

# kvadrat expert centre



## Textile performance reporting of Grassland in conjunction with reference glazing of EN 14501-2021

Report with textile performance measurements, calculations and glare classification in compliance with EN 14500:2021 & EN 14501:2021

## Kvadrat Expert Centre

Kvadrat Shade together with Kvadrat High Performance Textiles (KHPT), formerly known as Verosol, is well-known as the specialist in designing and manufacturing technically superior textiles for curtains and internal curtains. Kvadrat Expert Centre as part of KHPT can play an important role in the design phase of a building project.

We have a modern, well equipped, laboratory to measure the performances of textiles according to the latest standards (EN14500:2021). We calculate according to the detailed method EN 52022-3:2017. This enables us to create custom-made reports of the impact our shades in conjunction with building specific glazing. We do this at Kvadrat's Expert Centre, where we aim to create ever more sustainable advantaged and superior value. By engaging with design teams at the earliest possible stage, Kvadrat can maximise the impact of the shading system. We assist architects, consultants and façade engineers to create the optimal combination of shades with glazing. Our aim is to consistently maximise natural (day)light without creating thermal or visual discomfort. Put it simple, minimise energy cost for the building without compromising occupant comfort.

This report shows the results of curtain Kvadrat Grassland 0991 in combination with the reference glazings, the most common glazing types, from EN14501:2021 to give an impression on the achievements that can be made. If you wish a tailor made report for your project, please contact the local Kvadrat sales contact.



ing. Evert Bos



ir. Lindsay Hovenier

## Glass composition and performance data

Performance calculations are made with all relevant reference glazings from EN 14501:2021. The glazings A and B are configured with integrated performance values, glazings F, G, H and I are configured with panes with full spectral data that are included in the standard. Full spectral data is required to perform accurate and detailed calculations in compliance with EN-ISO 52022-3

No	Glazing composition from outdoor to indoor	U-value	g-value	LT-value
1	Reference glazing A single (EN 14051-2021) Pane : EN14501:2021 clear glass 4 mm	6.0	0.88	0.91
2	Reference glazing B double (EN 14501-2021) Pane : EN14501:2021 clear glass 4 mm Gap : Air 12 mm Pane : EN14501:2021 clear glass 4 mm	3.0	0.80	0.82
3	Reference F double Low-E (EN 14501-2021) Pane : EN14501:2021 clear glass 4 mm Gap : Air-Argon 10/90 15 mm Pane : EN14501:2021 low-E reference 4 mm	1.1	0.65	0.82
4	Reference G double Solar Control (EN 14501-2021) Pane : EN14501:2021 Reference Solar Control 6 mm Gap : Air-Argon 10/90 16 mm Pane : EN14501:2021 clear glass 4 mm	1.0	0.33	0.70
5	Reference H triple Low-E (EN 14501-2021) Pane : EN14501:2021 low-E reference 4 mm Gap : Air-Argon 10/90 12 mm Pane : EN14501:2021 clear glass 4 mm Gap : Air-Argon 10/90 12 mm Pane : EN14501:2021 low-E reference 4 mm	0.7	0.53	0.74
6	Glazing I triple Solar Control with reference panes Pane : EN14501:2021 Reference Solar Control 6 mm Gap : Air-Argon 10/90 14 mm Pane : EN14501:2021 clear glass 4 mm Gap : Air-Argon 10/90 14 mm Pane : EN14501:2021 low-E reference 4 mm	0.6	0.31	0.64

1. Reference glazing A is a single clear glass.
2. Reference glazing B is a double clear glass.
3. Reference glazing F is a double insulation glazing, coating on position 3.
4. Reference Glazing G is a double solar control glazing, coating on position 2.
5. Reference Glazing H is a triple insulation glazing, coating on positions 2 and 5.
6. Glazing I is a triple solar control glazing, coatings on positions 2 and 5, composed with full spectral reference panes from outdoor to indoor: Pane 3 (Tables A-18/19) - Pane 1 (Tables A-14/15) - Pane 2 (Tables 16/17) out of EN14501:2021.

