

**THE NETHERLANDS**
(N E D E R L A N D)**COMMUNICATION**

Concerning:

- ~~approval granted~~
- approval extended
- ~~approval refused~~
- ~~approval withdrawn~~
- ~~production definitely discontinued~~

of retro-reflective markings of heavy and long vehicles and their trailers, pursuant to Regulation number 104.

Approval number: E4-104R-00 0001

Extension number: 08

1. Trade name mark of the marking material : REFLEXITE VC 104 Conspicuity material;
REFLEXITE JV 104E Conspicuity material;
REFLEXITE VC104 + Rigid Grade;
REFLEXITE VC104 + Rigid Grade Imagine;
ORALITE JV104E Rigid Grade;
ORALITE VC104+ Rigid Grade;
ORALITE VC104 + Rigid Tanker Stickers;
ORALITE VC104 + Rigid Grade Imagine
2. Class of the marking material : C/D/E
3. Name and address of the manufacturer : ORAFOL Europe GmbH,
Reflective Solutions Ireland
Unit 5, Cleaboy Business park,
Old Kilmeaden Road, Waterford, Ireland

Assembly plant address : ORAFOL Europe GmbH,
Orafolstrasse 2,
D-16515 Oranienburg,
Germany
4. If applicable, name and address of manufacturer's representative : --



5. Date on which the marking material was submitted for approval tests : June 17, 1998;
December 2, 1999;
February 7, 2000;
September 14, 2007;
July 2, 2012;
30 April 2013
6 October 2014
6. Technical service responsible for conducting approval test : DEKRA Certification B.V.
7. Date of test report issued by the technical service : September 23, 1998;
January 13, 2000;
February 24, 2000;
November 8, 2007;
August 19, 2010;
21 May 2013
17 October 2014
8. Number of test report issued by the technical service : 98-103;
99-221;
00-034;
2109752-QUA-PHO 07-170;
2137117-QUA/PHO 10-142;
2163281-PHO 13-135-1
2174910-PHO 14-218-1
9. Remarks : --
10. Approval : ~~granted/refused/extended/withdrawn~~
11. Reason(s) for the extension (if applicable) : Alternative brand name "ORAFOL" with marketing name "ORALITE ..."
12. Place : Zoetermeer
13. Date : 24-OCT-2014
14. Signature :

Name

:

Uwe Löbig



15. Annexed is a list of documents making up the approval file, deposited with the competent authority which granted approval; a copy can be obtained on request.
- 3 Drawings Nos. "Reflexite VC104 Conspicuity Material" dated August 12, 1998; November 8, 1999; February 3, 2000,
 - 1 Technical Product Bullitin "Reflexite VC104+ Rigid Grade" Bullitin 200-11
 - 1 Technical Product Bullitin "Reflexite VC104+ Rigid Grade Imagine" Bullitin 200-xx and a logo lay-out proposal
 - 1 Technical Datasheet page 1 and 2 "ORALITE VC104+ Rigid Grade" dated 2015/01 (annexed)
 - 1 Technical Datasheet page 1 and 2 "ORALITE VC104+ Rigid Grade Imagine" dated 2015/01 (annexed)
 - Test report as mentioned in item 8



ORALITE® VC 104+ Rigid Grade

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Datasheet
2015/01
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Description

ORALITE® VC 104+ Rigid Grade is a tough weather resistant product designed for rugged outdoor use. The material is intended for application as conspicuity marking on trucks and trailers with rigid sides.

Product Construction

ORALITE® VC 104+ Rigid Grade 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 0,16 mm thick, and comes with an aggressive high-tack pressure sensitive adhesive. The product is single layer, with no need for edge sealing.

Product Approval

ORALITE® VC 104+ Rigid Grade is approved to Regulation ECE 104 Class C.

Film Logo Pattern



Colour

ORALITE® VC 104+ Rigid Grade is available in yellow, white and red. The colours conform to the requirements of Regulation ECE 104. The colour shall be 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 and illuminated with the CIE standard illuminant D₆₅ at an angle of 45° to the normal (45° / 0° geometry). The measured value shall be the average of 8 readings. The test sample shall be rotated 45 degrees. The retroreflected colour (nighttime colour), when illuminated with CIE standard illuminant A at an observation angle of 20° and entrance angles of $\beta_1 = \pm 5^\circ$, and $\beta_2 = 0^\circ$ shall be located within the area defined by the chromaticity coordinates in Table 3.

Retroreflectivity

ORALITE® VC 104+ Rigid Grade complies with the minimum reflectivity requirements of Regulation ECE 104 Class C. When illuminated with CIE standard illuminant A and measured with the provisions of CIE No. 54, the coefficient of retroreflection for ORALITE® VC 104+ Rigid Grade shall be not less than the values in Table 1.

