## **Technical Leaflet**

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Glues and Resins for the Woodworking Industry

> - 🗆 The Chemical Company

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 BASF Aktiengesellschaft

# KAURIT<sup>®</sup> Glue 234 **Powder**

Kaurit Glue 234 Powder<sup>1)</sup> is used together with hardeners in both the cold and hot processes in the door, furniture, plywood and parquetry industries. Depending on the glue formulation, the bond strengths obtained meet the following requirements:

EN 636-1 for use class 1

EN 636-2 for use class 2

EN 12765 durability class C4

DIN 68705 (1981): IF; BFU 20; BST 20; BSTAE 20

DIN 68705 (1968): IF 20; IW 67; A 100

Furthermore Kaurit Glue 234 Powder is used to produce binders for granular and fibrous materials as well as for ingot mould insulating panels.

Chemical characterization Urea-formaldehyde condensation product in powder form

Classification and labelling	Classification:	Water hazard class (WGK) 1
according to EC directives	Labelling:	Xi, R 38, R 43, S 37

# **Properties**

Product specification	Appearance	white	
	Density of solution (2 : 1) at approx. 20 °C	approx. 1.25	g/cm <sup>3</sup> ISO 2811-3
Other properties	Shelf life in sealed original		
	container	at 20 °C	approx. 12 months
		at 30 °C	approx. 6 months
	Shelf life of the solution (2 parts by weight powder : 1 part by weight water)	at 20 °C	approx. 1 week

<sup>&</sup>lt;sup>1)</sup> Up to 31.03.2007 identical with Urecoll<sup>®</sup> 270 Powder

# Table 1 Gel times (guide values) of Kaurit Glue 234 Powder solution (2 : 1) without extender with selected hardener solutions (10 % added Bonit solution)

(solution figures in parts by weight)

Hardener solution		Gel time at			
		20 °C	30 °C	40 °C	100 °C
Bonit 13030 Bonit 13070 Bonit 13300 Bonit 11700	15 % soln. 50 % soln. 40 % soln. 15 % undissolved	14 min 1 h 3 h 20 min 13 h	5 min 45 s 20 min 50 min 3 h 20 min	2 min 5 s 5 min 45 s 20 min 1 h 25 min	15 s 17 s 30 s 1 min 39 s

Hardeners 13030 and 13070 are also available as a ready-to-use solution.

For virtually all applications, there is an extensive, specific Bonit range of products<sup>1)</sup> available, allowing especially 2-component systems to be used both in liquid/liquid and liquid/powder mixtures.

# Application

Manufacture of plywood and furniture	Kaurit Glue 234 Powder is always used with hardeners and, if appropri- ate, extenders and fillers. The solution required is made with the follow- ing ratio:	
	2 parts by weight Kaurit Glue 234 Powder to 1 part by weight water ( $15 - 20$ °C)	
	The glue solution can be used as soon as it is free of lumps.	
Hot gluing	Kaurit Glue 234 Powder can be processed with	
	Bonit 13070 solution above Bonit 13300 solution above	70 °C 90 °C

<sup>&</sup>lt;sup>1)</sup> See page 9 for suppliers of Bonit products

# Interior plywood

# EN 636-1 for use class 1

EN 12765 durability class C2

# DIN 68705 (1981): IF; BFU 20; BST 20; BSTAE 20

### Table 2

Formulation		1	2
Kaurit Glue 234	Powder	100	100
Vvaler Popit 12070		50 15	50
Bonit 13070		15	15
Extender		10 15	10
Extender		10 - 15	—
Pot-life in h			
at 20 °C approx.		1	4
at 30 °C approx		10	1.1 <sub>0</sub>
		-72	1 72
Pressing tem-	Heating time	Basic pressing t	ime
perature °C	min/mm	min	
70	2	3	_
80	2	2	5
90	<u>-</u> 1	1	3
100	1	3//	2
110	1 <sub>/2</sub>	1/2	- 1 <sup>1</sup> /2

