Sekisui Alveo Foam Products

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General description

Characteristics of Sekisui Alveo crosslinked Polyolefin foams

- Wide density range
- Excellent mechanical properties
- Fine, uniform, closed or partly open cells
- High elasticity
- Temperature resistant from -80°C up to 140°C
- Excellent thermal insulation
- Very low water absorption
- Chemical resistant
- Good weather resistance
- Easy to convert
- Non-toxic, environment friendly

All Sekisui Alveo polyolefin foams are crosslinked, many of the unique properties are due to the crosslinking effect and the wide softening temperature range. These include:

- thermoformability (vacuumforming or pressforming)
- high temperature resistance
- improved physical properties
- better chemical resistance
- improved UV-resistance

UV stability

Non-crosslinked and not UV stabilized polyolefin based materials are known to be relatively unstable when exposed to UV radiation like sun shine.
Alveolit and Alveolen are crosslinked polyolefin materials where the crosslinking process significantly improves the UV stability. However, in outdoor applications some limitations should be taken into consideration.
The UV resistance significantly depends on whether the foam is directly exposed to sunshine or is covered by UV protectors/filters (e.g. facing materials, glass, etc.) and what the environmental conditions are.
It is therefore difficult to give any guideline for the lifespan of the foam in an application.
For foams directly exposed to the sun, the typical life spans for North/Western European latitudes is about 1 to 5 years depending on the foam type, grade, thickness and/or colour. In case of indirect sun exposure or when using UV covers/filters the lifespan will significantly be extended.

This is not a specification but has to be seen as guideline only. In critical cases trials are recommended.

It is the responsibility of the fabricator/converter/user to verify the well- functioning of the foam as part of his specific application and under his specific UV conditions.

UV exposure mainly destroys the polymeric structure and especially the outer cells of the foam. This results in a loss of mechanical properties (e.g. tensile strength/elongation) and a change in the visual aspect of the foam ("crumbly" and/or whitening of the surface).

Factors which positively influence the UV-stability are:
- black colours
- high densities
- high thicknesses
- E and EE types

Chemical resistance

Introduction

Alveolit and Alveolen as closed cell crosslinked polyolefin foams have an excellent resistance against most chemicals. However, prolonged exposure to chemicals may result in a limited (sometimes reversible) change of dimensions due to swelling or shrinkage.

The following tables give an outline of the volume changes when the foam is 100 % immersed for 28 days at 23 °C.
Remarkable is the swelling of copolymer foams such as NEE, TEE and NP DM G with organic solvents and the shrinkage of the same types with soft soap; whereas homopolymer foams such as TA, TL, TT, NA, NT have only a limited reaction to most chemicals.

Volume change [%] after 28 days of immersion at 23 °C.
Sample size: 50 mm x 50 mm x thickness,
Interpretation:
0 - 9 %: no problems expected
9 - 24 %: scope of applications limited
> 24 %: not advisable for application

Alveolit	TA 3005	TL 3004.4	TT 3006	TEE 3005
Toluene	17.4	20.5	12.6	59.0
Unleaded fuel	13.1	15.3	10.7	33.2
Hexane	13.6	11.4	10.7	19.0
Diesel fuel	10.4	11.7	9.4	12.0
Ethyl acetate	3.9	3.8	2.5	11.3
Hydraulics oil	2.9	3.0	2.4	2.5
Motor oil	2.4	3.8	2.0	1.7
Ethanol	-0.5	-0.7	2.2	3.0
Acetone	1.9	0.6	1.8	7.9
Brake fluid	2.6	1.2	0.4	3.7
Coolant	1.0	0.7	2.2	0.5
Acetic acid 5%	0.5	0.9	0.5	0.5
Nitric acid 10%	1.1	1.1	0.8	3.4
Hydrochloric acid 10%	1.2	0.5	1.1	0.4
Sulphuric acid 30%	-0.4	-0.7	-1.4	-0.4
Distilled water	0.4	0.7	0.9	1.5
Sodium chloride 10%	-1.0	0.7	0.2	0.7
Sodium hydroxide 10%	-0.3	0.7	1.4	-2.0
Ammonia 10%	0.8	-1.5	1.2	-1.5
Soft soap 2%	-14.7	-7.4	-5.0	-37.4

Alveolen	NA 3306.5	NTC 2005	NEE 3306	NPDM 2005	NPA FRF 1503
Toluene	19.1	14.9	47.9	41.0	15.0
Unleaded fuel	16.9	12.7	28.0	46.6	13.4
Hexane	15.4	12.5	14.1	23.9	13.7
Diesel fuel	12.6	8.7	0.9	25.1	10.8
Ethyl acetate	3.4	3.0	11.3	6.6	6.0
Hydraulics oil	2.3	2.5	4.0	10.0	2.9
Motor oil	2.9	2.3	3.7	7.8	0.5
Ethanol	0.9	0.7	1.6	1.8	1.6
Acetone	2.0	1.6	5.3	6.7	6.0
Brake fluid	1.7	1.6	1.8	2.0	2.6
Coolant	0.9	0.8	1.4	3.0	1.0
Acetic acid 5%	1.9	0.9	2.0	1.7	0.9
Nitric acid 10%	1.4	-0.5	2.1	0.6	0.7
Hydrochloric acid 10%	1.2	0.4	0.7	1.9	1.1
Sulphuric acid 30%	-0.4	-1.6	-1.6	-10.4	1.2
Distilled water	1.1	0.5	0.9	1.2	-0.1
Sodium chloride 10%	0.5	-0.5	-0.8	0.9	1.1
Sodium hydroxide 10%	0.1	0.6	-2.1	0.2	0.9
Ammonia 10%	1.8	-1.4	-0.9	0.9	2.1
Soft soap 2%	-14.1	-3.2	-34.0	-2.3	0.2

