working condition as intended by this specification.

20. GUARANTEE: The Contractor shall guarantee all labor and materials for a period of one year from the date of final acceptance. The owner reserves the right to use the equipment installed by the Contractor prior to the date of final acceptance, and such use shall in no way invalidate the guarantee, except that the owner shall be liable for any damage to the equipment during this period due to the negligence of his operator or other employees.