

AD/A-005 300

PROTECTIVE CLOTHING

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JANUARY 1975

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This bibliography contains unclassified and unlimited citations on Protective Clothing. Discussed are protective clothing such as fire protective clothing, flight clothing, gasproof clothing, underwater clothing, pressure suits, and exposure suits. It also includes pertinent information on stress physiological, psychological and biological aspects of human performance in the use of protective clothing in actual test. (See reverse)		

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

ITEM 19, (Cont'd)

Flight Helmets
Helmets
Thermal Insulation
Shoes

Human Factors Engineering
Pressure Suits
Protective Masks

ITEM 20, (Cont'd)

Computer-generated indexes of Corporate Author-Monitoring
Agency, Subject, Title and Personal Author are included.

OF DISBURSE

FOREWORD

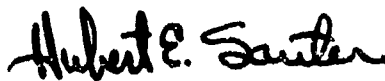
This unclassified and unlimited bibliography contains 236 selected citations of reports on *Protective Clothing*. These references provide information relating to specifications, design, fabrication techniques, synthetic fibers, textiles, plastics, heat tolerance, thermal stress, test analysis, and performance evaluation of materials used in protective clothing. Discussed are protective clothing such as fire protective clothing, flight clothing, gas-proof clothing, underwater clothing, pressure suits and exposure suits. It also includes pertinent information on stress physiological, psychological and biological aspects of human performance in the use of protective clothing in actual test.

These citations were taken from entries processed into the Defense Documentation Center's data bank during the period of January 1953 to September 1974.

Individual entries are arranged in AD number sequence under the heading AD Bibliographic References. Computer-generated indexes of Corporate Author-Monitoring Agency, Subject, Title, and Personal Author are provided.

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HUBERT E. SAUTER
Administrator
Defense Documentation Center

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-458 909

LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY
DIV

HIGH-ALTITUDE PRESSURE SUITS AND HERMETICALLY SEALED
CABINS FOR STRATOSPHERIC FLIGHTS. (U)

DESCRIPTIVE NOTE: TRANSLATIONS OF SOVIET-BLOC
SCIENTIFIC AND TECHNICAL LITERATURE.

MAR 65 1EP SPASSKIY, V. A. ;

REPT. NO. ATD-T-65-13

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. FROM VESTNIK VOZDUSHNOGO
FLOTA, NO. 5, PP. 48-49, 1938.

DESCRIPTORS: (•PRESSURE SUITS, USSR), PRESSURIZED
CABINS, HERMETIC SEALS, HIGH ALTITUDE, STRATOSPHERE,
BREATHING APPARATUS, OXYGEN EQUIPMENT, REVIEWS, DESIG(U)

HIGH-ALTITUDE PRESSURE SUITS AND HERMETICALLY
SEALED CABINS FOR STRATOSPHERIC FLIGHTS.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AR-462 767

ARCTIC AEROMEDICAL LAB FORT WAINWRIGHT ALASKA

PROJECT COLD CASE.

(U)

DESCRIPTIVE NOTE: TECHNICAL DOCUMENTARY REPT.,

FEB 65 26P MILAN, FREDERICK A. I

REPT. NO. AAL-TDR-64-23

PROJ: 8238

TASK: 823801

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FLIGHT CLOTHING, PRESSURE SUITS),
(*PRESSURE SUITS, COLD WEATHER TESTS), FLIGHT CREWS,
HIGH ALTITUDE, EFFECTIVENESS, SURVIVAL (PERSONNEL),
ARCTIC REGIONS, SIMULATION

(U)

THE RESULTS OF PROJECT COLD CASE, AN INVESTIGATION OF THE COLD LAND SURVIVAL CAPABILITIES OF AIR FORCE PILOTS WEARING THE FULL PRESSURE HIGH ALTITUDE FLYING OUTFIT (A/P22S-2 AND A/P 22S-3) ARE PRESENTED IN THIS REPORT. SIX SUBJECTS WEARING THESE GARMENTS WERE PLACED UNDER SIMULATED SURVIVAL CONDITIONS IN A WOODED AREA OF INTERIOR ALASKA NEAR FAIRBANKS. AMBIENT AIR TEMPERATURES REACHED -30 F AND WERE BELOW -27 F FOR AT LEAST 50% OF THE TIME. ON THE THIRD DAY AIR TEMPERATURES ROSE AND REMAINED AT -10 F UNTIL THE CONCLUSION OF THE TEST. THE TEST LASTED FOR 72 HOURS. TWO SUBJECTS WEARING THE FULL PRESSURE SUIT WITHOUT ADDITIONAL CLOTHING SURVIVED FOR 11 AND 30 HOURS. AT THE END OF THIS TIME THEY WERE FATIGUED AND MODERATELY HYPOTHERMIC. TWO SUBJECTS WITH THE FULL PRESSURE SUIT PLUS A NINEPIECE DOWN-FILLED SURVIVAL OUTFIT (CLOTHING OUTFIT, ARCTIC SURVIVAL) SURVIVED FOR 52 AND 72 HOURS. THE 52-HOUR SURVIVOR SUFFERED A NONCOLD INJURY WHICH NECESSITATED HIS REMOVAL. TWO SUBJECTS WITH THE FULL PRESSURE SUIT PLUS AN EXPERIMENTAL ADC WALK-AROUND SLEEPING BAG SURVIVED FOR 72 HOURS EACH. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-467 823

SYSTEMS ENGINEERING GROUP WRIGHT-PATTERSON AFB OHIO

COMPARATIVE EVALUATION OF USAF STANDARD A/P22S-2 AND
IMPROVED A/P22S-2A HIGH ALTITUDE, FULL PRESSURE
FLYING OUTFITS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 65 61P GILLESPIE, KENT W. I
REPT. NO. SEG-TR-65-9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*FLIGHT CLOTHING, HIGH ALTITUDE),
(*PRESSURE SUITS, HIGH ALTITUDE), DESIGN, PRESSURE,
THERMAL PROPERTIES, WEIGHT, DATA, TESTS, BODY
TEMPERATURE, GAS FLOW (U)

IN THIS REPORT, THE A/P22S-2A IS COMPARED
WITH THE A/P22S-2 OUTFIT. THE COMPONENTS AND
FACTORS COMPARED INCLUDED: THE VISOR, WEIGHT, LEAK
RATE AND PRESSURE RELIEF, REACH CAPABILITY, WORK
SPACE, THERMAL AND ACOUSTICAL EVALUATION, BACK
PRESSURE, AND ALTITUDE. THE COMMENTS OF THE
PERSONS WEARING THE OUTFIT WERE ALSO CONSIDERED.
RESULTS INDICATE THAT THE A/P22S-2A SHOWS
SOME IMPROVEMENT OVER THE A/P22S-2. HOWEVER
FURTHER IMPROVEMENTS ARE REQUIRED TO MAKE THE OUTFIT
MORE OPERATIONALLY ACCEPTABLE. SPECIFIC
RECOMMENDATIONS ARE MADE AS TO THOSE AREAS THAT NEED
IMPROVEMENTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-474 980 15/5 6/17
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF SPIKE RESISTANT INSOLE. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 65 25P MANGUM, EDWIN W. ;
PROJ: RDTE-1M643303D547 ,USATECOM-8-5-6010-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHOES, PROTECTIVE CLOTHING), ARMY
EQUIPMENT, PERFORMANCE(ENGINEERING), SPIKES,
PENETRATION, DEFORMATION, FRACTURE(MECHANICS), METAL
PLATES, STEEL, BUCKLING, HEAT TRANSFER, LIFE EXPECTANCY,
DESIGN, EFFECTIVENESS (U)

THE TEST WAS CONDUCTED TO DETERMINE THE TECHNICAL
PERFORMANCE AND SAFETY CHARACTERISTICS OF THE SPIKE
RESISTANT INSOLE WORN IN THE STANDARD TROPICAL BOOT
WHEN SUBJECTED TO ACCELERATED USAGE. IT WAS FOUND
THAT A MINIMUM FORCE 265 POUNDS WAS REQUIRED AT POINT
OF CONTACT TO PIERCE THE COMBINED OUTSOLE OF THE
TROPICAL COMBAT BOOT AND THE EXPERIMENTAL INSOLE.
THE INSOLES ARE UNSATISFACTORY FROM A DURABILITY
STANDPOINT, BEING HIGHLY SUSCEPTIBLE TO DEFORMATION
AND CRACKING. THE INSOLES PRODUCE FOOT DISCOMFORT
DUE TO EXCESSIVE HEATING OF THE SOLES OF THE FEET.
THE INSOLES ARE SATISFACTORY FROM A SAFETY
STANDPOINT. IT WAS RECOMMENDED THAT THE
EXPERIMENTAL SPIKE RESISTANT INSOLE BE REDESIGNED TO
PREVENT BUCKLING OF THE STEEL PLATE, THUS REDUCING
CRACKING OF THE PLATE AND DIMINISHING THE HEAT
TRANSMITTED TO THE FOOT PRODUCED BY FLEXING OF THE
PLATE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-603 701

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

X-20A FULL-PRESSURE SUIT QUANTITATIVE PERFORMANCE,

(U)

MAY 64 50P BOWEN, J. D. :

PROJ: 6301

TASK: 630104

MONITOR: AMRL ,

TDR64 36

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*AEROSPACE MEDICINE, ASTRONAUTS),
(*PRESSURE SUITS, EXPOSURE SUITS), (*EXPOSURE SUITS,
PRESSURE SUITS), MOTOR REACTIONS, HANDS, PERFORMANCE
(HUMAN), SPACE ENVIRONMENTS, SPACECRAFT CABINS,
SIMULATION, PHYSICAL PROPERTIES, ACOUSTIC PROPERTIES,
WEIGHT, VISION

(U)

IDENTIFIERS: X-20 SPACECRAFT

(U)

A SERIES OF EXPERIMENTAL PROCEDURES WAS
ACCOMPLISHED TO DEMONSTRATE AND MEASURE THE
PROTECTION X-20A (DYNASOAR) PILOTS OBTAIN
BY WEARING THEIR CUSTOM FITTED PRESSURE GARMENTS
WHILE EXPOSED TO SIMULATED MISSION CONDITIONS.
MISSION CONDITIONS WERE SIMULATED TO THE EXTENT
POSSIBLE WITH AVAILABLE ALTITUDE AND TEMPERATURE TEST
FACILITIES. PHYSICAL CHARACTERISTICS OF THE GARMENTS
WERE DETERMINED SUCH AS WEIGHT, PRESSURE DROP WITH
FLOW, DIMENSIONAL STABILITY, VISUAL FIELDS, AND
ACOUSTICAL ATTENUATION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-603 705

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

FINGER DEXTERITY OF THE PRESSURE-SUITED SUBJECT, (U)

MAY 64 16P WALK, DIETER E. :
PROJ: 7184
TASK: 718408
MONITOR: AMRL , TDR64 41

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (AEROSPACE MEDICINE, ASTRONAUTS),
(GLOVES, PRESSURE SUITS), (MOTOR REACTIONS, HANDS),
PSYCHOMOTOR TESTS, PERFORMANCE (HUMAN) (U)

THE STUDY ATTEMPTS TO ESTABLISH AN OBJECTIVE
BASELINE FOR EVALUATING THE FUNCTIONAL MOBILITY OF
PRESSURE GLOVES. THE PURDUE PEGBOARD
DEXTERITY TEST WAS EMPLOYED TO MEASURE HAND
DEXTERITY UNDER THREE CONDITIONS: (1) SUBJECTS
BAREHANDED, BUT WEARING AN UNPRESSURIZED A/P22S-2
FULL-PRESSURE SUIT ENSEMBLE; (2) SUBJECTS GLOVED
(WAK-3/P-22S-2) AND SUITED, BUT NOT
PRESSURIZED; (3) SUBJECTS GLOVED, SUITED, AND
PRESSURIZED TO 2.5 PSI. THE PURDUE PEGBOARD
DEXTERITY TEST WAS FOUND TO BE A DELICATE
INDICATOR OF HAND DEXTERITY IN THE TEST CONDITIONS.
THE TEST RESULTS SHOW A MARKED REDUCTION IN
DEXTERITY EVEN WITH THE GLOVES AND SUIT UNINFLATED,
AND AN ADDITIONAL LOSS WHEN GLOVES AND SUIT WERE
INFLATED. THE DEGREE OF LOSS OF DEXTERITY IS
BELIEVED TO PROVIDE AN OBJECTIVE MEASURE WHEREBY ONE
OPERATIONAL ASPECT OF PRESSURE GLOVES MAY BE
EVALUATED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-606 039

ANTIOCH COLL YELLOW SPRINGS OHIO

HEIGHT-WEIGHT SIZING OF PROTECTIVE GARMENTS, BASED ON
JAPANESE AIR SELF-DEFENSE FORCE PILOT DATA, WITH FIT-
TEST RESULTS. (U)

JUL 64 1V MCCONVILLE, JOHN T. ;
ALEXANDER, MILTON ; KRAMER, JAMES H. ; FRITZ,
EUGENE A. ;
CONTRACT: AF33 616 6792 , AF33 657 9201
PROJ: 7184
TASK: 718408
MONITOR: AMRL , TOR64 66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (PROTECTIVE CLOTHING, ANTHROPOMETRY),
(FLIGHT CLOTHING, TESTS), EXPOSURE SUITS, PRESSURE
SUITS, ARMED FORCES (FOREIGN), AIR FORCE, JAPAN,
STATISTICAL DATA (U)

THE STUDY DISCUSSES THE DEVELOPMENT AND TEST OF A
FOURSIZE HEIGHT-WEIGHT SIZING PROGRAM OF PARTIAL
PRESSURE AND EXPOSURE SUITS DESIGNED FOR THE
JAPANESE AIR SELF-DEFENSE FORCE. THE
SIZING PROGRAM IS BASED UPON AN ANTHROPOMETRIC SURVEY
OF OVER 200 SUBJECTS, CONDUCTED AT FIVE AIR BASES
THROUGHOUT JAPAN DURING THE SPRING OF 1961. THE
STATISTICAL RATIONALE USED IN DEVISING THE HEIGHT-
WEIGHT PROGRAM IS PRESENTED ALONG WITH THE ANALYSIS
OF THE ANTHROPOMETRIC DATA. TWO GARMENTS, THE CSU
- 9/P PARTIAL PRESSURE ASSEMBLY AND THE CWU
- 13/P EXPOSURE GARMENT, WERE FABRICATED IN
ACCORDANCE WITH THE DEVELOPED SIZING PROGRAM. A
FIT-TEST OF THESE GARMENTS WAS CONDUCTED AT
HAMAMATSU AND TACHIKAWA AIR BASES, JAPAN,
IN APRIL 1963. THE RESULTS OF THE FIT-TEST
SERVED TO VALIDATE THE SOUNDNESS OF THE BASIC SURVEY
DATA AND SUBSEQUENT DEVELOPMENT OF THE
HEIGHTWEIGHT SIZING PROGRAM. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-608 088

GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE
DIV

EMERGENCY BREATHING AND SUIT PRESSURIZATION
SYSTEM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 31 MAY 63-31 MAR 64.

SEP 64 47P MILLER, R. A. WITHEY, D. J. I
CONTRACT: AF33 667 11345
PROJ: 6373
TASK: 637305
MONITOR: AMRL . TDR64 60

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LIFE SUPPORT, RESPIRATION),
(*RESPIRATION, LIFE SUPPORT), (*PRESSURE SUITS,
RESPIRATION), (*PRESSURE SUITS, RESPIRATION), (*PRESSURE
BREATHING, ASTRONAUTS), CLOSED ECOLOGICAL SYSTEMS,
CARBON DIOXIDE, OXYGEN, VENTILLATION, HUMIDITY, HEAT
EXCHANGERS, TEMPERATURE, CONTROL SYSTEMS, FLIGHT
CLOTHING, EQUATIONS (U)

THE DESIGN AND FABRICATION OF AN EMERGENCY
BREATHING AND SUIT PRESSURIZATION SYSTEM
(EBSPS), CAPABLE OF SUSTAINING THREE FULL-PRESSURE
SUITED CREWMEN WITHIN THE AEROSPACE MEDICAL
RESEARCH LABORATORIES LIFE SUPPORT SYSTEM
EVALUATOR, HAS BEEN INVESTIGATED. TWO OPERATING
MODES ARE PROVIDED. ONE, WHEN THE EVALUATOR IS
PRESSURIZED, THE EMERGENCY BREATHING AND SUIT
PRESSURIZATION SYSTEM OPERATES AS AN OPENLOOP
SYSTEM AND VENTILATES THE PRESSURE SUIT WITH THE
AMBIENT AIR. TWO, WHEN THE EVALUATOR IS
DEPRESSURIZED, THE EMERGENCY BREATHING AND SUIT
PRESSURIZATION SYSTEM OPERATES AS A CLOSED
ENVIRONMENTAL CONTROL SYSTEM, AND PROVIDES THE
CREWMEN WITH A HABITABLE ATMOSPHERE. IN THIS
LATTER MODE, THE SYSTEM REGULATES THE SUIT PRESSURE,
THE CO2 PARTIAL PRESSURE, RELATIVE HUMIDITY,
COMPOSITION (100% O2), AND TEMPERATURE OF THE
VENTILATING AIR, AND SUPPLIES OXYGEN FOR BREATHING
AND LEAKAGE MAKE UP AS REQUIRED. IN ALL MODES, THE
EMERGENCY BREATHING AND SUIT PRESSURIZATION
SYSTEM REGULATES THE FLOW OF VENTILATING ATMOSPHERE
THROUGH THE PRESSURE SUITS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-608 139

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

RESPIRATORY AND MICROCLIMATE TEMPERATURES WITHIN THE
PARKA HOOD IN EXTREME COLD. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

SEP 64 15P VEGHTE, JAMES H. ;

PROJ: 7164

TASK: 716409

MONITOR: AMRL . TDR64 79

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROTECTIVE CLOTHING, COLD WEATHER TESTS),
(*RESPIRATION, COLD WEATHER TESTS), (*FROSTBITE, COLD
WEATHER TESTS), HEAD(ANATOMY), NOSE(ANATOMY),
FACE(ANATOMY), POLAR REGIONS, ARCTIC REGIONS,
EXPOSURE(PHYSIOLOGY), EXERCISE(PHYSIOLOGY), RELAXATION,
AIR, TEMPERATURE, TEMPERATURE SENSITIVE ELEMENTS,
THERMOCOUPLES, AIR FORCE PERSONNEL (U)

IDENTIFIERS: MICROCLIMATE TEMPERATURES,
RELAXATION (U)

THE STANDARD AIR FORCE ARCTIC CLOTHING WAS WORN
TO DETERMINE IF IT PROVIDED ADEQUATE HEAD PROTECTION
IN EXTREMELY COLD TEMPERATURES. SUBJECTS WERE
EXPOSED TO -62C FOR 40 TO 60 MINUTES IN AN
ENVIRONMENTAL CHAMBER. POSSIBLE RESPIRATORY
PROBLEMS AND FROSTBITE OF THE CHEEKS AND NOSE WERE
THE PRIMARY CONCERN. SUBJECTS RESTING OR
EXERCISING EXPERIENCED NO RESPIRATORY OR FROSTBITE
PROBLEMS. AIR IN THE HOOD RAPIDLY APPROACHED
AMBIENT CONDITIONS, BECAUSE OF THE EXPULSIVE NATURE
OF EXPIRATION AND THE STRONG CONVECTIVE AIR MOVEMENT.
EXERCISE INCREASED THE MICROCLIMATE TEMPERATURES IN
THE HOOD. THE EXISTING HOOD DESIGN WAS FOUND TO
PROVIDE ADEQUATE HEAD PROTECTION FOR AF PERSONNEL
AT MORE EXTREME TEMPERATURES THAN ARE NORMALLY
ENCOUNTERED IN THE ARCTIC. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-609 164

NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL
MATERIALS LAB

METHODS OF SANITIZING AND DEODORIZING RUBBERIZED
FABRIC AND PRODUCING TEMPORARY ANTI-STATIC FILMS ON
SYNTHETIC MATERIALS. (U)

OCT 64 10P MACKENZIE, W. E. I
REPT. NO. NAEC-AML-2050

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*RUBBER COATINGS, FLIGHT CLOTHING),
(*CLEANING COMPOUNDS, TEXTILES), (*TEXTILES, CLEANING
COMPOUNDS), (*FLIGHT CLOTHING, CLEANING), (*AMMONIUM
COMPOUNDS, CLEANING COMPOUNDS), MATERIALS, STATIC
ELECTRICITY, INHIBITION, ODORS, TOILET ARTICLES (U)

AN INVESTIGATION OF SANITIZING, DEODORIZING, AND
ANTISTATIC AGENTS IS DESCRIBED. RECOMMENDATIONS
ARE MADE FOR THE USE OF QUATERNARY AMMONIUM COMPOUNDS
FOR SANITIZING AND DEODORIZING RUBBERIZED FLIGHT
CLOTHING AND FOR THE USE OF NON-IONIC DETERGENTS FOR
RENDERING SYNTHETIC MATERIALS ANTI-STATIC.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-609 206

CHANCE VOUGHT CORP DALLAS TEX

INTEGRATED BACK-PACK MANEUVERING UNIT PROPULSION
STUDY AND EXHAUST PLUME HEATING ANALYSIS. (U)

DESCRIPTIVE NOTE: ASTRONAUTICS ENGINEERING REPT. FOR DEC
62-JUN 63,

SEP 63 237P PRATT ,C. L. 1GOODNIGHT,F. H. 1
REPT. NO. CVC-00.252
CONTRACT: AF33 657 10408
PROJ: 8170
TASK: 817008
MONITOR: ASD , TOR63 729

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART
UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM BEST
AVAILABLE COPY.

DESCRIPTORS: (*ASTRONAUTS, SPACEBORNE), (*ROCKET MOTORS
(LIQUID PROPELLANT), PORTABLE EQUIPMENT), (*FLIGHT
CLOTHING, SPACE NAVIGATION), (*SPACE PROPULSION, FLIGHT
CLOTHING), FEASIBILITY STUDIES, MONOPROPELLANTS,
HYDROGEN PEROXIDE, EXHAUST GASES, HEAT TRANSFER, SPACE
ENVIRONMENTS, HALOGENATED HYDROCARBONS, SPECIFIC
IMPULSE, PERFORMANCE (ENGINEERING), GAS GENERATING
SYSTEMS, MILITARY PERSONNEL, ROCKET PROPULSION, WEIGHT
MANUEVERABILITY (U)
IDENTIFIERS: ASTRONAUT MANEUVERING UNITS (U)

TWO TECHNICAL PROBLEMS RELATED TO THE ASTRONAUT
MANEUVERING UNIT ARE TREATED. THE PROBLEMS
ARE: (1) HEATING ASSOCIATED WITH THE IMPINGEMENT
OF THE ROCKET EXHAUST ON SPACE SUIT SURFACES, AND
(2) THE PERFORMANCE OF INERT HEATED GASES AS
PROPELLANTS. METHODS FOR PREDICTING ROCKET EXHAUST
HEATING RATES IN SPACE ARE PRESENTED AND RESULTS ARE
COMPARED WITH TEST DATA. EFFECTS OF PLUME HEATING
OF AN H2O2 MONOPROPELLANT EXHAUST FROM A TYPICAL
MOTOR PLACEMENT IS SUMMARIZED. THE RESULTS OBTAINED
FROM SEVERAL HEATED GAS PROPELLANT TESTS ARE REPORTED
AND COMPARED TO THEORETICALLY PREDICTED PERFORMANCE.
THE ANALYTICAL AND EXPERIMENTAL TECHNIQUES UTILIZED
ARE DISCUSSED IN DETAIL. THE REFRIGERANTS, FREON
115 AND FREON C318 SHOW THE HIGHEST DENSITY
IMPULSE AND LOWEST WEIGHT. FREON 115 IS
RECOMMENDED FOR USE DUE TO THE LOWER STORAGE
TEMPERATURE REQUIRED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-659 863

NORTH AMERICAN AVIATION INC LOS ANGELES CALIF

MOMENTS OF INERTIA AND CENTERS OF GRAVITY OF THE
LIVING HUMAN BODY ENCUMBERED BY A FULL-PRESSURE SUIT(U)

DESCRIPTIVE NOTE: FINAL REPT. FOR JUL-DEC 63:
NOV 64 62P DUBOIS, J. ISANTSCHI, W.
R. WALTON, D. M. ISCOTT, C. O. MAZY, F.
W. I

REPT. NO. NA-64-527
CONTRACT: AF33 657 11619
PROJ: AF-7184
TASK: 718408
MONITOR: AMRL TR-64-110

UNCLASSIFIED REPORT

DESCRIPTORS: (*ASTRONAUTS, PRESSURE SUITS), (*PRESSURE
SUITS, ASTRONAUTS), (*CENTER OF GRAVITY, ASTRONAUTS),
MOMENT OF INERTIA, HUMAN FACTORS ENGINEERING,
ANTHROPOMETRY, ANATOMY, HUMAN BODY, HUMANS,
WEIGHTLESSNESS, POSTURE(PHYSIOLOGY), RESPIRATION, AIR
FORCE PERSONNEL, OXYGEN CONSUMPTION, RESPIRATION,
STATISTICAL DATA, CORRELATION TECHNIQUES (U)

THE CENTER OF GRAVITY AND THE MOMENTS OF INERTIA OF
EACH OF 19 MALE SUBJECTS, REPRESENTATIVE IN STATURE
AND WEIGHT OF THE U. S. AIR FORCE POPULATION,
WERE DETERMINED. TWO BODY POSITIONS: SITTING AND
RELAXED; AND THREE MODES OF DRESS: NUDE, SUITED-
UNPRESSURIZED, AND SUITEDPRESSURIZED WERE
INVESTIGATED. THE THEORETICAL ACCURACY OF THE
EXPERIMENTAL PROCEDURES, BASED ON A COMPOUND
PENDULUM, RANGED FROM 2 TO 8 PERCENT, DEPENDING ON
BODY POSITION AND AXIS. THE MOMENTS OF INERTIA
WERE FOUND TO VARY SIGNIFICANTLY BETWEEN BODY
POSITIONS AND BETWEEN NUDE AND SUITED CONDITIONS.
CORRELATION COEFFICIENTS BETWEEN THE MOMENTS OF
INERTIA AND STATURE AND WEIGHT EXCEEDED 0.9. FIFTY
ANTHROPOMETRIC DIMENSIONS AND FRONTAL AND PROFILE
PHOTOGRAPHS WERE OBTAINED ON EACH SUBJECT TO SERVE AS
THE BASIS FOR ADDITIONAL BIODYNAMIC ANALYSES.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-609 937

NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AEROSPACE CREW
EQUIPMENT LAB

METABOLIC MECHANISMS OF MAN IN THE FULL PRESSURE
SUIT. PHYSIOLOGICAL COST OF DONNING A FULL PRESSURE
SUIT, (U)

DEC 64 25P HENDLER, EDWIN IDERY, DONALD
W. MILLER, NFIL ;
PROJ: 32
TASK: R360FR101 200 1R011 0101
MONITOR: NAEC ACEL , 527

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*METABOLISM, AEROSPACE MEDICINE),
(*PRESSURE SUITS, STRESS (PHYSIOLOGY)), OXYGEN
CONSUMPTION, PULSE RATE, ENERGY, PHYSIOLOGY, TIME
STUDIES, EFFECTIVENESS, PROTECTIVE CLOTHING, VOLUME,
EXERCISE (PHYSIOLOGY), NAVAL PERSONNEL (U)
IDENTIFIERS: MARK-4 PRESSURE SUITS (U)

EXPERIENCED SUBJECTS DONNED THE U. S. NAVY MK-4
FULL PRESSURE SUIT UNDER CONDITIONS OF TIME AND
DONNING SPACE LIMITATIONS. DIRECT AND INDIRECT
MEASURES OF PHYSIOLOGICAL COST WERE MADE USING OXYGEN
CONSUMPTION AND HEART RATE, RESPECTIVELY.
APPROXIMATELY 1 KCAL OF ENERGY PER KG OF BODY
WEIGHT WAS EXPENDED IN THE DONNING TASK. DONNING
VOLUMES AS SMALL AS ABOUT 7 TIMES THE VOLUME OF THE
SUBJECT'S BODY ACCOMMODATED THE DRESSING PROCEDURE
WITH NO APPARENT INCREASES IN DONNING TIME NOR IN
ENERGY EXPENDITURE. SUIT FIT WAS FOUND TO HAVE AN
IMPORTANT EFFECT ON BOTH EFFORT AND TIME REQUIRED FOR
DONNING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-410 519

RAND DEVELOPMENT CORP CLEVELAND OHIO

THE USE OF LINES OF NONEXTENSION TO IMPROVE MOBILITY
IN FULL-PRESSURE SUITS. (U)

DESCRIPTIVE NOTE: FINAL REPT. MAR 63-MAR 64,

NOV 64 44P IBERALL, ARTHUR S. I

CONTRACT: AF33 657 10992

PROJ: 7184

TASK: 718408

MONITOR: AMRL . TR64 118

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PRESSURE SUITS, HUMAN FACTORS
ENGINEERING), (•ANTHROPOMETRY, PRESSURE SUITS),
PERFORMANCE (HUMAN), PROTECTIVE CLOTHING, ANATOMY,
MOTION, SKIN(ANATOMY), ELASTIC PROPERTIES, AVIATION
PERSONNEL, ASTRONAUTS, DESIGN, MOBILE (U)

AN IMPORTANT OBJECTIVE IN THE DEVELOPMENT OF A
FULLPRESSURE SUIT FOR A HUMAN BEING IS TO PERMIT THE
WEARER FULL MOBILITY WITHOUT INTERFERING WITH
PHYSICAL CAPABILITY. ALTHOUGH THE HUMAN SKIN IS
STRETCHED DURING BODY MOTION, THERE IS VIRTUALLY NO
STRETCH ALONG CERTAIN LINES, HERE CALLED 'LINES OF
NONEXTENSION'. THE INVESTIGATION WAS UNDERTAKEN
TO DETERMINE THE EFFICACY OF UTILIZING LINES OF
NONEXTENSION TO PROVIDE NATURAL MOBILITY AND MINIMAL
BALLOONING IN FULL-PRESSURE SUITS. THE PROGRAM OF
INVESTIGATION PURSUED WAS: (1) TO MAP OUT THESE
LINES OF NONEXTENSION, (2) TO TEST WHETHER STRING
ELEMENTS OF HIGH ELASTIC MODULUS, A CONNECTED
NETWORK, COULD BE LAID ALONG THESE LINES OF
NONEXTENSION WITHOUT PROVIDING ANY CONSTRAINT TO
MOBILITY, (3) TO OBTAIN A HIGHLY MOBILE PRESSURE-
RETAINING LAYER TO BE CONSTRAINED BY THE NET, AND
(4) TO CONSTRUCT AND DEMONSTRATE AN ENTIRE
PRESSURE-RETAINING GARMENT SYSTEM THAT MAKES USE OF
ALL NECESSARY LAYERS AND STRING ELEMENTS IN A
COMPLETELY CONNECTED, NETTED COVERING FOR THE BODY,
WITH MINIMAL CONSTRAINT TO MOBILITY UP TO 5 PSI. A
MOBILE, PRESSURE-RETAINING GARMENT WAS DEVELOPED BY
BUILDING EACH STRUCTURAL, FUNCTIONAL LAYER INTO THE
COMPOSITE GARMENT IN ACCORDANCE WITH THE BASIC DESIGN
THEORY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-613 189

ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK
MASS

THE ARCTIC SOLDIER: POSSIBLE RESEARCH SOLUTIONS FOR
HIS PROTECTION, (U)

64 22P GOLDMAN, RALPH F. I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ARMY PERSONNEL, ARCTIC REGIONS), (*ARCTIC
REGIONS, ARMY PERSONNEL), (*PROTECTIVE CLOTHING, ARMY
PERSONNEL), (*ACCLIMATIZATION, ARMY PERSONNEL),
SCIENTIFIC RESEARCH, SHELTERS, HEATING, FEET, HANDS,
CLIMATE, EXPOSURE SUITS, HEAT PRODUCTION (BIOLOGY),
GLOVES, SHOES (U)
IDENTIFIERS: CLIMATE, COLD TOLERANCE (U)

THE RESULTS ARE SUMMARIZED OF A RESEARCH PROGRAM ON
AUXILIARY HEATING WITH MINIMUM POWER. THE PROGRAM
ESTABLISHED THE FEASIBILITY OF 2 APPROACHES:
AUXILIARY HEATING FOR THE EXTREMITIES OF THE BODY
AND A CONDITIONED AIR-CLOTHING SYSTEM THAT PROBABLY
HAS PRIMARY APPLICATION IN HOT AND/OR TOXIC
ENVIRONMENTS BUT COULD HANDLE COLD EASILY.
PROTECTION OF THE INACTIVE SOLDIER IN EXTREMELY
COLD ENVIRONMENTS WAS RESOLVED IN TERMS OF THE
PARAMETERS OF WEIGHT AND COST. A 7-LB PROTOTYPE
SYSTEM WAS ADEQUATE TO MEET MILITARY CHARACTERISTICS
OF PROVIDING 8 HOURS OF PROTECTION FOR THE INACTIVE
MAN AT -40 DEGREES F WITH A 3 MILE/HOUR WIND.
IMPROVEMENT IN THE WEIGHT FACTOR CAN BE ANTICIPATED
AS POWER SOURCE DEVELOPMENT IMPROVES OVER THE CURRENT
16 WATT-HOURS/POUND. A MORE IMMEDIATE USE OF
AUXILIARY HEATED HANDWARE AND FOOTWEAR IS IN AREAS
WHERE POWER IS AVAILABLE SUCH AS MILITARY VEHICLES,
RADIO AND RADAR EQUIPMENT, AND MISSILES. THE
AUXILIARY HEATING SYSTEM DEVELOPED IS COMPATIBLE WITH
A 12- OR 24-V AC OR DC POWER SOURCE. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-613 597

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

A COMPARISON OF THREE FULL-PRESSURE SUITS IN TERMS OF
CONTROL ACTIVATION TIME. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR NOV 63-FEB 64,
DEC 64 22P SHARP, EARL D. I
REPT. NO. TR-64-126
PROJ: 7184
TASK: 718402

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PRESSURE SUITS, MANEUVERABILITY),
(*ASTRONAUTS, POSITIONING REACTIONS), HUMAN FACTORS
ENGINEERING, MOTION, INSTRUMENTATION, TIME STUDIES,
CONTROL KNOBS, TOGGLE SWITCHES, SIMULATION (U)

THREE PRESSURE SUITS, BOTH PRESSURIZED AND
UNPRESSURIZED, WERE COMPARED ON THE BASIS OF TIMES
TAKEN BY TWO SUBJECTS TO INITIATE ACTION AND TO REACH
TO AND OPERATE CONTROLS LOCATED IN VARIOUS POSITIONS
IN A SIMULATED WORKSPACE. THE SUITS COMPARED WERE
THE APOLLO PHASE B, THE GEMINI G2C-1, AND
THE APOLLO 1960 STATE-OF-THE-ART. THE
CONTROLS USED WERE KNOBS, TOGGLE SWITCHES, AND
PUSHBUTTONS. THE WORK AREA INVESTIGATED WAS
SEMICIRCULAR, EXTENDING LEFT AND RIGHT 78 DEGREES, 34
TO 49 INCHES ABOVE THE FLOOR, AT A DISTANCE OF
APPROXIMATELY 2 FEET. AVERAGE TIMES FOR EACH
COMBINATION OF SUIT, SUIT CONDITION (PRESSURIZED OR
UNPRESSURIZED), CONTROL TYPE, CONTROL LOCATION, AND
HAND USED ARE PRESENTED. NO SUIT APPEARED TO BE
UNEQUIVOCALLY SUPERIOR. TOTAL TIME TO INITIATE
ACTION AND TO REACH TO AND OPERATE TOGGLE SWITCHES
AND PUSHBUTTONS WAS TYPICALLY, ALTHOUGH NOT
UNIVERSALLY, SHORTER WHEN WEARING THE APOLLO 1960
STATE-OF-THE-ART SUIT. TOTAL TIME TO INITIATE
ACTION AND TO REACH TO AND OPERATE KNOBS WAS
TYPICALLY, ALTHOUGH NOT UNIVERSALLY, SHORTER WHEN
WEARING THE GEMINI G2C-1 SUIT; HOWEVER, NOT ALL
LOCATIONS COULD BE REACHED WHEN WEARING THIS SUIT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-614 241

NAVAL MEDICAL RESEARCH INST BETHESDA MD

A REVIEW OF CURRENT CONCEPTS AND PRACTICES USED TO
CONTROL BODY HEAT LOSS DURING WATER IMMERSION. (U)

64 33P BECKMAN, E. L. I
REPT. NO. NR-005.13-4001.06 ,R-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED TO THE AEROSPACE MEDICAL
PANEL GENERAL ASSEMBLY OF ADVISORY GROUP FOR
AERONAUTICAL RESEARCH AND DEVELOPMENT (14TH), HELD
AT LISBON, PORTUGAL, 12 SEP 64. AVAILABLE COPY WILL
NOT PERMIT FULLY LEGIBLE REPRODUCTION. REPRODUCTION WILL
BE MADE IF REQUESTED BY USERS OF DDC. COPY IS AVAILABLE
FOR PUBLIC SALE.

