

497
498
499

HEAVY DUTY

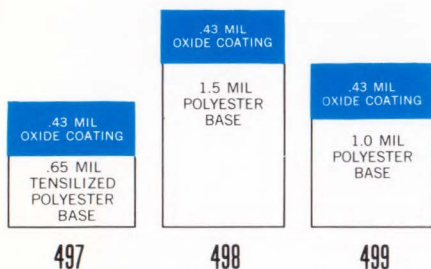
"Scotch" Brand Magnetic Tape for Instrumentation



The tape that changed TV for all time leads you right to rugged "SCOTCH" BRAND Heavy Duty Tapes*

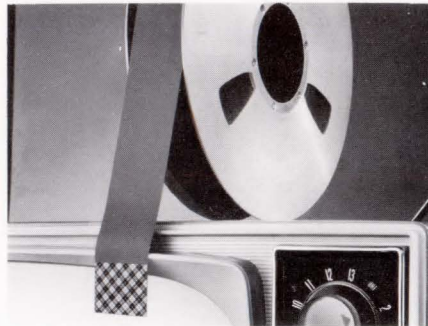
The tie that binds television's top performer to instrumentation tape is strong—and it goes beyond the fact that the same expert team produces the best of both. "SCOTCH" BRAND Heavy Duty Tapes share a common heritage—and uncommon endurance—with "SCOTCH" BRAND Video Tape, the tape that puts a network TV show on the same "clock time" from Maine to California.

Similarities worth noting between the two: a similar high-temperature binder system, famous "SCOTCH" BRAND high potency oxides, a similar ability to resist tremendous speeds, pressures, and temperatures while providing high resolution.



Heavy Duty Tapes shown in cross section

Let's look at the record of "SCOTCH" BRAND Video Tape and see what message it has for the user of instrumentation tape. On a standard reel of video tape like that shown on this page, some $1\frac{1}{2}$ million pulses per second must be packed to the square inch—on a total surface area equal to the size of a tennis court. The tape must provide this kind of resolution while defeating the deteriorating effects of high speeds, pressures as high as 10,000 p.s.i., and temperatures up to 250°F.



The fact is that video tape must be essentially perfect. And it's a matter of record that thus far only the 3M experts have mastered the art of making commercial quantities of video tape that consistently meet the demands of the application.

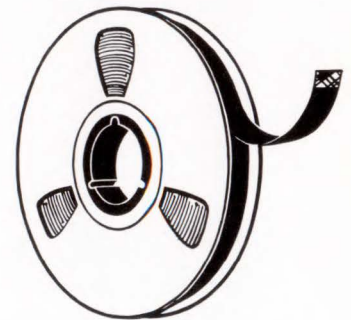
Significantly, the high-temperature binder system developed for "SCOTCH" BRAND Video Tape is first cousin, only slightly removed, to that used in the Heavy Duty Tapes. It's this special feature that has given Heavy Duty Tapes their exceptional wear life—15 times that of standard tapes.

The moral emerges: for tape that provides the best resolution of high and low frequencies under the severest conditions, turn to "SCOTCH" BRAND Heavy Duty Tapes. They offer the high-temperature binder system, plus the same high quality and uniformity that distinguish all "SCOTCH" BRAND Tapes.

Check all three Heavy Duty Tapes. All have the same .43 mil coating of high potency oxide, and thus identical magnetic characteristics. The difference is in the base. No. 498 has a 1.5 mil polyester base for maximum strength. No. 499 has a 1.0 mil polyester base for 50% extra recording time. No. 497, with a .65 mil base of tensilized polyester, offers twice the standard recording time.

SILICONE LUBRICATION

Like all "SCOTCH" BRAND magnetic tapes, Heavy Duty Instrumentation Tapes have 3M's exclusive silicone lubrication (U.S. Patent No. 2654681). This dry lubrication allows the tape to glide smoothly over sensitive recording heads, with a minimum of friction and wear. Impregnated throughout the coating, the silicone lubricant lasts the life of each tape.



