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WAL 710/659

WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT

NO. WAL 710/659

Resistance of Weinberger Protective Fabric and of Its Components to Perforation by Fragment-Simulating Projectiles

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BY

J. F. SULLIVAN
Asst. Engineer

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DATE 30 June 1944

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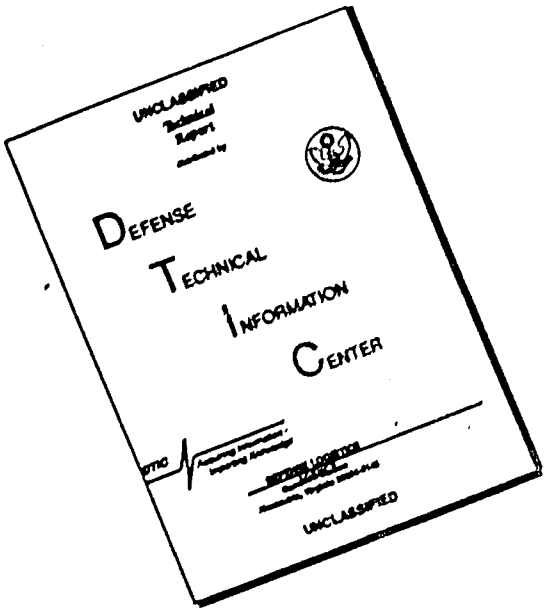

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WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT NO. WAL 710/659

Final Report on Problem B-8.10

30 June 1944

Resistance of Weinberger Protective Fabric and of Its Components to Perforation by Fragment-Simulating Projectiles

1. In accordance with directives from the Office, Chief of Ordnance[1,2] there have recently been conducted at this arsenal tests for resistance to perforation of a sample of proposed body armor (fabric) submitted by the Canadian Army Staff. This armor consists of two outside layers of heavy woven fabric, presumably nylon, and an inner quilted piece, presumably containing a filling of nylon fibers. The theory proposed by the designer is that the projectile will be diverted from its line of flight due to the nature of the construction of the woven fabric layer and thus much of its energy will be absorbed prior to reaching the quilted layer.*

2. Under impact of none of the fragment-simulating[3,4] or standard ball projectiles was the resistance to perforation of this assembly or of any of its components as great as that of an equivalent weight of 17½ ounce nylon duck previously tested.[5]

1. O.O. 400.112/[illegible] - [illegible] 400.112/3096, dated 29 [illegible].
2. O.O. 423/7842 - Wtn [illegible]3/177, dated 3 May 194[illegible].
3. Watertown Arsenal Laboratory Memorandum Report No. [illegible] 762/247(c), "Development of Projectiles to Be Used in [illegible] to Simulate Flak and 20 mm. HE Fragment," dated 17 December 1943.
4. Watertown Arsenal Laboratory Memorandum Report No. AL 7[illegible]/253(c), "Development of a Projectile, to Be Used in Testing [illegible] Armor, to Simulate Fragments of a 20 mm. H.E. Projectile", dated 7 January 194[illegible].
5. Watertown Arsenal Laboratory Memorandum Report No. AL 710/[illegible](c), "Resistance of Various Layers of 17½ Ounce Nylon to Several Types of Small Arms Projectiles", dated 22 April 194[illegible].

*See photographs Wtn 710-2301 and Wtn 710-2302, attached.

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Table I

Summary of Penetration Tests Conducted at Watertown Arsenal on Samples of Weinberger Protective Fabric and Its Components

Sample	Equivalent Steel Gauge	Ballistic Limits (F/S)			
		G-1-A[1]	G-1-S[2]	G-2[3]	Cal. .45[4]
Complete assembly	.040"	488	961	1108	560
4 plies corded component	.046"	-	-	1044	505
3 plies corded component	.034"	-	-	990	474
3 plies corded component (coated with rubber)	.046"	-	-	1028	-
4 plies quilting	.068"	-	-	—	735
3 plies quilting	.051"	-	-	—	694
2 plies quilting	.034"	-	-	1080	613
1 ply quilting	.017"	-	-	804	460
For Comparison:					
11 plies 17½ oz. nylon duck	.040"	567	1058	1310	704
Hadfield manganese steel	.040"	-	900	1600	900

[1]Cal. .30 fragment-simulating projectile - 150 grains.
[2]Cal. .30 fragment-simulating projectile - 34 grains.
[3]Cal. .22 fragment-simulating projectile - 17 grains.
[4]Cal. .45 (steel-jacketed) ball projectile - 230 grains.