Appearance

Alveolit
Alveolit foamed sheet has fine cells, slightly oval-shaped in machine direction and provides two ultra smooth but somewhat scratch sensitive skins.
Alveolit is often preferred when the highest quality and excellent appearance is desirable.

Alveolen
Alveolen foamed sheet has a fine but somewhat coarser cell size compared with Alveolit. The cells are of a round shape. Both production skins are smooth but more scratch resistant.
Alveolen is often preferred for applications where surface scratch resistance and good pressmoulding properties are important.

Alveolux
Alveolux foamed board has very fine and round cells. In contrast to skived boards, raw buns have a rough and strong production skin.
Alveolux is often preferred for applications where excellent appearance, thickness or pressmoulding properties are important.

Alveo-Soft
Alveo-Soft is a unique product especially in the range of low compressive strength foams. Alveo-Soft is a physically crosslinked polyolefin foam manufactured in a continuous process. The cell structure is uniform, fine and partly open.

Product comparison

The adjacent table gives a brief comparison of product and production related properties and is intended for guidance only.
Within each Sekisui Alveo product family, different types of foam are available each having very specific properties.
The following charts give a relative comparison of each product type together with their individual strengths and weaknesses.

Basic properties	Alveolit	Alveolen	Alveolux	Alveo-Soft
Cell structure:	closed	closed	closed	partly open
Cell size (ca. mm):	0.1 - 0.6	0.5 - 1.2	0.1 - 0.3	depends on type
Cell shape (ca.):	oval, flat	round-oval	round	round-oval
Skin:	smooth, sensitive	coarse, tough	cut cells	
Thickness range (mm):	0.2 - 8	2 - 15	25 - 35	2 - 12
Density range (kg/m3):	25 - 330	25 - 400	100 - 200	NA
Supplied form:	rolls/boards	rolls/boards	buns/boards	rolls
Crosslinking:	physically	physically	chemically	physically
Foaming:	vertical	horizontal	batch	continuous
Isotropic properties:	no *	no**	yes***	no

* cells oriented in machine direction
** cells slightly oriented in machine direction (less than Alveolit)
*** cells are almost round

The following tables show relative comparisons of properties between the different Sekisui Alveo foam types, within the same density range. For further product comparisons, please ask your local sales contact.

Please note that not all foam types are covered by this table (e.g. flame retardant and coarse cell)

Alveolit	TEE	TE	TMA SR	TLG	TL, TLA	TA	TT	TP SPV
Tensile strength:	+++++	++	+++++	+++++	+++	+	++++	+++++
Tensile elongation:	++++	++	+++++	++++	+++	+	++	++++
Compressive strength:	+	++	+	++	+++	+++	++++	++++
Softness:	++++	++++	+++++	++	+++	+++	+	+
Compression set*:	+	++	++	+++	+++	+++	+++	+++
Thermoformability:	++	+	+++	++	+++	+	+	++
Thermal stability:	+	++	++	++	+++	+++	+++++	+++++

Alveolen	NSR II	NES	NEE	NE	NA	NLB	NT	NPA FR G
Tensile strength:	++++	++	++	+	+	++	+++	++++
Tensile elongation:	++++	+++	+++	++	+	+++	+	+
Compressive strength:	+	+	++	+++	++++	+++++	++++++	++++++
Softness:	+++++++	++++++	+++++	++++	+++	++	+	+
Compression set *:	+	++	++	+++	++++	+++	++	+
Thermoformability:	+++	++	++	+	+	+++	++	++
Thermal stability:	+	+	+	++	+++	+++	++++	++++++

Alveolux	XE	XA	XM
Tensile strength:	++	++	++
Tensile elongation:	+++	++	+
Compressive strength:	+	++	+++
Softness:	+++	++	+
Compression set*:	++	++	++
Thermoformability:	+++	++	+
Thermal stability:	+	++	+++

