brother
at your side

Durability test data for Brother laminated TZe labels

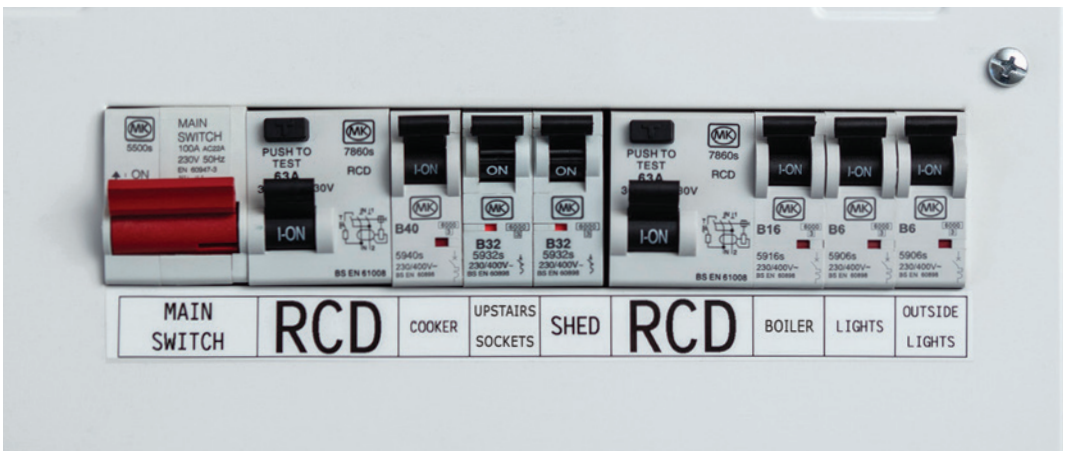
www.brother.eu

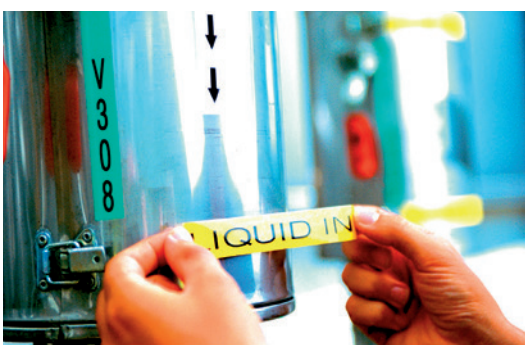

60.2
LI81/100L
PMV
81/100LCV
81/100LCV

Brother laminated TZe labels have been designed to last, wherever you use them

Whether you need a professional labelling solution for the office, industry or home, Brother laminated TZe labels have been designed with you in mind. We've thought about exactly when, where and how you might need to use our labels and put them through a series of tests which demonstrate how our laminated labels withstand heavy abrasion, heat, cold, sunshine, water and chemicals.

Brother laminated TZe labels

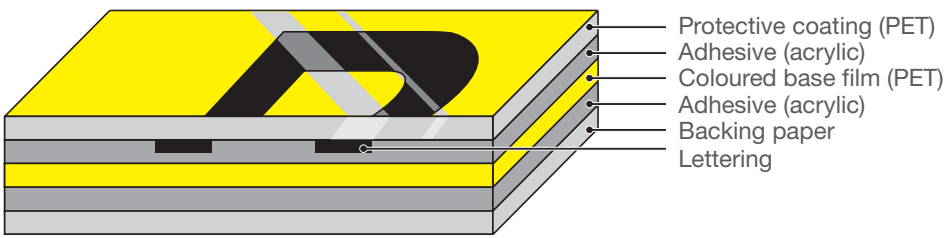




Why Brother laminated TZe labels withstand the test of time

Lamination provides an extra protective overcoat

Unlike non-laminated labels, our laminated TZe tape technology applies a layer of super-clear polyethylene laminate to protect your text.



Brother laminated TZe labels consist of six layers of materials, resulting in a thin, extremely strong label. Characters are formed with a thermal transfer ink and sandwiched between two protective layers of PET (polyethylene film). The result is a virtually indestructible label that can withstand harsh conditions.

In fact, we are sure about the durability of our laminated labels because we've had them tested to the extreme. The results prove that Brother laminated TZe labels stay legible and attached, so you can be confident of a professional quality label that has been designed to last. The following pages will show you exactly how our labels were tested to the extreme.

