EAGLE®

Four Wheel Mechanical Sweeper

ELGIN

Subsidiary of Federal Signal Corporation

ELGIN EAGLE®

TECHNICAL DESCRIPTION / WALK-AROUND

GENERAL OVERVIEW

Street sweeping is an essential part of good sanitation. In health, ecology and aesthetics, a community benefits from clean streets. Clean streets reduce dust and dust-borne contaminants, bacteria from decomposition of organic matter, pollutants entering storm water systems and accidents due to debris in the roadway.

Elgin Sweeper Company, Elgin, Illinois has been designing, engineering and manufacturing street sweepers since 1914. Elgin equipment utilizes all variations of today's sweeping technology – mechanical, pure vacuum, regenerative air – and now waterless dust control – to offer customers the sweeper that matches their needs.

Elgin Sweeper is part of the Federal Signal Environmental Products Group, which also includes Vactor® Manufacturing, Guzzler® Manufacturing and Jetstream® of Houston. Each of the group's member companies is a leader in their respective industries providing innovative solutions with environmental cleaning products.

This document was prepared to provide a detailed description of the Eagle, a reliable, heavy duty, versatile mechanical broom sweeper. Elgin Sweeper first introduced the Eagle in 1988, with model changes and product improvements in the years following. The most dramatic changes have come with the consolidation of all the truck mounted mechanical sweepers Elgin Sweeper Company offers. The newest model Eagle was introduced in 2014. The Eagle's platform is now shared with the Broom Bear® and the Road Wizard®. This standardization provides our customers with a proven mechanical broom sweeper with reliable, heavy duty performance, high dump capability, a simplified dual-engine design, increased operator efficiency and productivity, along with the latest technology for superior results.

MECHANICAL SWEEPING

The basic function of a mechanical sweeper is to remove debris from the roadway by utilizing the rear broom of the sweeper to "flick" the debris onto a conveyor which would then deposit the debris into the hopper. The illustration below shows how each component of the Eagles sweep system works together to accomplish the task. The side brooms rotate to move the debris from the edges of the roadway to the middle of the sweeper so the main broom can pick up the debris and flick it to the conveyor so it can be deposited into the hopper and disposed of.

THE ELGIN EAGLE
A POWERFUL CLEANING SYSTEM

Each component on a sweeper is important, however, how they all work together in a "cleaning system" is what determines true sweeping performance. The Eagle's powerful cleaning system is a combination of carefully designed components - working together for maximum productivity.

The Eagle combines five primary systems to create the most "Advanced Sweep System" available in a mechanical street sweeper. These include:

- High Productivity Sweep System
- Dust suppression water system
- Simple, easy-access maintenance system
- Versatile chassis system
- Customization system

HIGH PRODUCTIVITY SWEEP SYSTEM

The high productivity sweep system of the Eagle is comprised of five major components. These components have been developed and refined to work together to provide the customer with a reliable, heavy duty, versatile mechanical broom sweeper.

The Eagle's sweep system components:

- Auxiliary Engine
- Gutter Brooms
- Hopper
- Main Broom
- Conveyor
- Hydraulics
- Pneumatics
- Electrical
- Controls

EAGLE SWEEP SYSTEM COMPONENTS:

AUXILIARY ENGINE

The auxiliary engine drives the hydraulic system that powers all of the functions that encompass the sweep system of the Eagle. A separate auxiliary engine for the sweeper functions allows increased power to the sweep components since 100% of the engine horsepower is dedicated sweeping and not transporting. The chassis engine delivers the transport power, unlike single engine units where power for transport and power for sweeping must be divided from the single engine system. The availability of two engines is especially important given any variations in sweeping grade or payload levels. The sweeper's auxiliary engine continues to perform consistently, oblivious to changes in grade or payload. A single engine will need to divert more power to transport and less to sweeping when changes occur.

The Eagle utilizes a 74hp Cummins diesel engine, (55 kW @ 2400 RPM), one of the most powerful standard auxiliary engines available on a mechanical sweeper. It is protected by a dual safety element dry type air cleaner and a restriction indicator that alerts the operator when it is time to service the filter element. The engine efficiently operates in extreme warm or cold conditions with a 50/50 mixture of anti-freeze/water for cold weather storage or operation. As a precaution the engine has an optional safety shutdown system for high coolant temperature and low oil pressure.