DESCRIPTORS: (*PROTECTIVE CLOTHING,
SURVIVAL(PERSONNEL)), (*SURVIVAL(PERSONNEL), PROTECTIVE
CLOTHING), (*UNDERWATER CLOTHING, THERMAL INSULATION),
BODY TEMPERATURE, HYPOTHERMIA, HEAT PRODUCTION
(BIOLOGY), TOLERANCES (PHYSIOLOGY), STRESS (PHYSIOLOGY),
WATER, MOISTURE PROOFING, THERMAL CONDUCTIVITY, WOOLEN
TEXTILES, SYNTHETIC RUBBER, FATS, MUSCLES, EXTREMITIES,
SWIMMING, GLOVES, SHOES, EXPOSURE SUITS (U)
IDENTIFIERS: COLD TOLERANCE, IMMERSION (U)

THE PROBLEM OF PROVIDING ADEQUATE CLOTHING FOR
PERSONNEL WHO EITHER DURING NORMAL OPERATIONS OR
ACCIDENTALLY ARE IMMERSSED IN COLD WATER HAS CONTINUED
TO CHALLENGE CLOTHING MANUFACTURERS. IN THE PAST
DECADE THE DEVELOPMENT OF FOAMED PLASTICS AND OTHER
CLOTHING MATERIALS HAS OFFERED NEW POSSIBILITIES.
LIKEWISE ADVANCES IN ENERGY CONVERSION AND STORAGE
SYSTEMS OFFER NEW SOLUTIONS TO THIS CRITICAL
OPERATIONAL PROBLEM. THE BASIC PHYSICAL AND
PHYSIOLOGICAL CONCEPTS WHICH RELATE TO THE PROBLEM OF
LIMITING THERMAL LOSS FROM THE IMMERSSED HUMAN WILL BE
REVIEWED. NEWER TECHNICAL DEVELOPMENTS IN
INSULATIVE CLOTHING AND SUPPLEMENTAL HEATING SYSTEMS
WILL BE DISCUSSED WITH RELATION TO THESE BASIC
CONCEPTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-616 952

AIR FORCE SYSTEMS COMMAND WASHINGTON D C

WILEY POST: FIRST TEST OF HIGH ALTITUDE PRESSURE
SUITS IN THE UNITED STATES.

(U)

DESCRIPTIVE NOTE: HISTORICAL NOTE.

SEP 64 6P WILSON, CHARLES L. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN ARCH ENVIRON HEALTH V10
P805-10 MAY 1965 (COPIES AVAILABLE FROM AUTHOR: HQ
AFSC (SCTB) U.S.A.F. ANDREWS AIR FORCE BASE,
WASHINGTON, D. C., 20331).

DESCRIPTORS: (•PRESSURE SUITS, TESTS), HIGH ALTITUDE,
AVIATION PERSONNEL, UNITED STATES, DESIGN, TEXTILES,
RUBBER COATINGS, FLIGHT TESTING, LIQUEFIED GASES,
OXYGEN, HISTORY

(U)

THREE DIFFERENT HIGH ALTITUDE SUITS WERE DESIGNED
AND TESTED FOR WILEY POST. THE REPORT CONTAINS
A PHOTOGRAPH OF EACH OF THESE THREE SUITS. TWO LOW
PRESSURE CHAMBER TESTS WERE CONDUCTED USING THE FINAL
SUIT. THESE REPRESENT THE FIRST UNITED STATES
TESTS OF A HUMAN SUBJECT IN A HIGH ALTITUDE PRESSURE
SUIT AT LOW BAROMETRIC PRESSURES. POST EMPLOYED
HIS SUIT ON AT LEAST TEN AND POSSIBLY 17 FLIGHTS AND
USED LIQUID OXYGEN ON ALL SUCH FLIGHTS.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-618 715

AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

ACOUSTICAL EVALUATION OF X-20A DYNA-SOAR FULL-
PRESSURE SUIT ASSEMBLIES.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 65 30P SOMMER, HENRY C. HILLE,
HAROLD K. ;
REPT. NO. AMRL-TR-65-86
PROJ: 7231
TASK: 723103

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PRESSURE SUITS, ACOUSTIC PROPERTIES),
(•ASTRONAUTS, AUDITORY PERCEPTION), HELMETS, NOISE,
SOUND TRANSMISSION, ATTENUATION, TRAINING, FLIGHT
CLOTHING, EXPOSURE SUITS, AUDITORY SIGNALS, SPACECRAFT
CABINS, EARPHONES, MICROPHONES, COMMUNICATION EQUIPMENT,
BOOST GLIDE VEHICLES (U)
IDENTIFIERS: EVALUATION, X-20 SPACECRAFT (U)

DATA ON THE SUBJECTIVE REAL-EAR ATTENUATION
AT THRESHOLD (REAT) AND NOISE TRANSMISSION
MEASUREMENTS AT THE HELMET MICROPHONE AND EAR CUP
WERE OBTAINED FOR TWO MODELS OF THE SUIT ASSEMBLY.
THE FIRST MODELS TESTED AND EVALUATED WERE CALLED
THE 'TRAINING' MODELS AND WERE CUSTOM FITTED FOR EACH
OF THE DYNA-SOAR PILOTS. DURING THE TEST
PROGRAM, IN WHICH THE PILOTS WERE ACTING AS
EXPERIMENTAL SUBJECTS, THE X-20A PROGRAM WAS
CANCELLED AND ONLY FOUR OF THE SIX PILOTS COMPLETED
THE TESTS. THE RESULTS OF THIS EVALUATION REVEALED
THAT VARIOUS FEATURES OF THE ASSEMBLY WERE
UNSATISFACTORY; THEREFORE, AN IMPROVED VERSION WAS
FABRICATED TO CORRECT THE UNDESIRABLE DEFICIENCIES.
FROM THE ACOUSTICAL STANDPOINT, THE ASSEMBLY WAS
REDESIGNED TO ELIMINATE A RESONANCE AT 250 CPS WITH
THE VISOR OPEN. THIS IMPROVED SECOND MODEL WAS
CALLED THE 'FLIGHT READY' MODEL. THE REPORT
DESCRIBES A COMPARATIVE ACOUSTICAL EVALUATION OF THE
TRAINING MODELS AND FLIGHT-READY MODELS OF THE SUIT
ASSEMBLIES. EVALUATION CONSISTED OF (1) THE
SUBJECTIVE MEASUREMENT OF REALEAR ATTENUATION
AT THRESHOLD (REAT) AND (2) THE MEASUREMENT
OF TRANSMISSION LOSS THROUGH THE HELMET AT THE HELMET
MICROPHONE AND EAR CUP POSITION. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-619 029

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

STUDY OF HUMAN PERFORMANCE IN A MARK IV PRESSURE
SUIT. (U)

NOV 64 38P MILLER, A. K. ; LINCOLN, R. S.

REPT. NO. 6-62-64-19

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PRESSURE SUITS, MANEUVERABILITY),
(•PERFORMANCE(HUMAN), SPACE CREWS), MOTOR REACTIONS,
PERFORMANCE(HUMAN), COMPUTERS, OSCILLOSCOPES, ROTATION,
GLOVES, INHIBITION, DESIGN, ANTHROPOMETRY, TRACKING (U)
IDENTIFIERS: MARK-4 PRESSURE SUITS (U)

TWO SUBJECTS WEARING MARK IV PRESSURE SUITS,
UNDER BOTH THE PRESSURIZED AND UNPRESSURIZED
CONDITION, WERE TESTED ON SEVERAL PERFORMANCE TASKS.
THE PURPOSE OF THE STUDY WAS TO PROVIDE AN
EVALUATION OF PERFORMANCE TASKS UNDER SUIT
CONDITIONS. RESULTS OF THE STUDY INDICATED THAT
THE TASKS CAN BE SUCCESSFULLY PRESENTED ON AN
OSCILLOSCOPE UNDER COMPUTER CONTROL TO EVALUATE
PERFORMANCE CAPABILITY OF SUITED CREW MEMBERS. TWO
INTERESTING EFFECTS IDENTIFIED IN THE EXPERIMENTAL
DATA WERE RELATED TO CHARACTERISTICS OF THE PRESSURE
SUIT. WHEN PRESSURIZED: (1) THE SUBJECTS WERE
HINDERED IN THE PERFORMANCE OF A TRACKING TASK
BECAUSE THEY WERE UNABLE TO ROTATE THEIR WRISTS, AND
(2) ONE SUBJECT HAD DIFFICULTY OPERATING PUSH
BUTTONS, WHICH WERE SEPARATED BY 5/8 IN. BETWEEN
EDGES, BECAUSE OF THE CHARACTERISTICS OF THE GLOVES
INCLUDED WITH THE MARK IV SUIT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-620 099

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SPACE CLOTHING OF SUBJUGATORS OF OUTER SPACE: (U)

JUN 65 8P KRICHAGIN, V. I
REPT. NO. FTD-TT-65-604
MONITOR: TT : 65-63335

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF
MEDITSINSKAYA GAZETA (USSR) V28 P2 MAR 28 1965.

DESCRIPTORS: (•PRESSURE SUITS, ASTRONAUTS), (•EXPOSURE
SUITS, ASTRONAUTS), AEROSPACE MEDICINE, SPACE
ENVIRONMENTS, DESIGN, USSR (U)

TRANSLATION OF RUSSIAN RESEARCH: USES OF SPACE
CLOTHING FOR ASTRONAUTS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-622 047

NAVAL SCHOOL OF AVIATION MEDICINE PENSACOLA FLA

TEST AND EVALUATION OF U. S. AIR FORCE EXPERIMENTAL
CUTAWAY TYPE ANTI-BLACKOUT SUITS DESIGNATED MA-1. (U)

DESCRIPTIVE NOTE: SPECIAL REPT.,

APR 59 14P ZARRIELLO, J. J. INORSWORTHY,

MARY E. I

REPT. NO. NSAM-SR-59-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BLACKOUT(PHYSIOLOGY), PRESSURE SUITS),
(*PRESSURE SUITS, TESTS), PROTECTIVE CLOTHING,
ACCELERATION TOLERANCE, PILOTS, NAVAL PERSONNEL,
AVIATION MEDICINE, TABLES(DATA) (U)

THE PURPOSE OF THIS STUDY WAS TO TEST AND EVALUATE
THE U. S. AIR FORCE EXPERIMENTAL CUTAWAY TYPE
ANTI-BLACKOUT SUIT DESIGNATED MA-1. THE MA-1
ANTI-BLACKOUT SUIT WAS TESTED AND EVALUATED FOR ANTI-
BLACKOUT PROTECTION AT VARIOUS POSITIVE G LEVELS TO
THE POINTS OF GREYOUT AND BLACKOUT. THE RESULTS OF
THE ANTI-BLACKOUT PROTECTION AFFORDED BY THE ANTI-
BLACKOUT SUIT HAS BEEN PRESENTED IN TABLE FORM.
THE SUIT IS COMFORTABLE, PROVIDES ADEQUATE ANTI-
BLACKOUT PROTECTION, AND WOULD PROBABLY BE WELL
ACCEPTED BY FLEET PILOTS. NO MAJOR DIFFERENCES
WERE NOTED BETWEEN THE PROTECTION AFFORDED BY THE
MA-1 ANTI-BLACKOUT SUIT BETWEEN EXPERIENCED AND
INEXPERIENCED SUBJECTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-622 197

NAVAL SCHOOL OF AVIATION MEDICINE PENSACOLA FLA

SOUND ATTENUATION CHARACTERISTICS OF THE PROJECT
MERCURY PRE-PRODUCTION FULL PRESSURE SUIT HELMET. (U)

DESCRIPTIVE NOTE: SPECIAL REPT.,

SEP 60 15P CAMP, ROBERT T. JR.; TOLHURST;

GILBERT C. GREENE, JAMES W. I

REPT. NO. SR-60-7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELMETS, PRESSURE SUITS), (*EAR, SAFETY
DEVICES), (*SAFETY DEVICES, EAR), SOUND, NOISE,
ATTENUATION, ACOUSTIC EQUIPMENT,
PERFORMANCE(ENGINEERING), TESTS, TEST METHODS,
THRESHOLDS(PHYSIOLOGY), ASTRONAUTS (U)

TO DETERMINE THE SOUND ATTENUATION CHARACTERISTICS
OF THE PROJECT MERCURY PREPRODUCTION FULL
PRESSURE SUIT HELMET USING TWO DIFFERENT METHODS:
(1) PSYCHOPHYSICAL: THE DIFFERENCES BETWEEN A
TRAINED LISTENER'S AUDITORY THRESHOLDS FOR VARIOUS
TEST TONES WITHOUT HELMET AND THE THRESHOLDS OBTAINED
WHILE WEARING THE HELMET DEFINED THE RELATIVE
ATTENUATION VALUES AT LOW SOUND PRESSURE VALUES.
(2) PHYSICAL: DIFFERENCES BETWEEN SOUND
PRESSURES MEASURED OUTSIDE THE SUIT AND THOSE
MEASURED UNDER THE RIGHT EARPHONE CUSHION BY A PROBE
MICROPHONE WERE TAKEN AS ATTENUATION VALUES UNDER
HIGH SOUND PRESSURE LEVEL (SPL) CONDITIONS.
MEASUREMENTS MADE UNDER LOW SPL CONDITIONS SHOW
THAT THE 'REAL-EAR' ATTENUATION VALUES OBTAINED WITH
TEST TONES 250 CPS, 500 CPS, 4000 CPS, 6000 CPS, AND
8000 CPS EXCEEDED PRE-ESTABLISHED SPECIFICATIONS.
ATTENUATION VALUES OBTAINED WITH TEST TONES 125
CPS, 1000 CPS, 2000 CPS, 3000 CPS, AND A WIDE BAND OF
NOISE (20 TO 10,000 CPS) DID NOT MEET
SPECIFICATIONS. THE ATTENUATION MEASURED BY
PHYSICAL METHODS USING AS REFERENCE FREQUENCIES 125
CPS, 500 CPS, 1000 CPS, 2000 CPS, 3000 CPS, 4000 CPS,
6000 CPS, AND 8000 CPS EACH PRESENTED AT 120 DB SOUND
PRESSURE LEVELS DID NOT MEET SPECIFICATIONS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-624 886 6/11 14/2
LITTLE (ARTHUR D) INC CAMBRIDGE MASS

STUDY AND DEVELOPMENT OF MATERIALS AND TECHNIQUES FOR
PASSIVE THERMAL CONTROL OF FLEXIBLE EXTRAVEHICULAR
SPACE GARMENTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 64-JUN 65.
SEP 65 84P RICHARDSON, DAVID L. I
CONTRACT: AF33(615)-1904
PROJ: AF-6373
TASK: 637302
MONITOR: AMRL TR-65-156

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TEMPERATURE CONTROL, PROTECTIVE),
(*PROTECTIVE CLOTHING, SPACE ENVIRONMENT), THERMAL
CONDUCTIVITY, THERMAL INSULATION, HELIUM, HEATING (U)

THE PROGRAM ENCOMPASSED AN ANALYTICAL AND
EXPERIMENTAL INVESTIGATION OF THE APPLICATION OF
PASSIVE THERMAL CONTROL TECHNIQUES TO EXTRAVEHICULAR
FLEXIBLE SPACE GARMENTS IN 300 NAUTICAL MILE EARTH
ORBITS. RESULTS INDICATE THAT PASSIVE THERMAL
CONTROL BY VARYING THE ABSORPTANCE AND EMITTANCE OF
THE OUTER SURFACE OF THE GARMENT IS NOT POSSIBLE WHEN
INTERNAL HEAT GENERATED IS IN EXCESS OF 1500 BTU/
HR. FOR ALL CONDITIONS, THE SUIT'S SOLAR
ABSORPTANCE SHOULD BE AS SMALL AS POSSIBLE AND ITS
EMITTANCE AS LARGE AS POSSIBLE. BY CONTROLLING THE
CONDUCTANCE OF THE SPACE SUIT WALL, INTERNAL HEATING
RATES TO 2000 BTU/HR ARE ACHIEVABLE WHEN THE SPACE
SUIT HAS AN ABSORPTANCE OF 0.17 AND AN EMITTANCE OF
0.85. A SOLAR PARASOL WITH SELECTED RADIATING
PROPERTIES ON EACH SIDE ALLOWS FOR HIGHER INTERNAL
HEATING RATES. EXPERIMENTS WERE MADE IN A
SIMULATED NOON ORBIT WITH A CYLINDRICAL SECTION OF A
SPACE SUIT WHICH WAS FIRST TESTED WITH AN EVACUATED
INSULATION AND THEN WITH A HELIUM-FILLABLE
INSULATION. THE RANGE OF AVERAGE CONDUCTANCE FOR
THESE INSULATIONS WAS 0.3 TO 4.0 BTU/SQ FT HR F.
A RANGE OF INTERNAL HEAT GENERATION FROM 600 TO 2100
BTU/HR WAS ACHIEVED WHEN THE EVACUATED INSULATION
WAS FILLED WITH HELIUM. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-626 619 6/11 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

BIOCHEMICAL AND PHYSIOLOGICAL EVALUATION OF HUMAN
SUBJECTS WEARING PRESSURE SUITS UNDER SIMULATED
AEROSPACE CONDITIONS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.:
OCT 65 50P SMITH, K. J. ; SPECKMANN, E. W.
; GEORGE, MARILYN E. ; HOMER, G. M. ; DUNCO, D.
WILTSIE I
REPT. NO. AMRL-TR-65-147
PROJ: AF-7164
TASK: 716405

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DIET, AEROSPACE MEDICINE), (*PRESSURE
SUITS, AEROSPACE MEDICINE), ASTRONAUTS, AVIATION
PERSONNEL, AVIATION, NUTRITION, PHYSIOLOGY, BLOOD
PRESSURE, BODY, PULSE RATE, HEMATOLOGY, BLOOD CHEMISTRY,
METABOLISM, EXERCISE (PHYSIOLOGY), CONFINED ENVIRONMENTS,
LIFE (U)

A SERIES OF EXPERIMENTS HAS BEEN DESIGNED TO
DETERMINE THE WATER, ENERGY, AND PROTEIN REQUIREMENTS
OF MAN UNDER VARIOUS SIMULATED AEROSPACE CONDITIONS.
THE EXPERIMENT DESCRIBED MEASURED THE EFFECTS OF
WEARING A MA-10 PRESSURE SUIT CONTINUOUSLY FOR 14
DAYS ON THE AFOREMENTIONED MEASUREMENTS. A FRESHLY
PREPARED DIET THAT CLOSELY MATCHED PROPOSED AEROSPACE
DIETS WAS FED TO FOUR HUMAN VOLUNTEERS AND
COEFFICIENTS OF APPARENT DIGESTIBILITY AND BALANCES
OF THE COMPONENT NUTRIENTS WERE DETERMINED. THE
RESULTS SHOWED THAT THE WEARING OF UNPRESSURIZED
MA-10 SUITS UNDER AMBIENT CONDITIONS FOR 14 DAYS
DID NOT AFFECT THE SUBJECTS' FLUID INTAKE AND OUTPUT.
NO SIGNIFICANT CHANGES WERE OBSERVED IN
DIGESTIBILITIES OR BALANCES OF THE NUTRIENT
COMPONENTS. RESULTS INDICATED THAT THE FRESH FOOD
DIETS WAS VERY EFFICIENTLY UTILIZED. NO
SIGNIFICANT CHANGES IN SUBJECT BLOOD PRESSURES, ORAL
TEMPERATURES OR PULSE RATES WERE OBSERVED DURING THE
EXPERIMENT. ALL HEMATOLOGICAL AND CHEMICAL
ANALYSES OF BLOOD WERE WITHIN THE NORMAL RANGE AND
DID NOT EXHIBIT DIFFERENCES BETWEEN EXPERIMENTAL
PERIODS. THE 2 DAY MENU OF FRESH FOODS PROVED TO
BE VERY ACCEPTABLE AND DID NOT DECREASE IN
ACCEPTABILITY DURING THE 42 DAY EXPERIMENT.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-676 979 6/19 6/17 22/1 3/2
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

MOBILITY OF PRESSURE-SUITED SUBJECTS UNDER WEIGHTLESS
AND LUNAR GRAVITY CONDITIONS. (U)

DESCRIPTIVE NOTE: FINAL REPT.: JUN 61-JUN 62:
AUG 65 96P SIMONS, JOHN C. WALK:
DIETER E. SEARS, CHARLES W. I
REPT. NO. AMRL-TR-65-65
PROJ: AF-7184
TASK: 718405 .718408

UNCLASSIFIED REPORT

DESCRIPTORS: (*WEIGHTLESSNESS, HUMAN FACTORS
ENGINEERING), (*LUNAR ENVIRONMENT, PERFORMANCE(HUMAN)),
(*PRESSURE SUITS, MOBILITY), SIMULATION, MOTION,
MANEUVERABILITY, GRAVITY, SPACE FLIGHT, HUMAN BODY,
POSTURE(PHYSIOLOGY), TIME, ASTRONAUTS, HATCHES, ANALYSIS
OF VARIANCE, ANTHROPOMETRY, GRAPHICS, TABLES(DATA) (U)

PROBLEMS OF MOVING THROUGH HATCHWAYS UNDER ZERO AND
LUNAR GRAVITY CONDITIONS, AND RELATED DESIGN PROBLEMS
OF HATCH SIZE AND SHAPE, WERE INVESTIGATED IN FLIGHT.
SUBJECTS WERE TIMED AND PHOTOGRAPHED AS THEY
ACCOMPLISHED VARIOUS MOTIONS DURING WEIGHTLESS AND
LUNAR-GRAVITY MANEUVERS OF A LARGE CABIN AIRCRAFT.
PERFORMANCE DATA ARE PRESENTED FOR VARIOUS
COMBINATIONS OF CLOTHING, GRAVITY AND BODY-POSITION
CONDITIONS. TIME AND CONTACT DATA ARE PRESENTED
FOR THE EGRESS MOTION AS IT IS INFLUENCED BY CHANGES
IN THE EXIT AREA. ORIENTATION PROBLEMS AND
MANEUVERING TECHNIQUES, AS INFLUENCED BY AREA AND
VOLUME RESTRICTIONS, ARE DISCUSSED. MOTIONS OF
PRESSURE-SUITED SUBJECTS GENERALLY REQUIRED 30%
MORE TIME THAN CORRESPONDING MOTIONS OF UNSUITED
SUBJECTS. MOST MOTIONS REQUIRED 35% MORE TIME
DURING ZERO G THAN DURING LUNAR G. NO
SIGNIFICANT DIFFERENCES IN EGRESS TIMES WERE FOUND
AMONG FOUR BODY-POSITIONS. COMPARED WITH 1 INCH OF
EXIT CLEARANCE, 5 INCHES OF CLEARANCE IMPROVED EGRESS
TIME BY APPROXIMATELY 6%. ACCURACY, RATHER THAN
TIME OF MOTION, APPEARED TO BE A MORE SENSITIVE
MEASURE OF OPERATOR PERFORMANCE FOR THE EGRESS TASK.
A 95TH PERCENTILE SHOULDER PLANE WITH A 19.4-INCH
MAJOR AXIS IS PROPOSED AS A BASIC EGRESS REFERENCE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-627 190 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

EFFICACY OF PRESSURE SUIT COOLING SYSTEMS IN HOT
ENVIRONMENTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR JUL-DEC 64,
OCT 65 9P VEGHTE, JAMES H. ;
REPT. NO. AMRL-TR-65-58
PROJ: AF-7164
TASK: 716409

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN AEROSPACE MEDICINE V36
N10 P945-7 OCT 1965. COPIES TO DDC USERS ONLY.

DESCRIPTORS: (•PRESSURE SUITS, COOLING), HEAT TOLERANCE,
THERMAL STRESSES, VENTILATION, WATER, AIR, COOLING +,
EVAPORATION, ENVIRONMENT (U)

THREE DIFFERENT AIR DISTRIBUTING SYSTEMS AND ONE
WATER-COOLED SYSTEM WERE EVALUATED FOR EFFICACY IN
COOLING A PERSON IN A FULL PRESSURE SUIT. FIVE
SUBJECTS PARTICIPATED IN EXPERIMENTS AT ATMOSPHERIC
PRESSURE IN A 43C ENVIRONMENT. THE PRESSURE SUIT
WAS WORN UNPRESSURIZED AND PRESSURIZED AT 192 MM
HG. THE RESULTS SHOW THE SEPARATE TUBULAR AIR
VENTILATING GARMENT TO BE EQUAL TO OR SUPERIOR IN
EVAPORATIVE COOLING EFFICIENCY TO EITHER AN EXTREMITY
DISTRIBUTING SYSTEM WHICH IS AN INTEGRAL PART OF THE
CURRENT OPERATIONAL FULL PRESSURE SUIT, OR TO THE
STANDARD AIR FORCE VENTILATING GARMENT. THE
WATER-COOLED SYSTEM WAS SUPERIOR TO ALL AIR
DISTRIBUTION SYSTEMS AND THE SUBJECTS WERE
COMFORTABLE FOR THE ENTIRE TWO-HOUR TEST PERIOD.
IN CONTROL EXPERIMENTS WITH NO VENTILATION,
TOLERANCE LIMITS WERE REACHED BEFORE THE END OF TWO
HOURS. ON THE BASIS OF THESE DATA, SERIOUS
CONSIDERATION OF WATER-COOLED SUIT SYSTEMS FOR
MAINTAINING A PERSON IN THERMAL COMFORT UNDER
CONDITIONS OF THERMAL STRESS SHOULD BE CONTINUED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-628 367 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

EFFECTS OF VARIOUS GASES ON HANDGEAR INSULATION. (U)

DESCRIPTIVE NOTE: FINAL REPT. SEP 64-MAR 65,
DEC 65 18P HALL, JOHN F. JR.;
BUEHRING, WILLI J. ; STROBL, WOLFGANG W. ;
REPT. NO. AMRL-TR-65-4,
PROJ: AF-7164,
TASK: 716409,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PROTECTIVE CLOTHING, GLOVES), (•GLOVES,
THERMAL INSULATION), GASES, CARBON DIOXIDE,
FLUOROHYDROCARBONS, HELIUM, EFFECTIVENESS, THERMAL
CONDUCTIVITY, TESTS, TEST METHODS (U)

THE EFFECT OF GASES HAVING DIFFERENT THERMAL
CONDUCTIVITIES ON THE THERMAL INSULATION OF HANDGEAR
WAS INVESTIGATED. EXPERIMENTAL MITTENS WITH
SPECIAL PLASTIC SPACER INTERLINERS OF VARIOUS
THICKNESSES WERE SEALED BETWEEN GAS IMPERMEABLE OUTER
AND INNER SHEETS AND FILLED FIRST WITH ROOM AIR (AS
CONTROL), THEN VARIOUS EXPERIMENTAL GASES, AND
THERMAL INSULATION MEASURED ON A COPPER HAND.
EXPERIMENTAL GASES INCLUDED CARBON DIOXIDE,
FREON-12, AND HELIUM. COMPARATIVE RESULTS ARE
PRESENTED IN TERMS OF PERCENTAGE INSULATION CHANGE;
CLO PER INCH; CONDUCTIVITY (K) VALUES; AND THE
MEASURED THERMAL INSULATION (CLO) VALUES.
BEFORE ALL TESTS EACH MITTEN WAS EVACUATED (13 CM
HG) TO REMOVE ALL ENTRAPPED AIR, THEN FILLED
WITHOUT CONTAMINATION WITH THE CONTROL, OR
EXPERIMENTAL GAS. GAS WITHIN THE HANDGEAR WAS
MAINTAINED AT A CONSTANT POSITIVE PRESSURE (7.6 MM
WATER) THROUGHOUT EACH EXPERIMENT. MEAN
MEASUREMENTS SHOWED SIGNIFICANT INCREASES (13-
32%) OF THERMAL INSULATION FOR FREON-12 AND
CARBON DIOXIDE, WITH DECREASED INSULATION OBSERVED
WITH HELIUM. SIGNIFICANCE AND SOME PRACTICAL
APPLICATION OF THESE RESULTS FOR PROTECTIVE CLOTHING
DESIGN ARE SHOWN. (U)

UNCLASSIFIED

DNC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-631 295 11/5 15/5
LITTON SYSTEMS INC ST PAUL MINN APPLIED SCIENCE DIV

THERMAL-PHYSICAL PARAMETERS OF MATERIALS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 21, MAY 62-20 MAY 65,
JAN 66 240P LARSON, R. E. IKYDD, A. R. 1
CONTRACT: DA-19-129-QM-1998,
PROJ: DA-1-K-024401-A-113
MONITOR: USA-NLABS, C/OM TR-66-3-CM, 16

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROTECTIVE CLOTHING, THERMAL),
(*TEXTILES, *THERMAL INSULATION), THERMAL, PHYSICAL
PROPERTIES, HEAT TRANSFER, DEGRADATION, INTERFEROMETERS,
SURFACE TEMPERATURE, HEAT TRANSFER COEFFICIENTS (U)

RESEARCH WAS PERFORMED ON THE THERMAL-PHYSICAL
PARAMETERS OF MATERIALS NECESSARY FOR PROTECTION
AGAINST INTENSE THERMAL RADIATION. IN THE
THEORETICAL STUDIES, A SIMPLIFIED MODEL OF THE
FABRIC-SKIN SYSTEM WAS CHOSEN AND THE HEAT FLOW
EQUATIONS WERE SOLVED USING AN EXPLICIT FINITE
DIFFERENCE CALCULATION PROCEDURE PROGRAMMED FOR
SOLUTION ON A CONTROL DATA G-150 DIGITAL
COMPUTER. SEVERAL SAMPLE CALCULATIONS WERE
COMPARED WITH RESULTS EXISTING IN THE LITERATURE AND
A LIMITED PARAMETER STUDY WAS PERFORMED WITH
VARIATION OF THE FABRIC SURFACE HEAT TRANSFER
COEFFICIENTS. FABRIC TEST SAMPLES WERE IRRADIATED
IN AN ARC IMAGE FURNACE TEST FACILITY AND THE HEATING
AND DEGRADATION PROCESSES WERE QUALITATIVELY AND
QUANTITATIVELY STUDIED WITH A MACH-ZEHNDER
INTERFEROMETER. THIS INSTRUMENT PROVIDED FABRIC
SURFACE TEMPERATURE DATA, HEAT TRANSFER COEFFICIENT
INFORMATION, AND A BETTER INSIGHT INTO THE CHEMICAL
PROCESSES TAKING PLACE. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-633 952 6/17
SYSTEMS ENGINEERING GROUP RESEARCH AND TECHNOLOGY DIV
WRIGHT-PATTERSON AFB OHIO

EVALUATION OF IMPROVED EXHALATION VALVE FOR HGU-8/P
FLYING HELMET. (U)

DESCRIPTIVE NOTE: FINAL REPT. AUG 63-DEC 65,
APR 66 33P GOOD, DONALD R. ;
REPT. NO. SEG-TR-66-7,
PROJ: AF-913A-0000-97144.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•HELMETS, FLIGHT CLOTHING), (•EXHAUST
VALVES, HELMETS), PRESSURE SUITS,
PERFORMANCE(ENGINEERING), DESIGN, RESPIRATION (U)
IDENTIFIERS: EVALUATION (U)

THE REPORT RECORDS THE RESULTS OF A COMPONENT
IMPROVEMENT PROGRAM ON AN EXHALATION VALVE FOR THE
HGU-8/P PARTIAL PRESSURE SUIT HELMET. THE
PROGRAM WAS INTENDED PRIMARILY TO ELIMINATE THE
TENDENCY FOR SUDDEN PRESSURE LOSS WITHIN THE HELMET
CAUSED BY IMPROPER AND ERRATIC CLOSING
CHARACTERISTICS OF THE EXHALATION VALVE AND TO MEET
ADDITIONAL DESIGN OBJECTIVES OF GREATER OPENING
SENSITIVITY, LOWER PRESSURE DROPS DURING FLOW
CONDITIONS, AND AN OVERALL INCREASE IN RELIABILITY.
THE VALVE AND ITS FUNCTION ARE DESCRIBED.
INTERNAL FRICTION OF MOVING PARTS WAS REDUCED.
THE OPENING OR 'CRACKING' PRESSURE WAS REDUCED AND
THE DIFFERENTIAL PRESSURE UNDER FLOW CONDITIONS WAS
IMPROVED SIGNIFICANTLY. TEST PROCEDURES AND
RESULTS OBTAINED DURING LOW TEMPERATURE TESTS AND
ROOM TEMPERATURE TESTS AT HIGH ALTITUDE ARE
PRESENTED. IT IS CONCLUDED THAT THE IMPROVED
DESIGN MEETS THE INITIAL OBJECTIVES OF THE PROGRAM.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-635 052 6/17 6/19
NAVAL MEDICAL RESEARCH INST BETHESDA MD

CURRENT CONCEPTS AND PRACTICES APPLICABLE TO THE
CONTROL OF BODY HEAT LOSS IN AIRCREW SUBJECTED TO
WATER IMMERSION.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
66 12P BECKMAN, E. L. ;REEVES, E. I
GOLDMAN, R. F. ;
MONITOR: NAVMED MR005.13-4001.04

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PROTECTIVE CLOTHING, *BODY TEMPERATURE),
FLIGHT CREWS, EXPOSURE(PHYSIOLOGY), SURVIVAL(PERSONNEL),
SEA RESCUES, HEAT PRODUCTION(BIOLOGY), PHYSIOLOGY, HEAT
TRANSFER, THERMAL INSULATION, THERMAL CONDUCTIVITY,
HYPOTHERMIA, METABOLISM, ENERGY CONVERSION,
THERMOCHEMISTRY, TOLERANCES(PHYSIOLOGY), WATER, OCEANS,
TEMPERATURE, COSTS (U)
IDENTIFIERS: IMMERSION, WATER (U)

THE PROBLEM OF PROVIDING ADEQUATE CLOTHING FOR
PERSONNEL WHO EITHER ACCIDENTALLY OR OTHERWISE ARE
IMMERSED IN COLD WATER HAS CONTINUED TO CHALLENGE
CLOTHING MANUFACTURERS FOR THE PAST DECADE. THE
DEVELOPMENT OF FOAMED PLASTICS AND OTHER CLOTHING
MATERIALS OFFERS NEW POSSIBILITIES. LIKEWISE NEW
ADVANCES IN ENERGY CONVERSION SYSTEMS OFFER NEW
SOLUTIONS TO THIS CRITICAL OPERATIONAL PROBLEM.
THE BASIC PHYSICAL AND PHYSIOLOGICAL CONCEPTS WHICH
PERTAIN TO THE PROBLEM OF LIMITING THERMAL LOSS FROM
THE IMMERSSED HUMAN ARE REVIEWED. THE NEWER
TECHNICAL DEVELOPMENTS IN INSULATIVE CLOTHING AND
SUPPLEMENTAL HEATING SYSTEMS ARE REVIEWED. THE
NEWER TECHNICAL DEVELOPMENTS IN INSULATIVE CLOTHING
AND SUPPLEMENTAL HEATING SYSTEMS ARE REVIEWED AND
DISCUSSED WITH RELATION TO THESE BASIC CONCEPTS.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-635 206 6/17 6/11 22/1
HAMILTON STANDARD DIV UNITED AIRCRAFT CORP WINDSOR LOCKS
CONN

A STUDY OF TECHNIQUES AND EQUIPMENT FOR THE
EVALUATION OF EXTRAVEHICULAR PROTECTIVE GARMENTS. (U)

DESCRIPTIVE NOTE: FINAL REPT., AUG 64-JUN 65.
FEB 66 427P PARRY, DAVID G. CURRY,
LEROY R. , JR. HANSON, DONALD B. TOWLE,
GEORGE B. ;

REPT. NO. HSER-3671,
CONTRACT: AF 33(615)-1780,
PROJ: AF-6301,
TASK: 630104,
MONITOR: AMRL TR-66-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ASTRONAUTS, *PRESSURE SUITS),
(*PROTECTIVE CLOTHING, ASTRONAUTS), CLOSE ECOLOGICAL
SYSTEMS, LIFE SUPPORT, SPACE ENVIRONMENTS,
PERFORMANCE(HUMAN), MODELS(STIMULATIONS), ANTHROPOMETRY,
THERMAL CONDUCTIVITY, HEAT TRANSFER, LOADS(FORCES),
JOINTS(PHYSIOLOGY), METABOLISM, MOBILITY, TORQUE,
GLOVES, HELMETS, RADIATION HAZARDS, DATA PROCESSING,
TELEMETER SYSTEMS, TEST METHODS, PARTIAL DIFFERENTIAL
EQUATIONS, MATRICES(MATHEMATICS), GONIOMETERS, SPACE
SIMULATION CHAMBERS, BODY TEMPERATURE, OXYGEN
CONSUMPTION (U)

THE PURPOSE OF THIS STUDY WAS TO ESTABLISH A TEST
METHODOLOGY AND A TEST SYSTEM FOR OBJECTIVE,
QUANTITATIVE, AND ACCURATE EVALUATION OF
EXTRAVEHICULAR SPACE PROTECTIVE GARMENTS. AREAS OF
TESTING STUDIED INCLUDE FUNCTIONAL PERFORMANCE, LIFE
SUPPORT, AND ENVIRONMENTAL PROTECTION. EMPHASIS IS
PLACED ON THE PROBLEM OF SUIT TORQUE RESTRAINTS, I.
E., MOBILITY. CONCEPTS FOR APPROPRIATE EVALUATION
CRITERIA ARE DISCUSSED. THE INFORMATION PRESENTED
AND CONCLUSIONS REACHED ARE THE RESULTS OF EXPERIENCE
IN SUIT TESTING, TECHNICAL ANALYSIS, SEARCH OF THE
LITERATURE, AND DISCUSSIONS WITH EXPERTS. THE
NATURE AND CAUSES OF SUIT TORQUE RESTRAINT ARE
DISCUSSED AND A PIN JOINTED MODEL IS DEVELOPED FOR
PRECISE DESCRIPTION OF SUIT TORQUES AND BODY
INTERLINK ANGLES. VARIOUS TECHNIQUES FOR TORQUE
VECTOR AND BODY ANGLE MEASUREMENTS ARE EXPLORED AND
IT IS CONCLUDED THAT A POWERED ARTICULATED DUMMU AND
AN INTRASUIT EXOSKELETAL ELECTROGONIOMETER WITH OFF-(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-636 044 6/11
BIOTECHNOLOGY INC ARLINGTON VA

EFFECTIVE LIFE SUPPORT HELMETS.

