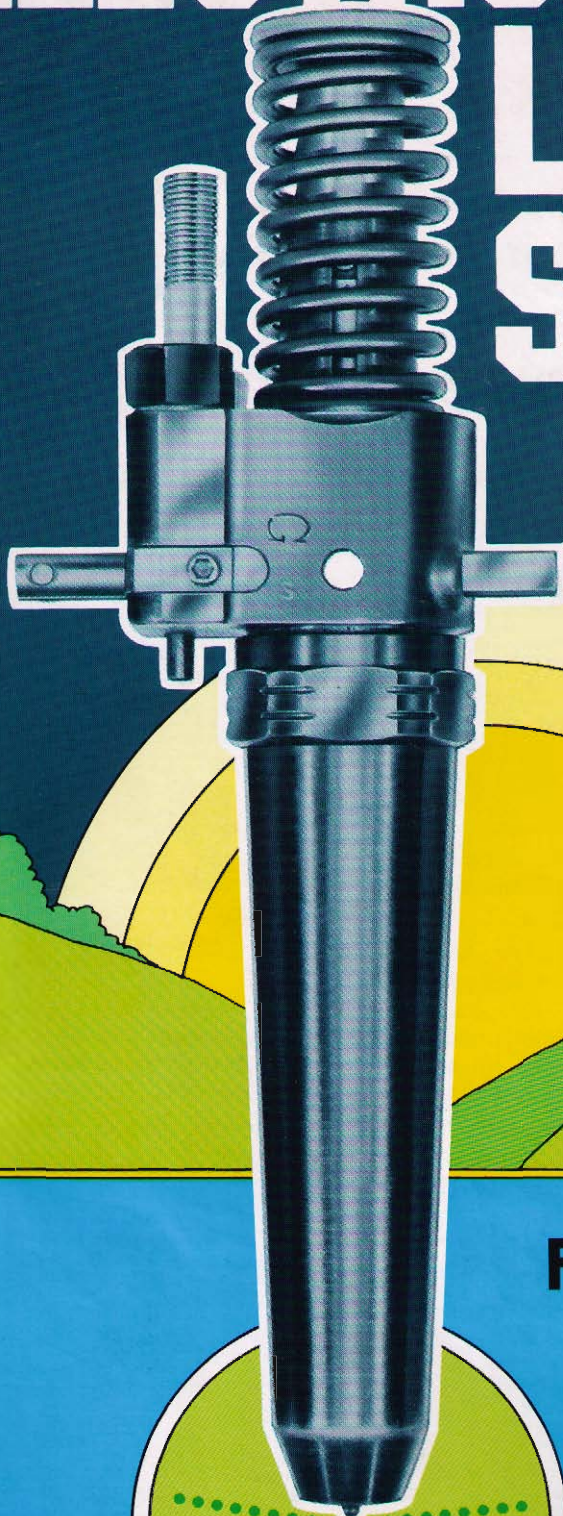


ELECTRO-MOTIVE'S LOW SMOKE INJECTOR



FEATURES:

- a more positive end of injection
- more uniform atomization of fuel
- reduced amount of unburned or partially burned fuel left in the cylinder
- improved combustion efficiency
- reduced engine deposits
- less smoke
- reduction of certain gaseous emissions

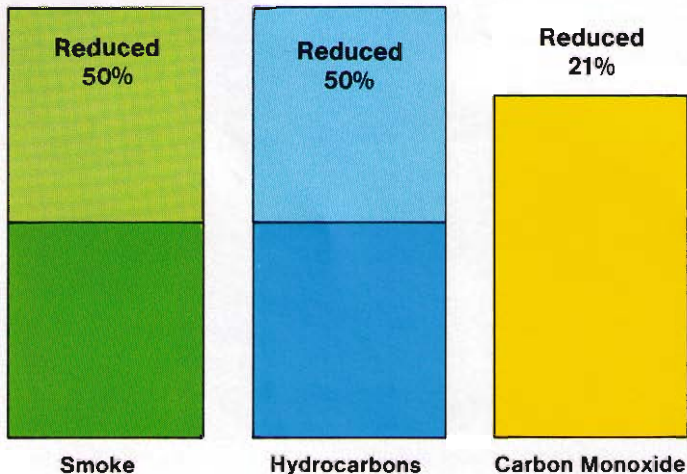
EXHAUST SMOKE CAN BE REDUCED 50% WITH ELECTRO-MOTIVE LOW SMOKE INJECTORS

Electro-Motive's Ecology Program

Electro-Motive made a major step toward emission control, combustion efficiency and fuel economy in 1959 with the introduction of the needle valve injector. At that time, the needle valve injector provided a 60% reduction in smoke over the spherical valve injector then in use.

