July.2011

Presentation

Waterproof Molecule Gradient Tape

2) Narrow Frame Bezel Waterproof / Strong Adhesive Tape

＜Necessity of waterproof characteristics of wearable products＞

Currently waterproof specifications such as waterproof smartphones
and digital camera products are increasing.
Under such circumstances, the related double-sided tape is
required to strengthen the waterproof and adhesive properties
by narrowing the frame due to the expansion demand of the display area.

●Waterproof property with narrow width of tape

Since no foam substrate is used, there is no fear of flooding due to air bubbles.
Moreover, this product is excellent in waterproofness with narrow width of less than 1 mm.

●Strong adhesion

* Excellent breakage and followability by our adhesive multilayer
Manufacturing method (molecular gradient film).

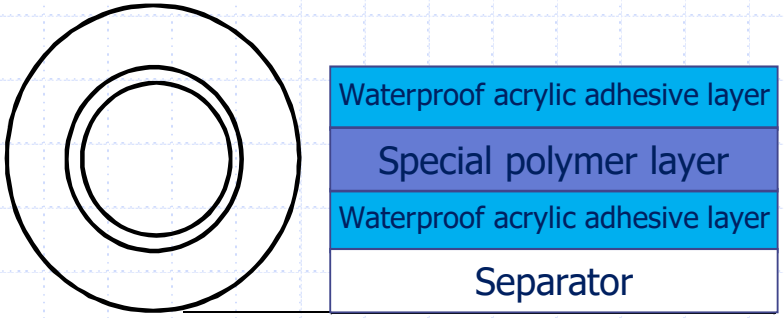
*This product also has high adhesive performance to materials that
are difficult to adhere (UV painted surface, high molecular weight polyethylene, etc.).

3） Waterproof Molecule Gradient Tape【300Z】

●Overview

Molecular gradient film double-sided tape is a new idea double-sided adhesive tape that makes it possible to achieve higher functionality than conventional double-sided tape by attaching a gradient to the molecular weight of acrylic adhesive without using base material which is different material.

●Structure



Special adhesive layer

●Feature

- **Excellent adhesive performance to materials that are difficult to adhere (UV painted surface, high molecular weight polyethylene, etc.).**
- **Since foam substrate is not used, there is no fear of flooding due to air bubbles.**
- **Excellent in waterproofness, step absorbability and impact resistance.**

●Application

Applications for fixing and waterproofing product parts such as smart phones and digital cameras

4) Lineup

Products	Thickness (um)	Color
300Z150 B/W	150	Black/White
300Z200 B/W	200	Black/White
300Z250 B/W	250	Black/White
300Z300 B/W	300	Black/White

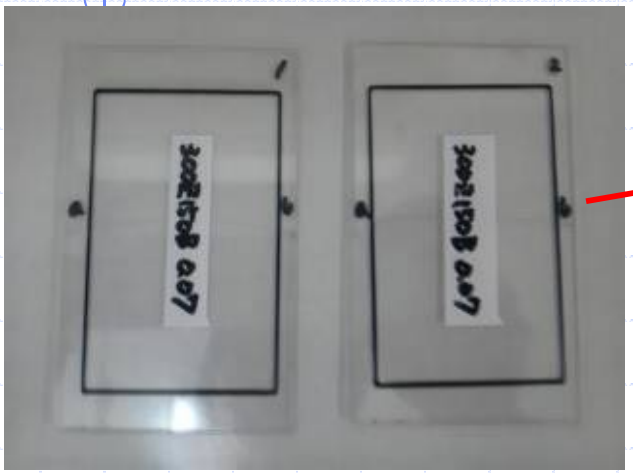
5） Basic Properties

Products	Thickness (t=mm)	Peel Strength (N/25mm)		Breaking strength (N/cm)	Growth rate (%)	Impact test
		PMMA	ABS			
300Z150B	0.15	25	25	6.5	475	6
300Z150W						
300Z200B	0.2	29	28.5	13	540	6+
300Z200W						
300Z250B	0.25	33.5	34	14	560	6+
300Z250W						
300Z300B	0.3	35	35	14.5	580	6+
300Z300W						

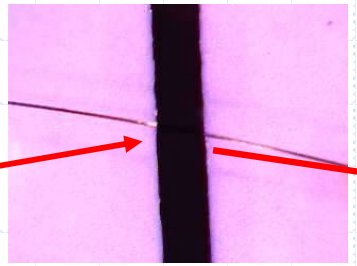
The test standard is measured according to JIS standard or KGK standard. Please contact us for details.
It will be all reference values.

