

ALTUGLAS[®] SANITARY SHEETS

Altuglas CS & Altuglas CS Easy Forming



Altuglas® Sanitary sheets

Altuglas® Sanitary sheets is the Altuglas® range, made of cross linked cast sheets with superior surface finish, specially developed for sanitary ware applications.

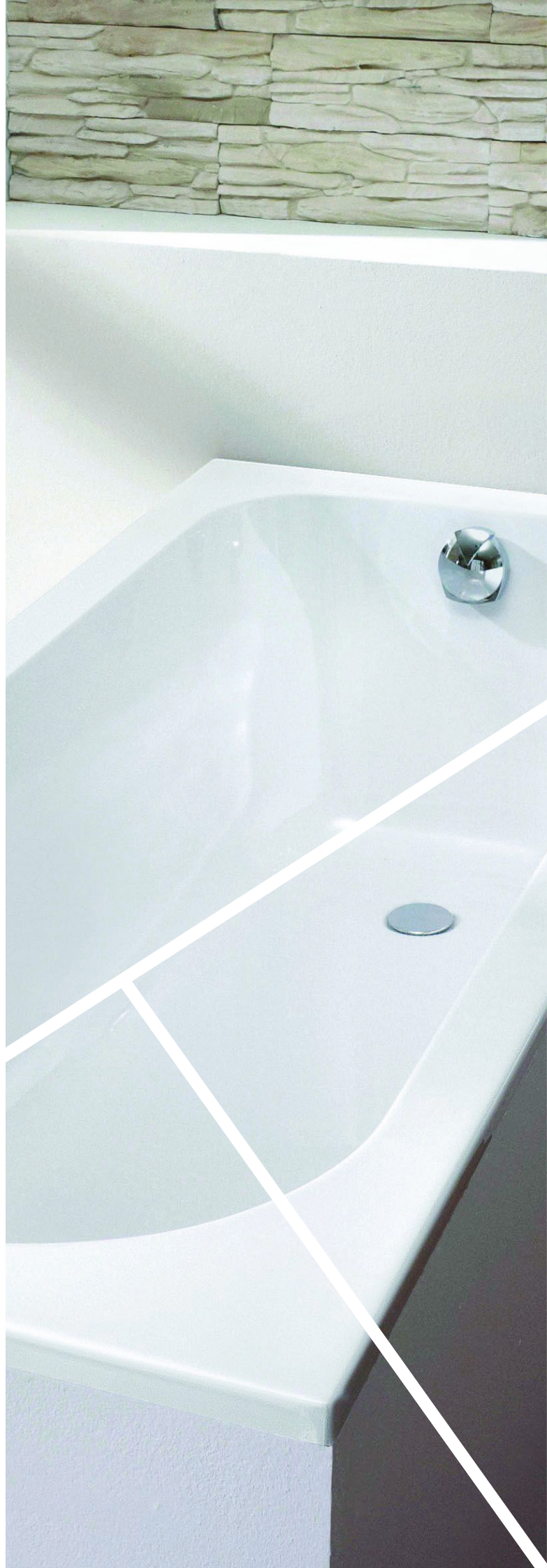
Altuglas® CS and Altuglas® CS Easy Forming (CSEF) are cast sheets specially developed for sanitary ware applications. They have a high molecular weight and are cross-linked.

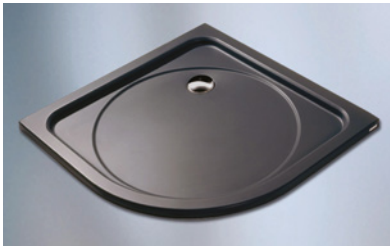
Altuglas® CS is a grade for all sanitary ware applications.

Altuglas® CS Easy Forming has a modification in order to improve the thermoformability. This property leads to new performances either in design or in productivity compare to Altuglas® CS.

It offers the general advantages of cast acrylic sheets well known for this application:

- wide range of colours
- very smooth surface finish
- exceptional resistance
- durability
- reliable quality
- fully recyclable





RANGE /

The Altuglas® Sanitary range includes 2 grades of sheets:

- Altuglas® CS : Grade for all sanitary ware applications
- Altuglas® CS Easy Forming : Grade with a higher thermoformability for deep or complex models

Altuglas International can manufacture 2 different finishes:

- Glossy for a high quality gloss aspect/finish
- Satin for an upper matt aspect

All colours are matched to ceramic products.