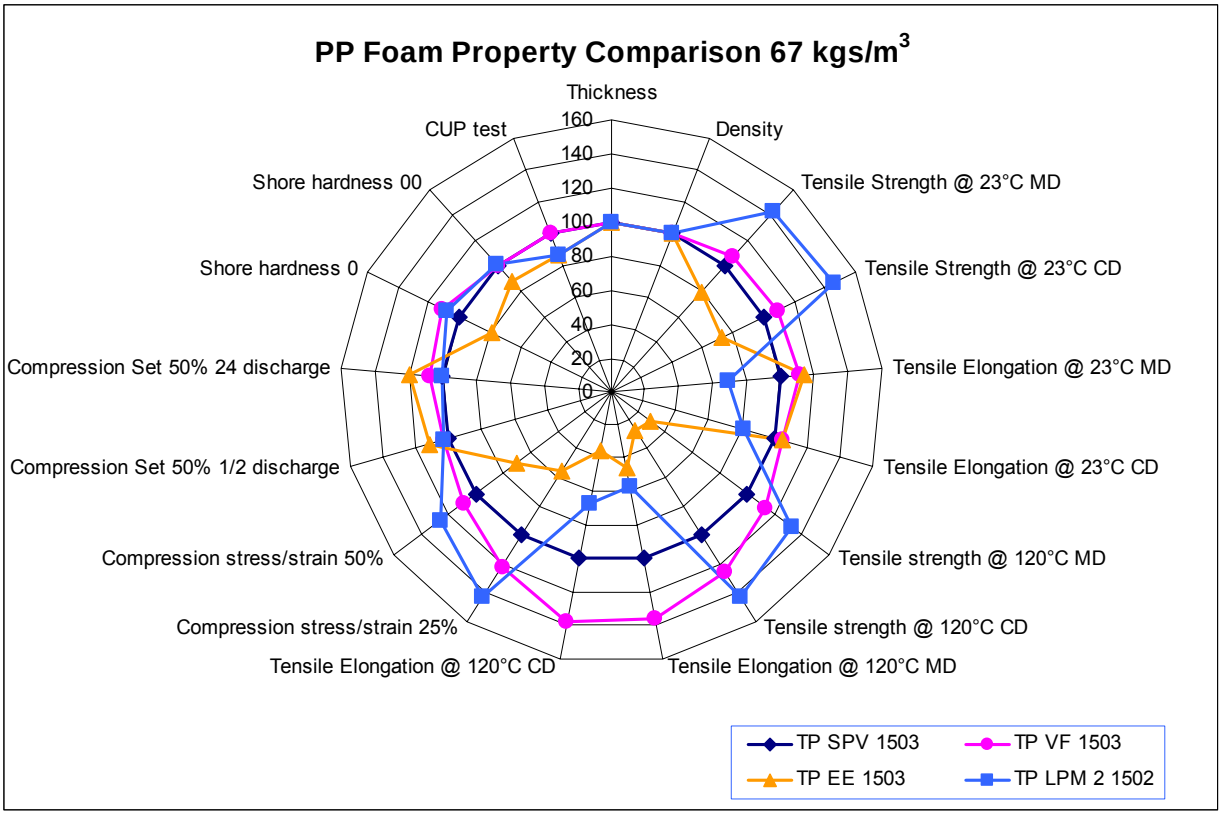
Note:
* The higher the number of +, the better the compression set. (Compression set for 25 % deflection during 22h, 1/2 h recovery.)
An approximate comparison between the properties of different Sekisui Alveo foam types within one density class is shown. As often the ideal foam type for the application depends on a compromise between different properties, often a standard type (such as TA, NA, XA) can be chosen as a starter for first trials.

Radar Charts

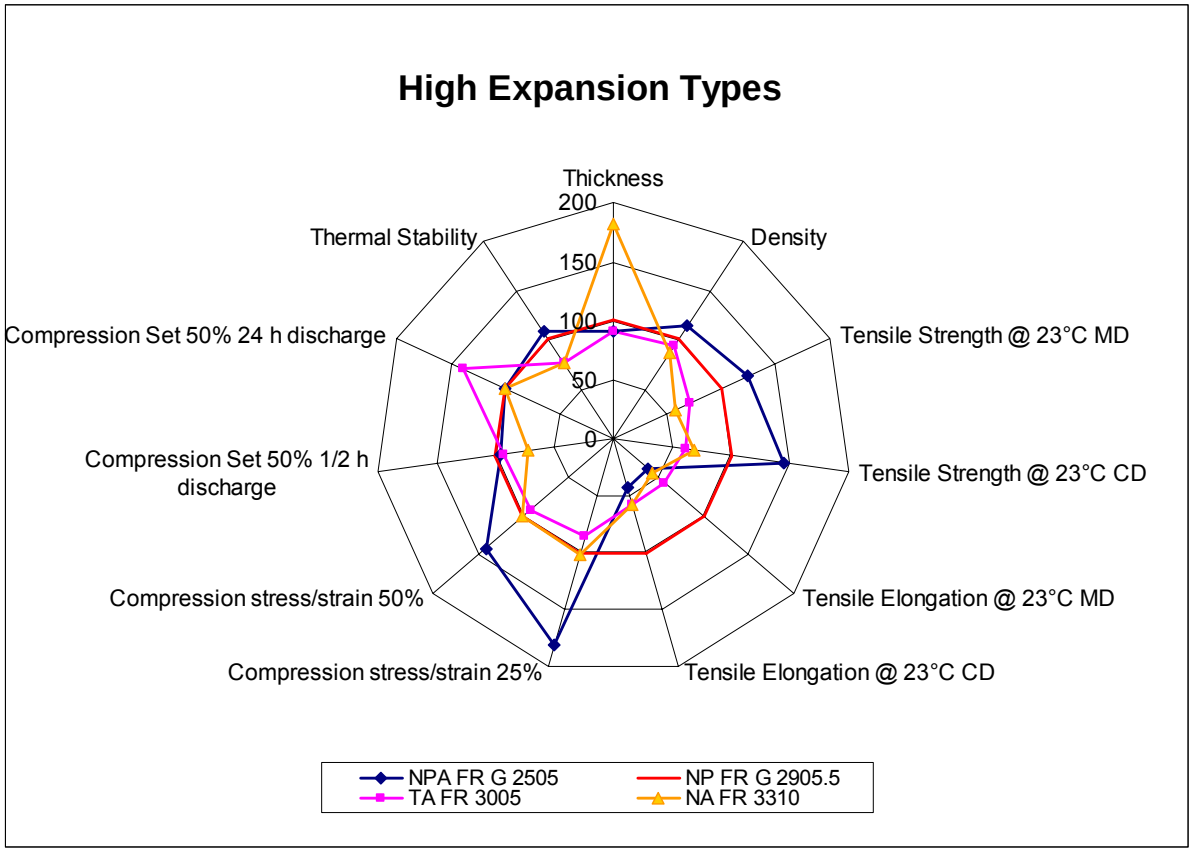
The radar charts compare some key properties relevant for certain key applications.

