

SECTION 9 MEASUREMENT AND PAYMENT

9.1 MEASUREMENT OF QUANTITIES - Work completed under the contract will be measured by the Engineer according to United States standard measure or International System of Units (SI), whichever is described in the contract.

A station when used as a definition or term of measurement will be 100 linear feet (1000 meters).

The method of measurement and computation to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Longitudinal measurements for area computations will be made horizontally, and deductions will not be made for individual fixtures having an area of one square yard (meter) or less. Transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the Engineer.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions, except as otherwise provided in these specifications.

Items which are measured by the linear foot (meter), such as pipe culverts, guardrail, underdrains, etc., will be measured parallel to the base or foundation upon which such structures are placed, except as otherwise provided in these specifications.

In computing volumes of excavation the average end area method will be used.

The thickness of plates and galvanized sheet metal used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fractions of inches (millimeters).

When the term "gage" refers to the measurement of wire, it will mean the wire gage, it will be specified and measured in decimal fractions of an inch (millimeter) as per AASHTO M 32 (ASTM A 82).

The term "ton" ("mton") will mean the short ton (metric ton) consisting of 2,000 pounds avoirdupois (1,000 kilograms). Materials which are measured or proportioned by weight shall be weighed on accurate, approved scales furnished by the Contractor at locations designated by the Engineer. The use of commercial scales may be permitted provided they are satisfactory to the Engineer and all charges for such use are paid by the Contractor.

Except as provided elsewhere in the specifications, scales shall be accurate within one-half percent at any point throughout the range of use of the scale and sensitive to the weight indicated by twice the smallest graduation of the scale. The Contractor shall verify scale accuracy periodically.

The Contractor shall provide, and be responsible for, the verification by the State Scale Inspector, or by other feasible means as the Engineer may order, of scales and measures which the Contractor is to operate or use in connection with the work.

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Scalehouses shall be furnished by the Contractor and shall be dust proof and watertight with satisfactory lighting and heating equipment.

The Contractor shall supply all scales with a computerized (automated) ticketing capability for all materials that are weighed for measurement and payment, unless otherwise specified in the plans. The Contractor shall be responsible for the operation of the weighing system. The weighing system shall automatically print the weigh tickets when the truck or pup identification number is entered into the system.

The printed ticket shall contain the following information:

- Project Number
- Material Identification, (Item Number or Description)
- Material Source
- Date & Time Material is Weighed
- Truck (and Pup) Identification Number(s) (or license number)
- Gross Weight
- Tare Weight (including date and time of current tare)
- Net Weight
- Ticket Number

The ticket size shall be a minimum of 5.5 inches by 8.5 inches (140 mm by 215 mm) in dimension, unless otherwise approved by the Engineer. Automated scales equipped to print smaller sized tickets on a continuous tape will be allowed to continue using the smaller tickets until January 1, 1998. When the equipment is replaced the Contractor shall convert to the larger ticket size.

Department personnel will periodically tare the trucks and pups and enter the tare information into the computer weighing system by truck or pup identification number.

The weighing system shall be capable of providing a security password that only allows authorized (Department and supervisory Contractor) personnel access to tare and gross weight input data and to print the daily load summary by material type.

A separate ticket shall be generated for pups, when the truck and pup combination cannot be simultaneously weighed. When trucks and pups are weighed separately, the scale approaches shall be level with the weighing platform for an adequate distance to allow for accurate weighing.

Truck and pup combinations shall be used such that the correct gross and tare weights are entered into the automated system. Changing or substitution of a pup shall only be done after the Engineer has been notified and the gross and tare weights are properly entered into the system and can accurately accommodate this type of change.

The automated system shall be programmed such that when an overweight (illegal load) is on the scale, a ticket will not be printed. An overload message with the gross weight shall be displayed so that the overload amount is known allowing guidance to reduce the load prior to reweighing and ticket printing.

