State of Illinois
Department of Transportation
Division of Highways
Springfield

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SPECIFICATIONS
FOR
CUTTING EDGES FOR SNOWPLOWS

Serial Number: M50-07

1. *Material:* The cutting edges shall be alloy steels meeting the approval of the Department. The steels shall be melted by the electric-furnace, basic-oxygen or other similar commercially accepted steel making process, and may be either ingot cast or strand cast. The manufacturer shall have the option to fabricate and machine the blades in the as-rolled or annealed condition, and then subsequently quench and temper the steel to meet the requirements of this specification.

2. *Chemical Composition:* The cutting edges shall be made of one or more of the following approved alloy steels, listed in numerical order. Their respective chemical compositions shall conform to the following requirements*:

Alloy Name	%C	%Mn	%P	%S	%Si	%Cr	%Ni	%Mo
SAE 1330[D]	0.28-0.33	1.60-1.90	0.035 max	0.040 max	0.15-0.35	[A]	[B]	[C]
SAE 15B30 modified[E]	0.28-0.34	1.00-1.30	0.025 max	0.050 max	0.15-0.30	0.35-0.55	0.40 max	0.15 max
SAE 4130	0.28-0.33	0.40-0.60	0.035 max	0.040 max	0.15-0.35	0.80-1.10	[B]	0.15-0.25
SAE 8620	0.18-0.23	0.70-0.90	0.035 max	0.040 max	0.15-0.35	0.40-0.60	0.40-0.70	0.15-0.25
T-1 Type A (ASTM A514 Grade B)	0.12-0.21	0.70-1.00	0.035 max	0.035 max	0.20-0.35	0.40-0.65	[B]	0.15-0.25

*All alloys in the above table must be quenched and tempered in their final finished condition, and have a min CVN impact toughness of 25 ft-lbs at 32°F in the plate's rolling (longitudinal) direction. For the alloys listed in the above table, except for SAE 15B30, up to 0.35% copper is permitted in the heat analysis as scrap residual.

[A] Up to 0.20% chromium is permitted in the heat analysis as scrap residual.

[B] Up to 0.25% nickel is permitted in the heat analysis as scrap residual.

[C] Up to 0.06% molybdenum is permitted in the heat analysis as scrap residual.

[D] 0.04-0.08% vanadium is permitted.

[E] Boron, 0.00050-0.0020%; copper, 0.50% max; titanium, 0.007-0.030%; aluminum, 0.010-0.060%, nitrogen, 0.015% max; vanadium, 0.01% max.

If a special alloy steel is proposed, its composition shall be approved in writing by the Department prior to its use.

3. *Chemical Analysis:* A certified analysis of each heat of steel shall be furnished to the Department to verify the weight percentages of the elements specified in Paragraph 2. A product analysis of the cutting edge from an independent laboratory, in lieu of a heat analysis, can be furnished to the Department. The chemical composition shall be within the ranges for the elements specified in Paragraph 2, but can deviate within the permitted variations for the same elements as listed in Table B of ASTM Standard A 6, *General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.*

4. *Hardness:* The finished cutting edges shall have a Rockwell C Scale (R_c) hardness of not less than 25, nor more than 35. The corresponding Brinell hardness (BHN) range for a 3000 kg-f load and a 10 mm ball is 266 to 327 BHN. The Rockwell C or Brinell hardness shall be determined on a finished cutting edge in accordance with ASTM A 370 *Standard Test Methods and Definitions for Mechanical Testing of Steel Products.*

5. *Impact Toughness:* All cutting edges shall have a minimum average Charpy V-notch impact toughness of 25 ft-lbs at 32°F, based on a minimum of three test specimens. No single test value out of three or more specimens shall be less than 17 ft-lbs. Testing shall be in conformance with ASTM A 370. The Charpy V-notch test will not be required for blades that have a lifetime guarantee providing replacement for blades that are broken by impact.

6. *Dimensions:* The cutting edges shall conform to the Department's Code Numbers as shown on the drawings, or they shall fit the plow as identified by the manufacturer's name and model if the Code Number is not shown. For Code Number drawings, contact the Bureau of Materials & Physical Research, Engineer of Tests at 217 782-7200. Allowable tolerances for dimensions and holes shall in accordance with standard commercial practice. All snowplow blades shall be square edge flat unless otherwise specified.

7. *Finish:* The finished cutting edges shall be straight, free from observable flaws, voids, seams, large non-metallic inclusions, or other injurious defects. All finished or machined surfaces shall have a surface roughness not exceeding 125 microinches.

8. *Inspection:* All cutting edges shall be inspected by the Department for specification compliance. Inspection may be performed upon delivery, or if the Department elects, at the place of manufacture, whereby the inspector representing the Department shall have free entry to all parts of the plant related to that specific order of cutting edges.

9. *Marking:* The model of the plow on which the cutting edge is to be used, or the Code Number, shall be painted or labeled with 3-inch high letters or numbers on the front and back of each cutting edge.

10. *Holes:* All cutting edges shall be plasma or laser cut or punched to accept #3 countersunk head, square neck plow bolts. If the square holes exhibit any cutting protrusions or deformation lips, these raised hole edges shall be ground smooth to conform with the adjacent undeformed surfaces of the cutting edge. Holes may be punched in as-rolled or annealed alloy steels, and then subsequently heat treated to their final condition in order to meet this specification.

Effective February, 2007

This specification supersedes Serial Number M50-02, effective February 1, 2002.