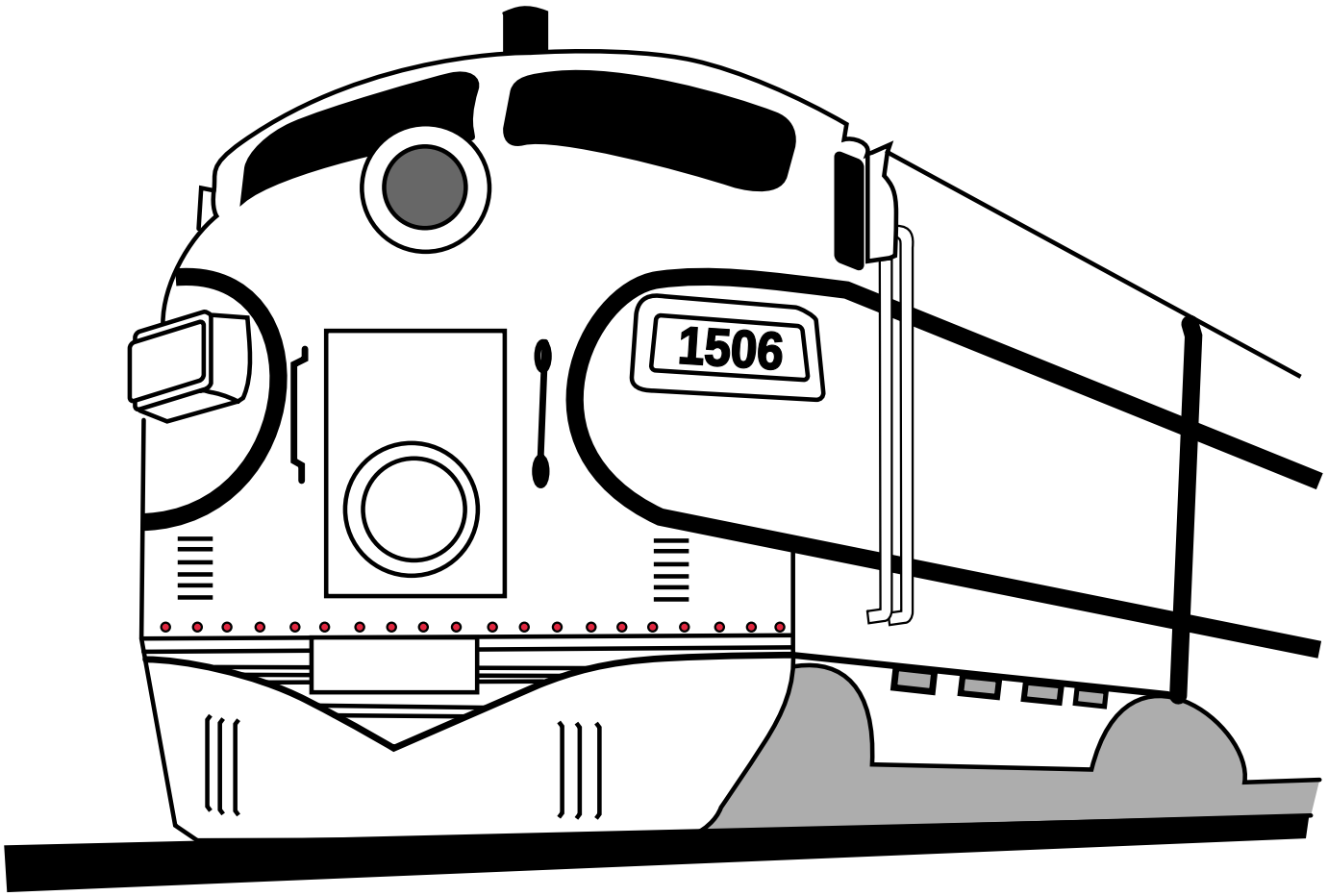
LOCOMOTIVE-TYPE SPARK ARRESTERS



STANDARDS FOR LOCOMOTIVE-TYPE SPARK ARRESTERS

Locomotive-type spark arresters are tested in accordance with the latest revision of the Association of American Railroads (AAR) Recommended Practice RP-557, "Spark Arresters for Non-turbocharged Diesel Engines Used in Railroad Locomotives", Society of Automotive Engineers (SAE) Recommended Practice J342, “Spark Arrester Test Procedure For Large Size Engines,” SAEJ997, "Spark Arrester Test Carbon", and USDA Forest Service Standard 5100-1c, “Spark Arresters for Internal Combustion Engines.”