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The weigh ticket shall be automatically printed for each load of material when the truck driver or qualified Contractor scale person enters the truck or pup identification number. The Engineer may require a truck to be reweighed to verify that the scale is working properly. The weigh ticket shall accompany each load of material to the project and shall be presented to the Engineer prior to unloading the material. The weighing system shall provide the Engineer with a printed daily summary of the individual net weights with truck and pup identification numbers and the daily total weight by material type.

If the automated weighing system becomes inoperable during the work shift, the Contractor will be allowed to furnish a scale person to perform the weighing duties according to the specified requirements and to complete the effected work shift. Within two working days, the weighing system shall be fully operational or the effected work items will not be allowed to continue.

Permanent commercial scales that are certified and meet the accuracy requirements are an acceptable alternative to the automated scale requirements.

Contractor furnished scale operators shall be experienced and fully capable of accurately operating the permanent commercial scales and portable automated scale systems should they become inoperable. Contractor furnished scale personnel are subject to approval by the Engineer.

All equipment, materials, labor, and incidentals required for the weighing system and scales shall be incidental to the related contract items.

Platform scales shall be of adequate length and capacity to permit weighing the entire hauling unit with one placement. In the case of tractor-trailer combinations this will mean placement in one operation of the entire unit inclusive of the front axle of the tractor. It will be permissible to weigh the primary hauling unit and the auxiliary hauling ("pup") unit separately without uncoupling, provided the scale approach ramps are level for a sufficient distance and the auxiliary hauling unit coupling does not transfer significant weight to the primary hauling unit.

Trucks used to haul material being paid for by weight shall be weighed empty at such times as the Engineer directs, and each truck shall bear a plainly legible identification mark.

When payment of royalty is on a tonnage basis, weight determinations of pit materials, which are used in the work will be based on weights of the produced materials at the time they are hauled from the pit site, including natural moisture. These materials will be weighed when stockpiled, except that where stockpiles are built at the pit site without weighing, the weight determination will be made when the material is hauled from the pit site. When material is stockpiled at the pit site without weighing and is processed through a dryer in preparation for mixing with bituminous material, the tonnage for royalty purposes will be considered as the weight of the dried material plus the weight of the bituminous material added.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Engineer, provided the body is of such shape that the volume may be readily and accurately determined.

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When requested by the Contractor and approved by the Engineer in writing, material specified to be measured by the cubic yard (meter) or gallon (liter) may be weighed and such weights will be converted to cubic yards (meters) or gallons (liters) for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Asphalt materials will be measured by the ton (t).

Validated refinery weigh tickets accompanying bituminous materials transported from the refinery in truck transports may be accepted for measurement purposes.

Asphalt materials shipped by rail shall be weighed, as determined by the Engineer, prior to use on the project.

Cement will be measured by the hundred weight (kilogram).

Timber will be measured by the thousand board foot measure (cubic meter) of material incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term "lump sum" when used as an item of payment will mean complete payment for the work described in the contract.

When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include necessary fittings and accessories.

Rental of equipment will be measured in hours of actual working time of the equipment within the limits of the project, except when special conditions make some other method of measurement desirable.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

9.2 SCOPE OF PAYMENT - The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing materials and for performing work under the contract in a complete and acceptable manner and for risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof, subject to the provisions of Section 7.20.

Payment for an item of work shall include full compensation for furnishing labor, materials, equipment and incidentals required to complete the work not specifically measured and paid for under a separate bid item.

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If the "Basis of Payment" clause in the specifications relating to unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid for under any other pay item which may appear elsewhere in the specifications.

9.3 PAYMENT FOR EXTRA HAUL OF MATERIALS - When through no fault of the Contractor, subbase, base course and surfacing materials (including clay and filler) cannot be secured and used as shown on the plans and an increase in the average haul provided in the contract results, or changes from the plans causes an increase in the average haul, an adjustment will be made at the rate per ton mile (metric ton kilometer) specified in the Price Schedule for Miscellaneous Items. Average haul provided in the contract is obtained by dividing the haul units shown in the contract for a material by the contract quantity of the material. Payment for extra haul as provided herein shall be understood to be full compensation for moving equipment, delays in operation, additional labor, equipment and other costs involved. Extra haul shall be included as a new item on a Construction Change Order and approval obtained prior to performing the work.

