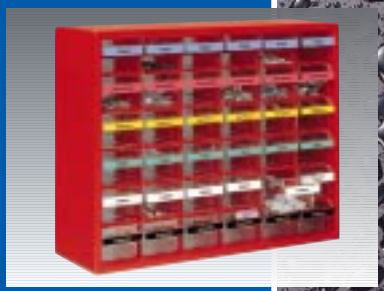
At your side.

brother

P-touch

TZ TAPE

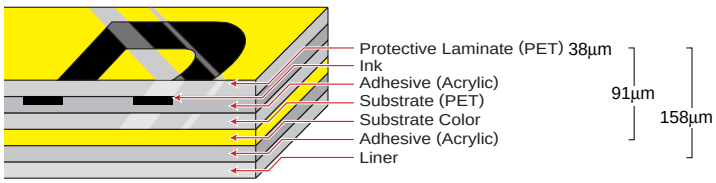


Tape information catalogue for TZ tapes

Technical data on Brother durable P-Touch tapes.

TAPE STRUCTURE

Brother Laminated tapes consist of six layers of materials, resulting in thin, yet extremely strong, labels. Characters formed with thermal transfer ink are actually printed onto the underside of a laminate. Sandwiched between two layers of PET (polyester) film, the characters are virtually indestructible.



BROTHER LAMINATED TAPE

LAMINATION

Brother 38µm of top lamination protects the ink from the sorts of hazards which abound in industrial environments: abrasion, chemicals, oil and water... even general rough handling.

SAFE FOR USERS

Brother had tapes tested by an official Japanese government food research laboratory. For the purpose of the tests, it was assumed that labels would be attached to food containers, food packages, or to food preparation equipment. The tapes met the food sanitation law of Japan. Results can be seen at the right. P-Touch laminated tapes were found to meet all of the chemical limits in the standard. Though they passed the chemical tests, P-Touch tapes are strong, and not easily digested. For this reason, care should be taken to prevent accidental ingestion.

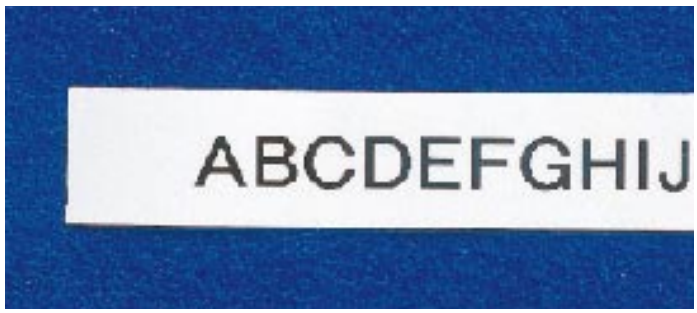
Additional test was performed to determine the effects of accidental affixation of tapes to one's skin. Again, the tapes caused no skin irritation in the tests and, therefore, are described as safe according to OECD guidelines.
Again, though the tapes passed the irritation tests, they could have some effect on people with sensitive skin.
Brother recommends that labels are not be attached to one's skin.
When use of the tape is related to safety, prior confirmation is needed.

RESULTS

Lead:	none detected (MLD 5ppm)
Cadmium:	Cadmium: none detected (MLD 0.5ppm)
Dissolution tests	
Heavy metals (as Pb): (Solvent:4% V/V acetic acid)	none detected (MLD 1µg/ml)
Consumption of Potassium permanganat (Solvent:water)	1.1µg/ml
Residue on evaporation: (Solvent:n-heptan)	not more than 5µg/ml
Residue on evaporation: (Solvent:20% V/V ethanol)	not more than 5µg/ml
Residue on evaporation: (Solvent:water)	not more than 5µg/ml
Residue on evaporation: (Solvent:4% V/V acetic acid)	not more than 5µg/ml
Antimony: (Solvent:4% V/V acetic acid)	none detected (MLD 0.05µg/ml)
Germanium: (Solvent:4% V/V acetic acid)	none detected (MLD 0.05µg/ml)
Methyl methacrylate: (Solvent:20% V/V ethanol)	none detected (MLD 5µg/ml)

ABRASION RESISTANCE

Tapes were tested with a weighted (9.8N-1kg) sand eraser device. After 50 “return” passes, Brother tapes' lamination was only slightly scratched. The characters underneath were completely unaffected.