Technical documentation are available on request.

Altuglas International offers also a range of specialized products developed for specific applications such as repair sets, cleaning products.

ALTUGLAS®

Cast acrylic sheets range for sanitary appliances

CERTIFICATIONS /

Altuglas® CS and Altuglas® CS Easy Forming sheets comply with the European standard EN 263, the guideline for cast acrylic sheets use in the manufacture of sanitary ware.

Altuglas® CS sheets were officially certified by AFNOR since December 1991 and Altuglas® Easy Forming sheets were officially certified by AFNOR in December 2000.

These labels are only suitable for the applications properties.

PROPERTIES /

Altuglas® CS and Altuglas® CSEF fulfil or exceed all requirements of ISO 7823.1-2003: polymethymethacrylate sheets - Types, dimensions and characteristics. Part 1 Cast sheets.

EN 263: Crosslinked cast acrylic sheets for baths and shower trays for domestic purposes.

Altuglas International regularly performs other tests to check the quality of the production.

These tests are intended to insure a constant behavior during thermoforming and a perfect bonding with the reinforcement.



APPLICATIONS /

Altuglas® CS and Altuglas® CSEF can be used for the thermoforming of the main sanitary appliances:

- bathtubs
- shower trays
- vanity basins
- shower panels
- spas
- wall cover and more

These products can be equipped with jets and pumps.



PROCESSING /

Altuglas® CS and Altuglas® CSEF sheets must be thermoformed by conventional methods using a female mold under vacuum.

Nevertheless versatile production procedures can be employed.

After molding, a shell is obtained, but generally this shell is too flexible and must be reinforced to give the required rigidity to the product.

After reinforcement, the piece is trimmed and drilled for waste, overflow, taps and other fittings which may be required.

TECHNICAL ADVICES /

The best performances during thermoforming are obtained at temperatures around 180 °C. The sheets must be heated uniformly throughout the thickness and over the entire surface.

It is advisable to work with aluminium moulds with incorporated water channels to enable a temperature regulation. This is a key to consistent molding conditions.

The cooling conditions must be moulding in order to cool down the entire surface, but mainly in the area of the clamping system. The shell must be removed from the mould at a temperature above 70 °C but below 80 °C. This avoids breakage on the mould or distortions after demoulding.



Altuglas CS 145 °C



Altuglas CSEF 145 °C



Altuglas CS 165 °C



Altuglas CSEF 165 °C

TESTS COMPARISONS ALTUGLAS® CS / ALTUGLAS® CSEF /

Altuglas® CS Easy Forming sheets when tested according to specific conditions, show a better thermoformability.

The tests carried out required thermoforming with a special mould designed to obtain specific shapes.

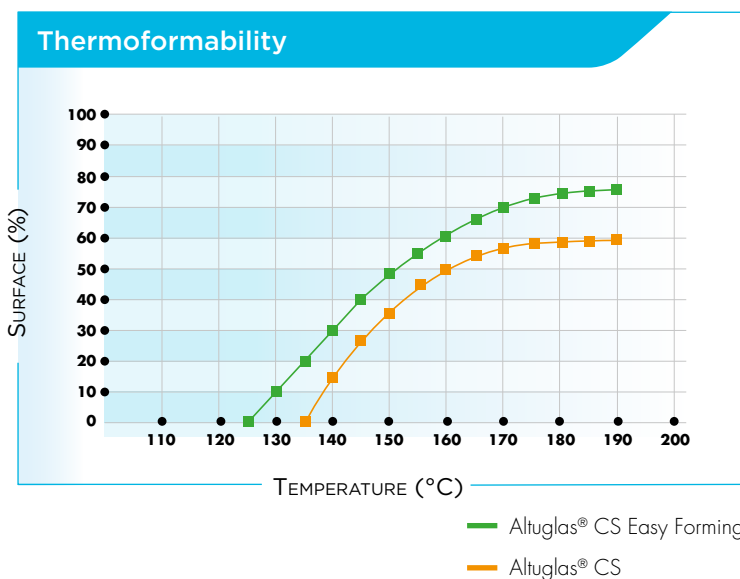
Thermoforming is realized at different temperatures, the temperature measurement applies when the vacuum performs on the sheet.