(U)

63 146P PARKER, JAMES F. , JR. :
DILLON, RICHARD F. :
REPT. NO. 64-3,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED IN PART BY ONR.
PROCEEDINGS OF AN INVITED SYMPOSIUM, WASHINGTON, D.
C., 31 OCT-1 NOV 63.

DESCRIPTORS: (•PRESSURE SUITS, HELMETS), (•HELMETS,
•LIFE SUPPORT), EFFECTIVENESS, SYMPOSIA, DESIGN, TEST
EQUIPMENT, OXYGEN, SAFETY

(U)

CONTENTS: PHILOSOPHY OF CURRENT PROTECTIVE
HELMET; DEFECTS OF CURRENT NAVY HELMETS;
ACCIDENT DATA RELATED TO APH-5 PERFORMANCE;
IMPROVED ACCIDENT REPORTING PROCEDURES RELATED TO
HELMET PERFORMANCE; COOLING AND VENTILATION
REQUIREMENTS FOR LIFE SUPPORT HELMETS;
COMMUNICATIONS REQUIREMENTS FOR LIFE SUPPORT
HELMETS; LENS AND VISOR SYSTEMS INFLUENCING HELMET
DESIGN; OXYGEN REQUIREMENTS IN FUTURE HELMET
DESIGN; DYNAMIC TESTING OF PROTECTIVE HELMETS;
DESIGN CRITERIA AND PARAMETERS OF LIFE SUPPORT
HELMETS; NAVY PHILOSOPHICAL CONSIDERATIONS IN
FUTURE HELMET DESIGN; SUMMARY OF RECOMMENDED
SPECIFICATIONS FOR IMPROVED LIFE SUPPORT HELMET.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-636 398 6/17
ARMY NATICK LABS MASS MECHANICAL ENGINEERING DIV

INVESTIGATION OF THE PERFORMANCE OF AN OPEN-FLAME
CONVECTOR. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.

JUN 66 36P LEVIN, ALEXANDER ;
PROJ: 7X89-20-003,
MONITOR: USA-NLABS TR-66-50-ME

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•HEATERS, •PROTECTIVE CLOTHING),
PERFORMANCE(ENGINEERING), BODY TEMPERATURE, HEAT
TRANSFER, FLAMES, IGNITION, FUEL CONSUMPTION, SAFETY (U)

THE CONVECTOR INVESTIGATED WAS AN EXPERIMENTAL
PROTOTYPE DESIGNED AS A BODY WARMER TO HEAT THE SPACE
BETWEEN THE WEARER'S BODY AND HIS OUTER APPAREL.
THREE PROTOTYPES WERE INVESTIGATED UNDER A SERIES
OF CONDITIONS INCLUDING STANDARD, LOW-TEMPERATURE,
AND OPERATIONAL. UNDER THESE CONDITIONS, DATA ON
IGNITION, FUEL REGULATION, FUEL CONSUMPTION,
CONVECTOR THERMAL CAPACITANCE, AND SAFETY WERE
OBTAINED. RESULTS OF THE INVESTIGATION SHOWED THAT
OPERATION OF THE PROTOTYPE CONVECTORS CAN BE
REGULATED FOR CONSISTENT OPERATION WITHIN 9 PERCENT.
IF THE FUEL RATE IS MONITORED AND CONTROLLED, THE
CONVECTOR THERMAL CAPACITANCE MAY BE REGULATED WITHIN
5 PERCENT TO ASSURE THE CONSTANCY OF THIS VARIABLE
WHEN APPLIED TO HUMAN TEST SUBJECTS. ALTHOUGH THERE
IS A POTENTIAL HAZARD OF FIRE, HEAT INJURY AND
TOXICITY FROM USE OF THE OPEN-FLAME CONVECTOR AS A
BODY WARMER, ITS PERFORMANCE WITHIN SAFETY THRESHOLD
LIMITS IS OBTAINABLE. THE FIRE AND HEAT INJURY
HAZARDS ARE MINIMIZED WHEN THE FUEL REGULATING VALVE
IS PREWARMED AT LOW TEMPERATURES AND THE BURNER IS
IGNITED IN A SHIELDED ENCLOSURE. CARBON MONOXIDE
CONCENTRATION WAS REDUCED TO ACCEPTABLE THRESHOLD
LIMITS, LESS THAN 0.01 PERCENT, WHEN THE CONVECTORS
WERE OPERATED AT LOW-TEMPERATURE OPERATIONAL
CONDITIONS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-636 423 6/17
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE
MEDICAL RESEARCH DEPT

DEVELOPMENT OF REVISED SIMPLEX FABRIC FOR SUMMER
FLYING GLOVES. (U)

JUL 66 10P BROCKMANN, HAL E. I
REPT. NO. NADC-MR-6607,
TASK: RAE-20J-010-2021-FO12-10-02,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•FLIGHT CLOTHING, •GLOVES), FIRE RESISTANT
TEXTILES, FIBERS, LEATHER, MANUFACTURING, STANDARDS (U)

AN IMPROVED SIMPLEX KNITTED FABRIC WAS DEVELOPED FOR USE IN SUMMER FLYING GLOVES WHICH WOULD EFFECT BETTER PROTECTION IN THE EVENT OF EXPOSURE TO FLAMES AND REDUCE OR ELIMINATE THE DIFFICULTIES ENCOUNTERED WITH THE FILAMENT SIMPLEX FABRIC. THE FABRIC WAS TO CONFORM TO ALL THE REQUIREMENTS NEEDED FOR COMFORT, SERVICEABILITY AND PROTECTION. ALL MANUFACTURING TECHNIQUES UTILIZED IN THIS EFFORT WERE TO CONFORM TO AND BE COMPATIBLE WITH STANDARD COMMERCIAL METHODS FOR REPRODUCING THE FINISHED PRODUCT. THE PRIMARY DIFFICULTIES ENCOUNTERED IN THE FLEET EVALUATION OF THE FILAMENT GLOVE WERE LIMITED TO SEAM SLIPPAGE AND GLOVE FIT. SINCE THE SEAM SLIPPAGE PRESENTS A PROBLEM IN SERVICEABILITY, IT IS PROPOSED THAT THE YARN STRUCTURE BE MODIFIED FROM A CONTINUOUS FILAMENT YARN TO A YARN SPUN FROM SHORT LENGTH STAPLE FIBERS. THIS IN ITSELF WOULD EFFECT A GREATER DEGREE OF SURFACE COHESIVENESS WITHIN THE FABRIC STRUCTURE AND THUS HELP TO HOLD THE SEAMS IN PLACE. AS FAR AS THE GLOVE FIT IN THE THUMB AREA WAS CONCERNED, A SIMPLE MODIFICATION OF THE PATTERN ACCOMPLISHED THE CHANGE. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-637 153 6/7 6/17
NAVAL MEDICAL RESEARCH INST BETHESDA MD

AN EVALUATION OF THE FOAMED NEOPRENE 'DIVER'S WET
SUIT' AS A SURVIVAL GARMENT FOR HELICOPTER AIRCREWS. (U)

DESCRIPTIVE NOTE: MEDICAL RESEARCH INTERIM REPT.
JUL 66 35P REEVES, ELIZABETH I STEPHENS,
MELVIN P. I BECKMAN, EDWARD L. I
MONITOR: NAVMED MF-011.99-1001.7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*AIR SEA RESCUES, UNDERWATER CLOTHING),
(*SURVIVAL (PERSONNEL), *UNDERWATER CLOTHING), (*FLIGHT
CREWS, SURVIVAL (PERSONNEL)), HELICOPTERS, ACCIDENTS,
DITCHING, OCEANS, PROTECTIVE CLOTHING, SYNTHETIC RUBBER,
HUMAN FACTORS ENGINEERING (U)

THE TYPE OF FLIGHTS PERFORMED BY HELICOPTERS
REQUIRE PARTICULAR GARMENTS FOR THEIR AIRCREWS AS
FOLLOWS: (1) WATER ENTRY BY AIRCREW IS BY WAY OF
WATER COLLISION SO THAT THERE IS A HIGH PROBABILITY
OF DAMAGE TO THE SURVIVAL GARMENT; (2) THE SHORT
FLIGHT RADIUS OF THE HELICOPTER ENSURES THAT THE
TIME-DISTANCE FROM A POTENTIAL RESCUE SHOULD BE
RELATIVELY SHORT, SO THAT RESCUE SHOULD BE EXPECTED
IN LESS THAN 4 HOURS; (3) THE SUIT MUST BE
WEARABLE WITHOUT AN AIR VENTILATED SUIT FOR COOLING
AND STILL BE USABLE IN HIGH COCKPIT TEMPERATURES UP
TO 90F; AND, (4) THE LOW ALTITUDE OF FLIGHT
ALLOWS NO TIME TO DON OR ZIPPER UP A SURVIVAL GARMENT
SO THAT THERE SHOULD BE NO SIGNIFICANT PENALTY FOR
ENTERING THE WATER WITH THE GARMENT PARTIALLY
UNZIPPED. LABORATORY EXPERIMENTS USING A VARIETY
OF ANTIEXPOSURE ASSEMBLIES DEMONSTRATED THAT THE 3/16
INCH. FOAMED NEOPRENE WET SUIT, MITTENS, HOOD, AND
INSULATED RUBBER 'THERMAL' BOOTS PROVIDED THE MOST
COMFORTABLE AND EFFICIENT CONFIGURATION. TOLERANCE
TIMES WERE ESTABLISHED FOR SUCH CLOTHING IN 40, 50,
AND 60F. WATER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-638 092 6/17

ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK
MASS

'WET' VERSUS 'DRY' SUIT APPROACHES TO WATER IMMERSION
PROTECTIVE CLOTHING. (U)

66 3P GOLDMAN, R. F. IBRECKENRIDGE, J.
R. IREEVES, E. IBECKMAN, E. L. I

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN AEROSPACE MEDICINE V37
N5 P485-7 MAY 1966.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•PROTECTIVE CLOTHING; THERMAL INSULATION);
FLIGHT CLOTHING; FLIGHT CREWS; AIR; WATER; SYNTHETIC
RUBBER; COMPRESSIVE PROPERTIES; TEMPERATURE (U)
IDENTIFIERS: IMMERSION; WATER (U)

IMMERSION PROTECTION FLIGHT CLOTHING CAN BE OF
EITHER A SKIN DIVER, 'WET' SUIT TYPE OR WATERPROOF,
'DRY' SUIT. A WATERPROOFED COOPER MANIKIN WAS USED
TO STUDY THE INSULATIVE PROPERTIES OF BOTH TYPES OF
SUITS, IN AIR AND ALSO DURING WATER IMMERSION. THE
BULKIER CHARACTERISTICS OF THE DRY SUIT STUDIED, THE
MARK 5A, PROVIDED GREATER INSULATION IN AIR THAN
EITHER A 1/4 INCH OR 3/16 INCH UNICELLAR SPONGE,
NEOPRENE WET SUIT. HOWEVER, DURING WATER
IMMERSION, COMPRESSION OF THE 'DRY' SUIT BY THE WATER
REDUCED THE INSULATION BY 75 PER CENT. THE
INSULATION OF THE 'WET' SUITS WAS ALSO REDUCED BUT
THESE SUITS ARE LESS COMPRESSIBLE AND THUS DURING
WATER IMMERSION PROVIDE SIGNIFICANTLY MORE INSULATION
THAN THE 'DRY' SUIT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-638 560 6/17 11/5
PRODESCO INC PERKASIE PA.

DESIGN OF WOVEN AND LAMINATED FABRICS FOR TESTING OF
THERMAL RESISTANCE. (U)

DESCRIPTIVE NOTE: FINAL REPT.
AUG 66 15P BROCKMANN, HAL E. ;
CONTRACT: N62269-2231
TASK: RAE-20J-010/2021/FO12-10-02,
MONITOR: NADC-MR 6612

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*THERMAL INSULATION, *TEXTILES), (*FIRE
PROTECTIVE CLOTHING, THERMAL INSULATION), FIRE RESISTANT
TEXTILES, LAMINATES, MANUFACTURING, EXPERIMENTAL
DESIGN (U)

IN AN EFFORT TO DEVELOP A SINGLE-LAYER FABRIC
SPECIFICALLY CONSTRUCTED TO RESIST THERMAL RADIATION
OF INTENSITY COMMENSURATE WITH THAT OF NUCLEAR
DETONATIONS SEVERAL CONCEPTS WERE INVESTIGATED.
THESE CONCEPTS WERE: (1) AIR SPACINGS
INCORPORATED IN THE FABRIC BY WEAVING; (2)
WEAVING INTO THE FABRIC A METALLIC SCRIM TO IMPEDE
AND SPREAD Laterally THE HEAT PASSING THROUGH THE
FABRIC; AND (3) INCORPORATING AN INSULATING LAYER
BY LAMINATION BETWEEN TWO FABRIC LAYERS. FABRICS
OF GOOD THERMAL RESISTANCE WERE OBTAINED AND CERTAIN
PRINCIPLES WITH REGARD TO THERMAL PROTECTION WERE
DERIVED FROM THE DATA GENERATED IN THIS STUDY
TOGETHER WITH THOSE FROM EARLIER STUDIES ON FLAME
CONTACT. FOREMOST AMONG THE LATTER IS THE FACT
THAT AIR SPACING IS FAR MORE EFFICACIOUS AGAINST HEAT
TRANSFER BY FLAME CONTACT THAN BY RADIATION.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-641 247 15/5
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE
MEDICAL RESEARCH DEPT

CAMOUFLAGE PRINTING OF NOMEX SUMMER FLYING
COVERALLS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
SEP 66 11P CHIANTA, MARIA A. I
REPT. NO. NADC-MR-6619.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (FLIGHT CLOTHING, *CAMOUFLAGE), FIRE
RESISTANT MATERIALS, PRINTING, COLORS, DYES,
FLAMMABILITY
IDENTIFIERS: NOMEX YARN

(U)

(U)

AN INVESTIGATION WAS CARRIED OUT TO DETERMINE THE
EFFECTIVENESS OF NOMEX SUMMER FLYING COVERALLS
PRINTED WITH A CAMOUFLAGE PATTERN AS COMPARED WITH
THE STANDARD PLAIN OLIVE GREEN COVERALLS.
LABORATORY TESTS INDICATED THAT CAMOUFLAGE PRINTING
OF STAPLE NOMEX IN A RESIN-BONDED PIGMENT SYSTEM
DOES NOT SIGNIFICANTLY ALTER THE FLAME-RESISTANT
CHARACTERISTICS OF NOMEX. FIELD TESTS WITH
MARINE UNITS SHOWED THAT THE CAMOUFLAGE SYSTEM
CONSIDERED HERE OFFERED VERY LITTLE ADVANTAGE OVER
THE ORDINARY OLIVE-GREEN NOMEX SUITS IN CONCEALMENT
IN GREEN LEAFY AREAS AND NEITHER SUIT CONTRIBUTES TO
CONCEALMENT IN PREDOMINANTLY BROWN SURROUNDINGS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-642 178 6/17 1/3 15/5
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY
DIV

SOVIET HIGH ALTITUDE EQUIPMENT FOR AIRCREW
PROTECTION.

(U)

JUN 66 82P UMANSKII, S. P. IREBROV, M. F. I
RABKIN, I. G. IBELSKII, B. L. ISOFRONOV, E. V. I
REPT. NO. AYD-66-67
MONITOR: TT 67-60028

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON SURVEYS OF FOREIGN
SCIENTIFIC AND TECHNICAL LITERATURE. SPECIAL
EXTENDED ABSTRACT AND TRANSLATIONS.

DESCRIPTORS: (*AEROSPACE CRAFT, AVIATION SAFETY),
(*FLIGHT CLOTHING, HIGH ALTITUDE), FLIGHT CREWS,
PRESSURE SUITS, HELMETS, PARACHUTES, EJECTION SEATS,
JETTISONABLE EQUIPMENT, SPACECRAFT CABINS, ENVIRONMENT,
OXYGEN MASKS, ACCELERATION, USSR (U)

THE REPORT CONSISTS OF ABSTRACTS OF THE FOLLOWING
TOPICS: THE PILOT ENDURANCE BARRIER; PROTECTIVE
EQUIPMENT FOR HIGH-ALTITUDE FLIGHTS; FUNCTIONS OF
AUTOMATIC EQUIPMENT ON AIRCRAFT; FLIGHT SAFETY;
CONSTRUCTION OF AIRCRAFT; AIRPLANES, ROCKETS,
AND HELICOPTERS; AIRCRAFT EQUIPMENT. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-644 611 15/5 6/17
ARMY LIMITED WAR LAB ABERDEEN PROVING GROUND MD

VENTILATED FLIGHT SUIT.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 66 17P HARDENBROOK, FREDERIC G. ;
REPT. NO. LWL-TR-66-07
PROJ: 02-S-66

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, TROPICAL REGIONS),
(*AVIATION PERSONNEL, FLIGHT CLOTHING), VENTILATION,
COOLING, EFFICIENCY, PROTECTIVE CLOTHING, ENVIRONMENT,
AIR COOLED, LOGISTICS (U)

THE PURPOSE OF THIS DEVELOPMENT IS TO INCREASE THE
EFFICIENCY OF THE PILOT AND CO-PILOT OF THE HOHAWK
AIRCRAFT WHEN OPERATING IN HOT CLIMATES BY USING THE
PRINCIPLE OF EVAPORATIVE COOLING. TO DO SO, A
VENTILATED FLIGHT SUIT WAS DEVELOPED THROUGH
WHICH AMBIENT AIR COULD BE FORCED BY USING A SMALL
BLOWER AND FLEXIBLE TUBING CONDUCTING THE AMBIENT AIR
TO THE SUIT USING THE PERSPIRATION OF THE INDIVIDUAL
TO ACHIEVE THE COOLING. SERVICE TESTS MADE IN
SOUTH VIETNAM PROVED THE VENTILATED FLIGHT
SUIT INADEQUATE WHEN THE AIRCRAFT COOLING SYSTEM
WAS NOT IN OPERATION UNLESS A SUPPLEMENTARY
LIGHTWEIGHT, PORTABLE COOLING SYSTEM IS PROVIDED. (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-644 917 6/17 13/1
WESTINGHOUSE ELECTRIC CORP LIMA OHIO AEROSPACE ELECTRICAL
DIV

DEVELOPMENT OF THERMOELECTRIC HEATING AND VENTILATING
SYSTEM. (U)

DESCRIPTIVE NOTE: FINAL REPT. ON PHASE 3. 29 JUN 63-18
APR 65;
APR 65 37P BERNARD, ANDREW M. FOX,
LEONARD J. I
REPT. NO. WAED-65.26E
CONTRACT: DA-19-129-QM-1981
PROJ: 7X80-01-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*HEATERS, EXPOSURE SUITS), (*EXPOSURE
SUITS, *COOLING + VENTILATING EQUIPMENT),
THERMOELECTRICITY, BLOWERS, GENERATORS, PACKAGING,
PORTABLE EQUIPMENT, PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: THERMOELECTRIC POWER GENERATION (U)

THREE THERMOELECTRIC HEATING AND VENTILATING
SYSTEMS FOR ENVIRONMENTAL CONTROL OF TROOPS WHEN
EXPOSED TO EXTREME ENVIRONMENTS OR ENEMY IMPOSED
HAZARDS WERE DELIVERED. MODIFICATIONS OF A BATTERY
START, EASY FILL FUEL TANK AND A PACKAGE COVER WERE
REQUESTED AFTER DELIVERY OF THE FIRST UNIT AND WERE
THEN MADE TO ALL THREE UNITS. THE MODIFICATIONS
INCREASED THE PACKAGE WEIGHT BUT WERE CONSIDERED
NECESSARY FOR THE SUCCESS OF THE PROGRAM. IN
GENERAL, THE UNITS PERFORMED WELL IN LABORATORY
EVALUATION DELIVERING THE REQUIRED 18 CFM OF AIR AT 4
IN. STATIC WATER PRESSURE OR 20 WATTS OF ELECTRICAL
POWER TO AN EXTERNAL LOAD. ADDITIONAL AREAS OF
IMPROVEMENT BECAME EVIDENT DURING THE FABRICATION AND
LABORATORY EVALUATION OF THE THREE UNITS. THE
WEIGHT OF THE UNIT COULD BE REDUCED TO A MAXIMUM OF
ELEVEN POUNDS FROM THE PRESENT 15.7 LBS., INCLUDING
ALL PRESENT SPECIFICATIONS AND MODIFICATIONS.
(AUTHOR) (U)

UNCLASSIFIED

/ZOM08

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-646 062 6/17
NAVAL RESEARCH LAB WASHINGTON D C

REACTIVITY OF VARIOUS DAMAGE CONTROL PROTECTIVE
CLOTHING MATERIALS WITH CHLORINE TRIFLUORIDE. (U)

DESCRIPTIVE NOTE: MEMORANDUM REPT.,
JUN 63 19P MORAN, H. E. BURNETT, J. C. I
REPT. NO. NRL-MR-1434

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, MATERIALS), (*DAMAGE
CONTROL, PROTECTIVE CLOTHING), CHLORINE COMPOUNDS,
FLUORIDES, SYNTHETIC RUBBER, IGNITION, HALOCARBON
PLASTICS, OXIDIZERS, OXYGEN MASKS (U)

CHLORINE TRIFLUORIDE (CTF) HAS BEEN PROPOSED FOR
USE IN AN IMPROVED MISSILE PROPELLANT SYSTEM.
SINCE THIS IS A STRONGER OXIDIZER THAN ANY USED
HERETOFORE, IT WAS DESIRABLE TO EXAMINE ITS EFFECT ON
MATERIALS USED, OR PROPOSED FOR USE, IN MAKING
PROTECTIVE CLOTHING AND OTHER GEAR FOR DAMAGE
CONTROL. NEOPRENE AND ARMALON (WOVEN
POLYTETRAFLUOROETHYLENE LAMINATED WITH A CONTINUOUS
SHEET OF POLYTETRAFLUOROETHYLENEPROPYLENE) SHOWED
PROMISE AS MATERIALS FOR THE CONSTRUCTION OF
PROTECTIVE COVERALLS. IT WAS ALSO SHOWN THAT THESE
MATERIALS MUST BE KEPT FREE OF LOCAL CONTAMINATION
WITH SUBSTANCES EASILY IGNITED BY CTF, SUCH AS OIL
AND GREASE, SINCE, ONCE IGNITED, THE UNCONTAMINATED
PORTION MAY CONTINUE TO BURN, EVEN IN DILUTE CTF
VAPOR. THE ARMALON SHOWED GREATER RESISTANCE TO
CTF OVER A WIDER RANGE OF CONCENTRATION THAN THE
NEOPRENE. BUTYL RUBBER COATED CLOTH AND VINYL
COATED GLASS CLOTH WERE READILY IGNITED BY DILUTE
CTF VAPOR, AND THEY APPEAR UNSUITABLE FOR
PROTECTIVE CLOTHING. HYDRAZOID PROPELLANT FUELS
WERE IGNITED BY CTF VAPOR IN CONCENTRATIONS AS LOW
AS 1-1/2 PERCENT BY VOLUME. SAMPLES OF THE
MATERIALS USED IN THE CONSTRUCTION OF THE NAVY OBA
(OXYGEN BREATHING APPARATUS) WERE FOUND TO BE
REACTIVE WITH CTF, HENCE, THE OBA MUST BE WORN
INSIDE A GAS-TIGHT PROTECTIVE COVERALL. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-647 197 6/11 22/1 6/17
CLARK (DAVID) CO INC WORCESTER MASS

RESEARCH AND DEVELOPMENT OF EXTRAVEHICULAR PROTECTIVE
ASSEMBLY. (U)

DESCRIPTIVE NOTE: FINAL REPT., 2 JUL 62-30 APR 64,
OCT 66 73P OSBORNE, NORMAN H. ROCK;

LEE C. I

CONTRACT: AF 33(657)-9532

PROJ: AF-6301

TASK: 630104

MONITOR: AMRL TR-66-143

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXTRAVEHICULAR ACTIVITY, PRESSURE SUITS),
(*PRESSURE SUITS, DESIGN), PROTECTIVE CLOTHING, LIFE
SUPPORT, SPACE ENVIRONMENTS, LUNAR ENVIRONMENT, HELMETS,
OXYGEN, VENTILATION, SHIELDING, THERMAL INSULATION,
MATERIALS, JOINTS, SEALS (U)

A PROTOTYPE EXTRAVEHICULAR PRESSURE SUIT ASSEMBLY
WAS DESIGNED AND FABRICATED FOR USE IN EARTH AND
LUNAR ENVIRONMENTS. CONDITIONS OF SPACE
ENVIRONMENT, PRELIMINARY DESIGN CONCEPTS, LABORATORY
EVALUATIONS OF MATERIALS, THE INTERMEDIATE MODEL
CONFIGURATION, AND THE FINAL SUIT ASSEMBLY ARE
DESCRIBED IN DETAIL. THIS ASSEMBLY CONSISTS OF
SPECIAL UNDERWEAR, LINER VENTILATION SYSTEM, GAS
CONTAINER, RESTRAINT LAYER AND COVER, INSULATION,
MICROMETEORITE PROTECTION, AN OUTER REFLECTIVE LAYER,
AND A LIFE SUPPORT SYSTEM. THE LIFE SUPPORT SYSTEM
IS A LIQUID OXYGEN, SEMI-CLOSED, RECIRCULATING-TYPE
BACKPACK. THE USE OF NEW MATERIAL DISTINGUISHES
THIS ASSEMBLY FROM CURRENT PRESSURE SUITS.
RECOMMENDATIONS FOR FURTHER RESEARCH AND
DEVELOPMENT ARE INCLUDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-647 828 4/17
KENTUCKY UNIV LEXINGTON

SENSIBLE HEAT TRANSFER IN THE GEMINI AND APOLLO
PRESSURE SUITS. (U)

DESCRIPTIVE NOTE: FINAL REPT. NOV 65-AUG 66,
DEC 66 94P FUNK, J. E. HOEGLING, J.
B. IDRAKE, R. M. , JR. HALL, J. F. , JR.
KLEMM, F. K. :
CONTRACT: AF 33(615)-3370
PROJ: AF-7164, AF-7222
TASK: 716409, 722207
MONITOR: AMRL 66-173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: RESEARCH SUPPORTED IN PART BY
NASA.