6) Waterproofness / Step Absorbability

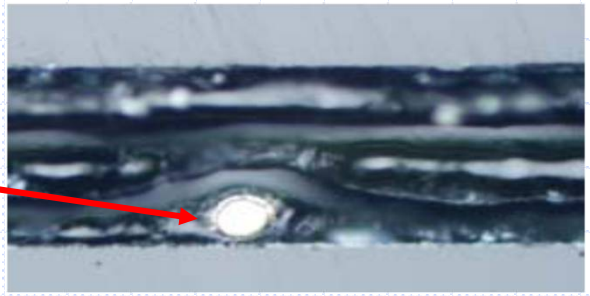
●Waterproof Test Method
Make the specimen of Fig. 2
Leave for 24 hours after lamination
Evaluate the presence or absence of immersion in the specimen by immersing it in the aquarium in Fig. 1
＊Depth of water 1 m 30 min IPX 7 JIS C 0920



Foreign matter biting part（×7 times）



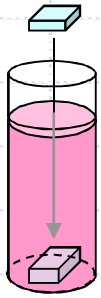
Cross section of foreign matter（×200 times）



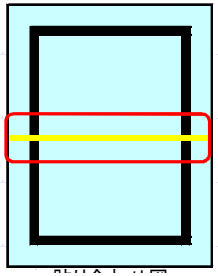
Piano wire engaging part
Piano line width：0.07Φ
Tape sample width：0.8mm

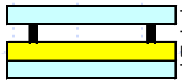
●Sufficient waterproofing is possible even with a width of 0.8 mm

Pic.1



Pic.2





Acrylic plate 1 mm
Sample
Piano wire
Acrylic plate 1 mm

Products			300Z150B			300Z200B			300Z300B		
Tape Thickness (mm)			0.15			0.2			0.3		
Tape window frame width (mm)			0.8	1.0	1.2	0.8	1.0	1.2	0.8	1.0	1.2
Waterproof test	Lamination condition	Temporary foreign matter									
JIS C 0920 IPX7 Water depth 1m 30min	2 kg roller press	None	○	○	○	○	○	○	○	○	○
		50um Φ	○	○	○	○	○	○	○	○	○
		70um Φ	△	○	○	○	○	○	○	○	○
		90um Φ	×	×	×	×	×	×	○	○	○

○：No flooding　△：Some specimens flooded
×：All flooded

7） Impact Resistance

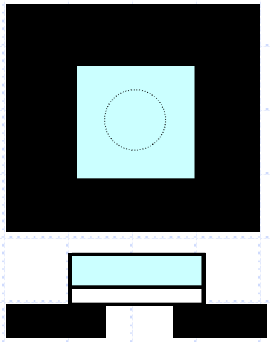
●Impact Resistance

① Make a test piece of 20 mm × 20 mm.
② Paste acrylic and ABS (Fig. 2)
conditions:2 kg roll, 3 round trips, Leave for 72 hours
③ Drop the weight until the tape peels off
④ Falling sequence
Change the weight and height of the weight to drop it.
Weight of weight (g) - Height of fall (mm) - Number of drops
*Impact test data
Fall 1st and 2nd peeling = - (minus)
Falling third time = not described
Fall 4・5th peeling = + (plus)
Ex) When the result is (200-150-2), it is described as 5-

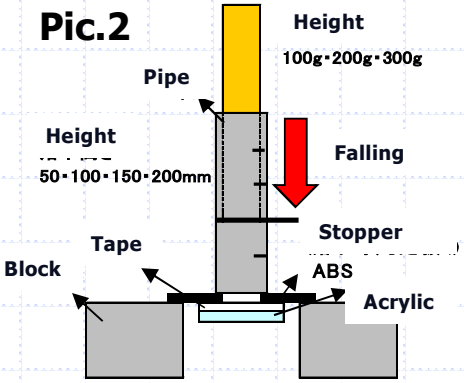
100−50−5	100−100−5	100−150−5	100−200−5	200−150−5	200−200−5	300−150−5
1	2	3	4	5	6	7