9.4 COMPENSATION FOR ALTERED QUANTITIES - When the accepted quantities of work vary from the estimated quantities in the Contract, the Contractor shall accept as payment in full, payment at the original contract unit prices for the accepted quantities of work. Allowance will not be made for increased expense except as provided in Section 4.2 or for loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the bidder and subsequent loss of expected reimbursements or from other cause.

9.5 EXTRA AND FORCE ACCOUNT WORK - Extra work performed in accordance with the requirements and provisions of Section 4.3 will be paid for at the agreed prices stipulated in the order authorizing the work. The Department may require the Contractor to do such work on a force account basis to be compensated in the following manner:

A. Labor: For labor and supervisor in direct charge of the specific operations, the Contractor shall receive the rate of wage agreed upon in writing before beginning work or the actual rate paid in the event it is less than the agreed rate, for each and every hour that said labor and supervisor are actually engaged in such work.

If a laborer or supervisor is paid for "overtime" during a calendar week in which he is employed for part of that period on force account work, the Department will pay to the Contractor a percentage of that portion of the overtime payment. For each such employee, this percentage will be the ratio which the total hours he worked on force account during the week bears to the total hours he worked during that week.

Overtime incurred due to the Department requiring the Contractor to do force account work, during periods not normally worked, will be paid 100 percent by the Department. In order that the Engineer may verify wages paid and prorate overtime, the Contractor will be required to furnish to the Engineer, certified payrolls during the period force account

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work is in progress.

An amount equal to 15 percent of the sum for labor will also be paid the Contractor as compensation for administrative and overhead costs.

- B. Bond, Insurance, and Tax:** For property damage, liability, and workmen's compensation insurance premiums, unemployment insurance contributions, and social security taxes on the force account work, the Contractor shall receive the actual cost, to which no percentage will be added. The Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond, insurance, and tax. In lieu of furnishing itemized statements to substantiate these costs, of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and Social Security tax, the Contractor may elect to receive an amount equal to 25.1 percent of the actual labor costs (excluding the 15 percent for administrative and overhead costs) as compensation for those costs.
- C. Materials:** For materials accepted by the Engineer and incorporated into the project, the Contractor shall receive the actual cost of such materials, including transportation charges paid (exclusive of machinery rentals as hereinafter set forth), to which cost 15 percent will be added as compensation for administrative and overhead costs.
- D. Equipment:** For machinery or special equipment including fuel and lubricants, plus transportation costs, authorized by the Engineer, the Contractor shall be paid in accordance with the provisions and rates set forth in the South Dakota Equipment Rental Rates Book which is currently established as Dataquest's "Blue Book". For purposes of determining an hourly rate, the monthly rate divided by 176 shall be used. This rate will be adjusted for regional factors, age and operating expenses as set forth in the "Blue Book".

Standby rates shall apply when the work requires a piece of equipment, not already on the project, be brought in and through no fault of the contractor, this equipment is on standby status. Standby rates shall be 50 percent of the normal base rates without the operating expenses. Standby rates shall not exceed 8 hours per day. When a unit works for a portion of a day and is on standby for a portion, the total time allowed shall not exceed 8 hours for that day.

The costs for move in and move out of equipment not already on the project shall be at standby rates. This is in addition to the applicable rates for the hauling unit moving in and returning empty to its point of origin.

Equipment will be paid for at invoice prices if necessary equipment is not of a type owned by the Contractor or if equipment is available in the area at a cost less than the cost of paying force account including move in and move out, for contractor owned equipment.

- E. Miscellaneous:** Additional allowance will not be made for general superintendence or other costs for which no specific allowance is herein provided.

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- F. Compensation:** The Contractor's representative and the Engineer shall compare records of the cost of work done as ordered on a force account basis.

- G. Statements:** Payment will be made for work performed by force account based on itemized statements of the cost of such force account work detailed as follows:
 - 1. Name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman.

