SPECIAL PROVISIONS

SLUICE GATE AND ACCESSORIES

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PART 1 GENERAL

1.1 SCOPE

The work covered by this section of specifications consists of furnishing and installing the sluice gates and related accessories as shown on the plans and as specified herein to make the equipment complete and fully functional.

1.2 REFERENCES

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C501	(1992) Cast Iron Sluice Gates

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH-02	(1997) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 4417	(1984) Field Measurement of Surface Profile of Blast Cleaned Steel

STEEL STRUCTURES PAINTING COUNCIL SPECIFICATIONS (SSPC)

SSPC Paint 16			(1991) Coal Tar Epoxy-Polyamide Black (or Dark Red) Paint
SSPC	SP	1	(1982) Solvent Cleaning
SSPC	SP	3	(1989) Power Tool Cleaning
SSPC	SP	5	(1991) White Metal Blast Cleaning
SSPC	SP	7	(1991) Brush-Off Blast Cleaning

1.3 SUBMITTALS

Approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted:

Drawings

Sluice Gate and Accessories; GA

The Contractor shall submit to the Engineer, for approval, the pertinent drawings and other data in accordance with Section 501, STRUCTURES – GENERAL of the Construction and Materials Specifications. The shop drawings should show as a minimum the proposed brand and model name; dimensions and details for the gate operator, stem and stem guides; and anchorage details of the stem guides and gate operator.

The Contractor shall also submit the manufacturer's spare lists and/or bulletins for each piece of equipment. These lists and /or bulletins shall clearly show all details and parts shall be adequately described and/or have proper identification marks.

Certificates

Field Engineers; FIO

An affidavit shall be submitted showing and stating that the sluice gate and accessories have been installed properly and that the field engineer or engineers have adjusted and tested the equipment.

Operation and Maintenance Manuals

Operation and Maintenance Manuals; GA

The Contractor shall furnish seven (7) copies of a manual containing complete information in connection with the operation, lubrication, adjustment, maintenance, disassembly, repair and reassembly of the sluice gate and all related accessories.

Paint Data

Manufacturer's Product Data; GA, E. Material Safety Data Sheets; FIO, E.
Submit manufacturer's printed product data, specifications, use limitations, and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.

1.4 QUALIFICATIONS AND EXPERIENCE

The Contractor shall submit for review and acceptance, a written Qualification and Experience statement for painting signed and dated by the Contractor and the "Qualified and Competent Persons", defined in EM 385-1-1, that the Contractor has selected to develop the required safety and health submittal items and who will act as the Contractor's onsite safety and health representative during the contract period. The Qualified and Competent person who is responsible for development and implementation of health related submittal items (i.e., air sampling, confined space program, medical surveillance, hazard communication, ventilation system, etc.) shall be a current practicing qualified Industrial Hygienist with a minimum of 3 years of demonstrated experience in similar related work. Acceptance of this submission must be obtained prior to the submission of other required safety and health submittal items.

1.5 SAFETY AND HEALTH

Work shall comply with applicable safety requirements of the Ohio Industrial Commission and OSHA.

1.5.1 Worker Exposures

Exposure of workers to chemical substances shall not exceed limits as established by ACGIH-02, or as required by a more stringent applicable regulation.

1.5.2 Toxic Compounds

Toxic compounds having ineffective physiological properties, such as odor or irritation levels, shall not be used unless approved by the Engineer.

1.5.3 Training

Workers having access to an affected work area shall be informed of the contents of the applicable material safety data sheets (MSDS) and shall be informed of potential health and safety hazard and protective controls associated with materials used on the project. An affected work area is one which may receive mists and odors from the painting operations.

Workers involved in preparation, painting, and clean-up shall be trained in the safe handling and application, and the exposure limit, for each material which the worker will use in the project. Personnel having a

need to use respirators and masks shall be instructed in the use and maintenance of such equipment.

1.5.4 Coordination

Work shall be coordinated to minimize exposure of building occupants, other Contractor personnel, and visitors to mists and odors from preparation, painting, and clean-up operations.

1.6 DELIVERY, STORAGE, AND HANDLING

Paints shall be processed and packaged to ensure that within a period of 1 year from date of manufacture, they will not gel, liver or thicken deleteriously, or form gas in the closed container. Paints, unless otherwise specified or permitted, shall be packaged in standard containers not larger than 5 gallons in size, with removable friction or lug-type covers. Containers for vinyl type paints shall be lined with a coating resistant to the solvent in the formulations and capable of effectively isolating the paint from contact with the metal container. Each container of paint or separately packaged component thereof shall be clearly and durably labeled to indicate the purchaser's order number, date of manufacture, manufacturer's batch number, quantity, color, component identification, and the designated name, formula or specification number of the paint together with special labeling instructions, when specified.

