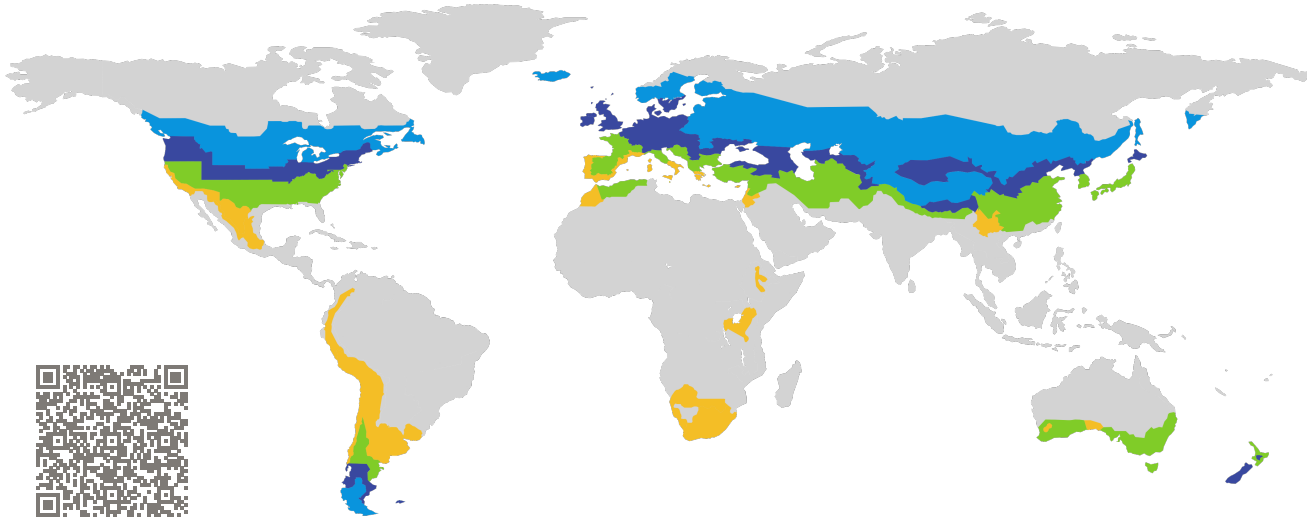


# CERTIFICATE

Certified Passive House Component

Component-ID 1506sp03 valid until 31st December 2020

Passive House Institute  
Dr. Wolfgang Feist  
64283 Darmstadt  
Germany



Category: **Spacer for low-E-glazing**

Manufacturer: **Alu-Pro S.r.l,**  
**Noale,**  
**Italy**

Product name: **CHROMATECH ultra F**

### This certificate was awarded based on the following criteria:

Depending on the climatic region, the spacer prevents high surface temperatures, which can cause mould. At least 3 out of the 7 reference frames fulfilled the spacer hygiene criteria for the relevant climatic region.

Hygiene  $f_{Rsi} \geq 0.75$

The specific resistance of the spacer's edges is greater than the climate-independent minimum requirement.

Efficiency  $R_E = 3.60 \text{ m K/W} \geq 1.50 \text{ m K/W}$

| Type                         |
|------------------------------|
| Plastic with stainless steel |
| Height Box 2                 |
| 6.90 mm                      |
| Thermal conductivity Box 2   |
| 0.280 W/(m K)                |



cold climate



**CERTIFIED COMPONENT**

Passive House Institute

Passive House efficiency class

phE

phD

phC

phB

phA

phA+

## Alu-Pro S.r.l

Via A. Einstein 8, Z.I., 30033 Noale, Italy

☎ +39 041 5897311 | ✉ alupro@alupro.it | 🌐 <http://www.alupro.it> |

### Description

Spacer Bar in stainless steel (0.10 mm combined with a special Plastic Top).

Spacer height: 6.90 mm

Thermal conductivity: 0.280 W/(m K) (WA-17/1 measured)

Available spacer widths: 8, 10, 12, 13, 14, 15, 16, 18, 20, 22 and 24 mm

| Appropriate secondary seal | Specific edge resistance $R_E$ | Efficiency class |
|----------------------------|--------------------------------|------------------|
| Polysulfide                | 3.77 m K/W                     | phB              |
| Polyurethane               | 3.77 m K/W                     | phB              |
| Silicone                   | 3.95 m K/W                     | phB              |

### Explanation




































Spacers are categorized into different efficiency classes based on the resistance of their edges  $R_E$ . A secondary polysulfide sealant is typically used, unless the spacer is not approved for polysulfide. A detailed report with the calculations is available from either the manufacturer or the Passive House Institute.