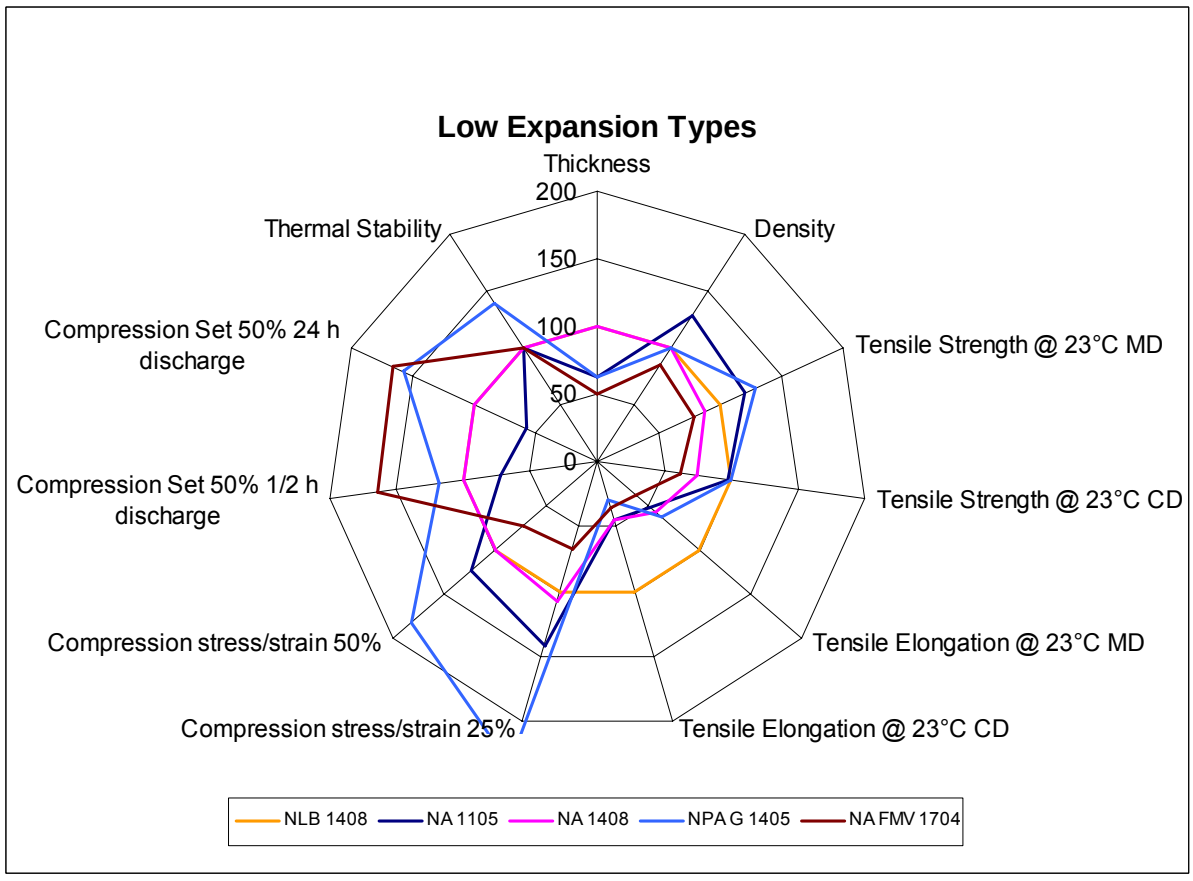
Automotive interior trim with PP-foams

The most important products are:
TP VF 1503, TP LPM2 1503, TP SPV 1503, TP EE 1503.
With the most important properties
thickness,
density,
tensile strength and elongation @ 23°C and 120°C
compression stress/strain 25% and 50%
compression set 50% after 1/2h and 24h



Other automotive applications





Product storage and handling

Transportation/Handling

The transport of Sekisui Alveo products is organized on behalf of most customers. Sekisui Alveo audits all transport facilities and rejects trucks which are not up to a minimum standard of cleanliness, water tightness etc.
In case material arrives in a damaged condition, a comment must be made on the delivery note which will enable us to take up the problem with the transportation company.

