SIGNAL
High Visibility Materials

C522 80S

Heat transfer

Flame retardant

Domestic wash

Fluorescent Yellow

Fluorescent Orange

Technical Data Sheet

Product Description

Coats Signal C522 80S is a combined performance segmented flurescent yellow or flurescent orange heat transfer for domestic wash heat and flame protective clothing, especially firefighter uniforms. Combined with retro reflective and fluorescent elements, it helps to maximise the visibility in nighttime, during daytime or low light conditions.

Product Construction

Coats Signal C522 80S is made of fluorescent yellow or orange part and high performance glass beads based silver part laminated on a durable flame retardant polymer layer. A heat reactive adhesive is applied on the back side. The heat transfer is diagonally segmented in 4mm segments with 1mm gap. A liner protects the reflective side and the adhesive side of the heat transfer. The daytime colour is fluorescent and when illuminated by light the reflected colour is white.

Areas of Applications

Coats Signal C522 80S is a segmented heat transfer for high visibility heat and flame protective clothing especially firefighter uniforms where EN ISO 20471, ANSI/ISEA 107, EN 469, EN ISO 11611, EN ISO 11612, EN ISO 14116 and EN ISO 15384 certifications are required. Coats Signal C522 80S is suitable to apply on flame retardant woven and knit fabrics. The heat transfer should be applied on a flat surface with the help of uniform heat and pressure parameters for example a transfer heat press or continual belt heat press. Other methods such as heat fusing or high frequency welding can also be used. Tests should be done ahead of bulk production to determine which process suits best for the application.

Product Certification

Colour and Reflective Performance – EN ISO 20471

Coats Signal C522 80S is certified according to the EN ISO 20471 standard for high-visibility clothing. The fluorescent yellow or orange colours meet both the chromaticity coordinates and min. luminance factor requirements, while the retro reflective performance is well above minimum requirement. The typical reflective performance (RA in cd/lux/m²) according to EN ISO 20471, table 4 is shown below.

Observation angle	Entrance angle	Coats Signal C522 80S	Minimum norm requirement
12’	5°	100	65

Article Number / Make-up

Art. No.: C522 80S / width: 50.8mm (±0.8) - roll of 200 m

Art. No.: C522 80S / various widths available

Care Instructions

Domestic Wash

High visibility clothing must not be laundered with other coloured garments as this could cause colours to bleed and damage the luminance of the fluorescent material. The visibility garment would then no longer fulfill requirements according EN ISO 20471.

Physical Performance

Coats Signal C522 80S silver part meets or exceeds in origin the performance as per EN ISO 20471, clause 6.1 as well as the requirements in clause 6.2 after exposure to abrasion, flexing, folding at cold temperature, temperature variation, washing, dry cleaning and influence of rainfall. The following table shows the detail specifications.

Tests	Details
Retro reflective performance in origin	EN ISO 20471:2013+A1:2016, pt. 6.1, table 4 and 5 Test method: CIE 54.2
Retro reflective performance after pre-treatment	EN ISO 20471:2013+A1:2016, pt. 6.2.1, table 6 Test method: CIE 54.2
Color new, after xenon test and ageing	EN ISO 20471:2013+A1:2016, pt. 5.1.2, 5.2, 7.5.1 (EN ISO 6330:2012, method 6N+F) Test method: CIE 15:2004
Abrasion	EN ISO 12947-2:2007, 9 kPa, wool, 5000 cycles
Flexing	ISO 7854:1995 method A, 7500 cycles
Folding at cold temperature	ISO 4675, (-20 ±2)ºC
Temperature variation	EN ISO 20471:2013, pt. 7.4.4, 12 hours @ (+50±2)ºC & 20 hours @ (-30±2)ºC
Domestic washing 60°C with tumble drying	EN ISO 6330:2012, method 6N+F, 60 cycles
Dry cleaning	EN ISO 3175-2:2010, perchloroethylene, 50 cycles
Influence of rain	EN ISO 20471:2013+A1:2016, annex C

Heat Resistance and Limited Flame Spread Performance

Coats Signal C522 80S meets the heat resistance and limited flame spread requirements according to EN 469, EN ISO 11612, EN ISO 14116 and EN ISO 15384. The following table shows the detail specifications.

