Asner Sheet Technical Data Sheet

Introduction

Asner Sheet is thin rubber foil with the minimum thickness of 0.15mm which has the properties of rubber. It is designed to increase adhesive strength and anti vibration strength when it is used as inter layers of composite materials. The main purpose of the development of this material is for bonding more than two different material layers and absorbing vibration. Asner Sheet is mainly used in sports related materials such as ski and snowboard.

General Information

Asner Sheet belongs to SBR and its formation places under the category of non-polar rubber. SBR can not be expected to get high adhesion strength when it is used with bonding agent. To improve wetting strength(or wettability), Asner Sheet is devised on formation and surface (or interface).

Size and Specification

*Listed Only Standard Grades

Thickness (mm)	Color*	Surface	Length (Roll)	Width (mm)	Tolerance
0.15	B, W	Blasted	150m	7.5 to 450	-0.05/+0.03
0.20	B, W	Blasted	150m	7.5 to 450	±0.05
0.50	B, W	Blasted	20m	7.5 to 300	±0.05
0.75	B, W	Blasted	20m	7.5 to 300	±0.05
1.00	B, W	Blasted	20m	7.5 to 300	±0.1
2.00	B, W	Blasted	10m	7.5 to 300	±0.2

Color: B=Black, W=White

Physical Property

Raw Material :SBR (Styrene Butadiene Rubber)
Hardness HS (JIS.A) :65±5
Tensile Elongation Percentage:200 or above(0.20t or above) / 123 or above(0.15t)
180 Peel Value (Kgf/25mm) :10 or above(0.20t or above) / 8 or above(0.15t)
Heat & Low Temperature Resistance: above 120 degrees centigrade, under -30 degrees centigrade

Note: The above numbers are standard score of products.

Storage and Treatment

Storage:
Cool and dark place. Usage of black sheet to avoid direct sun light is recommended.

Usage:
Use within one year from receiving products. Do not touch with dirty hand.

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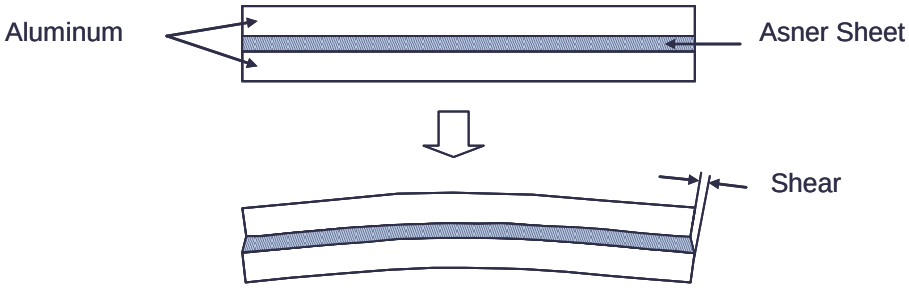
Technical Information

Testing sample consists of Asner Sheet (0.1t) which is sandwiched by aluminum (0.5t) using epoxy resin as bonding agent. Following shows the test results of vibration absorption, adhesive property.

Vibration Absorption

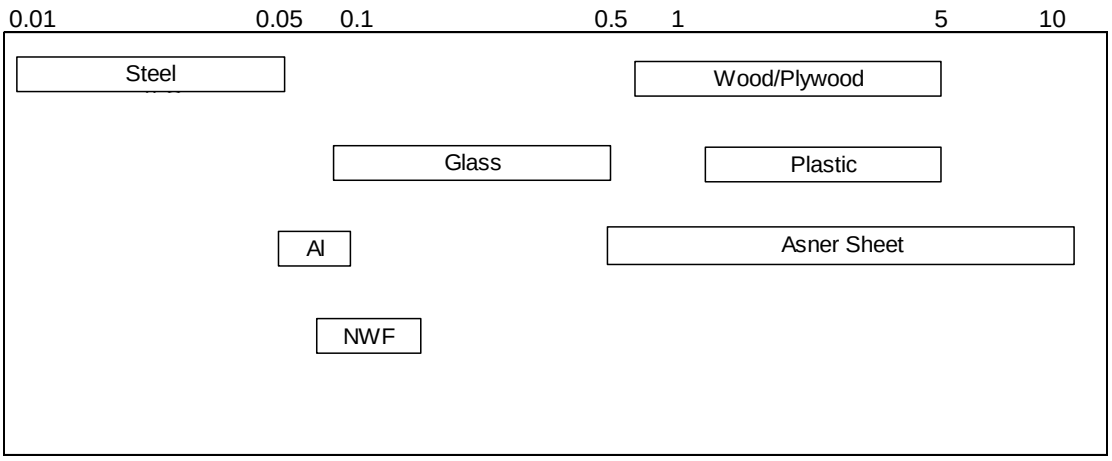
Loss factor η is used as index of vibration absorption. It is determined by absorption quantity of materials vibration. The loss factor becomes bigger when shearing strain of rubber inserted between aluminum work as viscoelastic substance.