### Interior plywood with enhanced resistance

### EN 12765 durability class C3

DIN 68705 (1968): IW 67

# Table 3

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Formulation No.		3	4
Kaurit Glue 234 F	'owder	100	100
Water		50	50
Wood flour <sup>2)</sup>		5–7	5–7
Bonit 13070		9	–
Bonit 13300		–	9
Pot-life in h at 20 °C approx. at 30 °C approx.		3/4 1/2	3 1
Pressing tem-	Heating time	Basic pressing tin	ne
perature °C	min/mm	min	
90	1	1 <sup>1</sup> /4	3
100	1	2 <sup>1</sup> /2	
110	1/2	1	2
120	1/2	3⁄4	1 <sup>3</sup> ⁄4

<sup>2)</sup> Sieve fineness at least MS 180

# **Boil-proof plywood**

# EN 636-2 for use class 2 EN 12765 durability class C4 DIN 68705 (1968): A 100

### Table 4

Formulation No.		5	
Kaurit Glue 234 Water Bonit 11700 <sup>3)</sup> Wood flour <sup>4)</sup>	Powder	100 50 – 70 15 – 22 ½ 3 – 5	
Pot-life in h at 20 °C approx. at 30 °C approx.		9 3	
Pressing tem- perature °C	Heating time min/mm	Basic pressing time min	
115 120	1 <sub>/2</sub> 1 <sub>/2</sub>	3 1/2 3	

# **High-frequency gluing**

Kaurit Glue 234 Powder can also be used for gluing in the highfrequency process. For this, the glue formulations employed are only extended a little.

### Table 5

Formulation No.	6	7
Kaurit Glue 234 Powder	100	100
Water	50	50
Glue extender, e.g.		
rye flour, DIN type 1370	25	45
Water	_	50
Bonit 13070 solution 1:1	15	15
Pot-life in h		
at 20 °C approx.	1.75	2.25
at 30 °C approx.	0.5	0.75
Required specific electric work	with	
$W \cdot min cm^2$	1.2	1.5
Perpendicular heating about		
W ⋅ min cm <sup>3</sup>	3.0	3.3
Achievable bond qualities	EN 12765 C3	EN 12765 C2

<sup>&</sup>lt;sup>3)</sup> The higher dose applies to hardwood. An increase in quality can be achieved by raising the amount of hardener added to 30 parts by weight.

<sup>&</sup>lt;sup>4)</sup> Sieve fineness at least MS 180

Cold gluing

**Pre-coating process** 

Cold gluing may be performed using the pre-coating or mix-in process.

In the pre-coating process, the hardener solution is pre-applied to one side of the joint and allowed to dry. The glue is applied without extender to the other side of the joint. The hardener may be applied up to a few days before the bonding. The coating of hardener must be completely dry before the parts are brought together (lay-up time 5–10 minutes).

When the parts have been brought together, pressure must be applied immediately. (See Closed assembly time).

### Table 6

Hardener	Pressing temperature °C	Closed as- sembly time max. min	Minimum pressing time min
Bonit 13005, 30 % solution	10	8	60
	15	3	40
	20	2	20
Bonit 13026, 15 % solution	20	8	60
Bonit 13030, 15 % solution	30	5	30

With many types of wood, Bonit 13005 can lead to discolouration, so care should be taken to ensure that only the joint surfaces are wetted with hardener solution. For the same reason, this hardener is normally only used for the bonding of solid wood.

### **Mix-in process**

### Table 7

Formulation No.	8	9	
Kaurit Glue 234 Powder	100	100	
Water	50	50	
Extender flour approx.	20	20	
Bonit 13030, 15 % solution	15	_	
Bonit 13070, 50 % solution	-	15	
Pot-life in h			
at 20 °C approx.	1⁄4	2	
at 30 °C approx.		3⁄4	
Pressing time in h			
at 20 °C approx.	1	5	
at 30 °C approx.	1/4	2	