Due to its expanded nature, Sekisui Alveo PO foams are normally light weight and often very bulky.
Unloading (especially of voluminous rolls or packages) should be done carefully using suitable equipment (e.g. fork lift with clean and rubber/foam coated roll or board clamps).
Where such equipment is not at hand, preventive means (e.g. protective underlay, sufficient unloading personnel) should be made available for a careful unloading. Forced unloading like dropping or throwing from a truck can result in potentially serious edge damage or damage of the outer layers of the packages.

It is not advisable to roll material along the ground because of
• risk of damaging the outer layers by protruding items, stones etc.
• risk that outer roll layers become loose if not rolled in the direction indicated on the label.
• build up of electrostatic charges

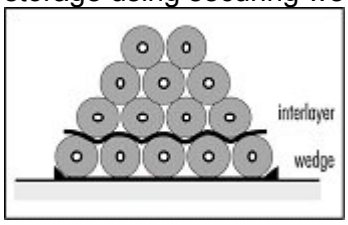
Partially used materials should be re-bagged in PE film and carefully closed for later use.

Storage

Sekisui Alveo advises to store their materials on a dry, flat and clean surface of a covered warehouse away from direct sunlight. (even indirect sun light through a transparent roof panel or window can cause edge welding and distortion by the "greenhouse" effect and temperature built up) Pressure against adjacent walls, pallet cages or caused by small fastening belts or strips should be avoided (or reduced by load spreaders) as they may lead to permanent deformations.

Rolls

Both, vertical and horizontal storage of roll material is possible for Alveolit and Alveolen. Alveo-Soft rolls should only be stored vertically. For safety reasons, vertical storage should be always in stacking pallets. Horizontal storage can be also done by using stacking pallets, but also by free storage using securing wedge bars.



The effective weight of the upper roll layers may permanently deform the lower rolls or outer windings of the lower rolls (especially bottom rolls). The max. possible stacking height therefore depends on the weight of the rolls and the compressive strength of the foam type/grade. Trials are recommended. It may be advisable to use foam interlayer against damages.

Board

When laying on a flat and clean support, board material can be piled up freely or in stacking pallet. The limit for a foam stack is given by the board weight and max. compressive strength of the lower foam layers (e.g. max. ca. 50 - 100 kg/m2 for Alveolit TA 4000; information available from the Sekisui Alveo sales office).

Raw buns

Raw buns are normally delivered on pallets. Pallets may be stacked using load spreaders or foam interlayer.

Remark
Good and safe storage practice should be self-evident in all cases.

Storage – outdoor

Sekisui Alveo recommends that all their polyolefin foams are stored indoors.
The products are protected by a polyolefin film wrap which under normal handling/storage conditions has proven itself over many years. However, the packaging materials are not designed to withstand typical outdoor conditions without additional protection.

If outdoor storage is the only intermediate facility then we recommend the following protective precautions:

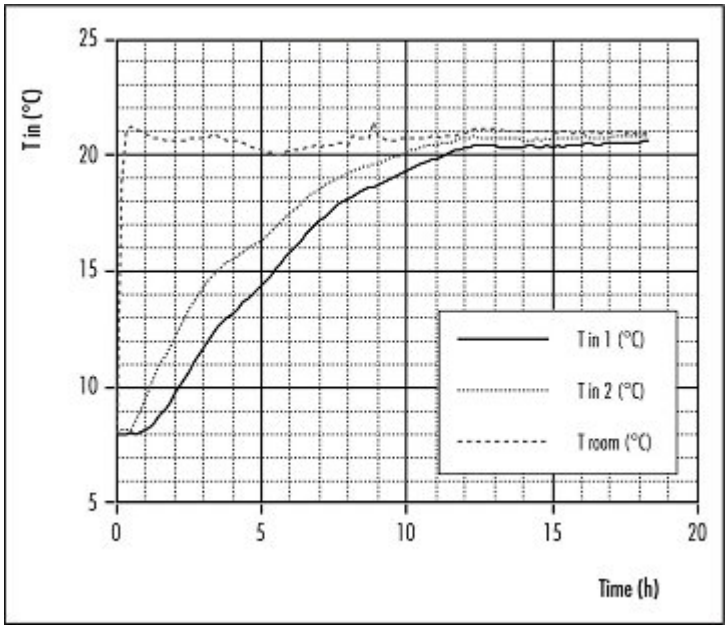
- dry underlay (e.g. pallets) to keep the rolls clean
- strong opaque tarpaulin to protect the foam from water and direct sunlight. (even indirect sun light through a transparent roof panel or window can cause edge welding and distortion by temperature built up)
- securing straps (with load spreaders) to prevent the rolls falling and getting damaged in high winds.

