

# **KIWALITE**

**REFLECTIVE SHEETING**

**PRODUCT  
BULLETIN**

No. KL-12220

**High Intensity Grade #22000 Series**

**Instruction for Products**

**KIWA CHEMICAL INDUSTRY CO., LTD.**

**FILMS DIVISION**

## 1. Description

“KIWALITE” Reflective Sheeting High Intensity Grade #22000 Series is an encapsulated lens type reflective sheeting, to be designed for the manufacture of traffic signs which require the highest performance in reflectivity and outdoor exposure.

This sheeting has either a heat activated adhesive type (#22002 Series) or a pressure sensitive adhesive type (#22003 Series).

## 2. Reflective Intensity

The minimum reflective intensity values of “KIWALITE” Reflective Sheeting High Intensity Grade #22000 Series are specified in Table-1.

Table-1. Minimum Reflective Intensity Values

D.A.	I.A.	White	Yellow	Orange	Red	Green	Blue	Brown
0.2°	-4°	250	170	100	45	45	20	12
	+30°	150	100	60	25	25	11	8.5
0.5°	-4°	95	62	30	15	15	7.5	5.0
	+30°	65	45	25	10	10	5.0	3.5
2.0°	-4°	4	3.0	1.1	0.7	0.5	0.3	-
	+30°	3	1.8	0.5	0.3	0.2	0.1	-

Note: D.A.=Divergence Angle, I.A.=Incidence Angle; Unit of value=cd/lux/sq.m

## 3. Color and Code No.

a) Following colors are available in “KIWALITE” Reflective Sheeting High Intensity Grade #22000 Series :

( Color )	Heat Activated Type ( Code No. )	Pressure Sensitive Type ( Code No. )
White	#22012	#22013
Yellow	#22042	#22043
Orange	#22052	#22053
Red	#22062	#22063
Green	#22072	#22073
Blue	#22082	#22083
Brown	#22192	#22193

b) The color conforms to the requirements specified in Table-2.

Table-2. Color Specifications Limits

	C.I.E. Chromaticity Coordinates								Reflectance	
	1		2		3		4		Y	
	x	y	x	y	x	y	x	y	Min.	Max.
White	0.295	0.325	0.305	0.315	0.325	0.355	0.335	0.345	27.0	—
Yellow	0.470	0.480	0.494	0.505	0.513	0.437	0.545	0.454	15.0	40.0
Orange	0.506	0.404	0.558	0.352	0.570	0.429	0.636	0.364	14.0	30.0
Red	0.610	0.340	0.638	0.312	0.660	0.340	0.690	0.310	3.0	11.0
Green	0.110	0.415	0.110	0.500	0.170	0.415	0.170	0.500	3.0	6.0
Blue	0.130	0.090	0.130	0.140	0.160	0.090	0.160	0.140	1.0	4.0
Brown	0.430	0.340	0.610	0.390	0.550	0.450	0.430	0.390	4.0	9.0

\* Light source: CIE Standard Illuminant "D65"

#### 4. Resistance to Accelerated Weathering

After the accelerated weathering test by sunshine weather-o-meter for 2,200 hours except Orange color (for 500 hours), "KIWALITE" Reflective Sheeting High Intensity Grade #22000 Series retain more than 80 % of the reflective intensity values specified in Table-1, and also shows good colorfastness and no evidence of cracking, scaling, pitting, blistering, edge lifting or curling or more than 0.8mm shrinkage or expansion.

#### 5. Other Properties

"KIWALITE" Reflective Sheeting High Intensity Grade #22000 Series conforms to all other requirements specified in ISO/DIS 3864-1 and ASTM D 4956-01 Type III, Class 1 and Class 2.

#### 6. Performance Life

According to the test results by both natural outdoor exposure and accelerated weathering, "KIWALITE" Reflective Sheeting High Intensity Grade #22000 Series can be expected to provide the effective performance life of 10 years except Orange color (for 3 years) under normal, vertical outdoor conditions. However, the effective performance life will depend upon substrate selection and preparation, compliance with recommended application procedures, exposure conditions and maintenance.

When exposed in any position other than vertical, or exposed to extremely severe atmospheric conditions or unusual conditions, the effective performance life may be shortened.



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