This means the set-up of the heaters (oven or radiation) should be around 15-20 °C higher in order to compensate for the temperature decrease during the handling of the sheet from the oven to the mould.

After cooling, the piece obtained is measured (principally the bottom which is in contact with the mould).

The mould has a special pattern to simplify the measurement. There is a direct correlation between this surface and for example the radii in the corners.

The results are drawn on a curve, giving the surface contact depending on the temperature.



PERFORMANCES ALTUGLAS® CS VERSUS ALTUGLAS® CSEF /

On the curve we can see easily the advantage of Altuglas® CS Easy Forming in comparison with Altuglas® CS.

It has a thermoforming range from 140 °C to 180 °C and a maximum definition of 75%.

For Altuglas® CS the thermoforming temperature range is increased by 10 °C from 150 °C to 190 °C and the maximum definition remains at 60%.

Altuglas® CSEF can be used in two different ways:

- thermoforming the sheets in the upper temperature range to obtain the best possible definition for difficult shapes
- thermoforming the sheets in the lower temperature range to achieve a shorter cycle time by reduction of the heating and cooling time



MAIN PROPERTIES ALTUGLAS® CSEF VERSUS ALTUGLAS® CS /

- **thermal resistance:** it is slightly lower than Altuglas® CS (10 °C)
- **thermoforming conditions:** this graph (page 4) shows very well the difference between the both materials; better definition for Altuglas® CSEF at 165 °C in comparison with Altuglas® CS

Lower thermoforming range, between 140 and 180 °C.

The performance can be seen on the pictures. The definition of the corners is much better, whatever the temperature.

- **chemical resistance:** the chemical resistance of Altuglas® CSEF is slightly lower than Altuglas® CS

This does not affect the adhesion of reinforcement and the resistance to chemicals agents included in the cleaners.

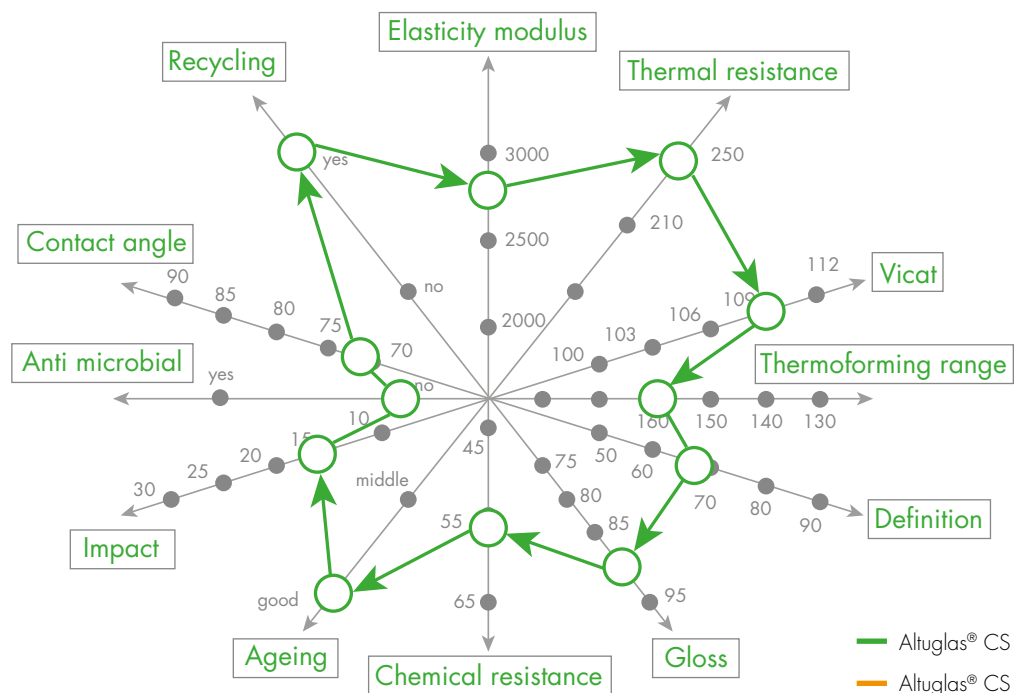
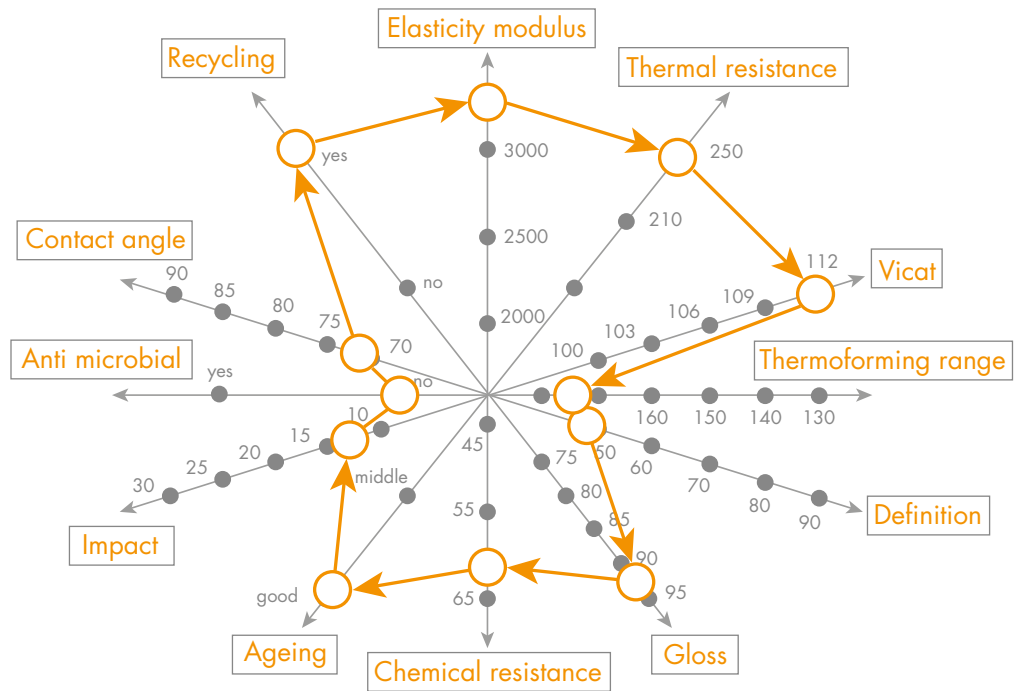
- **ageing resistance:** equal to that of Altuglas® CS

