

Perforator Extraction Apparatus, 1,000 ml

For the Determination of Formaldehyde in Wood-Based Panels

DIN EN ISO 12460-5:2016-05 | Previous standard designation: DIN EN 120:1992-08

The HLL Perforator Extraction Apparatus SON02269 is a complete 1,000 ml glass set for determining the formaldehyde content of uncoated and unvarnished wood-based panels in accordance with DIN EN ISO 12460-5:2016-05. The previous standard designation DIN EN 120:1992-08 is retained for clear identification.

APPLICATION

The perforator is an extraction apparatus for intensive liquid-liquid extraction. The solvent is continuously evaporated, condensed in a reflux condenser and returned to the material being extracted.

The perforator method is used to determine the formaldehyde content of uncoated and unvarnished wood-based panels. Formaldehyde is extracted from the test material using boiling toluene and transferred into distilled or demineralised water. Subsequent determination is carried out photometrically using the acetylacetone method.

SCOPE OF SUPPLY AND SYSTEM SETUP

Article No. SON02269 includes only the complete 1,000 ml glass set. The HME/G heating mantle, stainless-steel support and laboratory jack are additionally required for the basic operational setup and must be ordered separately. Connection, sealing and operating components are also required separately. Laboratory equipment listed on page 3 must be provided according to existing stock. The safety / fire-protection tray is optionally recommended. Spare parts are available separately.

Landgraf Laborsysteme HLL GmbH is the manufacturer of the Perforator Extraction Apparatus and the system supplier for the complete test setup.

NORMATIVE INFORMATION

DIN EN 120:1992-08 has been withdrawn and replaced by DIN EN ISO 12460-5:2016-05. The previous standard designation is retained for clear identification and easier retrieval.



GLASS SET

Article No. SON02269: complete glass extraction apparatus.

BASIC SETUP

Heating mantle, stainless-steel support and laboratory jack are additionally required.

OPERATION

Connection and sealing components must be ordered separately.

ACCESSORIES / SPARE PARTS

Laboratory equipment as required; spare parts available separately.

Setup, Components and Procedure



1 COMPLETE GLASS SET

Glass extraction apparatus, Article No. SON02269

For determining the formaldehyde content of uncoated and unvarnished wood-based panels in accordance with DIN EN ISO 12460-5:2016-05.

The glass set consists of a condenser, connecting elements, perforator filter insert, perforator head, double-bulb tube, Erlenmeyer flask and round-bottom flask.

2 HEATING AND HEIGHT ADJUSTMENT

Heating mantle HME/G, Article No. 010906G

Two heating zones, 300 W, power controller and plastic-coated metal housing. According to the available product information, 500 ml of water reaches boiling point in approximately 10 to 15 minutes.

Laboratory jack, Article No. 0511040

240 × 240 mm, aluminium, for the HME/G heating mantle.

3 SUPPORT

Stainless-steel support for perforator, Article No. SON0226921

H-shaped base, 490 × 540 mm, height-levelling screw, height 1,500 mm, complete with four clamps and bosses.

OPTIONALLY RECOMMENDED

Safety / fire-protection tray, Article No. 1410000

Light alloy, W × H × D: 445 × 130 × 445 mm.

Test Procedure

1

Sample Preparation

Test specimens are prepared from the wood for moisture-content determination and extraction. The moisture content is determined in accordance with ISO 16979; the corresponding German standard is DIN EN 322.

2

Extraction Setup

110 g of test specimens are weighed to the nearest 0.1 g and placed in a round-bottom flask with 600 ml of toluene. The perforator head is filled with 1,000 ml of distilled water and the receiver with 100 ml of water.

3

Extraction

Extraction is carried out for (120 ± 5) minutes. A steady toluene reflux rate of 70 to 90 drops per minute must be maintained throughout the extraction period.

4

Preparation of the Extract

The water contained in the perforator is drained into a volumetric flask. After rinsing the perforator twice with 200 ml of distilled water each time, the extract is made up to 2,000 ml with distilled water.

5

Photometric Determination

A 10 ml portion of the extraction solution is mixed with 10 ml of acetylacetone solution and 10 ml of ammonium acetate solution, heated for 10 minutes at 60 °C and subsequently measured at 412 nm.

SAFETY AND APPLICATION INFORMATION

Due to the height of the apparatus, the setup must be operated in a suitably dimensioned fume cupboard designed to accommodate tall laboratory apparatus, or in an appropriately designed laboratory area with suitable local exhaust ventilation. This procedure overview is provided for general guidance. The user is responsible for carrying out the procedure, performing the safety assessment and evaluating the results.