National concern for environmental improvement led Electro-Motive to develop and introduce the LOW SMOKE injector in 1972 as well as improved power assembly components which contributed to further reduction of gaseous emissions and exhaust smoke.

Average Emission Reduction



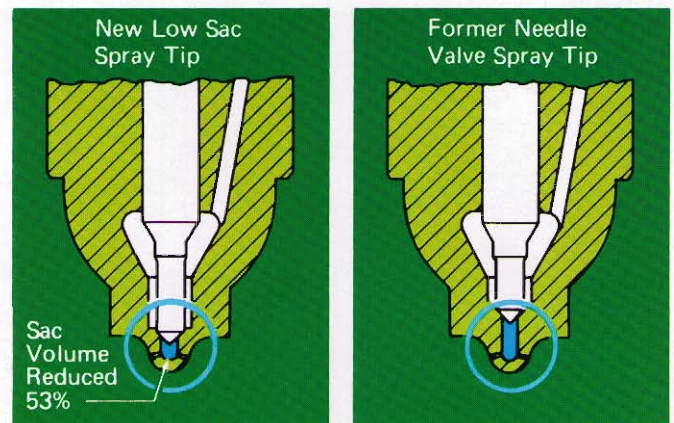
These emission reductions are based on a comparison of a new "old design" needle valve injector to a new "LOW SMOKE" design injector. Considerably greater improvements are realized when "old design" needle valve injectors with accumulated mileage or hours are replaced with LOW SMOKE injectors.

These same reductions in exhaust smoke and emissions can be expected in Model 567 engines with the application of current production power packs containing the raised ring belt piston and the wide port cylinder liner.

While the 50% reduction in smoke, 50% reduction in hydro-carbons and 21% reduction in carbon monoxide is significant, current research programs are aimed at continuing reduction of these emissions and the control of oxides of nitrogen.

EMD'S LOW SAC Spray Tip— The key to Emission Control

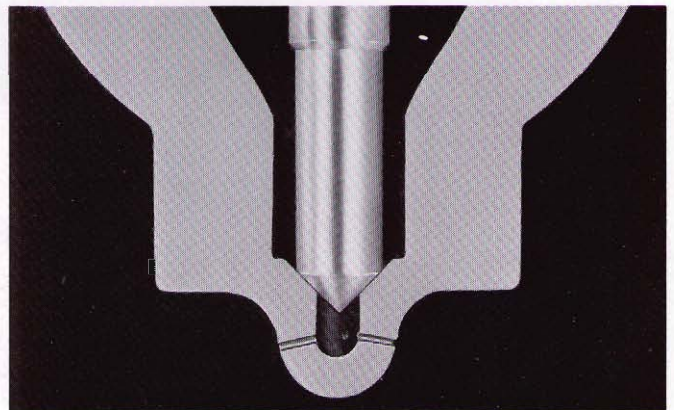
The LOW SAC spray tip reduces the sac volume below the needle valve seat by 53%—thereby reducing the potential after-dribble of fuel which causes smoke and undesirable emissions.



LOW SAC Spray Tip Lengthens Injector Life

Since orifice wear usually determines the useful life of a spray tip, an improved manufacturing process was adopted to produce the injector orifices.

This technique utilizes electrical discharge machining (EDM) which produces a straighter and sharper orifice than holes produced by drilling, thereby extending the life of the spray tip.



AN ANSWER TO YOUR SMOKE AND EMISSION PROBLEMS

Conversion Kits

For those customers who do their own injector remanufacturing, EMD has LOW SMOKE conversion kits available for reworking worn and outdated components.

New Replacement Parts

To aid in the national effort to improve the ecology, all needle valve spray tips, conversion kits and injectors sold by Electro-Motive are of the LOW SAC-LOW SMOKE design.