Paint shall be delivered to the job in unbroken containers. Paints that can be harmed by exposure to cold weather shall be stored in ventilated, heated shelters. All paints shall be stored under cover from the elements and in locations free from sparks and flames.

PART 2 PRODUCTS

2.1 SLUICE GATE

The sluice gates shall be installed as shown on the drawings and as specified herein. The gates shall be of a high grade cast iron conforming to ASTM A126 for "Gray Iron Castings for Valves, Flanges, and Pipe Fittings," Class B, and of ample section to withstand the specified head of water load without distortion. Bronze seating surfaces shall be machined to a smooth finish and meet AWWA C501 leakage. The sluice gate and wall thimble shall be designed to withstand a minimum seating and unseating head shown in Table 1. The sluice gates and appurtenances shall meet the requirements of AWWA C501 in all respects with the following additions.

2.1.1 Wall Thimble

The wall thimble shall be 12 inches deep, Type F and tapped for studs to suit the sluice gate. The wall thimble shall be of high grade cast iron conforming to ASTM A126 for "Gray Iron Castings for Valves, Flanges, and Pipe Fittings," Class B, and of ample section to withstand the specified head of water load without distortion. The frame guides shall be of sufficient length so that not less than one-half the gate is within the guides when the gate is wide open, and shall be equipped with adjustable side wedges.

2.1.2 Stem

The stems shall be solid, type 304 stainless steel. Connection to the gate shall be by means of a bronze nut suitable for maximum thrust in both directions. Stem sections shall be connected to each other by means of bronze couplings threaded and keyed with a set screw and shall be of greater strength than the stem.

Hand operated floor stems shall operate the gates, under the heads shown, with a 40 pound effort applied to the hand wheel. However, for the purposes of stem and stem guide design, a stall thrust shall be used that would result from applying 100 pounds of effort to the hand wheel. Using this stall thrust (2.5 X normal operating thrust), stems shall be designed not to exceed the critical buckling load as predicted by the Euler long column equation using an end fixity coefficient of 2 and a factor of safety of 1.25.

2.1.3 Stem Guides

Bracket mounted stem guides shall be constructed so that when properly spaced they will hold the stem in alignment and yet allow it enough play to permit easy operation. The inside diameter of the guide shall not be greater than 1/8 inch larger than the outside diameter of the stem. The guides shall be spaced in accordance with the manufacturer's recommendations for each stem size. The L/r ratio shall not be greater than 200. The guides shall be adjustable with respect to the bracket to provide proper concentric alignment with the stem, and shall be so designed that alignment will be maintained after adjustment. The guides shall be lined and provisions shall be made to hold the lining in place. Brackets shall be attached to the wall by sufficient anchor bolts to prevent twisting or sagging under load.

2.1.4 Lifting Device

The lifting device shall be a non-rising stem with a 2-inch operating nut and open/close dial housed in a floor box as shown on the drawings. The design of the lifting mechanism shall be based upon the manufacturer's load calculations for the loads specified herein.

2.2 SPECIAL PAINT FORMULAS

The ingredient materials described in this paragraph are applicable only to the special paint formulations not covered by standard specifications, specified hereinafter and not to those finished-product coatings governed by federal or other standard specifications.

2.2.1 General

Special paints shall have the composition as indicated in the formulas listed herein. Where so specified, certain components of a paint formulation shall be packed in separate containers for mixing on the job.

2.2.2 Color and Tints

Colors shall conform to the listed chip of FED-STD 595. If not specified or otherwise prescribed, the color shall be that naturally obtained from the required pigmentation.

2.2.3 Paint Formulations

Coal Tar Epoxy (Black) Paint (Formula C-200a)

This paint shall conform to SSPC Paint 16 manufactured with Type 1 pitch. In addition to standard labeling, container labels shall include the term, "Corps of Engineers Formula C-200a". Finished product samples submitted for approval shall be accompanied by a list showing all of its raw material ingredients, the name of the manufacturer of each, and the trade name and/or code designation by which the producer identifies the ingredient product.

2.2.4 SAMPLING AND TESTING

Batches of paint that the Contractor proposes to use shall be stored in an approved shelter on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for sampling and testing. The Contractor shall notify the Contracting Officer when the paint is available for sampling. Sampling of each batch shall be witnessed by a representative of the Engineer unless otherwise specified or directed. Samples of paint submitted for approval shall be clearly labeled to indicate formula or specification number and nomenclature, batch number, batch quantity, color, date made, and applicable project contract number.

