A Checklist and Sample Specifications for Single and/or Tandem Axle Dump Trucks

HERPICC

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A CHECKLIST AND SAMPLE SPECIFICATIONS FOR SINGLE AND/OR TANDEM AXLE DUMP TRUCKS

DECEMBER 1986

(This is a revision to the February 1983 publication of the same title)

PURDUE UNIVERSITY - SCHOOL OF CIVIL ENGINEERING
In cooperation with
INDIANA DEPARTMENT OF HIGHWAYS
INDIANA ASSOCIATION OF COUNTY COMMISSIONERS
INDIANA ASSOCIATION OF CITIES AND TOWNS
FEDERAL HIGHWAY ADMINISTRATION
Attached is a checklist and sample specifications to assist Indiana's Local Public Agencies in the procurement of dump trucks for use in the maintenance of local roads and streets. Most LPA's do not purchase such equipment in large numbers, hence many do not have highly qualified and experienced staff to assist in the development of the specifications for purchasing new equipment.

This checklist and the sample specifications provide for individual preferences. They are not intended to dictate decisions or restrict bidding. If followed, they will assure a durable piece of maintenance equipment well suited for the uses placed on dump trucks by Indiana Counties, Cities and Towns.

A general observation of those with experience is that reducing requirements to obtain a lower first cost is nearly always a poor economic decision. This is especially true if the truck will ever be used to plow snow. You will note specific references to snow plow operations and this is because it is extremely hard on equipment.

The information was developed by a task group on Maintenance Equipment Guidelines composed of the following:

Steven Brooke - White County  
Jim Harper - Crawfordsville  
Lloyd Jones - Purdue  
Russell T. Lawson - Hendricks County  
William Penn - South Bend  
Eugene Shurte - LaPorte County  
Wallace W. West - IDOH

HERPICC is proud to acknowledge the time and effort these men put into developing these items. Their combined experience and judgment, without a doubt, qualifies the attached items for your sincere consideration. The task group will continue to meet, hence revisions will be made and guides developed for other items of equipment. If you have comments or suggestions, please write to me.

Sincerely,

Charles F. Scholer  
Director

CFS:ms
CHECKLIST AND EXAMPLE SPECIFICATIONS FOR SINGLE AND/OR TANDEM AXLE DUMP TRUCKS

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<td>Width</td>
<td>2</td>
</tr>
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<td>2</td>
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<td>Body</td>
<td>1</td>
</tr>
<tr>
<td>Tail Gate</td>
<td>1</td>
</tr>
<tr>
<td>Welding</td>
<td>1</td>
</tr>
<tr>
<td>Front End</td>
<td>1</td>
</tr>
<tr>
<td>Cab Protector</td>
<td>1</td>
</tr>
<tr>
<td>Cross Members</td>
<td>1</td>
</tr>
<tr>
<td>Main Longitudinals</td>
<td>1</td>
</tr>
<tr>
<td>Safety Strut</td>
<td>2</td>
</tr>
<tr>
<td>Rear Corner Posts</td>
<td>2</td>
</tr>
<tr>
<td>Hoists</td>
<td>2</td>
</tr>
<tr>
<td>Lights</td>
<td>2</td>
</tr>
<tr>
<td>Paint</td>
<td>3</td>
</tr>
<tr>
<td>Undercoating</td>
<td>3</td>
</tr>
<tr>
<td>Tail Gate Identification Number</td>
<td>3</td>
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</tbody>
</table>

Example of Specifications for Central Hydraulics

<table>
<thead>
<tr>
<th>Item</th>
<th>Page No.</th>
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</thead>
<tbody>
<tr>
<td>Hydraulic Pump</td>
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</tr>
<tr>
<td>Oil Reservoir</td>
<td>1</td>
</tr>
<tr>
<td>Hydraulic Oil-Filter</td>
<td>1</td>
</tr>
<tr>
<td>Temperature</td>
<td>2</td>
</tr>
<tr>
<td>Hydraulic Valves</td>
<td>2</td>
</tr>
<tr>
<td>Hydraulic Hoses</td>
<td>3</td>
</tr>
</tbody>
</table>
CHECKLIST

for

PREPARING BASIC SINGLE AND/OR TANDEM AXLE DUMP TRUCK SPECIFICATIONS

The following pages contain various items to be considered when seeking bids for dump trucks regardless of the gross vehicle weight being considered. Appendix "A" lists sources of additional reference material.

General description of equipment being bid.
Statement of requirement of manufacture of equipment.
Statement of standardization of all component parts of unit.
Statement of parts availability and access.
Statement of location of manufacturer and/or assembly of unit(s).
Statement of bid submitting requirements.
Statement of indemnification of local agency concerning patent devices.
Statement concerning description of term "or equal".
Statement of terms for accepting unit(s), new and used, year hold overs, inspection of unit(s), local, state and federal requirements, disposition of trade-in unit(s).

Vendor shall provide the following engine information:

Vehicle Make __________________ Model __________________ Year ____________

Engine (Gasoline) (Diesel) (Natural Gas) (Propane)
Make __________________ Model __________________

Number of Cylinders ___________ stroke-cylinder.

Bore and Stroke ___________________ x ___________________

Displacement __________________ cubic inches.

Flywheel horsepower _______ HP at ________ KPM

Output of standard engine complete with water pump, lubricating oil pump, fuel pump, air cleaner and fan. Alternator and compressor not charging. SAE standard ambient temperature and barometric conditions of 99.2 Kpa (29.38" Hg.) and 29.4 degrees C (85 F).

Chart indicating Net gradability in % for each operating gear at rated GVW on a surface with a rolling resistance of 1%.