ABRASION RESULT (after 50 passes)

DIELECTRIC STRENGTH

In tests performed by Brother, white P-Touch tapes with black characters began to lose their electric resistance at an applied voltage of 8kv, and lost their resistance entirely at 11kv. Most other colour variations will have a similar resistance. However, though they meet the majority of Japan Industrial Standards for electrical insulator tape, P-Touch tapes are not designed to be used as electrical insulation, and Brother recommends that they not be used as such. [It is important to note that tapes with “metallic” (gold, silver) backgrounds or characters contain aluminium, and that tapes with black backgrounds contain carbon, and therefore have lower dielectric strength than the standard colour styles.]

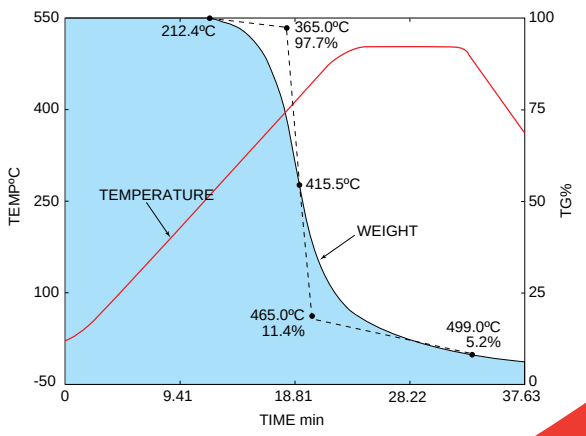
TAPES	(a) (mm)	(b) (kV)	(c) (kV/mm)	(d) (kV)
BLACK ON WHITE	0.110	11	100	8
BLACK ON GOLD	0.110	6	55	4
BLACK ON SILVER	0.110	6	55	5

(a)*TAPE'S THICKNESS*
(b)*DIELECTRIC BREAKDOWN VOLTAGE*
(c)*DIELECTRIC STRENGTH FOR 1MM IN THICKNESS*(b)(a)
(d)*THE MAXIMUM VOLTAGE WHICH CAN BE APPLIED BEFORE THE INSULATOR RUPTURES.*

TAKING THE HEAT

Brother P-Touch tapes retain their integrity even at extremely high temperatures. Tapes were placed in an analysis chamber. Then, starting at room temperature, the chamber was heated at a rate of 20˚C increase per minute. Adhesive evaporates at 212˚C and above. In other words, under general working environments the tapes will retain their form and readability.

When the tape is subject to an extreme high temperature, however, the laminate film may be separated or discolored or it may shrink. Use of the tape should be avoided at places subject to ignition.



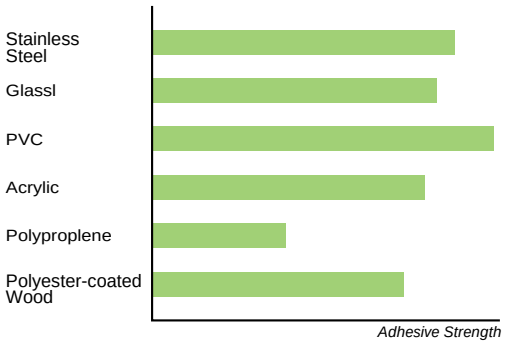
PERCENTAGE CHANGE OF TAPE WEIGHT UNDER HIGH TEMPERATURE

ADHESIVE STRENGTH

A label that falls off ceased to perform its function. Anybody who has experience using embossed stiff films knows that their reduced surface adhesion area decreases the tape's ability to cling to items.

Adhesion To Various Materials

First, Brother tested tapes' adhesive strength under ordinary conditions when applied to various materials.
Though the exact forces required to remove the labels varied, the finding was that in a general working environment, even after handling, P-Touch tapes will remain affixed.