Storage – temperatures

All Sekisui Alveo foams can be stored at typical temperatures between -20 °C to + 35°C. However, for many applications it is better to store at temperatures around 20 °C. In case the foam is to be post-fabricated (e.g. die cutting, thermoforming, adhesive coating etc.) it is advisable to bring the foam to the right temperature and humidity (= temperature/humidity in the fabrication hall) in time. This reduces the risk of undesired side effects like e.g.

• thermal dilatation of the foam after or during post-fabrication (die-cutting)
• temperature "shocks" when materials of different temperatures are brought together
• condensation of humidity on the surface

The graph below shows an example of how much time is needed to get a roll of Alveolit TA 3005 from 8 °C storage temperature to 21 °C room temperature. The exact time for temperature/humidity acclimatization depends on the product density, roll diameter or board size and the temperature difference. 12 to 48 hours are typical but in critical cases, measurements might be required.



Temperature as function of time after moving a roll from 8 °C storage to 23 °C room (ΔT = 15°C).
Temperature measured at 2 different locations inside the roll windings.
Product: TA 3005, ca. 40 cm total roll diameter, 4 inch core, 1 meter wide.

Flammability

Sekisui Alveo PO foams are organic plastic materials and will burn when exposed to sufficient heat, open flames or other sources of ignition. Flame retardant (FR) grades have been developed, passing certain well defined laboratory test standards like DIN 4102-B2, ISO 3795 (FMVSS 302) etc. However, such standards are designed with the objective of covering very specific application related circumstances under normalized, reproducible laboratory conditions. General target is to find/specify products which do not or only partly burn in case they are (shortly) exposed to small ignition sources like matches, cigarettes, etc. Specific Sekisui Alveo flame retardant products do comply with such standards but under real life conditions and in the event of major conflagrations they will also burn.

The calorific value of non-FR and FR PO foams is ca. 40 MJ/kg foam, a value approximately corresponding to heating oil. It is therefore strongly recommended that the usual and legally required precautionary measures are followed concerning the storage of flammable materials (e.g. fire walls, small product volumes in separated halls or fire spreading distance, repair by welding, electrical installations, attention to burning glass effect of windows, extinguishing equipments, etc.) Semi-finished or finished foam products should not be stored near production equipment.
For further advice see the Sekisui Alveo Material Safety Data Sheets of the specific product.

Shelf life

Under ideal storage conditions (e.g. dust free, room temperature/humidity conditions, no UV exposure, no compression etc.) Sekisui Alveo PO foams have an excellent shelf life of several years.

However, for applications with high demands Sekisui Alveo recommends the product to be used within 6 months of delivery.

This mainly in order to minimise the risk of "blocking" (when unwinding, foam layers stick together) and "static blooming" (dust accumulation due to static discharge effects within the foam layers).

For Sekisui Alveo surface treated materials (ST, MT and LT treatment) see the product specific information in the individual product sales specifications (PSS).

Smell

Freshly skived Alveolux boards often have a strong odour. Some very sensitive people may experience allergic reactions. The smell is caused by the decomposition products of the foaming and crosslinking agents which, after production, diffuse outwards.

Objective measurements have shown that:
- the type of gas set free is not considered to be dangerous
- typical gas concentrations in the working and storage areas are below the MAK values; nevertheless we recommend to work and/or store those products in well ventilated rooms.

With time (ca. 2 - 12 weeks, depending on the board thickness) the cell gases are completely replaced by ambient air and the smell disappears. Storage at increased temperatures (e.g. 40 - 60 °C) in ventilated rooms and using spacers between the individual boards accelerates this process.

Alveolux raw buns are thick and have strong and almost impermeable process skins. Accordingly the described diffusion process is much slower than for skived materials.
It is therefore advisable to accelerate the diffusion time by skiving the raw bun to the desired thickness before processing.

Electrostatic discharging effects

Electrostatic discharging effects in form of sparks (ca. 80 % of all cases), corona or brush discharges are often observed when handling plastic materials.

These effects are not only annoying to those handling such materials, but may also be dangerous (e.g. explosive areas) and counter measures must be taken.

The reasons for the build up of electrostatic charges are various:
- high unwinding speed (= high separation speed of the foam layers)
- friction of foam layers between each other or towards other materials (during transportation, fabrication)
- little or no possibilities for natural electrostatic discharge (grounding) due to painted warehouse floors, low concentration of ions in the air (e.g. smoke, weather, fog etc.).