Where specifically indicated herein or where indicated in a standards specification for a finished product, separate samples of ingredient materials

shall be furnished. The ingredient samples shall be clearly identified by commercial name, trade designation, manufacturer, batch or lot number, and such other data as may be required. Testing of paint for compliance with the specifications will be performed in a Government designated laboratory at no expense to the Contractor except that the cost of testing any samples representing material that replaces previously rejected material will be deducted from payments to the Contractor at the rate of 200 dollars for each replacement sample.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

3.1.1 Storage and Handling

The Contractor shall store equipment in a manner to keep it clean and free from damage and shall handle it with care to prevent damage during installation and storage.

3.1.2 Delivery of Equipment

Items to be incorporated into the work shall be scheduled for delivery to the job site in sufficient time so as not to hold up construction.

3.2 INSTALLATION INSTRUCTIONS

3.2.1 Preparation and Supervision

The Contractor shall coordinate shop drawing, diagrams, templates, instructions and directions for the installation of the sluice gate.

Contractor and his installer must examine the areas and conditions under which sluice gate and associated items are to be installed and notify the Engineer, in writing, of any conditions detrimental to the proper and timely completion of the work. The Contractor shall not proceed with the work until unsatisfactory conditions have been corrected.

3.2.2 Sluice Gate

The sluice gates shall be installed at the gatewell as shown on the drawings, as specified in these specifications and in accordance with the sluice gate manufacturer's installation instructions and recommendations.

3.2.3 Wall Thimble

A wall thimble shall be installed in the wall of the gatewell structure as shown on the drawing.

3.3 SERVICES OF FIELD ENGINEERS

Upon completion of the work specified in this section, the services of one or more competent field engineers shall be provided by the Contractor to adjust the sluice gate and accessories as required to make all equipment function properly. The Contractor shall employ the services of such field engineer or engineers for the length of time required and shall include the cost of such services in his bid.

3.4 OPERATION AND MAINTENANCE MANUAL AND PARTS LISTS

The operation and maintenance manual and parts lists shall be bound separately, shall be approximately 8-1/2 inches by 11 inches, printed on good quality paper and bound between flexible, durable covers. Drawings incorporated in the manual and/or parts lists may be reduced to page size provided they are clear and easily legible, or may be folded into the manual to page size. Photographs and/or catalog cuts of components may be included for identification.

3.5 WARRANTY

The equipment to be furnished under this section of the specifications shall be warranted for a period of (1) year from the date of acceptance, either for beneficial use or final acceptance, whichever is earlier, but not before the equipment has passed all specified tests. Upon receipt of notice from the Engineer of failure of any part of the warranted equipment during the warranty period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the Contractor. The Contractor shall acknowledge his responsibility under these warranty provisions by letter, stating that the equipment and materials referred to herein are warranted and the inclusive dates of the warranty periods.

3.6 PAINTING

3.6.1 CLEANING AND PREPARATION OF SURFACES TO BE PAINTED

3.6.1.1 General Requirements

Surfaces to be painted shall be clean before applying paint or surface treatments. Deposits of grease or oil shall be removed in accordance with SSPC SP 1, prior to mechanical cleaning. Solvent cleaning shall be accomplished with mineral spirits or other low toxicity solvents having a flashpoint above 100 degree F. Clean cloths and clean fluids shall be used to avoid leaving a thin film of greasy residue on the surfaces being cleaned. Items not to be prepared or coated shall be protected from damage by the surface preparation methods. Machinery shall be protected against entry of blast abrasive and dust into working parts. Cleaning and painting shall be so

programmed that dust or other contaminants from the cleaning process do not fall on wet, newly painted surfaces, and surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations. Welding of, or in the vicinity of, previously painted surfaces shall be conducted in a manner to prevent weld spatter from striking the paint and to otherwise reduce coating damage to a minimum; paint damaged by welding operations shall be restored to original condition. Surfaces to be painted that will be inaccessible after construction, erection, or installation operations are completed shall be painted before they become inaccessible.

3.6.1.2 Ferrous Surfaces Subject to Normal Exposure

Ferrous surfaces that are to be permanently and continuously in exterior or interior atmospheric exposure and other surfaces as directed shall be cleaned by means of power tools or by dry blasting to the brush-off grade. Cleaning and priming shall be done in the shop unless otherwise directed or permitted. Power tool cleaning shall conform to the requirements of SSPC SP 3. Brush-off blast cleaning shall conform to the requirements of SSPC SP 7. Irrespective of the overall cleaning method used, welds and adjoining surfaces within a few inches, thereof shall be cleaned of weld flux, spatter, and other harmful deposits by blasting, power impact tools, power wire brush, or such combination of these and other methods as may be necessary for complete removal of each type of deposit. The combination of cleaning methods need not include blasting when preparation of the overall surfaces is carried out by the power tool method, but brush scrubbing and rinsing with clean water, after mechanical cleaning is completed, will be required unless the latter is carried out with thoroughness to remove essentially all soluble alkaline deposits.