Adhesion To Plastic Substrates

Adhesion was tested on plastic substances with different kinds of surfaces.
The adhesive strength of P-Touch tape was improved by developing a better adhesive.
The table shows that P-Touch tape maintained adequate adhesive strength on materials from which it previously peeled off under certain conditions thus allowing the use of a wider variety of material.

Substrate material	Surface emboss	Tape condition	
		Conventional tape	New tape (now in use)
ABS	A	○	○
	B	○	○
Polyamide	A	○	○
	B	○	○
Polycarbonate	A	○	○
	B	○	○
Polyethylene	A	▲ →	○
	B	○	○
Polyacetal	A	▲ →	○
	B	○	○
Polypropylene	A	▲ →	○
	B	○	○
Polystyrene	A	○	○
	B	○	○

Surface emboss: A and B have different size and height of surface embossed patterns.
Circles indicate that no tape separation or floating was observed.
The "▲" mark indicates that partial floating of tape was observed.

Adhesion In High Temperature & High Humidity

The combination of high temperature and high humidity was no problem for Brother tapes. The highest adhesion strengths of any test were registered after the tapes' exposure to 40˚C temperatures and 5% salt water baths.

No change in ink colour occurred, and no adhesive was left behind when tapes were removed.

	Tape condition
40ºC DISTILLED WATER X 24 HOURS	○
40ºC 5ºC SALT WATER X 24 HOURS	○

○=*No problem*

In general, the adhesion strengths determined through the various tests demonstrate that Brother's tapes will remain affixed under all but the most extreme environments.

Adhesion After Exposure To Heat And Cold

Next, tapes attached to stainless steel slightly roughened with abrasive paper were heated and cooled. After two hours in -30˚C, no change in tape or adhesive colour had occurred. Heating, on the other hand, actually increased the tapes' adhesive strength, due to a slight softening and spreading of the adhesive. After two hours in 150˚C though, the tape's white backing and adhesive had slightly discoloured. When the tape is subject to an extreme high temperature, however, the laminate film may be separated or discolored or it may shrink. Use of the tape needs to be avoided at places subject to ignition.

Temperature	Hours	Tape condition
-30ºC	2 hrs	○
0ºC	240 hrs	○
50ºC	240 hrs	○
100ºC	240 hrs	○
150ºC	2 hrs	△
200ºC	2 hrs	△

○=No problem
△=There are cases of tape discoloration, floating laminate film or residue of adhesive agent after removal of tape.

CHEMICALS & WATER

P-Touch tapes, attached to glass slides, were bathed in a variety of materials for two hours. Despite some changes in appearance and structure, all tapes remained affixed to their slides. As the photographs show, in a number of tests, Brother's laminated tapes fared remarkably well.

Also, though soaking labels in chemicals for two hours caused some changes, rubbing P-Touch labels with cloths soaked in those same chemicals had no effect on the tapes.
This implies that even if chemicals are spilled on the P-Touch tapes, quick wiping should prevent damage. Here, Brother's laminated tape technology clearly protects the printed characters.

TOLUENE:	Slight adhesive swelling Slight puffing of tape and laminate
HEXANE:	No noticeable change
ETHANOL:	Slight adhesive swelling Slight puffing of tape
ETHYL ACETATE:	Slight adhesive swelling Slight puffing of laminate
ACETONE:	Some adhesive dissolving Slight puffing of laminate
MINERAL SPIRITS:	Slight adhesive swelling Slight puffing of laminate
WATER:	No noticeable change in structure Very slight weakening of adhesive
0.1N HCl:	No noticeable change in structure Very slight weakening of adhesive
0.1N NaOH:	No noticeable change in structure Very slight weakening of adhesive

CHANGES OF APPEARANCE AND STRUCTURE IN VARIOUS CHEMICALS

ETHYL ACETATE BATH RESULT

ETHYL ACETATE RUBBING RESULT

FADING RESISTANCE

Brother laminated tapes of various background colours were attached to coated metal plates (similar to a car's surface), and placed in a fade-inducing chamber at 83˚C.
They were left for 100 hours to simulate a year in sunny surroundings. Afterwards, measurements of the change in reflective strength (ΔE) were taken, with results as shown:
Only yellow tape showed significant fading. The other background films, though yielding measurable ΔEs, were not overly affected to the eye. Ink remained basically unchanged, and all characters were still completely legible.