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<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous (Net) Brake Horsepower</td>
<td>R.P.M.'s</td>
</tr>
<tr>
<td>Governed Speed</td>
<td>R.P.M.'s</td>
</tr>
<tr>
<td>Peak Torque</td>
<td>ft. lbs. @ R.P.M.'s.</td>
</tr>
<tr>
<td>Compression Ratio</td>
<td></td>
</tr>
<tr>
<td>Carburetion (Carburetor)</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>(Naturally Aspirated)</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>(Turbo-charged)</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>(After cooled system)</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>(2Bbl) (4 Bbl) (Other)</td>
<td></td>
</tr>
<tr>
<td>Extended Warranty</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>Cooling System</td>
<td></td>
</tr>
<tr>
<td>Radiator Capacity</td>
<td>quarts.</td>
</tr>
<tr>
<td>Frontal Area</td>
<td>sq. in.</td>
</tr>
<tr>
<td>Overflow recovery system</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>Corrosion Resistor</td>
<td>(Yes) (No) Type Location</td>
</tr>
<tr>
<td>Silicone Hose System</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>Engine Block Heater(s)</td>
<td>(Yes) (No) Number Size Watts.</td>
</tr>
<tr>
<td>Type Location</td>
<td></td>
</tr>
<tr>
<td>Weatherhead Connection mounted below left front door corner.</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>Radiator Fan.</td>
<td>(Fixed) (Modulated) Size</td>
</tr>
<tr>
<td>Crankshaft Adaptor for Front Mounted Central Hydraulics.</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>Filters</td>
<td>(Yes) (No) Type Location</td>
</tr>
<tr>
<td>Air-Type</td>
<td></td>
</tr>
<tr>
<td>Diverter Valve</td>
<td>(Yes) (No) Under Hood (Yes) (No)</td>
</tr>
<tr>
<td>Oil-Number</td>
<td>Location</td>
</tr>
<tr>
<td>Oil-Extra Capacity</td>
<td>(Yes) (No) Type Location</td>
</tr>
<tr>
<td>Fuel -</td>
<td>(Yes) (No) Type Location</td>
</tr>
<tr>
<td>Heater</td>
<td>(Yes) (No)</td>
</tr>
<tr>
<td>Water</td>
<td>(Yes) (No) Type Location</td>
</tr>
</tbody>
</table>

Checklist: October 27, 1986

HERPICC
Starter  Rated Heaviest Duty for this application by manufacturer.

Alternator/Generator amperes (Brush) (Brushless) Make & Model.

Regulator (Internal) (External)

Emergency Shut Down Alarm/Mechanism
High Water Temperature - Low Oil Pressure emergency kill system with manual override capability.

Ignition (Compression Ignited) (Spark Ignited)

Batteries Quantity (Standard) (Maintenance Free) Voltage.

Ampere Hour Capacity Cold Crank Power @ 0 degree F.

Dry weight (each) Group Number Mounting Location

Electrical System (Standard) (Weatherproof) (Betts System) (Or Equal)

(Circuit Breakers) (Fuses)

Headlights - Type

Tail Lights - Type & Location

Snowplow Lights - Type & Location

Watts Candle Power

Strobe Lights - Candle Power (Fixed) (Variable)

Separate Power Source (Yes) (No)

Mounting Location(s)

Plug in for towed units (Yes) (No) Male on (Truck) (Towed Unit)

Electrical brake control in cab (Yes) (No)

Exhaust System (Vertical) (Horizontal) (Left Side) (Right Side):

(Single) (Dual)

Muffler - (Standard) (Stainless Steel) (Horizontal) (vertical)

Checklist October 27, 1986 HERPICC
Clutch Size _____ Number of Disks ____ (Dry) (Oil) Surface Area _____.

Transmission (Manual) (Automatic) Model ________________________

Number of (Gears) (Speeds) Forward ______ Reverse _________

Auxiliary Cooler (Yes) (No) Temperature Gauge (Yes) (No)

Auxiliary Filter (Yes) (No)

Extended Warranty (Yes) (No) Extent of coverage ______________

Power Take Off for Central Hydraulics (Yes) (No)

Gross Vehicle Weight ____________________ pounds.

Front Axles Load Rate at ground _______ pounds.

Power Steering (Yes) (No)

Shock Absorbers (Yes) (No)

NOTE: Notify vendors if a snow plow will be mounted on front of truck and approximate weight of the plow and complete hitch.

Rear Axle(s) Manufacture ______________ Model ________________

Load Rate at ground ____________________ pounds.

(Both axles live) (Tag axle)

No Spin (Yes) (No)

Positive Lock (Yes) (No)

(Single Speed) (Two Speed) (Electric) (Air)

Gear Ratio(s) _________________________

All Axles Hub Seals (wet) (dry)

Springs Front Springs - Load capacity at ground (total) _______ pounds.

Rear Springs - Load capacity at ground (total) ________________ pounds.

Bushings (Bronze) (Rubber)

Auxiliary Springs Load capacity (total) ____________________ pounds.

Usage Paved Roads ____ Gravel/Dirt Roads ____ Off Road ____

Checklist October 27, 1986 HERP1CC
Wheels Size (Cast Spoke) (Disk) Rim Size

Wheels, rims and spacers shall conform to American Wheel and Rim Association.

Tires (See Appendix B)

Construction: Tube Type Tubeless

Radial
Bias

Tread Style - Front Rear

(Refer to Appendix B)

Tire Size - Front Load Range/Ply Rear Load Range/Ply

(Refer to Appendix B)

NOTE: Tires to be sized to meet:

Front Axle Capacity
Rear Axle Capacity

Frame

Yield Strength psi. RBM Section Modulus

Reinforcement (Yes) (No) Description Section Modulus

Frame Extensions (Yes) (No) Length

Bolt On (Yes) (No) Integral (Yes) (No)

Chassis Dimensions and Weights

Cab to Axle (CA) inches. Overall Length (OAL) inches.

Wheel Base (WB) inches. Weight on Front Axle pounds.