DESCRIPTORS: (•PRESSURE SUITS, HEAT TRANSFER), SURFACE
TEMPERATURE, HUMAN BODY, HEAT FLUX, ENVIRONMENTAL TESTS,
HEAT TRANSFER COEFFICIENTS, CONVECTION(HEAT TRANSFER),
TEMPERATURE, SPACE ENVIRONMENTS (U)
IDENTIFIERS: APOLLO, GEMINI (U)

THE RESULTS OF AN EXPERIMENTAL PROGRAM TO DETERMINE
SENSIBLE HEAT TRANSFER EFFECTS IN THE GEMINI AND
APOLLO PRESSURE SUITS ARE REPORTED. A COPPER
MANIKIN MAINTAINED AT A CONSTANT SURFACE TEMPERATURE
WAS USED AND THE OVERALL AVERAGE BODY SURFACE HEAT
FLUX AND THE REGIONAL HEAT FLUX DISTRIBUTION WERE
MEASURED. THE ENVIRONMENTAL VARIABLES STUDIED WERE
VENTILATING AIR FLOWRATE, VELOCITY OF THE AIR MOVING
OVER AND AROUND THE OUTSIDE SURFACE OF THE SUIT, AND
PRESSURE. IN ADDITION, THE FOLLOWING
DETERMINATIONS WERE MADE: THE HEAT TRANSFER
COEFFICIENT BETWEEN THE MANIKIN SURFACE AND THE
VENTILATING AIR, THE OVERALL THERMAL CONDUCTANCE
BETWEEN THE VENTILATING AIR AND THE AIR MOVING OVER
THE OUTSIDE SURFACE OF THE SUIT, THE THERMAL
EMISSIVITY OF THE GEMINI SUIT, AND THE CONVECTION
COEFFICIENT BETWEEN THE OUTSIDE SURFACE OF THE
GEMINI SUIT AND THE AIR MOVING OVER THE OUTSIDE OF
THE SUIT. THESE DATA MAY BE USED FOR HEAT
BALANCES, DETERMINATION OF TEMPERATURES, AND
EVALUATION OF THE INSULATION VALUE OF THE SUIT AND
OUTSIDE AIR. THE INSULATION VALUE FOR THE AIR
AMBIENT TO THE GEMINI SUIT WAS FOUND TO FOLLOW A
RELATIONSHIP DIFFERENT FROM THE EMPIRICAL EQUATION
FOR A NUDE MANIKIN. (AUTHOR) (U)

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-647 892 6/17 6/7
NAVAL MISSILE CENTER POINT MUGU CALIF

TIMED HEAT-RELEASE CHEMICAL SYSTEM FOR UNDERWATER
APPLICATIONS; THERMAL CREAM WARMS DIVERS AND DOWNED
PILOTS IN OCEAN. (U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,
FEB 67 26P TINKLEPAUGH, K. N. ICROWELL,
C. J. : JR;
REPT. NO. NMC-TM-67-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE COVERINGS, *HEATING), (*BODY
TEMPERATURE, PROTECTIVE COVERINGS), (*SURFACE ACTIVE
SUBSTANCES, *HEAT OF SOLUTION), DIVING, DITCHING,
EXPOSURE (PHYSIOLOGY), HEAT TRANSFER, INHIBITION,
UNDERWATER CLOTHING, THERMAL INSULATION,
THERMOCHEMISTRY (U)

DIVERS AND AVIATORS DOWNED IN THE OCEAN REQUIRE
WARMING TO PREVENT EXCESSIVE LOSS OF BODY HEAT. A
COMBINATION OF CHEMICAL HEATING AND FABRIC INSULATION
WAS EVALUATED FOR THIS PURPOSE. CHEMICAL HEATING
RESULTS FROM THE PROGRAMMED HEAT OF SOLUTION OF AN
INEXPENSIVE CREAM IN WATER. LESS THAN 25 POUNDS
PER HOUR FOR THE AVIATOR AND 5 POUNDS PER HOUR FOR
THE WET-SUIT DIVER WILL PROBABLY BE REQUIRED TO
PREVENT EXCESSIVE LOSS OF BODY HEAT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-648 417 6/17 15/5
IIT RESEARCH INST CHICAGO ILL

RESEARCH AND DEVELOPMENT OF BLAST PROTECTIVE
FOOTWEAR, FABRICATION AND PROOFTESTING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

JUL 66 116P FUJINAKA, E. S. IMACDONALD,

J. L. :

CONTRACT: DA-19-129-QM-2061

PROJ: 7-70-10-002

MONITOR: USA-NLABS, C/OM

TR-67-5-CH, TS-141

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHOES, PROTECTIVE CLOTHING), (*PROTECTIVE
CLOTHING, BLAST), WARFARE, ARMY EQUIPMENT, HONEYCOMB
CORES, SANDWICH CONSTRUCTION, METAL PLATES, ALUMINUM,
TESTS, LAND MINES

(U)

SEVERAL OF THE BLAST PROTECTIVE COMBAT BOOT
CONCEPTS WHICH WERE DEVELOPED UNDER PHASE I OF
THIS PROGRAM WERE FABRICATED AND PROOFTESTED UNDER
PHASE II. ALL OF THE PROTECTIVE BOOTS
INCORPORATED A HONEYCOMB FILLED SHANK. THE HIGH
STRENGTH ALUMINUM HONEYCOMB FILLER RANGED FROM 2550
PSI TO ABOUT 4200 PSI NOMINAL CRUSHING STRENGTH.
IN ADDITION TO THE PROTECTIVE SHANK, SEVERAL MODELS
OF PROTECTIVE BOOTS WERE FABRICATED WITH WEDGE-SHAPED
HEEL CUT OUTS AND/OR METAL HEEL COUNTERS. A TOTAL
OF 150 PAIRS OF PROTECTIVE BOOTS WERE FABRICATED WITH
EIGHT POSSIBLE COMBINATIONS OF THE VARIABLES STUDIED.
SIXTY-FOUR CADAVER SPECIMENS PROTECTED BY VARIOUS
TYPES OF BOOTS WERE BLASTLOADED WITH THE M-14 LAND
MINE; 27% OF THE PROTECTIVE BOOTS WITH CONVENTIONAL
COUNTERS RESULTED IN A FOOT DAMAGE LEVEL WHICH COULD
POSSIBLY BE 'SALVAGED FROM AMPUTATION' WHILE 63% OF
THE PROTECTIVE BOOTS INCORPORATING A METAL HEEL
COUNTER WERE 'POSSIBLE SALVAGES.' THIS COMPARES TO
A ZERO PERCENT RATE OF POSSIBLE SALVAGE WITH
CONVENTIONAL FOOTWEAR. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-652 207 6/17
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX

PRELIMINARY STUDIES ON A NEW PARTIAL-PRESSURE SUIT
CONCEPT. (U)

DESCRIPTIVE NOTE: REPT. FOR AUG 65-FEB 66.
FEB 67 13P DAVIS, JEFFERSON C. BOYLE,
JOSEPH. IIRITZINGER, FREDERICK R. I
REPT. NO. SAM-TR-67-15
PROJ: AF-7750

UNCLASSIFIED REPORT

DESCRIPTORS: (PRESSURE SUITS, DESIGN), AEROSPACE
MEDICINE, SPACE FLIGHT, PROTECTION, SKIN (ANATOMY),
PRESSURE (U)

IN PRELIMINARY STUDIES, A NEW PARTIAL-PRESSURE SUIT
HAS BEEN DEVELOPED AS AN EMERGENCY GARMENT FOR HIGH-
ALTITUDE AIRCRAFT FLIGHT, FOR CONTINUOUS WEAR IN
EXTENDED SPACE FLIGHT, AND FOR CREWMEMBERS OF THE
PROPOSED SUPERSONIC TRANSPORT. THE USAFSAM
EXPERIMENTAL SUIT WAS DESIGNED FOR COMFORT IN THE
UNPRESSURIZED STATE, YET TO PROVIDE ADEQUATE PRESSURE
PROTECTION AT ALTITUDE. MECHANICAL PRESSURE IS
APPLIED TO THE SKIN BY EXPANSION OF AIR SEALED IN
RUBBER TUBES SEWED BETWEEN TWO LAYERS OF POROUS
FABRIC. AIR IN THE TUBES EXPANDS AT ALTITUDE
ACCORDING TO BOYLE'S LAW. IN MANNED FLIGHTS TO
75,000 FEET, SKIN PRESSURE MEASUREMENTS ARE EQUAL TO
THOSE OF THE PARTIAL-PRESSURE SUIT; YET AT GROUND
LEVEL AND UP TO 25,000 TO 30,000 FEET, 'SHIRT SLEEVE
COMFORT' IS APPROACHED. (AUTHOR) (U)

UNCLASSIFIED

/ZOM08

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-652 248 6/17
LITTON SYSTEMS INC BEVERLY HILLS CALIF SPACE SCIENCES
LABS

RESEARCH AND DEVELOPMENT OF HELMET FACEPIECES FOR
SPACE PROTECTIVE ASSEMBLIES. (U)

DESCRIPTIVE NOTE: FINAL REPT., 30 JUN 64-30 DEC 65,
JAN 67 116P ROCCO, R. M. I
REPT. NO. PUB-4832
CONTRACT: AF 33(615)-1875
PROJ: AF-7222
MONITOR: AMRL TR-64-193

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE SUITS, •PROTECTIVE MASK
FACEPIECES), HELMETS, ASTRONAUTS, EXTRAVEHICULAR
ACTIVITY, DESIGN, SPACE ENVIRONMENTS, ANTIFOGGING
AGENTS, SKIN(ANATOMY), TEMPERATURE, SOLAR RADIATION,
LAMINATED GLASS (U)

THE RESEARCH AND DEVELOPMENT OF AN ASPHERICAL GLASS
FACEPIECE FOR A FULL PRESSURE SPACESUIT COMPATIBLE
WITH AF HELMET AP-22F-2, CAPABLE OF PROTECTING
AN ASTRONAUT FROM HAZARDS OF SPACE DURING A 4-HOUR
EXTRAVEHICULAR MISSION ARE DESCRIBED. THE
TRANSPARENCY WAS TO REMAIN FOG-FREE DURING A
CONDITION OF ZERO AIR FLOW AND 100 PERCENT RELATIVE
HUMIDITY. IN ADDITION, FACEPIECE DESIGN WAS TO
PROVIDE SUFFICIENT ATTENUATION OF SOLAR
ELECTROMAGNETIC RADIATION TO ASSURE AN ASTRONAUT MEAN
FACIAL SKIN TEMPERATURE NOT IN EXCESS OF 100F.
INITIAL EFFORT WAS DIRECTED TOWARD DEFINITION OF
THE EXTREME SPACE ENVIRONMENTS FOR THE DEFINED ORBIT.
THESE ENVIRONMENTS WERE SIMULATED IN THE LABORATORY
FOR COMPATIBILITY TESTING OF CANDIDATE MATERIALS
(GLASSES, OPTICAL COATINGS, AND ELECTRICALLY
CONDUCTIVE COATINGS). ADDITIONAL TESTS WERE
DEvised TO INVESTIGATE THE EFFECTIVENESS OF ANTI-FOG
DEVICES AND SOLAR REFLECTIVE COATINGS. TEST
RESULTS INDICATE THAT, FOR THE PARTICULAR FACEPIECE
CONFIGURATION AND INTERNAL AND EXTERNAL SPACESUIT
ENVIRONMENTS DEFINED, A POWER DISSIPATION OF 0.33
WATT/SQ IN IS REQUIRED TO MAINTAIN A FOG-FREE
FACEPIECE; AND A MEAN FACIAL SKIN TEMPERATURE OF
100F WILL NOT BE EXCEEDED PROVIDED THE SOLAR
RADIATION INCIDENT ON THE ASTRONAUT'S SKIN IS NOT
GREATER THAN 0.43 SOLAR CONSTANT. FACEPIECE
MATERIALS WERE SELECTED FROM CANDIDATES WHICH
SATISFACTORILY WITHSTOOD THE EXTREME ENVIRONMENTAL (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-652 405 6/17 11/10
NAVY ELECTRONICS LAB SAN DIEGO CALIF

DIVERS' BODY HEAT LOSS: DESCRIBES A STUDY OF THE
ENDURANCE OF UNDERWATER SWIMMERS WEARING A VARIETY OF
FOAM NEOPRENE WET SUITS AND IMMersed AT 30-32F IN THE
NEL ARCTIC POOL. (U)

DESCRIPTIVE NOTE: RESEARCH REPT.,
OCT 66 39P BEAGLES, J. A. ICOIL, E.
F. ;

REPT. NO. NEL-1408
PROJ: SR-011-01-01
TASK: 0401

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, ARCTIC REGIONS),
(*SYNTHETIC RUBBER, UNDERWATER CLOTHING), DESIGN, SOCKS,
GLOVES, BODY TEMPERATURE, EXPOSURE (PHYSIOLOGY),
EFFECTIVENESS, SCUBA DIVERS (U)

A STUDY WAS MADE PRIMARILY TO OBTAIN DATA
APPLICABLE TO THE DESIGN OF AN OPTIMUM PROTECTIVE
SUIT FOR DIVERS IN ARCTIC ENVIRONMENTS. THE
EXPERIMENTAL METHOD EMPLOYED SWIMMERS WHO PERFORMED
SHALLOW DIVES IN THE NEL ARCTIC POOL AT 30-32F.
SKIN TEMPERATURE WAS RECORDED BY THE USE OF
SUITABLY LOCATED THERMISTORS, AND OTHER DATA WERE
OBTAINED FROM BLOOD SAMPLES DRAWN IMMEDIATELY BEFORE
AND AFTER EACH DIVE. RESULTS SUGGEST THAT A FOUR-
PIECE FOAM NEOPRENE WET SUIT CONSISTING OF A 1/8-INCH
TIGHT-FITTING INNER SUIT AND A 1/4-INCH SNUG-FITTING
OUTER SUIT ALONG WITH TWO PAIRS OF NEOPRENE SOCKS AND
MITTENS WOULD PROVIDE THE OPTIMUM COMBINATION OF
PROTECTION AND MOBILITY FOR DIVERS IN ARCTIC WATERS.
(AUTHOR) (U)

UNCLASSIFIED

DNC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-652 653 6/17 11/9
NORTHROP SPACE LABS HAWTHORNE CALIF SPACE MATERIALS
LAB

RESEARCH ON CLOSED-CELL SPONGE AS A PRESSURE
TECHNIQUE FOR PROTECTIVE ASSEMBLIES.

(U)

DESCRIPTIVE NOTE: FINAL REPT., 10 MAY 66-5 JUL 66,
FEB 67 74P HEITZ, R. M. JONES, G. W.

CONTRACT: AF 33(615)-2953
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-66-183

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, *FOAM RUBBER),
(*PRESSURE SUITS, SPACE FLIGHT), VACUUM, PHYSICAL
PROPERTIES, VINYL PLASTICS, PROCESSING, PROTECTION,
TABLES(DATA), SPACE ENVIRONMENTS, POLYVINYL CHLORIDE (U)

A CLOSED-CELL FOAM WAS DEVELOPED FOR INTEGRATION
INTO A PARTIAL PRESSURE SUIT THAT WOULD PRODUCE
PRESSURE ON THE HUMAN BODY TO PROVIDE PROTECTION IN A
VACUUM ENVIRONMENT. A SURVEY OF LITERATURE AND
INDUSTRIAL ORGANIZATIONS WAS FOLLOWED BY AN EXTENSIVE
EXPERIMENTAL STUDY ON KNOWN FOAM SYSTEMS AND THE
DEVELOPMENT OF NEW FOAM SYSTEMS. THE EVALUATION
AND DEVELOPMENT OF THE FOAM COMPOSITION AND
PROCESSING TECHNIQUES ARE DESCRIBED. FROM THIS
STUDY, THE FORMULATION AND PROCESSING OF SUITABLE
VINYL CLOSED-CELL FOAMS WERE DEVELOPED WITH
REPRODUCIBLE PROPERTIES IN CONTROLLED PROCESSES.
THEIR PHYSICAL PROPERTIES PASSED SUCCESSFULLY THE
REQUIRED CYCLING TEST WHEREIN THE FOAMS, PROPERLY
RESTRAINED AND EXPOSED TO VACUUM, EXERTED A PRESSURE
RESPONSE OF 7 PSIA OR 3.5 PSIA DEPENDING UPON THE
PROCESS USED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH08

AD-655 147 6/17
QUARTERMASTER RESEARCH AND DEVELOPMENT CENTER NATICK
MASS

SOME EFFECTS OF ABSORBENCY OF CLOTHING MATERIALS. (U)

JUN 56 4P PRATT, R. L. IFONSECA, G.
F. WOODCOCK, A. H. I
REPT. NO. RESEARCH-STUDY-8P-3
PROJ: DA-7-64-12-004A

UNCLASSIFIED REPORT

DESCRIPTORS: (PROTECTIVE CLOTHING, ABSORPTION), HEAT
TRANSFER, TEXTILES, WOOLEN TEXTILES, MOISTURE (U)

IT IS CONCLUDED THAT ABSORBED MOISTURE CAN CAUSE
TRANSIENT EFFECTS IN HEAT TRANSFER WHICH ARE
APPRECIABLE FOR AN HOUR OR MORE. THESE TRANSIENT
EFFECTS MAY BE PUT TO ADVANTAGE BY USING ABSORBENT
MATERIALS SUCH AS WOOL WHICH STABILIZES HEAT LOSS
FROM A MAN WHO IS CHANGING HIS ENVIRONMENT SUCH AS
GOING IN AND OUT OF HEATED BUILDINGS. HOWEVER,
SUCH ABSORBENT MATERIALS WOULD BE A DISADVANTAGE TO
PERSONS LIKE THE COMBAT SOLDIER WHO REMAINS IN A
RELATIVELY STABLE OUTDOOR ENVIRONMENT BUT CHANGES HIS
ACTIVITY. HENCE, NONABSORBENT MATERIALS SUCH AS
SOME OF THE SYNTHETICS MAY BE PREFERABLE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-655 834 6/17
HONEYWELL INC ST PAUL MINN RESEARCH DEPT

AUTOMATIC TEMPERATURE CONTROL FOR LIQUID-COOLED
FLIGHT SUITS. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 66-MAR 67,
AUG 67 83P MERRILL, GLEN L. ISTARR,
JAMES B. I
REPT. NO. 12045-FR1
CONTRACT: N156-48547
TASK: MFO22.02.02-6001
MONITOR: NADC-AC 6702

UNCLASSIFIED REPORT

DESCRIPTORS: (FLIGHT CLOTHING, TEMPERATURE CONTROL),
AUTOMATIC, LIQUID COOLED, FLUID AMPLIFIERS, DETECTORS,
SKIN (ANATOMY), SURFACE TEMPERATURE, WATER, CONTROL
SYSTEMS (U)

AN AUTOMATIC CONTROL SYSTEM FOR MAINTAINING
CONSTANCY OF SKIN TEMPERATURE (T SUB S) HAS BEEN
SHOWN TO BE FEASIBLE BY USING SPECIAL SENSORS TO
DETECT CHANGES IN T SUB S AND PROPORTIONAL FLUID
AMPLIFIERS TO REGULATE THE TEMPERATURE OF WATER
FLOWING THROUGH THE TUBING OF A WATER-COOLED
UNDERGARMENT. TESTS HAVE INDICATED THE RESPONSE OF
THE SYSTEM WHEN T SUB S INCREASED DUE TO EXERCISE
OR TO AN EXTERNAL HEAT LOAD. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AN-657 436 6/17 6/7
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

A PROTECTIVE PASSENGER SMOKE HOOD,

(U)

APR 67 12P MCFADDEN, ERNEST B. ;
REYNOLDS, H. I. IFUNKHOUSER, GORDEN E. ;
MONITOR: FAA-AM 67-4

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIRE PROTECTIVE CLOTHING, *BREATHING APPARATUS), POLYAMIDE PLASTICS, AMIDES, POLYMERS, FILMS, METAL COATINGS, AIRCRAFT FIRES, SMOKE, SURVIVAL(PERSONNEL) (U)

SEVERAL RECENT JET TRANSPORT ACCIDENTS HAVE FOCUSED THE ATTENTION OF THE AVIATION INDUSTRY UPON SMOKE AND TOXIC GASES AS CAUSAL FACTORS OF PASSENGER INCAPACITATION AND FAILURE TO EVACUATE AIRCRAFT BEFORE FIRE AND HEAT RENDER THE ENVIRONMENT UNINHABITABLE. IF IT WERE POSSIBLE TO PROVIDE PASSENGERS WITH A SHORT DURATION SUPPLY OF BREATHING AIR SUFFICIENT TO MAINTAIN THE PASSENGERS' MOBILITY AND ALLOW COMPLETION OF AIRCRAFT EVACUATION, SURVIVAL WOULD BE ENHANCED. SIMPLE, LIGHT-WEIGHT, BAG-SHAPED HOODS INCORPORATING A NECK SEAL WERE FABRICATED OF A THIN PLIABLE, HIGH-TEMPERATURE, TRANSPARENT, POLYIMIDE PLASTIC FILM. POLYIMIDE FILM HAS NO MELTING POINT BUT REPORTEDLY CHARS AT 1500 DEG F. IN A MORE ADVANCED DESIGN, THIN TRANSPARENT METALLIC COATINGS WERE APPLIED TO THE POLYIMIDE FILM IN ORDER TO REFLECT UP TO 90% OF THE RADIANT HEAT. UPON EXPOSURE TO A SPECIFIC INFRA-RED HEAT FLUX, FACIAL SKIN TEMPERATURES OF 114-115 F WERE RECORDED ON TWELVE HUMAN SUBJECTS WEARING THE NON-METALIZED HOOD. UNDER IDENTICAL CONDITIONS, SKIN TEMPERATURES OF THE SAME SUBJECTS WEARING THE METALIZED HOOD DID NOT EXCEED 99 F. CAPABILITY OF THE HOOD TO PROVIDE SHORT TERM AND EXTENDED PROTECTION FROM SMOKE AND FLAME INHALATION IN A FIRE ENVIRONMENT IS DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-657 853 15/5
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL
MATERIALS LAB.

LABORATORY SHRINKAGE EVALUATION OF NOMEX SUMMER
FLIGHT SUITS.

(U)

APR 67 6P KELLY, WARREN T. I
REPT. NO. NAEC-AHL-2604
TASK: A32-013-200/1

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, SHRINKAGE), (*FIRE
RESISTANT TEXTILES, SHRINKAGE), POLYAMIDE PLASTICS,
CLEANING COMPOUNDS, CLEANING, CAMOUFLAGE (U)

SHRINKAGE OF COVERALLS MADE OF OLIVE GREEN AND
CAMOUFLAGE PRINTED NOMEX HERRINGBONE TWILL CLOTHS
LAUNDERED BY FORMULA S IS REPORTED. COVERALL
DIMENSIONS, EXCEPT FOR CROTCH SEAM THAT APPARENTLY
PUCKERS, ARE NOT SHORTENED EXCESSIVELY.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-658 204 6/17 11/1 13/5
NORTHROP SPACE LABS HAWTHORNE CALIF

PRESSURE SEALING CLOSURES FOR FULL PRESSURE
PROTECTIVE SUIT ASSEMBLIES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 15 JUL 66-10 FEB 67,
JUN 67 62P HEITZ, ROGER M. BROWN, GARY
G. I

REPT. NO. NSL-67-177
CONTRACT: AF 33(615)-5372
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-67-59

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *FASTENINGS), (*GAS
SEALS, PRESSURE SUITS), DESIGN, MANUFACTURING,
MOLDINGS

(U)

LONGITUDINAL AND CIRCULAR PRESSURE SEALING CLOSURES
WERE DESIGNED AND DEVELOPED FOR FULL PRESSURE
PROTECTIVE ASSEMBLIES FROM A DESIGN CONCEPT PROVIDED
BY THE AEROSPACE MEDICAL RESEARCH
LABORATORIES, INVENTION DISCLOSURE NUMBER 66/588.
THIS STUDY CONSISTED OF (1) DESIGNING PRESSURE
CLOSURE DEVICES, (2) SELECTING SUITABLE MATERIALS
FOR THE FABRICATION OF THE SEALING CLOSURE PARTS AND
THE CYLINDERS TO INCLUDE THE CLOSURES, (3)
SELECTING AN APPROPRIATE FABRICATION PROCESS FOR THE
CLOSURE SEALING PARTS, AND (4) FABRICATING AND
TESTING THE BREADBOARD AND DEMONSTRATION MODELS
CONTAINING EITHER THE CIRCULAR OR LONGITUDINAL
CLOSURES. AN EPDM ELASTOMERIC MATERIAL WAS FOUND
TO BE SUITABLE FOR THE FABRICATION OF THE CLOSURE
SEALING PARTS WHICH WERE MOLDED USING AN ESTABLISHED
MOLDING TECHNIQUE. THE FABRICATED BREADBOARD AND
DEMONSTRATION MODELS PASSED SUCCESSFULLY THE REQUIRED
TESTS WHEREIN LEAK RATES WERE DETERMINED FROM 0 TO 5
PSIG, AND EXPOSURE TO PRESSURE UP TO 12 PSIG WERE
PERFORMED. (AUTHOR)

(U)

UNCLASSIFIED

/ZOM08

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY, SEARCH CONTROL NO. /ZOM08

AD-658 508 6/17 6/19
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE
MEDICAL RESEARCH DEPT

EVALUATION OF A WET SUIT IN CONJUNCTION WITH ANTI-
BLACKOUT PROTECTION. (U)

AUG 67 14P PATTON, ROBERT M. I
REPT. NO. NADC-MR-6713
PROJ: NAVMED-MFO22.02.02-6002
TASK: MFO22.02.02-6002-11

UNCLASSIFIED REPORT

DESCRIPTORS: (PRESSURE SUITS, ACCELERATION TOLERANCE),
BLACKOUT (PHYSIOLOGY), EFFECTIVENESS, ACCEPTABILITY,
AEROSPACE MEDICINE (U)
IDENTIFIERS: WET SUITS (U)

AN INVESTIGATION WAS UNDERTAKEN TO TEST AND
EVALUATE A WET SUIT WORN IN CONJUNCTION WITH THE
MARK II ANTI-G SUIT UNDER ACCELERATION.
EIGHT SUBJECTS WERE RUN ON THE CENTRIFUGE UNDER
CONDITIONS OF NO PROTECTION, WEARING AN ANTI-G SUIT
ONLY, WEARING AN ANTI-G SUIT UNDER THE WET SUIT,
AND WEARING THE ANTI-G SUIT OVER THE WET SUIT.
RESULTS INDICATED THAT ACCELERATION TOLERANCE WAS
SIGNIFICANTLY IMPROVED BY THE USE OF THE ANTI-G
SUIT, BUT THERE WAS NO STATISTICALLY RELIABLE
DIFFERENCE BETWEEN THE ANTI-G SUIT ONLY AND THE TWO
ANTI-G SUIT/WET SUIT COMBINATIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-659 974 6/17 11/5
PRODESCO INC PERKASIE PA.

DEVELOPMENT OF HIGH-INTENSITY THERMAL PROTECTIVE
FABRIC. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 67 43P BROCKMANN, HAL E. DONNELLY,
ROBERT I
REPT. NO. PNAS-94
CONTRACT: N62269-3129
TASK: A34 531/2021/FO12-10-02
MONITOR: NADC-MR 6715

UNCLASSIFIED REPORT

DESCRIPTORS: (•PROTECTIVE CLOTHING, THERMAL RADIATION),
(•HEAT RESISTANT MATERIALS, PROTECTIVE CLOTHING),
(•TEXTILES, PROTECTIVE CLOTHING), METALLIC TEXTILES,
SYNTHETIC FIBERS, PERFORMANCE(ENGINEERING),
FOILS(MATERIALS), ALUMINUM, POLYESTER PLASTICS, FILMS(U)

THE DEVELOPMENT OF A FABRIC THAT WOULD BE PROTECTIVE AGAINST HIGH-INTENSITY THERMAL ENERGY WAS APPROACHED USING THREE CRITERIA, THE FIRST BEING THAT THE MAJORITY OF THE FIBER IN THE FABRIC BE A TEXTILE MATERIAL. AFTER EVALUATING VARIOUS FIBERS, NOMEX WAS DETERMINED TO BE THE PRIMARY FIBER FOR THIS STRUCTURE. THE SECOND PARAMETER EXAMINED WAS THAT OF A KNOWN SPACING BETWEEN TWO LAYERS OF FABRIC STUDIED IN VARIOUS WAYS. THE FINAL CONCEPT ARRIVED AT WAS A TWO-LAYER FABRIC THAT WAS INTIMATELY TIED TOGETHER AT 3/8 INCH INTERVALS. THE THIRD EFFORT WAS DIRECTED TOWARD FINDING A FIBROUS MATERIAL THAT WOULD ABSORB OR DISTRIBUTE THE THERMAL ENERGY WITHIN THE FABRIC ITSELF. OF THE MANY METALLIC AND INORGANIC MATERIALS EVALUATED, A SLIT ALUMINUM FOIL/ MYLAR FILM YARN WAS CONSIDERED TO BE THE OPTIMUM STRUCTURE FOR ITS WEIGHT AND BULK. THE FABRIC DEVELOPED FROM THIS FIBER AND STRUCTURE EVALUATION WAS A 7.3 OZ/SQ YD TWO-LAYER NOMEX FABRIC TIED TOGETHER AT INTERVALS, EITHER WITH OR WITHOUT A SLIT ALUMINUM SCRIM BETWEEN THE TWO LAYERS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-663 634 6/17 6/7
NAVAL SUBMARINE BASE NEW LONDON CONN

EVALUATION FOR SERVICE USE OF A PROTO-TYPE SWIMMER'S
RESCUE SUIT. (U)

DESCRIPTIVE NOTE: MEMORANDUM REPT.,
MAR 58 13P RENTSCH, SAUEL B. , JR!
REPT. NO. SBNL-MEMO-58-1
PROJ: NAVMED-NM-21-01-20.01
TASK: NM-21-01-20.01-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEA RESCUES, UNDERWATER CLOTHING),
(*UNDERWATER CLOTHING, PERFORMANCE(ENGINEERING)),
SWIMMING, DIVING, EFFECTIVENESS, BREATHING APPARATUS,
MOISTUREPROOFING, BUOYANCY, THERMAL INSULATION, ELASTIC
PROPERTIES, ACCEPTABILITY (U)

THE INVESTIGATION WAS ONE OF A SERIES OF TESTS AND
EVALUATIONS OF PROTOTYPE RESCUE (SWIM) SUITS
CONDUCTED BY NAMRL IN COOPERATION WITH THE
RESEARCH SECTION OF THE NAVAL CLOTHING
SUPPLY OFFICE, BROOKLYN. THE SUIT WAS TRIED
OUT UNDER SERVICE OPERATING CONDITIONS DURING
EXERCISES ABOARD TWO SUBMARINE RESCUE AND SALVAGE
VESSELS (ASR'S 15 AND 16) DURING JUNE AND
JULY 1957 AND JANUARY 1958. THE SCOPE OF THE
EVALUATIONS INCLUDED SWIMMING, SURFACE DIVING,
FLOATING, SIMULATED RESCUING OF PERSONNEL, AND USE
WITH AN AQUA LUNG FOR SUCH PURPOSES AS EXAMINING THE
BOTTOM OF SHIPS, CHECKING ANCHOR CHAINS FOR FOULING,
AND FOR TAKING UNDERWATER PICTURES. A NUMBER OF
FAVORABLE FEATURES WERE NOTED--WATERPROOFNESS,
BUOYANCY, WARMTH, AND A NUMBER OF UNFAVORABLE
FEATURES WERE TABULATED FOR USE IN MODIFICATION OF
THESE SUITS, SUCH AS POOR LOCATIONS OF THE FLUTTER
VALVE AND THE CHIN SEGMENT OF THE FACE OPENING. IT
WAS DIFFICULT TO GET INTO THE SUIT AND TOOK TOO LONG
A TIME, AND THE MATERIAL WAS SO LIMITED IN ELASTICITY
AS TO CAUSE DISCOMFORT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0M08

AD-663 886 6/7 6/17
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN

FIELD EVALUATION OF MODIFIED SUBMARINE RESCUE AND
ESCAPE SUITS. (U)

DESCRIPTIVE NOTE: MEMORANDUM REPT.,
FEB 56 12P SCHULTE, JOHN H. ;
REPT. NO. NSMC-MR-56-3
PROJ: NAVMED-NM-002-013.01.03

UNCLASSIFIED REPORT

DESCRIPTORS: (SUBMARINE ESCAPE, UNDERWATER CLOTHING),
SEA RESCUES, COTTON TEXTILES, MODELS(SIMULATIONS),
UNDERWEAR, RUBBER, MANEUVERABILITY (U)

THE STUDY EVALUATES MODELS OF THE TWO-PIECE
SUBMARINE RESCUE AND ESCAPE SUITS WHICH HAVE
INCORPORATED SEVEN ALTERATIONS RECOMMENDED ON THE
BASIS OF PREVIOUS FIELD TRIALS. FOR SUBMARINE
RESCUE AND ESCAPE, THE GARMENT CONSIDERED MORE
SATISFACTORY IS THE TWO-PIECE SUIT OF TWO-WAY STRETCH
MATERIAL DYE INTERNATIONAL ORANGE, FITTED WITH A
NECK GASKET, HEAD STRAPS AND TWO RELIEF VALVES, ONE
AT THE BACK OF THE HEAD AND ONE BETWEEN THE
SHOULDERS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-663 907 6/11 6/17 6/19
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE CREW
EQUIPMENT DEPT

PHYSIOLOGICAL EFFECTS OF DIFFERENT OXYGEN FLOW RATES
AND AMBIENT TEMPERATURES ON PRESSURE-SUITED SUBJECTS
PERFORMING WORK AT ALTITUDE. (U)

DESCRIPTIVE NOTE: PHASE REPT.,
DEC 67 13P SANTAMARIA, LOUIS J. ;
HARRIGAN, DAVID J. , JR. ; RADLIFF, MEREDITH H. ;

REPT. NO. NADC-AC-6708
TASK: A34-531-060/20

UNCLASSIFIED REPORT

DESCRIPTORS: (+PRESSURE SUITS, VENTILATION), (+HEAT
TOLERANCE, PRESSURE SUITS), OXYGEN, GAS FLOW, LIFE
SUPPORT, ASTRONAUTS, SPACE FLIGHT, MANNED SPACECRAFT,
EXERCISE (PHYSIOLOGY), BODY TEMPERATURE, PULSE RATE, BODY
WEIGHT, SIMULATION (U)

IN A SERIES OF TESTS CONDUCTED AT DIFFERENT AMBIENT
TEMPERATURES, THE PHYSIOLOGICAL EFFECTS OF VARIOUS
LEVELS OF FLOW RATE OF VENTILATING O₂ WERE
INVESTIGATED. PRESSURE-SUITED SUBJECTS UNDERWENT
MODERATE WORK STRESS ON A BICYCLE ERGOMETER IN AN
ALTITUDE CHAMBER MAINTAINED AT 5 PSIA. THE
TEMPERATURE AND RELATIVE HUMIDITY OF THE VENTILATING
O₂ WERE MAINTAINED CONSTANT AT 55F AND 90-95%,
RESPECTIVELY; THE DURATION OF THE RUNS WAS FIXED AT 2
HOURS. WITHIN THE LIMITS OF THE AMBIENT
TEMPERATURES AND VENTILATING FLOW RATES EMPLOYED IN
THIS STUDY, ONLY SLIGHT ADVANTAGES WERE GAINED BY
INCREASING FLOW RATE, AS OBSERVED IN TERMS OF THE
PHYSIOLOGICAL MEASUREMENTS MADE IN THIS STUDY.
(AUTHOR) (U)

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-664 122 6/17 11/5
THIOLKOL CHEMICAL CORP MARSHALL TEX LONGHORN DIV

SPECIAL SAFETY STUDY. TESTING 'NOMEX' MATERIAL AS
HEAT RESISTANT CLOTHING FOR INDUSTRIAL APPLICATION. (U)

JUL 67 44P
REPT. NO. LD-17-67
CONTRACT: DA-11-173-AMC-200(A)

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIRE RESISTANT TEXTILES, NYLON), (*FIRE
PROTECTIVE CLOTHING, PERFORMANCE(ENGINEERING), FIRE
SAFETY, INSTRUMENTATION, TEST METHODS, HEAT TRANSFER,
HEAT FLUX, HEAT TOLERANCE, THRESHOLDS(PHYSIOLOGY),
STATIC ELECTRICITY, CLEANING, COSTS (U)
IDENTIFIERS: NOMEX (U)

THE OBJECTIVE OF THIS SERIES OF TESTS WAS TO
DETERMINE THE BEST COMBINATION OF PROTECTIVE CLOTHING
(UTILIZING 'NOMEX' MATERIAL) THAT WOULD AFFORD
THE LINE WORKER OPTIMUM PROTECTION AGAINST INCIDENT
CONDITIONS. THE DATA WAS RECORDED AND DEVELOPED
FOR A PERIOD OF TIME UP TO FOURTEEN SECONDS. THE
FIRST THREE TO FIVE SECONDS, HOWEVER, ARE THE MOST
CRITICAL. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-665 042 15/5 6/17
ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK
MASS

MOISTURE TRANSFER THROUGH IMPERMEABLE FOAM
INSULATIONS.

(U)

APR 67 SP FONSECA, GEORGE F. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN TEXTILE RESEARCH
JOURNAL, V37 N12 P1072-4 1967.