These Standards and procedures establish the minimum performance and maintenance requirements for locomotive-type spark arresters.

EXTERNAL ARRESTERS are those designed to be installed on the locomotive exhaust stack or stacks. They may be inside or outside the engine compartment. SAE J350 or Forest Service Standard 5100-1c test procedures are used for this type arrester.

INTERNAL or MANIFOLD-TYPE ARRESTERS make use of the engine manifold and are installed below the locomotive profile. This type arrester is tested against SAE J342 or ARR Recommended Practice, RP-557.

LOCOMOTIVE-TYPE SPARK ARRESTER INSPECTION PROCEDURES

1. Look for the locomotive manufacturer’s name on the locomotive frame below the cab.

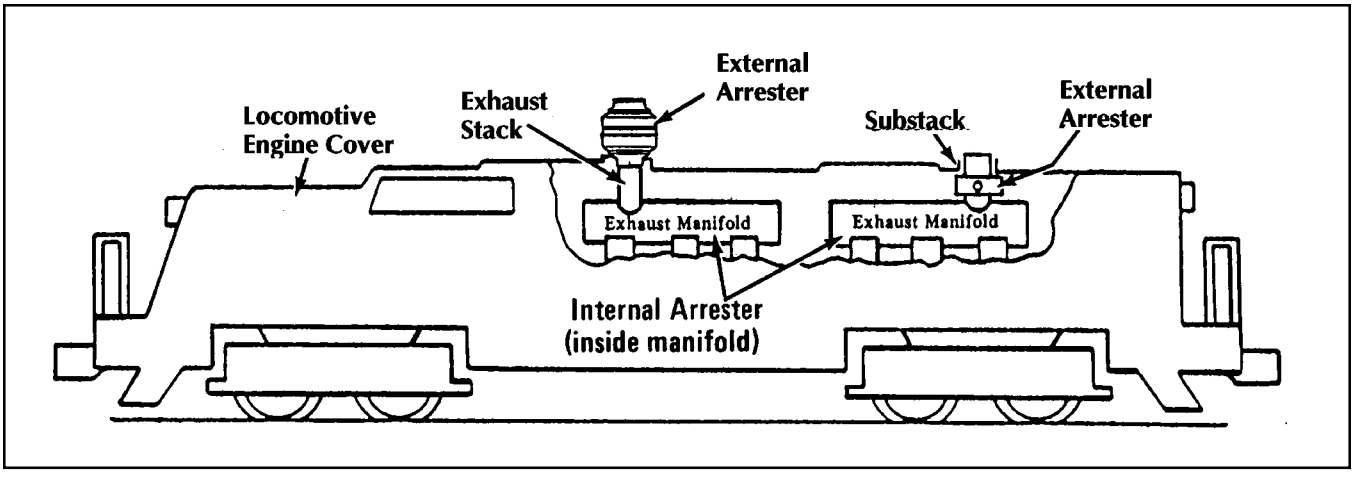
Note:

- Newer General Electric (GE) locomotives are all turbocharged.
- Electro-Motive Division (EMD) locomotives can be both turbo- and nonturbocharged, with and without a muffler.
- You will occasionally inspect an older locomotive of some other brand. The inspection procedures are similar. Determine if it is turbo- or nonturbocharged and if an arrester is needed or not.

2. If it has an arrester, look for the manufacturer’s name and model number on the body of the arrester. They **must** be stamped on the metal body or on an attached metal plate. Internal arresters **must** be stamped in the metal body or on an attached metal plate affixed to the manifold.