Woodmoistum	With all cold gluing, care must be taken to ensure that the temperature of the glue solution, wood and working environment does not fall below the specified minimum values. With cold gluing, the full strength is not achieved until 6 to 8 days after pressing. During this time the glued parts should not be stored at temperatures below 18 °C; otherwise, the glue will not cure properly. The pressing times can be reduced through the use of pre-warmed woods or warm cauls.		
wood moisture content	6 – 12 %		
Glue applied	Chipboard Blockboards Solid wood	140 – 200 g/m <sup>2</sup> 180 – 250 g/m <sup>2</sup> 200 – 300 g/m <sup>2</sup>	
	The quantity of glue app wood.	blied is dependent prima	rily on the nature of the
	Veneering on chipboard on blockboards Crossbanding	100 – 120 g/m <sup>2</sup> 120 – 140 g/m <sup>2</sup> 160 – 180 g/m <sup>2</sup>	
	Thin, even application of	f glue prevents glue fron	n bleeding through.
Lay-up time	Up to 15 minutes, depending on the indoor climate and quantity of glue applied (the glue should still feel sticky).		
Assembly time	Up to 2 minutes, depending on the press	ing temperature.	
Bonding pressure	The bonding pressure is ture, dimensional accur	s dependent on the natur acy of the middle layers	e of the surface, struc- and the type of wood.
	Gluing of veneer sheets	made of	
	<ul> <li>softwood</li> <li>hardwood</li> <li>Blockboards</li> <li>Face veneers</li> <li>Crossbands and face veneers</li> </ul>	0.8–1.0 1.2–1.6 1.0–1.2 0.4–0.6 eneers 0.5–0.7	N/mm <sup>2</sup> N/mm <sup>2</sup> N/mm <sup>2</sup> N/mm <sup>2</sup>
Pressing time	The pressing time required is derived from the basic time for pressing plus the heating time per mm of wood through to the innermost glue joint.		
General information	Woods such as maple, beech, birch, chestnut, teak, pine, oak etc. may cause problems during gluing owing to their high content of certain wood constituents or because of their structure. Better bonding can be achieved by adding up to 20 % PVAc glue to the glue solution.		
	Further information is contained in the Technical Information "Wood gluing: general information" and "Gluing of hardwoods and exotic woods".		

#### Binders for granular and fibrous materials as well as for ingot mould insulating panels

Kaurit Glue 234 Powder is usually used as a solution, though in a few cases it may also be used as a powder.

Kaurit Glue 234 Powder can be used alone or modified as a binder for granulated cork, core sand, ingot mould insulating panels etc. In most applications a hardener is added to the product to increase resistance to water.

The solution can be made in low-speed or high-speed stirrers.

a) In a low-speed stirrer

The powder is fed in first and is then mixed well with about 2/3 of the quantity of water. After that, the lump-free solution is diluted with the remaining water.

b) In a high-speed stirrer (200 – 400 rpm)

The powder is added slowly to the entire quantity of water whilst the stirrer is in operation.

The speed of reaction of the mixture of resin and hardener depends on the temperature. For a mixture consisting of 100 parts Kaurit Glue 234 solution (2:1) and 10 parts of a 15 % solution of ammonium chloride it is:

at 20 °C approx. 17 min at 30 °C approx. 7 min at 40 °C approx. 4 min

The quantity of binder is dependent on the end-product requirements. Generally, 5 - 20 % Kaurit Glue 234 Powder (calculated as solid to solid) is used.

The mixture of Kaurit Glue 234 solution and the material to be bound should be pre-dried gently (to about 8 %), in order to avoid vapour bubble formation during pressing. The temperature should be controlled in such a way that premature hardening of the resin is prevented. Spray the hardener solution on shortly before pressing.

Curing normally takes place at temperatures between 100 and 120 °C. At lower temperatures, the curing time is longer. Curing is usually carried out under pressure; at  $0.1 - 12 \text{ N/mm}^2$ , depending on the required density of the compressed material. The curing times are dependent on the temperature and the thermal conductivity of the material being bound.

As a binder for core sand, Kaurit Glue 234 Powder is processed with additives, e.g. furfuryl alcohol. Free acids (phosphoric acid or p-toluene sulphonic acid) are then used as hardeners.

When developing products based on Kaurit Glue 234 Powder, the user must carry out his own careful tests, because the homogeneity of the resin mixture, uniform hardening etc. are affected by numerous factors, which we cannot cover in full in our preliminary tests.

# Storage

Kaurit Glue 234 Powder must be protected from atmospheric humidity and stored in cool conditions. The bags must be closed again, when powder has been taken from them. If the powder can no longer be dissolved or if it flocculates, the glue is no longer usable.

Further information on storage can be found in the Technical Information "Storage of Kaurit and Kauramin<sup>®</sup> glue types".

# Safety

A safety data sheet according to 91/155/EEC is available for Kaurit Glue 234 Powder.

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