Axle to Rear Frame End (AF) inches. Weight Rear Axle pounds.

Bumper to Behind Cab (BBC) inches.

Turning Radius (dia. of Tire) inches. Total Weight pounds.

Checklist October 27, 1986 HERPCC
Ground Clearance required for mounting Underbody Scraper____inches.
(This includes Fuel Tanks, Air Tanks, Hydraulic Oil Reservoir, Battery Box and Exhaust System)

Brake System (Hydraulic Assisted Vacuum) (Air) (Disk) (Shoes)
(Front Disk - Rear Drum)

Pad Size - Front____ Rear____ Total Area____ Square Inches____.

Drum Diameter____ Shoe Width____

Parking Brakes Specifications____

Compressor Size____________ Cubic Feet.

Spitter Valves (Yes) (No)

Air Dryer (Yes) (No) (Electric) (Alcohol)

Pancake location - Front of axles (Yes) (No) Rear of Axles (Yes) (No)
Pancake Clearance from rear face of rear tires______ inches.

Fuel Tanks (Step) (Saddle) (Behind Cab)

Size of each tank_______ gallons. Number of tanks______.

Tank Marking (Diesel #1 or #2) (Gasoline - Regular, Unleaded, etc.)

Pintle Hitch (Yes) (No) Adjustable (Yes) (No)

Location______ Size_________ pounds

Adjustment range from ground _______ to _______

NOTE: Notify vendors if salt spreaders are to be installed.

Cab Ventilated and Insulated (Standard) (Deluxe)

Tinted Glass (Yes) (No) (Windshield Only) (All Windows)

Inside Dome Light (Manual Operated) (Door Operated)

Cigar Lighter (Yes) (No)

Cab Mount (Rigid) (Floating)

Seats (Bench Type) (Drivers) (Companion) (Standard) (Deluxe)

Checklist October 27, 1986 HERP1CC
Space between seats __________ inches.

Horn(s) (Electric) (Air)

Heater and Defroster (Standard) (Heavy Duty)

Heater/Defroster (Right side window) (Right & Left side window) (Yes)(No)

Air Conditioning (Yes) (No) (Standard) (Deluxe)

Sun Visors (One) (Dual)

Arm Rests (One) (Dual)

Radio (Yes) (No) (AM) (AM/FM)

Windshield Wipers & Washers (2 Speed) (Intermittent) (Electric) (Air)

Right Side Door Window Control (Manual) (Electric)

Dual West Coast Mirrors - Size __________ ____________.

(Heated) (Conventional)

Adjustable Convex Mirror on Right Side (Yes) (No) Size __________

Backup Alarm (Yes) (No) Type __________ D.B. Range __________

Exterior Grab Handles (Yes) (No)

Locking Hand Throttle (Yes) (No)

Hood (Alligator) (Tilt) (Tilt W/Butterfly Openings)

(Clearance Requirements)

Dash Mounted Gauges

Fuel (Switchable to either tank) (Separate gauge each tank)

Tachometer (Yes) (No)

Hourmeter (Yes) (No)

Ammeter (Light) (Needle Type) (Calibrated)

Oil Pressure (Light) (Needle Type) (Calibrated)

Hydraulic Oil Pressure (Yes) (No); Temperature (Yes) (No)

Water Temperature (Light) (Needle Type) (Calibrated)

Checklist October 27, 1986 HERPICC
Air Pressure (Needle Type) (Calibrated)
Transmission Temperature (Light) (Needle Type) (calibrated)

**Warning Lights**

High Water Temperature/Low Oil Pressure Emergency Shut Down Mechanism shall be dash mounted. (Yes) (No)

**Paint Color**__________________________ **Type**__________________________

**Preparation**__________________________

**Rustproofing**

Interior (cab) - Type of Material__________________________

Exterior (cab) - Type of Material__________________________

Frame - Type of Material__________________________

**Warranty of Cab and Chassis**

Rustproofing warranty equal to cost of rustproofing ________.

Rustproofing warranty equal to cost of actual repairs ________.

Rustproofing warranty equal to length of warranty of truck ________.

Description__________________________________________

**Manuals** Operators, parts, service and line set tickets

(Number of each required ________).

**Delivery Time**

List of number of weeks required for delivery of Unit(s) from date of order_________ weeks.

---

Checklist October 27, 1986 HERPICC
APPENDIX A

REFERENCES

1. SAE J-1349 "Engine Power Test Code - Spark Ignition & Diesel"

   Available from: Society of Automotive Engineers
   400 Commonwealth Drive
   Warrandale, PA 15096

   Phone: (412) 776-4841

   $8.00 for SAE members, others $10.00 plus $3.50 handling if not prepaid.

2. 1986 (or current year) Book

   Available from: The Tire and Rim Association
   3200 West Market Street
   Akron, OH 44313

   Phone: (216) 836-5553

   $16.50 plus postage.

3. Engineering Design Information for Ground Vehicle Tires

   Available from: The Tire and Rim Association
   3200 West Market Street
   Akron, OH 44313

   Phone: (216) 836-5553

   $25.00 plus postage. $10.00 per year for quantity revisions.

4. Care and Service of Highway Truck Tires

   Available from: Rubber Manufacturers Association
   1400 K Street, N.W.
   Washington, D. C. 20005

   Phone: (202) 682-4841

   $4.00 each; $272 per 100.

(NOTE: Information on numerous other rubber products such as off-highway tires, hoses, belts, etc. also available at nominal prices. Call RMA for lists & order forms.)
BASIC CONSTRUCTION
OF TRUCK TIRES

Highway truck tires are readily available in two basic constructions:

RADIAL AND BIAS

Light truck tires are available in three constructions:

RADIAL, BIAS, and BELTED BIAS

The basic differences between these constructions are as follows:

RADIAL TIRES — The body ply cords are placed perpendicularly across the tread from bead to bead. In addition, radial tires have belt plies which run circumferentially around the tire, under the tread. They constrict the radial ply cords and give rigidity to the tread.