Wetting of the surfaces during water-washing operations shall be limited to the weld area required to be treated, and such areas shall be dry before painting. Welds and adjacent surfaces cleaned thoroughly by blasting alone will be considered adequately prepared provided that weld spatter not dislodged by the blast stream shall be removed with impact or grinding tools. All surfaces shall be primed as soon as practicable after cleaning but, in any event, prior to contamination or deterioration of the prepared surfaces. To the greatest degree possible, steel surfaces shall be cleaned (and primed) prior to lengthy outdoor storage to minimize breakdown of mill scale and consequent rusting.

3.6.1.3 Ferrous Surfaces Subject to Severe Exposure

Ferrous surfaces subject to extended periods of immersion or otherwise as required shall be dry blast-cleaned to SSPC SP 5. The blast profile unless otherwise specified shall be 1.5 to 2.5 mils as measured by ASTM D 4417, Method C. Appropriate abrasive blast media shall be used to produce the desired surface profile and to give an angular anchor tooth pattern. If recycled blast media is used, an appropriate particle size distribution shall be maintained so that the specified profile is consistently obtained. Steel shot or other abrasives that do not produce an angular profile shall not be used. Weld spatter not dislodged by blasting shall be

removed with impact or grinding tools and the areas reblasted prior to painting. Surfaces shall be dry at the time of blasting. Blast cleaning to SSPC SP 5 shall be done in the field and, unless otherwise specifically authorized, after final erection. Within 8 hours after cleaning, prior to the deposition of any detectable moisture, contaminants, or corrosion, all ferrous surfaces blast cleaned to SSPC SP 5 shall be cleaned of dust and abrasive particles by brush, vacuum cleaner, and/or blown down with clean, dry, compressed air, and given the first coat of paint. Upon written request by the Contractor, the Contracting Officer may authorize mill or shop cleaning of assembled or partially assembled components specified to receive one of the vinyl-type paint systems or systems No. 6-A-Z, 21-A-Z, and 21-B-Z employing the epoxy zinc-rich primer. The surfaces, if shop blasted, shall be shop coated with the first and second coats of the specified paint system except that the epoxy zinc-rich primed surfaces shall receive an extra single spray coat of the zinc primer at the time field painting is started, as specified in the paint system instructions. The shop coating shall be maintained in good condition by cleaning and touching up of areas damaged during the construction period. Appearance of pinpoint or general rusting prior to application of field coats will be considered as evidence of poor workmanship, requiring reblasting and repainting at no added cost to the Government. Prior to the field application of subsequent coats, soiled areas of the shop coating shall be thoroughly cleaned and all welds or other unpainted or damaged areas shall be cleaned and coated in a manner to make them equivalent to adjacent, undamaged paint surfaces.

3.6.2 PAINT APPLICATION

3.6.2.1 General

The finished coating shall be free from holidays, pinholes, bubbles, runs, drops, ridges, waves, laps, excessive or unsightly brush marks, and variations in color, texture and gloss. Application of initial or subsequent coatings shall not commence until a Government representative has verified that atmospheric conditions and the surfaces to be coated are satisfactory or has waived specific verification. All paint coats shall be applied in a manner that will produce an even, continuous film of uniform thickness. Edges, corners, crevices, seams, joints, welds, rivets, corrosion pits, and other surface irregularities shall receive special attention to ensure that they receive an adequate thickness of paint. Spray equipment shall be equipped with traps and separators and where appropriate, mechanical agitators, pressure gages, pressure regulators, and screens or filters. Air caps, nozzles, and needles shall be as recommended by the spray equipment manufacturer for the material being applied. Airless-type spray equipment may be used only on broad, flat, or otherwise simply configured surfaces, except that it may be employed for general painting if the spray gun is equipped with dual or adjustable tips of proper types and orifice sizes. Airless type equipment shall not be used for the application of vinyl paints.

3.6.2.2 Mixing and Thinning

Paints shall be thoroughly mixed, strained where necessary, and kept at a uniform composition and consistency during application. Paste or dry-powder pigments specified to be added at the time of use shall, with the aid of powered stirrers, be incorporated into the vehicle or base paint in a manner that will produce a smooth, homogeneous mixture, free of lumps and dry particles. Where necessary, in the opinion of the inspector, to suit conditions of surface, temperature, weather, and method of application, the packaged paint may be thinned immediately prior to use by the addition of not more than 1 pint per gallon of the proper thinner, provided that this general limitation shall not apply when more specific thinning instructions are provided. Paint that has been stored at low temperature, shall be brought up to at least 70 degree F before being mixed and thinned, and its temperature in the spray tank or other working container shall not fall below 60 degree F during the application. Paint that has deteriorated in any manner to a degree that it cannot be restored to essentially its original condition by customary field-mixing methods shall not be used and shall be removed from the project site. Paint and thinner that is more than 1 year old shall be sampled and submitted for testing to determine its suitability for application.

