(1) LAMINATED AND ELLIPTICAL SPRINGS, Manufacture of; Application of

Laminated and elliptical springs are to be made and applied strictly in accordance with drawings or specifications supplied by the Controlling officer.

Buckles must be centrally spaced and securely fixed on springs, care being taken before any spring is passed out of Workshops, to see that the buckle is correct to dimensions. Where a pin-hole is provided on a buckle, it is to be drilled (if new) or finally reamered (if a used buckle) after the spring has been assembled, to ensure that it is correctly located and in perfect alignment.

For the treatment of newly manufactured springs, see clause 6.

For the application of laminated springs to rolling-stock, see B.P. W. 30612.

For the application of elliptical springs to rolling-stock, see B.P.'s W. 30609 to 30611.

(2) LAMINATED AND ELLIPTICAL SPRINGS, Material for.

Material used in the manufacture of laminated and elliptical springs is to conform with group "C" on B.P. W. 15600. Spring buckles are to be made from material to group "J" on B.P. W. 15600, unless other material is specifically authorized.

(8) LAMINATED AND ELLIPTICAL SPRINGS, Repairing of.

All laminated ~~and elliptical~~ springs are to be sent to the Spring shop for examination or repairs, [when a loco is shopped for A or B repairs (rolling stock when in for a lift)]. If no loose buckles or broken leaves are detected, and the camber is correct, the springs are to be tested, and if complying with the test conditions (see clause 7) they need only be painted.

When springs require any new leaves, they are to be taken apart and new leaves made as required, and each complete spring with old and new leaves is to be reformed and retempered in accordance with clause 6.

Slack buckles are to be either renewed or retightened.

(4) COIL SPRINGS, Manufacture of; Application of.

Coil springs are to be made and applied strictly in accordance with drawings or specifications supplied by the Controlling Officer.

~~For the treatment of newly manufactured springs, see clause 6.~~ [CME.'s 24/563 of 24/11/55]

For the application of all rolling-stock coil springs, see B..P. W. 30608.

(5) COIL SPRINGS, Material for.

Material used in the manufacture of coil springs is to conform with group " D" on BP. W. 15600.

(6) SPRINGS, Treatment of.

	Laminated	Coil.
(a) Heat leaves or section to NOTE.-Any forging work that is necessary is to be carried out prior to this heating.	$1{,}650^0$ F.	$1{,}600^0$–$1{,}655^0$ F.
(b) Form leaves or wind coils.		
(c) Reheat to	$1{,}500^0$-$1{,}550^0$ F.	$1{,}450^0$-$1{,}500^0$ F.
(d) Quench in an approved soluble quenching oil. NOTE:- The temperature of the quenching oil must not exceed 150^0 F., and must be kept in circulation and cooled so that this temperature is not exceeded.		
(e) Draw back in an approved "draw-temp" to NOTE.-In drawing back, the complete set of leaves for any one laminated spring are to be immersed at the same time.	600 ^{0}- 650^0 F.	650^0-750^0 F.

[(a) Heat spring leaves to 1500 – 1550^OF.

(b) Form to shape in forming machine.

(c) Quench in oil.

(d) Draw back in approved "draw temp" to 600 – 650^OF.

NOTE: In drawing back, the complete set of leaves for any one laminated spring is to be immersed at the same time.]

{C.M.E.'s 24.563 of 24/11/55]

[(a) Heat to 1450^{O} – $1500\ ^{O}$F and form leaves.
(b) Reheat to 1450^{O} - $1500\ ^{O}$F and quench in an approved quenching oil.
The quenching oil should be maintained at a temperature between 90^{O} - $140\ ^{O}$F.
(c) Temper at 780^{O} – $800\ ^{O}$F. An approved draw tempering salt with a working range of 300^{O} - $1000\ ^{O}$F shall be used.
NOTE: Leaves should be separated in the bath to allow a free flow of salt over all faces and leaves shall remain immersed for a minimum time of 15 minutes. After tempering the leaves shall have a Brinell hardness in the range 340 - 380.]

[C.M.E.'s 24/563 of 27/1/67]

(7) SPRINGS, Testing of.

Before new laminated or elliptical springs are used, or after laminated or elliptical springs have been repaired, they are to be tested by being deflected in a quick-acting scrag to an amount equal to $L^2 / (900\ t)$ in. (see table below), where L is the length of the top leaf in inches between bearings, and *t* is the thickness of the thickest leaf in inches. They shall then withstand being deflected again three times in quick succession, without showing any permanent set. The test deflection shall not at any time during manufacture be exceeded by more 15 per cent.

L in Inches.	REQUIRED DEFLECTION UNDER SCRAG IN INCHES				
	$^{3}/_{8}$ in Plate.	$^{7}/_{16}$ in Plate.	½ in Plate.	$^{9}/_{16}$ in Plate.	$^{5}/_{8}$ in Plate.
	Inches.	Inches.	Inches.	Inches.	Inches.
60	$10^{5}/_{8}$	$9^{1}/_{8}$	8	$7^{1}/_{8}$	$6^{3}/_{8}$
54	$8^{5}/_{8}$	$7^{3}/_{8}$	6½	5¾	$5^{1}/_{8}$
48	$6^{7}/_{8}$	$5^{7}/_{8}$	$5^{1}/_{8}$	4½	$4^{1}/_{8}$
42	5¼	4½	$3^{7}/_{8}$	3½	$3^{1}/_{8}$
36	$3^{7}/_{8}$	3¼	$2^{7}/_{8}$	2½	2¼
30	$2^{5}/_{8}$	2¼	2	1¾	$1^{5}/_{8}$

Each coil spring shall be tested by being fully compressed five times in succession by a quick-acting scrag, after which the free height shall not exceed that specified by more than 1 per cent., nor shall it be less than that specified by more than half this tolerance.

(S) SPRINGS, Painting of.

After springs have been manufactured or repaired, they are to be wiped clean and painted all over with one coat of Japan Black, or an approved rust preventive.

(9) SPRINGS, Inspection of.

Locomotive Foremen are responsible for the regular examination and maintenance of the correct alignment of springs on locomotives and tenders at the respective depots.

Car and Wagon Inspectors are responsible for the regular examination of all rolling-stock spring gear on their section.