*Epoxy resin is used as bonding agent.

Figure 1 shows results of the measurement of loss factor η for laminated sheet like rubber or non-woven fabric inserted between aluminum as damper.
Efficiency of vibration absorption is indicated by loss factor n. As you could see from the fig.1, Asner Sheet has high vibration proof compare with non-woven fabric and other materials. Especially, Asner Sheet has loss factor which covers wide area between non-woven fabric to plywood, and that is a special feature of this rubber.

Fig.1. Vibration Absorption Loss Factor(n) x 10-2



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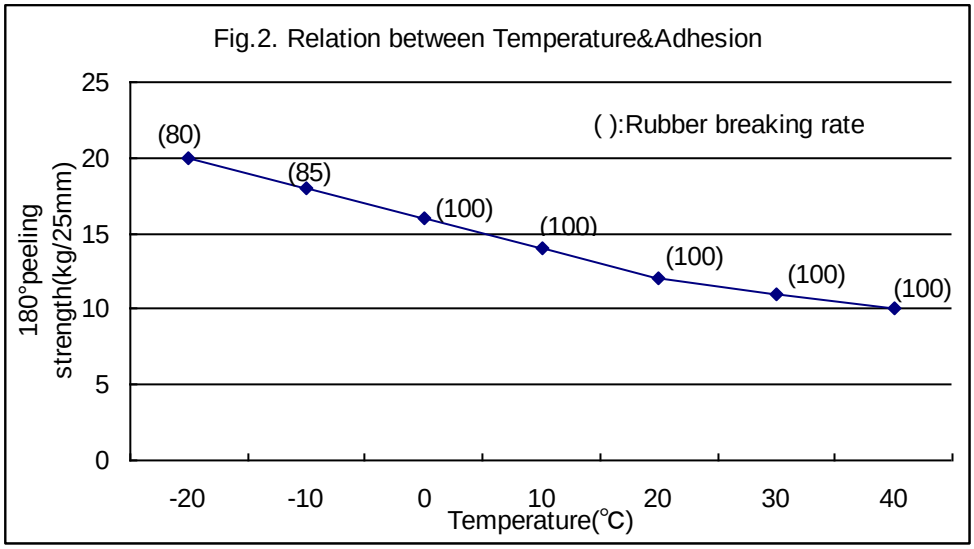
Adhesive Property

1. Temperature & Adhesion

Figure 2 shows 180 degree peeling strength of rubber tested under temperature from -18 Celsius through 40 Celsius divided into 7 groups.



Adhesion condition	**Test condition**
Bonding agent: Epoxy resin	In conformity to the JIS K6854
Pressing temperature: 80 Celsius	Testing machine:
Pressure: 8kg/cm2	Machine with constant temperature box
Pressing time: 20 minutes	Elongation: 100mm/min speed

Peeling strength of the test sample of rubber which is inserted between aluminum shows a rising tendency almost straight as the temperature becomes low. This is because rubber is viscoelastic substance whose property becomes soft at high temperature and becomes brittle at low temperature. According to these facts, the figure 2 indicates that the cohesive power of rubber increases in the area of low temperature and (numerical) value of cohesive failure appeared in the graph. As for breaking rate at each measuring points, they are over 80% and the adhesion property is very good at each points.

2. Adhesion with various bonding agents

Figure 3 shows adhesion strength with bonding agents.

Hard board is used as adhered when resorcinol resin is used as bonding agent. The peeling test was made at an angle of 90 degree. As for the other bonding agents with aluminum, they were tested by 180 degree peeling test.