3. If identification is established, then check the “Qualified and Rated” list.

4. If the arrester cannot be identified *(i.e., tag missing)*, determine if the arrester is an internal arrester *(manifold type)*, or an external arrester *(generally mounted on the exhaust stack).*



TYPICAL LOCOMOTIVE
Location of Internal and External Spark Arresters

5. Then turn to the locomotive identification section and check the illustrations for configuration of body type to identify make and model possibilities.

6. Check the “Qualified and Rated” pages to determine if it is qualified.

*(**Note:** The two most often found are FARR and HAPCO.)*

Inspection

1. Turbocharged Locomotives
   - Inspect for carbon build-up on the eductor tubes and exhaust stack *(no arrester is required).*

   •On muffler equipped locomotives,you will have to remove or have the eductor removed for inspection.

   *(**Note:** The locomotive will have one exhaust stack.)*

2. Nonturbocharged Locomotives
   - Inspect for correct application of arrester.

   - Arrester properly cleaned and maintained.

- Exhaust system in good order.

*(**Note:** The locomotive can have up to four exhaust outlets and will require up to four spark arresters).*

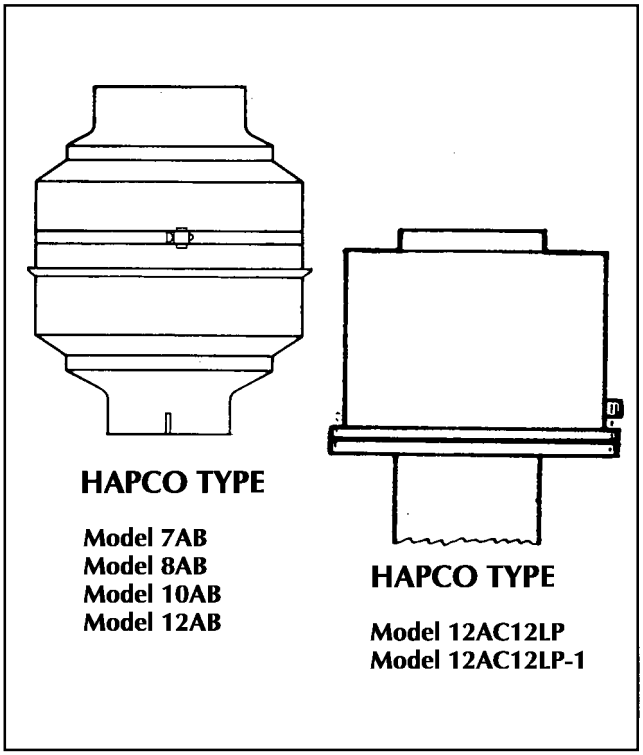
3. Steam Powered Locomotives
   •Inspect for a screen over the entire exhaust stack that has been maintained in good order. Check your agency rules and regulations.

4. Tools needed for an inspection:
   - Miscellaneous hand tools
   - Coveralls
   - Gloves
   - Goggles
   - Flashlight
   - Mirror
   - Carbon particle collection containers.

More detailed instructions are found in the NWCG publication “Railroad Inspection Handbook", and the NWCG video, "Spark Arresters and the Prevention of Wildland Fires".

Identification Key

EXTERNAL SPARK ARRESTERS are fitted to the exhaust stack of a conventional locomotive exhaust manifold. They are identified by the manufacturers name and model number.