Products	Impact Value
300Z150B	6
300Z200B	6+
84020BLACK	6-

Pic.1 Laminated diagram



Pic.2

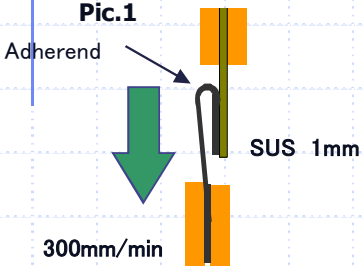


●300Z is excellent in impact resistance

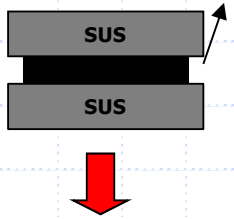
8） Adhesion force / surface adhesion force

Products		300Z150B	300Z200B	8402B	84020BLack
Thickness(um)		150	200	200	200
Peel Strength (N/25mm)	SUS	32.5	36.5	20	16.9
	PMMA	27.3	31.8	22	14.5
	Glass	27.8	28.1	20.5	14.5
Adhesion to SUS surface (N/cm2)		67.3	67.3	67.1	65

Pic.1



Pic.2



Peel Speed 50mm/min

●300Z has excellent adhesion characteristics

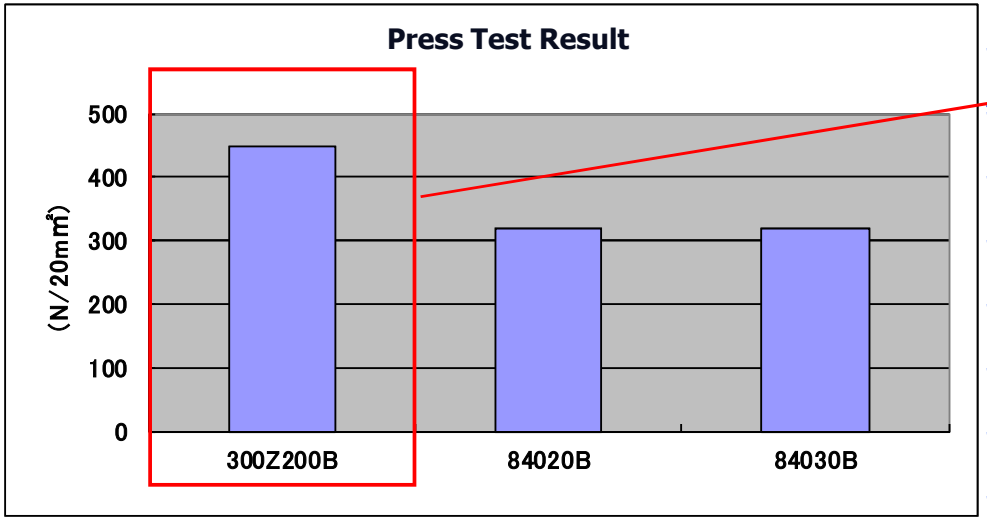
●Peel Strength

① Cut the sample to 25 × 100 mm
② Put the cut sample on the adherend (SUS, acrylic, glass)
Condition: 2 kg roll, 2 round trips
③ Leave at room temperature for 24 hours
④
Peeling speed 300 mm / min
180 degree direction peel strength measurement

●Surface Adhesion Force

① Cut the sample to 10 mm × 10 mm
② Put the cut sample on the adherend SUS (Fig. 1),
Condition: 2 kg roll, 2 reciprocal crimping
③ Leave at room temperature for 24 hours
④ Peeling speed 50 mm / min
Peel strength measurement in the direction perpendicular to the surface

