

MANUFACTURING EQUIPMENT PURCHASE SPECIFICATION DELPHI SAGINAW STEERING SYSTEMS

TITLE: Air Self-Cleaning Dust Collector

NUMBER: SD-1010

ISSUED BY: Manuel Gonzalez

DATE: 11/20/95

APPROVED BY: _____

REVISION:

DATE:

SHEET: 1 of 14

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I. INTRODUCTION

This specification covers the basic requirements for a dust collector that cleans dust-laden air by receiving the air into a settling and equalizing compartment so the heavier particles settle. The dust collects on the filters, and the clean air passes into another equalizing chamber before being discharged to the fan and factory atmosphere. The filters are cleaned by short bursts of compressed air. Normal applications will be to clean the contaminated air produced by a blast machine.

II. QUOTATION

- A. The vendor is expected to discuss Delphi Saginaw Steering System's requirements with the Process Engineer in order to fully understand all details in this specification before the proposal is submitted.
- B. The quotation shall include this statement: "We have read, understand, and agree to conform to Delphi Saginaw Steering System's specification SD-1010."

If this is not possible, a request for deviation(s) must be included in numerical order under the above statement and cross-referenced to the specification. Explain the problem and proposed recommendation. Written approval of the deviation(s) must be obtained from the Process Engineer responsible for the equipment before an order is issued.

- C. The quotation shall be identified and shall contain all of the following:
1. Request for quotation number.
 2. Name and part number of Delphi Saginaw Steering Systems part(s) to be processed.
 3. Gross and net production rate per hour.
 4. Describe proposed system with drawings, text, and brochures. Include general arrangement with floor-plan size, maximum CFM, air-cloth ratio, maximum static pressure, rotary value, exhaust fan curve, platform, etc.
 5. Weight and dimensions of each section shipped.
 6. Utility consumption for electrical power, compressed air, and ventilation.
 7. Ventilation CFM, required static pressure, duct transport velocity, and amount of containment's removed.
 8. Expected sound level and described sound control features.
 9. Preliminary sequence of machine operation with required interlock logic.

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10. Delivery in weeks from purchase-order date:

- a. Concept meeting at Delphi Saginaw Steering Systems
- b. Detail approval meeting(s).
- c. Start building machine.
- d. Approval trip for machine run-off.
- e. Ship to Delphi Saginaw Steering Systems.

11. Cancellation – indicate the basis on which charges will be based. Also state what the drawing approval and reproducible drawing charge would be if the machine design is completed but not built.

12. Warranty.

13. Give price for the following items with “Approvals Required” per Section VI.

- a. Basic machine (including motors, GM sound level, preferred components, and GM paint specifications).
- b. Spare parts.
- c. Delivered to GM factory – freight pre-paid.

III. REFERENCES

A. Unless otherwise stated, the following specifications are to be considered part of this specifications and must be complied with:

1. SD-001 General Manufacturing Equipment Specification.
2. SD-002 Manufacturing Equipment Statistical Qualification.
3. SD-003 General Drawings and Manuals Specification.
4. SD-004 General Manufacturing Equipment Controls Specification
5. SD-005 General Gauge Specification.
6. SD-006 Design Guidelines for Lean Manufacturing Equipment.
7. SD-007 Preferred Components List.

IV. MACHINE – GENERAL CONDITIONS

A. Arrangement

A completely self-contained, floor-mounted system that can be installed under a 18-foot-high truss is required, which is to be pre-wired with motor(s), controls, have machine-mounted guards, and is to meet Delphi Saginaw Steering System’s standards. Items on Delphi Saginaw Steering System’s preferred components list shall be used when required.

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B. Filters

1. Provide 99.5% minimum filtering efficiency.
2. Materials shall be capable of withstanding 275°F minimum temperatures, not support combustion, withstand the required flexing, and not collapse.
3. Cleaning of the filters is to be accomplished by using a positive pulse of compressed air to expand and expel the dust on the out surface. Solenoid valves connected to an air manifold are to clean each row of filters in sequential order whenever the filters need cleaning. The filters shall be cleaned during the normal shut down sequence.

C. Superstructure

1. The structural steel framework is to be provided for supporting the dust collector access platform, fan, and all associated components.
2. A platform and ladder is required to service and maintain the dust collector and fan.
3. All major items, if any, that are broken down for shipping shall bolt together with abrasive-tight seals and required sealant.
4. Framework shall give 42" minimum under the rotary valve with inside leg spacing of 46" minimum for a standard roura hopper, supplied by Delphi Saginaw Steering Systems. The top and three sides (bolt-on panels) are to be enclosed with the fourth side open – this prevents stray air currents from blowing the dust under the rotary valve.
5. The framework shall have heavy-duty base pads with holes for anchoring to the floor.