The Passive House Institute has defined global component requirements for seven climate regions. In principle, components that have been certified for climates with higher requirements can also be used in climates with lower requirements. This may be economically advantageous.

Use in PHPP:

If individually calculated values are not available then the thermal bridge loss coefficient specified in this document can be used. In this case, the appropriate reference frame must be selected and a 10% safety margin should be applied.

Further information regarding certification is available on [www.passivehouse.com](http://www.passivehouse.com) and [www.passipedia.org](http://www.passipedia.org).

| Reference frames calculated with Polysulfide |   |   |   |   |   |
|--|---|---|---|---|---|
| Climate                                      | Arctic  | Cool ✓  | Cool temperate ✓  | Warm temperate ✓  | Warm ✓  |
| Glass  | Quadruple   | Triple  | Triple  | Triple  | Double  |
| Glass package                                | 4/12/3/12/3/12/4  | 6/18/2/18/6   | 6/16/6/16/6   | 6/16/6/16/6   | 6/16/6  |
| Glass U-value                                | 0.35 W/(m <sup>2</sup> K)   | 0.52 W/(m <sup>2</sup> K)   | 0.70 W/(m <sup>2</sup> K)   | 0.70 W/(m <sup>2</sup> K)   | 1.20 W/(m <sup>2</sup> K)   |
| Timber-aluminium integral frame              |    |    |    |    |    |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.48  | 0.62  | 0.73  | 0.87  | 1.03  |
| $\Psi_g$ [W/(m K)]                           | 0.036   | 0.039   | 0.038   | 0.037   | 0.042   |
| $f_{Rsi}$ [-]                                | 0.74  | 0.74  | 0.70 ✓  | 0.68 ✓  | 0.58 ✓  |
| Timber-aluminium                             |    |    |    |    |    |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.54  | 0.57  | 0.75  | 0.97  | 1.19  |
| $\Psi_g$ [W/(m K)]                           | 0.039   | 0.041   | 0.041   | 0.040   | 0.046   |
| $f_{Rsi}$ [-]                                | 0.74  | 0.71  | 0.67  | 0.64  | 0.52  |
| Timber                                       |    |    |    |    |    |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.51  | 0.53  | 0.78  | 0.86  | 0.99  |
| $\Psi_g$ [W/(m K)]                           | 0.035   | 0.038   | 0.038   | 0.037   | 0.042   |
| $f_{Rsi}$ [-]                                | 0.76  | 0.75 ✓  | 0.72 ✓  | 0.71 ✓  | 0.61 ✓  |
| Vinyl  |  |  |  |  |  |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.70  | 0.75  | 0.82  | 1.02  | 1.16  |
| $\Psi_g$ [W/(m K)]                           | 0.039   | 0.039   | 0.042   | 0.044   | 0.048   |
| $f_{Rsi}$ [-]                                | 0.76  | 0.74  | 0.71 ✓  | 0.71 ✓  | 0.59 ✓  |
| Aluminium                                    |  |  |  |  |  |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.60  | 0.61  | 0.71  | 0.73  | 1.17  |
| $\Psi_g$ [W/(m K)]                           | 0.041   | 0.046   | 0.047   | 0.047   | 0.053   |
| $f_{Rsi}$ [-]                                | 0.77  | 0.77 ✓  | 0.74 ✓  | 0.74 ✓  | 0.61 ✓  |
| Curtain wall timber                          |  |  |  |  |  |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.60  | 0.65  | 0.66  | 0.71  | 1.11  |
| $\Psi_g$ [W/(m K)]                           | 0.055   | 0.056   | 0.056   | 0.055   | 0.067   |
| $f_{Rsi}$ [-]                                | 0.72  | 0.70  | 0.68  | 0.67 ✓  | 0.54  |
| Curtain wall aluminium                       |  |  |  |  |  |
| $U_f$ [W/(m <sup>2</sup> K)]                 | 0.67  | 0.73  | 0.75  | 0.79  | 1.33  |
| $\Psi_g$ [W/(m K)]                           | 0.064   | 0.064   | 0.067   | 0.067   | 0.091   |
| $f_{Rsi}$ [-]                                | 0.80 ✓  | 0.79 ✓  | 0.77 ✓  | 0.76 ✓  | 0.65 ✓  |