Structural adhesive like epoxy resin and resorcinol resin has over 60% breaking rate, and its adhesive property is very stable. On the other hand, contact adhesive type CR and NBR keep fixed intensity, but they do not come to the destruction point, therefore, it is safe to avoid using these bonding agents where stronger adhesive is needed.

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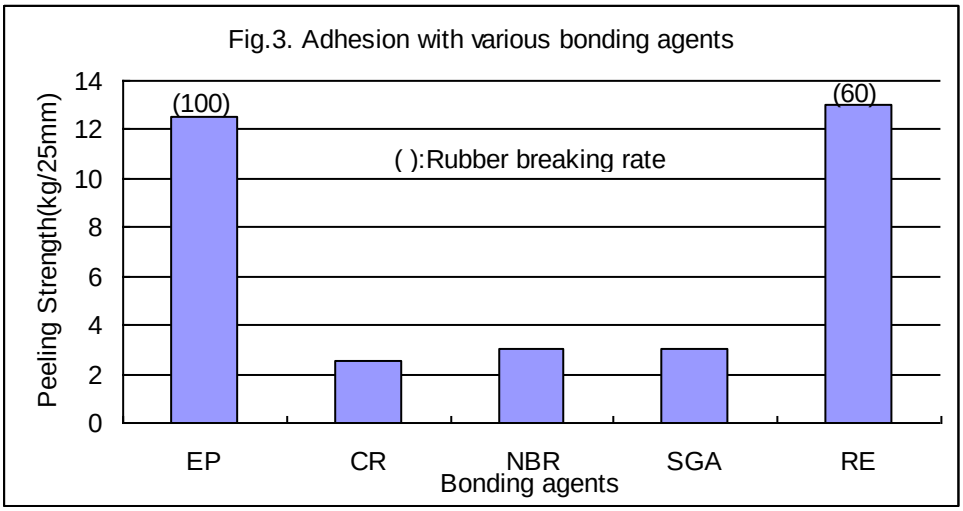
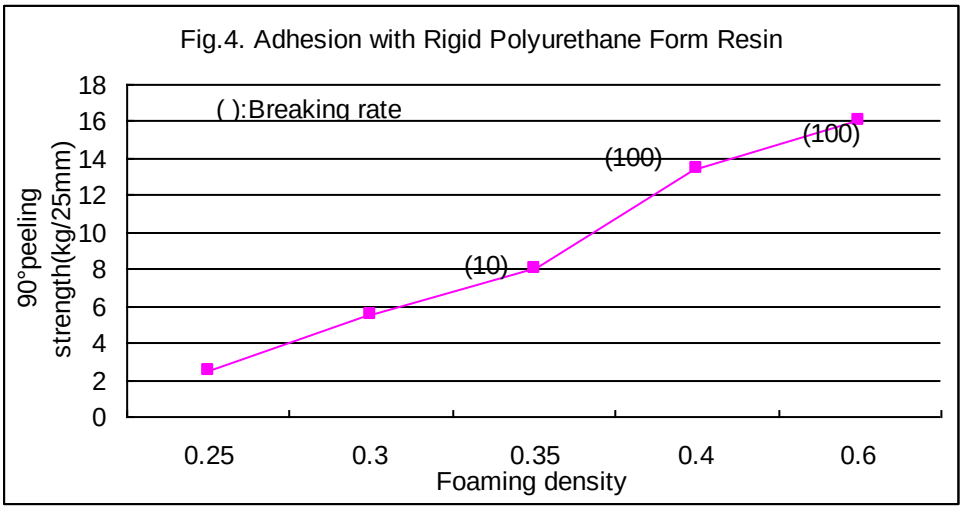


Peeling strength of SGA (Second Generation Acrylic) which is called an advanced structural adhesive is small, because the main contents of methyl acrylic or organic peroxide of catalyzer reacts with rubber which causes expansion of the structure and brittleness.

3. Adhesion with Rigid Polyurethane Foam Resin

Figure 4 shows adhesion strength with rubber foamed in mold caused by mixing polyurethane resin by hand.



The more foaming density becomes high, the more adhesive strength becomes strong, and the breaking rate becomes 100%, so rubber and polyurethane resin have excellent adhesion strength.

Test results of laminated wood in conformity to the JAS immersion peeling test (6.hour immersion in room tempered water → 40 Celsius, 18.hour drying) shows no defects.