Next, tape samples were placed in a sunshine weather-o-meter at 63˚C for 100 hours. They were subjected to not only heat and light, but also water, to simulate a year of outdoor conditions. Again, yellow or red tapes were the most affected, with these results:

Color	Fade meter		
Time	20H	50H	100H
Transparency	0.09	0.06	0.26
White	0.78	1.54	1.40
Red	0.52	0.86	0.80
Blue	0.59	0.92	1.39
Yellow	1.45	2.63	3.34
Green	0.52	0.91	1.10
Gray	0.44	0.51	0.82
Black	0.25	0.15	0.33

Color	Weather meter		
Time	20H	50H	100H
Transparency	1.94	2.58	3.78
White	2.36	2.70	3.59
Red	6.29	11.34	19.02
Blue	1.84	3.11	4.76
Yellow	7.40	12.12	36.29
Green	1.08	1.49	1.97
Gray	2.73	3.36	3.52
Black	0.59	1.62	2.08

SPECIAL TAPES

Special Tapes are available in addition to a laminated tape for the use in a wide assortment of areas.

<Caution>

Some Special Tapes require special handling. To make sure that you use the tape correctly, follow any and all directions.

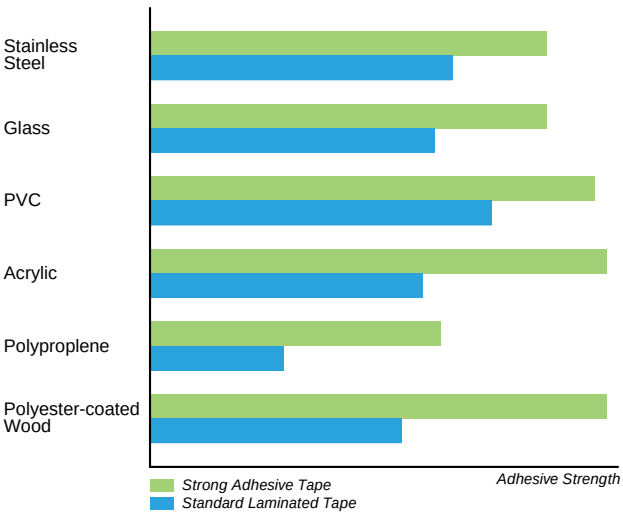
Strong Adhesive Tape

Strong Adhesive Tape has a stronger adhesive that allows it to be used on a much wider range of materials. Use of adhesives on many of these materials was often difficult up to now.

If the cutter built-in to P-Touch is used to cut the Strong Adhesive Tape, the adhesive's properties will cause the cutter to cut poorly. This is why it is always better to use scissors to cut the tape.

Adhesion to various materials

Brother has tested the adhesive strength of Strong Adhesive Tape under ordinary conditions. Strong Adhesive Tape demonstrates a very high level of adhesion when used on many different kinds of materials, and is far superior to standard laminated tape.



Adhesion to plastic substrates

We have tested the adhesion of this tape to plastic substrates with many different kinds of surfaces. Strong Adhesive Tape works on a wide variety of plastic materials.

Substrate material	Surface emboss	Tape condition
ABS	A	○
	B	○
Polyamide	A	○
	B	○
Polycarbonate	A	○
	B	○
Polyethylene	A	○
	B	○
Polyacetal	A	○
	B	○
Polypropylene	A	○
	B	○
Polystyrene	A	○
	B	○

Surface emboss: A and B have different size and height of surface embossed patterns.
Circles indicate that no tape separation or floating was observed.