Adhesive

The adhesive is protected by a release liner, which shall be removed by peeling, without soaking in water or other solvents.

A 25 mm strip shall provide a bond such that it shall support an 800 g weight for 5 minutes without the strip peeling for a distance of more than 50 mm when applied to a smooth aluminium surface as specified in the ASTM 4956 adhesion test.

The adhesive service temperature ranges from -40° C to +90° C (*).

(*) Data based on laboratory testing and under no load. The practical service temperature is dependent on variables including the substrates being bonded, environmental conditions, the loading and method of application.

Application Instructions

Material must be applied when the air and surface temperature is between 15° C and 38° C to assure proper adhesive bonding. Surfaces must be cleaned for all grease, oil and dirt. Use a clean towel and Isopropyl alcohol or similar to wipe the surface before application. If any air bubbles are trapped, use a pin to puncture the bubble and squeegee to push the air towards the pin hole. Please contact ORAFOL for complete application instructions.



ORAFOL Europe GmbH - Orafolstrasse 2 - D 16515 Oranienburg - Germany
reflective.solutions@orafol.de - www.orafol.com



ORALITE® VC 104+ Rigid Grade

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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 room temperature 20° C and at 50% relative humidity.

Warranty

ORALITE® VC 104+ Rigid Grade has a ten year warranty. Please contact ORAFOL for full details.

Table 1
Retroreflectivity

| Observation Angle | Entrance Angle (β) | | | | | |
|-------------------|----------------------------|-----|-----|-----|-----|-----|
| | Beta 1 (β_1) | 0° | 0° | 0° | 0° | 0° |
| 20° (0,33°) | Beta 2 (β_2) | 5° | 20° | 30° | 40° | 60° |
| White | R' | 450 | n/a | 200 | 90 | 16 |
| Yellow | R' | 300 | n/a | 130 | 75 | 10 |
| Red | R' | 120 | 60 | 30 | 10 | n/a |

All values have units of cd/lux/m².

Table 2
Colour Specification Limits (Daytime)

| Colour | Chromaticity Coordinates* | | | | | | | | Y |
|--------|---------------------------|-------|-------|-------|-------|-------|-------|-------|--------|
| | 1 | | 2 | | 3 | | 4 | | |
| | x | y | x | y | x | y | x | y | |
| White | 0,300 | 0,270 | 0,385 | 0,355 | 0,345 | 0,395 | 0,260 | 0,310 | > 0,25 |
| Yellow | 0,545 | 0,454 | 0,487 | 0,423 | 0,427 | 0,483 | 0,465 | 0,534 | > 0,16 |
| Red | 0,690 | 0,310 | 0,595 | 0,315 | 0,569 | 0,341 | 0,655 | 0,345 | > 0,03 |

*) The four pairs of chromaticity coordinates determine the acceptable chromaticity on the CIE diagram

Table 3
Colour Specification Limits (Nighttime)

| Colour | Chromaticity Coordinates* | | | | | | | |
|--------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | | 2 | | 3 | | 4 | |
| | x | y | x | y | x | y | x | y |
| White | 0,373 | 0,402 | 0,417 | 0,359 | 0,450 | 0,513 | 0,548 | 0,414 |
| Yellow | 0,585 | 0,385 | 0,610 | 0,390 | 0,520 | 0,480 | 0,505 | 0,465 |
| Red | 0,720 | 0,258 | 0,735 | 0,265 | 0,665 | 0,335 | 0,643 | 0,335 |

*) The four pairs of chromaticity coordinates determine the acceptable chromaticity on the CIE diagram

IMPORTANT NOTICE

All ORALITE® products are subject to careful quality control throughout the manufacturing process and are warranted to be of merchantable quality and free from manufacturing defects. Published information concerning ORALITE® products is based upon research which the Company believes to be reliable although such information does not constitute a warranty. Because of the variety of uses of ORALITE® products and the continuing development of new applications, the purchaser should carefully consider the suitability and performance of the product for each intended use, and the purchaser shall assume all risks regarding such use. All specifications are subject to change without prior notice.

ORALITE® is a registered trademark of ORAFOL Europe GmbH.



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ORALITE® VC 104+ Rigid Grade Imagine

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Description

ORALITE® VC 104+ Rigid Grade Imagine is a tough weather resistant product designed for rugged outdoor use. The material is intended for application as conspicuity marking on trucks and trailers with rigid sides. ORALITE® VC 104+ Rigid Grade Imagine can be customised to include the customer's logo offering new possibilities in brand awareness and corporate identity. Please contact ORAFOL for more information about how to order your customised ORALITE® VC 104+ Rigid Grade Imagine.