3.6.2.3 Atmospheric and Surface Conditions

Paint shall be applied only to surfaces that are above the dew point temperature and that are completely free of moisture as determined by sight and touch. In no case shall any paint be applied to surfaces upon which there is detectable frost or ice. Except as otherwise specified, the temperature of the surfaces to be painted and of air in contact therewith shall be not less than 45 degree F during paint application nor shall paint be applied if the surfaces can be expected to drop to 32 degree F or lower before the film has dried to a reasonably firm condition. During periods of inclement weather, painting may be continued by enclosing the surfaces and applying artificial heat, provided the minimum temperatures and surface dryness requirements prescribed previously are maintained. Paint shall not be applied to surfaces heated by direct sunlight or other sources to temperatures that will cause detrimental blistering, pinholing, or porosity of the film.

3.6.2.4 Time Between Surface Preparation and Painting

Surfaces that have been cleaned and/or otherwise prepared for painting shall be primed as soon as practicable after such preparation has been completed but, in any event, prior to any deterioration of the prepared surface.

3.6.2.5 Method of Paint Application

Unless otherwise specified, paint shall be applied by brush or spray to ferrous and nonferrous metal surfaces. Special attention shall be directed toward ensuring adequate coverage of edges, corners, crevices, pits, rivets, bolts, welds, and similar surface irregularities. Other methods of application to metal surfaces shall be subject

to the specific approval of the Contracting Officer. All coats on plaster, concrete, or other nonmetallic surfaces shall be applied by brush, roller, spray, or a combination thereof provided that the latter methods, in the opinion of Contracting Officer, produce films that are suitable in appearance and equivalent in quality to those obtained by brush application. Whenever application of paint by a specific method to a surface is permitted or directed, it is to be understood that all areas inaccessible to that method shall be coated by alternate means.

3.6.2.6 Coverage and Film Thickness

The actual surface area covered per gallon of paint shall not exceed the spreading rates prescribed for specific paints. Where no spreading rate is specified, the paint shall be applied at a rate normal for the type of material being used. In any event, the combined coats of a specified paint system shall completely hide base surface and the finish coats shall completely hide undercoats of dissimilar color.

3.6.2.7 Progress of Painting Work

Where field painting on any type of surface has commenced, the complete painting operation, including priming and finishing coats, on that portion of the work, shall be completed as soon as practicable, without prolonged delays. Sufficient time shall elapse between successive coats to permit them to dry properly for recoating, and this period shall be modified as necessary to suit adverse weather conditions. Paint shall be considered dry for recoating when it feels firm, does not deform or feel sticky under moderate pressure of the finger, and the application of another coat of paint does not cause film irregularities such as lifting or loss of adhesion of the undercoat. All coats of all painted surfaces shall be unscarred and completely integral at the time of application of succeeding coats. At the time of application of each successive coat, undercoats shall be cleaned of dust, grease, overspray, or foreign matter by means of airblast, solvent cleaning, or other suitable means. Cement and mortar deposits on painted steel surfaces, not satisfactorily removed by ordinary cleaning methods, shall be brush-off blast cleaned and completely repainted as required. Undercoats of high gloss shall, if necessary for establishment of good adhesion, be scuff sanded, solvent wiped, or otherwise treated prior to application of a succeeding coat. Field coats on metal shall be applied after erection except as otherwise specified and except for surfaces to be painted that will become inaccessible after erection.

3.6.2.8 Contacting Surfaces

When riveted or ordinary bolted contact is to exist between surfaces of ferrous or other metal parts of substantially similar chemical composition, such surfaces will not be required to be painted, but any resulting crevices shall subsequently be filled or sealed with paint. Contacting metal surfaces formed by high-strength bolts in friction-type connections shall not be painted. Where a nonmetal surface is to be in riveted or bolted contact with a metal surface, the contacting surfaces of the metal shall be cleaned and given three coats of the specified primer. Unless otherwise specified,

corrosion-resisting metal surfaces, including cladding therewith, shall not be painted.

3.6.2.9 Drying Time Prior to Immersion

Painted surfaces that are to be immersed in water shall be permitted a final drying time as long as practicable; but in any event, the following minimum requirements shall be met. Epoxy systems shall not be immersed until the final coat has dried at least 5 days. Vinyl-type paint systems shall not be immersed until the final coat has dried at least 3 days. The cold-applied coal tar system shall not be immersed until the final coat has dried at least 7 days. Minimum drying periods may be required to be increased to twofold if the drying temperature is below 65 degree F and/or if the immersion exposure involves considerable abrasion.