DESCRIPTORS: (*PROTECTIVE CLOTHING, *EXPANDED PLASTICS),
THERMAL INSULATION, MOISTURE, PERMEABILITY, TEXTILES,
WIND, MATHEMATICAL ANALYSIS (U)

THE BIOPHYSICAL CHARACTERISTICS OF PERFORATED FOAM
SYSTEMS ARE PRESENTED IN TERMS OF EXPERIMENTALLY
DETERMINED VALUES OF INSULATION AND MOISTURE VAPOR
PERMEANCE (MVP). THE EFFECT OF WINDBREAK MOTION
ON THE MOISTURE VAPOR TRANSFER THROUGH SUCH SYSTEMS
IS DISCUSSED. A THEORETICAL COMPARISON AMONG
SYSTEMS IS GIVEN IN TERMS OF ENVIRONMENTAL RANGE
USING THE CONCEPT OF MOISTURE PERMEABILITY INDEX.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-665 388 4/17
ARMY NATICK LABS MASS CLOTHING AND ORGANIC MATERIALS
LAB

ADVANCES IN THE DEVELOPMENT OF HEAD PROTECTION FOR
AIRCRAFT CREWMEN. (U)

FEB 67 14P LASTNIK, ABRAHAM L. ;
REPT. NO. C/ED-45
PROJ: DA-1M6-43303-D547
MONITOR: USA-NLABS TR-67-53-CM

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELMETS, PERFORMANCE(ENGINEERING)),
(*FLIGHT CLOTHING, FLIGHT CREWS), NYLON, LAMINATES,
PROTECTION, CRASH INJURIES, EYE, POLYESTER PLASTICS, EAR
PROTECTORS, NOISE, ATTENUATION, IMPACT TESTS (U)

THE U.S. ARMY'S NEW NYLON FABRIC LAMINATE
FLIGHT HELMET PROVIDES INCREASED CRASH AND BALLISTIC
PROTECTION OVER THAT OF OTHER CURRENT U.S.
MILITARY FLIGHT HELMETS. A NEWLY DEVELOPED
RETENTION DEVICE, BASED ON AN ORTHOPEDIC SLING FOR
NECK TRACTION, ASSURES RETENTION OF THE HELMET. A
NEW VISOR OF POLYCARBONATE RESIN PROVIDES EYE
PROTECTION AGAINST IMPINGING FRAGMENTS. IT RESISTS
SHATTERING AND PENETRATION. RESEARCH STUDIES
REVEAL THE FEASIBILITY OF ATTENUATING LOW FREQUENCY
NOISE, AT THE EAR, WITH RELATIVELY SMALL VOLUME EAR
CUPS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-665 833 6/17 6/11
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX

FLAME PROTECTION AFFORDED MICE BY A NONCOMBUSTIBLE
GARMENT IN 100% OXYGEN ATMOSPHERES. (U)

DESCRIPTIVE NOTE: REPT. FOR 24 MAY-8 JUN 67,
SEP 67 23P HARGREAVES, JOHN J. IULVEDAL,
FRODE I
REPT. NO. SAM-TR-67-91
PROJ: AF-7930
TASK: 793002

UNCLASSIFIED REPORT

DESCRIPTORS: (FIRE PROTECTIVE CLOTHING, CLOSED
ECOLOGICAL SYSTEMS), FIRE SAFETY, FLAME PROPAGATION,
OXYGEN, FIRES, FLAMMABILITY, ASTRONAUTS, TEST METHODS,
SPACECRAFT CABINS, SIMULATION, PERFORMANCE(ENGINEERING),
AEROSPACE MEDICINE (U)

THIRTY-NINE MICE, WITH HAIR CLIPPED OR UNCLIPPED,
WERE CLOTHED IN A NONCOMBUSTIBLE GARMENT, BETA
CLOTH, AND SUBJECTED TO FLAME IGNITION IN 100%
OXYGEN ATMOSPHERES FROM 744 TO 190 MM. HG TOTAL
PRESSURE. THE EXPERIMENTAL RESULTS SHOWED THAT THE
NONCOMBUSTIBLE GARMENT AFFORDED PROTECTION FROM
COMBUSTION AND FLAME PROPAGATION ONLY IF THE ANIMAL'S
HAIR HAD BEEN PREVIOUSLY CLIPPED. FURTHER STUDIES
SHOULD BE CONDUCTED IN AN EFFORT TO ASSURE MAN'S
PROTECTION. (AUTHOR) (U)

UNCLASSIFIED

ADC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-666 226 6/17 13/8
MINE SAFETY APPLIANCES CO PITTSBURGH PA

ENGINEERING RESEARCH PROTOTYPE DISTRIBUTION SYSTEMS
FOR THERMALIBRIUM CLOTHING. (U)

DESCRIPTIVE NOTE: TECHNICAL REP7. (FINAL), 5 JUL 63-
26 APR 67,

OCT 67 45P AUSTIN, HARRY W. THESS, W.
C. THEODORE, MICHAEL I
CONTRACT: DA-19-129-AMC-118(N)
PROJ: DA-1C025601A032
MONITOR: USA-NLABS, C/OM TR-68-21-CM, 37

UNCLASSIFIED REPORT

DESCRIPTORS: (PROTECTIVE CLOTHING, MANUFACTURING),
QUALITY CONTROL, DESIGN, TEST METHODS, VENTILATION,
VALVES, TEXTILES, MATERIALS, MILITARY SUPPLIES,
PRODUCTION, SPECIFICATIONS (U)
IDENTIFIERS: THERMALIBRIUM CLOTHING (U)

THE RESULTS OF MATERIAL OPTIMIZATION, FABRICATION
TECHNIQUES AND THE FABRICATION OF PROTOTYPE AIR
DISTRIBUTION SYSTEMS FOR THERMALIBRIUM CLOTHING ARE
SUMMARIZED. THE ENGINEERING RESEARCH EFFORT WAS
ACCOMPLISHED IN TWO WORK PHASES. THE INITIAL PHASE
WAS DIRECTED TO THE TESTING OF MATERIALS. THE
DEVELOPMENT OF FABRICATION TECHNIQUES AND THE
FABRICATION OF TWO PROTOTYPE SYSTEMS FOR DESIGN
VERIFICATION TESTING. THE SECOND PHASE OF THE
PROGRAM INVOLVED THE MODIFICATION OF PATTERNS, AND
THE FABRICATION OF 34 AIR DISTRIBUTION SYSTEMS ON A
MODIFIED PRODUCTION BASIS. THE COUNTER-FLOW SYSTEM
OF DISTRIBUTION VENTILATING AND/OR CONDITIONED AIR
FOR PROTECTIVE CLOTHING CAN BE MANUFACTURED UNDER
STANDARD PRODUCTION METHODS, USING COMMERCIALY
AVAILABLE MATERIALS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-666 940 6/16 22/1
LITTLE (ARTHUR D) INC CAMBRIDGE MASS

TECHNIQUES AND MATERIALS FOR PASSIVE THERMAL CONTROL
OF RIGID AND FLEXIBLE EXTRAVEHICULAR SPACE
ENCLOSURES. (U)

DESCRIPTIVE NOTE: FINAL REPT. FEB 66-MAY 67.
DEC 67 113P RICHARDSON, DAVID L. I
CONTRACT: AF 33(615)-3533
PROJ: AF-7164
TASK: 716412
MONITOR: AMRL TR-67-128

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *EXTRAVEHICULAR
ACTIVITY), (*TEMPERATURE CONTROL, PRESSURE SUITS),
PERFORMANCE(HUMAN), PASSIVE SYSTEMS, THERMAL INSULATION,
COOLING, UNDERWEAR, HEAT TRANSFER, WORK FUNCTIONS,
VENTING, THERMAL ANALYSIS, MATHEMATICAL ANALYSIS,
CONTROL SYSTEMS (U)

THE RESULTS OF THE ANALYSIS INDICATE THAT WHEN AN
ASTRONAUT IN A FLEXIBLE ENCLOSURE (SOFT SPACE
SUIT) WORKS ON THE SURFACE OF A LARGE SPACECRAFT,
THE TEMPERATURES ON HIS EXTERNAL SURFACE ARE MARKEDLY
INCREASED OVER THOSE WHICH OCCUR WHEN HE IS NOT NEAR
THE SPACECRAFT. MOREOVER, PASSIVE THERMAL CONTROL
OF THE ASTRONAUT IS NOT POSSIBLE WHEN HE IS NEAR THE
SPACECRAFT. THE TECHNIQUES INVESTIGATED FOR
THERMALLY COUPLING AN ASTRONAUT WITH HIS THERMAL
CONTROL SYSTEM INCLUDE LIQUID COOLED UNDERGARMENTS,
GAS COOLING, AND HEAT TRANSFER TO THE COOLED WALLS OF
HIS ENCLOSURE. TECHNIQUES WERE INVESTIGATED FOR
INCREASING THE CONDUCTANCE THROUGH SOFT SPACE SUIT
INSULATIONS BY COMPRESSING THE INSULATION. THE
INSULATION OF A CYLINDRICAL SECTION OF A SPACE SUIT
ARM WAS MEASURED UNDER BOTH COMPRESSED CONDITIONS
(3.7 PSIA) AND UNCOMPRESSED CONDITIONS IN
SIMULATED NOON AND EARTH-UMBRA ORBIT-POSITIONS.
THE RANGE OF CONDUCTANCE INCREASED FROM 0.26 BTU/
SQ FT-HR DEGREE F UNCOMPRESSED TO 0.81 BTU/SQ
FT-HR DEGREE F COMPRESSED. MEASUREMENTS WERE
MADE IN SIMULATED NOON AND EARTH-UMBRA ORBIT
POSITIONS OF THE THERMAL HEAT DISSIPATING CAPABILITY
OF A LOUVER SYSTEM WHICH WAS DESIGNED FOR OPERATION
IN THE SUN. A 6-INCH SQUARE MODEL HAD A NET HEAT
FLOW FROM THE LOUVERS FOR THE FOUR ORBIT CONDITIONS
TESTED (OPEN AND CLOSED IN THE SUN AND IN THE
SHADE). THE LOUVER OPERATION CONTROLS MAINTAINED (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-667 718 6/17 11/5
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE CREW
EQUIPMENT DEPT

FLEET EVALUATION - COVERALLS, FLYING, SUMMER, FIRE
RESISTANT, POLYAMIDE, TYPE CS-FRP-1. (U)

DESCRIPTIVE NOTE: PHASE REPT.,
APR 68 18P DESIMONE, DAVID N. I
REPT. NO. NADC-AC-6809

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, ACCEPTABILITY), (*FIRE
RESISTANT TEXTILES, FLIGHT CLOTHING), LAUNDRY
OPERATIONS, WEAR RESISTANCE, COLORS, WEIGHT, NYLON,
MILITARY REQUIREMENTS, DESIGN, QUESTIONNAIRES (U)
IDENTIFIERS: SUMMER (U)

A FIELD EVALUATION WAS CONDUCTED IN ACCORDANCE WITH
REFERENCE (A) ON THE SUBJECT COVERALL TO OBTAIN
INFORMATION REGARDING THE ACCEPTABILITY OF FIRST
PRODUCTION LOTS. ONE THOUSAND QUESTIONNAIRES WERE
DISTRIBUTED TO THE FLEET AND 621 WERE RETURNED TO
THE AEROSPACE CREW EQUIPMENT DEPARTMENT
REPRESENTING A CROSS SECTION OF VARIOUS ACTIVITIES.
COVERALL DESIGN WAS FOUND ACCEPTABLE FOR FLEET
USE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-668 139 6/17 1/3
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS
LAB

AIRCREW COOLING STUDY.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,
JAN 68 180P JURGENS, P. 1
REPT. NO: APL-TG-945
CONTRACT: NOW-62-0604

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CREWS, COOLING), (*PROTECTIVE
CLOTHING, FLIGHT CREWS), NAVAL PERSONNEL, AIRCRAFT
EQUIPMENT, THERMAL INSULATION, AIR COOLED, LIQUID
COOLED, MOISTURE, TOLERANCES (PHYSIOLOGY), METABOLISM,
ENVIRONMENT, HEAT TRANSFER (U)

THE NAVAL AVIATOR CANNOT WEAR SEPARATE GARMENTS FOR
THE WIDE VARIETY OF THERMAL ENVIRONMENTS IN WHICH HE
MUST WORK. THE RESULTS OF A STUDY CONDUCTED TO
ASCERTAIN THE THERMAL CONTROL REQUIREMENTS OF THESE
AIRCREW MEN ARE PRESENTED. THE STUDY SET OUT TO
DEFINE THE HEAT AND MOISTURE REMOVAL REQUIREMENTS
DURING GROUND AND FLIGHT OPERATIONS, TO LEARN THE
EFFECTS OF VARIOUS CLOTHING COMBINATIONS, AND TO
LEARN THE EFFECTS OF FLIGHT CONDITIONS ON THERMAL
MOISTURE CONTROL. THE EFFECTS OF BOTH METABOLIC
ACTIVITY AND ENVIRONMENT ON BODY TEMPERATURE ARE
CONSIDERED, AND VARIOUS TECHNIQUES OF AIR AND LIQUID
COOLING IN A VARIETY OF GARMENTS ARE THEN REVIEWED IN
ORDER TO DETERMINE THE MOST EFFECTIVE WAYS OF KEEPING
BODY TEMPERATURES AT REASONABLE LEVELS. IMMEDIATE
USE OF FORCED-AIR COOLING SUITS, MORE PRECISE
DETERMINATION OF THE LIMITS OF 'TOLERABLE' WORKING
CONDITIONS, AND FURTHER IMPROVEMENTS IN THE DESIGN OF
LIQUID-COOLED GARMENTS ARE RECOMMENDED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-668 765 6/17 13/1
NORTHROP CORPORATE LABS HAWTHORNE CALIF

VARIABLE THERMAL CONDUCTIVITY HEAT TRANSFER RESEARCH
FOR PERSONAL PROTECTIVE ASSEMBLIES. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 66-31 AUG 67,
DEC 67 52P OLSON, ROBERT B. IFELDER,
JOHN W. ILOMBARD, CHARLES F. I
REPT. NO. NCL-67-36R
CONTRACT: AF 33(615)-5109
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-67-190

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, COOLING), HEAT
PRODUCTION(BIOLOGY), THERMAL CONDUCTIVITY, HEAT FLUX,
ISOCYANATE PLASTICS, EXPANDED PLASTICS, TEMPERATURE
CONTROL, POROUS METALS, EXTRAVEHICULAR ACTIVITY,
FEASIBILITY STUDIES, PERFORMANCE(ENGINEERING) (U)

IN THIS PROGRAM A FEASIBILITY STUDY WAS CONDUCTED
OF A CONDUCTIVE COOLING SYSTEM FOR COOLING A MAN IN
SPACE. IN THE CONCEPT STUDIED THE COOLING WAS
PROVIDED BY A POROUS PLATE SUBLIMATOR AND CONTROLLED
BY A VARIABLE THERMAL CONDUCTANCE LAYER. THE
RESULTS OF THE TESTS PERFORMED DEMONSTRATE THE NEED
FOR ADVANCES IN TECHNOLOGY AND FURTHER DEVELOPMENT
WORK TO MAKE THIS CONCEPT FEASIBLE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-668 809 6/17 6/7
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

PHYSIOLOGICAL EVALUATION OF THE BRITISH MARK VII
SUBMARINE ESCAPE IMMERSION SUIT DURING IMMERSION. (U)

MAR 68 28P HALL, DAVID A. INOBEL, JOEL
J. ISANTA MARIA, LOUIS J. I
REPT. NO. SMRL-514
PROJ: NAVMED-MF022.03.03-9027
TASK: MF022.03.03-9027.03

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING,
PERFORMANCE(ENGINEERING)), (*SUBMARINE ESCAPE,
UNDERWATER CLOTHING), SUBMARINE PERSONNEL,
SURVIVAL(PERSONNEL), COLD WEATHER TESTS,
EXPOSURE(PHYSIOLOGY), HANDS, FEET, MORTALITY RATES, TIME
STUDIES, CORRELATION TECHNIQUES, THEORY,
ELECTROCARDIOGRAPHY, PREDICTIONS, DAMAGE ASSESSMENT,
STRESS(PHYSIOLOGY), GREAT BRITAIN (U)
IDENTIFIERS: *SUBMARINE ESCAPE IMMERSION SUITS (U)

THIS STUDY DETERMINES THE GENERAL PERFORMANCE AND
SURVIVAL TIME AFFORDED BY THE BRITISH MARK VII
SUBMARINE ESCAPE IMMERSION SUIT (SEIS), IN
29 DEGREES F. WATER, 10 DEGREES F. AIR, AND 20
MPH WIND SPEED. IT WAS FOUND THAT THE BRITISH
SUIT DID NOT PROVIDE THE 24-HOUR ESTIMATED SURVIVAL
TIME AT THE SEVERE CONDITIONS LISTED ABOVE, AND THE
FOUR SUBJECTS WERE TAKEN FROM THE WATER AFTER AN
AVERAGE TIME OF 2.8 HOURS OF EXPOSURE. DAMAGE TO
THE HANDS AND FEET WOULD PROBABLY OCCUR BETWEEN 5.1
AND 9.1 HOURS. DEATH WOULD PROBABLY OCCUR AFTER
5.6 TO 24 HOURS OF EXPOSURE. TESTS WERE ALSO
CONDUCTED IN 90 DEGREES F. WATER AND 85 DEGREES
F., IN STILL AIR. THESE TESTS INDICATED THAT NO
MAJOR PROBLEM WILL BE ENCOUNTERED UNDER THESE
CONDITIONS. THE ENVIRONMENTAL CONDITIONS WERE THEN
CHANGED IN A STEP-WISE FASHION FROM 29 DEGREES F.
WATER, 10 DEGREES F. AIR, AND 20 MPH WIND, UNTIL
24-HOUR ESTIMATED SURVIVAL TIME WAS OBTAINED. AT
44 DEGREES F. WATER, 32 DEGREES F. AIR, AND 20
MPH WIND, 24-HOUR SURVIVAL MAY BE PREDICTED FOR
MOST MEN, BASED ON RESULTS IN THE LIMITED NUMBER OF
SUBJECTS USED IN THIS INVESTIGATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-640 840 6/11 6/17 6/7
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY
DIV

AEROSPACE LIFE SUPPORT SYSTEMS AND CREW PROTECTIVE
EQUIPMENT. (U)

APR 68 62P PYLE, D. I. ANDROVSKY, B. I
REPT. NO. ATD-68-6-22-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SURVEYS OF FOREIGN SCIENTIFIC AND
TECHNICAL LITERATURE.

DESCRIPTORS: (*LIFE SUPPORT, REVIEWS), (*FLIGHT
CLOTHING, REVIEWS), (*SEA RESCUE EQUIPMENT, REVIEWS),
CONFINED ENVIRONMENTS, PRESSURE SUITS, PERIODIC
VARIATIONS, SURVIVAL KITS, LIFE PRESERVERS, LIFE RAFTS,
PRESSURE SUITS, CLOSED ECOLOGICAL SYSTEMS, CONTROLLED
ATMOSPHERES, CHLORELLA, NUTRITION, SPACE BIOLOGY,
RADIATION EFFECTS, METABOLISM, MANNED SPACECRAFT,
ABSTRACTS, USSR (U)

THE FIRST PART OF THIS REPORT, DEALING WITH HIGH-
ALTITUDE CREW PROTECTION, IS BASED ALMOST ENTIRELY ON
A DETAILED REVIEW OF SELECTED PORTIONS OF A MONOGRAPH
BY S. P. UMANSKIY ENTITLED, PILOT AND
COSMONAUT EQUIPMENT. IT CONTAINS A SECTION ON
FLIGHT CLOTHING SUITABLE FOR VARIOUS SEASONS OF THE
YEAR, GLOVES AND FOOT GEAR, HELMET LINERS, VENTILATED
SUITS, ANTI-G SUITS, AND SURVIVAL EQUIPMENT (SEA
SURVIVAL GEAR, SURVIVAL SUITS, LIFE JACKETS, LIFE
RAFTS, AND AN EMERGENCY SURVIVAL PACK). IN
ADDITION, THE FIRST PART OF THIS REPORT CONTAINS A
BRIEF GLOSSARY OF ABBREVIATIONS USED IN SOVIET
AIRCRAFT EQUIPMENT DESIGNATIONS AND A BRIEF COMMENTARY
ON THE HANDBOOK ON ASTRONAUTICS BY N. YA.
KONDRAT'YEV AND V. A. ODINTSOV. THE SECOND
PART OF THIS REPORT CONTAINS 30 ABSTRACTS RELATED TO
SPACECRAFT LIFE-SUPPORT SYSTEMS. THEY DEAL LARGELY
WITH RECENT DEVELOPMENTS IN SOVIET CHLORELLA
RESEARCH WHICH ARE DIRECTLY APPLICABLE TO THE USE OF
CHLORELLA FOR REGENERATION OF SPACECRAFT CABIN AIR
AND TO THE POSSIBLE USE OF ALGAE AS A SOURCE OF FOOD
FOR COSMONAUTS ON EXTENDED SPACEFLIGHTS.
(AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-669 230 6/7 6/17
COAST GUARD BALTIMORE MD FIELD TESTING AND DEVELOPMENT
CENTER

EVALUATION OF ONE PIECE WET SUIT. (U)

DESCRIPTIVE NOTE: TEST REPT.,
MAY 68 44p CUTHRELL, C. BUZHARDT, R.
E. I
REPT. NO. 481
PROJ: CG-3986/01/01

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, BUOYANCY),
(*EXPOSURE SUITS, ACCEPTABILITY),
PERFORMANCE(ENGINEERING), FLIGHT CLOTHING, LIFE
PRESERVERS, SYNTHETIC RUBBER, EFFECTIVENESS,
SURVIVAL(PERSONNEL), FASTENINGS, PHOTOGRAPHS, TEST
METHODS (U)

THE REPORT COVERS THE EVALUATION OF THE FLOTATION
CAPABILITIES OF THE TWO-PIECE WET SUIT BEING USED AS
SURVIVAL EQUIPMENT BY COAST GUARD PERSONNEL, A
ONE-PIECE WET SUIT AND AN ANTI-EXPOSURE MILITARY
FLIGHT SUIT. IN ADDITION, THE WET SUITS AND THE
ANTI-EXPOSURE SUIT WERE EVALUATED WHILE WEARING
SUPPLEMENTAL FLOTATION, FOUND NECESSARY FOR SELF-
RIGHTING CAPABILITY. THE REPORT DESCRIBES THE
TESTS CONDUCTED AND RESULTS OBTAINED. THE REPORT
ALSO DESCRIBES ADDITIONAL TESTS CONDUCTED TO
DETERMINE IF A DOWNED PILOT COULD ZIP CLOSED THE ONE-
PIECE NEOPRENE WET SUIT IN THE WATER.
(AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-670 212 18/2 6/7 6/17 20/13
SANDERS NUCLEAR CORP NASHUA N H

FEASIBILITY STUDY AND CONCEPTUAL DESIGN FOR A
PERSONAL THERMAL CONDITIONING SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. AUG-DEC 67,
DEC 67 327P SULLIVAN, J. J. DISCOIN.

R. IWONG, A. I

CONTRACT: F41609-67-C-0096

PROJ: AF-6770

MONITOR: AMD TR-68-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, RADIOACTIVE
ISOTOPES), (*RADIOACTIVE ISOTOPES, HEAT TRANSFER),
(*SURVIVAL KITS, ARCTIC REGIONS), PILOTS, FEASIBILITY
STUDIES, EJECTION SEATS, TERRAIN, SEA RESCUES, RADIATION
TOLERANCE, HEAT, AIRCRAFT CABINS, THERMAL INSULATION,
REFRIGERATION SYSTEMS, COOLING, DESIGN (U)

AN AIRMAN FORCED TO EJECT OVER ARCTIC TERRAIN OR
COLD WATER IS FACED WITH A VERY BRIEF SURVIVAL PERIOD
AFTER LANDING. (APPROXIMATELY THREE MINUTES IN
28F WATER.) THIS PERIOD OF TIME IS INSUFFICIENT
TO INITIATE AND ACCOMPLISH A SUCCESSFUL RESCUE
MISSION. A STUDY HAS BEEN MADE TO DETERMINE THE
FEASIBILITY OF EXTENDING THE SURVIVAL PERIOD BY
WARMING THE AIRMAN WITH HEAT GENERATED BY A
RADIOISOTOPE. A CONCEPTUAL DESIGN HAS BEEN CREATED
CONSISTING OF A NETWORK OF WATER FILLED TUBES WORN
BENEATH AN INSULATED SUIT. WATER IN THE TUBES IS
HEATED BY A 500 WATT RADIOISOTOPE TO WARM THE PILOT
DURING A SURVIVAL SITUATION (28F WATER OR -65F
AIR), AND IS COOLED BY AN 825 WATT REFRIGERATOR TO
KEEP THE AIRMAN COMFORTABLE WHILE FLYING THE AIRCRAFT
WITH CABIN TEMPERATURES UP TO 120F. A THERMO-
ELECTRIC POWER GENERATOR SUPPLIES 12 WATTS OF POWER
FOR THE WATER PUMP. COMPARISON STUDIES OF SEVERAL
RADIOISOTOPES HAVE BEEN MADE. SYSTEM CALCULATIONS
AND COMPONENT CALCULATIONS SHOW THAT THE CONCEPT IS
FEASIBLE AND PRACTICABLE FOR EXTENDING THE SURVIVAL
PERIOD INDEFINITELY. THE SURVIVAL SYSTEM WEIGHT IS
ESTIMATED AT 80 POUNDS AND IS CONFIGURED TO FIT IN A
USAF STANDARD EJECTION SEAT KIT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-671 681 6/17
RHODE ISLAND UNIV KINGSTON

FLOW OF HEAT AND VAPOR THROUGH COMPOSITE PERM-
SELECTIVE MEMBRANES UNDER SIMULATED CONDITIONS. (U)

DESCRIPTIVE NOTE: FINAL REPT. JAN 67-JAN 68,
JAN 68 38P VOTTA, FERDINAND, JR;
CONTRACT: DAAG17-67-C-0061
PROJ: DA-1J025601A032
MONITOR: USA-NLABS, C/OM TR-68-44-CH, 45

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, *TEMPERATURE
CONTROL), HEAT TRANSFER, MASS TRANSFER, COMPOSITE
MATERIALS, EVAPORATION, SKIN (ANATOMY), MEMBRANES,
ENVIRONMENTAL TESTS, COOLING, SURFACE TEMPERATURE,
SIMULATION, VAPORIZATION, PERMEABILITY (U)

AN EXPERIMENTAL STUDY WAS MADE OF THE HEAT AND MASS
(WATER VAPOR) FLOW RATE THROUGH SEVERAL DIFFERENT
COMPOSITE CLOTHING SYSTEMS. COOLING OF A SIMULATED
SKIN SURFACE WAS OBTAINED THROUGH VAPORIZATION OF
WATER FROM A WET WICK IN THE CLOTHING SYSTEM.
TESTS WERE CONDUCTED AT BOTH REDUCED AND AT
ATMOSPHERIC PRESSURE. IN THE REDUCED PRESSURE
TESTS, COOLING RATES AS HIGH AS 182 BTU/(HR. X
SQ. FT.) WERE OBTAINED WITH A SIMULATED SKIN
TEMPERATURE OF 91F. EXCELLENT CONTROL OF THE
SIMULATED SKIN TEMPERATURE AT WIDELY VARYING HEAT
FLOW RATES WAS POSSIBLE. TEMPERATURE CONTROL WAS
OBTAINED BY CONTROLLING THE WICK VAPORIZATION
PRESSURE. BOTH FORCED AND NATURAL CONVECTION WERE
USED IN THE ATMOSPHERIC PRESSURE TESTS. FORCED
CONVECTION WAS OBTAINED BY BLOWING AIR FROM A LARGE
FAN ACROSS THE SURFACE OF THE CLOTHING SYSTEMS.
THE AIR VELOCITY WAS APPROXIMATELY 7 FT./SEC.
WHILE THE HEAT FLOW RATE DEPENDED SOMEWHAT UPON THE
TEMPERATURE AND THE HUMIDITY OF THE ROOM AIR, WHICH
WERE NOT CONTROLLED IN THESE TESTS, THE RESULTS
INDICATED THAT HIGH COOLING RATES WERE POSSIBLE.
FOR A SIMULATED SKIN TEMPERATURE OF 91F, COOLING
RATES AS HIGH AS 200 BTU/(HR. X SQ. FT.) FOR
FORCED CONVECTION AND 121 BTU/(HR. X SQ. FT.)
FOR NATURAL CONVECTION WERE OBTAINED, WITH ROOM
AIR. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-672 876 6/16 15/5
ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK
MASS

A METHOD OF RELATING PHYSIOLOGY AND MILITARY
PERFORMANCE: A STUDY OF SOME EFFECTS OF VAPOR BARRIER
CLOTHING IN A HOT CLIMATE. (U)

68 14P JOY, ROBERT J. T. ; GOLDMAN,
RALPH F. ;

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN MILITARY MEDICINE, V133 N6
P458-470 JUN 68.

DESCRIPTORS: (*PROTECTIVE CLOTHING, BIOLOGICAL WARFARE),
HEAT TOLERANCE, MILITARY PERSONNEL, MALES,
ACCLIMATIZATION, GROUP DYNAMICS, PHYSICAL FITNESS,
MILITARY REQUIREMENTS, PERFORMANCE(HUMAN), PROTECTIVE
MASKS, PHYSIOLOGY, UNDERWEAR, CANNULATION, WEATHER,
GEOGRAPHY (U)
IDENTIFIERS: RECTAL TEMPERATURE, SUMMER (U)

IT IS OUR INTENT TO SUGGEST AN EXPERIMENTAL DESIGN
WHICH WILL RELATE PHYSIOLOGICAL MEASUREMENTS TO
INDIVIDUAL AND UNIT PERFORMANCE DURING MILITARY
TASKS. IT MAY BE SUMMARIZED AS (A) THE SELECTION
OF PHYSIOLOGICAL VARIABLES WHICH CAN BE DEMONSTRATED
TO BE CLOSELY RELATED TO CLINICAL OR SUBCLINICAL
CASUALTY PRODUCTION AND, (B) TEMPORALLY RELATING
THESE TO THE OCCURRENCE OF INDIVIDUAL INEFFECTIVENESS
IN TERMS OF JOB, UNIT PROGRESS, UNIT MISSION, AND
ENVIRONMENTAL VARIABLES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-673 345 14/2 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

APPLICATION OF THE RANQUE-HILSCH VORTEX TUBE TO
AIRCREW COOLING PROBLEMS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. FEB-MAY 67,
JUN 68 19P VAN PATIEN, ROBERT E. ;
GAUDIO, RALPH , JR;
REPT. NO. AMRL-TR-67-124
PROJ: AF-7222

UNCLASSIFIED REPORT

DESCRIPTORS: (HILSCH TUBES, PROTECTIVE CLOTHING),
COOLING, FLIGHT CREWS, ACCEPTABILITY, BLOOD CHEMISTRY,
PULSE RATE, RESPIRATION, PERSPIRATION, HEAT TOLERANCE,
URINE, REVIEWS, HISTORY, OPERATION, MECHANICAL DRAWINGS,
RAILROADS, MINING ENGINEERING, USSR, THERMOSTATS (U)

THE RANQUE-HILSCH VORTEX TUBE, A DEVICE WITH NO
MOVING PARTS, PRODUCES SIGNIFICANT REFRIGERATION
EFFECT WHEN DRIVEN BY COMPRESSED AIR. THIS REPORT
DISSEMINATES UP-TO-DATE INFORMATION ON THE
PERFORMANCE OF CURRENT VORTEX TUBES, REPORTS THE
RESULTS OF AN AIRCREW COOLING EXPERIMENT USING THE
DEVICE, AND SUGGESTS OTHER USES OF POTENTIAL INTEREST
TO THE AIR FORCE. THE HISTORY OF THE VORTEX
TUBE AND ITS BASIC THEORY ARE PRESENTED BRIEFLY.
(AUTHOR)

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-674 184 6/17 5/5 5/9
ARMY AEROMEDICAL RESEARCH UNIT FORT RUCKER ALA

USFR EVALUATIONS OF TWO AIRCREW PROTECTIVE HELMETS: (U)

AUG 68 37P BYNUM, JAMES A. I
REPT. NO. USAARU-69-1
PROJ: DA-3AO-2560-1A819
TASK: 3AO-2560-1A819-036

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CREWS, PROTECTIVE CLOTHING),
(*HELMETS, PERFORMANCE(ENGINEERING)), HUMAN FACTORS
ENGINEERING, JET PLANE NOISE, ATTENUATION, EXPERIMENTAL
DESIGN, ANALYSIS OF VARIANCE, PROTECTION, DESIGN,
WEIGHT, ACCEPTABILITY, DECISION MAKING, VOICE
COMMUNICATIONS (U)
IDENTIFIERS: EVALUATION (U)

TWO AIRCREW PROTECTIVE HELMETS WERE EVALUATED BY 24
INSTRUCTOR PILOTS WHO WERE DIVIDED EQUALLY INTO
GROUPS SUBJECTED TO THREE AMBIENT NOISE ENVIRONMENTS.
PILOTS RATED THE ARMY APH-5 AND THE SPH-3X
(EXPERIMENTAL) ON EIGHT CATEGORIES DESIGNED TO
ASSESS RELATIVE COMFORT, ACCEPTABILITY, AND NOISE
ATTENUATION. RATINGS WERE COMPARED, USING A
SPLIT-PLOT FACTORIAL ANALYSIS OF VARIANCE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-676 885 6/14 20/1
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA

MANIKIN MEASUREMENTS OF THE NOISE ATTENUATION
PROVIDED BY FLIGHT HELMETS.

(U)

AUG 68 22P FORSTALL, JOHN R. I
REPT. NO. NAHI-1049
PROJ: MF-12.524.005-5020.1

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANTHROPOMETRY, NOISE),
MODELS(SIMULATIONS), EAR PROTECTORS, EAR, SOUND
TRANSMISSION, ACOUSTIC PROPERTIES, AIRCRAFT NOISE,
ATTENUATION

(U)

IDENTIFIERS: *FLIGHT CLOTHING, *HELMETS

(U)

MEASUREMENTS OF THE NOISE ATTENUATION PROVIDED BY
FIVE FLIGHT HELMETS WERE OBTAINED ON A MANIKIN HEAD
AND COMPARED WITH ATTENUATION MEASUREMENTS OBTAINED
ON HUMAN SUBJECTS ACCORDING TO THE USASI STANDARD
FOR EVALUATING REAL-EAR ATTENUATION AT
THRESHOLD. THE TWO SETS OF MEASUREMENTS WERE
SIMILAR. THE MANIKIN METHOD HAS CERTAIN ADVANTAGES
WHICH SHOULD BE CONSIDERED IN TERMS OF THE PARTICULAR
REQUIREMENTS OF AN EVALUATION PROGRAM: (1) A
HELMET CAN BE OPTIMALLY FITTED WITH LITTLE
EXPENDITURE OF TIME; (2) VARIABILITY INTRODUCED
BY HUMAN FACTORS IS KEPT AT A MINIMUM; (3) HIGH
LEVELS OF NOISE CAN BE USED AS THE TEST STIMULUS;
(4) VISUAL AND AUDITORY MONITORING OF THE
ATTENUATED NOISE PROVIDES THE EXPERIMENTER WITH A
PRECISE APPRAISAL OF THE FIT AS ADJUSTMENTS ARE MADE;
(5) MANIKIN MEASUREMENTS ARE PARTICULARLY USEFUL
IN REVEALING IMPROVEMENTS IN ATTENUATION RESULTING
FROM MINOR MODIFICATIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-677 118 6/17 11/4
ROHM AND HAAS CO WARREN R I RHEE DIV

DEVELOPMENT OF A LIGHTWEIGHT BUTYL-COATED STRETCH
FABRIC.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 6 OCT 66-6 APR 68.

