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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Replacing GB/T 144-2013

Log inspection

原木检验

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1 Scope

The document lays down the dimensional measurement, quality inspection, measuring tools, log marking and log volume calculation of logs.

It applies to the fields of log production, circulation, use and supervisory inspection.

2 Normative references

Four undated references are cited: GB/T 155 on log defects, GB/T 4814 on log volume tables, GB/T 15787 on log inspection terminology, and LY/T 1511 on log products, marking and hammer branding.

3 Terms and definitions

The terms and definitions given in GB/T 155 and GB/T 15787 apply to the document; it defines none of its own.

4 Dimensional measurement

4.1 General. The steps and tolerances of the check length and check diameter of a log follow the provisions of the corresponding log product standard.

4.2 Length measurement. Length is measured in metres (m) to the centimetre (cm), anything short of 1 cm being discarded. The length of a log is measured straight at the shortest distance between the two end faces, as shown in Figure 1, whose key gives L as the length. Where the measured length is less than the check length laid down in the log product standard but is within the lower deviation, the check length of that standard still

applies; where it exceeds the lower deviation, the next check length down applies. Where a log has a butt-cut face, the length of the butt-cut part is discarded and the length measured straight, as shown in Figure 2.

4.3 Diameter measurement. Diameter is measured in centimetres (cm) to the millimetre (mm), anything short of 1 mm being discarded, and rounded to the centimetre where it is 14 cm or less. The check diameter is fixed by measuring the short diameter through the centre of the small end face and then measuring the long diameter through the centre of the short diameter at right angles to it, as shown in Figure 3, whose key gives d_1 as the short diameter and d_2 as the long diameter. Where the difference between long and short diameter is 2 cm or more, the check diameter is the mean of the two after stepping; where the difference is less than 2 cm, it is the short diameter after stepping. Bark and butt swell are always deducted when measuring diameter, short diameter and long diameter. Steps of the check diameter: for logs of 14 cm or less the step is 1 cm, a remainder of 0.5 cm or more moving up a step and less than 0.5 cm being discarded; for logs over 14 cm the step is 2 cm, a remainder of 1 cm or more moving up a step and less than 1 cm being discarded. Where the small end face is oblique, the steel rule is held perpendicular to the length when measuring diameter, as shown in Figure 4, whose key gives D as the diameter. Where the actual length exceeds the check length, the diameter is still measured at the small end face, as shown in Figure 5, whose key gives L_1 as the check length and D as the diameter. Where the small end face carries one-sided decay or outgrown bark and the diameter measurement has to pass through it, a steel rule may be laid flat across the surface of the log, as shown in Figure 6. Where a knot has fallen out of the small end face, the original shape is restored before measuring. For double-pith and three-pith logs and logs thin in the middle and thick at both ends, the diameter is measured at a normal part of the log, that is at the thinnest place, as shown in Figure 7, whose key gives D as the diameter at the thinnest place.

4.4 Measurement of special logs. For a forked log the diameter and length are measured on the fork with the larger end face and the other fork is treated as a knot, as shown in Figure 8, whose key gives L as the length and D as the diameter. Where the stems of two logs are joined together, each is measured and calculated separately, as shown in Figure 9.

4.5 Measurement of split logs, shattered logs included. For a split that has not fallen away, where the diameter measurement has to pass through the split and the smallest angle between the split and the direction of measurement is 45° or more, the perpendicular width at the half-length point of the split is deducted; where the smallest angle is less than 45° , half of that perpendicular width is deducted, as shown in Figure 10, whose key gives α_1 as the smallest angle at 45° or more, α_2 as the smallest angle below 45° , and D as the diameter. Where the split has fallen away at the small end, a split thickness not exceeding 10 % of the original diameter in the same direction is disregarded; above 10 % the check diameter is conceded, that is the short diameter is measured first, then the longest diameter perpendicular to it, and the mean of the two after stepping taken as the

check diameter, two or more splits being calculated separately, as shown in Figure 11, whose key gives P1 as a split thickness above 10 % of the original diameter, P2 as a split thickness at or below 10 %, d1 as the short diameter and d2 as the longest diameter. Where the split has fallen away at the large end, the short diameter of that face after stepping is disregarded if it is at or above the check diameter; if below, that stepped short diameter becomes the check diameter. Where splits are present at both large and small ends, each is dealt with under 4.5.1, 4.5.2 and 4.5.3.

4.6 Measurement of abrasion at the log ends or on the stem. Abrasion at the small end is dealt with under 4.5.2, abrasion at the large end under 4.5.3, and abrasion on the stem under 5.16.1.