Strong
Adhesion

Strong Adhesion Tests

Strong Adhesion Tests

Strong Adhesion

Strong adhesion tests were conducted in two stages:

Stage 1: Adhesion to smooth and textured surfaces test
Stage 2: Adhesion to various diameter curved surfaces test

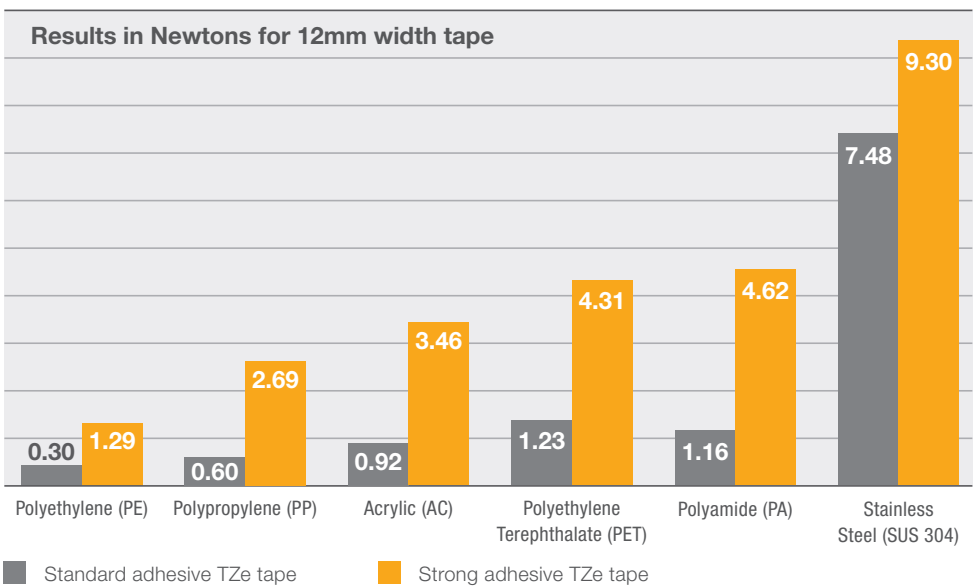
STAGE 1

Adhesion to smooth and textured surfaces test procedure

To test the adhesive strength of Brother laminated TZe labels, Brother standard adhesive and strong adhesive laminated TZe labels were affixed to a variety of materials at room temperature and left for 30 days. After this period, adhesive strength was tested by measuring the force needed to remove the labels at an angle of 180 degrees.
The testing method complies with Japanese Standard JIS Z 0237 (2009) testing.

Test Results

The chart below details the amount of force needed (measured in Newtons) to remove Brother standard adhesive labels and Brother strong adhesive labels from the various materials. The higher the value, the stronger the tape was affixed to the material. As this test shows, when used on textured surfaces Brother strong adhesive labels maintained three times the adhesive strength of Brother standard adhesive labels on average. Brother strong adhesive labels have been specially developed to adhere to both smooth and textured surfaces, and on more demanding materials.



Strong
Adhesion

Strong Adhesion Tests

STAGE 2

Adhesion to various diameter curved surfaces test procedure

To test the adhesive strength of Brother laminated TZe labels, Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were affixed to a variety of materials at room temperature and left for 14 days. After this period, the labels were visually inspected to note any peeling from the materials they were attached to.

Test Results

The table below explains that Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels showed no signs of peeling from the materials of 6mm or higher diameter. However, when the labels were wrapped or applied as a flag to the 3mm diameter material, the standard adhesive and strong adhesive laminated labels either showed signs of peeling or fell off completely. Only the Brother flexible ID labels showed no peeling.

Brother flexible ID labels have been developed for flagging and wrapping around wires, cables, pipes and tubes with a minimum diameter of 3mm, and should be used to ensure your labels stay affixed.

Brother self-laminating labels have the exact same properties as Brother flexible ID labels and can therefore also be safely used for wrapping around cables. Brother strong adhesive labels should be used for applying to the surfaces of larger diameter curved surfaces.

	CURVED SURFACE		WRAPPED		FLAGGED
	Ø50mm glass beaker	Ø25mm glass beaker	Ø6mm PVC cable	Ø3mm Polypropylene tube	Ø3mm Polypropylene tube
Standard TZe tape	●	●	●	○	◗
Strong adhesive TZe tape	●	●	●	○	◗
Flexible ID TZe tape	●	●	●	●	●

● No peeling of label observed

◗ Some peeling of label observed

○ Label peeled off completely

Strong Adhesion Tests

Strong
Adhesion

Water Resistant

Chemical Resistant

Water and Chemical Resistance Tests

Water and Chemical Resistance Tests

Water Resistant

Chemical Resistant

Water and chemical resistance tests were conducted in three stages:

Stage 1: Water and chemical submersion test
Stage 2: Water and chemical abrasion test
Stage 3: Pure water and 5% sodium chloride (salt) solution immersion test

STAGE 1

Water and chemical submersion test procedure

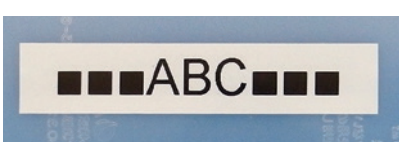
To test Brother laminated labels against the effects of water and chemicals, Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were firstly attached to glass slides and immersed in a variety of liquids for 2 hours at room temperature.