D. Housing

1. The housing casing shall be fabricated of 12 gauge minimum steel panels having interlocking flanges and required structural reinforcement to withstand positive or negative pressures of 15" S.P.W.G. minimum and also be at least 4" greater than the system required pressure.
2. The panel flanges shall be sealed leak-proof, using felt and plastic cement along with bolts not exceeding 6" centers. The entire housing shall be dust and water-tight, permitting it to be used inside or outside the factory.
3. The hopper shall be assembled to the housing with required slope to discharge the dust.
4. The air inlet shall be flanged and have a replaceable debri-baffle plate.

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E. Rotary Valve

1. A rotary valve shall continuously empty the hopper(s) of all dust.
2. The rotary valve shall continue to operate during the normal shut down sequence (3 to 10 minutes).

F. Pressure Differential Indication

1. A needle-type gauge is to indicate the pressure difference in inches of water between the clean plenum and the dust-laden plenum.
2. The gauge is to read from the floor (60 inches). All piping is to be metallic.
3. If the filtering efficiency changes due to plugged or broken filters, a large flashing light is to be energized on the control panel.

G. Fire Protection

1. Multiple sprinkler heads (non-fusible-type) shall be located in both the housing and hopper section of the dust collector.
2. A normally-closed ball valve shall be located for operation from the floor level (60 inches). Located next to the valve, a sign shall read "In case of fire – turn on valve" (minimum 2" high letters).
3. All piping and installation shall be supplied by the vendor between the ball valve and nozzles.

H. Fan Assembly

1. Includes: fan, motor, v-belt drive, base, guards, and weather cover.
2. Direction of fan rotation shall be noted on the fan housing.
3. Fan assembly shall be completely mounted on the dust collector and wired by the vendor.
4. Each point requiring lubrication shall have a steel tubing line to common block (located 42" above the floor) with nameplate identifying Delphi Saginaw Steering System's lube type and frequency.

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5. The fan is to be mounted on the side or top of the dust collector. If the fan cannot be mounted on the dust collector, a stand or platform shall be supplied (with leg strength no less than that of the dust collector) to support the fan assembly. Floor mounting or truss-mounting is not desirable and must be discussed and approved before quoting.
 6. Fan may be located 75 feet from the blast machine.
 7. Air discharge shall be to the plant atmosphere.
- I. Ventilation (Engineering and Technical Service Only – Delphi Saginaw Systems to Supply Material)
1. The ventilation system is to be designed in conformance with the latest edition of “Industrial Ventilation” by the American Conference of Governmental Industrial Hygienists.
 2. The necessary negative exhaust pressure is to be supplied by the dust collection system to properly remove the abrasive fines and refuse and also prevent the machine from leaking dust to the plant.
 3. Baffle gates should be used and located six (6) pipe-duct diameters from the duct entrance, and a gate is required before the dust-collector inlet.
 4. The ventilation system is to be designed so abrasive and/or abrasive fines do not settle in the ductwork.
 5. The ventilation duct should slope downward so abrasive cannot settle in the duct if the system gets out of balance.
- J. Paint
- The exterior of the equipment is to be painted, with the exception of components that have proper surface protection.
- K. Safety Devices
- All exposed power drives on this machine are to be protected with guards totally enclosing all six (6) sides (solid tops and see-through side) and that comply with OSHA and MIOSHA safety codes. The guards must be machine-mounted and hinged whenever possible.
- L. Sound Level
- The machine shall be designed with sound-deadening to meet the requirements of the GM Sound Level Specification SL1.0 (GM-1619). Actual sound readings are to be taken and submitted on form GM-1676.

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M. Controls

1. Power: 460 volt, 60 hertz, 3-phase electrical, 60-100 P.S.I.G. compressed air.
2. All controls to be per Delphi Saginaw Steering System and GM specifications and preferred components list.
3. Motors, where required, are to be U-frame, 7EQ.
4. The dust collector will have one power inlet and its own electrical panel. Wires in the panel will terminate on a terminal block located in the panel.
5. Inter-connections between panels are required so that, when the blast machine is put in "power on", the dust collector will come on if in "remote start" mode. If the dust collector is not running, the blast machine shall not blast.
6. Controls are to be relay-type logic with the blast panel to start with number ICR and the collector panel to start with 100 CR. The dust-collector panel shall also have 100-series wire numbers.
7. Control lights are required to show the status of the machine components. The following "press-to-test" lights are as a minimum:
 - a. Power on (Red).
 - b. Exhauster on (Amber).
 - c. Rotary valve on (Amber).
 - d. Filter fault (Red) and large flashing light (Amber).
 - e. Dust collector on (Amber) – remote in blast panel.
8. Individual push buttons shall be used for the following items as a minimum:
 - a. Master start.
 - b. Master stop (palm button).
 - c. Exhauster start.
 - d. Rotary valve start.
 - e. Initiate shut down sequence.