5 Quality inspection

5.1 General. The permissible limits of the several log defects follow the corresponding log product standard. Where two or more defects, or the same defect at different places, are present when grading a log, the defect with the heaviest effect on the grade governs. Units of measurement are fixed as follows: the radius of a ring shake, the rise of an arc shake, the length of a longitudinal split, the rise of a bow, the horizontal length of the inner curve, the slope height of spiral grain, the radial depth of one-sided decay, the length of outgrown bark and the radial depth of external damage are all measured to the centimetre (cm), anything short of 1 cm being discarded; all other defects are measured to the millimetre (mm), anything short of 1 mm being discarded. Defects outside the check length are not counted, except unsound knots, heartwood decay and sapwood decay. Where a special product lays down otherwise, that provision applies.

5.2 Knots. Knot diameter is measured as the smallest diameter of the knot against the check diameter and expressed as a percentage, as shown in Figure 12, whose key gives d3 as the knot diameter. The starting point for counting knot diameter is a knot diameter of 30 mm or more where the check diameter is above 20 cm, and 20 mm or more where the check diameter is below 20 cm. For broadleaved trees, live knots, knots on the check length terminating line and knots on the end face are counted neither for diameter nor for number. For a live knot of a coniferous tree the diameter of the darker, harder part is measured. Where the base of a knot forms a raised boss, the diameter of the knot at a normal part above the boss is measured, as shown in Figure 13. Decay or a hollow on the end face of a live knot of a broadleaved tree is counted as a dead knot, the decay or hollow being adjusted to a circle and its diameter taken as the dead knot diameter, as shown in Figure 14, whose key gives d4 as the dead knot diameter. Defects at the large end fork junction are disregarded, as shown in Figure 15, whose key notes that the decay is not counted. Knot numbers are counted within the check length over whichever 1 m length carries the most knots, a knot straddling the boundary line at one end of that 1 m by less than half not being counted, as shown in Figure 16, whose key gives g as a knot not counted in the

number. In counting knots within 1 m, live knots, dead knots and unsound knots are added together for coniferous logs, and dead knots and unsound knots for broadleaved logs. Unsound knots are counted over the whole length whatever their diameter, and those within the check length also have their knot diameter calculated.

5.3 End splits. A single radial split is expressed as the width of the crack against the check diameter as a percentage; for compound radial splits the greatest crack width and the number of cracks are measured. Ring shakes and arc shakes on the end face are counted where the width at the widest part of the crack is 1 mm or more, and disregarded below 1 mm. Ring and arc shakes are expressed as the radius of the ring shake or the rise of the arc shake with the heaviest effect on the grade against the check diameter as a percentage, as shown in Figure 17, whose key gives r as the ring shake radius and h_1 as the arc shake rise. Where three ring or arc shakes pass through any 5 cm square on the end face, the log is graded on the ring or arc shake and then dropped one grade; a log graded third class drops to secondary processing log.

5.4 Longitudinal splits. A longitudinal split is expressed as the length of the crack against the check length as a percentage. Longitudinal splits on the stem are counted where the width is 3 mm or more on coniferous logs and 5 mm or more on broadleaved logs, and disregarded below those figures. Where two or more longitudinal splits on the stem are separated by less than 3 mm of wood they are merged and the length calculated as one; at 3 mm or more their lengths are calculated separately. A crack running in a spiral along the stem is measured for longitudinal split length in the direction of the length. A split log whose crack has not fallen away, the crack having no restriction on its starting point, is measured for split length in the direction of the length and graded as a longitudinal split. Resin streaks on the stem of pine and frost cracks on the stem of broadleaved trees are counted as longitudinal splits whether or not they are open. A burst crack is graded as a longitudinal split and then dropped one grade; a log graded third class drops to secondary processing log.

5.5 Bow. Bow is measured by drawing a straight line between the two ends of the log; the distance between the two points where that line touches the stem is the horizontal length of the inner curve, and the greatest rise of the bow is measured perpendicular to that horizontal line. Bow is expressed as the greatest rise against the horizontal length of the inner curve as a percentage, as shown in Figure 18, whose key gives l as the horizontal length of the inner curve and h_2 as the greatest rise of the bow. For multi-directional bow the greatest rise and the horizontal length of the inner curve are measured for each bow within the check length, and the bow with the heaviest effect on the grade governs. Knots, burls and the like are avoided when measuring the horizontal length of the inner curve and a normal part measured instead. Stem shape curvature formed by a double pith or by swelling is not counted as bow.

5.6 Spiral grain. Spiral grain is measured as the slope height from the start to the end of the