Test Results

Although some labels soaked in certain chemicals showed slight separation of the laminate, the table below explains no change in the print quality occurred and the labels remained affixed to the slides. So even if any of the chemicals tested are spilled on your Brother TZe laminated labels, a quick wipe should be enough to prevent any damage.

	Toluene	Hexane	Ethanol	Ethyl Acetate	Acetone	Mineral Spirit	Pure Water	0.1N Hydrochloric Acid	0.1N Sodium Hydroxide
Standard TZe tape	●	●	●	●	●	●	●	●	●
Strong adhesive TZe tape	●	●	●	●	●	●	●	●	●
Flexible ID TZe tape	●	●	●	●	●	●	●	●	●

● No print discolouration



Label after testing:

Label: Brother strong adhesive laminated TZe label
Chemical: Acetone

Water Resistant

Chemical Resistant

Water and Chemical Resistance Tests

STAGE 2

Water and chemical abrasion test procedure

Next, Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were subjected to a 200gf weight with a chemical and solvent infused cloth, which was passed over each label for 100 round trips. The labels were then visually inspected to note if any print quality problems were observed.

Test Results

As the table below demonstrates, the print quality of Brother TZe laminated labels was unaffected by being rubbed with various chemicals.

	Toluene	Hexane	Ethanol	Ethyl Acetate	Acetone	Mineral Spirit	Pure Water	0.1N Hydrochloric Acid	0.1N Sodium Hydroxide
Standard TZe tape	●	●	●	●	●	●	●	●	●
Strong adhesive TZe tape	●	●	●	●	●	●	●	●	●
Flexible ID TZe tape	●	●	●	●	●	●	●	●	●

● No print discolouration

Label before testing:
Label: Brother strong adhesive laminated TZe label

Label after testing:
Label: Brother strong adhesive laminated TZe label
Chemical: 0.1N Hydrochloric Acid

Water and Chemical Resistance Tests

Water Resistant

Chemical Resistant

STAGE 3

Pure water and 5% sodium chloride (salt) solution immersion test procedure

The final test involved Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels being affixed to stainless steel plates which were then immersed in the two solutions. They were placed in a thermostatic chamber set at 40°C and removed after the predetermined periods shown in the table below. After that, the appearance of the labels was visually checked.

Test Results

As the table shows, even after 30 days immersed in pure water or 5% sodium chloride (salt) solution, Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels stayed perfectly attached and the print quality was unaffected.

	4 DAYS		10 DAYS		30 DAYS	
	Peeling	Fading	Peeling	Fading	Peeling	Fading
Standard TZe tape	●	●	●	●	●	●
Strong adhesive TZe tape	●	●	●	●	●	●
Flexible ID TZe tape	●	●	●	●	●	●

● No peeling of tape or fading of text observed

Label after testing:

Label: Brother strong adhesive laminated TZe label
Liquid: 5% sodium chloride solution

Abrasion
Resistant

Abrasion Resistance Test

Abrasion Resistance Test

Abrasion Resistant

Brother's tape lamination technology ensures that Brother TZe laminated labels can withstand heavy abrasion.

Abrasion test procedure

Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were firstly attached to stainless steel plates with a BA (bright annealed surface). A 1kgf sanding device was then passed over the labels with 50 return passes at a speed of 60 round trips per minute.

Test results

As the table below demonstrates, even after 50 return passes of the heavy sanding device although the laminated surface showed some sandpaper wear, the characters underneath the Brother laminated TZe labels were unaffected and the text was completely legible.