Fluorescent Tape

This tape has a background that stands out much more than standard color tape and is very eye-catching. Some of its best uses are for warning and instruction labels in factories and POP labels in stores.

Security Tape

Here's a tape with a special adhesives so that when the label is peeled off it leaves a checkerboard pattern. Use it for labels that must not be peeled off such as those on company assets.

Adhesion after exposure to heat and cold

For these tests we attached tape to stainless steel surfaces that had been roughened slightly and then subjected them to hot and cold.

The tape does not peel or fall off when subjected to high temperatures, but may change color at 100˚C and higher. At these temperatures, tape laminates may separate and when the tape is peeled away, the checkerboard pattern may not remain.

Tapes may discolor, the laminates may separate, and the checkerboard pattern may not remain when the tape is peeled off.

Temperature	Hours	Tape condition
-30ºC	2 hrs	○
0ºC	240 hrs	○
50ºC	240 hrs	○
100ºC	240 hrs	△
150ºC	2 hrs	△
200ºC	2 hrs	△

○=No problem
△=There are cases of tape discoloration, floating laminate film or residue of adhesive agent after removal of tape.

Instant Lettering Tape

This is a tape that allows only the letters printed on a label to be transferred to paper.
This works wonderfully when used on presentation materials or for creating diagrams.

INSTANT LETTERING TAPES

Fabric Tape

This tape is made from cloth so that after letters are printed on it, an iron can be used to stick this tape to some other piece of cloth.
Clothing with tape stuck to it can be dry-cleaned.

INSTANT LETTERING TAPES

Iron on transfer Tape

This tape allows the letters printed on it to be transferred, by ironing, to a piece of fabric.
It can be used to place the names on smooth-surface fabric like the 100-percent cotton used in uniforms.
If the transfer is done correctly, the letters will stay even after 20 washings.
Place a cloth over the printed letters when ironing.
Clothing with letters transferred onto it cannot be dry-cleaned.

IRON ON TRANSFER TAPES

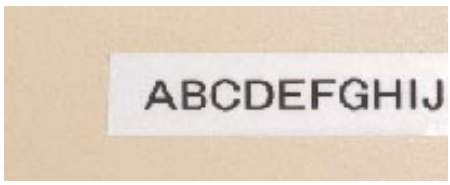
SOME COMMONLY ASKED QUES

"Can I use these labels outside?"

If the label is originally attached to a clean, dry surface, it will be able to stand even harsh environments without falling off. After prolonged exposure to the sun, some fading of tape or print colours may occur. Readability will not be affected. The tape may be faded or its edges be floated when affected by ultraviolet ray or wind and rain.

"What happens if water/motor oil/ diluted acid gets on the labels?"

Water presents no problems for the tape. Motor oil, diluted acid and other chemicals, in time, will weaken the tape's adhesive and/or laminate. If the spilled chemicals are wiped within a reasonable amount of time, the tapes will remain affixed, and will not be adversely affected.



NO DAMAGE TO BROTHER'S LAMINATED TAPE FROM SPILLED LACQUER

T I O N S

"Will the labels fall off if they are left in a refrigerator/ freezer, or in a hot environment?"

Even at extremely low temperatures, labels will remain adhered to most materials. Many customers already use P-Touch tapes in refrigerated environments for a variety of applications and are satisfied with the results.
Domestic refrigerator/freezers reach low temperatures of approximately -20˚C, while industrial models reach -30˚C. During adhesion tests, even at -50˚C, no adhesive strength problems, ink or tape changes were noted. High temperatures can even increase the labels' adhesion. After two hours in 200˚C temperatures, tested labels did not fall off (though some discolouration may occur.) When the tape is subject to an extreme high temperature, however, the laminate film may be separated or discolored or it may shrink. Use of the tape should be avoided at places subject to ignition.

"When I remove the label, will messy adhesive remain? How can I remove it?"