Ordering Information and Laboratory Equipment

MAIN COMPONENTS

ARTICLE NO.	DESCRIPTION	CLASSIFICATION
SON02269	Glass extraction apparatus, 1,000 ml - complete glass set	Basic scope of supply
010906G	Heating mantle HME/G	Additionally required
SON0226921	Stainless-steel support for perforator	Additionally required
0511040	Laboratory jack	Additionally required
1410000	Safety / fire-protection tray - optionally recommended	Optionally recommended

ADDITIONALLY REQUIRED COMPONENTS FOR CONNECTION AND OPERATION

ARTICLE NO.	DESCRIPTION	CLASSIFICATION
3430812	Red smooth hose, I.D. × O.D. 8 × 12 mm, natural rubber	Additionally required
0525002	Flow indicator, PMP, blue	Additionally required
7030045	Fork clamp, CrNi, for cone NS 45	Additionally required
7030029	Fork clamp, CrNi, for cone NS 29	Additionally required
1746007	PTFE sealing sleeve NS 29/32, pack of 10	Additionally required
1746014	PTFE sealing sleeve NS 71/51, pack of 10	Additionally required
7010045	PTFE seal for cores and sleeves NS 45	Additionally required
89363021	Isokeram insulation tape, 30 mm wide, 2 mm thick	Additionally required
0521003	Boss head, Ø 12 × 16 mm	Additionally required

ACCESSORIES FOR MEASUREMENT AND EVALUATION

ARTICLE NO.	DESCRIPTION	CLASSIFICATION	ARTICLE NO.	DESCRIPTION	CLASSIFICATION
148861597	Volumetric flask, 2,000 ml		147121464	Volumetric pipette, 20 ml	
1121226361	Erlenmeyer flask, 250 ml		147121469	Volumetric pipette, 25 ml	
143792050	Digital burette, 50 ml		147121476	Volumetric pipette, 50 ml	
148649372	Alternatively: analogue Schilling burette, 50 ml	Alternative	147121480	Volumetric pipette, 100 ml	
112332151	Watch glass, Ø 120 mm		122318517	6 bottles, 50 ml	
1488615941	2 volumetric flasks, 1,000 ml		149371284	2 measuring cylinders, 250 ml	
1488615811	6 volumetric flasks, 100 ml		441112002	Water bath for 60 ± 1 °C	
147121430	Volumetric pipette, 1 ml		122478161	Desiccator	
147121438	Volumetric pipette, 2 ml		210022719	Desiccator plate, 190 mm	
147121450	Volumetric pipette, 5 ml		7801100	Drying beads, 1 L	
147121460	Volumetric pipette, 10 ml		105654222	Precision balance	
147121462	Volumetric pipette, 15 ml		102603030	Drying oven for 103 ± 2 °C	

The listed laboratory equipment must be provided additionally, depending on the equipment already available. A suitable spectrophotometer capable of measuring at 412 nm is required for the photometric determination.

Spare Parts for the Glass Set

Separately Available Components of the Perforator Extraction Apparatus SON02269

SON02269PV

Perforator head, 1,000 ml



Perforator head, 1,000 ml

Sleeve NS 71, core NS 29
PRODURAN® PTFE valves.

Article No. SON02269PV

SON02269R

Double-bulb tube



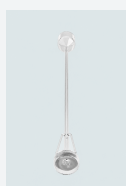
Double-bulb tube

Bulb diameter 50 mm

Article No. SON02269R

SON022691

Perforator filter insert



Perforator filter insert

Length 640 mm

Article No. SON022691

SON022695

Conical connecting element



Conical connecting element

Sleeve NS 29, core NS 45

Article No. SON022695

SON022693

Conical connecting element



Conical connecting element

Core NS 29 to hose olive

Article No. SON022693

SON022696

Round-bottom flask with centre neck, 1,000 ml



Round-bottom flask with centre neck, 1,000 ml

Sleeve NS 45

Article No. SON022696

SON02269K

Dimroth condenser



Dimroth condenser

Sleeve NS 29, core NS 45

Article No. SON02269K

SON022697

Erlenmeyer flask, 250 ml



Erlenmeyer flask, 250 ml

Receiver for the gas absorption apparatus

Article No. SON022697

SON022694

Conical connecting element



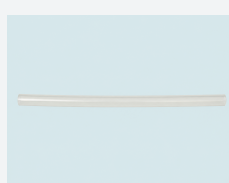
Conical connecting element

Sleeve NS 45, core NS 71

Article No. SON022694

SON02269S

Connecting hose for perforator



Connecting hose for perforator

Connecting component for the glass set

Article No. SON02269S