 - 2. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.

 - 3. Quantities of materials, prices and extensions.

 - 4. Transportation of materials.

 - 5. Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions, and social security tax.

Statements shall be accompanied and supported by paid invoices for materials used including transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

- H. Subcontracting:** When work on a force account basis is performed by a subcontractor in accordance with the provisions of an extra work order, a percentage will be allowed the prime contractor for the administrative expenses incurred in connection with the work. This administrative allowance will be based on the following table and is applicable to charges for labor and materials only. The allowance will be applied to all charges and added percentages specified in paragraphs A, and C above. Bid items in the original contract are not eligible for this administrative allowance.

\$ 0 to \$1,000.....	10%
\$ 1,000.01 to \$10,000...	\$100 plus 5% of excess over \$1000.
over \$10,000.01.....	\$550 plus 3% of excess over \$10,000.

- I. Profit:** To the sum of items A through C, shall be added ten percent for profit.

- J. Excise Tax -** The total cost of Force Account Work shall be incorporated into the final contract amount. The excise tax due the South Dakota Department of Revenue shall be computed from the final contract amount.

9.6 ELIMINATED ITEMS - Should items contained in the Contract be found unnecessary for the

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completion of the work, the Engineer will, upon written order to the Contractor, eliminate such items from the contract. Such action will not invalidate the contract. When a Contractor is notified of the elimination of items, the Contractor will be reimbursed for work completed and all costs incurred, including transportation of materials prior to said notification, and the return of unused materials to the supplier. In lieu of reimbursement for the return of eliminated materials, the Department may elect to purchase such materials at the actual cost to the Contractor.

Payment will not be made due to elimination of pile shoes regardless of work as may have been done or materials purchased prior to notification of the elimination of this item.

- 9.7 PROGRESS PAYMENTS** - Partial payments will be made at least once each month as the work progresses, if the total value of work done since the last estimate amounts to \$500 or more. Estimates may be paid twice each month if the amount of work performed is sufficient to warrant such payment.

The Contractor may submit items and quantities that may warrant consideration for payments on an estimate.

Said payments will be based upon estimates prepared by the Engineer of the value of the work performed and materials complete in place in accordance with the contract and for materials delivered in accordance with Section 9.8.

From the total amount determined payable, the Engineer will deduct payments due the landowner, as provided under Section 6.2. For each working day charged after the Contract Time specified for the work as extended, the appropriate amount from the schedule of Liquidated Damages, Section 8.7 will be retained from the amount payable.

- 9.8 PAYMENT FOR MATERIALS DELIVERED TO PROJECT** - Payment will not be made for materials delivered to, or stockpiled on, the project until incorporated in the work in their final position, except as specified hereinafter.

Partial payments may be made upon written request by the Contractor on specific items which will form a part of the completed work and which are stockpiled in a manner and location satisfactory to the Engineer.

Partial payment for structural and reinforcing steel will not be made prior to fabrication except that partial payment may be made on structural steel to be used in bridge girders when requested in writing by the Contractor. Partial payments will be made only for structural steel that has been delivered to and stockpiled at the fabrication shop. A request for partial payment for structural steel for bridge girders may only be made once throughout the duration of the project.

Payment may be made for mulch and seed provided satisfactory precautions are taken to insure proper storage.

If stored materials are lost or damaged, the Contractor will be responsible for repair and replacement of the materials. If prior payment has been made, the amount allowed, or a

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proportionate part thereof, shall be deducted from the next partial payment and withheld until the materials have been satisfactorily repaired or replaced.

Payment for stockpiled materials will be on the basis of the quantities placed in storage .

The rate of payment will be on the basis of actual costs as evidenced by a delivery invoice or other satisfactory evidence of cost furnished by the Contractor. The payment shall not exceed the contract amount **or contract unit price** for the item involved.

A delivery invoice must be supplied for all stockpiled materials, except materials manufactured by the Contractor which will be paid for according to the percentage established in the following table.

