

SECTION 564 - STRUCTURAL STEEL

564-1 DESCRIPTION. Under this work, the Contractor shall fabricate, furnish and erect structural steel and other metal parts as shown on the plans and in accordance with the provisions of the contract documents. The Contractor's attention is directed to §106-01, Source of Supply and Quality Requirements, with regard to advising Departmental Representatives of the sources of proposed materials. 5

564-2 MATERIALS. Materials for this work shall meet the requirements of the New York State Steel Construction Manual and the following subsections of §700 - Materials:

Paint as Specified	708	
Structural Steel	715-01	10
High Strength Bolts, Nuts and Washers	715-14	
Pins and Rollers	715-15	
Vertical Load Transmitting Devices	728	
Painting Procedures	740	

Certified copies of the results of tests conducted by the manufacturer shall be furnished to the Engineer in accordance with the requirements of §715-01, Structural Steel. 15

564-2.01 Structural Steel Replacement - Stock Steel Option. Stock steel may be furnished for this work. If furnished, the stock steel shall comply with the provisions of §715-01, Structural Steel. Positive heat identification will be required for all stock steel. Certified copies of the results of chemical analysis and physical tests shall be furnished to the Department. Shop inspection will be provided unless otherwise noted on the contract plans, or waived by the D.C.E.S. The provisions of this subsection shall apply only to pay items entitled "Structural Steel Replacement (kg.)" or "Structural Steel Replacement (Each)." 20

564-3 CONSTRUCTION DETAILS. All structural steel work, including, but not limited to fabrication inspection, transportation, and erection shall be done in accordance with the provisions of the SCM. 25

Shop drawings prepared for pay items titled Structural Steel Replacement (Kg.) and Structural Steel Replacement (Each) shall be prepared, approved and distributed in accordance with the provisions of the SCM, except that the term "D.C.E.S." shall be interpreted as "the Engineer."

564-4 METHOD OF MEASUREMENT. Measurement will be made by one, or combinations of the following methods as indicated in the contract documents. 30

- Kilogram
- Each
- Lump Sum

564-4.01 Kilogram. Measurement will be made on a kilogram basis. The mass of each shipping unit shall be clearly shown on the approved shop drawings. For the purpose of measurement, such items as castings, anchor bolts, forgings, fasteners, cable and other metal parts used in the construction shall, unless otherwise provided, be considered to be structural steel even if made of other materials. 35

A. Payment Mass. Payment will be based on the computed mass of metal as shown on the approved shop drawings, and shall include permanent bolts and welds in the structure as erected. The mass of all erection materials including but not limited to bolts, pilot and driving nuts, temporary protective coatings, and all boxes, crates or other containers used for packing, together with sills, struts, and rods used for supporting members during transportation, shall be excluded. 40

The mass of all required bolt heads, nuts and washers will be estimated, making no allowance for waste, and included in the mass for which payment will be made. 45

The mass of all required welds will be estimated and included in the mass for which payment will be made.

B. Computed Mass. The mass of steel shall be assumed as 7850 kg/m³. The mass of cast iron shall be assumed as 7210 kg/m³.

The masses of rolled shapes and of plates of all dimensions shall be computed on the basis of their nominal masses as required by the dimensions shown on the approved shop drawings. If the Contractor, however, elects to use for his convenience, steel members with masses that are greater than the nominal masses specified on the approved drawings, the computations shall be based on the nominal mass values on the drawings. Deductions shall be made for copes, cuts and all holes except those holes required for high-strength bolts.

The mass of fillet welds shall be computed from the following:

TABLE 564-1 MASS OF DEPOSITED METAL PER METER OF FILLET WELD							
Size of Fillet (mm)	5	6	8	10	12	16	20
Deposited Metal (kg/m)	0.139	0.200	0.365	0.516	0.705	1.088	1.747

The masses of castings shall be computed from the dimensions shown on the approved shop drawings, with an addition of 10% for fillets and overrun.

The mass of high-strength bolts, nuts and washers, exclusive of grip, shall be computed from the following:

TABLE 564-2 MASSES OF HIGH-STRENGTH BOLTS								
Bolt Diameter (mm)	13	16	20	22	24	27	30	36
Mass of 100 Bolts with Nut and 2 Washers (kg) ¹	10.8	16.3	28.7	38.8	51.4	71.6	91.7	143.0

NOTE 1. Measured mass will be exclusive of grips.

564-4.02 Each Unit. Measurement will be made for each unit of structural steel as indicated on the contract plans. The provisions of §564-4.01, concerning castings, anchor bolts, forgings, fasteners, cable, and other metal parts, shall apply.

564.4.03 Lump Sum. No measurement will be taken. The provisions of §564-4.01 concerning castings, anchor bolts, forgings, fasteners, cable and other metal parts, shall apply.

564-5 BASIS OF PAYMENT

564-5.01 General. The price bid shall include the cost of furnishing all labor, materials and equipment necessary to complete the work. For the purpose of payment, castings, forgings, fasteners, anchor bolts for other than bridge bearing installation, cables and other metal parts used in the construction, will be considered to be structural steel, even if made of other materials.

Partial payment will be made for structural steel in accordance with §109-04 PARTIAL PAYMENTS.

564-5.02 Additional Work. Items that are included in the price bid and are the Contractor's responsibility are as follows:

A. Shop Drawings, including Paper Prints and Reproducible Prints. The cost of all

shop drawings, prints and reproducible prints required by the specifications shall be included in the unit price bid for the payment item requiring the drawings.

