

## Description

ORALITE® VC 412RA Ecoflex™ (*RapidAir*® Liner (RA)) is a tough weather resistant product designed for rugged outdoor use for livery applications on emergency services vehicles. The material is die-cuttable and plotter cuttable, and easy to apply onto smooth painted vehicle surfaces.

## Product Construction

ORALITE® VC 412RA Ecoflex™ is composed of cube corner (microprism) retroreflective elements integrally bonded to a flexible, smooth-surfaced tough and weather resistant UV stabilised polymeric film. The prism surfaces are coated with a vacuum deposition of aluminium to provide a mirror surface to the prism facets. The resulting material is not more than 0.33 – 0.58 mm thick, and comes with an aggressive high-tack pressure sensitive adhesive. The product is single layer, with no need for edge sealing.

## Film Logo Pattern



## Retroreflectivity

Typical values for the coefficient of retroreflection ( $R'$ ) for ORALITE® VC 412RA Ecoflex™ are shown in Table 1 when illuminated with CIE standard illuminant A and measured with the provisions of CIE no. 54. The values are an average of rotation angles 0° and 90°. ORALITE® VC 412RA Ecoflex™ fulfils the requirements of ASTM D8514.

## Colour

ORALITE® VC 412RA Ecoflex™ is available in silver, yellow, red, blue, green, fluorescent lime and fluorescent orange. The colour is located in the area defined by the chromaticity coordinates and luminance factor provided in Table 2, when measured in accordance with the provisions of CIE No.15.2 (illuminant  $D_{65}$ ) and shall comply with the specifications of ASTM D8514.

## Impact Resistance

ORALITE® VC 412RA Ecoflex™ sheeting shall show no signs of cracking or delamination outside the actual area of impact when it is subjected to an impact of 1,13 N·m generated by a 0,91 kg weight with a 16 mm rounded tip, as per ASTM D4956.

## Adhesive

The adhesive has been specifically designed to allow for excellent initial repositionability by dry application method. In combination with the *RapidAir*® liner (RA), an application without air inclusion, especially in large scale applications, is quick and easy.

## Shrinkage

A 230 mm square specimen of the sheeting with liner shall be conditioned a minimum of 1 hour at 22° C and 50% RH. The liner is then removed and the specimen is placed on a flat surface with the adhesive side up. 10 minutes after the liner is removed and again after 24 hours, then specimen is measured to determine the amount of dimensional change. The specimen must not shrink in any dimension more than 0,8 mm in 10 minutes and 3,1 mm in 24 hours.

**Flexibility**

The sheeting is conditioned for 24 hours at 22° C and 50% RH. The release liner is removed and the sheeting is sufficiently flexible to show no cracking when bent in one second's time around a 3,1 mm diameter mandrel with the adhesive contacting the mandrel.

**Application Instructions**

Material must be applied when the air and surface temperature is between 10° C and 28° C to assure proper adhesive bonding. Surfaces must be cleaned for grease, oil and dirt. Use a clean towel and isopropyl alcohol to wipe the surface before application.

Please see ORAFOL homepage for complete application instructions.

**Solvent Resistance**

ORALITE® VC 412RA Ecoflex™ material meets the solvent resistance requirements of LS-300C solvent resistance, section 3.6.7, when tested as specified in Table VI, test method 4.6.6.

**Shelf Life**

The sheeting must be used within 1 year from the shipment date. All rolls including partially used rolls should be stored in original packaging, tightly wound. Store in a clean and dry area, away from direct sunlight. Store at 20° C and 50% relative humidity.

**Table 1 – Retroreflectivity**

Entrance Angle (Beta = $\beta_1$ )	Colour						
	White	Blue	Green	Yellow	Red	Fl. Lime	Fl. Orange
0,2° / 5°	560	44	104	420	104	336	160
0,2° / 30°	260	20	52	208	52	160	80
0,2° / 40°	110	8	16	70	16	56	24
0,33° / 5°	300	20	52	208	52	160	80
0,33° / 30°	148	10.4	25.6	120	25.6	80	50
0,33° / 40°	95	3.2	11	64	13	28	20
0,5° / 5°	110	7	16	64	20	52	45
0,5° / 30°	60	3.2	8	36	10	26.4	20
0,5° / 40°	20	1.04	3.2	11.2	3.6	9	8
1,0° / 5°	22.4	1.6	5	16	4	12	8
1,0° / 30°	11.2	0.8	1.6	8	1.6	6.4	4
1,0° / 40°	3.2	-	-	2.4	-	1.6	2
2,0° / 5°	5	0.2	0.5	3	1	-	-
2,0° / 30°	2.5	0.1	0.3	1,5	0.4	-	-
2,0° / 40°	1.5	-	0.2	1	0.3	-	-

All values have units of cd/lux/m<sup>2</sup>.



**Table 2 - Colour Specification Limits (Daytime)**

Colour	Chromaticity Coordinates*									
	1		2		3		4		Y%	
	x	y	x	y	x	y	x	y	Min.	Max.
Silver	0.303	0.300	0.368	0.366	0.340	0.393	0.274	0.329	27.0	----
Yellow	0.498	0.412	0.557	0.442	0.479	0.520	0.438	0.472	15.0	45.0
Green	0.026	0.399	0.166	0.364	0.286	0.446	0.207	0.771	3.0	9.0
Red	0.648	0.351	0.735	0.265	0.629	0.281	0.565	0.346	2.5	12.0
Blue	0.140	0.035	0.244	0.210	0.190	0.255	0.065	0.216	1.0	10.0
Fluorescent lime	0.387	0.610	0.369	0.546	0.428	0.496	0.460	0.540	50.0	----
Fluorescent orange	0.583	0.416	0.535	0.400	0.595	0.351	0.645	0.355	20.0	25.0

\*) The four pairs of chromaticity coordinates determine the acceptable chromaticity when measured with standard illuminant D65

### Physical and Chemical Properties

<b>Thickness<sup>1</sup></b> (without protective paper)	0.33 – 0.58 mm
<b>Temperature resistance</b>	adhered to aluminium, -40° C to +82° C (-40° F to 180° F)
<b>Resistance to cleaning agents</b>	adhered to aluminium, 8h in solution (0.5% household cleaning agents) at room temperature and 65° C (150° F): no variation
<b>Adhesive power<sup>1</sup></b> (FINAT-TM1 after 24h, stainless steel)	>15 N/25 mm (1 inch)
<b>Shelf life<sup>2</sup></b>	1 year
<b>Application temperature</b>	> +15° C
<b>Service life by specialist application<sup>3</sup></b> under vertical outdoor exposure	Up to 5 years (non-fluorescent colours) Up to 5 years (fluorescent colours)

<sup>1</sup> average

<sup>2</sup> in original packaging, at 20° C and 50% relative humidity

<sup>3</sup> standard central European climate, Please refer to the document *Practical Information ORALITE® VC 412RA Ecoflex / VC 612 / VC 612RA Flexibright / VC 612 Fleet Marking Grade* for all regions

### IMPORTANT NOTICE

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