APR 68 37P SHELLEY, JAMES P. I

CONTRACT: DAAG17-67-C-0009

PROJ: DA-1-J-025601-A-032

MONITOR: USA-NLABS, C/OM

TR-68-63-CM, 48

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMPOSITE MATERIALS, TEXTILES),
(*PROTECTIVE CLOTHING, COMPOSITE MATERIALS), NYLON,
BUTYL RUBBER, AGING(MATERIALS), IMPREGNATION, PROTECTIVE
TREATMENTS, THERMAL STABILITY, RUPTURE, TENSILE
PROPERTIES, DEFECTS(MATERIALS)

(U)

THE REPORT DISCUSSES THE DEVELOPMENT OF A TECHNIQUE
FOR THE APPLICATION OF MULTIPLE THIN LAYERS OF BUTYL
RUBBER ON A STRETCH NYLON SUBSTRATE. SEVERAL
VARIATIONS IN THE PROCESS DESIGNED TO MINIMIZE FABRIC
HANDLING WERE EXPLORED. (AUTHOR:)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-678 375 6/17 11/9 5/9
NAVAL SUBMARINE MEDICAL CENTER GROTON CONN SUBMARINE
MEDICAL RESEARCH LAB

THERMAL EVALUATION OF A POLYVINYLCHLORIDE EXPOSURE
SUIT (EMPRESS) AND COMPARISON WITH PRESENT SUBMARINE
DECK EXPOSURE SUIT. (U)

MAY 68 28P HALL, DAVID A. INOBEL, JOEL
J. I
REPT. NO. SHRL-527
MONITOR: NAVMED MFO22-03.03.9025-29

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXPOSURE SUITS, *POLYVINYL CHLORIDE),
SUBMARINE PERSONNEL, THERMAL INSULATION, EFFECTIVENESS,
ACCEPTABILITY, THERMAL PROPERTIES (U)
IDENTIFIERS: EVALUATION (U)

THE STUDY DETERMINED THE GENERAL PERFORMANCE AND
SURVIVAL TIMES AFFORDED BY THE 'EMPRESS'
POLYVINYLCHLORIDE EXPOSURE SUIT (PVES) AND THE
PRESENT SUBMARINE DECK EXPOSURE SUIT IN 44F WATER,
32F AIR, AND 20 MPH WIND SPEED. TESTS WERE
ALSO CONDUCTED UTILIZING THE PVES IN 44F WATER,
20F AIR, AND 20 MPH WIND, WITH: (A) MEN
STANDING ONE-HALF HOUR IN THE WATER (SIMULATING
BRIDGE WATCH); (B) MEN STANDING ONE HOUR, OUT
OF THE WATER, IN 20F AIR, 20 MPH WIND
(SIMULATING CONNING TOWER WATCH); MEN DRY,
MOVING ABOUT THE HABITAT. IT WAS FOUND THAT THE
PVES DID PROVIDE REASONABLE SURVIVAL TIME AT THE
EXTREME ENVIRONMENTAL CONDITION (44F WATER, 32F
AIR, 20 MPH WIND) IN ALL SUBJECTS, AND THAT THE
FOUR SUBJECTS WERE TAKEN FROM THE WATER AFTER AN
AVERAGE TIME OF 1.8 HOURS OF EXPOSURE. IT WAS
ESTIMATED THAT DAMAGE TO THE HANDS AND FEET WOULD
PROBABLY OCCUR BETWEEN 3.4 AND 8.2 HOURS AND DEATH
WOULD PROBABLY OCCUR BETWEEN 5.4 AND 16.1 HOURS OF
EXPOSURE. WEARING THE SDOS, THE FOUR SUBJECTS
WERE TAKEN FROM THE WATER AFTER AN AVERAGE TIME OF
1.1 HOURS OF EXPOSURE. IT WAS ESTIMATED THAT
DAMAGE TO THE HANDS AND FEET WOULD PROBABLY OCCUR
BETWEEN 2.0 AND 4.4 HOURS, WHILE DEATH WOULD REQUIRE
4.0 TO 7.8 HOURS OF EXPOSURE. TESTS CONDUCTED ON
THE PVES SIMULATING BRIDGE AND CONNING TOWER
WATCH CONDITIONS AND ALSO DURING THE DRY EXPERIMENTS
INDICATED THAT NO DISCOMFORT WOULD BE ENCOUNTERED
DURING THE NORMAL WATCH-STANDING TIME INTERVAL.
(AUTHOR)

81

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/ZOM08

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-680 165 20/1 6/17
ARMY NATICK LABS MASS PIONEERING RESEARCH LAB

RESEARCH ON ACOUSTICAL PROBLEMS OF THE MILITARY: A
REVIEW AND FUTURE ASPECT. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 68 40P TANENHOLTZ, STANLEY D. ;
PROJ: DA-1-T-0621068121
TASK: 1-T-062106812102
MONITOR: USA-NLABS TR-69-44-PR

UNCLASSIFIED REPORT

DESCRIPTORS: (*ACOUSTICS, PATHOLOGY), (*PROTECTIVE
COVERINGS, ARMY RESEARCH), BLAST, VIBRATION, COMBAT
NOISE, SHOCK(MECHANICS), PHYSIOLOGY, HUMAN FACTORS
ENGINEERING, ATTENUATION, EAR PROTECTORS, HELMETS,
PROTECTIVE CLOTHING, STATE-OF-THE-ART REVIEWS,
MATERIALS, STANDARDS (U)
IDENTIFIERS: ACOUSTIC RADIATION, GRAPHS(CHARTS) (U)

A REVIEW HAS BEEN MADE OF THE LITERATURE IN THE
AREA OF ACOUSTICS, VIBRATION, SHOCK, AND BLAST
PHENOMENA RELATED TO EFFECTS ON THE PHYSIOLOGICAL
SYSTEM AND ATTENUATION EFFECTS OF MATERIALS AND
DEVICES. IN ADDITION, INFORMATION FROM SOURCES
OTHER THAN THE LITERATURE PERTINENT TO AN EVALUATION
OF THE SIGNIFICANCE OF ACOUSTIC HAZARDS IN THE
MILITARY ENVIRONMENT, IS ALSO PRESENTED. DAMAGE-
RISK AND STANDARDS CRITERIA ARE PRESENTED, AND
FURTHER STUDIES ARE SUGGESTED TO ADVANCE THE STATE-
OF-THE-ART IN ACOUSTIC HAZARDS PROTECTION AS WELL AS
TO EXPLOIT THE POTENTIALS OF ACOUSTIC PHENOMENA FOR
THE INVESTIGATION OF MATERIAL PROPERTIES.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-680 825 4/17 5/5
APPLIED PSYCHOLOGICAL SERVICES INC WAYNE PA SCIENCE
CENTER

A PORTABLE TEST BATTERY FOR COMPARATIVELY EVALUATING
OPERATOR PERFORMANCE IN FULL-PRESSURE SUIT
ASSEMBLIES. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 67-MAR 68,
OCT 68 86P SIEGEL, ARTHUR I. ILANTERMAN,
RICHARD S. I
CONTRACT: F33615-67-C-1755
PROJ: AF-7184
TASK: 718402
MONITOR: AMRL TR-68-74

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE SUITS, PERFORMANCE(HUMAN)), TEST
METHODS, TEST EQUIPMENT, HUMAN FACTORS ENGINEERING, JET
FIGHTERS, LUNAR CRAFT, MOBILITY, PORTABLE EQUIPMENT,
TRACKING, PULSE RATE, ANTHROPOMETRY (U)
IDENTIFIERS: DEXTERITY, EVALUATION, F-111 AIRCRAFT,
LUNAR EXCURSION MODULES (U)

RECOMMENDATIONS FOR A PORTABLE BATTERY OF TESTS TO
ASSESS HUMAN MOBILITY IN FULL-PRESSURE SUITS ARE
PRESENTED. THE LITERATURE WAS REVIEWED TO
DETERMINE THE TYPES OF INSTRUMENTS AND TESTS EMPLOYED
BY PRIOR INVESTIGATORS. TASK ANALYSES WERE
PERFORMED ON THREE ADVANCED VEHICLES TO DETERMINE THE
BODY MEMBER-MOVEMENT FAMILIES MOST FREQUENTLY
INVOLVED. A SET OF TESTS AND MEASUREMENTS IS
SUGGESTED FOR THOSE MEMBER-MOVEMENT FAMILIES FOUND TO
BE MOST FREQUENTLY INVOLVED IN ADVANCED FLIGHT.
NECESSARY FUTURE STEPS FOR REALIZING THE PORTABLE
BATTERY ARE SUGGESTED. THE TEST BATTERY
RECOMMENDED INCLUDES THE PURDUE PEG BOARD FOR
FINGER DEXTERITY, A SPECIALLY DESIGNED APPARATUS FOR
THE STRENGTH OF VARIOUS BODY MOVEMENTS, A SINGLE
DIMENSION TRACKING TASK FOR VARIOUS COORDINATION
TESTS, A LEIGHTON FLEXOMETER, AND DIRECT
MEASUREMENT DEVICES FOR RANGE OF MOVEMENT AND STATIC
ANTHROPOLOGY MEASUREMENTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-680 826 6/11 22/1 6/17
HAMILTON STANDARD WINDSOR LOCKS CONN

ENGINEERING DESIGN STUDY OF A SPACE SUIT WITH AN
INTEGRATED ENVIRONMENTAL CONTROL SYSTEM. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUL 67-30 JUN 68,
OCT 68 167P HOWARD, DOUGLAS C. ;
CONTRACT: F33615-67-C-1946
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-68-122

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE SUITS, •LIFE SUPPORT),
CONTROLLED ATMOSPHERES, FEASIBILITY STUDIES, HELMETS,
OXYGEN EQUIPMENT, PRESSURE, DECONTAMINATION, HUMIDITY,
THERMAL INSULATION, EXTRAVEHICULAR ACTIVITY, POWER
SUPPLIES, SAFETY, MANEUVERABILITY, DISPLAY SYSTEMS,
CONTROL SYSTEMS, OPERATION (U)
IDENTIFIERS: SELF MANEUVERING UNITS, •SPACE SUITS (U)

CONTINUED SUCCESS IN COPING WITH THE SPACE
ENVIRONMENT HAS LED TO INCREASED CREWMAN CONFIDENCE
IN HIS ABILITY TO PERFORM USEFUL WORK DURING
EXTRATERRESTRIAL MISSIONS. FUTURE MISSIONS WILL
REQUIRE ADVANCED SUIT/LIFE-SUPPORT-SYSTEM CONCEPTS.
SUCH A CONCEPT MIGHT LOGICALLY TAKE THE FORM OF A
SPACE SUIT FOR EXTRAVEHICULAR ACTIVITY WITH AN
INTEGRATED ENVIRONMENTAL CONTROL SYSTEM. A DESIGN
STUDY OF THIS CONCEPT HAS BEEN PERFORMED AND DRAWINGS
PREPARED IN SUFFICIENT DETAIL TO PERMIT FABRICATION
OF A WORKING MODEL IN A SUITABLY EQUIPPED MODEL SHOP.
INTEGRATION OF THE ENVIRONMENTAL CONTROL SYSTEM
WITHIN THE HARD TORSO OF THE SUIT ASSEMBLY RESULTED
IN A SYSTEM HAVING A PACKAGING DENSITY APPROACHING 80
PERCENT AND ABLE TO PASS THROUGH A 27 INCH DIAMETER
HATCH. THE SYSTEM WILL SUPPORT A CREWMAN WORKING
AT 375 KCAL/HOUR FOR AN INDEFINITE TIME TO A
RECHARGE IN SPACE CAPABILITY. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-681 457 5/5 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

CLEARANCE AND PERFORMANCE VALUES FOR THE BARE-
HANDED AND THE PRESSURE-GLOVED OPERATOR.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 68 164P GARRETT, JOHN W. I
REPT. NO. AMRL-TR-68-24
PROJ: AF-7184
TASK: 718408

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, HUMAN FACTORS
ENGINEERING), (*GLOVES, PERFORMANCE(HUMAN)),
OPERATORS(PERSONNEL), ANTHROPOMETRY,
STRENGTH(PHYSIOLOGY), PERFORMANCE(HUMAN), DESIGN,
EFFECTIVENESS, AEROSPACE CRAFT, STATISTICAL PROCESSES,
HANDS, TABLES(DATA) (U)
IDENTIFIERS: CLEARANCE, DIMENSIONS (U)

THE REPORT SUMMARIZES HAND AND ARM DIMENSIONAL,
CLEARANCE, AND STRENGTH DATA OF 27 ADULT MALES
WEARING THE A/P225-2 FULL-PRESSURE SUIT.
THIRTY-SIX MEASURES WERE OBTAINED UNDER EACH OF
THREE CONDITIONS: BARE-HANDED; GLOVED AND
UNPRESSURIZED; AND GLOVED AND PRESSURIZED. THE
DATA ARE BOTH SUMMARIZED FOR ALL SUBJECTS AND
REPORTED INDEPENDENTLY BY GLOVE SIZE WORN. USES OF
THE DATA ARE SUGGESTED AND SPECIFIC DESIGN VALUES
RECOMMENDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-682 156 6/11 6/17
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE OUTFITTING OF THE PILOT AND THE COSMONAUT, (U)

JAN 67 162P UMANSKI, S. P. I
REPT. NO. FTD-MT-23-1314-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MONO.
SNARYAZHENIE LETCHIKA I KOSMONAVTA, MOSCOW, 1967 P1-
192.

DESCRIPTORS: (*PROTECTIVE CLOTHING, *ASTRONAUTS),
(*OXYGEN EQUIPMENT, ASTRONAUTS), (*PILOTS, *FLIGHT
CLOTHING), PRESSURE SUITS, HELMETS, LIFE SUPPORT,
VENTILATION, SURVIVAL KITS, BREATHING APPARATUS, HIGH
ALTITUDE, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE BOOK PROVIDES THE NECESSARY INFORMATION ON
PROTECTIVE FACILITIES (PROTECTIVE CLOTHING, G-
SUITS, HELMETS, OXYGEN SYSTEMS, AND SPACE SUITS)
AND OTHER EQUIPMENT THAT IS BEING OR WILL BE EMPLOYED
ON FLIGHTS INTO THE STRATOSPHERE AND OUTER SPACE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-682 715 6/17
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

MICROCLIMATE-CONTROLLED (THERMALIBRIUM) PROTECTIVE
CLOTHING SYSTEM FOR MILITARY APPLICATIONS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 68 29P SPANO, LEO A. I
REPT. NO: C/PSEL-60
PROJ: DA-1-J-062110-A-533
MONITOR: USA-NLABS TR-68-58-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, DESIGN), MILITARY
REQUIREMENTS, THERMAL RADIATION, ENVIRONMENT,
EXPOSURE(PHYSIOLOGY), CHEMICAL WARFARE AGENTS, TOXICITY,
BIOLOGICAL WARFARE AGENTS, TANKS(COMBAT VEHICLES), ARMY
AIRCRAFT, PROTECTIVE MASKS, FALLOUT, HEAT, COLD WEATHER
TESTS, HAZARDS (U)
IDENTIFIERS: THERMALIBRIUM CLOTHING (U)

THERMALIBRIUM CLOTHING IS A SYSTEM OF HEAT-
REGULATED PROTECTIVE ENSEMBLES DESIGNED TO PROTECT
TROOPS EXPOSED TO EXTREME AND/OR TOXIC ENVIRONMENTS.
THE DESIGN AND FUNCTIONAL CHARACTERISTICS OF THE
VARIOUS COMPONENTS COMPRISING THERMALIBRIUM SYSTEMS
ARE DESCRIBED. TYPICAL FUNCTIONAL SYSTEMS FOR USE
IN U. S. ARMY AIRCRAFT AND TRACKED VEHICLES
(TANKS); AND IN CHEMICAL AND BIOLOGICAL
CONTAMINATED ENVIRONMENTS ARE DISCUSSED.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-682 730 15/2 6/11 8/9
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

PROTECTIVE CLOTHING AND LIFE SUPPORT EQUIPMENT FOR
EXPLOSIVE ORDNANCE DISPOSAL PERSONNEL. (U)

DESCRIPTIVE NOTE: FINAL REPT., NOV 63-NOV 68;
NOV 68 24P IACONO, VINCENT D. , JR;
REPT. NO. C/PLSEL-58
PROJ: DA-1-J-062110-A-533
MONITOR: USA-NLABS TR-69-48-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*BOMBS, DISPOSAL), (*CHEMICAL WARFARE
AGENTS, TECHNICIANS), (*BIOLOGICAL WARFARE AGENTS,
*PROTECTIVE CLOTHING), ARMY PERSONNEL, FEASIBILITY
STUDIES, LIFE SUPPORT, THERMAL INSULATION, HELMETS,
SHOES, PROTECTIVE MASK FILTERS, GLOVES, BREATHING
APPARATUS, VOICE COMMUNICATIONS, DESIGN, HUMAN FACTORS
ENGINEERING, PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: EOD(EXPLOSIVE ORDNANCE DISPOSAL),
EVALUATION, EXPLOSIVE ORDNANCE DISPOSAL (U)

THE DESIGN AND ENGINEERING OF A SPECIAL PROTECTIVE
ENSEMBLE FOR PERSONNEL WHO ARE REQUIRED TO DISPOSE OF
TOXIC MUNITIONS ARE DISCUSSED. THE VARIOUS
COMPONENTS COMPRISING THE OVERALL SYSTEM AND THEIR
SPECIFIC PROTECTIVE REQUIREMENTS ARE DESCRIBED.
PERFORMANCE CHARACTERISTICS OF FUNCTIONAL SYSTEMS
BUILT TO DATE ARE DISCUSSED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-684 479

6/17

NAVAL MEDICAL RESEARCH INST BETHESDA MD

PHYSIOLOGICAL EVALUATION OF A FREE-FLOODING DIVER
HEAT REPLACEMENT GARMENT.

(U)

DESCRIPTIVE NOTE: MEDICAL RESEARCH INTERIM REPT.,

FEB 69

18P

BONDI, KENNETH R. ITAUBER,

JOHN F. I

MONITOR: NAVMED

MF12.524.014-1004-17

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIVING, *PROTECTIVE CLOTHING), UNDERWATER
CLOTHING, BODY TEMPERATURE, HEAT TRANSFER,
RESPONSE(BIOLOGY), DESIGN, TEMPERATURE, WATER

(U)

THE GENERAL CAPABILITIES OF A FREE-FLOODING HEAT
REPLACEMENT GARMENT IN MAINTAINING THERMAL COMFORT IN
40F WATER, AT BOTH SURFACE AND DEEP DIVING
CONDITIONS, ARE CONSIDERED. SUIT INLET AND OUTLET
TEMPERATURE, FLOW RATE, SKIN AND RECTAL TEMPERATURES,
AND DIVERS' SUBJECTIVE COMFORT LEVEL WERE RECORDED.
SUIT INLET TEMPERATURES WHICH PRODUCE A SUBJECTIVE
RESPONSE OF THERMAL COMFORT BY THE DIVER (COMFORT
ZONE INLET TEMPERATURE) AT VARIOUS FLOW RATES
ARE PRESENTED FOR SURFACE CONDITIONS AND THROUGH USE
OF A HEAT BALANCE EQUATION, FOR DEPTH CONDITIONS.
WHILE THE SUIT IS CONSIDERED INEFFICIENT BECAUSE OF
ITS HIGH POWER REQUIREMENTS, ESPECIALLY AT DEPTH, ITS
WEARABILITY AND MODE OF HEAT TRANSFER MAKE IT AN
EXCELLENT HEAT REPLACEMENT GARMENT. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-684 582 6/17
KANSAS STATE UNIV MANHATTAN DEPT OF INDUSTRIAL
ENGINEERING

A COOLING HOOD IN HOT-HUMID ENVIRONMENTS. (U)

DESCRIPTIVE NOTE: SPECIAL REPT.,
JAN 69 39P KONZ,STEPHAN A. INENTWICH,
H. FRITZ ;
REPT. NO: THEMIS-SR-81
CONTRACT: F44620-68-C-0020
PROJ: AF-7921
TASK: 792108
MONITOR: AFOSR 69-0574TR

UNCLASSIFIED REPORT

DESCRIPTORS: (•COOLING, HUMANS), (•PROTECTIVE CLOTHING,
COOLING), BODY TEMPERATURE, SKIN(ANATOMY), HEAT
TOLERANCE, CONDUCTION(HEAT TRANSFER), LIQUID COOLED,
STRESS(PHYSIOLOGY), SWEAT GLANDS, HUMIDITY,
ENVIRONMENT (U)

THIS PAPER DESCRIBES COOLING MAN WITH CONDUCTION;
SPECIFICALLY, COOL WATER IN TUBES OF A HOOD ON THE
HEAD. THE RESULTS CAN BE SUMMARIZED AS FOLLOWS:
HEAD TEMPERATURE WAS KPPT CONSIDERABLY LOWER AND
SKIN AND RECTAL TEMPERATURES WERE KEPT LOWER; CARDIAC
COST WAS REDUCED; SWEATING WAS AT APPROXIMATELY 40%
OF THE RATE WITHOUT THE HOOD, AND PERMITTED EXPOSURE
TIME TO HEAT STRESS WAS LONGER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-695 720 6/17
AFROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

PRINCIPLES OF THE BOYLE'S LAW EMERGENCY PRESSURE
SUIT AND THEIR APPLICATION. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
DEC 68 31P SCHUELLER, OTTO ;
REPT. NO. AMRL-TR-67-234
PROJ: AF-7164
TASK: 716411

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE SUITS, DESIGN); OXYGEN;
PERMEABILITY, FIRE SAFETY, GASES, HAZARDS, PROTECTION,
RESPIRATION, DESIGN, GAS CYLINDERS, HIGH ALTITUDE (U)

AN URGENT REQUIREMENT EXISTS FOR A SIMPLE, RELIABLE
EMERGENCY PRESSURE SUIT, PERMEABLE TO AIR AND
COMFORTABLE WHILE UNPRESSURIZED, THE CONDITION IN
WHICH THE PRESSURE SUIT IS WORN MOST OF THE TIME.
THE BOYLE'S LAW SUIT MEETS THESE ESSENTIAL
REQUIREMENTS. IT USES THE EXPANSION OF GAS SEALED
IN MULTIPLE TUBES FOR PRODUCING MECHANICAL
COUNTERPRESSURE ON THE SKIN. OXYGEN IS USED IN THE
MASK OR HELMET ONLY FOR BREATHING, THUS REDUCING
VULNERABILITY AND FIRE HAZARD TO A MINIMUM. THIS
REPORT ANALYZES THE PHYSICAL AND TECHNICAL PRINCIPLES
OF THE BOYLE'S LAW SUIT AND THEIR PRACTICAL
APPLICATION TOWARD IMPROVING DESIGN OF THE TUBE
SYSTEM, MINIMIZING BULK, TUBE CHARGING PROCEDURES,
AND SIZING AND ADJUSTMENT POSSIBILITIES. FINALLY,
RECOMMENDATIONS FOR REDESIGNING THE OXYGEN REGULATOR
TO MINIMIZE BREATHING EFFORT ARE GIVEN. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-686 1167 6/2 9/6 6/19
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

DESCRIPTION AND OPERATING INSTRUCTIONS FOR A 7-
CHANNEL TELEMETRY SYSTEM FOR PHYSIOLOGICAL
TEMPERATURES AND THE ELECTROCARDIOGRAM. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JAN-1 JUL 66,
OCT 68 24p RATINO, DAVID A. IMARKO,
ADOLPH R. KAUFMAN, WILLIAM C. I
REPT. NO. AMRL-TR-68-140
PROJ: AF-7222
TASK: 722206

UNCLASSIFIED REPORT

DESCRIPTORS: (*TELEMETER SYSTEMS, PRESSURE SUITS),
MULTIPLEXING, PULSE DURATION MODULATION, TELEMETERING
DATA, BODY TEMPERATURE, ELECTROCARDIOGRAPHY, THERMAL
INSULATION, ACCEPTABILITY, AEROSPACE MEDICINE,
INSTRUCTION MANUALS (U)
IDENTIFIERS: *BIOTELEMETRY (U)

PREVIOUS TELEMETRY DESIGNS WERE IMPROVED TO PRODUCE
A SYSTEM SPECIFIC TO THE PHYSIOLOGICAL EVALUATION OF
THE THERMAL ADEQUACY OF SPACE SUITS. A SMALL
SEVEN-CHANNEL PULSE DURATION MULTIPLEXED TELEMETRY
SYSTEM WHICH TRANSMITS AN ELECTROCARDIOGRAM, RECTAL
TEMPERATURE WITH AN ACCURACY BETTER THAN + OR -
0.05C, AND FIVE SKIN TEMPERATURES WITH AN ACCURACY
BETTER THAN + OR - 0.2C WAS CONSTRUCTED. THE
ENTIRE UNIT IS ENCLOSED IN A 13 BY 10 BY 5 CM BOX
WORN UNDER THE SPACE SUIT. COMPONENTS THAT HAVE
BECOME AVAILABLE SINCE CONSTRUCTION COULD REDUCE THIS
SIZE TO ONE-FIFTH WITHOUT SACRIFICING PERFORMANCE.
THREE MERCURY BATTERIES (12 V) POWER THE
EQUIPMENT FOR 40 HOURS AND PROVIDE RELIABLE RECEPTION
AT DISTANCES OF 90 M. THE SYSTEM IS ACTIVATED BY
CONNECTING THE SENSOR HARNESS, AND THE OUTPUT IS
CHECKED AND CALIBRATED BY A 3-POSITION SWITCH. THE
UNIT HAS BEEN TESTED DURING EXERCISE STUDIES IN SPACE
SUITS AND DURING METABOLIC EXPERIMENTS ON MEN
EXERCISING IN COLD ENVIRONMENTS. IT PROVIDED
RELIABLE TRANSMISSION OF ACCURATE TEMPERATURE AND
HEART RATE DATA FOR BOTH LABORATORY AND FIELD
STUDIES. IT HAS SIMPLIFIED EXPERIMENTAL PROCEDURES
BY ELIMINATING ALL COMPLICATIONS OF HARD WIRE LEADS
PENETRATING PRESSURE SHELLS IN SPACE SUITS AND BY
COMPLETELY FREEING THE SUBJECT IN FIELD STUDIES.
(AUTHOR)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-687 149 6/17 6/5 22/1
IIT RESEARCH INST CHICAGO ILL

SURVEY OF THERMAL CONTROL TECHNIQUES FOR
EXTRAVEHICULAR SPACE SUITS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAR 66-1 MAR 68,
DEC 68 28P HEDGE, JACK C. ;
REPT. NO: IITRI-J6028-1
CONTRACT: AF 33(615)-3468
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-68-87

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *THERMAL INSULATION),
(*EXTRAVEHICULAR ACTIVITY, PRESSURE SUITS), THERMAL
PROPERTIES, THERMAL STABILITY, ASTRONAUTS, PROTECTIVE
CLOTHING, SPACE ENVIRONMENTS, HEAT, TEMPERATURE, SOLAR
RADIATION, ALBEDO, SPACECRAFT, ORBITS, THERMAL
CONDUCTIVITY, SURFACE PROPERTIES, MOBILITY, GLOVES,
TOUCH, DESIGN, METABOLISM, BODY TEMPERATURE, BODY
FLUIDS, HEAT PRODUCTION(BIOLOGY)

(U)

THERMAL PROTECTION OF THE EXTRAVEHICULAR ASTRONAUT
WAS STUDIED WITH PARTICULAR ATTENTION TO THE
RELATIONSHIP BETWEEN THERMAL PROTECTION AND MOBILITY.
THE SPACE THERMAL ENVIRONMENT WAS REVIEWED WITH
RESPECT TO THE SOURCES AND MAGNITUDES OF HEAT ENERGY
DELIVERED TO THE ASTRONAUT. THE ASTRONAUT'S
THERMAL PHYSIOLOGY WAS INVESTIGATED. THE BASIC
THERMAL PROCESSES AVAILABLE FOR CONTROLLING THE SPACE
SUIT TEMPERATURE WERE CONSIDERED AND THE STATE-OF-
THE-ART OF ACTIVE AND PASSIVE THERMAL CONTROL SYSTEMS
WAS REVIEWED. THE STUDY CONCLUDES THAT A PASSIVE
SYSTEM ALONE CANNOT PROVIDE ADEQUATE EXTRAVEHICULAR
THERMAL PROTECTION. RECOMMENDATIONS ARE MADE FOR
INVESTIGATING HYBRID THERMAL CONTROL SYSTEMS AND FOR
STUDYING MEANS TO IMPROVE THE THERMAL PROTECTION OF
GLOVES WITH ADEQUATE TACTILITY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-687 436 6/17 6/11
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

AN AUTOMATIC ANALOG BREATHING SYSTEM FOR MULTICELL
PRESSURE SUITS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAR 69 21P SCHUELLER, OTTO ;
REPT. NO. AMRL-TR-67-235
PROJ: AF-7164
TASK: 716411

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *BREATHING APPARATUS),
(*OXYGEN EQUIPMENT, DESIGN), HUMAN FACTORS ENGINEERING,
DECOMPRESSION, AEROSPACE CRAFT, HIGH ALTITUDE,
SUPERSONIC AIRCRAFT, SIMULATION, EFFECTIVENESS, LIFE
SUPPORT, AUTOMATIC, CONTROL SYSTEMS (U)

THE DESIGN CRITERIA FOR AN OXYGEN REGULATOR FOR
MULTICELL PRESSURE SUITS, SUCH AS THE BOYLE'S LAW
SUIT, ARE ANALYZED. ON THE LATEST MODELS OF THE
BOYLE'S LAW SUIT THE CONVENTIONAL BREATHING
BLADDER IN THE THORAX AREA WAS OMITTED TO REDUCE
VULNERABILITY AND FIRE HAZARD. THE VOLUME CHANGES
OF THE BODY DURING BREATHING ARE COMPENSATED BY
EQUIVALENT VOLUME CHANGES OF THE GAS IN THE CLOSED
CELLS OF THE SUIT. IF A CONVENTIONAL OXYGEN
REGULATOR IS USED, THE WEARER MUST WORK TO COMPRESS
THE GAS IN THE CLOSED CELLS. AN OXYGEN REGULATOR
IS PROPOSED THAT USES THE ENERGY STORED IN COMPRESSED
OXYGEN TO DO THE NECESSARY COMPRESSION WORK ON THE
GAS IN THE CLOSED CELLS OF THE SUIT, AND TO RELIEVE
THE WEARER FROM FATIGUING BREATHING EFFORT. A
PRESSURE SENSOR IN THE CHEST AREA OR THE SLIGHT
PRESSURE FLUCTUATIONS DURING BREATHING CAN BE USED TO
PRODUCE SIMULTANEOUS BREATHING PRESSURE CHANGES
EQUIVALENT OR APPROXIMATE TO THE GAS PRESSURE CHANGES
IN THE CLOSED CELLS OR TUBES OF THE SUIT. THIS
TYPE OF REGULATOR ALSO PERMITS CONSIDERABLE REDUCTION
OF THE CELL VOLUME AND BULK OF THE SUIT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-698 057 6/17
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D
C

WORK CLOTHES.

(U)

MAY 69 9P VOSKRESENSKAYA, N. I
REPT. NO. FSTC-HT-23-787-68
PROJ: FSTC-92236282301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF NAUCHNO-TEKHNICKESKIE
OBSHCHESTVA SSSR. VIO N6 P33-34 1968.

DESCRIPTORS: (*PROTECTIVE CLOTHING, ENVIRONMENTAL
TESTS), SPECIFICATIONS, INDUSTRIES, TEXTILES, INDUSTRIAL
PLANTS, COLD WEATHER TESTS, CLIMATE,
MODELS(SIMULATIONS), LABOR, DESIGN, ACCEPTABILITY, US(U)
IDENTIFIERS: TRANSLATIONS (U)

A POPULAR OUTLINE OF WORK DONE BY THE ALL-UNION
SCIENTIFIC RESEARCH INSTITUTE OF THE SEWING
INDUSTRY. THIS INSTITUTE PERFORMS COMPREHENSIVE
TESTING AND FIELD EVALUATION OF ALL TYPES OF WORK
CLOTHING, INCLUDING PHYSIOLOGICAL TESTS IN TEST
CHAMBERS TO DETERMINE THE SUITABILITY OF WORK
CLOTHING FOR THE TYPE OF WORK BEING DONE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-670 89U 6/19 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

PHYSIOLOGICAL EVALUATION OF EFFECTS ON PERSONNEL
WEARING THE MICROWAVE PROTECTIVE SUIT AND
OVERGARMENT. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.:
JUL 69 32P REINS, D. A. WEISS, R. A.
:

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, *HEAT TOLERANCE),
(*MICROWAVES, PROTECTIVE CLOTHING), BODY TEMPERATURE,
VISUAL ACUITY, RESPIRATION, PERSPIRATION, SOLAR
RADIATION, SURVIVAL(PERSONNEL), OSCILLOGRAPHS,
CONTROLLED ATMOSPHERES (U)

A SILVERIZED NYLON, OPEN-WEAVE MICROWAVE PROTECTIVE
SUIT AND COTTON TWILL OVERGARMENT, TO BE WORN OVER
CONVENTIONAL NAVY WORK CLOTHING, WAS DEVELOPED TO
PROTECT PERSONNEL WORKING IN THE HIGH-DENSITY RADIO
FREQUENCY FIELDS OF THE LARGER AND MORE POWERFUL
RADAR SCANNING SYSTEMS ANTICIPATED ABOARD NAVAL
VESSELS AND AT SHORE INSTALLATIONS. SINCE TOTAL
BODY HEAT ABSORPTION PER UNIT TIME IS A CRITICAL
FACTOR FOR THE SURVIVAL OF PERSONNEL EXPOSED TO A
MICROWAVE FIELD, A PHYSIOLOGICAL EVALUATION OF THE
PROTECTIVE CLOTHING SYSTEM WAS PERFORMED TO DETERMINE
IF THE CLOTHING ITSELF WAS RESPONSIBLE FOR ANY
ADDITIONAL THERMAL STRESS IN A WARM ENVIRONMENT.
FOR A SERIES OF TWO-HOUR PERIODS, TWO MALE SUBJECTS
WEARING THIS CLOTHING IN A CLIMATIC CHAMBER WERE
EXPOSED TO A TEMPERATURE OF 85 DEGREES F, A
RELATIVE HUMIDITY OF 45 PERCENT, A WIND VELOCITY OF
11.5 MPH AND A SOLAR RADIATION OF 1.6 GM-CAL/SQ M/
MIN. THE PROTECTIVE CLOTHING SYSTEM DID NOT PLACE
ANY SIGNIFICANT PHYSIOLOGICAL HEAT STRESS ON
PERSONNEL IN THE WARM ENVIRONMENT AS COMPARED TO THE
WEARING OF CONVENTIONAL NAVAL WORK CLOTHING ALONE.
VISUAL ACUITY WAS DECREASED SLIGHTLY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-691 144 11/5 6/17
LITTON SYSTEMS INC MINNEAPOLIS MINN APPLIED SCIENCE
DIV

INVESTIGATIONS OF HEAT AND MASS (WATER VAPOR AND
LIQUID) MOVEMENT THROUGH CLOTHING SYSTEMS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 25 JUN 65-24 JUN 66,
SEP 68 269P LARSEN, R. E. IRUST, L. W.
;KYDD, A. R. ;GAUVIN, G. A. ;
CONTRACT: DA-19-129-AMC-683(N)
PROJ: DA-1-K-012501-A-032
MONITOR: USA-NLABS, C/OM TR-69-31-CH, 56

UNCLASSIFIED REPORT

DESCRIPTORS: (•PROTECTIVE CLOTHING, TRANSPORT
PROPERTIES), DESIGN, WATER VAPOR, WATER, TEMPERATURE,
MODELS(SIMULATIONS), EVAPORATION, THERMOCOUPLES,
TEXTILES, VENTILATION, MEASUREMENT, MATHEMATICAL
ANALYSIS, FLOW CHARTING, ENVIRONMENTAL TESTS, HEAT
TRANSFER, MASS TRANSFER (U)
IDENTIFIERS: COMPUTER ANALYSIS (U)

THE REPORT DISCUSSES RESEARCH OF THE INVESTIGATIONS
OF HEAT AND MASS (WATER VAPOR AND LIQUID)
MOVEMENT THROUGH CLOTHING SYSTEMS AND SUMMARIZES THE
RESULTS OF A THEORETICAL AND EXPERIMENTAL RESEARCH
PROGRAM. EXPERIMENTAL STUDIES INCLUDED
MEASUREMENTS OF PROFILES OF MEAN AND FLUCTUATING
VELOCITY, TEMPERATURE, AND WATER VAPOR CONCENTRATION
FOR VARIOUS FABRIC SPACINGS AND VENTILATING
VELOCITIES. TRANSFER COEFFICIENT DATA OBTAINED
FROM THESE PROFILES WERE COMPARED WITH TOTAL WATER
AND HEAT LOSS RATES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-691 461 6/17 22/1
IIT RESEARCH INST CHICAGO ILL

METEOROID THREAT TO EXTRAVEHICULAR SPACE SUIT
ASSEMBLIES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAR 66-1 MAR 67,
JUN 69 22P ZIMMERMAN, FRANK J. ;
CONTRACT: AF 33(615)-3468
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-68-86

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXTRAVEHICULAR ACTIVITY, PRESSURE SUITS),
(*PROJECTILES, HAZARDS), (*PRESSURE SUITS,
VULNERABILITY), PARTICLES, SPACE CREWS, PROTECTIVE
CLOTHING, IMPACT PREDICTION, IMPACT SHOCK, SHOCK
RESISTANCE, PENETRATION, DAMAGE, AEROSPACE MEDICINE,
PROBABILITY, UNCERTAINTY, TEXTILES, EXPERIMENTAL DESIGN,
SPACE ENVIRONMENTS (U)
IDENTIFIERS: FLUX DENSITY, *METEORIDS (U)

THIS REPORT UTILIZES MOST RECENT METEOROID FLUX
DATA AND ILLUSTRATES THE METHOD USED IN CALCULATING
THE PROBABILITY OF METEOROID PUNCTURE FOR A SPACE-
SUITED CREWMAN IN EARTH ORBIT. AN EXAMPLE OF THE
METHOD IS SHOWN AND UNCERTAINTIES IN THE PREDICTION
ARE REVIEWED. FINALLY, GUIDELINES ARE PRESENTED
THAT COULD BE FOLLOWED IN PLANNING AN EXPERIMENTAL
PROGRAM OF PENETRATION STUDIES ON SPACE SUIT
MATERIALS INTENDED TO RESOLVE SOME OF THESE AREAS OF
UNCERTAINTY. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-692 423 6/11 6/17
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

DIVER EQUIPMENT TESTS PERFORMED DURING THE JOINT U.
S. NAVY/DUKE UNIVERSITY 1000 FOOT SATURATION
DIVE. (U)

DESCRIPTIVE NOTE: FINAL REPT.:
APR 69 33P HARTER, JOHN V. I
REPT. NO. NEDU-RR-2-69

UNCLASSIFIED REPORT
PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE. SEE
INTRODUCTION TO THIS JOURNAL.