Tests	Details
Heat resistance EN 469:2020, clause 6.2.6.4 EN ISO 11612:2015, clause 6.2.1 EN ISO 15384:2020, clause 6.1	ISO 17493, 5 min. (180 ± 5) ºC ISO 17493, 5 min. (260 ± 5) ºC
Limited flame spread EN 469:2020, clause 6.2.1.1 EN ISO 11611:2015 EN ISO 11612:2015 EN ISO 14116:2015 EN ISO 15384:2020, clause 6.3	ISO 15025, Procedure A (face ignition) ISO 15025, Procedure B (bottom edge ignition)

Lamination

For heat lamination, first remove the blue liner on the adhesive side to expose the dry adhesive, do not remove the liner on the reflective side at this stage. Place the heat transfer on the surface with the adhesive side down. The recommended temperature for lamination is around 140-160°C with 45-70psi (approx. 3-5 bar) line pressure for a duration of around 20-25 seconds. For heat press, the pressure should be even. After lamination, allow the application to cool to room temperature and remove carefully the liner on the reflective side. It is recommended that continuous testing should be done to ensure acceptable adhesion.

STANDARD 100 by OEKO-TEX®

This article is certified according to STANDARD 100 by OEKO-TEX®, class II.

Storage and Shelf Life

Coats Signal reflective tapes should be stored in a cool (5°C to 25°C) and dry place (less than 70% relative humidity) and used within one year of date of receipt. The used rolls should be returned to original packaging or suspended from the middle by using a rod.

General Safety Information

Since conditions and applications vary considerably in the use of a product, the customer and/or user should assure herself or himself that the product meets end customer requirements and is suitable for the intended end use. Coats accepts no liability for unsuitable or improper use or application of products. Information provided above is based on current averages and should be taken only as indicative. Coats accepts no liability for the preciseness and correctness of the information provided.
Product information sheets are updated from time to time, please be sure you are referring to the most recent publication. Coats supports customers with advice on individual applications on request; if you have

any questions or concerns, please contact us. Coats Signal cannot guarantee an absolute visibility especially in severe weather conditions.

Further Assistance

Please contact your local Coats representative for further assistance.

Heat Lamination Instructions

Introduction

This document gives detailed heat lamination instructions for Coats Signal heat transfers. Coats Signal retro reflective heat transfers are for all types of high visibility applications and can be easily heat applied on different fabrics. Since individual conditions may vary because of fabric type, construction, chemical treatments and equipment, it is recommended that continuous testing should be done to ensure acceptable adhesion.

Preparation

The following recommendations are general guidelines for heat press lamination. Other methods such as continuous heat press can also be used given all parameters (temperature, pressure, time) are correct. For continuous press, ensure that the temperature and pressure in all zones are uniform, and the belt speed is correct to meet the recommended conditions. It is highly recommended to service the machine regularly.

1. Temperature: Before each use, make sure that the temperature is correct by using a thermometer or any other method.
2. Pressure: Before each use, make sure that the pressure in all zones of the machine is uniform. This should be checked regularly.
3. Time: The feeder and the belt speed is correct to allow the smooth flow. A tachometer is recommended to set the correct belt speed
4. Flat and clean surface: Use a flat surface where uniform heat and pressure can be applied. Do not overlap or apply on seams and stitches. There should not be any ink or chemical on the belt surface
5. Fabric type: Below table shows the recommended lamination conditions for polyester / cotton woven fabric. Further testing on other substrates or treatments should be done to achieve an appropriate lamination condition.
6. Substrate: Different substrates react differently to a temperature, pressure and time combination. Every substrate should be tested for optimal lamination conditions. Lamination on sensitive substrates may require reduced temperature and time to prevent surface damage. For FR heat transfer C522100/C52210S/C52210V/C50230S/C50250S etc., use flame retardant or flame resistant fabrics.
7. Special treatments: Fabrics with special treatments such as water repellent / waterproof finishes / flame retardant finishes may contain silicone, paraffin, fluorocarbon resin which may influence the lamination condition and therefore require continuous testing.
8. Construction: Woven fabrics are most suitable for lamination. Further testing on other constructions should be done to achieve appropriate lamination parameters.
9. Weight: Weight is very important to select the best lamination condition. Lighter fabrics behave differently than heavier fabrics during lamination process. Heavier fabrics may require slightly higher temperature, pressure or time, or a slightly higher combination of all. A heavier fabric with sensitive substrate or treatment may require lower temperature, pressure or time, but two times pressing. Further testing should be done to achieve appropriate lamination conditions.