Polyurethane resin except PE (polyethylene), PP (polypropylene) is known with its high adhesion strength with many materials. Asner Sheet also has high adhesion strength with polyurethane resin.

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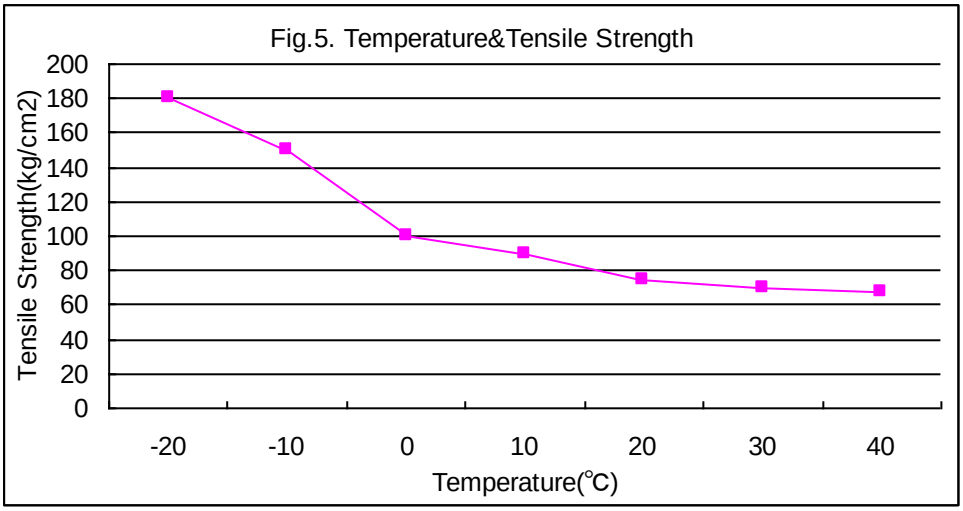
Temperature Dependency

1. Temperature & Tensile Strength

Figure 5 shows test results of mechanical strength of rubber according to the changes of room temperature.



As the graph indicates, tensile strength becomes big in the area of low temperature, and it has a tendency to drop its strength when temperature rises, so the temperature and tensile strength has negative correlation.

This phenomenon is considered that thermal agitation of rubber molecule effects before the second-order transition point, and it causes falling of the elasticity & flexibility of rubber. This brittleness is a phenomenon which occurs not only rubber but also many other materials.

2. Brittleness Temperature

Brittle point showed -60 degree Celsius when cantilever test with giving shock on rubber in a constant temperature box using dry ice as thermoregulator. From this fact, we could say that this rubber has characteristic which is very stable in the area of low temperature as well.

These tests show the results of static test of rubber, and it is predicted that composite materials for such as ski are covered by other materials which cause the change of coefficient of thermal conductivity, furthermore, various energy like vibration energy which occurs by actual ski running is absorbed inside the composite materials.

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Adhesive Characteristics of Asner Sheets with Various Adhesives

1. Test specimens and procedures

Test samples are polyamide, resorcinol, urethane, rubber, urea, vinyl acetate, cyanacrylate, and acrylic No.1, No.2, No.3, adhesives.

2. Rating criterions

A…….	Asner Sheets breaking rate	80 to100%
B…….	Asner Sheets breaking rate	20 to 80%
C…….	Asner Sheets breaking rate	0 to 20%
In case of rubber		
A…….	Delaminating resistance more than	6kgf/cm
B…….	Delaminating resistance more than	1.6kgf/cm
C…….	Delaminating resistance less than	1kgf/cm

3. Result of the test

Adhesives	SBR Type	Others
Polyamide	C	
Resorcinol	A	
Urethane	A	Without solvent
Rubber	A to B	With solvent (Note1)
Urea	A	
Vinylacetate	B	
Cyanacrylate	A to C	(Note2)
Acrylic No.1	A	
Acrylic No.2	C	
Acrylic No.3	A	
Epoxy	A	

(Note1) After one day B, gradually becomes A.

(Note2) From C to A according to the maker and the grade

4. Comment

Except when used with vinyl acetate and polyamide adhesives, Asner Sheets have good adhesive characteristics.

Our testing has data mainly with the adhesive properties of Asner Sheets. However Asner Sheets can be used not only as inter-layers but also by themselves in sound facilities, electric appliances, vehicles, musical instruments and other products.

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