	PRINT QUALITY
Standard adhesive TZe tape	●
Strong adhesive TZe tape	●
Flexible ID TZe tape	●

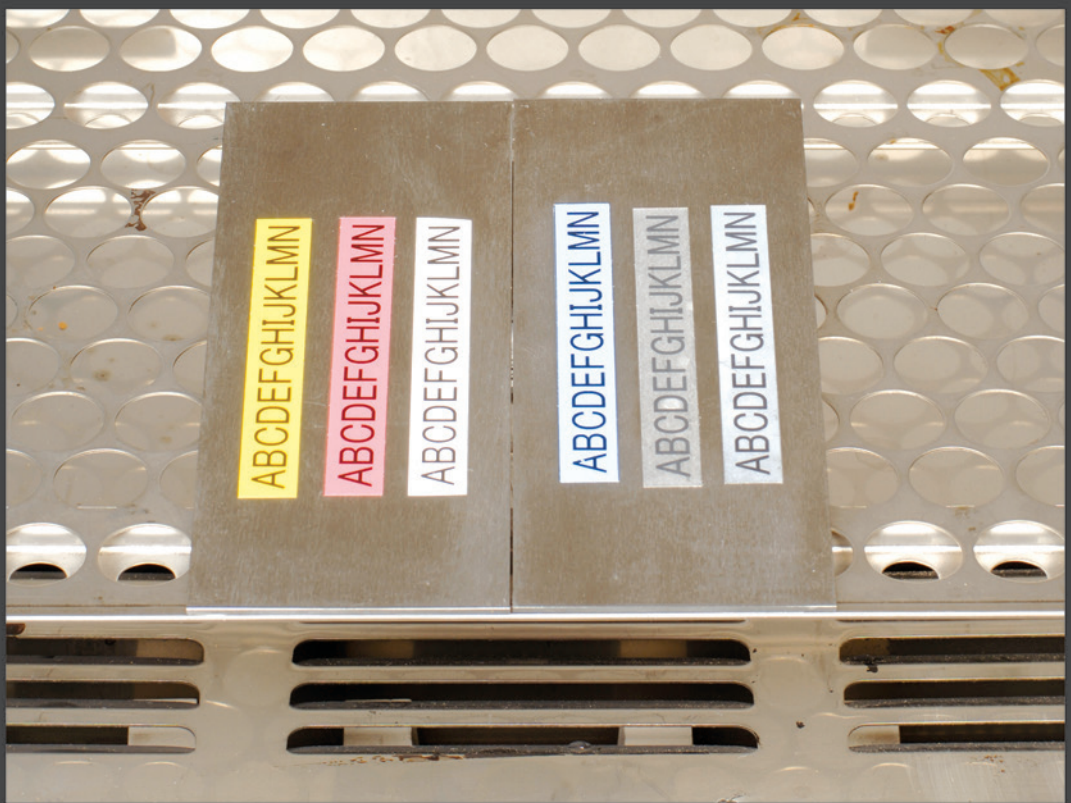
● Print quality unaffected

Label after testing:

Label: Brother flexible ID laminated TZe label
Test: Abrasion with sanding device

Temperature Resistant

Temperature Resistance Test



Temperature Resistance Test

Temperature Resistant

Whether you want to use our labels in freezing conditions or extremely warm environments, our labels have been designed to last. In fact, results show that Brother laminated TZe labels can withstand temperatures from -80°C to +150°C.

Temperature resistance test procedure

Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were firstly attached to stainless steel and placed in a thermo-hygrostat chamber set under the test conditions, taken out after a predetermined time and returned to room temperature where the appearance of the label was visually checked.

Test Results

As the table below shows, after 3 days at -80°C no noticeable change in label adhesive or colour had occurred. After 2 days at +150°C, despite slight discolouration of the label, the text on the label remained completely intact*. We recommend Brother TZe-M931/951/961 black on matt silver laminated TZe labels as most resistant to discolouration under high temperatures, and Brother flexible ID laminated TZe labels as most suitable when used in an autoclave/sterilising unit.

TEMPERATURE	TIME	RESULT
-80°C	3 days	●
-30°C	30 days	●
+50°C at 90% RH	30 days	●
+100°C*	18 days	●
+150°C*	2 days	●

* When used under extremely high temperatures or for long periods of time the laminate film may be separated, discoloured or shrink. If in doubt, request a free tape sample from Brother to perform your own testing.

● No peeling of tape or fading of text observed

● No peeling of tape observed. Text is legible but some tape discolouration observed

Label after testing:

Label: Brother flexible ID laminated TZe label
Temperature: +100C
Time: 18 days

Fade
Resistant

Fade Resistance Test

Fade Meter (Time - Δ E)

TAPE COLOUR	118h	236h	478h*
Transparent	9.66	15.69	24.69
White	0.83	1.58	3.18
Red	1.65	5.95	54.61
Blue	1.27	2.85	5.71
Yellow	22.59	55.57	57.2
Green	1.24	1.62	3.77
Fluorescent Orange	46.57	50.33	54.43
Fluorescent Yellow	81.02	85.09	84.66
Black	0.55	0.18	1.11
Extra Strength Adhesive - White	0.83	1.58	3.18
Flexible ID - White	1.49	2.35	3.94