Tapes can be easily removed from most materials such as polyethylene, polypropylene, fluoric resin, silicon-process materials, etc. Unless subjected to extreme heat, humidity or certain chemicals, adhesive will not remain on the item's surface after removal. On some other materials, portions of adhesive might remain after extended periods of affixation. If this occurs, the adhesive can --in most cases -- be removed by rubbing with Ethanol.

"Does the label adversely affect the item to which it is attached?"

P-Touch tapes are harmless for nearly all objects to which you might attach them. However, labels should not be affixed to copper, because corrosion is possible.
This is especially true for copper plates of electrical circuits, whose components could be damaged.

TAPE DIRECTORY

PRINTS IN VARIOUS COLOURS

Laminated Tapes

TZ TAPE	ON WHITE ADHESIVE			ON CLEAR ADHESIVE			ON BLACK ADHESIVE		BLACK ON FLUORESCENT		
	BLACK	RED	BLUE	BLACK	RED	BLUE	GOLD	WHITE	ORANGE	YELLOW	GREEN
36mm	TZ-261	TZ-262	TZ-263	TZ-161	———	———	———	———	———	———	———
24mm	TZ-251	TZ-252	TZ-253	TZ-151	TZ-152	TZ-153	TZ-354	TZ-355	TZ-B51	TZ-C51	TZ-D51
18mm	TZ-241	TZ-242	TZ-243	TZ-141	———	———	TZ-344	TZ-345	———	———	———
12mm	TZ-231	TZ-232	TZ-233	TZ-131	TZ-132	TZ-133	TZ-334	TZ-335	TZ-B31	TZ-C31	TZ-D31
9mm	TZ-221	TZ-222	TZ-223	TZ-121	TZ-122	TZ-123	TZ-324	TZ-325	———	———	———
6mm	TZ-211	———	———	TZ-111	———	———	———	TZ-315	———	———	———

TZ TAPE	WHITE ON COLOURS				BLACK ON COLOURS				ON MATT FINISH
	RED	BLUE	ORANGE	GREEN	RED	BLUE	YELLOW	GREEN	BLACK
36mm	———	———	———	———	TZ-461	TZ-561	TZ-661	———	———
24mm	TZ-455	TZ-555	TZ-655	TZ-755	TZ-451	TZ-551	TZ-651	TZ-751	TZ-M51
18mm	———	———	———	———	TZ-441	TZ-541	TZ-641	TZ-741	———
12mm	TZ-435	TZ-535	TZ-635	TZ-735	TZ-431	TZ-531	TZ-631	TZ-731	TZ-M31
9mm	———	———	———	———	TZ-421	TZ-521	TZ-621	TZ-721	———
6mm	———	———	———	———	———	———	TZ-611	———	———

Special Tapes

TZ TAPE	IRON ON TRANSFER	ON INSTANT LETTERING	STRONG ADHESIVE	SECURITY	FABRIC
	BLACK	BLACK	BLACK	BLACK	BLUE
36mm	———	———	———	———	———
24mm	———	———	TZ-S251	———	———
18mm	TZ-IY41	TZ-L041	TZ-S241	TZ-SE4	TZ-FA3
12mm	———	———	TZ-S231	———	———
9mm	———	———	TZ-S221	———	———
6mm	———	———	TZ-S211	———	———

★*Actual tape colours may differ from the printed samples here.*
★*Some kinds of tapes are not available in some countries.*

All tests, with the exception of toxicity and skin irritation analyses, were performed by Brother Industries, Ltd. Though they were not performed by an independent research laboratory, their procedures conformed to Japanese Industrial Standards. Results published here could differ slightly from those conducted by different groups, under different circumstances.
The information herein is subject to change without prior notice.
The information contained herein is the results of tests under certain conditions and is based on data available at that time. The information is provided mainly for your reference and, under no circumstances, does not guarantee the strength and safety.
Brother is not responsible to any damage or disadvantage arising from use of the product.
As a service to our customers, Brother will provide Material Safety Data Sheets for its tapes upon request. For additional information on tapes, including available styles and pricing, please call Brother Customer Service Dept.

At your side.
brother®
http://www.brother.com