Precise cause analysis and efficient counter measures are difficult and not always possible.
A more pragmatic approach is advisable:

- Spraying water / water vapour
  This counter measure is not efficient. Due to their closed cell plastic nature Sekisui Alveo foams are not hygroscopic or hydrophilic. The surface electrical resistance cannot be reduced by spraying of water vapour or increasing the relative humidity in the working/storage area.
- Special 'antistatic' sprays
  Only effective in the case of localised problem areas. An undesirable side effect could be contamination of the product surface.
- Machine grounding (earthing)
  Not efficient for discharging but may assist in preventing further build up of charges.
- Flame
  Very efficient, but obviously a fire risk, therefore not recommended.
- Passive Ionisation (earth wire)
  Simple to install and efficient but only works in the case of very high electrical fields (> 300 kV/m).
- Active Ionisation (high voltage)
  The most efficient method, especially when ionisation blowers using alternate current are used close to the foam surface. Periodic maintenance is required.

Note
Alveolen NA CO II is electrically conductive foam with a surface resistance low enough to dissipate potential build-up of static charges. Electrostatic discharge effects have not been observed during unwinding or during any kind of foam post-fabrication.

"Blooming" (s. under "shelf life") is a long-term effect caused by minute non-visible discharges within the foam ("Gleitbüschelentladung"). Their prevention is very difficult.

Environmental Aspects and Recycling

European waste code

Remnant Sekisui Alveo foams can be re-used, recycled, incinerated or dumped.
According to the consolidated European waste catalogue the foams belong to the categories 12, Waste from shaping and physical and mechanical surface treatment of metals and plastics, code 12 01 05 plastics shaving and turnings and/or to the category 20, Municipal waste (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions, code 20 01 39, plastics.

Sekisui Alveo promotes re-use, recycling and thermal recovery. The PE packaging film can be re-used or recycled.

Recycling

Sekisui Alveo promotes the state-of-the-art re-use, re-cycle and thermal recovery of their remnant foams wherever it can be ecologically and economically justified.
The definition of recycling has to be seen in the widest possible view:
- foam-to-foam recycling
- foam-to-others "down" cycling
- thermal recycling

and should even include conceptual thinking like:

- prevention of remnants by optimum machine or part design
- all polyolefin concepts
- clear marking
- re-use of recycling materials in new parts
- logistics

Only a combination of all items and priority setting on the highest relative value added can help to solve our today's waste/remnant material problems.

Foam-to-Foam Recycling

Sekisui Alveo foams are either physically or chemically crosslinked polyolefin foams.
The crosslinking process is the key to many unique properties like:

- thermoformability
- excellent mechanical, thermal, chemical and UV resistance

which make the product superior when compared to non-crosslinked polyolefin foams or other plastic foams.

On the other hand the crosslinking process changes the original thermoplastic material into a thermo-elastic material. Depending on the product, the crosslinking degree varies between 30-70 %, when determined with the gel fraction method (acc. to ASTM 2765). As a consequence, part of the material cannot be fully molten anymore and a 100 % foam-to-foam recycling is not possible without extreme loss in properties.

Due to the very high quality standard of Sekisui Alveo roll materials, using today's recycling techniques are not good enough to produce foams with comparable quality levels.

Foam-to-others Down-Cycling

The 'Schmitz' drainage mat is an example of down-cycling non-contaminated polyolefin foams to so-called drainage mats, a mat consisting of heat agglomerated foam chips.
Such a product is made by www.schmitzrecycling.nl.

Other examples where a down-cycling of Sekisui Alveo foams was technically and economically feasible are:

- automotive door panels made of a talcum filled PP carrier with an Alveolit PP foam/TPO foil cover stock were grinded and directly moulded into new PP door carriers. This recycling concept is realized on industrial scale.
- injection moulded PP caps with Alveolit TA cap seals were grinded and directly injection moulded into new caps

In case the share of Sekisui Alveo crosslinked foams is below 5 - 10 % (sometimes up to 20 %) in weight, very often a loss in properties is not significant.

Please ask your local sales office for more information about recycling of Sekisui Alveo foams into injection moulded PP parts.

Agglomeration of crosslinked polyolefin foam to densified pellets is realized on industrial scale. Through high volume reduction the dumping costs are reduced and a controlled energy supply is possible in case of thermal recycling of the pellets.

Thermal Recovery

Thermal recovery is certainly not the best way of recycling but the ecologically and economically only solution in cases where Sekisui Alveo remnant foams are:

- contaminated (adhesives, other coatings of non-polyolefin nature)
- too difficult to separate
- too small in size
- no recycling facilities are available

By using the calorific value of Sekisui Alveo foams (ca. 40 MJ/kg) many litres of valuable heating oil can be saved (1 l heat oil = ca. 1 kg foam).

Others methods

New technologies are presently under evaluation (hydration, pyrolysis, gasification etc.) to break down different kind of plastics to their origin (gas and oil).
These technologies are very important elements for the recycling future of plastics in general but for the time being all of them have limitations which prevent them from better market acceptance.

Marking for recycling

For recycling purpose, a correct marking is of importance.
Many different national standards for marking plastic have been published with the objective to identify remnant materials for further recycling.