BIAS TIRES — The body ply cords lie in a diagonal direction from bead to bead. The tires may also have narrow plies under the tread, called breakers, with cords that lie in approximately the same direction as the body ply cords.

BELTED BIAS TIRES — The body plies are as described for bias tires. In addition, the tires have belt plies that constrict the diameter and give rigidity to the tread. Belt cords lie in a more circumferential direction than for breakers. The belts reduce tread motion during contact with the road, thus improving tread life.

THE TYPE OF CONSTRUCTION can be determined by looking at the size designation molded on the tire’s sidewall. Radial truck tire sizes are designated with an “R” rather than the hyphen used for bias ply tires. For example a tube-type 10.00R20 tire is radial while the 10.00-20 tire is bias ply. In addition, radial tires have the word “RADIAL” molded onto the sidewall.

BODY PLY, BREAKER AND BELT MATERIALS — Tire body plies, breakers and belts may be of polyester, rayon, nylon, fiberglass, steel, or aramid. In radial ply tires these materials can be used in various combinations such as: steel body-steel belt; polyester body-fiberglass belt; or nylon body-steel belt.
TYPE OF TREAD DESIGN
AND WHEEL POSITION

The basic types of highway truck tire designs are Rib, Lug, and Special Service Mud & Snow Lug.

RIB TYPE TREAD
Tires with rib type tread are usually “all position” tires.

Unless designated otherwise, these tires are recommended for all wheel positions on all trucks and trailers. The circumferential groove design provides maximum steering control, good skid resistance, and even treadwear on all positions.

LUG AND RIB LUG TYPE TREADS
Cross lug or cross rib and rib lug type tires are designed for drive wheel service and are suitable for many over-the-road operations. These tread designs provide maximum resistance to wear and greater traction in high torque service. Such tires normally deliver more mileage than rib type tires on drive wheel positions. The tires are suitable for some off-the-road operations but do not provide maximum off-the-road traction of the special service mud and snow lug type.

SPECIAL SERVICE MUD & SNOW LUG TYPE TREAD
Special service mud and snow lug type tires are designed for traction on drive wheel positions for on and off-the-road service. They should be selected only when intended usage requires maximum traction in mud or snow.
LOAD & INFLATION TABLES

The tables on the following pages are from the 1980 Year Book of the Tire and Rim Association. Consult current yearbook for applicable notes and general data, e.g. approved rim sizes, dimensions, etc., as well as load and inflation tables.

LOAD RANGE—PLY RATING CONVERSION TABLES

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LOAD AND INFLATION IDENTIFICATION FOR RIMS AND WHEELS

IMPORTANT — The Load and Cold Inflation Pressure and tire construction imposed on the rim or wheel must not exceed the rim or wheel manufacturer's recommendation, even though the tire may be approved for a higher load or inflation.

The identification of rims or wheels for conditions of use in normal highway service must include the following information:

Max. Load ________ LBS. D or R

___________ Max. PSI Cold

Where

D — Diagonal (Bias) Ply or Bias-Belted only.
(except bias wire carcass)

R — Radial Ply and Diagonal (Bias) Ply or Bias Belted
(except bias wire carcass)

Note: D or R to be shown in vicinity of load and inflation stamping.
Letters "D" and "R" must be encircled. The words "Bias" and "Radial" may be substituted for D and R respectively.

For rims or wheels not so identified or for special conditions of use, consult rim or wheel manufacturers' published data or the manufacturer for the load, inflation and tire construction limits.
# Table TB-1B

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## TABLE T8-18 (Con't)

### DIAGONAL (BIAS) PLY

**TIRES FOR TRUCKS, BUSES AND TRAILERS USED IN NORMAL HIGHWAY SERVICE**

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**NOTE:** Letters in parentheses denote Load Range for which Bold Face Loads are maximum.

**CAUTION — ALWAYS USE APPROVED TIRE AND RIM COMBINATIONS FOR DIAMETERS AND CONTOURS.**
### TABLE TB-1R

**Radial Ply Tires for Trucks, Busses and Trailers Used in Normal Highway Service**

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**NOTE:** Letters in parentheses denote Load Range for which Bold Face Loads are maximum.

**CAUTION — ALWAYS USE APPROVED TIRE AND RIM COMBINATIONS FOR DIAMETERS AND CONTOURS.**
Checklist for Preparing BASIC UNDERBODY SCRAPER SPECIFICATIONS

The following pages contain various items to be considered when seeking bids for hydraulic operated underbody scraper assemblies.

General description of equipment being bid.

Statement of requirement of manufacture of equipment.

Statement of standardization of all component parts of unit.

Statement of parts availability and access.

Statement of location of manufacturer and/or assembly of unit(s).

Statement of bid submitting requirements.

Statement of indemnification of local agency concerning patent devices.

Statement concerning description of term "or equal".

Statement of terms for accepting unit(s), local, state and federal requirements, disposition of trade-in unit(s).

Vendor shall provide the following equipment information:

Equipment Make __________ Model __________ Year ______

Fixed (Yes) (No) Reversible (Yes) (No) Power (Yes) (No)

Mechanical (Yes) (No)

Moldboard Length _______ feet. Height _______ inches

Thickn ess _______ gauge.

Cutting Edge-S.S.H.P.* (Yes) (No) Height _______ inches.

Length _______ inches. Thickness _______ inches.

Number of Sections __________.

Shock Absorbing Assemblies Number ____ Type ____ Size ______

Underbody Scraper October 27, 1986 HERPICC
Moldboard Actuating Cylinder(s) Number _______ Size _______.

Required Mounting Clearance ____________________________.

Blade Range - Lift above ground _________________________ inches.

