

ProCell S4

Soft, self-skinning flexible foam with slow rise for large mouldings

MOULD
Life

1. Introduction

ProCell S4 Part A reacts with ProCell S4 Part B to form a very soft, medium density flexible polyurethane foam with a good skin. The system is designed to have a very slow rise, with a cream time of ~60 seconds, allowing plenty of time for mixing of casts up to 5 kgs in weight.

Key benefits of ProCell S4 include:-

- Soft and compliant foam with very low density (typically 150-180 kg/M³, 8-10 lb/ft³)
- Bright white colouring – readily and effectively pigmented
- CFC-free (Water blown) and non-flammable
- Easy to mix – 2:1 by weight or by volume
- Low viscosity allows for easy pouring once mixed
- Can be cut and shaped with appropriate tools
- Can be used with an additive to give a degree of fire retardance

2. Applications

ProCell S4 has been formulated for use primarily for moulding and casting applications requiring a moderate skin to the finished product. The processing characteristics allow for mixing by hand, drill or machine, although best results are obtained with a machine.

The soft, flexible nature of the material allows it to be used in a range of applications:-

- Arts and Crafts work
- Film, TV and Stage props and Special effects
- Mould Backing
- Scenery Design
- Industrial Cushioning and Padding, Sound Deadening and Vibration Dampening

3. Typical Properties – Liquid Materials

Property	Units	ProCell S4 Part A	ProCell S4 Part B
Viscosity @25°C	cps	~1200	~1500-1600
Specific Gravity @25°C	°Shore A	1.08	1.12
Appearance	-	Slightly Viscous Hazy Liquid	Viscous Amber Liquid

4. Typical Properties – Cured foam

Property	Units	Minimum	Maximum
Free-Rise Density	Kg/S4	150	200
Nominal Hardness	°Shore A	2	4
Colour	-	White	

Description

Very Soft, Low to Medium density Polyurethane Foam

Form

Two part pourable system with long cream time

Density

~150-200 kg/m³

Mix Ratio

2:1 by weight
2:1 by volume

Typical Cream Time

~60 seconds

Typical Demould Time

~35 minutes

5. Reactivity

Property	Typical Value	Units
Cream Time (100g @ 20°C)	60-90	Seconds
Rise Time (100g @ 20°C)	3-4	Minutes
Tack Free Time (100g @ 20°C)	12-15	Minutes
De-mould Time (Mould @ 35°C)	~35	Minutes
Full Cure (100g @ 20°C)	12-24	Hours

6. Mix Ratios

	ProCell S4A	ProCell S4B
By Weight	2 parts	1 part
By Volume	2 parts	1 part

7. Instructions for use – Preparation for mixing

1. Select an appropriate mixing container:-
 - a. The container should be clean and dry and capable of holding twice the mix quantity.
 - b. Ideally should be Polyethylene – this will allow re-use.
2. Prepare the mould or item to be filled:-
 - a. If moulding in a sealed chamber, then ENSURE YOU HAVE TAKEN ACCOUNT OF THE PRESSURES LIKELY TO BE GENERATED!
 - b. Ensure the mould or item to be filled is clean and dry.
 - c. Use a wax release agent if it is necessary to de-mould the item after cure.
 - d. If possible, ensure the mould is warm – ideally 20-25°C.
3. Prepare the mixing equipment (whether mixing by hand or drill):-
 - a. Ensure spatulas or mixers are clean and dry and suitable for the quantity to be mixed.
 - b. If using a drill, ensure it is set to an appropriate and safe speed.
 - c. Ideally should be Polyethylene – this will allow re-use.

8. Instructions for use – Mixing and moulding

1. Having previously calculated the amount of foam required (see section 10), weigh the ProCell S4 Part A into the mixing container.
2. Quickly, but carefully, weight the corresponding quantity of ProCell S4 Part B into the container.
3. Quickly mix the material, moving the mixing equipment up and down and from side to side in the liquid. Try and incorporate air bubbles into the blend as this will help the foam structure.*
4. Pour the material into the mould quickly and allow to rise, sealing the mould if required – ENSURE YOU HAVE ACCOUNTED FOR THE PRESSURES THAT WILL BE GENERATED!

* Mixing three to four seconds 'into the cream' (i.e. continuing to mix as the material is just starting to rise) can help foam structure, but care should be taken not to over-mix as this might adversely affect the foam.

9. Curing, De-moulding and 'Crushing'

1. Allow a minimum of 10-15 minutes and preferably longer before de-moulding.
2. De-mould carefully, pulling the foam from the mould sides in sections before removing completely.
3. On de-mould, crush and flex the foam several times – this helps to equalise pressure within the foam structure and can reduce shrinkage on cure.

10. Achieving a thicker skin

Moulding ProCell S4 in a typical application will give a thin skin that can be post-treated (for instance, painted). Although ProCell S4 is not designed to give a thick skin, experimentation with moulding conditions can improve the skin thickness. Ask your Mouldlife representative for details.

11. How much foam should I use?

ProCell S4 typically rises by a factor of 6-8 times its original volume, depending on the circumstances of use, and so it is strongly advised to calculate the foam prior to casting, otherwise overspill can occur, generating health and safety risks, requiring clean-up and wasting material.

In addition, when using a sealed mould, the pressures generated by the rising foam can be extremely high, and due care should be taken to ensure that the mould is not excessively over-packed - this can lead to a hazardous over-pressurisation of the mould which could cause to fail dangerously, See section 11 for more information.

In order to calculate the quantity required:-

- i) Take a rough measure of the width, height and breadth of the tool or cavity in cm.
- ii) Multiply these numbers together and divide by 1000 – this will give an approximate volume of the cavity in litres.
- iii) Divide this number by 7 to arrive at the approximate weight (in kgs) of the foam to mix. You should then carry out a test mould as described in section 11.

12. Working safely with ProCell S4

All polyurethane chemicals present certain hazards, and due care must be taken to ensure safe working practises are followed when using the materials. Failure to follow safe working practise when dealing with polyurethane materials can result in injury.

Some sensible guidelines for working safely with ProCell S4 include, but are not limited to the following.

- i) You must carry out an appropriate risk assessment for the process you are carrying out. Useful guidance can be found at www.hse.gov.uk/risk/index.
- ii) You must read and understand the MSDS for the materials, ensuring that you follow the guidelines as indicated.
- iii) When using a sealed mould, take advice from the mould maker or other expert as to the capability of the mould to withstand the likely pressures generated, which can be substantial. Remember that rising foam can potentially create a seal in a mould that might otherwise appear open.
- iv) When using a sealed mould, always carry out a dry run first; this should be done without sealing the mould, in order to confirm that the calculations of the volume of foam mixed are correct.

If in doubt, contact your Mouldlife representative who can put you in touch with experts who can assist.

13. Packaging, Storage and Shelf-life

ProCell S4 is available in a range of kit sizes:- 3kg, 7.5kg and 15kg. Larger sizes can be provided upon request.

ProCell S4 should be stored between 18°C and 25°C. Under these conditions, shelf-life in the original, unopened containers is six months.

ProCell S4 Part B is moisture sensitive, and thus due care should be taken to avoid contact with moisture; store in a dry place, and reseal containers after use.