PD ISO/TS 19858:2015

BSI Standards Publication

Forestry machines — Portable chainsaws — Test method for evaluating saw chain oil lubricity

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Forestry machines — Portable chain-saws — Test method for evaluating saw chain oil lubricity

Machines forestières — Tronçonneuses portables — Méthode d'essai pour l'évaluation de la lubrication à l'huile de la chaîne de la scie

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Contents

Page

Foreword

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The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 17, *Manually portable forest machinery*.

Forestry machines — Portable chain-saws — Test method for evaluating saw chain oil lubricity

1 Scope

This Technical Specification defines test procedures for classifying the lubrication ability of saw chain lubrication oils when using guide bar and saw chain.

These test procedures create a reproducible replication of the stress conditions experienced by the saw chain and guide bar during sawing. The test shows the capacity of the lubricant for reducing the wear between friction partners.

This enables the manufacturers of chain saws to include specifications for recommended saw chain lubrication oils in the owner's manual.

The test rig is based on a design produced by the Swedish test commission Svensk Maskinprovning (SMP). The test procedures also take into account the long-term practical experience of the Kuratorium für Waldarbeit und Forsttechnik e.V (KWF) in testing bio-degradable chain lubrication oils.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2049, *Petroleum products — Determination of colour (ASTM scale)*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
saw chain without teeth
saw chain where the cutting links are replaced by links without tooth or bumpers

3.2
loading wheel
rubber coated wheel that applies the contact force to the saw chain from below

Note 1 to entry: See Figure 1.

4 Test rig

4.1 General

The test rig is designed so that the saw chain is driven by the rim sprocket. The saw chain speed is adjusted by controlling the output speed of the motor driving the sprocket. See Figure 1.

4.2 Major components

The major components include the following:

— power source and a connecting device that transfers rotational energy to the cutting attachment;

— means of attachment for the cutting attachment;

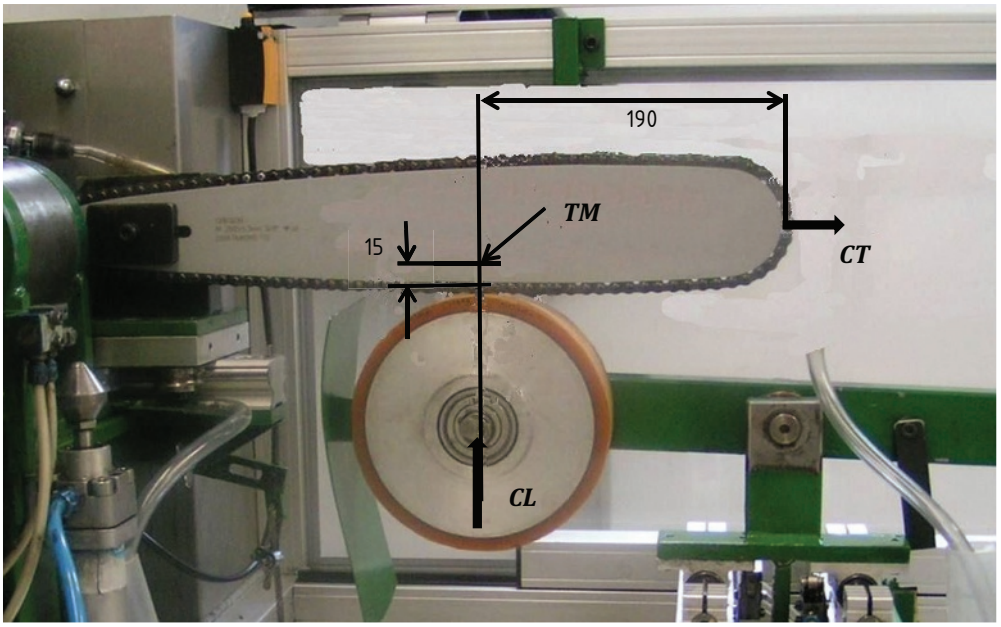
— loading wheel with a diameter of 185 mm ± 3 mm;

— cutting attachment comprising of the following:

  — a guide bar OREGON Laser Tip 16" with solid nose, Pitch: 3/8, Gauge: 0,05 ";

  — a saw chain without cutter or bumper links – Oregon TYP xxxLG GX 100R, number of rivets = 118;

  — Oil pump with an adjustable dosage of 1 ml/min to 10 ml/min, with precision ±0,1 ml/min.



Key

CL contact load; 50 N

CT chain tension; 80 N

TM measuring point temperature

Figure 1 — Test rig with cutting attachment and loading wheel

5 Test procedure

5.1 Chain extension after the run in period

Measure the chain extension after 10 min.

5.2 Chain extension and wear of the guide bar after the long duration test

The wear of the guide bar and the extension of the saw chain shall be measured after 180 min. The surface temperature of the guide bar shall be measured during the test.

The test shall be repeated with a new saw chain and new guide bar.

Before starting the tests and before measuring the guide bar wear and saw chain extension, both guide bar and saw chain must be cleaned with an ultra-sonic cleaner.