Scraper Position Locks Number _______

Type ________________________________

Power Reverse Hydraulic Cylinder(s) Number _______

Size _______

Scraper Plowing Positions Number ________

Swivel Capability From swivel point ____________ degrees.

Width of Cut At _____ degree angle _____ degree angle.

______ degree angle _____ degree angle _____ degree angle.

Dimensions of semi-circle ____________________________________.

Moldboard Hinge Size _______ Type ______.

Maximum Down Pressure ________________ pounds.

Fixed Position Discharge (Right Hand) (Left Hand)

Scraping Angle _____________ degree to _____________ degree.

Hydraulic Fittings To be quick disconnect (Yes) (No)

Operator Controls - Location ______________ (Hydraulic) (Air).

Controls Mounting Instructions

_________________________________________

All Friction Points To be equipped with Alemite-Zerk
fittings (Yes) (No)

Primed & Painted (Yes) (No) Color ________ (Fleet)
(Factory)

Weight including all mounting hardware __________ pounds.

*Standard State Highway Punch.

Underbody Scraper October 27, 1986 HERPICC
Checklist
for Preparing
BASIC ONE-WAY SNOW PLOW SPECIFICATIONS

The following pages contain various items to be considered when seeking bids for basic one-way snow plows.

General description of equipment being bid.

Statement of requirement of manufacture of equipment.

Statement of standardization of all component parts of unit.

Statement of parts availability and access.

Statement of location of manufacture and/or assembly of unit(s).

Statement of bid submitting requirements.

Statement of indemnification of local agency concerning patent devices.

Statement concerning description of term "or equal".

Statement of terms for accepting unit(s), local, state and federal requirements, disposition of trade-in unit(s).

Vendor shall provide the following equipment information:

Make __________________ Model __________________ Year ________________

Moldboard Length _______ feet Height at nose _______ inches.

Height at wing tip _______ inches.

Width of Cut at _______ degree angle _______ degree angle

___________________________ degree angle.

Moldboard thickness _______ gauge.

Number of vertical ribs.

Type of welds (Continuous) (Spot)

Snow Plow October 27, 1986 HERP1CC
Fixed Position (Yes) (No) (Right) (Left)
Reversible (Yes) (No) (Power) (Mechanical)
Moldboard extremities marker brackets (Yes) (No)
Moldboard snow deflectors (Yes) (No) (Rigid) (Flexible)
Cutting Edge* Height _______ inches Length _______ inches
            Thickness _______ inches.

*Standard State Highway Punch

Trip Mechanism Type ___________ Number ___________.

Weight including all accessories & hitch ___________.

Recommended Truck Size ___________.

Hinge Points Number ______ Size ______ inches.

Outside hinge spread ______ inches.

Caster Type (Pneumatic) (Caster Wheel) (Skid Shoe)
(Mushroom Shoe). Type of adjustment.

Blade Shoe(s) (Yes) (No) Curb Shoes (Yes) (No)

Semi-Circle Size ______ inches.

Moldboard Bottom Angle ______ inches.

Type of Hitch ______ automatic lock (Yes) (No)

Dimension of hitch ______ lift chains with hooks (Yes) (No)

Paint Back side nonreflecting black (Yes) (No)

Primed and painted (Yes) (No) Color (Fleet) (Factory)

Friction Points Equipped with Alemite-Zerks (Yes) (No)

Blade Range Lift from ground ______ inches.

Hydraulic Fittings Quick disconnects (Yes) (No)

Operator Controls Location ________________________________

Controls Mounting Instructions ________________________________

Snow Plow October 27, 1986 HERPICC
EXAMPLE OF SPECIFICATIONS FOR A 30,000 GVW SINGLE AXLE
AND/OR
50,000 GVW TANDEM DUMP TRUCK CHASSIS (For Snowplow Mounting)

The following pages contain example specifications for a
30,000 GVW Dump Truck.

Unit shall be manufactured and assembled within conformance
to the best known Engineering Standards of the trade,
relative to design, strength, quality, durability and
workmanship. Every item assembled upon this unit must meet
the latest Federal Safety Standards.

Bidder must state the model number under which the unit is
listed in a publication of recognized standing, devoted to
the manufacturing industry of this specified unit. All
parts assembled upon this unit must meet the latest Federal
Safety Standards.

Special attention is particularly called to the requirements
of the Indiana State Board of Accounts and the Local Agency
in regard to submitting proposals.

(List here local agencies usual statement concerning Bid
Bond, Non-Collusion Affidavit and Performance Bond.)

Bidders shall also attach literature or brochure of the
model being offered with his bid.

The Bid shall include the cost for and delivery of a Parts
Book and a Service Manual for the model being bid.

The successful bidder shall indemnify and save harmless the
local agency from any and all suits, costs and penalties or
claims for infringements by reason of use of any patented
designs, devices, or materials or any trademark or copyright
in connection with the specific unit furnished under this
proposal at anytime during manufacture and after purchase of
the specified unit(s).

Term "Or Equal" Where the term "or equal" is used in these
specifications and bidder deviates from the specified item,
he shall file (with his bid) a letter fully explaining and
justifying his proposed article or equal.

Acceptance of Unit Payment for the above unit(s) shall be
made after delivery of same and after a properly authorized
representative of the "local agency" has given his approval
of the satisfactory delivery and operation of said unit(s).

A certificate of origin shall be furnished with each unit as it is delivered.

Minimum Engine acceptable shall be a Caterpillar Model 3208, International Model DT 466 or equal as follows: V-8 naturally aspirated or In-Line 6 cyl. Turbo Charged with 210 Gross H.P. and a minimum Peak Torque of 485 lb. ft.