Interchangeability

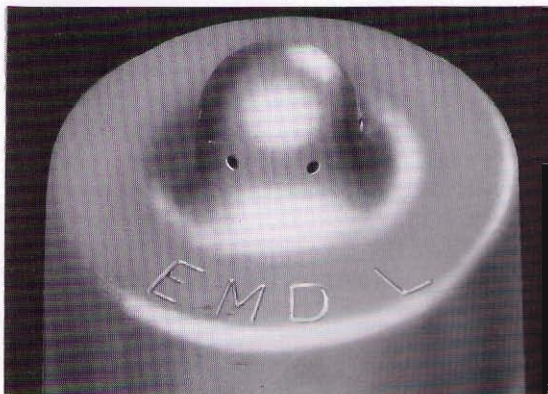
LOW SAC spray tips are designed to replace the original needle valve spray tips in all 567 and 645 needle valve injectors. The spray tip assembly is completely interchangeable. The new injectors may be intermixed in engines.

Converted Injectors

Injectors that have been converted to use other design spray tips will require a new injector nut and associated parts to accept the LOW SAC spray tip and achieve the benefits of the LOW SMOKE injector.

Identification

The LOW SAC spray tips have a 90° seat angle, "EMDL" stamped on the tip end and a .400" diameter counterbore on top of the spray tip to ensure proper identification. Rebuilt injectors containing the LOW SAC tip have an "L" stamped on the top of the injector stud where the fuel connection is made.



REMANUFACTURING SERVICES

REMANUFACTURING SERVICES Remanufacture and Return Only

LOW SMOKE SPRAY TIP ASSEMBLIES

ENGINE APPLICATION	REMANUFACTURING SERVICE	PART NO.	NUMBER SPRAY HOLES
567 Normally Aspirated; 567D1, D2, D3, D3A; 645E, E4	New Needle & Remfg. Spray Tip	5229293	6
567D2, D3, D3A; 645E, E1, E2, E6, E8	New Needle & Remfg. Spray Tip	5229333	5
645E3, E4, E5, E7, E9	New Needle & Remfg. Spray Tip	5229413	6
645E3A	New Needle & Remfg. Spray Tip	5229817	7
645E3A (F40PH-RTA); 645E3B, 645F3	New Needle & Remfg. Spray Tip	5229819	6

BODY CONVERSION-567 ONLY

ORIGINAL PART NO.	REMANUFACTURED PART NO.	FUEL OUTPUT
5226726 Body (Low-Without Slide)	5228845	Low to Medium
5226726 Body (Low-Without Slide)	5228847	Low to High
5228761 Body (Medium-With Slide)	5228852	Medium to High
5228245 Body (Medium-Without Slide)	5228852	Medium to High
5228759 Body (Low-With Slide)	5228845	Low to Medium
5228759 Body (Low-With Slide)	5228847	Low to High

BODY CALIBRATION SLIDE APPLICATION-567 ONLY

ORIGINAL PART NO.	REMANUFACTURED PART NO.	FUEL OUTPUT
5226726 Body	5228826	Low
5228245 Body	5228827	Medium
5228504 Body	5228828	High

BODY CONVERSION AND SLIDE APPLICATION-567 ONLY

ORIGINAL PART NO.	REMANUFACTURED PART NO.	FUEL OUTPUT
5226726 Body	5228930	Low to Medium
5226726 Body	5228849	Low to High
5228245 Body	5228854	Medium to High

INJECTOR NUT-SPHERICAL VALVE TO NEEDLE VALVE TYPE

ORIGINAL PART NO.	REMANUFACTURED PART NO.	FUEL OUTPUT
5226573 Nut	5228757	

PLUNGER-BRUSHING ASSEMBLIES

ENGINE APPLICATION	REMANUFACTURED PART NO.	FUEL OUTPUT
567 Normally Aspirated	5228288	Low
567 and 645 Normally Aspirated	5228354	Medium
567 Turbocharged	5228581	High
645E3, E4, E5, E7, E9	5228948	-
645E3A, E3B, E4, E7 (20Cyl.) 1/2" Dia. Plunger	5229123	-
645E3A (F40PH-RTA); 645F3 1/2" Dia. Plunger	5229711	-

INSTALL EMD LOW SMOKE UNIT EXCHANGE INJECTORS

Install EMD LOW SMOKE Unit Exchange Injectors

The fastest and most economical method of converting your worn injectors to LOW SMOKE injectors is to place a Unit Exchange order at your nearest Electro-Motive Parts Center.