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9. A selector switch is to indicate "normal start" and "remote start".
10. Improper pressure differential across the filters when the fan is running is to turn on a "filter fault" light and large yellow flashing light.
11. "Initiate shut-down sequence" shall clean all filters and continue to empty the hopper for 3 to 10 minutes.
12. One contact in the blast panel shall start and stop the dust collector if in "remote start" mode.
13. One contact in the dust-collector panel shall be used to turn a light on and off in the blast panel indicating "dust collector on".
14. A sequential timer located in the panel is to clean the row(s) of filters whenever dirty.
15. Every solenoid shall be fused.
16. Remote operation shall occur only if the dust collector has the master power energized and the selector switch is turned to "remote start". When the blast master relay is energized, the dust collector fan and rotary valve shall start. When the blast master relay is de-energized, the "initiate shut-down sequence" shall start.
17. All control components are to be labeled on the machine and in the panel – relays, timers, motor-starters, solenoids, limit switcher, pressure switchers, etc.
18. The pneumatic system shall be designed to be fail-safe due to a loss of electrical power.
19. The pneumatic inlet shall have a lock-out valve, 12" to 18" drip leg, air filter with automatic drain, and regulator.

V. APPROVALS REQUIRED

- A. The approval constitutes an acceptance of the design concept. It does not relieve the vendor of the responsibility for proper operation of the equipment.
- B. A concept and layout meeting (no later than two weeks after the purchase order date) will be held at Delphi Saginaw Steering Systems with the vendor's design personnel to discuss the design. Three (3) copies of the following drawings will be required:
 1. Top and side-assembly view of system.
 2. Assembly view of all moving mechanisms.
 3. Layout of ventilation duct with design calculations.

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4. Layout of fire protection system.
 5. Sequence of electrical and pneumatic controls with interlocks along with proposed diagram.
 6. List of major purchased components – mechanical, electrical, pneumatic, lubrication, etc.
 7. All vendor standard drawings (drawn before quotation date) that will be supplied not drawn on Delphi Saginaw Steering System's paper but will have Delphi Saginaw Steering System's title blocks.
 8. Preliminary list of drawings that will be drawn on Delphi Saginaw Steering System's paper for detail-approval meeting.
- C. A detail-approval meeting(s) (starting no later than four weeks after the purchase order date) will be held at Delphi Saginaw Steering Systems. Three (3) sets of all drawings must be submitted at least one (1) week in advanced of meeting, showing the complete machine. Revisions required during building must be shown on the drawings as a revision and must be approved. All drawings marked approved with a limitation (as shown, as noted, etc.) must receive final approval. At this meeting, the vendor's design personnel shall have:
1. Machine layout of entire system at 1/4" equals one foot.
 2. Complete general-arrangement drawings showing location of all utilities, controls, and pneumatics on machine.
 3. Assembly and sub-assembly drawings showing the location of all components in the complete system. Three (3) views are required on these drawings.
 4. Written finalized sequence of operation (manual and remote operation).
 5. Major purchased component parts list and delivery schedule.
 6. Electrical drawings and line-sequence diagram.
 7. Drawings of electrical panels, and parts list.
 8. Pneumatic drawings and parts list.
 9. Lubrication drawings and parts list.
 10. Ventilation drawings between blast and dust collector showing CFM, velocity, and static pressure.
 11. Operating and maintenance manuals.

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D. Progress Reports

Progress reports are required every month and are due on the purchase-order-month day. The report is to include a critical-path status and vendor's projected problem areas.

E. Machine Inspection

At any time during construction, the Delphi Saginaw Steering System's Process Engineer may examine the machine. When the machine is completed on the vendor's floor, a trial run-off is required for three (3) hours with no machine adjustments and is to meet the sound-level requirements. The GM-1676 "General Motors Corporation vendor's sound data form and certification sheet" is to be completed with the abrasive on and abrasive off. A vendor representative of the start-up and installation department responsible for the system – along with the vendor project engineer – is to be present at this inspection to verify that they system will meet Delphi Saginaw Steering System's purchase-order requirements.

F. Final Acceptance

Final acceptance of the equipment will be based upon a forty (40) hour "abrasive on" blasting production run at Delphi Saginaw Steering Systems without machine adjustments and the contract completed. The vendor will supply all the required technical service when required by Delphi Saginaw Steering Systems during the installation and/or pre-operative stages until final acceptance all as part of the base machine cost (this service shall be available continuously when the final acceptance test is being run and until passed).