Vendor shall specify indicated information on the engine proposed in bid:

<table>
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<tr>
<th>Engine</th>
<th>Diesel Engine Make</th>
<th>Model</th>
<th>Number of Cylinders</th>
<th>Cycle</th>
<th>Bore and Stroke</th>
<th>Displacement</th>
<th>Cubic Inches</th>
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Gross Brake Horse Power
Continuous (Net) Brake Horse Power
Gradability in highest gear at rated GVW and recommended continuous R.P.M. on a surface with rolling acceptance of 1% percent.
Governed Speed
Peak Torque ft. lbs. @ R.P.M. 's
Compression Ratio
Naturally Aspirated or Turbo Charged.
Radiator Capacity quarts.

The unit shall be equipped with the following items:

Cooling System
Overflow recovery system.
Corrosion Resistor Mechanism.
Silicone Hose System.
Engine Block Heater(s) with a minimum of 1200 watts.
Weatherhead connector (for Block Heater(s)) shall be located below left door, front corner.

Radiator Fan shall be modulated type.

Single-Tandem October 27, 1986 HERPICC
Crankshaft Adaptor  Engine shall be equipped with crankshaft adaptor for mounted central hydraulics. If necessary, radiator to be designed to allow for crankshaft drive front mounted central hydraulics.

Filters  Air Filter shall be replaceable paper type.  
Oil Filter(s) shall be full flow type. 

Engine shall be equipped with "Lubrifiner" extra capacity oil filter "or equal", located under hood.

Engine shall be equipped with Primary and Secondary Fuel Filters and fuel heater.  
Engine shall be equipped with Water Filter.  

Starter  Starter shall be rated Heaviest Duty for this application by manufacturer.

Alternator  Alternator shall be 90 ampere Brushless Delco Remy Model 29-51 type 300 "or equal".

Emergency Shut Down System  Engine shall be equipped with an Emergency Shut Down Mechanism as follows: High Water Temperature - Low Oil Pressure emergency kill system with manual override capability.

Batteries  Engine shall be equipped with two Group 30 Heavy Duty 170 ampere hour, 1200 Total Cold Crank Power @ 0 degree F, 15 plate/cell.

Electrical System  shall be weatherproof Betts System "or equal" equipped with circuit breakers.

Special Tail Lights  shall be a part of the Dump Body System. 

Exhaust System  shall be mounted on right side with vertical muffler.

* Transmission shall be an Allison Automatic, Model MT653 "or equal" with 5 speeds forward equipped with Hayden Model 1299 Cooler and Auxiliary In-Line filter.

Extended Transmission Warranty shall be included with this bid.

Chassis shall be of 30,000 pound G.V.W. Rating.

Front Axle shall have a 12,000 pound load rate at ground, (single) 16,000 pound (Tandem) Axle shall be equipped with Heavy Duty Power Steering.

Notice to Bidders: This truck will be operated with a front mounted snow plow which weighs approximately 2500 pounds.*
(Specifications for Dump Truck Chassis continued)

Heavy Duty Shock Absorbers shall be factory installed.

* Rear Axle shall have a 23,000 pound load rate at ground. (Tandem shall be 34,000 pound)

Axle shall be "No Spin" type with positive locking power.

* Axle(s) shall be single speed with a gear ratio to be determined at time of award. Power Divider shall be (Air Operated) (Electric Operated).

Front Springs - 14,000 lbs. capacity, (Single Axle), 16,000 lbs. (Tandem Axle)
Rear Springs - 23,000 lbs. capacity, (Single Axle), 34,000 lbs. (Tandem Axle)
Rear Auxiliary Springs - 4,000 lbs. capacity total.

Wheels shall be Cast Spoke Type, 7 1/2" x 20" Rims

Tires shall be Tube Type.

* Front Tires shall be 10:00 x 20-12 Load Range F/12 ply rating, Rib Type Tread

* Rear Tires shall be 10:00 x 20-12 Load Range F/12 ply rating, Rib Lug Type Tread

* Frame shall be (North) 110,000 PSI yield strength steel 5/16" with full channel 5/16" reinforcement and total section modules of 30 and 3,000,000 RBM. (Central and South) 50,000 PSI yield strength steel with 930,000 RBM

All frame material shall be continuous full length.

Frame shall extend not less than 9 inches in front of radiator & hood to allow for mounted crankshaft driven central hydraulics.

* Cab to axle measurement shall be 84", Single Axle, 102" - 120" Tandem Axle.

* Ground Clearance necessary for mounting of underbody scraper shall be 25".

Brakes Service Brakes shall be Dual Air W/Rear Axle Antilock and without Anti-skid mechanism.

Shoe size shall be 16.5" x 5" S-Cam front and 16.5" x 7" S-Cam rear.

Air Compressor shall be 12 cu.ft. minimum.

Air System shall be equipped with Bendix 62 Air Dryer (or equal).

Parking Brake shall be Piggy Back Spring Actuated Dual Diaphragm (MGM) (or equal).
Pancakes shall be mounted in front of rear axle with 4" clearance from tires.

*Fuel Tanks* Unit shall be equipped with two (2) 50 gallon fuel tanks with anti-slip steps.

Cab Cab shall be standard ventilated, insulated, equipped with tinted (all window) glass, floor operated inside dome light, cigar lighter, rigid cabmount, drivers seat to be Bostrom Lever Air II Low Back or equal and companion seat, space between seats shall be 13" minimum, dual air horns, heavy duty hot water heater and defroster, dual sun visors, dual arm rests. insulated headliner, AM radio, intermittent electric windshield wipers, electric operated (from center of dash) right side door window, dual west coast mirrors (16" x 7") with 4" x 5" adjustable convex mirror in lower section, backup alarm, exterior grab handles, locking hand throttle, tilt hood and the following dash mounted gauges:

Fuel, tachometer, hourmeter (Hobbs or equal), ammeter (needle type - calibrated), oil pressure (needle type- calibrated), water temperature (needle type - calibrated), air pressure (needle type - calibrated), transmission temperature (needle type - calibrated).

High water temperature - low oil pressure emergency shut down/alarm mechanism shall be dash mounted.