AUXILIARY ENGINE SPECIFICATIONS

Model (Turbocharged Diesel):	Cummins QSF 2.8L Tier 3
Power @ 2400 RPM:	55 kW
Cylinders:	4
Displacement:	2.8L
Torque @ 1400 RPM:	270 Nm (199 lb-ft)

GUTTER BROOMS

The dual free-floating gutter brooms adjust to variable road surfaces, a sweep path of 3050 mm (120 in) and a powerful free floating direct-drive main broom, ensure reliable and complete pickup of debris. These hydraulically driven 1168 mm (46 inch) brooms have four-way movement controlled by pneumatic cylinders, including in/out and up/down, to minimize broom damage if struck by an obstacle. The side broom hydraulic motor drive provides 734 Nm (6045 in-lbs) of torque (ea) for superior digging power. The parallelogram design provides simple, nonbinding action/motion for constant bristle and wear pattern. Sweeping performance is enhanced when side broom digging pressure is adjusted from in-cab to suit the application (i.e. increased digging pressure for heavy compact debris). The brooms are pneumatically raised, lowered and suspended. The pneumatic system acts as a natural spring to prevent damage to critical sweeping components. To facilitate maintenance, the side broom assemblies have greaseless pivot pins.

GUTTER BROOMS

Diameter:	1168 mm (46 in.)
Disc Construction:	Steel plate
Drive:	Hydraulic motor, protected by relief valve, 734 Nm (6045 in-lb) of torque
Mounting:	Free floating trailing arm
Adjustment:	Inward/outward forward/backward
Digging:	Pressure/wear control pneumatic in cab
Type:	Segment set disposable

HOPPER

3.4 m^3 (4.5 yd^3) hopper features a center mounted double-scissors lifting mechanism with a capacity of 4545 kg (10,000 lbs) for greater stability and trouble-free operation. Dumping height is variable up to 3048 mm and a 279 mm side shift enables a cleaner more efficient unloading of material. The hopper incorporates an inspection door with handles to allow the operator to view debris inside the hopper, and the hopper can be dumped at variable heights from a minimum of 965 mm (38 in) to maximum 3048 mm (10 ft) measured at the bottom of the chute. The hopper will tilt to 50 degrees in order to assure that all debris in the hopper will be removed during dumping.

279 mm Hopper Shift

DEBRIS HOPPER SPECIFICATIONS

Volumetric Capacity:	3.4 m^3 (4.5 yd^3)
Dump Angle:	50 degrees
Lifting:	Two-stage with hydraulic cylinder
Hopper Dump Door:	Hydraulic open/close
Hopper Dumping Control:	Electro/Hydraulic in cab

MAIN BROOM

A free-floating trailing arm main broom, with a width of 152 cm (60 in), conforms to road contours. Powered by the auxiliary engine, the main broom works at variable speeds that coincide with auxiliary engine RPM. Productivity is enhanced with automatic settings for the hydraulically operated down pressure, and wear control. Main broom lift, lower and down-pressure functions are controlled from the cab. The main broom arm bearings are sealed and self-aligning for self adjustment when experiencing an uneven load. The self-adjusting system guards against premature wear.

CONVEYOR

The Eagle's NO JAM DEBRIS CONVEYOR comes standard with the Chevron Belt. This unique belt design uses molded-in full-width angled cleats that move large debris without jamming. High-strength belt material provides long wear and maximum uptime. The conveyor is controlled from in-cab, including reverse. A built-in wash down makes cleanup quick and easy.

HYDRAULICS

The hydraulic system provides power to operate the main and side broom motors, the main broom and conveyor lift movement, and the hopper lift, dump, and door activation. The system has 3 gear pump sections each capable of 51 LPM (13.5 GPM) @ 1200 RPM. Section 1 is dedicated to the main broom, section 2 is dedicated to the side brooms, and section 3 is dedicated to the conveyor/elevator. This enables the sweeper to be more efficient because the pressure each pump section sees is determined by the load it is driving (broom or conveyor/elevator), this allows for less wasted energy in the hydraulics (in the form of heat going to the cooler and reservoir). The reservoir capacity is 132 L (35 Gallons) and has an exterior sight gauge that indicates level and temperature. The reservoir is located in the enclosed auxiliary engine compartment for quick inspection All circuits have quick disconnect pressure check ports for easy maintenance. To minimize the hazards of potential leaks, all high-pressure fittings are "O" ring type. The system also incorporates a 100-mesh suction strainer and one 6-micron absolute return filter in order to keep debris from entering the pump.

PNEUMATICS

The pneumatics control the in/out and up/down of the side brooms. The Eagle pneumatic system features DOT fittings with a PR4 type pressure protector for the chassis air system to protect it at air pressures below 5.9 bar (85 PSI). A separate air tank for all sweeper air components is provided. The cylinders are interchangeable and rated at 10.3 bar (150 PSI) with separate rod seals and wipers to prevent contamination from entering them. Each cylinder is controlled by a single two-position solenoid valve mounted on a manifold with a common input and exhaust.

ELECTRICAL

The Eagle electrical system is independent from the chassis electrical system. The sweeper engine has one 1000 CCA, 12-volt battery with a 60-amp alternator. Accessories powered by the electrical system include: an electronic back-up alarm and rear camera for additional warning and safety when the chassis is in reverse, sweeper lighting - rear identification lights, side broom and rear clearance lights, sweeper warning lights. In addition, all hydraulic and pneumatic valves are electrically actuated. The sweeper harnesses are color-coded and hot stamped with appropriate word designation labeled every four inches (i.e. ignition, side broom) on each wire. For safety and ease of maintenance all electrical circuits are protected by automotive style fuses.