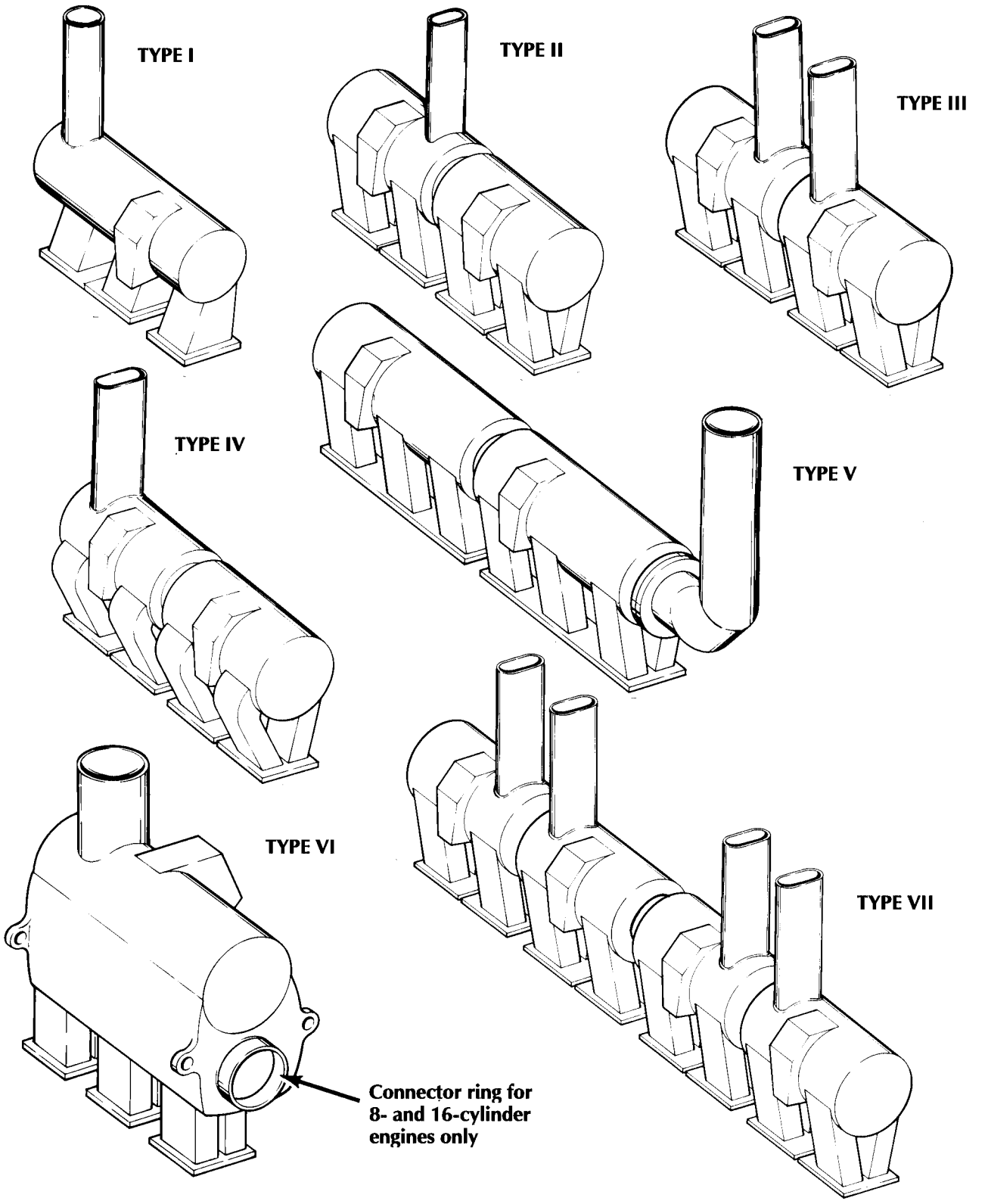


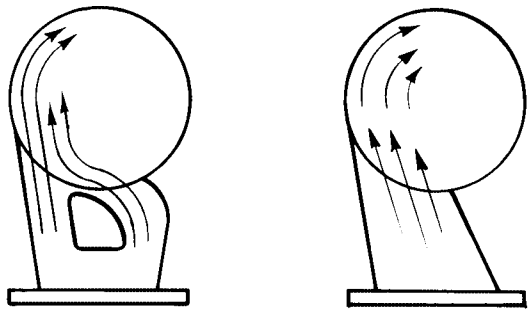
INTERNAL OR MANIFOLD-TYPE

Spark arresters have seven basic body variations referred to as Types I through VII. Each of these body types may use one or more of four leg configurations referred to as A-swirl leg, B-bent leg, C-straight leg, or D-short straight leg. *See the following pages for illustrations.*

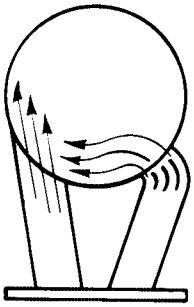
Qualified internal arresters may be redesigned manifolds or they may be originally designed as spark arrester manifolds. They can have any combination of body type and leg configuration as shown on the following pages and as listed on the individual qualification.