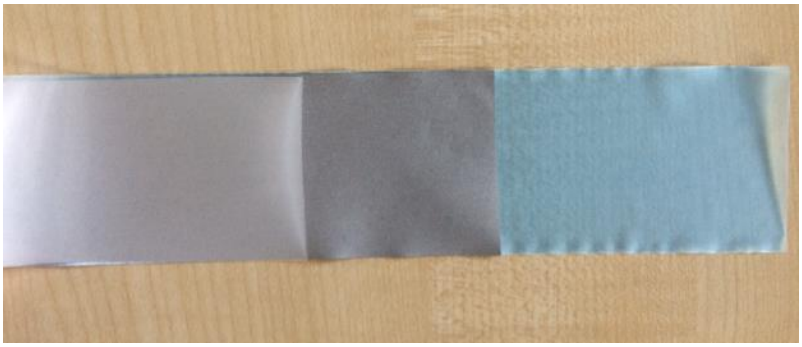
10. Shrinkage: Fabrics with shrinkage higher than 3% in either direction should be pre-shrunk before lamination. It is recommended to test the shrinkage in warp and weft direction by using the recommended lamination conditions. A fabric with high shrinkage rate could show a weave or curl effect which can be reduced by selecting lower temperature, pressure or time parameters and two times pressing. Further testing should be done to achieve appropriate lamination conditions.
11. Others: Care must be taken to avoid air blisters or surface damage. Avoid marks and creases during all production processes. Stack garment pieces after lamination or finished garments carefully, use paper in between if required. Remove reflective side liner before sewing. During sewing, take special care when turning the sides. Do not fold hard on reflective areas, and avoid harsh handling of pieces with reflective sides. Keep the reflective side away from sharp edges. Be careful during packaging and use paper between layers to avoid any abrasion.
12. Test before bulk: Make samples under the recommended lamination conditions and wash according to specifications, ideally until minimum recommended cycles. For best comparison, use ISO washing standards. Turn the garment inside out for washing. In case of severe end use weather conditions (extreme hot, cold or humid weather), it is recommended to test under those conditions.

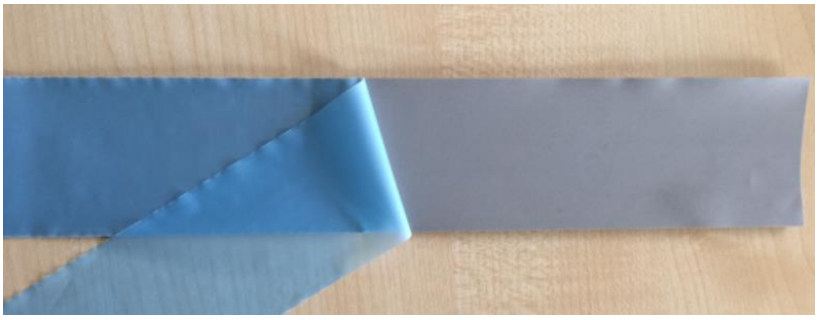
Fabric Type	Temperature	Time	Pressure
≤ 150 g/m²	130-140 °C	10-15 sec	3-4 bar
150 – 250 g/m²	140-160 °C	15-20 sec	4-5 bar
250 – 350 g/m²	160-170 °C	15-20 sec	4-5 bar

Lamination

Pre-heat the press machine to the recommended temperature and adjust the time and pressure as described above.

1. **Step 1**: C502200 / C502600 / C522100 / C532100 and other heat transfers are provided with a protective liner on both sides. C50250S / C50260S / C52210S / C52210V and other segmented heat transfers have no liner on the adhesive side and have a protective liner on the reflective side only. For heat lamination, first remove the thin liner on the adhesive side to expose the dry adhesive side, do not remove the PET liner on the reflective side at this stage.





2. **Step 2**: Place the heat transfer on the substrate surface with the adhesive side down, facing the substrate. For heat press, the temperature and pressure should be even on the tape. Use a press cloth, a siliconized slip-sheet or a Teflon heat pressing sheet to cover the heat transfer and the fabric during lamination to avoid any surface damage. For two times pressing, allow the fabric to cool down after first pressing and press again using the same lamination conditions.

3. **Step 3**: After lamination, allow the application to cool to room temperature and carefully remove the liner on the reflective side. Allow a long cooling temperature of up to one hour. To remove the liner, lift the film from one corner and pull it gently with a single motion while holding the substrate flat.

To ensure adequate adhesion to the substrate for the lifetime of the finished product, it is strongly recommended to test the application under the intended care instructions for the finished product prior to bulk production. Follow the care instructions from our product data sheet.

Since conditions and applications vary considerably in the use of a product, the customer and/or user should assure herself or himself that the product meets end customer requirements and is suitable for the intended end use. Coats accepts no liability for unsuitable or improper use or application of products. Information provided above is based on current averages and should be taken only as indicative. Coats accepts no liability for the preciseness and correctness of the information provided.

Product information sheets are updated from time to time, please be sure you are referring to the most recent publication. Coats supports customers with advice on individual applications on request; if you have any questions or concerns, please contact us. Coats Signal cannot guarantee an absolute visibility, especially in severe weather conditions.