Table 1 — Test parameter

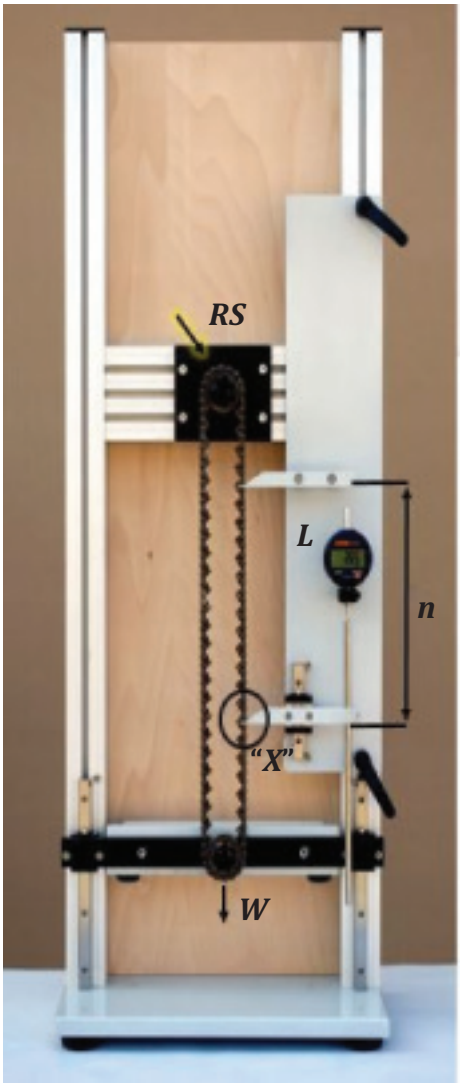
	Run time [min]	Chain speed [m/s]	Stretching force (F2) [N]	Loading force (N1) [N]	Lubricant flow [ml/min]
Run in period (5.1)	10	20	80	50	2
Long duration (5.2)	180	20	80	50	2

6 Measurements

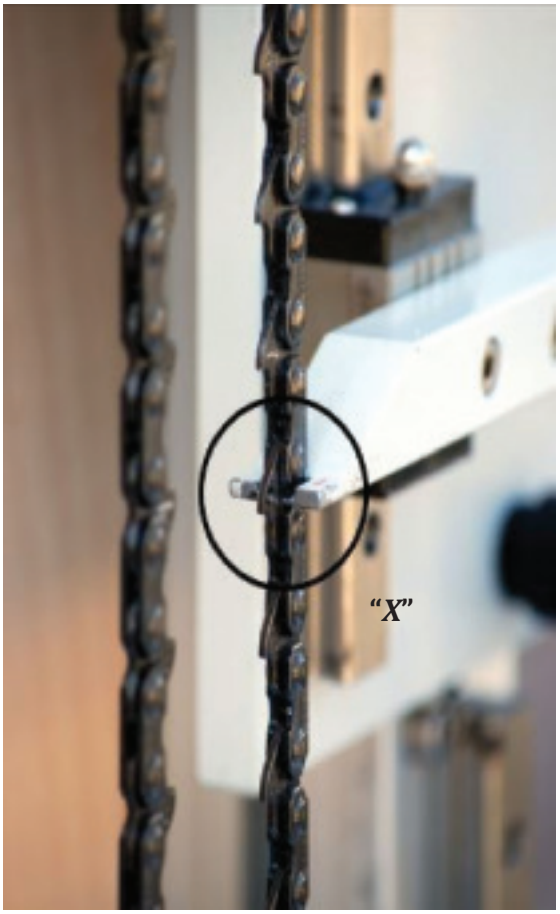
6.1 Chain extension

To perform the measurement, the chain shall be mounted on two chain sprockets which are fastened to a fixed and a flexible mounting device (Figure 2a). The chain shall be tensioned by applying a load of 50 N (±2 N).

The calculation of the chain extension shall be carried out based on the measurement of the defined distance on two separate sectors of the chain (n). The overall extension of the chain shall then be calculated with the mean extension determined on these two sectors.



a) Equipment used for measuring chain extension



b) Detailed view of the chain mounting (Detail "*X*" of Figure 2)