ISO 1043 part 1 for example provides uniform symbols in text form for terms relating to many common plastic materials.
This standard is supported by the automotive industry and their suppliers.
According to this standard, Alveolit TA and Alveolen NA foam grades can be marked as follows:
PE-LD-E-X
(PE, low density, expanded (E), crosslinked (X))
For correct marking of other Sekisui Alveo foam types please ask your local sales office.
Depending on the shape and size of the part, the text can be hot stamped, directly moulded or printed onto the foam surface.
In general, it is recommended to mark parts as of ca. 100 g weight.

Health & safety

Sekisui Alveo polyolefin foams are modern products and their recipes are based on state of the art raw materials. Sekisui Alveo polyolefin foams do not contain any dangerous chemicals and are therefore harmless for the human health and easy to handle; they are environmentally friendly, means they are free of ozone depleting substances and are not polluting water, air or soil.

Flame retardant types (FR, FRB, FRZ, FR0) are free of PBB (polybrominated biphenyls) and PBDE (polybrominated diphenyl ethers), means they do not develop any dioxins or furans in a fire.

Various Sekisui Alveo foam types are tested and approved according specific health and safety regulations which confirm their predestination for a wide range of applications.

Following overviews show the testing range of the 4 Sekisui Alveo foam families:

Some **Alveolit** type/grades have been tested for:
- Biological evaluation of medical devices (according ISO 10993)
  - dermal sensitization: not sensitizing
  - skin irritation: not irritating
  - cytotoxicity: not cytotoxic
- US FDA Drug Master File: Alveolit TA, TE, TEE, TL S are approved and listed
- SG-approval (non dangerous chemicals): suitable for medical devices class I
- Fungi and bacteria resistance (acc EN ISO 846): fulfils
- Sweat and spittle resistance (acc. DIN 53160): complies
- Water quality (according BS 6920): fulfils

All Alveolit types/grades comply with:
- Heavy metal content according EN 71-3, Directive 94/62/EC and Directive 2002/95/EC 'RoHS'
- Free of PBB (polybrominated biphenyls) and PBDE (polybrominated diphenyl ethers) acc. Directive 2002/95/EC 'RoHS':

Some **Alveolen** type/grades have been tested for
- Skin irritation (acc. OECD Guidelines no. 404): not irritating
- SG-approval (non dangerous chemicals approval): complies
- Sweat and spittle resistance (acc. DIN 53160): complies
- Water quality (acc. BS 6920): fulfils

All Alveolit types/grades comply with
- Heavy metal content (acc. EN 71)

Some **Alveolux** type/grades have been tested for
- SG-Approval (non dangerous chemicals approval): complies
- Fungi and bacteria resistance (acc. EN ISO 846): fulfils
- Sweat and spittle resistance (acc. DIN 53160): complies

All Alveolux type/grades comply with
- Heavy metal content (acc. EN 71)

Alveo Soft
- Heavy metal content (acc.Directive 2002/95/EC 'RoHS'): complies
- Fungi and bacteria resistance (acc EN ISO 846): fulfils

All Alveolux type/grades comply with
- Free of PBB (polybrominated biphenyls) and PBDE (polybrominated diphenyl ethers) acc. Directive 2002/95/EC 'RoHS':

If you need more specific information ask your Sekisui Alveo sales manager.
For further details on Health & Safety ask for our Material Safety Data Sheets.

Product Liability

Product Liability Disclaimer Legal liability

Recommendations as to methods of application and use of Sekisui Alveo foams are based on our experience and knowledge of the characteristics of our products and are given in good faith. As producer of the material we guarantee the supply of material free of defects. We have however no control over the application of Sekisui Alveo foams and no legal responsibility are accepted for such recommendations. In particular, no responsibility is accepted by us for any system in which Sekisui Alveo foams are utilized or for any application.
Sekisui Alveo's indications are recommendations which have to be verified under the actual circumstances. For new materials or fabrication processes trials to establish their suitability have to be run in any case.
The use and further processing of our foams is outside our control. Qualification, verification and validation of the end product are the responsibility of the fabricator/converter customer.

Sekisui Alveo property data sheets normally refer to international or national standards. In exceptional cases where no such standards are available or for other reasons, reference is made to Sekisui Alveo internal standards which are available on request.

These international, national or internal test standards are laboratory based and not related to any application or post fabrication standards. No responsibility can therefore be accepted, in terms of foam product standards in relation to practical applications and fabrication.

Combustibility

Sekisui Alveo foams are combustible and should not be exposed to flame or other sources of ignition.

Outdoor storage

Sekisui Alveo recommends that all their polyolefin foams are stored indoors.
The foams must be protected from direct sunlight (even indirect sun light through a transparent roof panel or window can cause edge welding and distortion by the "greenhouse" effect and temperature built up).
If outdoor storage is the only intermediate facility then the foam must be protected from direct sunlight (UV radiation, heat), dust, rainwater and storm damage. We recommend the following protective precautions:

- dry underlay (e.g. pallets) to keep the rolls clean
- strong opaque tarpaulin to protect the foam from water and direct sunlight
- securing straps (with load spreaders) to prevent the rolls falling and getting damaged in high winds.