The appropriate model number will appear on the spark arrester name plate and correspond to drawing numbers on file at SDTDC.

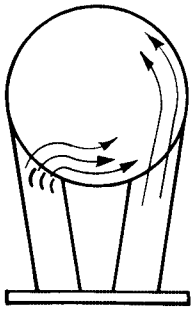

TYPE I
TYPE II
TYPE III
TYPE IV
TYPE V
TYPE VI
TYPE VII
Connector ring for 8- and 16-cylinder engines only



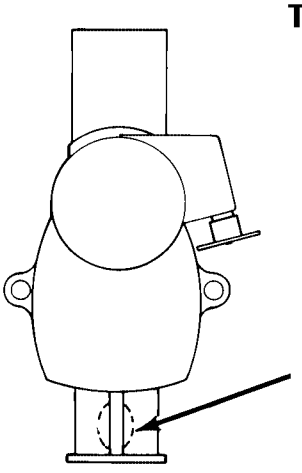
TYPE A SWIRL



TYPE B BENT



TYPE C STRAIGHT



TYPE D SHORT STRAIGHT

2000 QUALIFIED LIST—LOCOMOTIVE

	MFG	Model Number	Body Type	Leg Type	Remarks
1	BUR	GN7	IV	C	Unit consists of two sections combined.
2	BUR	GN8	IV	C	Two stacks near center.
3	EMD	EMD 32379	II	C	For GP-7 only. Two units, one with exhaust
		(Discontinued)	(with stack)	(with stack)	stack and one without exhaust stack make a set.
4	EMD	EMD 32379B	II	C	~
		continued	(w/o stack)		
5	EMD	EMD 32379A	II	C	For GP-7,GP-9,GP-18,GP-28 & GP-38. Two units,
		continued	(with stack)		one with exhaust stack and one without stack make a set.
6	EMD	EMD 32379AB	II	C	~
		continued	(w/o stack)		~
7	EMD	EMD 32379SDA	IV	C	For SD-7 & SD-9 with dynamic brake. Two units,
		continued	(with stack)		one with exhaust stack and one without stack, make a set.
8	EMD	EMD 32379SDAB	IV	C	~
		continued	(w/o stack)		~
9	EMD	EMD 44379	II	C	For GP-38, two units, one with exhaust stack
		continued	(with stack)		and one without stack, make a set.
10	EMD	EMD 44379B	II	C	~
		continued	(w/o stack)		~
11	EMD	EMD 8426352	I	A	Two sections form unit for half of 16
		continued	(with stack)		cylinder engine. Two stacks at opposite ends.
12	EMD	EMD 8426353	I	A	~
		continued	(w/o stack)		~
13	EMD	EMD 8426353	I	A	Two sections form unit for half of 16
		continued	(w/o stack)		cylinder engine. Two stacks at opposite ends.
14	EMD	EMD 8426354	I	A	~
		continued	(with stack)		~
15	EMD	EMD 8426353	I	A	Two sections form unit for half of 16
		continued	(w/o stack)		cylinder engine. Two stacks at opposite ends.
16	EMD	EMD 8426355	I	A	~
		continued	(with stack)		~
17	EMD	EMD 8426356	I	A	Two sections form unit for half of 12
		continued	(with stack)		cylinder engine. Two stacks at opposite ends.
18	EMD	EMD 8426356	I	A	~
		continued	(with stack)		~