*478 hours approximates to 1 year in outdoor sunny conditions

Fade Resistance Test

Fade Resistant

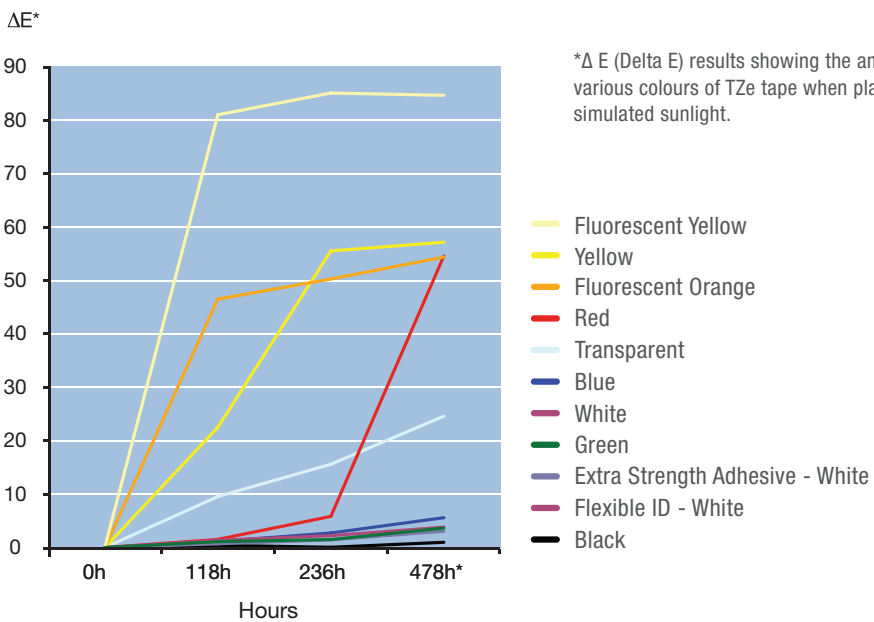
Wherever you use Brother laminated TZe labels, they have been designed to keep your text clear and legible for many years.

Fade resistance test procedure

Brother black on white strong adhesive and flexible ID laminated TZe labels, and various coloured Brother standard adhesive laminated TZe labels were attached to stainless steel plates and exposed to simulated outdoor UV radiation of approximately 12 months. After that, the appearance of the labels was checked, compliant with standard JIS K7350-2/ISO 4892-2.

Test Results

The printed text on all Brother laminated TZe tapes remained unchanged and was perfectly legible. The red, yellow and fluorescent tapes showed a larger change to the tape background colour compared with other tape colours, which showed little or no change. The higher the ΔE (Delta E) value, the larger the change in visual perception from the original colour.



*Δ E (Delta E) results showing the amount of fading on various colours of TZe tape when placed in one year of simulated sunlight.

Chemical Resistant

Oil Resistance Tests

The protective laminate top-coat on Brother laminated TZe labels ensures your text is protected even when submerged or rubbed with oil. Oil resistance tests were conducted in two stages:

Stage 1: Oil immersion test
Stage 2: Oil rubbing test

STAGE 1

Oil immersion test procedure

Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were attached to glass slides and immersed in various oils at room temperature for 2 hours, and the change in appearance was checked visually after this time.

STAGE 2

Oil rubbing test procedure

Brother standard adhesive, strong adhesive and flexible ID laminated TZe labels were attached to glass slides and rubbed with oil-soaked cloths for 100 round trips, using a measuring element of 4.6mm (16.6mm^2) and a load of 200gf. After this test was completed, the change in appearance of the labels was checked visually. This test is in accordance with JIS-L-0849. (ISO 105-X12:2001 – Textiles-Tests for colour fastness-Part X12)

Test Results

As the table below shows, at the end of both tests no change to the print quality occurred, and the labels remained affixed to the slides.

		Honilo 981	Variocut B30	CareCut ES1	Hysol X	Alusol B	Syntilo 81E	Syntilo 9954
Standard TZe tape	2 hour immersion	●	●	●	●	●	●	●
	100 round trips rubbing	●	●	●	●	●	●	●
Strong Adhesive TZe tape	2 hours immersion	●	●	●	●	●	●	●
	100 round trips rubbing	●	●	●	●	●	●	●
Flexible ID TZe tape	2 hours immersion	●	●	●	●	●	●	●
	100 round trips rubbing	●	●	●	●	●	●	●

● No change to print quality and label remained affixed to the slides

Autoclave Resistance Test

Temperature Resistant

Brother flexible ID laminated TZe labels demonstrate excellent adhesion and text legibility, even after several passes through the harsh environment of an autoclave sterilisation chamber.