3.6.2.10 Protection of Painted Surfaces

Where shelter and/or heat are provided for painted surfaces during inclement weather, such protective measures shall be maintained until the paint film has dried and discontinuance of the measures is authorized. Items that have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is fully dry and hard. All metalwork coated in the shop or field prior to final erection shall be stored out of contact with the ground in a manner and location that will minimize the formation of water-holding pockets, soiling, contamination, and deterioration of the paint film, and damaged areas of paint on such metalwork shall be cleaned and touched-up without delay. The specified first overall field coat of paint shall be applied within a reasonable period after the shop coat and in any event before weathering of the shop coat becomes extensive.

3.6.3 Vinyl Paints

3.6.3.1 General

Vinyl paints shall be spray applied, except that areas inaccessible to spraying shall be brushed. All of the vinyl paints require thinning for spray application except the zinc-rich vinyl paint (Formula VZ 108d) which will normally require thinning only under certain weather conditions. Selection of thinners for all vinyl paints shall be in accordance with Table I.

TABLE I
APPROXIMATE AMBIENT AIR
TEMPERATURE DEGREES F

BELOW 50	50 - 70	ABOVE
70 MEK	MIBK	MIAK

The amount of thinner shall be varied to suit the specific paint and prevailing temperature and wind conditions and shall at all times be sufficient to provide a wet

spray and avoid deposition of particles that are semidry when they strike the surface. Vinyl paints shall not be applied when the temperature of the ambient air receiving surfaces is less than 35 degree F nor when the receiving surfaces are higher than 125 degree F. Each spray coat of vinyl paint contemplated by these specifications shall consist of a preliminary extra spray pass on edges, corners, interior angles, pits, seams, crevices, junctions of joining members, rivets, weld lines, and similar surface irregularities followed by an overall double spray coat. A double spray coat of vinyl-type paint shall consist of applying paint to a working area of not less than several hundred square feet in a single, half-lapped pass, followed after drying to at least a near tack-free condition by another spray pass applied at the same coverage rate and where practicable at right angles to the first. Rivets, bolts, and similar surface projections shall receive sprayed paint from every direction to ensure complete coverage of all faces. Pits, cracks, and crevices shall be filled with paint insofar as practicable, but in any event, all pit surfaces shall be thoroughly covered and all cracks and crevices shall be sealed off against the entrance of moisture. Fluid and atomization pressures shall be kept as low as practicable consistent with good spraying results. Unless otherwise specified, not more than 2.0 mils, average dry film thickness of vinyl paint shall be applied per double spray coat. Except where otherwise indicated, an undercoat of the vinyl type paint may receive the next coat any time after the undercoat is tack-free and firm to the touch, provided that no speedup or delay in the recoating schedule shall cause film defects such as sags, runs, air bubbles, air craters, or poor intercoat adhesion. Neither the prime coat nor any other coat shall be walked upon or be subjected to any other abrading action until it has hardened sufficiently to resist mechanical damage.

3.6.3.2 Vinyl Zinc-Rich Primer

Vinyl Zinc-Rich Primer (Formula VZ-108d) is a 3-component paint that must be field mixed. It is packaged as a 5-gallon kit consisting of 4.5 gallons of base paint (Component A), 27.5 pounds of zinc dust (Component C) packaged in a 1-gallon pail, and a 3-ounce bottle of Silance (Component B) placed on top of the zinc dust in the gallon pail. To prepare the primer for application, add the Silance to the base paint and stir thoroughly. Sift the zinc dust into the base paint while it is being vigorously agitated with a power driven stirrer and continue the stirring until the zinc dust has been well dispersed and the mixture is smooth. The mixed paint shall at some point be strained through a 30-60 mesh screen to prevent undispersed zinc dust slugs from reaching the spray gun nozzle. After mixing, the paint shall be kept covered at all times to avoid contamination and shall be applied within 8 days after it is mixed. When the ambient and/or steel temperature is below about 80 degrees F, the paint will not normally require thinning; however, the paint shall at all times contain sufficient volatiles (thinners) to permit it to be satisfactorily atomized and to provide a wet spray and to avoid deposition of particles that are semidry when they reach the surface. Where thinning is required, the appropriate thinner shall be selected from Table I. The paint shall be stirred continuously during application at a rate that will prevent the zinc dust from settling. When spraying is resumed after any interruption of longer than 15 minutes, the entire length of the material hose shall be

whipped vigorously until any settled zinc is redispersed. Long periods of permitting the paint to remain stagnant in the hose shall be avoided by emptying the hoses whenever the painting operation is to be suspended for more than 1 hour. The material (paint) hoses shall be kept as short as practicable, preferably not more than 50 feet in length. Equipment used for spraying this zinc primer shall not be used for spraying other vinyl-type paints without first being thoroughly cleaned, since many of the other paints will not tolerate zinc contamination; no type of hot spray shall be used. An average dry film thickness of up to 2.5 mils may be applied in one double-spray coat. Unless specifically authorized, not more than 8 days shall elapse after application of a VZ-108d zinc-rich coat before it receives a succeeding coat.