Tilt Hood Hood shall be capable of opening over snow plow hitch and shall be (Solid) - (Butterfly).

* Paint shall be (local preference).

Warranty

Give description of all warranties and component warranties available.

Vendor shall provide warranty from date of delivery of completed unit(s).

Delivery Time

List number of weeks required for delivery of unit(s) from date of order.

______________ weeks.

* Various items may be changed to meet local or geographical preference.
EXAMPLE OF SPECIFICATIONS FOR DUMP BODY

The intent of these sample specifications is to obtain a dump body which meets the highest standards of the industry with respect to quality and strength of materials, design and workmanship of the finished product.

Body
Water level measurements 5 cyd. sides, 6 cyd. ends. Inside measurements 10' long x 7' wide, 45,000 P.S.I. Hi-Tensile steel, 8 gauge floor with radius sides and end, * 10 gauge sides with boxed toprail, 6" vertical and horizontal side braces. Rubrail shall have a 45 degree slope. There shall be three (3) interior vertical side braces (excluding rear corner posts).

Tail Gate
8 gauge material with heavy duty hardware, double acting type, with six (6) inch offset type upper hinges. It shall be equipped with 5/16" chain spreading device and fasteners. It shall be a formed boxed 6 panel gate. * Air operated tail gate latching mechanism, control shall be conveniently located for operator in cab of truck.

Welding
Wherever welding is done, it shall be continuous throughout.

Front End
Front end shall be horizontally braced with two adequate angle braces full length at third points between floor and top rail.

Cab Protector
Half cab shield designed manufactured and installed to meet State and Federal Regulations.

Cross Members
Cross members shall be four (4) inch x 5.4 lbs./ft. structural channels or equal. There shall be a minimum of 10 cross members. The floor shall be continuously welded to all cross members, side panels and main long gusseted to prevent tearing of welds or members. Area reinforcements not specifically described nor mentioned but necessary to counteract severe stress concentrations shall be completed.

Main Longitudinals
These members are to be as recommended by manufacturers standard design for class 40, 13.1 Ton hoist. Sub frame to be 5/16" thick channel members. Sub frame cross members shall be gusseted to the long members front & rear. All friction points are to be alemite - zerk fittings.

*Various items may be changed to meet local or geographical preferences.

Dump Body October 27, 1986 HERPICC
Safety Strut
Must be installed and comply with O.S.H.A. Standards.

Rear Corner Posts
Rear corner posts shall be full depth and vertical apron shall be solid with no openings for lights.

Hoist
Hoist shall be a Class 40, 13.1 Ton as specified in February 1974 TBEA Classification. Designed for a 10' bed underbody type with lay down arms, cylinder diameter of 7" minimum, bolt-on or screw-on head, maximum 50 degrees tilt double-acting power-up/power-down hoist, chrome plated piston rod shall be 2 1/2" diameter.

The body shall be equipped with a sufficient number of armored lights and reflectors so placed as to meet Indiana State and F.M.V.S.S. Specifications. Bed lights shall be of lexan lenses with replaceable bulbs. All wiring to be weather proofed in polyurethane tubing, Betts or equal. Wiring shall be placed and fastened so that it will be protected from outside chafing.

Four (4) lamps are to be located vertically in each rear corner post of dump bed, recessed, providing proper clearance for tail gate closure. Interior of corner post shall have a knee brace full depth to give added strength due to light punch-outs. Internal knee brace will terminate 3 1/2" from lamp openings to allow lamp and wires to have clearance without crimping wires.

Lights shall consist of (Top) amber sealed beam strobe. (Second lamp from top) stop, turn and hazard. (Third lamp from top) tail light. (Lower lamp) pattern light amber lens. The power source for the rear strobe lights shall be a remote unit located in cab of vehicle equal to Whelen Light Kit No. D80152-A-Y-Z-A. Both rear strobe lights shall flash simultaneously.

Rear Pattern Lighting - (Amber)
NOTE: The rear pattern lights shall provide a "Top-Hat" type lens which protrudes outward from its base approximately 1 1/2" allowing needed internal clearance for G.E. 25 Watt seal beam lamp to be mounted and angled approximately 45 degrees toward outboard side of vehicle. The inside surface of lens shall be painted from top of lens to lower edge of "Bull's eye" in lens. The lens shall have the word "Top" molded into lens to achieve above mentioned lens angle. The lens and lamp assembly must be marked to denote L.H. and R.H. side.
The above strobe lighting and pattern lighting units shall be approved and designated in a professional production type manner of engineering prior to final approval for installation into the equipment mentioned herein. Switches for the following lighting shall be provided for in the cab of vehicle. It should be dash mounted left of steering column.

Left and right strobe lights (Rear). Pattern lights left and right (Rear).

The lighting and wiring system, except Whelen Light Kit No. D80152-X-Y-Z-A, shall be the Betts lights and the polyurethane tubing for wiring or equal. The determination for the location of these lights modules shall be done at the time the body is mounted on the chassis. The Vendor shall contact the Purchasing Agent for a decision.

Painting
Preparation - All metal shall be chemically cleaned, DuPont 5717S or equal, and conversion coated DuPont 224S or equal before being primed.

Unit shall be primed with 825 S/826 S color polyamide zinc-chromate. This is a 2-component system which can be baked or air-dried.

Finish paint shall be Imron polyurethane enamel or equal. Color to be (local preference)

Undercoating of Bed
Dump bed undercoat material and thickness to be factory recommendation to be best industry standards.