All Unit Exchange injectors shipped by Electro-Motive are LOW SMOKE injectors equipped with LOW SAC

spray tips to bring you the ecological benefits and a substantially increased service life.

Electro-Motive's remanufacturing service provides quality workmanship, quality EMD parts, and the latest testing procedures to ensure that Unit Exchange injectors provide long, trouble-free, low smoke service.

NEEDLE VALVE INJECTOR ASSEMBLIES

ENGINE APPLICATION	LOW SMOKE INJECTOR WITH CALIBRATION SLIDE			LOW SMOKE SPRAY TIP ASY.	
	MAX. CU. MM. OUTPUT	NEW	UNIT EXCHANGE	NEW	NUMBER SPRAY HOLES
All 567 with 20-Port Liners-800 RPM	600	5229295	8478049	5229235	6
All 567 with 20-Port Liners-835 RPM	700	5229290	8478048	5229235	6
567, A, B, BC, C with 15-Port Liners-835 RPM or less	600	5229500	9081163	5229260	6
567C (835 RPM or less) and 567D1 with 15-Port Liners	700	5229510	9081164	5229260	6
567D2, D3, D3A, D4, D5, D6-835 RPM or 900 RPM	750	5229310	8478051	5229195	5
567D4, 567ED4-750 RPM or less	750	5229305	8478050	5229260	6
645E, E1, E2, E6, E8	700	5229200	8478045	5229195	5
645E Engines in High Altitude Operation	700	5229290	8478048	5229235	6
645E-835 RPM or Less-567 Engine Replacement	700	5229510	9081164	5229260	6
645E3, E4, E5, E7, E9	850	5229250	8478046	5229230	6
16-645E3A (F40PH Loco.-RTA); 645F3	920	5229710	9333858	5229275	6
16, 20-645E3A; 8, 20-645E3B	875	5229320	8478053	5229265	7
12, 16-645E3B	875	5229335	8478055	5229275	6
645E4-750 RPM or Less	850	5229315	8478052	5229235	6
645E4 and 20-645E7-750 RPM or Less	875	5229325	8478054	5229270	7

CONVERSION KITS

SPHERICAL VALVE TO NEEDLE VALVE KIT (Nut, Spacer, Check Valve, Cages, Spring, Seat, Spray Tip Asy.)	CONVERSION KIT PART NO.	SPHERICAL VALVE TO NEEDLE VALVE KIT (Same as 5229392 and 5229394 less Nut)	CONVERSION KIT PART NO.
567 and 645 Normally Aspirated Engines-6 Hole Spray Tip	5229392	567 and 645 Normally Aspirated Engines-6 Hole Spray Tip	5229248
567 and 645 Normally Aspirated Engines-5 Hole Spray Tip	5229394	567 and 645 Normally Aspirated Engines-5 Hole Spray Tip	5229246

NEEDLE VALVE INJECTOR REPAIR KITS

APPLICATION	REPAIR KIT PART NO.	APPLICATION	REPAIR KIT PART NO.
BASIC KIT (Seal, Spring, Gaskets, Filters)		REPAIR KIT WITH SPRAY TIP ASY. (Filters, Seal, Spring, Gaskets, Spray Tip Asy.)	
567 and 645 Engine Injectors	5228836	Injector Assembly 5229200, 5229300, 5229310	5229238
		Injector Assembly 5229285, 5229290, 5229295, 5229315	5229288
		Injector Assembly 5229500, 5229510	5229704
		Injector Assembly 5229250	5229258
		Injector Assembly 5229325, 5229330	5229326
		Injector Assembly 5229320	5229321
		Injector Assembly 5229335, 5229710	5229336
		REPAIR KIT LESS SPRAY TIP ASY. (Spacer, Check Valve, Cages, Spring, Seat)	
		567 and 645 Engine Injectors	5229779



ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS 60525

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