3.6.3.3 Vinyl Paints

Vinyl Paints (Formulas V-102e, V-103c, V-106d, and V-766e) are ready-mixed paints designed to be spray applied over a wide range of ambient temperatures by field thinning with the proper type and amount of thinner. For spray application, they shall be thinned as necessary up to approximately 25 percent (1 quart per gallon of base paint) with the appropriate thinner shown in Table I; when ambient and steel temperatures are above normal, up to 40 percent thinning may be necessary for satisfactory application.

3.6.3.4 Coal Tar Epoxy (Black) Paint (Formula C-200a)

3.6.3.4.1 Mixing

Component B shall be added to previously stirred Component A and thoroughly mixed together with a heavy-duty mechanical stirrer just prior to use. The use of not more than 1 pint of xylene thinner per gallon of paint will be permitted to improve application properties and extend pot life. The pot life of the mixed paint, extended by permissible thinning, may vary from 2 hours in very warm weather to 5 or more hours in cool weather. Pot life in warm weather may be extended by: precooling the components prior to mixing; cooling the mixed material; and/or by slow, continuous stirring during the application period. The mixed material shall, in any event, be applied before unreasonable increases in viscosity take place.

3.6.3.4.2 Application

Spray guns shall be of the conventional type equipped with a fluid tip of about 0.09-inch diameter and external atomization, seven-hole air cap. Material shall be supplied to the spray gun from a bottom withdrawal pot or by means of a fluid pump; hose shall be 1/2 inch in diameter. Atomization air pressure shall not be less than 80 psi. High pressure airless spray equipment may be used only on broad, simply configured surfaces. Brush application shall be carried out with a stiff-bristled tool heavily laden with material and wielded in a manner to spread out the coating smoothly and quickly without excessive brushing. The coverage rate of the material is approximately 110 square feet per gallon per coat to obtain 20 mils (dry thickness) in a two-coat system. The minimum amount of paint applied in any

coat shall be such that the deposited material flows together and provides a coherent, pinhole-free film. To promote uniformity of thickness, the direction of the spray passes (or finish strokes if brushed) of the second coat shall be at right angles to those of the first where practicable.

3.6.3.4.3 Subsequent Coats

Except at the high temperatures discussed later in this paragraph, the drying time between coal tar epoxy coats shall be not more than 72 hours, and application of a subsequent coat as soon as the undercoat is reasonably firm is strongly encouraged. Where temperature for substrata or coating surface during application or curing exceeds or can be expected to exceed 125 degree F as the result of direct exposure to sunlight, either the surfaces shall be shaded by overhead cover or the interval between coats shall be reduced as may be found necessary to avoid poor intercoat adhesion, here defined as inability of two or more dried coats of coal tar epoxy paint to resist delamination when tested aggressively with a sharp knife. Under the most extreme conditions involving high ambient temperatures and sun-exposed surfaces, the drying time between coal tar epoxy coats shall not exceed 10 hours, and the reduction of this interval to a few hours or less is strongly encouraged. Where the curing time of a coal tar epoxy undercoat exceeds 72 hours of curing at normal temperatures or 10 hours at extreme conditions or where the undercoat develops a heavy blush, frequently caused by its being subjected to moisture soon after application, it shall be given one of the following treatments before the subsequent coat is applied:

A. Etch the coating surface lightly by brush-off blasting, using fine sand, low air pressure, and a nozzle-to-surface distance of approximately 3 feet.

B. Remove the blush and/or soften the surface of the coating by wiping it with cloths dampened with 1-methyl-2-pyrrolidone solvent or with bitumastic 2CB solvent marketed by the Kopcoat, Inc. The solvents may be applied to the surface by fog spraying followed by wiping, but any puddles of solvent must be mopped up immediately after they form. The subsequent coat shall be applied in not less than 15 minutes or more than 3 hours after the solvent treatment.

3.6.3.4.4 Ambient Temperature

Coal tar epoxy paint shall not be applied when the receiving surface or the ambient air is below 50 degree F nor unless it can be reasonably anticipated that the average ambient temperature will be 50 degree F or higher for the 5-day period subsequent to the application of any coat.

3.6.3.4.5 Safety

In addition to the safety provisions in paragraph "SAFETY AND HEALTH PROVISIONS", other workmen as well as painters shall take extra care to avoid inhaling atomized particles of coal tar epoxy paint and to avoid contact of the paint with the skin.