MAINTENANCE /

Small accidental scratches can be removed by polishing with Special Care Polish 1. If the damage is extensive, Altuglas International supplies repairs sets kits in the desired colour. These are used to reconstitute the material at the site of a break.

The charts below summarize the main properties of Altuglas® CS and Altuglas® CS Easy Forming sheets.

Properties of Altuglas® CS & CS Easy Forming



— Altuglas® CS Easy Forming
— Altuglas® CS

TECHNICAL SKILLS AND EXPERIENCE FOR ADVANCEMENTS IN TECHNOLOGY /

With many years of experience, Altuglas International provides unrivaled expertise in acrylic glass technology around the world. PMMA offers aesthetically pleasing and optical properties in addition to a long service life.

Marketing and development teams join the market and technical leaders to remain on the cutting edge of the industry. The three development priorities are:

- Innovate and improve the properties of our sheet and resin.
- Focus on our customers to better understand their needs and quickly provide the right solutions.
- Make progress in the lighting, automotive & transport, building & construction, consumer goods, and design sectors.

WELCOME TO THE WORLD OF ALTUGLAS INTERNATIONAL, A SUBSIDIARY OF ARKEMA GROUP

A world leader in PMMA technology, Altuglas International is highly involved in the technical plastic sector, ranging from MAM monomers to PMMA acrylic glass. Altuglas International designs and manufactures innovative products tailored to our global customers' needs. Our strongly committed employees contribute to our three business areas daily (MAM, PMMA resin and sheet). Our four main brands set the market standard: Altuglas®, Plexiglas® (Americas), Oroglas® and Solarkote®.

www.altuglas.com

**Many leading companies around the world ask Altuglas International
to help design and plan their creations.**

If you require further information, do get in touch with us. Please consult the Arkema disclaimer hereafter for questions related to the terms and conditions of use of our products
<http://www.arkema.com/fr/products/product-safety/disclaimer/index.html>

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