2000 QUALIFIED LIST—LOCOMOTIVE					
	MFG	**Model Number**	**Body Type**	**Leg Type**	**Remarks**
19	EMD	EMD 9093985 continued	I (with stack)	A	Two sections form unit for half of 16 cylinder engine. Two stacks at opposite ends.
20	EMD	EMD 8426353 continued	I (w/o stack)	A	~ ~
21	EMD	EMD 9093986 continued	I (with stack)	A	Two sections form unit for half of 16 cylinder engine. Two stacks at opposite ends.
22	EMD	EMD 8426353 continued	I (w/o stack)		~ ~
23	EMD	EMD 9093983 continued	I (with stack)	A	Two sections form unit for half of 16 cylinder engine. Two stacks at opposite ends.
24	EMD	EMD 8426353 continued	I (w/o stack)	A	~ ~
25	EMD	EMD 9093984 continued	I (with stack)	A	Two sections form unit for half of 12 cylinder engine. Two stacks at opposite ends.
26	EMD	EMD 9093984 continued	I (with stack)	A	~ ~
27	EMD	EMD 9501801C continued	VI	D	For 8-645 engine -1 spark arrester unit** with 2-leg manifold connector.
28	EMD	EMD 9501801C continued	VI	D	For 16-645 engine - 2 spark arrester units** with 4-leg manifold connector.
29	EMD	EMD 9515814A	VI	D	For 12-645 engine - 2 independent spark arrester units.**
30	EMD	EMD 9530989	VI	D	For 6-567A thru 6-567C engines - 1 spark arrester unit.**
31	EMD	EMD 9530989	VI	D	For 12-567A thru 12-567C engines - 2 independent spark arrester units*
32	EMD	EMD 9531223 continued	VI	D	For 8-567A thru 8-567C engines - 1 spark arrester unit** with 2-leg manifold connector.
33	EMD	EMD 9531223 continued	VI	D	For 16-567A thru 16-567D engines - 2 spark spark arrester units** with 4 leg manifold connector.
34	FAR	C-37223***	I	C	Spark Arrester has 6 legs.
35	FAR	C-37247***	I	C	~
36	FAR	C-42317***	II	A	May not be marked with Farr No. 5
37	FAR	C-43888***	III	A	~
38	FAR	C-51994***	II	A	May not be marked with Farr No. 5
39	FAR	C-58151***	I	C	One round stack.
40	FAR	C-70899***	VII	C	Four oval stacks, manifolds are interconnected.

2000 QUALIFIED LIST—LOCOMOTIVE					
	MFG	Model Number	Body Type	Leg Type	Remarks
41	FAR	C-71088*** continued	III & VII	C	Four oval stacks, one at each end and two adjacent stacks in the center, manifolds are interconnected.
42	FAR	C-71372***	VII	C	Four oval stacks, manifolds are interconnected.
43	FAR	C-78327	VII	C	Same as C-70889, with side clean-out spark traps.
44	FAR	C-95248 continued	I	C	Same as C-37223, except with a thicker base plate and side clean-out spark traps, with a removable cover for trap cleanout.
45	FAR	C-95248*** continued	I	C	Same as C-37223 with thicker base plate and removable cover for trap clean-out.
46	FAR	C-95248-C	I	C	Same as C-37223, with Heavy Duty side clean-out spark trap.
47	FAR	C-95248-D	I	C	Same as C-37223, with Heavy Duty side clean-out spark trap.
48	FAR	C-95248-E continued	I	C	Same as C-37223, with increased capacity side clean-out trap and a thicker base plate.
49	FAR	D-35001***	II	C	~
50	FAR	D-36781***	V	C	~
51	FAR	D-37458***	I	B	~
52	FAR	D-37819***	II	B + C	~
53	FAR	D-38040***	V	B + C	~
54	FAR	D-38100***	IV	C	~
55	FAR	D-38101***	IV	B + C	~
56	FAR	D-38370***	II	C	~
57	FAR	D-40791***	I	A	~
58	FAR	D-40841***	I	A	~
59	FAR	D-41275***	III	C	~
60	FAR	D-41431***	I	A	End view looks like bent leg (waterpipe opening)
61	FAR	D-45312***	II	C	~
62	FAR	D-45313	IV	C	Side clean-out spark traps.
63	FAR	D-46091	II	C	Side clean-out spark traps.
64	FAR	D-46181	IV	C	Side clean-out spark traps.
65	FAR	D-46665***	II	A + C	~
66	FAR	D-47290***	II	C	~
67	FAR	D-47910	II	C	Side clean-out spark traps.
68	FAR	D-48747	II	A + C	Side clean-out spark traps.
69	FAR	D-49209***	I	C	~