SPEC. REF.	CONTRACT BID ITEM	TYPE OF MATERIAL & PAYMENT UNIT	RATE OF PAY (% CONTRACT UNIT PRICE)
260	*	Gravel, ton (mton)	60%
320	Asphalt Concrete	Gravel, ton (mton)	40%
380	PCCP	Coarse Agg., ton (mton) Fine Agg., ton (mton)	60% 30%
460	Concrete Masonry	Crushed Gravel or Rock, ton (mton)	5%

* Various items depending on material involved.
(mton) indicates metric ton (1000 kilograms)

The Contractor shall furnish paid invoices for all stored manufactured or fabricated materials that have not been incorporated into the permanent work within 60 days from the date payment was requested. The paid invoice shall include a notarized statement from the supplier or fabricator certifying that payment has been received. In the event a paid invoice is not received, the quantity of any previously allowed material remaining in storage will be deducted from the next progress estimate, and further allowance will not be made until the material is incorporated into the work.

9.9 ACCEPTANCE AND FINAL PAYMENT - When the project has been accepted as provided in Section 5.16 the Engineer will prepare the final estimate of the quantities of the various classes of work performed. After the Engineer determines the final estimate, the Contractor will be paid the entire sum found to be due after deducting previous payments and amounts to be retained or deducted under the provisions of the contract.

Prior partial estimates and payments shall be subject to correction in the final estimate of payment. Final payment will be due 120 days after the Department has determined the final estimate.

Interest will be added to payments in excess of \$2000 which are due the Contractor and remain

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unpaid 120 days after completion of the work and receipt of all required Contractor project documents. Interest will accrue at a rate of 9% per annum for the time period after the noted 120 days until final payment is made.

- 9.10 MOBILIZATION** - This item shall consist of preparatory work and operations, including, but not limited to the necessary movement of personnel, equipment, and incidentals to the project site; for the establishment of offices, buildings and other facilities necessary for work on the project; and for work and operations which must be performed, and for cost incurred before starting work on the various contract items on the project site.

When an item for Mobilization is included in the proposal, payment will be made at the contract lump sum price, and be considered full compensation for Mobilization costs. Partial payments will be made on the basis of the following schedule:

- A.** When the contract has been fully executed by parties thereto, an amount as determined by the following schedule will be paid. Except, payment shall not exceed 25 percent of the total contract amount for Mobilization.
- 1.** Contract amounts up to and including \$500,000.
Payment in an amount equal to 1.0 percent of contract amount.
 - 2.** Contract amounts in excess of \$500,000.
Payment in an amount equal to \$5,000. plus 0.60 percent of contract amount in excess of \$500,000.
- B.** Five percent, or more, of the original contract amount is earned an additional amount will be paid to bring the total payment for mobilization to 25 percent of the amount bid.
- C.** Ten percent, or more, of the original contract amount is earned, an additional amount will be paid to bring the total payment for mobilization to fifty percent of the amount bid.
- D.** Twenty-five percent, or more, of the original contract amount is earned, an additional amount will be paid to bring the total payment for mobilization to sixty percent of the amount bid.
- E.** Fifty percent, or more, of the original contract amount is earned, a final payment will be made to bring the total payment for mobilization to one hundred percent of the amount bid.

The item Mobilization shall include Excise Tax due the South Dakota Department of Revenue. **If the final contract amount increases or decreases from the original contract amount, (including increases from force account work), the increase or decrease in Excise Tax will be incorporated on the final Construction Change Order.** Since there is no excise tax on projects where only a gravel stockpile is involved, this adjustment will not be made on these projects and the excise tax

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should not be included in the item Mobilization.

When an item for "Mobilization" is not included in the proposal, this work shall be considered as incidental to the various contract items.

- 9.11 FREIGHT RATES** - Bidders shall fully inform themselves as to the source of supply of acceptable materials needed for the performance of the work and as to carrier rates and other transportation costs and facilities for these materials before submitting proposals.

Changes in carrier rates or in the cost of other transportation facilities used for materials during the life of the Contract shall not constitute cause for a claim for additional compensation.