3.6.4 PAINT SYSTEMS TO BE APPLIED

The required paint systems and the surfaces to which they shall be applied are shown in this paragraph, paragraph "PAINTING SCHEDULES", and on the drawings. Supplementary information follows:

3.6.4.1 Fabricated and Assembled Items

Items that have been fabricated and/or assembled into essentially their final form and that are customarily cleaned and painted in accordance with the manufacturer's standard practice will be exempted from equivalent surface preparation and painting requirements described herein, provided that:

3.6.4.2 Surfaces primed (only) in accordance with such standard practices are compatible with specified field-applied finish coats.

3.6.4.3 Surfaces that have been primed and finish painted in accordance with the manufacturer's standard practice are of acceptable color and are capable of being satisfactorily touched up in the field.

3.6.4.4 Items expressly designated herein to be cleaned and painted in a specified manner are not coated in accordance with the manufacturer's standard practice if different from that specified herein.

3.6.5 Colors and Tints

Colors and tints shall match the respective color specimen designated by, or otherwise be subject to the approval of, the Contracting Officer. Where specified or directed, alternate applications of successive undercoats having the same color shall be tinted with small amounts of lampblack or other approved ingredients, ground in a vehicle compatible with the paint being tinted, to ensure that all surfaces are properly coated with the specified number of paint coats. Tinting of vinyl-type paints shall be done by the manufacturer.

3.6.6 Surface Preparation

The method of surface preparation and pretreatment shown in the tabulation of paint systems is for identification purposes only. Cleaning and pretreatment of surfaces prior to painting shall be accomplished in accordance with detailed requirements previously described.

3.6.7 Supplementary Application Instructions (Systems)

Surfaces shall be coated with the system indicated in the schedule and/or as noted in the drawings in accordance with the following instructions

3.6.7.1 System No. 1-A

This epoxy paint system shall be applied by spray, brush, or roller. The average dry film thickness for each coat shall be the same as that used to qualify the coating under specification C-100. The minimum acceptable film thickness for each coat at any point shall be 1 mil less than the average specified thickness. The maximum film thickness for each coat at any point shall be the average specified thickness plus 1.5 mils. The paint shall be applied in the same number of coats as used to qualify the paint under specification C-100. Attainment of the specified film thickness in fewer coats than specified is expressly forbidden. The epoxy coating shall be mixed and thinned in accordance with the manufacturer's written directions. Under no circumstances shall mixed unused coating material older than 8 hours be applied. The manufacturer's recommendations for maximum and minimum dry time between coats shall be strictly adhered to.

3.6.7.2 System No. 6

The coal tar epoxy paint shall be applied by brush or spray in not less than two coats to provide a total thickness at any point of not less than 16 mils. The specified film thickness shall be attained in any event, and any additional (beyond two) coats needed to attain specified thickness shall be applied at no additional cost to the Government. See safety provisions and special direction for mixing and applying coal tar epoxy paint.

3.6.7.3 Protection of Nonpainted Items and Cleanup

Walls, equipment, fixtures and all other items in the vicinity of the surfaces being painted shall be maintained free from damage by paint or painting activities. Prompt cleanup of any paint spillage and prompt repair of any painting activity damage shall be required.

3.6.8 PAINTING SCHEDULES

SYSTEM NO. 1-A

Items or surfaces to be coated: Structural steel and embedded items

PAINT FORMULAS TO BE APPLIED

SURFACE PREPARATION	1st COAT	2nd COAT
Brush-off blast cleaning to SSPC SP-7	Aluminum Epoxy Mastic C-100	Aluminum Epoxy Mastic C-100

SYSTEM NO. 6

Items or surfaces to be coated: Sluice gates and wall thimbles

PAINT FORMULAS TO BE APPLIED

SURFACE PREPARATION	1st COAT	2nd COAT	3rd COAT
White Metal Blast Cleaning (if needed to attain required thickness)	Coal tar epoxy (black) C-200a	Coal tar epoxy (black) C-200a	Coal tar epoxy (black) C-200a

3.7 PAYMENT

3.7.1 Wall Thimble

No separate payment will be made for costs in connection with furnishing and installing the wall thimble. The costs in connection with this work shall be included in the contract lump sum price for the "Gatewell."

3.7.2 Sluice Gates for Gatewell

No separate payment will be made for costs in connection with furnishing and installing the Sluice Gates and portable engine driven hydraulic operator. The costs in connection with this work shall be included in the contract lump sum price for the "Gatewell."

3.7.3 Paint

Payment for all painting work performed and for all materials furnished under this section of the specifications will be included in the contract lump sum price for the "Gatewell."