2000 QUALIFIED LIST—LOCOMOTIVE					
	MFG	Model Number	Body Type	Leg Type	Remarks
70	FAR	D-50318***	II	C	~
71	FAR	D-50590	III	C	Side clean-out spark traps.
72	FAR	D-52151***	II	B	~
73	FAR	D-52179	IV	C	Side clean-out spark traps.
74	FAR	D-52190	II	C	Side clean-out spark traps.
75	FAR	D-52236***	V	C	Four oval stacks, manifolds are not interconnected.
76	FAR	D-52632	III	C	Side clean-out spark traps.
77	FAR	D-53043***	V	C	~
78	FAR	D-53104***	II	C	~
79	FAR	D-53347***	II	C	~
80	FAR	D-53355***	II	B	~
81	FAR	D-53415***	IV	C	P~
82	FAR	D-53934	II	C	Side clean-out spark traps.
83	FAR	D-54500	IV	C	Side or bottom clean-out spark traps.
84	FAR	D-54501	II	C	Side or bottom clean-out spark traps.
85	FAR	D-54502	II	C	Side or bottom clean-out spark traps.
86	FAR	D-54503	IV	C	Side or bottom clean-out spark traps.
87	FAR	D-54504	II	C	Side or bottom clean-out spark traps.
88	FAR	D-54505	IV	C	Side or bottom clean-out spark traps.
89	FAR	D-58438***	IV	C	One round stack.
90	FAR	D-59286***	IV	C	One round stack, standard EMD manifold.
91	FAR	D-62777	II	C	One oval stack, quick-opening side clean-out spark trap.
92	FAR	D-62778	IV	C	One oval stack, quick-opening side clean-out spark trap.
93	FAR	D-65800***	IV	C	One round stack, manifolds connected by a flex-joint connector.
94	FAR	D-66531***	IV	B or C	One oval stack.
95	FAR	D-66541***	IV	C	One oval stack.
96	FAR	D-69642*** continued	III	C	Two oval stacks located in the middle, manifolds are not interconnected.
97	FAR	D-71303***	VII	C	Four oval stacks, manifolds are interconnected.
98	FAR	D-72221***	VII	A	Four oval stacks, manifolds are interconnected.
99	FAR	D-72222***	II	A	Two rectangular stacks, manifolds are interconnected.
100	FAR	D-72687***	IV	B&C	Same as D-38101 with flex joint in place of band clamp.
101	FAR	D-72698***	III	B or C	Four oval stacks, manifolds are not interconnected.
102	FAR	D-72704***	III	B or C	Four oval stacks, manifolds are not interconnected.

