

## What is ASNER SHEET?

Asner Sheet, developed solely by Ask Industries, is rubber sheet used as an inter layers for bonding different materials. It improves adhesion where shocks are given, increases water-resistance, and absorbs small vibration. It is notably thin and light, so it is used mainly for bonding materials and absorbing vibration in sporting goods.



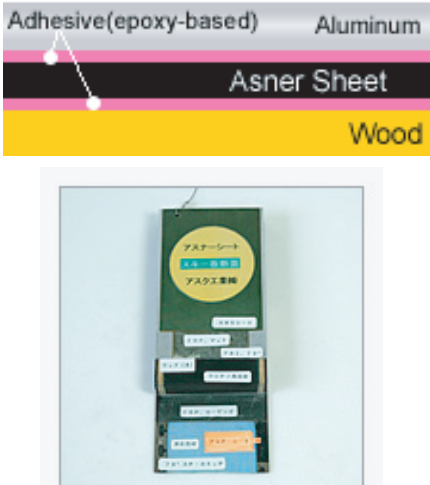
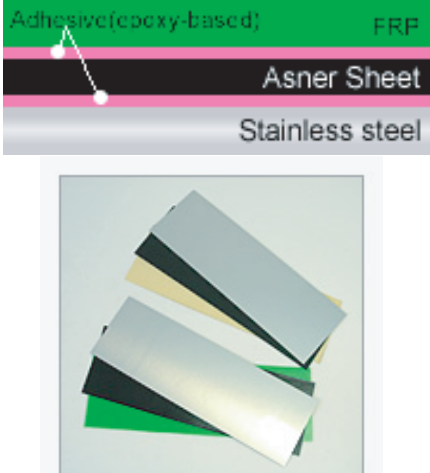
Since this sheet has little surface stickiness, it can also be used as the material for low-stickiness gaskets. We are now proposing to use it as quake-absorbing material.

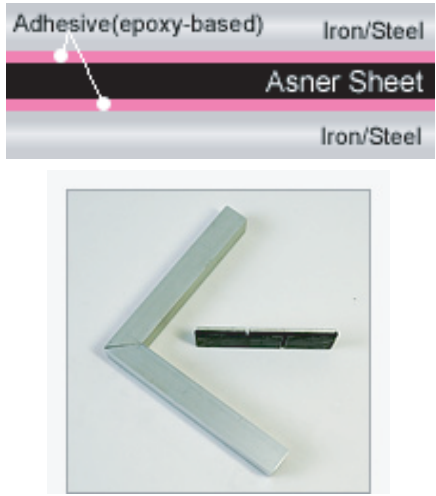
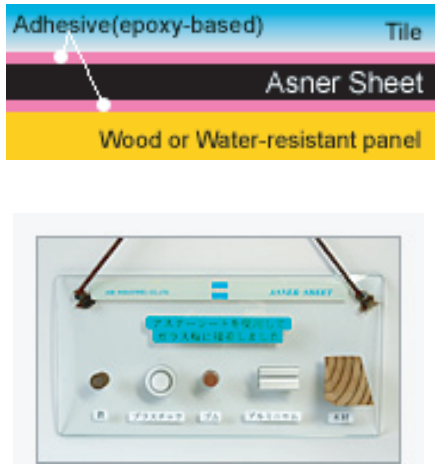
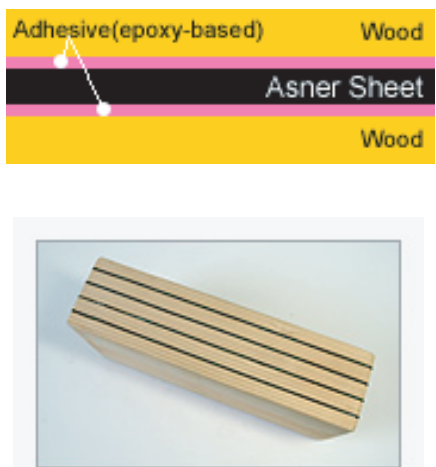
## ASNER SHEET

Advances in composite materials have been expanding their applications year by year: to cars, buildings, sporting goods, and to electronics and machining equipment. This has imposed severer requirements on bonding the different materials.