Tail Gate Identification Number
Serial Number of dump body shall also be permanently marked on outside of each tail gate.
"0" HEAD ASSEMBLY (P/N 6-HEAD)  
(OPTION)  
AMBER LENS  
MOUNTED ON CAB ROOF  

CAB MOUNTED  
12V POWER SUPPLY (P/N 81501353-01)  

POWER  

2 16-GAUZE WIRES TO POWER  
(OR WIRE INTO EXISTING CONSOLE)  

14-4 CONDUCTOR  
OIL RESISTANT CABLE  
(FED THROUGH CHANNEL OF TRUCK FRAME)  

(CABLE ASSEMBLY P/N C-80145)  

"9" HEAD ASSEMBLY (P/N 8-HEAD)  
PAR 30 SEALED BEAM STROBES  
FLUSH MOUNT—AMBER LENS  

18-3 CONDUCTOR  
OIL RESISTANT CABLE  

WATERPROOF H-TAP INSULATED  
COVER/CABLE JUNCTION BOX
STANDARD LIGHTING FOR ALL SINGLE AND TANDEM DUMP TRUCKS

**NOTE**

Upper left and right Strobe Light Assembly with wiring is equal to Whelen Light Package Number D80152 -X-Y-Z-A.

All Wires to have "Eyelet" type Wire Ends except Strobe light harness.
EXAMPLE OF SPECIFICATIONS FOR CENTRAL HYDRAULICS SYSTEM

The intent of these suggested specifications is to obtain a front mounted crank shaft driven central hydraulics system. This system is intended for a 30,000 G.V.W. Dump Truck used for total snow & ice control. Unless otherwise approved, all component parts of this system shall be made in U.S.A. It is the responsibility of the bidder to furnish a complete working system which includes all parts not specifically mentioned herein and that the strength, quality and workmanship of the system shall conform to industry standards in general.

Hydraulic Pump

The hydraulic pump shall be rated at 26 G.P.M. @ 2000 P.S.I. @ 2000 R.P.M. Rotation shall be counterclockwise. Inlet size shall be 1 1/4" diameter outlet size shall be 1" diameter.

The pump shall be connected to the engine by a double universal splined shaft or other method as approved by truck manufacturer and Highway or Street Department. The pump shall be mounted in front of the hood of the truck and between the frame extensions, on a suitable cross member.

*Hydraulic Oil Reservoir

Tank shall be of not less than 30 gallon capacity. Tank shall be mounted beneath dump bed and on right side of truck frame to permit easy servicing. Tank dimensions shall be approximately 24" long x 19" wide x 14" deep. The tank shall be of seven (7) gauge material and baffled. It shall contain a 6" x 6" clean out port, a "stand up" filler neck with a filler screen to prevent oil contamination. The filler cap shall be a breather type.

Hydraulic Oil

Reservoir and entire hydraulic system shall be filled with anti-wear hydraulic oil as recommended by pump and valve manufacturer. Unit shall be filled and kept full from time of installation to time of delivery.

Hydraulic Oil Filter

An in-line 50 G.P.M. cartridge type oil filter with a 10 micron element shall be installed in the hydraulic circuit so that all return oil shall pass through it, then to the reservoir. The filter shall be equipped with a built-in bypass.

*Various items may be changed to meet local or geographical preferences.

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Temperature

The entire central hydraulic system shall be of the design that normal operating speeds and conditions (for summer road grading and winter ice and snow removal) do not cause temperatures to exceed 160 degrees F.

Hydraulic Valves

High pressure oil from the pump shall first be directed to a priority flow divider which shall provide an adequate flow of oil to the spreader motors at all times. The priority flow divider shall be fully adjustable from 0-30 G.P.M. Maximum P.S.I. rating shall be 3000 P.S.I. Excess flow is to be directed to the spreader motors via a Tee in the high pressure carry-over line from the bank valve. The bank valve assembly shall be capable of a maximum flow rate of 30 G.P.M. and 3000 P.S.I. and shall be equipped with a adjustable, pilot operated pressure relief valve and individual spool load checks. All porting shall be SAE "O" ring type for ease of servicing.

The first valve spool shall be a double acting spring return spool to control the power up/power down dump body hoist.

The second valve spool shall be a double acting spring return spool to control the power up/power down underbody scraper cylinders.

The third valve spool shall be a double acting spring return spool to control the power reversing underbody scraper cylinder.

The fourth valve spool shall be single acting spring return spool to control the power up snow plow hoist.

The fifth valve spool (if required) shall be a double acting spring return to control the power reversing cylinder(s) on the snow plow.

The bank valve assembly shall be installed behind the truck cab between the truck frame in such a manner to facilitate convenient servicing. Linkage to cab levers shall be direct rods (cables will not be permitted). Control levers connected to the bank valves shall be installed in the cab, within convenient reach of the driver and between the seats.

Provisions shall be made at the bank valve assembly for power beyond to facilitate the installation of a spreader control valve (or other such attachment).

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Hydraulic Hoses

Inlet (suction) Line to pump - 1.50" diameter SAE 100R4.
Main Pressure Line from pump to valves - 0.75" diameter SAE 100R2.
Priority Flow Divider By-Pass Line - 0.75" diameter SAE 100R2.
High Pressure Carry Over Line - 0.75" diameter SAE 100R2.
Dump Body Cylinder Lines - 0.75" diameter SAE 100R2.
Underbody Scraper Cylinder Lines - 0.50" diameter SAE 100R2.
Snow Plow Cylinder Lines - 0.50" diameter SAE 100R2. *

* These lines shall be equipped with 0.50" I.D. minimum diameter, double shutoff quick disconnects with storage plugs and caps attached.

The spreader motor lines shall be 0.50" and 0.75" diameter SAE 100R2 for spinner and auger respectively. All return lines shall be SAE 100S1 with a minimum I.D. of 1.00". All return lines shall be tee'd before entering the return line filter.

Hoses shall have swivel connection on both ends unless a quick-disconnect fitting is used or unless otherwise permitted.

All hoses shall be bracketed or shielded at points where rubbing against metal or exposed to intense heat. Suitable piping (with equal safety SAE rating) shall be used where the installation of hoses is impractical, such as along truck framing etc.