2000 QUALIFIED LIST—LOCOMOTIVE

	MFG	Model Number	Body Type	Leg Type	Remarks
103	FAR	D-73358***	VII	C	Approved as D-71303.
104	FAR	D-75318***	III	C	Approved as D-69642.
105	FAR	D-78348	V	C	Same as D-53043 with flex joint & bottom clean-out spark traps.
106	FAR	D-96702*** continued	II	C	Same as D-52190 with a side clean-out spark trap, a thicker mounting flange base plate and a removable cover for trap clean out.
107	FAR	D-96702 continued	II	C	Same as D-52190 with thicker base plate and removable cover for trap clean-out.
108	FAR	D-99346*** continued continued	III	C	Same as D-69642 except for increased thickness of the base plate and the distance from centerline of the stack to the manifold is reduced to 2.89 inch.
109	FAR	D-99346*** continued	III	C	Same as D-69642 with thicker base plate and a reduced distance from centerline of the stack to the end of manifold.
110	FAR	D-111513 continued continued	III	C	Same as D-69642 with an increased capacity side clean-out trap, a thicker base plate and a removable cover for trap clean-out.
111	FAR	D-111513*** continued	III	C	Same as D-69642 with thicker base plate and removable cover for trap clean-out.
112	FAR	D-111639 continued	III	C	Same as D-69642 with removable cover for trap clean-out, and reduced distance from the stack centerline to the manifold.
113	FAR	D-111639*** continued continued	III	C	Same as D-69642 with removable cover for trap clean-out and a reduced distance from the stack centerline to the end of the manifold.
114	FAR	D-116089 continued	III	C	Same as D-69642 with removable cover for trap clean-out on opposite sides of the manifolds.
115	FAR	D-116089*** continued	III	C	Same as D-69642 with removable cover for trap clean-out on opposite sides of the manifolds.
116	HAR	HAPCO 7 AB*	External	N/A	Single inlet fits on exhaust stack.
117	HAR	HAPCO 7 AC 1* continued	External	N/A	Single inlet fits on exhaust stack with a Horizontal or Vertical application.
118	HAR	HAPCO 8 AB*	External	N/A	Single inlet fits on exhaust stack.
119	HAR	HAPCO 10 AB*	External	N/A	Single inlet fits on exhaust stack.
120	HAR	HAPCO 12 AB*	External	N/A	Single inlet fits on exhaust stack.
121	HAR	HAPCO 12 AC12LP*	External	N/A	Single inlet, fits on a round or oval exhaust stack.
122	HAR	HAPCO 12 AC12LP-1*	External	N/A	Single inlet, fits on a round or oval exhaust stack.

2000 QUALIFIED LIST—LOCOMOTIVE

	MFG	Model Number	Body Type	Leg Type	Remarks
123	PEN	C-466143-C	II	C	For EMD GP-9, RR class ERS 17.
124	SPR	PT1	III	B	For GP-9 (Discontinued model).
125	SPR	PT 11	I	B	For SD-9 (Discontinued model).

A description of the terms used in the Locomotive Spark Arrester Update table follows:

MFG — *Manufacturer*

FAR — *Farr Company—Model 5 Locomotive Spark Arresters; Not all Farr Model 5 exhaust devices are qualified Locomotive Spark Arresters, only the Farr Model 5 model numbers listed on this qualified list.*

Footnotes—

* = *Harco series are external spark arresters designed to be installed on standard locomotive manifold stacks. The back pressure of an external arrester is additive to that of the manifold. Users of external arresters should measure maximum manifold leg backpressure with the arrester installed to make certain it does not exceed the 3 1/2 inches of mercury backpressure limit, specified by the AAR Recommended Practice RP-557, "Spark Arresters For Non-Turbocharged Diesel Engines in Railroad Locomotives."*

** = *Spark arrester has 6 legs.*

*** = *All have bottom spark trap clean-outs.*

2000 LOCOMOTIVE TYPE
SPARK ARRESTERS MANUFACTURERS LIST

BUR = BURLINGTON NORTHERN, INC., Great Northern Railway

EMD = ELECTRO-MOTIVE DIVISION, General Motors

FAR = HARCO MANUFACTURING COMPANY

PEN = PENN CENTRAL TRANSPORTATION CO.

SPR = SOUTHERN PACIFIC RAILROAD

HELPFUL HINTS

***REMEMBER**:* The **RULE OF THREE** applies to Locomotive arresters, as well as General Purpose arresters. An approved arrester must have all of the following:

1. A manufacturer brand name/trademark.

2. A spark arrester model number.

3. A cleanout.

SUGGESTIONS

- If it is a turbo-charged locomotive, inspect the eductor tubes.

- If the locomotive is muffler equipped, the eductor must be removed for inspection.

- If not turbo-charged, then it has to have a spark arrester. There are less than a dozen brands of locomotive spark arresters in common use.

CHECK LIST

1. Has the locomotive been *BLUE FLAGGED** for safety while you conduct the inspection?

2. Make sure everyone who could move the locomotive knows you are conducting an inspection.

3. Always face the locomotive when climbing on or off the equipment.

4. A witness is very helpful when encountering violations.

5. Use a piece of chalk to write the locomotive number on the stack for documentation when taking photographs.

***Association of American Railroads requirement.**