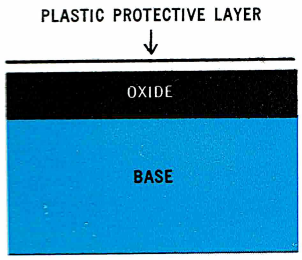
"Scotch" Brand Sandwich Instrumentation Tapes* end oxide rub-off, reduce head wear, extend tape life

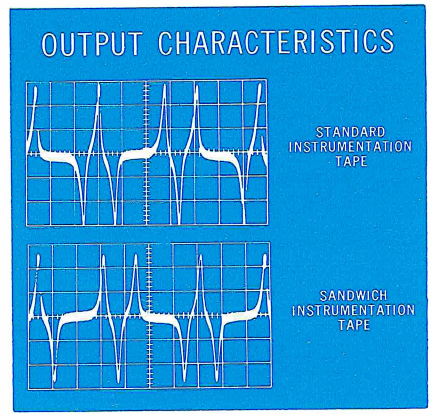
In that slender lifeline of data known as magnetic tape, a miss is magnified into a mile. A missed bit, or one picked up by error, is confusing, frustrating, and time consuming. If you're in doubt about the kind of performance you're getting, perhaps "Scotch" Brand Sandwich Tape can solve some of your problems.

The exclusive construction of Sandwich Tape combats the causes of error because it eliminates the source —oxide rub-off and head build-up. Tests prove Sandwich Tape wears a minimum of 30 times as long as ordinary tapes before it errs. (And that's stating it conservatively; on many transports it wears up to 100 times as long.) As a by-product, you can rely on Sandwich Tape to drastically reduce maintenance and replacement cost on equipment, too.



The Sandwich is constructed as shown in the diagram above. The famous "Scotch" Brand high potency oxide coating is sandwiched between a tough polyester base and a 50 micro-inch protective layer of plastic. Since the oxide is never in contact with the head, tape movement is smooth and low in friction—easy on both tape and equipment. Oxide can't rub off and distort valuable data.

Since head build-up is reduced



Actual photographs showing comparative output characteristics of Standard Instrumentation Tape and Sandwich Instrumentation Tape at 500 pulses per inch. As shown by the virtually identical patterns, signal attenuation due to the 50 micro-inch protective layer on Sandwich Tape is insignificant at this pulse density and does not affect practical performance requirements.

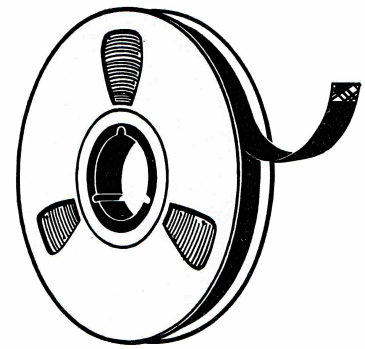
sharply, you require less equipment downtime for cleaning. Reduced erosion of the critical slit in magnetic heads means fewer costly replacements.

Yet, the real meat of this remarkable Sandwich is the "Scotch" Brand high potency oxide coating. Even under the protective plastic, the oxide's potency is quite sufficient to pick up 500 pulses per inch—and give desirable high-frequency response in many AM, FM, and PDM applications.

Sandwich Tape is but one of the developments to come out of 3M research—the same research responsible for "Scotch" Brand Video Tape, the first and only thoroughly time-tested video tape in commercial use.

Wide acceptance has shown the value of Sandwich Tape in the acquisition and reduction of information. This will come as no surprise to those who have learned to rely on 3M technology to create tapes of higher uniformity and reliability for error-free performance.

Check all three Sandwich Tapes: No. 488 for maximum strength and standard output; No. 486 for maximum strength and intermediate output; No. 489 for standard output plus 50% more recording time.



STANDARD SIZES

Popular standard widths of Sandwich Tapes are ¼", ½", ¾", and 1". Standard lengths for 486 and 488 (1.5 mil base) are 1250', 2500', and 5000'. For 489 (1.0 mil base), the standard lengths are 1800', 3600', and 7200'. Sandwich Tapes are supplied, in standard widths and lengths, on NAB hubs, on NAB reels, on semi-precision reels, and on precision reels.