ASNER SHEET and ASNER SHEET NW, which we developed to satisfy these requirements, have been used in the sporting goods industry for more than 30 years, and are now being used by about 50% of the world's ski and snowboard manufacturers. They are new types of rubber sheets with adhesion problems solved which were considered standing drawbacks, but with the advantages of conventional industrial rubber sheet still remaining.

## BONDING DIFFERENT MATERIALS

MATERIALS	EXPLANATION	ILLUSTRATION
Aluminum - Wood	<p>Aluminum sheet bonded directly to wood may peel on impact. To prevent this, Asner Sheet is used by Japanese and overseas manufacturers of sporting goods such as skis, snowboards, rackets, shafts, and so on.</p> <p>Asner Sheet works well in skis and snowboards of which repeated resilience from large flexure is required, and in jump skis that land from high in the air with a great impact.</p>	 <p>The illustration for Aluminum - Wood shows a cross-section of the bonding process. From top to bottom, the layers are: Adhesive (epoxy-based) in a pink layer, Aluminum in a grey layer, Asner Sheet in a black layer, and Wood in a yellow layer. Below the diagram is a photograph of a green Asner Sheet product box with Japanese text and a small image of the product being applied to a surface.</p>
FRP - SUS	<p>Asner Sheet prevents peeling caused by the thermal expansion difference between FRP and stainless steel.</p>	 <p>The illustration for FRP - SUS shows a cross-section of the bonding process. From top to bottom, the layers are: Adhesive (epoxy-based) in a green layer, FRP in a black layer, Asner Sheet in a pink layer, and Stainless steel in a grey layer. Below the diagram is a photograph showing several sheets of Asner Sheet in various colors (green, black, yellow, grey) stacked together.</p>

MATERIALS	EXPLANATION	ILLUSTRATION
Iron - Iron	Asner Sheet bonded between iron and iron prevents peeling caused by impact.	 <p>The diagram shows a cross-section of the Asner Sheet application. It consists of three layers: a top layer of Iron/Steel, a middle layer of Asner Sheet, and a bottom layer of Iron/Steel. The Asner Sheet is bonded to the Iron/Steel layers using an Adhesive (epoxy-based). Below the diagram is a photograph showing a corner joint of metal beams with a dark, rectangular Asner Sheet applied to the joint.</p>
Tile - Panel	Asner Sheet improves water-resistance, and prevents peeling caused by the thermal expansion difference.	 <p>The diagram shows a cross-section of the Asner Sheet application. It consists of three layers: a top layer of Tile, a middle layer of Asner Sheet, and a bottom layer of Wood or Water-resistant panel. The Asner Sheet is bonded to the Tile and Wood or Water-resistant panel using an Adhesive (epoxy-based). Below the diagram is a photograph of a testing apparatus. It shows a rectangular panel with a blue Asner Sheet applied to its surface. The panel is held in a frame with two metal rods and weights, and there are various sensors and a digital display on the front.</p>
Wood - Wood	Recently, earthquakes occur frequently. Asner Sheet can be utilized as part of earthquake-resistant structural materials.	 <p>The diagram shows a cross-section of the Asner Sheet application. It consists of three layers: a top layer of Wood, a middle layer of Asner Sheet, and a bottom layer of Wood. The Asner Sheet is bonded to the Wood layers using an Adhesive (epoxy-based). Below the diagram is a photograph showing a wooden beam with a dark, rectangular Asner Sheet applied to its surface.</p>

## SUITABILITY OF ADHESIVES FOR ASNER SHEET

ADHESIVE	ASNER SHEET (WHITE)	NOTES
Polyamide-based	C	
Resorcinol-based	A	
Epoxy-based	A	
Urethane-based	A	Solventless adhesive
Rubber-based	A to B	Solvent adhesive (*1)
Urea-based	A	
Polyvinyl acetate-based	B	
Acrylic-based	A to C	(*2)
Cyanoacrylate-based	A to C	(*3)

(\*1) B after 11 days, then moves gradually toward A;

(\*2, \*3) ranges from A to C, depending on the manufacturer and grade.