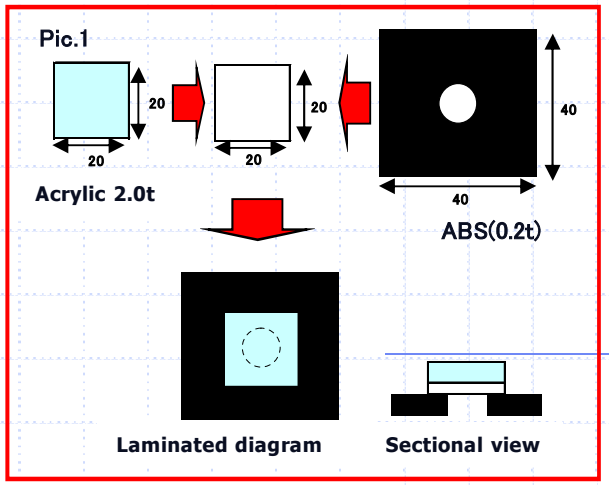
9) Pressure Test

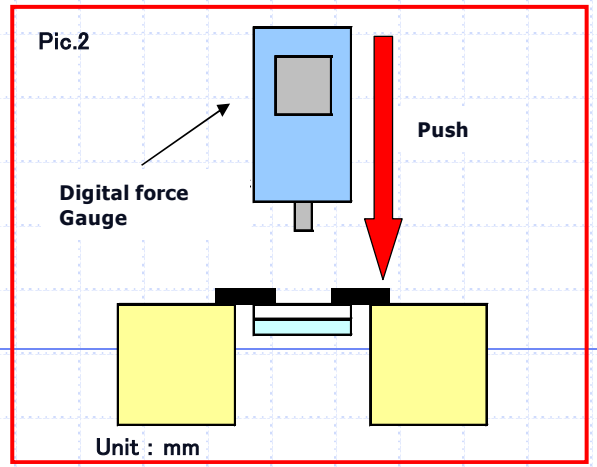


(graph.1) Press Test Result

●300Z series advantage

	Test Result (N/20mm²)
300Z200B	448.4
84020B	320.2
84030B	319.2





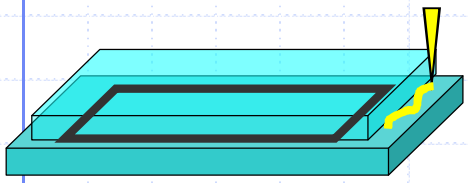
●Test method
① Create a test specimen as shown in (fig.1).
②
2 kg roll
2 reciprocating crimping
Leave for 24 hours.
③ Press the digital force gauge from above the test piece as shown in (fig.2).
Measure the strength of the tape.

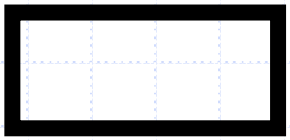
10） Oil Resistance

Products	Swelling degree (Comparison before test start value)
300Z	0.91 times to 1.07 times

*There was hardly any change in height

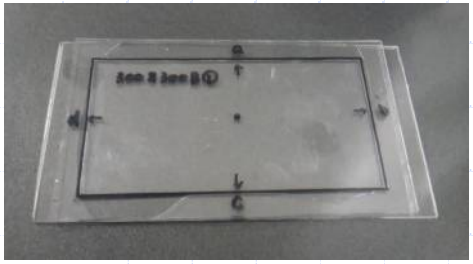
The 300Z series has excellent oil resistance





Vertical frame width
×
Horizontal frame width

300Z200B



●Test method
① Put together the acrylic board (1 mm thick) with the 300 Z processed product.
Upper plate: 60 × 100 mm
Lower plate: 60 x 110 mm
Tape width 1 mm
2 kg round trip 2 rollers
② Drop squalene into between acrylic boards.
③ Infiltrate the four sides that are tilted to the left and right.
④ Leave in a high temperature and high humidity bath (60 ° C x 90% RH x 24 h)
Confirmation of degree of swelling
① Change in height of laminated products
Measure with a dial gauge.
② Frame dimensions change
Measure with a microscope.

Thank for your attention

All the technical data are prepared based on the tests and measured values carried out in our laboratory. However, product characteristics may vary greatly depending on environment and adherend.

Therefore, regarding these characteristic data, it is a reference value and not a guaranteed value.

Before using it please make sure that this product is suitable for use and environment.

KGK Chemical Corporation.

Head Office

940 Minaminagai Tokorozawa-City Saitama-Pref 3590011

TEL : +81 4-2944-5151

E-mail : info-k@kgk-tape.co.jp