SPECIAL ORDERS

Widths and lengths of Sandwich Tapes to meet any specialized requirements can be provided on special order. Check with your 3M Representative for details.

*Note: *The numbers shown for Sandwich Tapes are new designations. No. 486 used to be called No. 186; No. 488 was formerly No. 188; No. 489 was No. 189.*

FORMERLY 186

486

1.5 MIL BASE

FORMERLY 188

488

1.5 MIL BASE

FORMERLY 189

489

1.0 MIL BASE

PHYSICAL PROPERTIES

	486	488	489
Color	Purple	Purple	Purple
Base Material	Polyester	Polyester	Polyester
Thickness in Mils			
Base	1.45	1.45	.92
Coating	.55	.35	.35
Protective Layer	.05	.05	.05
Total	2.05	1.85	1.32
Slitting Tolerances—inches	+.000 —.004	+.000 —.004	+.000 —.004
Ultimate Tensile Strength			
¼″ Wide—Room Conditions	9#	9#	7#
PSI	25,000	25,000	25,000
PSI @ 150°F.	20,500	20,500	20,500
Yield Strength			
5% Stretch in ¼″ Width	5.4#	5.4#	3.6#
Elongation at Break	100%	100%	100%
Coefficient of Friction	0.33	0.33	0.33
Residual Elongation	0.5%	0.5%	0.5%
Toughness			
Tear—grams	26	26	12
Impact—kg—cms	100	100	70
Coefficient of Expansion*			
Humidity (units per % RH change)	1.1×10^{-5}	1.1×10^{-5}	1.1×10^{-5}
Temperature (units per °F.)	2×10^{-5}	2×10^{-5}	2×10^{-5}
Temperature Limits for Safe Use**			
Low	— 40°F.	— 40°F.	— 40°F.
High	+140°F.	+140°F.	+140°F.
Wear Ability***	30	30	30

*These coefficients are unitless and represent the change per % relative humidity or degree Fahrenheit over the following ranges:
Humidity: 20% RH to 80% RH
Temperature: +30°F. to +130°F.

**These tapes will not cup or show layer-to-layer adhesion within the indicated temperature limits for safe use.

***Wear ability of standard instrumentation tape No. 408 is considered as "1". Relative wear ability of each additional tape is expressed as a multiple of this figure. (The factor of "30" indicated for Sandwich Tapes is a conservative claim. On many transports Sandwich Tapes wear up to 100 times as long as standard.)

MAGNETIC PROPERTIES

	486	488	489
Intrinsic Coercivity (H_{ci})—oersteds	230	230	230
Retentivity (B_{rs})—gauss	1050	1050	1050
Remanence (flux lines/¼″ tape)	0.8	0.6	0.6
Output at 1% Distortion—db†			
15 Mil Wave Length	+2.5	0	0
Sensitivity—db†			
15 Mil Wave Length	+0.8	+0.8	+0.8
1 Mil Wave Length	—2.0	—2.0	—2.0
Erasing Field—oersteds	800	800	800
Uniformity at 15 Mil Wave Length			
Within a Roll	± 3%	± 3%	± 3%
Roll to Roll	±10%	±10%	±10%
Dropout Count††			
Errors/1 Roll	1 or less	1 or less	1 or less

†At optimum bias for each tape. Output and sensitivity are referred to standard instrumentation tape No. 408, which is designated as "0". All other tapes are expressed as gradations from this reference point.

††Measured by recording 200 non-return-to-zero (NRZ) pulses per inch on a 0.035″ track. A reduction to less than 50% normal signal amplitude constitutes a signal error. Zero errors are measured by saturating the tape unidirectionally. Each spurious signal greater than 10% of normal signal amplitude constitutes a zero error. Errors per roll based on recording 7 tracks on rolls ½″ x 2500′.