Autoclave resistance test procedure

A Brother flexible ID laminated TZe label was affixed to flat and smooth stainless steel at room temperature. The condition of the label was observed after it was processed in an autoclave under the following test conditions:

Autoclave test machine:
Steam steriliser GETINGE HS22
Test program:
B cycle P11 *EN (European Standard) prEN13060 standard compliant
Pre-vacuum:
4 times
Sterilising temperature:
134°C
Sterilising duration:
5 minutes
Drying duration:
20 minutes

Test Results

The table below shows the high durability of our Brother flexible ID laminated TZe labels during the test. After several process cycles, some slight label discolouration and separation of lamination film was observed. Nevertheless, the printed text stayed legible.

FLEXIBLE ID TAPES	1 cycles	5 cycles	10 cycles	20 cycles	30 cycles
Text blurring	●	●	●	●	●
Tape discolouration	●	●	●	●	◗ *1
Laminate film separation	●	●	●	●	◗ *2
Tape peeling	●	●	●	●	●

*1 Some tape discolouration may be observed
*2 Some separation off the laminate film may be observed

Brother Tape Range

	6mm	9mm	12mm	18mm	24mm	36mm
TZe STRONG ADHESIVE LAMINATED - 8 METRES						
Black on white	TZe-S211	TZe-S221	TZe-S231	TZe-S241	TZe-S251	TZe-S261
Black on transparent		TZe-S121	TZe-S131	TZe-S141	TZe-S151	
Black on yellow		TZe-S621	TZe-S631	TZe-S641	TZe-S651	
TZe FLEXIBLE ID LAMINATED - 8 METRES						
Black on white	TZe-FX211	TZe-FX221	TZe-FX231	TZe-FX241	TZe-FX251	TZe-FX261
Black on yellow	TZe-FX611	TZe-FX621	TZe-FX631	TZe-FX641	TZe-FX651	TZe-FX661
TZe SELF-LAMINATING - 8 METRES						
Black on white					TZe-SL251	TZe-SL261
Black on yellow					TZe-SL651	TZe-SL661
TZe SECURITY LAMINATED - 8 METRES						
Black on white				TZe-SE4	TZe-SE5	
STe STENCIL - 3 M						
Black on white				STe-141	STe-151	STe-161
FLe FLAG (DIE-CUT) - 72 LABELS						
Black on white					FLe-2511*	
Black on yellow					FLe-6511*	
Black on green					FLe-7511*	

* Labels are: 45mm x 21mm when printed. 45mm x 10.5mm once applied.

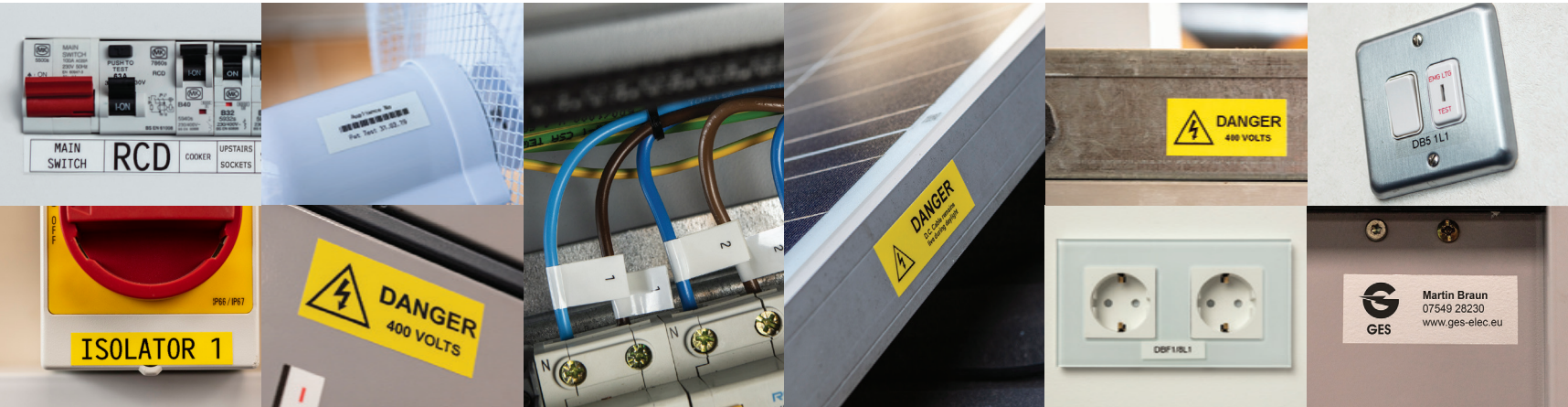
HSe HEAT SHRINK TUBE - 1.5 METRES

	5.8mm	8.8mm	11.7mm	17.7mm	23.6mm
Black on white	HSe-211	HSe-221	HSe-231	HSe-241	HSe-251