Any prints and reproducible prints required beyond the number specified shall be furnished by the Contractor at cost.

B. Laminar Defects at the Boundary of Tension Groove Welds. The cost of all work and materials required for the correction or elimination of laminar defects at the boundary of tension groove welds shall be included in the price bid for structural steel. 5

The cost of all ultrasonic testing and repairs and the cost of replacement of defective portions of plates where partial replacement is approved shall be borne by the Contractor and included in the price bid for structural steel. 10

C. Inspection of Bolted Connections. All labor and equipment necessary for the performance of inspection of bolt tightness during structural steel fabrication and erection shall be provided by the Contractor and included in the price bid for structural steel. The State shall witness the bolt testing, but will not provide equipment or labor.

D. Qualification Test for Welders, Welding Procedures and Electrode and Flux Combinations. The cost of tests required to qualify welders, welding procedures and electrode and flux combinations shall be included in the unit price bid for the steel with the exception that the State will witness tests and perform Charpy V-Notch Impact Tests without cost to the Contractor. 15

E. Radiographic Inspection. The cost of radiographic inspection and of preparation for radiography, together with the cost of providing access and of furnishing adequate facilities for the review of radiographs in the shop or field, shall be included in the price bid for structural steel. 20

F. Ultrasonic Inspection. Ultrasonic inspection, when required, will be performed by the State or its representatives unless otherwise provided for in the contract documents. The cost of any required preparation and of furnishing access to the joints shall be included in the price bid for structural steel. 25

G. Magnetic Particle Inspection. The cost of magnetic particle inspection when specified or required by the inspector to verify limits of defects discovered during visual inspection shall be included in the unit price bid for structural steel.

H. Repair of Defects in Welds and Base Metal. The cost of repairing defects found by visual inspection or nondestructive tests shall be included in the unit price bid for structural steel. 30

I. Field Inspection of Rejected Material or Material Not Offered for Shop Inspection even though Required to be Shop Inspected by the Contract Documents. When the Department, at its discretion, permits inspection of the subject materials to be performed at the project site, all costs of this inspection shall be borne by the Contractor as a condition of the Department's approval of inspection of this material. All costs associated with the inspection of rejected material, which has been shipped to the field without approval, shall be borne by the Contractor. 35

J. Straightening Bent Material and Correcting Camber Deficiencies. All corrective work required to straighten bent material and correct camber deficiencies, when permitted, shall be performed at no additional cost to the State. 40

K. Field Repair, Reaming and Drifting of Holes. All work permitted for the correction of unacceptable holes shall be provided at the Contractor's expense.

L. Metal Scuppers. Metal scuppers shall be paid for as structural steel unless otherwise noted on the plans.

M. Adjustment and Alignment of Bearings. All labor, materials and equipment required for adjustment and alignment of bearings shall be included in the unit price bid for structural steel.

N. Field Splices. When the specific location for a bolted or welded field splice in stringers and girders is not shown on the plans, the Contractor will be permitted to introduce splices at locations of his choice. The splices shall be made in accordance with the provisions of the SCM. No payment will be made for labor, material, and equipment required to make a splice if the splice is not shown on the contract plans. Also, payment will not be made for increases in the thickness of webs or flanges made necessary by the requested splice. 5

O. Photographs. Photographs requested by the D.C.E.S. in accordance with the provisions of the SCM, shall be furnished at no additional cost. 10

P. Testing of Stock Steel. All labor, materials and equipment necessary to perform chemical and physical tests on stock steel when such tests are required shall be furnished by the Contractor and included in the price bid for structural steel.

Q. Heat-Curving and Cambering. All costs of nondestructive testing, repairs or replacement of material damaged due to over stressing or destructive heating during heat-curving or cambering shall be borne by the Contractor. 15

564-5.03 Progress Payments - Lump Sum. These shall be calculated by multiplying the lump sum price bid by the ratio which represents the structural steel members erected during the payment period in question. (Refer to §109-03). The ratio will be computed by dividing the shipping mass of the erected steel (obtained from the Report of Shipment of Structural Material, Form B & GC-4b) by the Total Mass for Progress Payments for the appropriate item. "The Total Mass for Progress Payments" will be indicated on the plans for use in determining Partial Payments and Progress Payments. Under no circumstances will the "Total Mass for Progress Payments" be used for final payment purposes. The Contractor is advised not to use the "Total Mass for Progress Payments" as a bidding tool. Discrepancies which may occur between the total mass shipped and the "Total Mass for Progress Payments", as indicated on the plans, will not be a basis for additional compensation. 20 25

564-5.04 Other Work. Work not included in the unit price bid for the structural steel item is as follows:

A. Setting Anchor Bolts for Bridge Bearings. The pipe sleeves, anchor bolts and work required to furnish, set and grout the anchor bolts, shall be included in the price bid for the respective bearing item. 30

B. Vertical Load Transmitting Devices. The furnishing and installing of vertical load transmitting devices, such as; rubber impregnated random fiber pad, and plain rubber pad, shall be included in the price bid for the respective item.

Payment will be made under: 35

Item No.	Item	Pay Unit
564.05XX M	Structural Steel (Type 1-16)	Lump Sum
564.10nn M	Structural Steel Replacement	Kilogram
564.51nn M	Structural Steel	Kilogram
564.70nn M	Structural Steel Replacement	Each 40

NOTE: nn denotes serialized pay item, see §101-02 Definitions of Terms under "Specifications".