DESCRIPTORS: (*UNDERWATER CLOTHING, *BREATHING
APPARATUS), (*DIVING, LIFE SUPPORT), PERFORMANCE(HUMAN),
THERMAL INSULATION, TEST METHODS, RESPIRATION, DESIGN(U)

A SERIES OF DIVING EQUIPMENT TESTS WERE PERFORMED
AT DEPTHS OF 1000 AND 850 FEET DURING THE JOINT
DUKE UNIVERSITY/NAVY 1000 FEET SATURATION DIVE
AT DURHAM, NORTH CAROLINA. DESCRIPTION OF
TESTS PERFORMED AND RESULTS THEREOF ARE PRESENTED FOR
DOCUMENTATION PURPOSES. RECOMMENDATIONS FOR
MODIFICATIONS AND FURTHER TESTING ARE PRESENTED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-694 013 6/17 13/10
NAVAL MEDICAL RESEARCH INST BETHESDA MD

THEORETICAL THERMAL REQUIREMENTS FOR THE MARK II
DIVING SYSTEM. (U)

DESCRIPTIVE NOTE: MEDICAL RESEARCH INTERIM REPT.,
AUG 69 46P TAUBER, JOHN F. IRAWLINS;
JOHN S. P. BOND, KENNETH R. I
PROJ: M4306.20-60108
MONITOR: NAVMED M4306.02-60108-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, THERMAL ANALYSIS),
(*DIVING, DEEP SUBMERGENCE), HEAT TRANSFER, THERMAL
STABILITY, HUMAN FACTORS ENGINEERING, CONFIGURATION,
METABOLISM, UNDERWATER VEHICLES, PRESSURE, TEMPERATURE,
ENVIRONMENT, MATHEMATICAL PREDICTION, CORRELATION
TECHNIQUES, EXPERIMENTAL DATA (U)
IDENTIFIERS: MARK-2 DEEP DIVE SYSTEMS, PERSONNEL
TRANSFER CAPSULES (U)

THEORETICAL HEATING REQUIREMENTS FOR THE
MAINTENANCE OF THERMAL BALANCE IN A DIVER AT DEPTH
AND THE PERSONNEL TRANSFER CAPSULE OF THE MARK 2
DEEP DIVE SYSTEM ARE CONSIDERED. THE EFFECTS OF
RADIATION, CONDUCTION, FORCED AND NATURAL CONVECTION,
METABOLIC HEAT GENERATION AND RESPIRATORY HEAT LOSS
ARE CONSIDERED AND HEAT REPLACEMENT REQUIREMENTS FOR
VARIOUS CONFIGURATIONS OF DIVER GARMENTS ARE
PRESENTED AS FUNCTIONS OF AMBIENT PRESSURE,
TEMPERATURE AND PTC OPERATING CONDITIONS.
THERMAL REQUIREMENTS FOR HEATING THE PTC ITSELF
ARE ALSO CONSIDERED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-594 023 6/17 13/10
NAVAL MEDICAL RESEARCH INST BETHESDA MD

EVALUATION OF THE NSRDL HEATER PUMP PERFORMANCE
CHARACTERIZATICS AND RELIABILITY.

(U)

DESCRIPTIVE NOTE: MEDICAL RESEARCH INTERIM REPT.,
AUG 69 22P JACKSON, DAVID L. ; TAUBER,
JOHN F. ; RAWLINS, JOHN S. P. ;
PROJ: M4306.02-60108
MONITOR: NAVMED M4306.02-60108-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, HEATING ELEMENTS),
(*PUMPS, PERFORMANCE(ENGINEERING)), TEST FACILITIES,
HUMAN FACTORS ENGINEERING, BODY TEMPERATURE, DEEP
SUBMERGENCE, SIMULATION, TEST METHODS, FLUID FLOW (U)
IDENTIFIERS: DIVING EQUIPMENT, EVALUATION, PERSONNEL
TRANSFER CAPSULES (U)

EXPERIMENTS TO EVALUATE THE PERFORMANCE OF THE
NSRDL HEATER PUMP WERE PERFORMED IN A COLD TANK.
ONE TO THREE DIVERS WERE EMPLOYED, EACH WEARING A
3/16-INCH FOAM NEOPRENE WET SUIT OVER A WELSON
TUBING SUIT. THE SYSTEM WAS OBSERVED DURING OVER
10 HOURS OF TESTING. THE DIVERS WERE MAINTAINED IN
THESE CONDITIONS AT VARYING FLOW RATES AND SUIT INLET
TEMPERATURES. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AC-694 130 6/17 6/11 13/1
KANSAS STATE UNIV MANHATTAN INST FOR ENVIRONMENTAL
RESEARCH

PROCEEDINGS OF THE SYMPOSIUM ON INDIVIDUAL COOLING,
MARCH 17-18, 1969. (U)

JUL 69 285P NEVINS, RALPH G. ;
CONTRACT: F44620-68-C-0020
PROJ: AF-7921
TASK: 792108
MONITOR: AFOSR 69-2197TR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON PROJECT THEMIS.

DESCRIPTORS: (*PROTECTIVE CLOTHING, ENVIRONMENT),
(*COOLING, *SYMPOSIA), PHYSIOLOGY, COOLING + VENTILATING
EQUIPMENT, EXTRAVEHICULAR ACTIVITY, LIFE SUPPORT, BODY
TEMPERATURE, NUCLEAR POWER PLANTS, HEAT TRANSFER, FLIGHT
CLOTHING, TEMPERATURE CONTROL, CONTROL SYSTEMS, PRESSURE
SUITS (U)
IDENTIFIERS: THEMIS PROJECT (U)

THE REPORT CONTAINS TWELVE PAPERS PRESENTED AT A
SYMPOSIUM ON INDIVIDUAL COOLING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-697 022 6/14 5/5
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERS AFB
OHIO

ANTHROPOMETRIC DIMENSIONS OF AIR FORCE PRESSURE-
SUITED PERSONNEL FOR WORKSPACE AND DESIGN
CRITERIA.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 69 259P ALEXANDER, MILTON ; GARRETT,
JOHN W. ; FLANNERY, MICHAEL P. ;
REPT. NO. AMRL-TR-69-6
PROJ: AF-7184
TASK: 718408

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ERRATA SHEET INSERTED.

DESCRIPTORS: (*ANTHROPOMETRY, MILITARY PERSONNEL),
(*PRESSURE SUITS, MILITARY PERSONNEL), DESIGN, SPACE
FLIGHT, EFFICIENCY

(U)

THE RESULTS OF AN ANTHROPOMETRIC SURVEY OF USAF
PERSONNEL WEARING THE A/P22S-2 FULL
PRESSURE SUIT FITTED IN ACCORDANCE WITH THE USAF
EIGHT-SIZE, HEIGHT-WEIGHT SIZING PROGRAM
ARE PRESENTED. ONE HUNDRED AND THIRTY-EIGHT
MEASURES WERE TAKEN ON EACH OF THIRTY-FOUR SUBJECTS
STANDING, SITTING AND SUPINE, WITH THE SUIT IN THE
UNINFLATED, INFLATED, AND INFLATED-RESTRAINED
CONDITIONS. FORTY CIRCUMFERENCES WERE MEASURED ON
A SEPARATE SAMPLE OF THIRTY-TWO SUBJECTS STANDING AND
SITTING, WITH THE SUIT UNINFLATED AND INFLATED.
PICTORIAL AND VERBAL DESCRIPTIONS OF THE DIMENSIONS
AND DETAILED NUMERICAL RESULTS, INCLUDING CLEARANCE
RANGES, ARE PRESENTED. GRAPHS COMPARING VARIOUS
DIMENSIONS ACROSS SUIT SIZES ARE PRESENTED IN THE
APPENDIX. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-697 455 6/17
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

ZOOM BAG SCENARIO. (U)

69 4P GARRETT, JOHN W. ;ALEXANDER,
MILTON ;
REPT. NO. AMRL-TR-69-127
PROJ: AF-7184
TASK: 718408

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN INTERCEPTOR, P20-21 OCT/
NOV 69.

DESCRIPTORS: (*PRESSURE SUITS, DESIGN), TESTS, PILOTS,
COCKPITS, COMPATIBILITY, SURVIVAL KITS (U)
IDENTIFIERS: A/P 225-6 PRESSURE SUITS, A/P 225-2
PRESSURE SUITS, F-106 AIRCRAFT (U)

THE ESTABLISHMENT OF AN INFORMAL RAPPORT BETWEEN
THE AEROSPACE MEDICAL RESEARCH LABORATORY-
HA AT WRIGHT-PATTERSON AIR FORCE BASE AND
THE 4756TH PTF AT TYNDALL AIR FORCE BASE
LED TO THE COMPLETION OF TWO ENGINEERING ANTHROPOLOGY
RESEARCH PROJECTS AND THE COMMENCEMENT OF A THIRD.
A MAJOR ADVANTAGE OF THIS FIELD RESEARCH WAS THE
USE OF PILOTS AND PRESSURE SUIT EXPERIENCED PERSONNEL
AS SUBJECTS. ILLUSTRATIONS OF AN A/P225-6
FULL PRESSURE SUITED PILOT IN A F-106 COCKPIT ARE
INCLUDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-699 170 6/11 15/5
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

AD HOC COMMITTEE REPORT.

(U)

DESCRIPTIVE NOTE: RESEARCH REPT. 7-25 JAN 68,
68 73P MURDOCH, RICHARD A. BEAGLES,
JOHN A. ELKINS, JAMES H. FORAN, MICHAEL J.
JENKINS, WALLACE T. I
REPT. NO. NEDU-RR-3-68

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, MILITARY
REQUIREMENTS), (*DIVING, *LIFE SUPPORT), LOGISTICS,
HELMETS, BREATHING APPARATUS, GAS FLOW, COMMUNICATION
SYSTEMS, LOGISTICS, DECOMPRESSION SICKNESS (U)

THE OBJECT OF THE STUDY WAS TO SURVEY THE FIELD OF
DIVING EQUIPMENTS, CATALOGUE DEFICIENCIES OF EXISTING
EQUIPMENTS, ENUMERATE EQUIPMENTS NOT NOW AVAILABLE
WHICH SHOULD BE DEVELOPED AND TO RECOMMEND SHORT AND
LONG RANGE DEVELOPMENT PROGRAMS. A SUMMARY OF COST
BY EQUIPMENT IS INCLUDED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-700 914 6/17
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE CREW
EQUIPMENT DEPT

DESCRIPTION AND EVALUATION OF A PORTABLE DRY-ICE
WATER-CONDITIONED SUIT SYSTEM FOR
AIRCREW MEMBERS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
NOV 69 22P ESPOSITO, JOHN J. ;
REPT. NO. NADC-AC-6906
PROJ: A34-531/202/70F12-424-402

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, COOLING), HEAT TRANSFER,
DESIGN, CARBON DIOXIDE, HEAT TOLERANCE, EFFECTIVENESS,
PORTABLE EQUIPMENT (U)
IDENTIFIERS: DRY ICE (U)

A PORTABLE WATER-CONDITIONED SUIT SYSTEM, EMPLOYING
A DRY-ICE COOLER DESIGNED AND CONSTRUCTED AT THE
NAVAL AIR DEVELOPMENT CENTER AND A
COMMERCIALY AVAILABLE WATER-COOLED VEST, WAS
EVALUATED BY EXPOSING TWO SITTING-RESTING SUBJECTS AT
SEA LEVEL PRESSURE TO ENVIRONMENTS OF 105F AND
115F. TESTS WERE CONDUCTED WITH AND WITHOUT THE
COOLING SYSTEM. SUBLIMATION OF APPROXIMATELY
FIFTEEN POUNDS OF DRY-ICE KEPT THE SUBJECTS
RELATIVELY FREE FROM EVIDENCES OF HEAT STRESS FOR
PERIODS OF FOUR HOURS AT 115F. BASED ON A
COMPARISON WITH A WET-ICE SYSTEM, THE DRY-ICE
PORTABLE COOLER, POSSESSING SIGNIFICANT ADVANTAGES IN
TERMS OF SIZE AND WEIGHT, PRODUCED EQUIVALENT COOLING
OF THE SUBJECTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-701 864 5/5 6/17 16/4.2 15/5
QUARTERMASTER RESEARCH AND ENGINEERING CENTER NATICK
MASS

HUMAN FACTORS STUDY OF QMC CLOTHING AND EQUIPMENT
DURING COLD WEATHER TESTS OF THE SERGEANT MISSILE
SYSTEM. II. (U)

DESCRIPTIVE NOTE: ENGINEERING PSYCHOLOGY RESEARCH STUDY
REPT.,

JUN 62 14P MCGINNIS, JOHN M. ;
ZIMMERER, THEODORE ;
REPT. NO. GREC-EPR-2
PROJ: DA-7-X-9501001

UNCLASSIFIED REPORT

DESCRIPTORS: (*SURFACE TO SURFACE MISSILES, ARMY
EQUIPMENT), (*EXPOSURE SUITS, COMPATIBILITY), HUMAN
FACTORS ENGINEERING, COLD WEATHER TESTS, ARCTIC REGIONS,
ARMY OPERATIONS, LAUNCHING SITES, GROUND SUPPORT
EQUIPMENT, CLOTHING (U)

A PREVIOUS STUDY WAS BASED ON COLD WEATHER TESTS OF
THE SERGEANT MISSILE SYSTEM WHICH WERE HELD AT
THE EGLIN AFB CLIMATIC LABORATORY DURING THE
SUMMER OF 1959. THE OBSERVATIONS DESCRIBED IN THE
PRESENT REPORT WERE MADE IN THE SAME LABORATORY IN
1962. BOTH STUDIES ARE PART OF A CONTINUING EFFORT
BY THE QUARTERMASTER CORPS TO INSURE
COMPATIBILITY BETWEEN THE QM-EQUIPPED SOLDIER AND
ARMY MILITARY SYSTEMS WHICH HE WILL BE REQUIRED TO
OPERATE. THE GENERAL PURPOSE OF THESE STUDIES IS TO
DETECT PROBLEMS ASSOCIATED WITH QMC CLOTHING IN THE
OPERATION OF ARMY EQUIPMENT SYSTEMS, AND TO REPORT
THESE PROBLEMS TO THE RESPONSIBLE DESIGN AND
DEVELOPMENT GROUPS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-701 872 5/5 6/17 16/4.2 15/5
QUARTERMASTER RESEARCH AND ENGINEERING CENTER NATICK
MASS

HUMAN FACTORS STUDY OF GMC CLOTHING AND EQUIPMENT
DURING COLD WEATHER TESTS OF THE PERSHING MISSILE
SYSTEM. (U)

DESCRIPTIVE NOTE: ENGINEERING PSYCHOLOGY RESEARCH STUDY
REPT.:

APR 62 16P MCGINNIS, JOHN M. ;
ZIMMERER, THEODORE ;
REPT. NO. QREC-EPR-1
PROJ: DA-7-X-9501001

UNCLASSIFIED REPORT

DESCRIPTORS: (*SURFACE TO SURFACE MISSILES, ARMY
EQUIPMENT), (*EXPOSURE SUITS, COMPATIBILITY), HUMAN
FACTORS ENGINEERING, COLD WEATHER TESTS, ARCTIC REGIONS,
ARMY OPERATIONS, LAUNCHING SITES, GROUND SUPPORT
EQUIPMENT, GLOVES, HEATERS (U)
IDENTIFIERS: PERSHING (U)

THE PRIMARY PURPOSE OF THE PSYCHOLOGY LABORATORY
PARTICIPATION IN THE TEST WAS TO DETECT HUMAN FACTORS
PROBLEMS ASSOCIATED WITH QUARTERMASTER CORPS
STANDARD CLOTHING AND EQUIPMENT IN THE OPERATION OF
THE PERSHING MISSILE SYSTEM AND TO REPORT THESE
PROBLEMS TO THE RESPONSIBLE DESIGN AND DEVELOPMENT
GROUPS. SECONDARY GOALS WERE TO MAKE PRELIMINARY
STUDIES CONCERNING THE NEW EXPERIMENTAL INTEGRATED
CLOTHING SYSTEM, AND THE FEASIBILITY OF USING
ELECTRICALLY HEATED HANDWEAR FOR PERFORMING CRITICAL
TASKS DURING OPERATION OF THE PERSHING EQUIPMENT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-701 874 15/5
QUARTERMASTER RESEARCH AND ENGINEERING CENTER NATICK
MASS

SLEEPING PROTECTION FOR WARM AND COOL ENVIRONMENTS;
THE EFFECT OF UTILIZING AN ATTACHABLE PONCHO
LINER. (U)

DESCRIPTIVE NOTE: RESEARCH STUDY REPT.,
OCT 60 10P BYRON, ROBERT F. ;
REPT. NO. QREC-FPB-2
PROJ: DA-7-X-9030001

UNCLASSIFIED REPORT
PORTIONS OF THIS DOCUMENT ARE NOT FULLY LEGIBLE.

DESCRIPTORS: (CLOTHING, ARMY EQUIPMENT), PROTECTIVE
CLOTHING, SLEEPING BAGS, ENVIRONMENTAL TESTS,
COMPATIBILITY, ARMY OPERATIONS (U)

FOUR COMBINATIONS OF ITEMS FOR PROVIDING
ENVIRONMENTAL PROTECTION TO THE SLEEPING MAN UNDER
COOL ENVIRONMENTAL CONDITIONS AND THREE COMBINATIONS
IN A WARM ENVIRONMENT WERE EVALUATED IN TERMS OF THE
SLEEPING PROTECTION PROVIDED BY EACH COMBINATION.
OF PARTICULAR INTEREST IN THE STUDY WAS THE
PERFORMANCE OF A QUARTERMASTER EXPERIMENTAL
ATTACHABLE PONCHO LINER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-712 124 6/17
NORTHROP CORPORATE LABS HAWTHORNE CALIF

INVESTIGATION OF VIBRATION AND IMPACT PROTECTION OF
THE HUMAN HEAD AND NECK. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 66-15 NOV 67,
DEC 69 88P MATTINGLY, T. E. IFELDER, J.
W. LOMBARD, C. F. I
REPT. NO. NCL-67-70R
CONTRACT: AF 33(615)-5119
PROJ: AF-7231
TASK: 723101
MONITOR: AMRL TR-69-112

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELMETS, FLIGHT CLOTHING),
(*HEAD(ANATOMY), PROTECTION), AEROSPACE CRAFT, IMPACT
SHOCK, VIBRATION, ACCELERATION, LANDING IMPACT,
ABANDONMENT, PARACHUTE DESCENTS, BREATHING MASKS, SAFETY
BELTS, SHELLS(STRUCTURAL FORMS), MATERIALS, VENTILATION,
PRESSURIZATION, VOICE COMMUNICATIONS (U)

A SUMMARY OF THE INVESTIGATION LEADING TO THE
FABRICATION OF A PROTOTYPE MODEL OF A HEAD AND NECK
PROTECTIVE SYSTEM FOR AIRCREW MEMBERS IS PRESENTED.
THE SYSTEM PROVIDES IMPACT, VIBRATION AND
ENVIRONMENTAL PROTECTION FOR THE WEARER FROM 0 TO
OVER 82,000 FEET ALTITUDE. THE SYSTEM CONSISTS OF A
HELMET AND A PNEUMATICALLY OPERATED NECK RESTRAINT
DEVICE WHICH IS USED TO STIFFEN THE COUPLING BETWEEN
THE HELMET AND THE WEARER'S TORSO DURING VIBRATION
AND ACCELERATION ENVIRONMENTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-702 245 6/17 19/4 13/1
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

DEVELOPMENT OF A PERSONAL COOLING SYSTEM FOR
EXPLOSIVE ORDNANCE DISPOSAL PERSONNEL. (U)

DESCRIPTIVE NOTE: FINAL REPT. NOV 68-SEP 69,
DEC 69 19P CRAIN, BERRY, JR.; IACONO,
VINCENT D. ;

REPT. NO. C/PLSEL-69
PROJ: DA-1-J-664713-D-547
MONITOR: USA-NLABS TR-70-37-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, COOLING), (*COOLING
+ VENTILATING EQUIPMENT, BODY ARMOR), (*FRAGMENTATION
AMMUNITION, DISPOSAL), (*UNDERWEAR, DESIGN), BATTERY
COMPONENTS, ELECTRIC BATTERIES, BLOWERS, PROTECTIVE
CLOTHING, WEIGHT, COSTS, TEST METHODS (U)

IDENTIFIERS: ORDNANCE DISPOSAL PERSONNEL, EXPLOSIVE
ORDNANCE DISPOSAL PERSONNEL, EXPLOSIVE ORDNANCE
DISPOSAL (U)

THE DEVELOPMENT AND CONSTRUCTION OF A PERSONAL
COOLING SYSTEM TO BE USED BY MILITARY PERSONNEL
ENGAGED IN THE CLEARANCE AND DISPOSAL OF MUNITIONS IN
THE FIELD IS DISCUSSED. THE TOTAL SYSTEM CONSISTS
OF AN AIR DISTRIBUTION UNDERGARMENT AND A BATTERY-
POWERED VENTILATING BACKPACK. THE VENTILATING
BACKPACK IS DESIGNED TO PROVIDE 18 CFM OF AMBIENT AIR
FOR VENTILATION OF THE TORSO TO RELIEVE THE HEAT
STRESS IMPOSED ON THE INDIVIDUAL BY THE ARMORED
CLOTHING WORN OVER THE AIR DISTRIBUTION SYSTEM.
EACH CHARGE OF THE MODULAR RECHARGEABLE BATTERY
ASSEMBLY PROVIDES ADEQUATE POWER TO OPERATE THE
BLOWER FOR TWO HOURS. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

0702 537 6/17
MIROYAL INC WAYNE N J RESEARCH CENTER

RESEARCH AND DEVELOPMENT ON A PASSIVELY PRESSURIZED
FLIGHT UNIFORM. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 66-OCT 68,
DEC 69 34p FOWKES, ROBERT A. ; OLSON,

MARK W. ;
CONTRACT: AF 33(615)5261
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-69-56

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, DESIGN), HIGH ALTITUDE,
FLIGHT CLOTHING, DESIGN, RESPIRATION, PROTECTION (U)

A HIGH ALTITUDE PROTECTION SUIT WAS DEVELOPED OF THE PARTIAL PRESSURE TYPE THAT UTILIZES 40 SEALED CELLS EACH CONTAINING A SMALL AIR CHARGE SO THEY EXPAND IN ACCORD WITH BOYLE'S LAW WHEN THE ATMOSPHERIC PRESSURE IS REDUCED. THESE INDEPENDENTLY ACTING, EXPANDABLE, TUBULAR CELLS ARE RESTRAINED WITHIN A STRETCH RESISTANT BUT POROUS COVERALL IN A MANNER TO ALLOW THEM TO PRESSURIZE THE BODY OF THE WEARER. WHEN THE COVERALL IS WORN WITH PRESSURE GLOVES, BOOTS AND A PRESSURE HELMET, IT IS POSSIBLE TO PRESSURIZE THE ENTIRE BODY SUFFICIENTLY FOR ALTITUDE EXPOSURE UP TO 100,000 FEET FOR AT LEAST SEVERAL MINUTES. THE SUIT IS FABRICATED OF NOMEX MATERIAL, WITH PLEATED CELLS OF POLYURETHANE, AND AN INNER COMFORT LINER. THE EXPERIMENTAL SUITS WERE EVALUATED THROUGH ACTUAL WEAR IN THE ALTITUDE CHAMBERS AT THE USAF SCHOOL OF AEROSPACE MEDICINE. RESULTS OF THESE TESTS CONFIRM THE POTENTIAL OF THIS APPROACH FOR PROVIDING AIRCREW PROTECTION. FURTHER REFINEMENT IS NEEDED TO OBTAIN A DESIGN MORE SUITABLE FOR USE IN THE FIELD AND TO ASSURE BALANCED RESPIRATORY PRESSURES.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-735 064 6/17 18/2
NAVAL MEDICAL RESEARCH INST BETHESDA MD

EVALUATION OF A DIVER'S THERMONUCLEAR SWIMSUIT
HEATER SYSTEM. (U)

DESCRIPTIVE NOTE: MEDICAL RESEARCH INTERIM REPT.,
FEB 70 19P TAUBER, JOHN F. TRAWLINS,
JOHN S. P. BOND, KENNETH R. ;
PROJ: M4306.07-1003
MONITOR: NAVMED M4306.07-1003-3

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, HEATING), (*HEATERS,
*RADIOACTIVE ISOTOPES), TEMPERATURE, STRESS (PHYSIOLOGY),
HYPOTHERMIA, RADIATION HAZARDS, EFFICIENCY (U)
IDENTIFIERS: *RADIOISOTOPE HEAT SOURCES, SEALAB 3
MANNED SUBMERSIBLE (U)

THE PRESENT STATE OF THE THERMONUCLEAR (I.E.,
RADIOISOTOPE HEAT SOURCE) DIVER HEATING SYSTEM IS
DISCUSSED AND THE RESULTS OF THE ONLY DIVE TO DATE
USING THIS SYSTEM ARE REPORTED. THE INLET AND
OUTLET TEMPERATURES OF THE SYSTEM ARE RECORDED
TOGETHER WITH THE TIME-COURSE OF SKIN AND RECTAL
TEMPERATURES. IT IS CONCLUDED THAT THE SYSTEM IN
ITS PRESENT STATE IS INCAPABLE OF MAINTAINING THERMAL
BALANCE IN A DIVER AT DEPTH, AND ITS USE UNDER
SEALAB III CONDITIONS WOULD ENTAIL A GRAVE RISK OF
HYPOTHERMIA. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-705 455 6/16 13/1
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

VORTEX TUBE AS A THERMAL PROTECTIVE DEVICE. (U)

69 5P VAN PATTEN, ROBERT E. ;
GAUDIO, RALPH , JR;
REPT. NO. AMRL-TR-68-187
PROJ: AF-7222
TASK: 722205

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN AEROSPACE MEDICINE, V40 N3
P289-292 MAR 69.

DESCRIPTORS: (*AVIATION PERSONNEL, COOLING + VENTILATING
EQUIPMENT), (*HILSCH TUBES, FLIGHT CLOTHING), COMPRESSED
AIR, REFRIGERATION SYSTEMS, TEST METHODS, HEAT
TOLERANCE, TIME, PULSE RATE, BODY TEMPERATURE, SWEAT
GLANDS, ENDURANCE (PHYSIOLOGY) (U)
IDENTIFIERS: *VORTEX TUBES (U)

THE VORTEX TUBE IS CAPABLE OF PRODUCING
REFRIGERATION WHEN DRIVEN BY COMPRESSED AIR. TO
EVALUATE ITS AIRMAN COOLING CAPABILITIES, RESTING
SUBJECTS WERE STUDIED IN A 54C DRY BULB, 40C WET
BULB ENVIRONMENT WHILE WEARING AN MA-3 VENTILATING
GARMENT. DURING THE FIRST SESSION, EACH SUBJECT WAS
EXPOSED TO HIS SUBJECTIVE TOLERANCE WITHOUT THE
VORTEX TUBE. WITH THE VORTEX TUBE PROVIDING 13C
INLET AIR TO THE MA-3, EACH SUBJECT WAS EXPOSED FOR
A PERIOD EQUAL TO HIS ENDURANCE TIME (SECOND
SESSION) AND FOR A PERIOD EQUAL TO TWICE HIS
ENDURANCE TIME (THIRD SESSION). HEART RATE AND
RECTAL TEMPERATURE WERE RECORDED CONTINUOUSLY.
SWEAT LOSS AND SWEAT EVAPORATED WERE CALCULATED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-706 888 5/5 6/17
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

ANTHROPOLOGICAL APPLICATIONS IN HIGH ALTITUDE FLIGHT
SYSTEMS. (U)

MAR 70 18P ALEXANDER, MILTON ; GARRETT,
JOHN W. ; ROBINETTE, JOAN C. ;
REPT. NO. AMRL-TR-70-3
PROJ: AF-7184
TASK: 718408

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANTHROPOMETRY, MAN MACHINE SYSTEMS),
(*FLIGHT CLOTHING, *HUMAN FACTORS ENGINEERING), HIGH
ALTITUDE, DESIGN, PRESSURE SUITS, AVIATION PERSONNEL (U)

THE REPORT REFLECTS RESEARCH ON VARIOUS PHASES OF
THE DIMENSIONAL REQUIREMENTS OF THE PRESSURE SUITED
MAN IN THE MAN-MACHINE SYSTEM. THE SPATIAL
REQUIREMENTS FOR THE MAN IN A COCKPIT OR CAPSULE AND
AN EJECTION AND ESCAPE MECHANISMS OR WEARING CLOTHING
AS PROTECTION AGAINST HOSTILE ENVIRONMENTAL FACTORS,
SUCH AS HEAT, COLD, VACUUM, HIGH G, AND RADIATION,
PRESENT SEPARATE PROBLEMS FOR THE DESIGN ENGINEER
THAT CAN BE HELPED EFFECTIVELY WITH THE APPLICABLE
ANTHROPOLOGICAL DATA. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-708 680 6/17 13/1
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

SEALAB III - DIVER'S ISOTOPIC SWINSUIT-HEATER
SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL NOTE,
MAY 70 128p BAYLES, JOHN J. (TAYLOR,
DOUGLAS ;
REPT. NO. NCEL-TN-1087
PROJ: NCEL-64-005

UNCLASSIFIED REPORT

DESCRIPTORS: (•UNDERWATER CLOTHING, •HEATING ELEMENTS),
DIVING, PLUTONIUM, RADIOACTIVE ISOTOPES, PLASTICS,
PIPES, PUMPS, HYDROSTATIC PRESSURE, PROTECTION,
ENVIRONMENTAL TESTS, RELIABILITY, SPECIFICATIONS (U)
IDENTIFIERS: BACKPACKS, •RADIOISOTOPE HEAT SOURCES, (U)
•SEALAB 3

THE ATOMIC ENERGY COMMISSION AND THE DEEP
SURMERGENCE SYSTEMS PROJECT OFFICE INCLUDED
THE DEVELOPMENT AND EVALUATION OF AN ISOTOPIC
SWINSUIT HEATING SYSTEM IN THE SEALAB III PROGRAM
TO DEMONSTRATE A USE OF ATOMIC ENERGY AS A METHOD FOR
PROVIDING SUPPLEMENTAL HEAT TO DIVERS. THE TASK OF
DEVELOPING A SWINSUIT HEATING 'PACKAGE' WAS ASSIGNED
TO THE NAVAL CIVIL ENGINEERING LABORATORY,
PORT HUENEME, CALIFORNIA. THE 'PACKAGE'
UTILIZES AEC FURNISHED PLUTONIUM 238 CAPSULES FOR
HEATING WATER WHICH IS PUMPED THROUGH A CLOSED-CYCLE
SYSTEM INCLUDING A DIVER'S UNDERGARMENT FITTED WITH
CLOSELY SPACED PLASTIC TUBING. THE DIVER WEARS A
WET SUIT OVER THIS UNDERGARMENT TO AID IN RETAINING
THE HEAT PROVIDED. THE 'PACKAGE' OR ISOTOPE
BACKPACK SEGMENT IS DESIGNED TO BE ATTACHED TO A
MODIFIED MARK VIII MIXED GAS BREATHING APPARATUS
BACKPACK. THE SPECIFICATIONS BASED UPON AVAILABLE
INFORMATION AT THE TIME OF INITIAL DEVELOPMENT
STAGES, DID NOT PROVIDE FOR SUFFICIENT ISOTOPE TO
PRODUCE ADEQUATE SUPPLEMENTAL HEAT. HOWEVER, THE
FINAL BACKPACK DESIGN DID NOT MATERIALLY AFFECT THE
DIVER'S CAPABILITIES AND THE SYSTEM WAS SUCCESSFULLY
TESTED WITH RESPECT TO ITS DESIGN OPERATIONAL
CHARACTERISTICS. (AUTHOR)

(U)

UNCLASSIFIED

/ZON08

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-708 874 11/5 15/5
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

A STUDY OF SEAM LEAKAGE IN COATED FABRICS. (U)

DESCRIPTIVE NOTE: SUMMARY REPT. AUG 67-JUL 69,
APR 70 49P FREDERICK, EDWARD B. ; HENRY,
MALCOLM C. ;
REPT. NO. C/PLSEL-TS-169
MONITOR: USA-NLABS TR-70-59-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*TEXTILES, MOISTUREPROOFING), (*PROTECTIVE
CLOTHING, LEAKAGE(FLUID)), PERMEABILITY, TEST METHODS,
PROCESSING (U)
IDENTIFIERS: SEWING (U)

EXTENSIVE INVESTIGATIONS OF SEWN SEAMS IN COATED
FABRICS HAVE BEEN CONDUCTED. THE RELATIVE ROLL OF
THREAD, SEWING MACHINE COMPONENTS, STITCH AND SEAM
TYPES AND PROPERTIES OF FABRICS HAVE BEEN EVALUATED
AS PARAMETERS INVOLVED IN SEAM LEAKAGE. UTILIZATION
OF VARIOUS EXPERIMENTAL SEAM CONSTRUCTIONS,
GASKETING, APPLICATION OF HEAT DURING SEAM SEWING AND
OTHER TECHNIQUES WERE ATTEMPTED AS POTENTIALLY USEFUL
APPROACHES IN COMBATING SEAM LEAKAGE.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-709 570 6/17
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE
MEDICAL RESEARCH DEPT

DEVELOPMENT OF PRACTICAL HIGH-INTENSITY THERMAL
PROTECTION SYSTEMS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,
JUL 70 20P STOLL, ALICE M. ICHIANTA,
MARIA A. JUDGE, L. B. ;
REPT. NO. NADC-MR-7016
PROJ: A34-531/202/70F32-523-401

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, *THERMAL INSULATION),
TEXTILES, COLORS, THERMAL PROPERTIES, OPTICAL
PROPERTIES, HEAT TRANSFER, NUCLEAR EXPLOSIONS, THERMAL
RADIATION, JET FIGHTERS (U)
IDENTIFIERS: F-4 AIRCRAFT (U)

THE MILITARY REQUIREMENT FOR HIGH-INTENSITY THERMAL
PROTECTION ENTAILS PROVISION OF A SYSTEM WHICH IS
EFFECTIVE IN THE NUCLEAR WEAPON RANGE AND AT THE SAME
TIME PRACTICAL FROM THE LOGISTICS POINT OF VIEW AND
COMFORTABLE FOR EXTENDED PERIODS OF WEAR. WITH
THESE ENDS IN MIND, SMALL-SCALE LABORATORY PROCEDURES
AND FULL-SCALE EVALUATION PROCEDURES WERE DEVISED
WHEREBY SPECIFIC SYSTEMS COULD BE DESIGNED TO MEET
SPECIFIC NEEDS. THERMAL BARRIERS WERE DESIGNED
THROUGH APPLICATION OF BASIC HEAT TRANSFER PRINCIPLES
WITH CAREFUL CONSIDERATION FOR THE INFLUENCE OF
THERMAL AND OPTICAL PROPERTIES OF MATERIALS ON HEAT
EXCHANGE. IN THE PRESENT EXAMPLE A GREEN ASSEMBLY
WAS DEVELOPED TO REPLACE A WHITE ONE DESIGNED FOR
PROTECTION OF FLIGHT PERSONNEL FROM THE THERMAL
EFFECTS OF NUCLEAR WEAPONS. IN THERMAL EXPOSURES
DELIVERING APPROXIMATELY 50 CAL/(SQ CM) IN 2
SECONDS IN SOME AREAS, WITH AN OVERALL AVERAGE OF
ABOUT 20 CAL/(SQ CM) IN 2 SECONDS, THE NEW SYSTEM
OFFERED PROTECTION EQUAL TO THAT OF THE WHITE
ASSEMBLY WHILE WEIGHING ONLY HALF AS MUCH AND
REPRESENTING SIGNIFICANT ADVANTAGES IN COMFORT AND
LOGISTICS. THE PROCEDURES DEVELOPED IN THIS STUDY
ARE GENERAL IN NATURE AND WIDELY APPLICABLE TO THE
DEVELOPMENT OF OTHER THERMAL PROTECTION SYSTEMS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-711 676 6/11
IIT RESEARCH INST CHICAGO ILL

EXPLORATORY DEVELOPMENT OF PRESSURE SUIT MOBILITY
JOINTS, GLOVES AND HELMET. (U)

DESCRIPTIVE NOTE: FINAL REPT. MAR 66-APR 69;
APR 70 19P SLOWIK, JOZEF ; MARCUM, ALFRED
; BURNS, MARVIN ;
REPT. NO. IITRI-J6028-FR
CONTRACT: AF 33(615)-3468
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-69-64

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, DESIGN), MOBILITY,
GLOVES, HELMETS, JOINTS, MATERIALS, THERMAL PROPERTIES,
METEORITES, SPACE CREWS, AIR FORCE RESEARCH (U)
IDENTIFIERS: MICROMETEROIDS (U)

A RESEARCH PROGRAM WAS CONDUCTED TO INVESTIGATE AND
DEVELOP APPROACHES FOR IMPROVING PRESSURE SUIT
MOBILITY AND COMFORT. NOVEL CONCEPTS WERE GENERATED
AND UNIQUE PROPERTIES OF MATERIALS WERE EXPLOITED TO
IMPLEMENT THESE CONCEPTS FOR VARIOUS PRESSURE SUIT
COMPONENTS. SINGLE PLANE MOBILITY JOINTS OF LOW
PROFILE FABRIC MATERIALS WERE MADE WITH MOBILITY
APPROACHING THAT OF HARD JOINTS. WORK WAS BEGUN TO
ADAPT THE SAME PRINCIPLES TO BIAXIAL JOINTS.
ADVANCED CONCEPTS FOR IMPROVING THE TACTILITY AND
MOBILITY OF PRESSURE GLOVES WERE IMPLEMENTED IN
SEVERAL MODELS OF EXPERIMENTAL GLOVES. EXPLORATORY
DEVELOPMENT OF PARTIAL PRESSURE HELMET WAS INITIATED.
AS A PART OF THE BROAD SYSTEMS STUDY, THE THERMAL
CONTROL PROBLEMS AND MICROMETEOROID THREAT TO THE
EXTRAVEHICULAR CREWMAN WERE ALSO INVESTIGATED.
(AUTHOR) (U)

UNCLASSIFIED

/ZOM08

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-712 505 11/5
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE
MEDICAL RESEARCH DEPT

HEAT TRANSFER THROUGH FABRICS.