STANDARD SIZES

Popular standard widths of Heavy Duty Tapes are $\frac{1}{4}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", and 1". Standard lengths for 498 (1.5 mil base) are 1250', 2500', and 5000'. Standard lengths for 499 (1.0 mil base) are 1800', 3600', and 7200'. For 497 (.65 mil base), the standard lengths are 2400', 4800', and 9600'. Heavy Duty Tapes are supplied, in standard widths and lengths, on NAB hubs, on NAB reels, and on corrosion-free, aluminum heavy duty (flat) and low inertia (tapered) precision reels.

SPECIAL ORDERS

Widths and lengths of Heavy Duty Tapes to meet any specialized requirements can be provided on special order. Contact your 3M Representative for details.

*NOTE: The numbers shown for Heavy Duty Tapes are new designations. No. 497 was formerly No. 197; No. 498 was No. 198; No. 499 was No. 199.

497

.65 MIL BASE

498

1.5 MIL BASE

499

1.0 MIL BASE

PHYSICAL PROPERTIES

Color Base Material	Black Tensitized Polyester	Black Polyester	Black Polyester
Thickness in Mils			
Base	.65	1.45	.92
Coating	.43	.43	.43
Total	1.08	1.88	1.35
Slitting Tolerances—inches	+.000 −.004	+.000 −.004	+.000 −.004
Ultimate Tensile Strength			
1/4" Wide—Room Conditions	6.8#	9#	7#
PSI	42,000	25,000	25,000
PSI @ 150°F.	38,000	20,500	20,500
Yield Strength			
5% Stretch in 1/4" Width	3.5#	5.4#	3.6#
Elongation at Break	50%	100%	100%
Coefficient of Friction	0.33	0.33	0.33
Residual Elongation	0.5%	0.5%	0.5%
Toughness			
Tear—grams	8	26	12
Impact—kg—cms	25	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	+250°F.	+250°F.	+250°F.
Wear Ability***	15	15	15

*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.

MAGNETIC PROPERTIES

Intrinsic Coercivity (H_{ci})—oersteds	240	240	240
Retentivity (B_{rs})—gauss	875	875	875
Remanence (flux lines/1/4" tape)	0.6	0.6	0.6
Output at 1% Distortion—db†			
15 Mil Wave Length	0	0	0
Sensitivity—db†			
15 Mil Wave Length	0	0	0
1 Mil Wave Length	+1.0	+1.0	+1.0
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 1/2" x 2500'.

**GENERAL
OFFICES**

**BRANCH
OFFICE
LOCATIONS**

900 Bush Avenue
St. Paul 6, Minnesota

ATLANTA

732 Ashby Street N.W.
Atlanta 18, Georgia

BOSTON

1330 Centre Street
Newton Center 59, Massachusetts

BUFFALO

330 Green Street
All Mail: P.O. Box 2012
Buffalo 5, New York

CHICAGO

6850 South Harlem Avenue
Argo P.O.
Bedford Park, Illinois

CINCINNATI

4835 Para Drive
Cincinnati 37, Ohio

CLEVELAND

12200 Brookpark Road
Cleveland 30, Ohio

DALLAS

2121 Santa Anna Avenue
Dallas 28, Texas

DETROIT

411 Piquette Avenue
Detroit 2, Michigan

GRAND RAPIDS

815 Monroe Avenue
Grand Rapids 4, Michigan

HIGH POINT

2401 Brevard Street
All Mail: P.O. Box 151
High Point, North Carolina

HONOLULU

1410 Kapiolani Boulevard
Honolulu 14, Hawaii

LOS ANGELES

6023 South Garfield Avenue
Los Angeles 22, California

PHILADELPHIA

5698 Rising Sun Avenue
Philadelphia 20, Pennsylvania

RIDGEFIELD (NEW YORK)

700 Grand Avenue
Ridgefield, New Jersey

ST. LOUIS

10725 Baur Boulevard
St. Louis 32, Missouri

ST. PAUL

Benz Building
367 Grove Street
St. Paul 1, Minnesota

SAN FRANCISCO

320 Shaw Road
South San Francisco, California

SEATTLE

3663 1st Avenue South
Seattle 4, Washington

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