STANDARD LAMINATED - 8 METRES

	3.5mm	6mm	9mm	12mm	18mm	24mm	36mm
Black on white		TZe-211	TZe-221	TZe-231	TZe-241	TZe-251	TZe-261
Black on transparent		TZe-111	TZe-121	TZe-131	TZe-141	TZe-151	TZe-161
Black on yellow		TZe-611	TZe-621	TZe-631	TZe-641	TZe-651	TZe-661
Black on red			TZe-421	TZe-431	TZe-441	TZe-451	TZe-461
Black on blue			TZe-521	TZe-531	TZe-541	TZe-551	TZe-561
Black on green			TZe-721	TZe-731	TZe-741	TZe-751	
Blue on white			TZe-223	TZe-233	TZe-243	TZe-253	TZe-263
Red on white			TZe-222	TZe-232	TZe-242	TZe-252	TZe-262
Red on transparent				TZe-132			
Blue on transparent				TZe-133			
White on transparent				TZe-135	TZe-145		
White on black		TZe-315	TZe-325	TZe-335	TZe-345	TZe-355	TZe-365
White on blue				TZe-535		TZe-555	
White on red				TZe-435			
Gold on black				TZe-334	TZe-344	TZe-354	

	6mm	9mm	12mm	18mm	24mm	36mm
FLUORESCENT LAMINATED - 5 METRES						
Black on fluorescent orange			TZe-B31		TZe-B51	
Black on fluorescent yellow			TZe-C31		TZe-C51	
MATT LAMINATED - 8 METRES						
Black on transparent			TZe-M31			
METALLIC LAMINATED - 8 METRES						
Black on matt silver		TZe-M921	TZe-M931		TZe-M951	TZe-M961
PREMIUM LAMINATED - 8 METRES						
Black on premium glitter gold			TZe-PR831		TZe-PR851	
White on premium glitter silver			TZe-PR935		TZe-PR955	

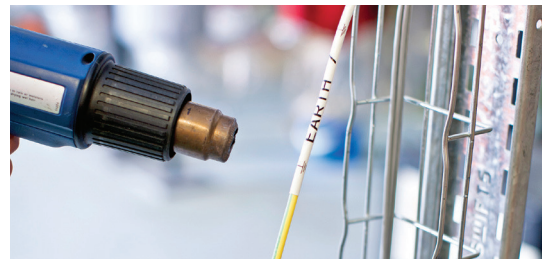


Choose the right tape for the job

SURFACE	WIRE AND CABLE IDENTIFICATION				GENERAL IDENTIFICATION		
	Flexible ID	Self-Laminating	Heat Shrink Tube	Flag	Strong Adhesive	Security	Stencil
Smooth surfaces	✔				✔	✔	✔
Textured surfaces	●				✔	●	
Cable wrap	✔	✔	✔				
Cable flag	✔			✔			

✔ Recommended ● Acceptable

HEAT SHRINK TUBE



Tape	Width	Recommended cable diameters
HSe-211	5.8mm	Ø1.7mm to 3.2mm
HSe-221	8.8mm	Ø2.6mm to 5.1mm
HSe-231	11.7mm	Ø3.6mm to 7.0mm
HSe-241	17.7mm	Ø5.4mm to 10.6mm
HSe-251	23.6mm	Ø7.3mm to 14.3mm

Brother Genuine Supplies

Consommables originaux Brother

Brother genuine supplies work in perfect harmony with Brother printers.

Designed, manufactured and tested in controlled environments by the same team of engineers as Brother hardware. Providing you with the best possible results for your business and protection of your print investment.


YELLOW

Frequently asked questions

How accurate are the tests in simulating real-world examples?

Every effort was made to ensure the tests accurately simulate real-world examples. However when printed labels are used in the real-world, many factors could change the results of these tests, such as surface material, heat, moisture, pressure, chemicals etc. If in doubt, always test Brother P-touch laminated labels in your own environment to ensure they meet your requirements.

Which tape is recommended for rough or textured surfaces?

Brother strong adhesive TZe tape has been specially developed for more demanding surfaces such as rough or textured surfaces.