CONTROLS

Control of all sweeping functions, hopper side shift, spray water and lighting is accomplished using simple conventional rocker switch controls located on a central console for use from either right or left positions. The hopper raise/lower and tilt functions are controlled via joystick and configured per SAE standards for bucket loading equipment. The console includes a gauge package that allows the operator to view all-important auxiliary engine information from either operating position. Sweeper engine instrumentation includes a tachometer, hour meter, oil pressure, fuel, voltage, and coolant temperature for complete information for the operation on the condition of the auxiliary engine. The controls for auxiliary engine ignition and throttle, and side broom down pressure are located in the control console for quick and easy service of the system. Auto-shutdown of auxiliary engine (low-oil pressure/high temperature) and the water level gauge come standard.

DUST SUPPRESSION/SPRAY WATER SYSTEM

The proper use of water is essential for dust suppression, sweep performance and improved longevity of major sweep components. The Eagle water system features:

- Easy access electric diaphragm water pump
- Three section, 1363 L (360 gallon) non-corrosive polyethylene water tank
- An 80 mesh in-line water filter shall be provided with the fill hose to prevent contaminants from entering the water tank.
- High quality agriculture grade water nozzles, all in easy-to-access locations, providing water where it is needed.
- On/off activated from in the cab, with two flow rates High and Low, can be adjusted to match debris conditions

DUST SUPPRESSION/SPRAY WATER SYSTEM COMPONENTS:

- Spray Water System

SPRAY WATER SYSTEM

The Eagle features an efficient spray water system for dust suppression. Water sprayed at the side brooms and across the main broom reduces the dust stirred up into the air. The Eagle water system also features a removable 1363 L (360 gallon) rustproof polyethylene water tank. The spray system is powered by a 12 volt electric diaphragm water pump. Water to the left and right side brooms , and main broom spray bar is controlled in cab, and has adjustable valves which control water flow. The system features a three way switch to control water output (high, low, off).

SPRAY WATER SYSTEM

Water tank construction:	Polythylene with lifetime warrant against rust thru
Water tank capacity:	1363 L (360 gal.)
Fill hose:	5080 mm (16 ft. 8 in.)
Controls:	On-off switch in-cab, with High and Low flow rate selection
Filter:	100 mesh, cleanable

SIMPLE, EASY ACCESS MAINTENANCE SYSTEM

The Eagle is designed with maintenance systems that are accessible and easy to service including:

- Two large, rear fiberglass access doors open for quick inspection of the machine's systems.
- The O-ring hydraulic connectors and hydraulic system are designed for long life and leak-free operation.
- The electrical system includes waterproof snap-together connectors and color-coded wire with stamped identification for quick location of systems during maintenance.
- The water system is equipped with an automatic internal hopper/conveyor flush and wash down system. A manual bypass valve diverts hydrant water into system without necessitating filling of water tank.
- Supported by factory and dealer based training, operation and care are headache free.

VERSATILE CHASSIS SYSTEM

Conventional or cab-over chassis for versatility and a high level of driver comfort and safety.

CUSTOMIZATION SYSTEM OPTIONS

Understanding that each sweeping application is unique, the Eagle was designed with several unique factory installed options that allow the machine to be built to the customer's specific needs.

Some of these options include:

- Interchangeable conveyor/elevator
- Side Broom Tilt and extended reach
- LifeLiner™ Hopper System
- Front Spray Bar
- Automatic lubrication system

Interchangeable Conveyor/Elevator

- The Eagle comes standard with the NO JAM debris chevron conveyor belt featuring molded-in full-width cleats that move debris without jamming, this high-strength belt provides long wear and maximum uptime. The unique 4M platform allows the Eagle to be converted to the squeegee-type conveyor for applications such as aggregate and granular material pick up of gravel and millings; ideal for road construction contractors. Conveyor rotation direction is controlled in-cab and conveyor speed is variable with auxiliary engine RPM providing maximum on-the-go productivity and ease of cleaning.

Side Broom Tilt and Extended Reach

- Allows operator to sweep effectively in variably-pitched gutters. On-the-go pitch adjustment with a console mounted simple variable rocker switch. Extended reach allows the side broom to follow curbs and tight cul-de-sacs. The tilt option allows the operator to adjust the side broom tilt between 0 and 20 degrees.

LifeLiner Hopper System

- A specially designed hopper liner and finish system that greatly improves the life, durability and functionality of a sweeper hopper.
- The system uses a proprietary polyurethane coating that is more wear resistant than stainless steel and extremely resistant to most chemicals.
- Backed by a lifetime warranty against rust perforation.

QUALITY POLICY STATEMENT

The Quality Policy of Elgin Sweeper Company is to provide products and services which consistently meet or exceed the requirements of our customers.

ELGIN
Built for clean. Backed for life.