## Textile Performance Indicators

### Measured performances acc. EN 14500:2021

Shading textile	Solar Reflec-tion	Solar Trans-mission	Visible Trans-mission	UV Trans-mission	Open-ness Factor	IR-Emis-sivity	Ra
Kvadrat Grassland 0211	0.61	0.19	0.14	0.00	0.1%	0.80	87
Kvadrat Grassland 0371	0.33	0.14	0.01	0.00	0.1%	0.80	82
Kvadrat Grassland 0411	0.63	0.19	0.14	0.00	0.1%	0.80	85
Kvadrat Grassland 0541	0.60	0.18	0.11	0.00	0.1%	0.80	60
Kvadrat Grassland 0611	0.63	0.20	0.15	0.00	0.1%	0.80	86
Kvadrat Grassland 0731	0.54	0.15	0.04	0.00	0.1%	0.80	89
Kvadrat Grassland 0741	0.51	0.14	0.02	0.00	0.1%	0.80	76
Kvadrat Grassland 0771	0.32	0.13	0.00	0.00	0.1%	0.80	87
Kvadrat Grassland 0781	0.32	0.13	0.00	0.00	0.1%	0.80	35
Kvadrat Grassland 0911	0.63	0.19	0.15	0.00	0.1%	0.80	92
Kvadrat Grassland 0991	0.33	0.12	0.00	0.00	0.1%	0.80	29

### Performances classifications acc. EN 14501:2021

Shading textile	Glare Control Class	Visual Contact Class	Daylight use Class	Night Privacy Class
Kvadrat Grassland 0211	2	1	2	2
Kvadrat Grassland 0371	4	2	0	2
Kvadrat Grassland 0411	2	1	2	2
Kvadrat Grassland 0541	2	1	1	2
Kvadrat Grassland 0611	2	1	2	2
Kvadrat Grassland 0731	3	2	1	2
Kvadrat Grassland 0741	4	2	0	2
Kvadrat Grassland 0771	4	2	0	2
Kvadrat Grassland 0781	4	2	0	2
Kvadrat Grassland 0911	2	1	2	2
Kvadrat Grassland 0991	4	2	0	2

All reflection and transmission properties are measured in compliance with EN 14500:2021. These properties are based on averages and are subject to production tolerances, misprints, errors and technical modifications

Ra = Colour Rendering Index and is an indicator for natural daylight passing through the shade. Ra = 100 is best. For offices Ra should be at least 80.

Glare Control Class = Glare control - Classification, determined in compliance with Table 7 from EN

14501:2021.

View Through Class = Visual contact with the outside - Classification, determined in compliance with Table 9 from EN 14501:2021.

Daylight Use Class = Daylight utilization - Classification, determined in compliance with Table 10 from EN 14501:2021 using formula 32 from EN 14500:2021. Smart shade control systems will/can neutralise the low Daylight Use rating.

Night privacy Class = Privacy night - Classification, determined in compliance with Table 8 from EN 14501:2021.

Classifications classes: 0 - very little effect; 1 - little effect; 2 - moderate effect; 3 - good effect; 4-very good effect.

## Calculated Fenestration Performances

All calculations are made in WIS 3.0.1.sp2 and are in compliance with EN-ISO 52022-3:2017 under reference conditions. Calculated values are mid-pane values. Framing and spacerbars are not taken into account.

The cavity between glazing and curtain is set at 300mm and is assumed to be free ventilated due to small gaps at the perimeter of the curtain.

All values have been rounded to two decimal places. Any apparent similarities or small differences are due to rounding and do not affect the accuracy of the underlying data

Reference glazing A single (EN 14051-2021)	U-tot value	g-tot value	LT-tot value	FC-value
Glazing only	6.0	0.88	0.91	
+ Kvadrat Grassland 0211	3.73	0.33	0.14	0.37
+ Kvadrat Grassland 0371	3.73	0.47	0.00	0.53
+ Kvadrat Grassland 0411	3.73	0.32	0.15	0.36
+ Kvadrat Grassland 0541	3.73	0.33	0.11	0.37
+ Kvadrat Grassland 0611	3.73	0.32	0.15	0.36
+ Kvadrat Grassland 0731	3.73	0.36	0.04	0.41
+ Kvadrat Grassland 0741	3.73	0.37	0.02	0.42
+ Kvadrat Grassland 0771	3.73	0.47	0.00	0.53
+ Kvadrat Grassland 0781	3.73	0.47	0.00	0.53
+ Kvadrat Grassland 0911	3.73	0.32	0.15	0.36
+ Kvadrat Grassland 0991	3.73	0.46	0.00	0.52

Reference glazing B double (EN 14501-2021)	U-tot value	g-tot value	LT-tot value	FC-value
Glazing only	3.0	0.80	0.82	
+ Kvadrat Grassland 0211	2.22	0.35	0.14	0.44
+ Kvadrat Grassland 0371	2.22	0.50	0.00	0.62
+ Kvadrat Grassland 0411	2.22	0.34	0.14	0.43
+ Kvadrat Grassland 0541	2.22	0.36	0.10	0.45
+ Kvadrat Grassland 0611	2.22	0.34	0.15	0.43
+ Kvadrat Grassland 0731	2.22	0.39	0.04	0.49
+ Kvadrat Grassland 0741	2.22	0.40	0.02	0.50
+ Kvadrat Grassland 0771	2.22	0.50	0.00	0.63
+ Kvadrat Grassland 0781	2.22	0.51	0.00	0.63
+ Kvadrat Grassland 0911	2.22	0.34	0.15	0.43
+ Kvadrat Grassland 0991	2.22	0.50	0.00	0.62