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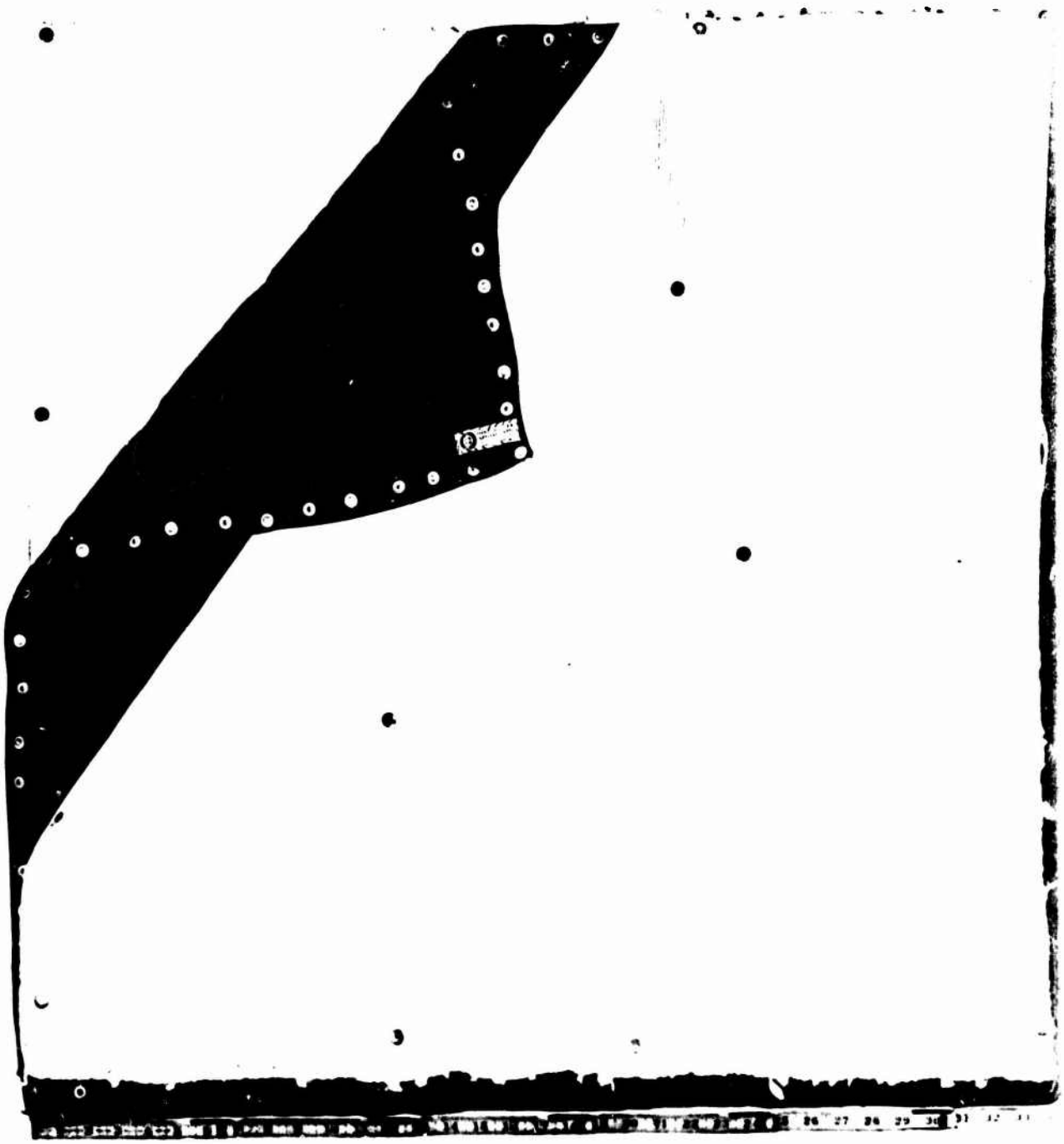

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WEINBERGER PROTECTIVE FABRIC

6 MAY 1944 WTN.710-2301

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6 MAY 1944 WEINBERGER PROTECTIVE FABRIC
EDGE VIEW MAG. X1 WTN.710-2302

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ABSTRACT:

Final report is given on the resistance of Weinberger protective fabric and of its components to perforation by fragment-simulating projectiles. This armor consists of two outside layers of heavy woven fabric, presumably nylon, and an inner quilted piece, presumably containing a filling of nylon fibers. A sample of the armor was mounted on a canvas dummy and subjected to impacts of fragment-simulating projectiles and standard cal. .45 (steel-jacketed) ball projectiles. Results showed that the resistance of the complete assembly was inferior to that of an equivalent weight of 17-1/2 ounce nylon duck. The resistance of none of its components was equivalent to an equal weight of the nylon duck, but the resistance of two piles of the quilted component was greater than that of the complete assembly.

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