Product Construction

ORALITE® VC 104+ Rigid Grade Imagine 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 0,16 mm thick, and comes with an aggressive high-tack pressure sensitive adhesive. The product is single layer, with no need for edge sealing. The logo is printed underneath the film and therefore is permanently protected from the elements.

Product Approval

ORALITE® VC 104+ Rigid Grade Imagine is approved to Regulation ECE 104 Class C.

Visual Appearance



Colour

ORALITE® VC 104+ Rigid Grade Imagine is available in yellow, white and red. The colours conform to the requirements of Regulation ECE 104. The colour shall be 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 and illuminated with the CIE standard illuminant D₆₅ at an angle of 45° to the normal (45° / 0° geometry). The measured value shall be the average of 8 readings. The test sample shall be rotated 45 degrees.

The retroreflected colour (nighttime colour), when illuminated with CIE standard illuminant A at an observation angle of 20° and entrance angles of $\beta_1 = \pm 5^\circ$, and $\beta_2 = 0^\circ$ shall be located within the area defined by the chromaticity coordinates in Table 3.

Retroreflectivity

ORALITE® VC 104+ Rigid Grade Imagine complies with the minimum reflectivity requirements of Regulation ECE 104 Class C. When illuminated with CIE standard illuminant A and measured with the provisions of CIE No. 54, the coefficient of retroreflection for ORALITE® VC 104+ Rigid Grade Imagine shall be not less than the values in Table 1.

Adhesive

The adhesive is protected by a release liner, which shall be removed by peeling, without soaking in water or other solvents. A 25 mm strip shall provide a bond such that it shall support an 800 g weight for 5 minutes without the strip peeling for a distance of more than 50 mm when applied to a smooth aluminium surface as specified in the ASTM 4956 adhesion test. The adhesive service temperature ranges from -40° C to +90° C (*).

(*) Data based on laboratory testing and under no load. The practical service temperature is dependent on variables including the substrates being bonded, environmental conditions, the loading and method of application.

Application Instructions

Material must be applied when the air and surface temperature is between 15° C and 38° C to assure proper adhesive bonding. Surfaces must be cleaned for all grease, oil and dirt. Use a clean towel and Isopropyl alcohol or similar to wipe the surface before application. If any air bubbles are trapped, use a pin to puncture the bubble and squeegee to push the air towards the pin hole. Please contact ORAFOL for complete application instructions.



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ORALITE® VC 104+ Rigid Grade Imagine

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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 at 50% relative humidity.

Warranty

ORALITE® VC 104+ Rigid Grade Imagine has a ten year warranty. Please contact ORAFOL for full details.

Table 1
Retroreflectivity

| Observation Angle | Entrance Angle (β) | | | | | |
|-------------------|----------------------------|-----|-----|-----|-----|-----|
| | Beta 1 (β_1) | 0° | 0° | 0° | 0° | 0° |
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| White | R' | 450 | n/a | 200 | 90 | 16 |
| Yellow | R' | 300 | n/a | 130 | 75 | 10 |
| Red | R' | 120 | 60 | 30 | 10 | n/a |

All values have units of cd/lux/m².

Table 2
Colour Specification Limits (Daytime)

| Colour | Chromaticity Coordinates* | | | | | | | | Y |
|--------|---------------------------|-------|-------|-------|-------|-------|-------|-------|--------|
| | 1 | | 2 | | 3 | | 4 | | |
| | x | y | x | y | x | y | x | y | |
| White | 0,300 | 0,270 | 0,385 | 0,355 | 0,345 | 0,395 | 0,260 | 0,310 | > 0,25 |
| Yellow | 0,545 | 0,454 | 0,487 | 0,423 | 0,427 | 0,483 | 0,465 | 0,534 | > 0,16 |
| Red | 0,690 | 0,310 | 0,595 | 0,315 | 0,569 | 0,341 | 0,655 | 0,345 | > 0,03 |

*) The four pairs of chromaticity coordinates determine the acceptable chromaticity on the CIE diagram

Table 3
Colour Specification Limits (Nighttime)

| Colour | Chromaticity Coordinates* | | | | | | | |
|--------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | | 2 | | 3 | | 4 | |
| | x | y | x | y | x | y | x | y |
| White | 0,373 | 0,402 | 0,417 | 0,359 | 0,450 | 0,513 | 0,548 | 0,414 |
| Yellow | 0,585 | 0,385 | 0,610 | 0,390 | 0,520 | 0,480 | 0,505 | 0,465 |
| Red | 0,720 | 0,258 | 0,735 | 0,265 | 0,665 | 0,335 | 0,643 | 0,335 |

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