Reference F double Low-E (EN 14501-2021)	U-tot value	g-tot value	LT-tot value	FC-value
Glazing only	1.1	0.65	0.82	
+ Kvadrat Grassland 0211	0.94	0.35	0.13	0.54
+ Kvadrat Grassland 0371	0.94	0.51	0.00	0.79
+ Kvadrat Grassland 0411	0.94	0.34	0.14	0.52
+ Kvadrat Grassland 0541	0.94	0.35	0.10	0.55
+ Kvadrat Grassland 0611	0.94	0.34	0.14	0.52
+ Kvadrat Grassland 0731	0.94	0.39	0.04	0.61
+ Kvadrat Grassland 0741	0.94	0.41	0.02	0.63
+ Kvadrat Grassland 0771	0.94	0.52	0.00	0.80
+ Kvadrat Grassland 0781	0.94	0.52	0.00	0.80
+ Kvadrat Grassland 0911	0.94	0.34	0.15	0.52
+ Kvadrat Grassland 0991	0.94	0.51	0.00	0.79

Reference G double Solar Control (EN 14501-2021)	U-tot value	g-tot value	LT-tot value	FC-value
Glazing only	1.0	0.33	0.70	
+ Kvadrat Grassland 0211	0.85	0.16	0.12	0.49
+ Kvadrat Grassland 0371	0.85	0.29	0.00	0.88
+ Kvadrat Grassland 0411	0.85	0.16	0.12	0.47
+ Kvadrat Grassland 0541	0.85	0.17	0.09	0.52
+ Kvadrat Grassland 0611	0.85	0.15	0.12	0.47
+ Kvadrat Grassland 0731	0.85	0.20	0.03	0.61
+ Kvadrat Grassland 0741	0.85	0.21	0.02	0.63
+ Kvadrat Grassland 0771	0.85	0.29	0.00	0.89
+ Kvadrat Grassland 0781	0.85	0.29	0.00	0.89
+ Kvadrat Grassland 0911	0.85	0.16	0.13	0.47
+ Kvadrat Grassland 0991	0.85	0.29	0.00	0.89

Reference H triple Low-E (EN 14501-2021)	U-tot value	g-tot value	LT-tot value	FC-value
Glazing only	0.7	0.53	0.74	
+ Kvadrat Grassland 0211	0.64	0.32	0.13	0.59
+ Kvadrat Grassland 0371	0.64	0.45	0.00	0.85
+ Kvadrat Grassland 0411	0.64	0.31	0.13	0.58
+ Kvadrat Grassland 0541	0.64	0.32	0.10	0.61
+ Kvadrat Grassland 0611	0.64	0.31	0.14	0.58
+ Kvadrat Grassland 0731	0.64	0.36	0.04	0.67
+ Kvadrat Grassland 0741	0.64	0.37	0.02	0.69
+ Kvadrat Grassland 0771	0.64	0.46	0.00	0.86
+ Kvadrat Grassland 0781	0.64	0.46	0.00	0.86
+ Kvadrat Grassland 0911	0.64	0.31	0.14	0.58
+ Kvadrat Grassland 0991	0.64	0.46	0.00	0.86

Glazing   triple Solar Control with reference panes	U-tot value	g-tot value	LT-tot value	FC-value
Glazing only	0.6	0.31	0.64	
+ Kvadrat Grassland 0211	0.56	0.17	0.11	0.56
+ Kvadrat Grassland 0371	0.56	0.28	0.00	0.92
+ Kvadrat Grassland 0411	0.56	0.17	0.11	0.55
+ Kvadrat Grassland 0541	0.56	0.18	0.08	0.59
+ Kvadrat Grassland 0611	0.56	0.17	0.12	0.54
+ Kvadrat Grassland 0731	0.56	0.21	0.03	0.67
+ Kvadrat Grassland 0741	0.56	0.21	0.02	0.69
+ Kvadrat Grassland 0771	0.56	0.28	0.00	0.92
+ Kvadrat Grassland 0781	0.56	0.28	0.00	0.92
+ Kvadrat Grassland 0911	0.56	0.17	0.12	0.55
+ Kvadrat Grassland 0991	0.56	0.28	0.00	0.92