Which tape is recommended for cable labelling?

Use Brother self-laminating TZe tape or flexible ID TZe tape for cable wrap labelling, For cable flag labelling use Brother flexible ID TZe tape, or non-laminated flag labels.
Brother HSe heat shrink tube is also available for wire and cable identification.

Which tape is recommended for high temperatures?

We recommend TZe-M931/951/961 black on matt silver TZe tape as most resistant to high temperatures in terms of discolouration.

How thick are laminated TZe labels?

Laminated TZe labels are around 160 micro metres in thickness, but this varies slightly by tape type.

Frequently asked questions

Do TZe tapes contain silicone?
Since the tape liner itself is silicone coated on both sides, there is a chance that small amounts of silicone may remain on the adhesive layer underneath the label even after the liner is peeled off.

Do TZe tapes contain latex?
TZe tape uses acryl based adhesive materials and do not include latex.

Do TZe tapes contain lead?
There is no lead in the TZe cassette case, tape or ink.

Do TZe tapes contain chloride?
Except for clear (transparent) and silver TZe tapes, chloride materials are used in the coloured base film layer of other TZe tapes.

Do TZe tapes contain polyvinyl chloride (PVC) or halogen?
There is no PVC in the TZe cassette case, tape or ink. The coloured layer of the base film includes some chlorine compound which means TZe tapes cannot be categorised as halogen-free.

Do TZe tapes contain REACH SVHC?
Please see www.brother.eu/reach for the latest information.

Do TZe cassettes contain recycled material?
TZe cassettes contain at least 5% of recycled material.

Do TZe labels create any outgassing?
The following gases may be produced when labels are stored or applied in a hot environment: Toluene, n-butanol, 2-ethylhexyl alcohol, butyl carbinol acetate. These levels are however very low.

Do TZe labels leave any adhesive residue when removed?
Labels can be removed from most materials with relative ease leaving little or no adhesive on the material. Extreme heat, humidity and certain chemicals may result in some residual adhesive being left but this can be removed in most cases with Ethanol.

Frequently asked questions

Can TZe labels be used on circuit boards?

We do not recommend that TZe labels are used on circuit boards due to the sensitivity of circuit boards to dust, static electricity and acid (although these are at very low levels).

Can TZe labels be used to label food?

TZe labels can be used safely on food packaging but should not be in contact with the food itself.

Can TZe labels be used on copper?

As adhesive materials used in our labels are acrylic and therefore weakly acid we do not recommend that TZe labels are used on copper.

Can TZe labels be used for the marking of electrical and electronic equipment (EEE) that is covered by the RoHS Directive?

TZe labels are in conformity with the requirements of the RoHS Directive, and do not contain restricted substances (Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (Cr VI), Polybrominated Biphenyls (PBB), Polybrominated Diphenyl Ethers (PBDE), Bis(2-Ethylhexyl) phthalate (DEHP), Benzyl butyl phthalate (BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate (DIBP)) above the allowed limit values. TZe tape cassettes themselves do not fall under the definition of EEE.

Can TZe labels be submerged in alcohol?

Submersion of TZe labels in alcohol is not recommended for extended periods due to the possible deterioration of the tape adhesive.

Are Brother TZe tapes or HSe Tubes UL certified?

Most of our strong adhesive, flexible ID and security TZe tapes have been recognised by Underwriters Laboratories, and which are listed under the UL file number PGJI2.MH21016.

How long should a security TZe label be attached before peeling off?

We recommend that security TZe labels are affixed for at least 24 hours in order to work effectively.

Notes

1. A random sample of Brother laminated TZe tapes were selected and used to perform these tests.
2. All test results were acquired under specific conditions configured by Brother and/or Allion (as detailed below), with the sole aim of providing information contained within this booklet.
3. Since TZe tape adherence performance is affected by many variable factors, including the material the tape is attached to, the material's surface condition, whether it is greasy, dusty, rough or curved, and environmental conditions, customers should confirm adherence performance under the actual usage conditions. Products are used at the customers own risk and the findings presented in this document should not be taken as a guarantee of TZe tape performance in each customers' specific circumstances.
4. Brother accepts no responsibility for losses incurred as a result of reliance on information contained in this document.

Test data sources:

Allion Japan Inc (April 2020):

Strong adhesive | Water and chemical resistance | Abrasion resistance

Temperature resistance (all temperatures except -80°C) | Oil resistance

Brother Industries Ltd Japan (December 2012):

Fade resistance | Temperature resistance (-80°C)

Autoclave resistance

brother
at your side

P-touch

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07/2020