Key

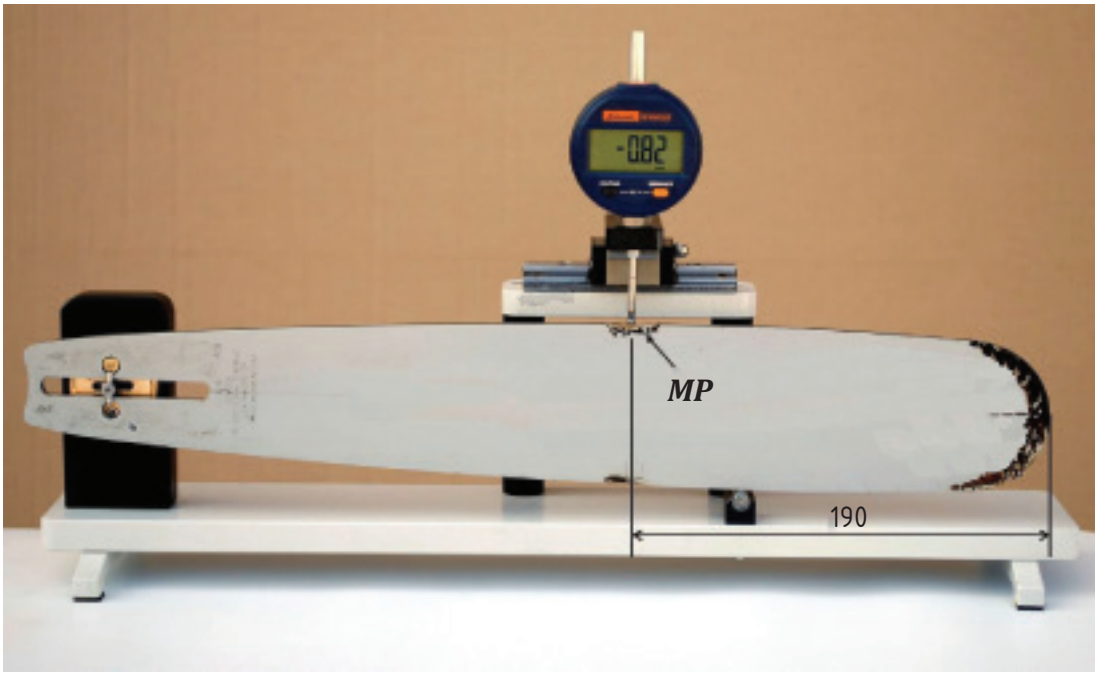
RS rim sprocket, 9 teeth
n number of rivets
L length measuring device
"*X*" detail
W weight; 50 N

Figure 2 — Measuring chain extension

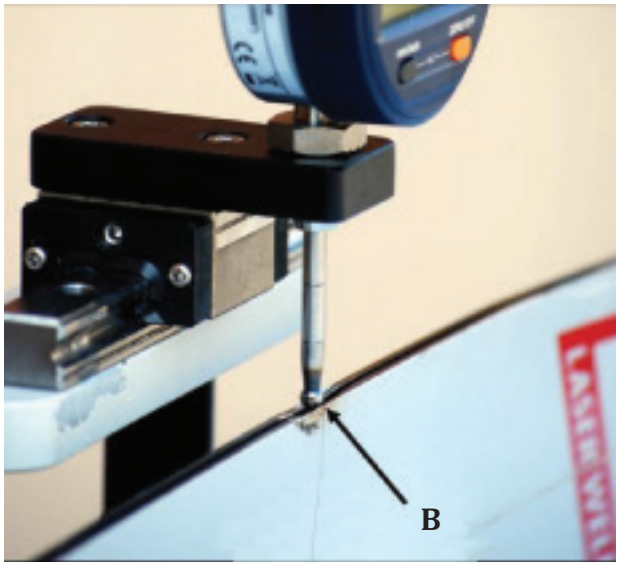
6.2 Guide bar wear

Abrasion of the guide bar shall be measured with a dial indicator with a measuring range of 0 mm to 50 mm and an accuracy of ±0,01 mm (Figure 3a). The wear is the depth of the material lost from the surface where the saw chain is pressed against the guide bar by the loading wheel (Figure 3b).

Lateral and vertical abrasion is measured with a ball head.



a) Equipment used for measuring guide bar wear



b) Ball head to measure the guide bar wear depth

Key

MP measuring point

4 mm diameter

Figure 3 — Measuring guide bar wear

6.3 Temperature

The temperature is measured at point [**T**], using a non-contact thermometer with a measuring range of 0 °C to 300 °C or more and an accuracy of ±3 °C.

7 Information to be reported

The test report shall contain at least the following information.

Table 2 — Identification of the tested lubrication oil

Test Nr.	Colour ISO 2049	Viscosity [mm²/s] 40°	ISO 17025 100°C	Viscosity index ISO 17025

Table 3 — Extension of saw chain

Chain	Beginning of test (chain length after the run-in period, see 5.1)		End of test (chain length after the long duration test, see 5.2)		Calculated overall extension n = 118
Nr.1	n=	mm	n =	mm	mm
Nr.2	n=	mm	n=	mm	mm
n = number of chain rivets					

Table 4 — Wear of guide bar

Guide bar	Beginning of test	End of test	Difference (wear depth)
Nr.1	mm	mm	mm
Nr.2	mm	mm	mm

Table 5 — Temperature at the guide bar surface

Beginning of test [°C]	0 [min]	10 [min]	60 [min]	120 [min]	180 min
Nr.1	°C	°C	°C	°C	°C
Nr.2	°C	°C	°C	°C	°C

8 Results

No requirements are set. The measured values are to be seen as a basis for determining the lubrication ability of the saw chain lubrication oil under practical conditions.

The following values are to be seen as guidance. If these values are not exceeded, the lubrication ability can be considered as sufficient.

— Overall chain extension: <2 mm;

— Wear (depth) of the guide bar: <1,5 mm;

— Surface temperature after 180 min: <85 °C.

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