Evaluation Criteria for All but Rubber-based Adhesive

A: Asner Sheet breakage rate: 80-100 %

B: Asner Sheet breakage rate: 20-80 %

C: Asner Sheet breakage rate: 0-20 %

Evaluation Criteria for Rubber-based Adhesive

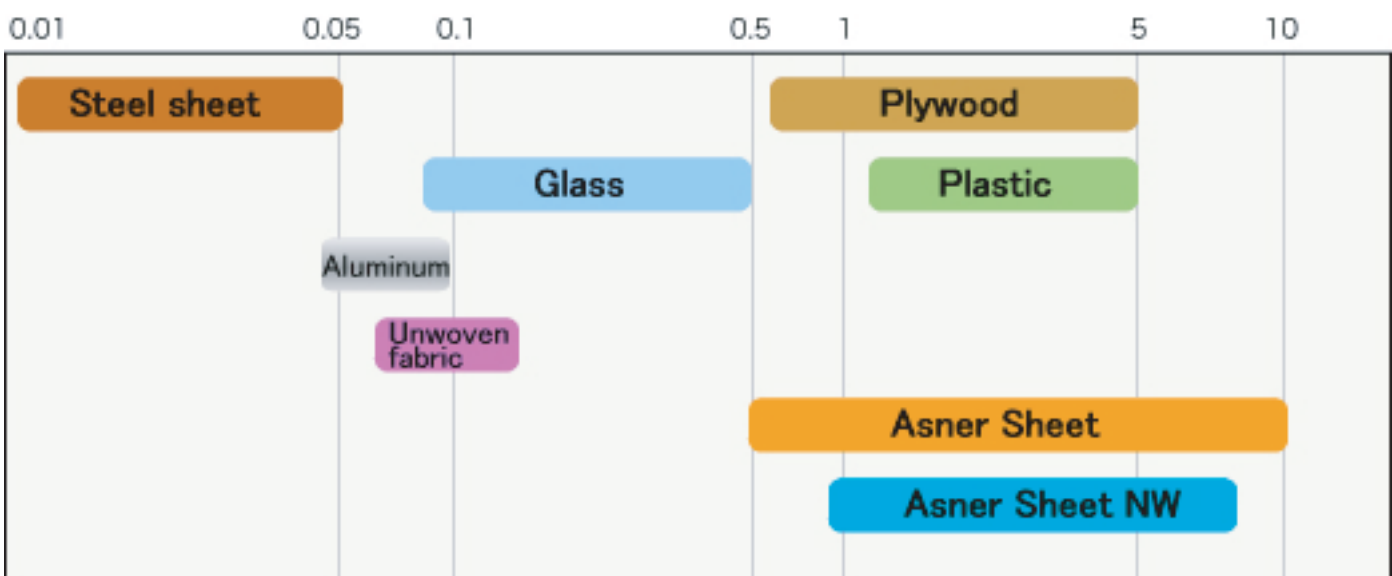
A: adhesion peel strength: 6 kgf/cm

B: adhesion peel strength: 1-6 kgf/cm

C: adhesion peel strength: 1 kgf/cm

## VIBRATION ABSORPTION

loss coefficient  $n \times 10^{-2}$



Loss coefficient  $n$  was measured on a laminate with unwoven fabric, for example, sandwiched as a damper between aluminum sheets.

## POSSIBLE APPLICATIONS

### For Bonding Materials in:

skis, snowboards, archery equipment, mallet-golf clubs, aluminum sashes, tombstones

### For Isolating Vibration in:

golf club shafts, seismic supports of buildings, cars, golf club heads and other sporting goods, sound insulating material for buildings

### For Gaskets:

non-stick gaskets

## ■ PROPERTIES OF ASNER SHEET

<b>MATERIAL</b>	SBR (styrene-butadiene rubber)
<b>HARDNESS</b>	65 +5/-5
<b>ADHESION PEEL STRENGTH</b>	10 kg or above (180 degree peel, 25mm-wide sheet bonded between aluminum sheets)

## ■ SPECIFICATIONS OF ASNER SHEET

<b>THICKNESS (mm)</b>	<b>COLOR</b>	<b>SURFACE</b>	<b>TOLERANCE</b>
0.15	Ivory white	Blasted	-0.05/+0.03
	Black		
0.20	Ivory white	Blasted	+0.05/-0.05
	Black		
0.75	Ivory white	Blasted	+0.05/-0.05

We can supply sheet cut to a width of from 7 mm to 450 mm.