Also, the Delphi Saginaw Steering System's Department Foreman and Production Engineer in charge of the system are to be trained as to how the machine operates, principles on how the dust collector cleans the air, and how to examine items that wear and need replacing and/or adjustment.

VI. ENGINEERING SERVICES

A. Drawings standards per SD-003.

B. Reproducible Drawings

One complete set of reproducible drawings for building the machine with part lists must be supplier for each piece of equipment and shall include – but is not limited to:

1. Machine layout at 1/4" equals one foot. This is to include as a minimum the dust collector, control panel, and ventilation duct.
2. General arrangement, showing locations of all utilities and controls on machine.

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3. Assembly and detail drawings on Delphi Saginaw Steering System's paper showing all mechanical details of the entire machine:
 - Collector bag and cage
4. Major sub-assemblies showing the location of all utilities and controls on machine.
5. All drive-train components and assembly.
6. Controls – these drawings must be on Delphi Saginaw Steering System's paper:
 - a. Electrical-panel layout and junction box(es).
 - b. Elementary wiring and line-sequence diagram.
 - c. Piping for ventilation, pneumatic, lubrication, and electrical schematics are acceptable.
7. Parts list on Delphi Saginaw Steering System's paper.
- C. Operating and maintenance manuals per SD-003.
 1. Each manual shall contain as a minimum:
 - a. Title page with machine name, company, Delphi Saginaw Steering System's machine and tag number, and purchase order number, machine serial number, and model number.
 - b. Table of contents and section dividers.
 - c. Main body describing system.
 - d. Sequence of operation for start up and shut down in auto and manual mode.
 - e. Adjustment and set up procedure for setting and checking:
 1. Installing bags.
 2. Initial start up with new bags.
 3. Air flow in duct work.
 4. Baffle gates.
 5. Bag cleaning sequence.
 6. Dust leakage to the fan.

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7. Exhaust fan rotation and RPM.
 8. Rotary valve.
 9. Fire protection.
 10. Lubrication
- f. Preventive maintenance schedule (based upon number of machine operational hours).
 - g. Recommended spare-parts list based upon operational hours until normal replacement with manufacturer's part number, quantity used, quantity to order, price, and delivery.
 - h. Installation of machine as shipped, including utilities.
 - i. Booklets from your suppliers for components. Note which item is actually used if booklet cover more than one type.
 - j. Copy of the reproducible drawings (11" x 17" preferred) and list of reproducible drawings supplied with jobs.
1. The name of the component or operation shall be consistent for the entire manual. Do not use general recommendations such as proper, when required, regular, and necessary. Specific information or specific descriptions are required. Use the same terminology as stated on the control panel.

The operating instructions must be in a logical order. Whenever cross-references are used, the sub-title and page numbers must be stated.

VII. DELIVERY OF DOCUMENTATION

- A. All approval drawings, reproducible drawings, and manuals are to be hand-carried, mailed, or sent U.P.S. to the Process Engineer. Documents of value shall have method of tracing to verify who received subject items at Delphi Saginaw Steering Systems.

Mail:

Delphi Saginaw Steering Systems
3900 Holland Road
Saginaw, MI 48601
Attention: Manuel Gonzalez, Sr. Process Engineer
Advanced Manufacturing Center – 1

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UPS:

Delphi Saginaw Steering Systems, Plant 3
Towerline Road (off Holland)
Saginaw, MI 48601
Attention: Manuel Gonzalez/Joe Schramkoski
Sr. Process Engineer
Advanced Manufacturing Center – 1

VIII. WARRANTY AND PAYMENT

A. Warranty

The supplier's warranty on the equipment shall be as follows:

1. Purchased parts: Manufacturer's warranty.
2. Workmanship and material: One year from date placed into service, regardless of delivery date.
3. During the warranty period, the vendor will be responsible for supplying technical service at Delphi Saginaw Steering Systems within 24 hours after being requested for trouble-shooting and machine adjustments done beyond that supplied in the drawings and manual, and for resolving warranty items that must be replaced, repaired, or re-designed.
4. Improper dust flow through the duct work and dust leakage (especially that causing piles of dust) to the exterior of the machine (except that associated with normal maintenance) is the vendor's responsibility to correct for the first 500 hours of operation.

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IX.

SPECIFICATION REVISION SHEET

PAGE #	REV SYMBOL	REVISION DESCRIPTION	DATE	ISSUED BY
		<ul style="list-style-type: none">Rewritten	11-03-95	D.Hitz
		<ul style="list-style-type: none">SD-1010 Supersedes Spec E-1908		
		<ul style="list-style-type: none">		