We can also supply die-cut pieces.

One roll: 150 m (T 0.15 mm, T 0.2 mm), 40 m (T 0.75 mm)

## STORAGE METHOD

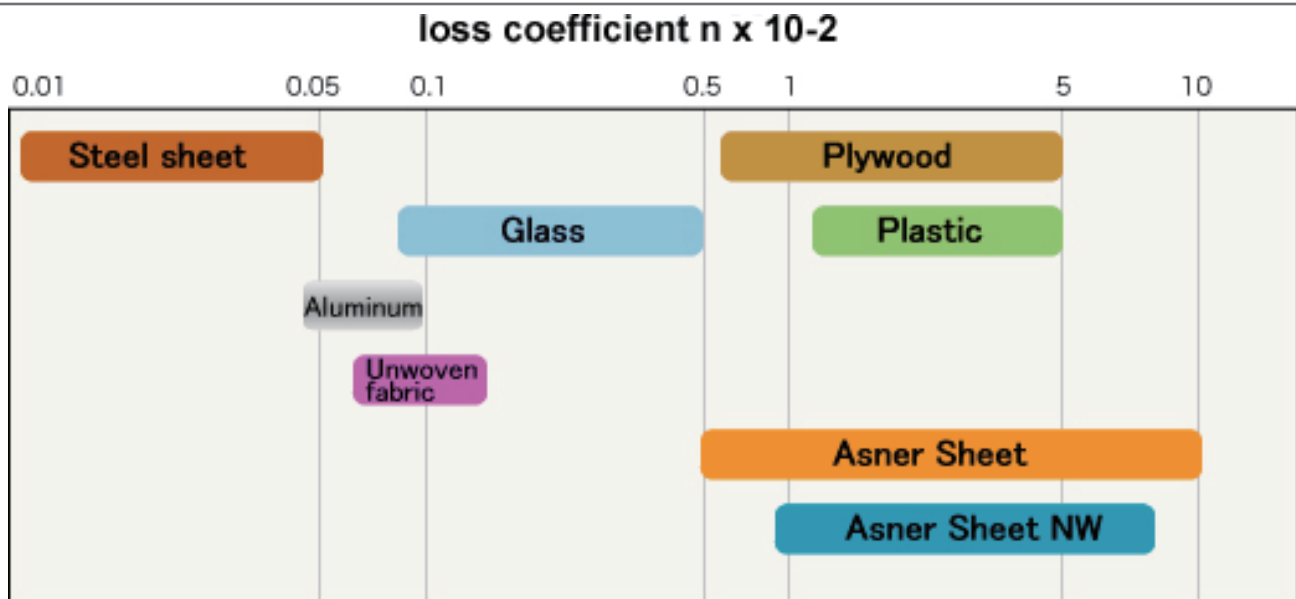
Asner Sheet degrades little in normal storage conditions because of stable properties of the rubber. Avoid direct sunlight and dust, however.

## ASNER SHEET NW

Asner Sheet NW is non-woven fabric impregnated with SBR (styrene-butadiene rubber) latex, thus lighter and less expensive than Asner Sheet. It is used a lot for sporting goods to attenuate vibration. It is possible to print a logo or other information directly on Asner Sheet NW and use it as product surface material.



## VIBRATION ABSORPTION



Loss coefficient  $n$  was measured on a laminate with unwoven fabric, for example, sandwiched as a damper between aluminum sheets.

## POSSIBLE APPLICATIONS

### For Bonding Materials in:

skis, snowboards, archery equipment, mallet-golf clubs, aluminum sashes, tombstones

### For Isolating Vibration in:

golf club shafts, seismic supports of buildings, cars, golf club heads and other sporting goods

## PROPERTIES OF ASNER SHEET NW

<b>MATERIAL</b>	SBR (styrene-butadiene rubber) latex and non-woven fabric
<b>ADHESION PEEL STRENGTH</b>	8 kg or above (180 degree peel, 25mm-wide sheet bonded between aluminum sheets)

## SPECIFICATIONS OF ASNER SHEET NW

THICKNESS (mm)	COLOR	TOLERANCE
0.25	Ivory white	+0.05/-0.05

We can supply sheet cut to a width of 15 mm~500 mm.

We can also supply die-cut pieces.

One roll: 250 m