(U)

SEP 70 41P STOLL, ALICE M. ICHIANTA,
MARIA A. I
REPT. NO. NADC-MR-7017
PROJ: A34-531/202/70F32-523-401, A34-531/202/70F12-
524402

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED IN PART AT THE AIR FORCE
MATERIALS LAB. SYMPOSIUM, MIAMI BEACH, FLA.,
MAY 70.

DESCRIPTORS: (*TEXTILES, HEAT TRANSFER), (*PROTECTIVE
CLOTHING, *THERMAL INSULATION), CONDUCTION(HEAT
TRANSFER), CONVECTION(HEAT TRANSFER), THERMAL RADIATION,
VAPORIZATION, SKIN(ANATOMY), PROTECTION, WOUNDS AND
INJURIES, AIR FORCE RESEARCH (U)

HEAT IS TRANSFERRED THROUGH FABRICS BY CONVECTION,
CONDUCTION AND RADIATION AND UNDER CERTAIN
CIRCUMSTANCES BY VAPORIZATION. EACH MODE IS SUBJECT
TO DIFFERENT PHYSICAL PRINCIPLES BUT THE EFFECT OF
THE TOTAL HEAT ABSORBED BY UNDERLYING SKIN IS THE
SAME: IF THE RESULTANT SKIN TEMPERATURE RISE IS
SUFFICIENTLY HIGH AND MAINTAINED SUFFICIENTLY LONG,
INJURY RESULTS. THE EXTENT OF INJURY IS PREDICTED
UNDER CERTAIN CONTROLLED CONDITIONS AND THESE
CONDITIONS MAY BE USED TO DISCLOSE PROTECTION
PRINCIPLES APPROPRIATE TO EACH MODE OF TRANSFER.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-712 994 6/17
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

FLOW OF HEAT AND WATER VAPOR THROUGH PROTECTIVE
CLOTHING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 70 22P VOTTA, FERDINAND, JR.; SPANO,
LEO A.;
REPT. NO. C/PLSEL-78
PROJ: DA-1-J-062110-A-533
MONITOR: USA-NLABS TR-71-5-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, HEAT TRANSFER),
WATER VAPOR, COOLING, ISOCYANATE PLASTICS, TEXTILES,
NYLON, BODY TEMPERATURE, LAMINATES

(U)

IN A CONTINUING EFFORT TO IMPROVE THE COMFORT AND
WORKING EFFICIENCY OF PERSONS WEARING VARIOUS
PROTECTIVE CLOTHING SYSTEMS, A SWEATING CYLINDER TO
TEST THE HEAT AND WATER VAPOR TRANSFER
CHARACTERISTICS OF SUCH SYSTEMS WAS DESIGNED,
CONSTRUCTED AND TESTED. WITH THIS EQUIPMENT, THE
HEAT AND WATER VAPOR TRANSFER THROUGH A CARBON-
TREATED POLYURETHANE-NYLON TRICOT LAMINATED CLOTHING
SYSTEM WAS DETERMINED UNDER A WIDE RANGE OF SIMULATED
ENVIRONMENTAL CONDITIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-713 430

6/17

6/19

15/7

ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK
MASS

TACTICAL IMPLICATIONS OF THE PHYSIOLOGICAL STRESS
IMPOSED BY CHEMICAL PROTECTIVE CLOTHING SYSTEMS. (U)

70

15P

GOLDMAN, RALPH F. ;

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING,
*STRESS(PHYSIOLOGY)); MILITARY TACTICS, TEXTILES, HEAT
TRANSFER, TOLERANCES(PHYSIOLOGY), TESTS (U)

THE PAPER DETAILS THE SUBSEQUENT LABORATORY
STUDIES, DELINEATES THE PHYSIOLOGICAL PROBLEMS,
DESCRIBES SUBSEQUENT, SUCCESSFUL FIELD EVALUATIONS
AND SUGGESTS SOME OF THE TACTICAL LIMITATIONS IMPOSED
BY WEARING CURRENT CHEMICAL PROTECTIVE SYSTEMS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOM08

AD-713 573 6/17
ARMY NATICK LABS MASS

MODERN COUNTER-SURVEILLANCE IN COMBAT
CLOTHING,

(U)

70 14P RAMSLEY, A. O. ;

UNCLASSIFIED REPORT
AVAILABILITY: MICROFICHE COPIES ONLY.

DESCRIPTORS: (*PROTECTIVE CLOTHING, *CAMOUFLAGE),
COLORS, REFLECTION, OPTICAL PROPERTIES, SOILS, TREES,
EXPERIMENTAL DATA, AERIAL PHOTOGRAPHY, SNIPERSCOPES,
INFRARED PHOTOGRAPHY, IMAGE INTENSIFIERS(ELECTRONICS)(U)
IDENTIFIERS: SURVEILLANCE (U)

THE PAPER DESCRIBES THE DEVELOPMENT OF A COLORANT
SYSTEM FOR COMBAT CLOTHING THAT SATISFIES THE
REFLECTANCE REQUIREMENTS FOR CAMOUFLAGE PROTECTION
AGAINST DETECTION BY ALL OF THE MODERN SURVEILLANCE
DEVICES, AS WELL AS BY VISUAL OBSERVATION.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-713 581 6/17
ARMY NATICK LABS MASS

MICROCLIMATE-CONTROLLED (THERMALIBRIUM) CLOTHING
SYSTEMS FOR MILITARY APPLICATIONS.

(U)

70 ISP SPANO, LEO A. ; IACONO,
VINCENT D. ;

UNCLASSIFIED REPORT

DESCRIPTORS: (PROTECTIVE CLOTHING, CONTROLLED
ATMOSPHERES), REVIEWS, AMMUNITION, TOXICITY,
VENTILATION, AIR CONDITIONING EQUIPMENT, HEATING, GAS
FLOW, CONTROL, AIRCRAFT, TROPICAL REGIONS, THERMAL
RADIATION, FLIGHT CLOTHING

(U)

CONTENTS: DESIGN PRINCIPLES FOR MICROCLIMATE-
CONTROLLED PROTECTIVE CLOTHING SYSTEMS; PROTECTIVE
CLOTHING SYSTEM FOR EXPLOSIVE ORDNANCE DISPOSAL;
AIR-CONDITIONED CLOTHING FOR ARMY AIRCREWMEN; AND
PERFORMANCE EVALUATION OF AIR-CONDITIONED
CLOTHING.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-714 224 6/11
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

PASSIVE THERMAL CONTROL SYSTEMS FOR
ADVANCED SPACE SUIT CONCEPTS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 64-JAN 68,
NOV 68 179P DUSABLON, LOUISE V. IVOTTA,
FERDINAND, JR. ISCHNEIDER, NATHANIEL S. ISPANO,
LEO A. ;

CONTRACT: NASA ORDER-R-135

MONITOR: USA-NLABS, C/OM

25-CE.54

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE SUITS, TEMPERATURE CONTROL),
PERMEABILITY, PERSPIRATION, COMPOSITE MATERIALS,
POLYMERS, MEMBRANES, DIFFUSION, COOLING, VOLTAGE, SPACE
FLIGHT, EXTRAVEHICULAR ACTIVITY, LUNAR ENVIRONMENT (U)
IDENTIFIERS: TEMPERATURE CONTROL (U)

PERVAPORATION OF WATER FROM A SPACE SUIT HAS BEEN
PROPOSED AS A METHOD OF COOLING AN ASTRONAUT. THE
PURPOSE OF THIS PROGRAM WAS TO INVESTIGATE THE
VARIOUS PRINCIPLES, TECHNIQUES AND MATERIAL DESIGNS
APPLICABLE TO THE ENGINEERING OF A SYSTEM CAPABLE OF
TRANSFERRING UP TO 3000 BTU/HR. FOUR DIFFERENT
APPROACHES WERE INVESTIGATED WITH AN EVENTUAL
PROTOTYPE KEPT IN VIEW. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-714 577 6/11
HAMILTON STANDARD WINDSOR LOCKS CONN

INTEGRATED MANEUVERING LIFE SUPPORT
SYSTEM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 31 MAY 68-31 OCT 69.
JUL 70 61P HOWARD, DOUGLAS C. ;
CONTRACT: F33615-67-C-1946
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-69-132

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, DESIGN), (*EXTRAVEHICULAR
ACTIVITY, PROTECTIVE CLOTHING), SPACE ENVIRONMENTS, LIFE
SUPPORT, CONFIGURATION, PROPELLANT TANKS, CONTROL
SYSTEMS, HUMAN FACTORS ENGINEERING (U)
IDENTIFIERS: *SPACE SUITS (U)

SUCCESSFUL COMPLETION OF A DESIGN STUDY OF AN
EXTRAVEHICULAR SPACE SUIT ASSEMBLY WITH AN INTEGRATED
LIFE SUPPORT SYSTEM HAS LED TO THE FABRICATION AND
EVALUATION OF A HUMAN FACTORS MOCKUP. THIS MOCKUP
CONSISTS OF A TWO-PIECE HARD TORSO WITH SOFT ARMS AND
LEGS, A FULL BUBBLE HELMET AND PRESSURE GLOVES
COMPLETE THE PRESSURE SUIT SYSTEM. THE HARD TORSO
IS A VOLUMETRIC REPRESENTATION OF AN INTEGRAL LIFE
SUPPORT SYSTEM. IT ALSO CONTAINS AN OPERATIONAL
COLD-GAS PROPULSION SYSTEM AND CONTROLS AND DISPLAY
PANEL. SIXTEEN THRUSTERS PROVIDE ACCELERATIONS OF
0.3 FT/SEC SQUARED IN THREE DEGREES OF TRANSLATION
AND 10 TO 20 DEGREES OF ROTATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-718 327 6/17
NAVAL AEROSPACE MEDICAL RESEARCH LAB PENSACOLA FLA

A TECHNIQUE FOR OPTIMAL FITTING OF FLIGHT
HELMETS.

(U)

SFP 70 12P GREENE, JAMES W. ;
REPT. NO. NAMRL-1118
PROJ: MF12.524.005, A340-5314/561-B/1F12-52-4402
MONITOR: NAVMED MF12.524.005-7008A-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*EAR PROTECTORS, NAVAL AVIATION), (*NOISE,
ATTENUATION), (*HELMETS, COMPATIBILITY), OPTIMIZATION,
HUMAN FACTORS ENGINEERING, TEST METHODS, AUDIOMETRY,
THRESHOLDS(PHYSIOLOGY), EARPHONES (U)
IDENTIFIERS: COMFORT, *FLIGHT CLOTHING, *HELMETS (U)

ALTHOUGH FLIGHT HELMETS SELECTED FOR NAVY USE MAY
POSSESS EXCEPTIONALLY GOOD NOISE ATTENUATION
QUALITIES, MAXIMUM ATTENUATION MAY NOT ALWAYS BE
REALIZED WHEN THE HELMET IS WORN, PARTICULARLY IF THE
HELMET DOES NOT FIT. THE LACK OF A STANDARDIZED
PROCEDURE FOR FITTING FLIGHT HELMETS OFTEN RESULTS IN
A POOR COMPROMISE THAT SACRIFICES NOISE EXCLUSION FOR
COMFORT. A PROCEDURE THAT INVOLVES THE USE OF A
NOISE SOURCE AND AN AUTOMATIC RECORDING AUDIOMETER
HAS BEEN DEVELOPED AS AN AID IN THE FITTING PROCESS.
THE NOISE SOURCE ALLOWS THE AVIATOR TO DETECT
ACOUSTICAL LEAKAGE AROUND HIS EARS SO THAT A BETTER
FIT CAN BE EFFECTED. MASKED HEARING THRESHOLD
LEVELS OBTAINED WITH THE HELMET'S EARPHONES MAY BE
USED TO DEMONSTRATE IMPROVED PERFORMANCE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-719 106 6/17 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

CLOTHING (AVIATION).

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON MATERIEL TEST PROCEDURE.
DEC 70 23P
REPT. NO. MTP-7-3-087
PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: (•FLIGHT CLOTHING, TEST METHODS),
PROTECTION, HUMAN FACTORS ENGINEERING, ENVIRONMENTAL
TESTS, VISUAL INSPECTION, LAUNDRY OPERATIONS, SURVIVAL
KITS

(U)

IDENTIFIERS: COMFORT, •COMMON ENGINEERING TEST
PROCEDURES, EVALUATION

(U)

TEST PROCEDURES ARE DESCRIBED TO DETERMINE THE
DEGREES AND FORMS OF PROTECTION, AND THE RELATIVE
COMFORT AND FUNCTIONAL PERFORMANCE OF FLIGHT CREW
MEMBER CLOTHING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-719 112 6/17 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD.

BOOTS, CB PROTECTIVE.

(U)

DESCRIPTIVE NOTE: MATERIEL TEST PROCEDURE.

JAN 68 18P

REPT. NO. MTP-8-2-041

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS),
(*SHOES, TEST METHODS), PROTECTIVE CLOTHING,
IMPREGNATION, LEAKAGE (FLUID), DECONTAMINATION

(U)

IDENTIFIERS: *COMMODITY ENGINEERING TEST PROCEDURES,
TOXIC AGENT PROTECTIVE CLOTHING

(U)

THE DOCUMENT PROVIDES TEST METHODS AND TECHNIQUES
NECESSARY TO DETERMINE THE TECHNICAL PERFORMANCE AND
SAFETY ASPECTS OF CB PROTECTIVE BOOTS.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-719 113 6/17 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

HOODS, PROTECTIVE.

(U)

DESCRIPTIVE NOTE: MATERIEL TEST PROCEDURE.

JAN 68 26P
REPT. NO. MTP-8-2-043

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS), ARMY
PERSONNEL, BIOLOGICAL WARFARE AGENTS, CHEMICAL WARFARE
AGENTS, BREATHING MASKS, TEST EQUIPMENT, PHOTOGRAPHY,
COMPATIBILITY, ENVIRONMENTAL TESTS, PERSONNEL, MEDICAL
EXAMINATION, LEAKAGE (FLUID), VISUAL INSPECTION,
FLAMMABILITY (U)

IDENTIFIERS: COMMON ENGINEERING TEST PROCEDURES,
SDR (SMALL DEVELOPMENT REQUIREMENTS), TOXIC AGENT
PROTECTIVE CLOTHING (U)

THE DOCUMENT PROVIDES TEST METHODS AND TECHNIQUES
NECESSARY TO DETERMINE THE TECHNICAL PERFORMANCE AND
SAFETY ASPECTS OF THE TEST ITEM RELATIVE TO THE
CRITERIA CITED IN APPLICABLE QUALITATIVE MATERIAL
REQUIREMENTS (QMR'S), SMALL DEVELOPMENT
REQUIREMENTS (SDR'S), TECHNICAL CHARACTERISTICS
(TC'S), AND AS INDICATED BY THE PARTICULAR DESIGN
AND TO DETERMINE THE TECHNICAL SUITABILITY OF THE
TEST ITEM FOR SERVICE TEST. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-719 131 6/17 15/2 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

ARCTIC ENVIRONMENTAL TEST OF CB PROTECTIVE
CLOTHING. PROTECTIVE MASKS AND WINTERIZATION
KITS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON MATERIEL TEST PROCEDURE.
JAN 70 12P
REPT. NO. MTP-8-4-006
PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE MASKS, TEST METHODS),
(*PROTECTIVE CLOTHING, TEST METHODS), COLD WEATHER
TESTS, RELIABILITY, CHEMICAL PROPERTIES,
MAINTAINABILITY, HUMAN FACTORS ENGINEERING, BIOLOGICAL
WARFARE AGENTS, CHEMICAL WARFARE AGENTS, PROTECTIVE
MASKS, ARCTIC REGIONS

(U)

IDENTIFIERS: TOXIC AGENT PROTECTIVE CLOTHING,
*ENVIRONMENTAL TEST PROCEDURES

(U)

THE PROCEDURES OUTLINED IN THIS MATERIEL TEST
PROCEDURE ARE DESIGNED TO DETERMINE AND EVALUATE
THE PERFORMANCE CHARACTERISTICS OF CB PROTECTIVE
CLOTHING, PROTECTIVE MASKS AND WINTERIZATION KITS IN
ARCTIC ENVIRONMENTAL CONDITIONS. PROCEDURES ARE
ALSO INCLUDED WHICH ARE APPLICABLE TO SURVEILLANCE
(5 YEARS) TESTING OF SUBJECT ITEMS.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-720 275 6/17
IIT RESEARCH INST CHICAGO ILL

EXPLORATORY DEVELOPMENT OF PARTIAL PRESSURE
HELMET AND MOBILITY JOINTS FOR EMERGENCY
PRESSURE SUIT OUTFITS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 69-31 AUG 70,
JAN 71 43P SLOWIK, JOZEF ; MARCUM, ALFRED
; BURNS, MARVIN ;
REPT. NO. IITRI-J6181-FR
CONTRACT: F33615-69-C-1592
PROJ: AF-7164, IITRI-J6181
TASK: 716411
MONITOR: AMRL TR-70-111

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *JOINTS), (*HELMETS,
JOINTS), MOBILITY, DACRON, DISTORTION, NETS, HIGH
ALTITUDE

(U)

ANISOTROPIC DACRON NET PREPARED BY DISTORTION ON
THE BIAS AND LOCKING WITH A POLYURETHANE SOLUTION WAS
USED FOR EXPANDABLE PANELS ALONG WITH NON-EXPANDABLE
FABRICS AND VOLUME TRANSFER BANDS TO FORM SEVERAL
EXPERIMENTAL JOINTS. COMBINATIONS SHOWING PROPER
FUNCTION IN A SINGLE PLANE WERE NOT FULLY ADAPTABLE
TO MULTIPLE PLANE JOINTS WITHOUT RESORTING TO BULKY,
RIGID PARTS. THE HELMET INCORPORATED A MANUALLY
OPERATED PRESSURE VISOR, FACE-EAR SEALS, AND A MULTI-
COMPARTMENTED BLADDER SYSTEM WHICH DOES NOT COVER THE
CROWN OF THE HEAD THUS CANCELLING HELMET LIFTING
FORCES. THE HELMET IS FUNCTIONAL AND HAS BEEN WORN
AT 175 MM HG PRESSURE WITHOUT UNDUE DISCOMFORT.
TOTAL WEIGHT AND BULK ARE LOW FOR A PRESSURE HELMET
AND HIGH ALTITUDE TRIALS HAVE BEEN SUCCESSFUL. HEAD
MOBILITY (LIMITED BY OMISSION OF A ROTARY BEARING
AND SUIT-BIB OVERLAP), BETTER FACE-EAR SEALS, AND
AUTOMATIC VISOR CLOSING WOULD BE ATTAINABLE IN A
COORDINATED HELMET/SUIT SYSTEM DEVELOPMENT.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-720 827 6/17 15/5
CLARK (DAVID) CO INC WORCESTER MASS

DESIGN AND FABRICATION OF A PASSIVELY
PRESSURIZED SUIT. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 68-APR 70,
JAN 71 28P PLESKUN, WALTER G. IRUSECKAS,

JOSEPH A. ;

CONTRACT: F33657-68-C-1663

PROJ: AF-7164

TASK: 716411

MONITOR: AMRL TR-70-120

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, HIGH ALTITUDE),
PRESSURIZATION, FIRE RESISTANT TEXTILES, VALVES,
RESPIRATION, TESTS, CARDIOVASCULAR DISEASES, HELMETS (U)

THE PURPOSE OF THE EXPERIMENTAL EFFORT WAS TO
EVOLVE NEW DESIGNS AND MANUFACTURING TECHNOLOGY
APPLICABLE TO HIGH ALTITUDE PRESSURE SUITS.
EMPHASIS WAS PLACED ON DEVELOPMENT OF BLADDERS
USING AN ELASTOMERIC COMPOUND WHICH WOULD HAVE
EXCELLENT AIR RETENTION FOR EXTENDED PERIODS OF TIME,
WOULD HAVE THE CAPABILITY TO EXPAND SUFFICIENTLY TO
SERVE AS A REDUNDANT SEGMENT FOR FAILED ADJACENT
BLADDERS AND WOULD BE ECONOMICAL TO FABRICATE.
ADDITIONAL EMPHASIS WAS PLACED ON THE DEVELOPMENT
OF A RESTRAINT COVERALL WHICH WOULD SATISFY THE
REQUIREMENTS FOR PASSIVE VENTILATION, UNPRESSURIZED
MAXIMUM MOBILITY, ACCEPTABLE PRESSURIZED MOBILITY,
LONG TERM COMFORT UNPRESSURIZED, ADEQUATE SKIN
PRESSURE DURING PRESSURIZATION AND LOWEST POSSIBLE
WEIGHT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-722 774 13/12 6/17
CORNELL AERONAUTICAL LAB INC BUFFALO N Y

FIRE FIGHTER'S EXPOSURE STUDY.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUL-NOV 70.
DEC 70 90P GRAVES, KENNETH W. ;
REPT. NO. CAL-HM-2972-Z-1
CONTRACT: F33615-70-C-1715
MONITOR: AGFSRS 71-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*AVIATION FUELS, FIRES), (*JET ENGINE
FUELS, FIRES), (*FIRE PROTECTIVE CLOTHING, DESIGN),
THERMAL RADIATION, INFRARED RADIATION, WIND,
CONVECTION(HEAT TRANSFER), MEASURING INSTRUMENTS, HEAT
FLUX, FIRE SAFETY, AIRCRAFT FIRES, RESCUES (U)

EXPERIMENTAL FIRES FROM POOLS OF BURNING AIRCRAFT
FUELS WERE INSTRUMENTED WITH HEAT METERS TO DETERMINE
HEAT FLUX DISTRIBUTIONS FOR APPLICATION TO THE DESIGN
OF PROTECTIVE CLOTHING FOR FIREFIGHTING PERSONNEL.
THE SPECTRAL DISTRIBUTION OF INFRARED RADIATION
EMITTED BY FIRES WAS ALSO MEASURED. CONDITIONS
AFFECTING THE FIRES AND THE RESULTING HEAT EFFECTS
THAT WERE STUDIED WERE WIND VELOCITY, FUEL POOL AREA,
TIME OF BURNING, ORIENTATION AROUND THE FIRE RELATIVE
TO WIND DIRECTION, DISTANCE FROM THE FIRE, AND AN
EXTRANEOUS OBJECT IN A FIRE. A MEANS BY WHICH
EVALUATION OF REFLECTIVE CLOTHING CAN BE MADE IS
DESCRIBED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-722 857 6/11 6/17
FLYING PERSONNEL RESEARCH COMMITTEE LONDON (ENGLAND)

A LABORATORY COMPARISON OF THREE METHODS OF
PERSONAL CONDITIONING.

(U)

JAN 71 42P ALLAN, J. R. ; ALLNUTT, M.
F. ; HANSON, R. DE G. ; BEENY, M. ; SHORT, B. ;

REPT. NO. FPRC-1307

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH RAF
INST. OF AVIATION MEDICINE, FARNBOROUGH
(ENGLAND), REPT. NO. IAH-R497 AND JOINTLY WITH
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH
(ENGLAND), REPT. NO. RAE-TR-70121, AD-884 467.

DESCRIPTORS: (*FLIGHT CLOTHING, DESIGN), (*PILOTS,
STRESS(PHYSIOLOGY)), TACTICAL BOMBING, AIRCRAFT CABINS,
THERMAL STRESSES, SIMULATION, GREAT BRITAIN (U)

TWELVE SUBJECTS WERE USED TO OBTAIN COMPARATIVE
DATA BETWEEN A WATER COOLED, A CONVECTIVE AIR COOLED
AND A REVERSE FLOW AIR COOLED PERSONAL CONDITIONING
SYSTEM DURING LABORATORY SIMULATIONS OF A TYPICAL
OPERATIONAL SORTIE IN A HOT CLIMATE. THE RESULTS
GENERALLY FAVOURED THE WATER COOLED SYSTEM ON
PHYSIOLOGICAL, BEHAVIOURAL AND SUBJECTIVE GROUNDS.
THE RESULTS OF THIS LABORATORY TRIAL MAY NOT
NECESSARILY TRANSFER TO REALISTIC OPERATING
CONDITIONS AND FURTHER FIELD TESTING BOTH IN FLIGHT
AND USING APPROPRIATE GROUND EQUIPMENT WILL BE
REQUIRED BEFORE IT CAN BE SHOWN WHETHER THESE
ADVANTAGES CAN BE REALISED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-723 030 15/5 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

CLOTHING (AVIATION).

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON MATERIEL TEST PROCEDURE.

MAR 71 34P

REPT. NO. MTP-7-2-087

PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, TEST METHODS),
MAINTENANCE, RELIABILITY, SAFETY, HUMAN FACTORS
ENGINEERING, EXPOSURE(PHYSIOLOGY), ENVIRONMENTAL TEST(U)
IDENTIFIERS: COMMODITY ENGINEERING TEST
PROCEDURES (U)

THE DOCUMENT PROVIDES TEST METHODOLOGY AND TESTING
TECHNIQUES NECESSARY TO DETERMINE THE TECHNICAL
PERFORMANCE AND SAFETY CHARACTERISTICS OF AVIATION
TOOLS AND ASSOCIATED ACCESSORIES AS DESCRIBED IN
MATERIEL NEEDS (MN) AND TO DETERMINE THE ITEM'S
SUITABILITY FOR SERVICE TESTS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOM08

AD-723 549 6/17 15/2
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

IMPRFGNATION PLANT IMPROVEMENT TESTS.

(U)

DESCRIPTIVE NOTE: INTERIM TECHNICAL NOTE.

JAN 58 18P NEHLSN, WILLIAM R. HALTON.

J. E. ;

REPT. NO. NCEL-TN-325

PROJ: NY-310-004-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, IMPREGNATION),
(*CHEMICAL WARFARE AGENTS, PROTECTIVE CLOTHING),
TANKS(CONTAINERS), CHEMICALS, PROCESSING, DYES, LAUNDRY
OPERATIONS (U)

THE OBJECT OF THE STUDY WAS TO IMPROVE CHEMICAL
HANDLING PROCEDURES AND EQUIPMENT FOR USE IN
CONVERTING LAUNDRY EQUIPMENT TO A CLOTHING
IMPRFGNATION UNIT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-724 020 6/17
KANSAS STATE UNIV MANHATTAN COLL OF ENGINEERING

WATER COOLED HOOD AFFECTS CREATIVE
PRODUCTIVITY.

(U)

69 SP KONZ, S. ; GUPTA, V. K. ;
CONTRACT: F44620-68-C-0020
PROJ: AF-9563
MONITOR: AFOSR TR-71-1364

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ASHRAE JNL., P40-43 JUL
69.

DESCRIPTORS: (*PERFORMANCE(HUMAN); *PROTECTIVE
(CLOTHING); (*HELMETS, COOLING); STRESS(PHYSIOLOGY); BODY
TEMPERATURE; SWEAT GLANDS; PULSE RATE (U)

THE EFFECT OF LOCALIZED COOLING OF THE HEAD WAS
STUDIED IN A HEAT STRESS (100 F. 70% RH)
ENVIRONMENT ON EIGHT MALE STUDENTS. PRODUCTIVITY
ON A CREATIVE MENTAL TASK DECLINED 8% LESS WITH
THE HOOD. RECTAL AND LIMB TEMPERATURE WERE NOT
SIGNIFICANTLY AFFECTED BY THE HOOD BUT, WITH THE
HOOD, THE HEAT TEMPERATURE RISE WAS 2 DEG F LESS.
THE SWEAT RATE WHILE WEARING THE HOOD WAS
SIGNIFICANTLY LESS. THE HEART RATE INCREASE WAS
LOWER WITH THE HOOD. HEART BEAT VARIABILITY (AN
INDEX OF STRESS) WAS AFFECTED BY THE HEAT AND, WITH
THE HOOD, VARIABILITY DECREASED LESS AS WAS
PREDICTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-724 617 6/17 6/19
NAVAL AIR DEVELOPMENT CENTER WARMINSTER PA AEROSPACE CREW
EQUIPMENT DEPT

PHYSIOLOGICAL EVALUATION OF SUBJECTS EXPOSED
TO A COLD WATER ENVIRONMENT WHILE WEARING
DIFFERENT PROTECTIVE SUIT ASSEMBLIES. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
MAR 71 18P SANTA MARIA, LOUIS J. ;
RADLIFF, MEREDITH H. ;
REPT. NO. NADC-AC-7101
PROJ: A340-5311/202-B/1F32-523-401

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, LOW TEMPERATURE),
(*PROTECTIVE CLOTHING, LOW TEMPERATURE), EFFICIENCY,
UNDERWATER, ENVIRONMENT, PHYSIOLOGY, DESIGN, MATERIALS,
TEMPERATURE, BODY TEMPERATURE, EXPOSURE (PHYSIOLOGY) (U)

THE PHYSIOLOGICAL RESPONSES OF TWO VOLUNTEER
SUBJECTS EXPOSED TO AN EXTREME COLD WATER ENVIRONMENT
(OC) WHILE WEARING THE 3/16 INCH CHLOROPRENE
WET SUIT, 1/8 INCH CHLOROPRENE WET SUIT,
AND THE POLYVINYL CHLORIDE WET SUIT WERE
INVESTIGATED UNDER TWO CONDITIONS OF USE: CONSTANT
IMMERSION-FLOTATION (COND I) AND IMMERSION-
FLOTATION FOR A TWO-MINUTE PERIOD FOLLOWED BY RAFT
OCCUPANCY (COND II). IN VIEW OF EXPOSURE DURATION
RANGING FROM 0.5-1.0 HR AND FROM 2.0-3.0 HR UNDER
CONDITIONS I AND II, RESPECTIVELY, THE RESULTS
INDICATE THAT SURVIVAL AND TISSUE DAMAGE PROTECTION
IS AFFORDED, WITHIN EXPECTED LIMITS OF TIME UNDER
BOTH EMERGENCY CONDITIONS FOR SEARCH AND RECOVERY, BY
ANY OF THE CLOTHING ASSEMBLIES TESTED. IT IS
RECOMMENDED, THEREFORE, THAT THE 1/8 INCH
CHLOROPRENE WET SUIT BE CONSIDERED AS THE MOST
ACCEPTABLE ON THE BASIS OF SUCH PHYSICAL
CHARACTERISTICS AS REDUCED WEIGHT AND BULK.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-724 648 6/17 11/7
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

THE BEHAVIOR OF PROTECTIVE UNIFORMS IN
LARGE-SCALE SIMULATED FIRES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.

MAR 71 54P
REPT. NO. C/PLCEL-TS-177
PROJ: DA-1-0-024401-A-329
MONITOR: USA-NLABS YR-71-40-CE

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ERRATA SHEET INSERTED.

DESCRIPTORS: (•FLIGHT CLOTHING, •HEAT RESISTANT
MATERIALS), FIRE RESISTANT TEXTILES, MILITARY
FACILITIES, TEST FACILITIES, JET ENGINE FUELS, FIRES,
VISUAL INSPECTION, TEMPERATURE, SYNTHETIC FIBERS, ARMY
RESEARCH (U)
IDENTIFIERS: JP-4 FUEL, EVALUATION (U)

THE REPORT DESCRIBES A NEW TEST FACILITY DEVELOPED
AT THE U. S. ARMY NATICK LABORATORIES FOR
EXPOSING CLOTHED MANIKINS TO LARGE FUEL (JP-4)
FIRES AND GIVES THE RESULTS OF EVALUATIONS MADE OF
SEVERAL PROTECTIVE SYSTEMS DEVELOPED FOR HOT AND COLD
WEATHER AVIATORS' UNIFORMS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-726 076 6/17 13/1
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

EFFICACY OF VENTILATING SYSTEMS.

(U)

70 9P VEGHTE, JAMES H. ;
PROJ: AF-7222
TASK: 722207
MONITOR: AMRL TR-69-54

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN NASA. AMES RESEARCH
CENTER PORTABLE LIFE SUPPORT SYSTEMS, NASA
SP-234 P151-177 N.O.

DESCRIPTORS: (*FLIGHT CLOTHING, VENTILATION),
EQUILIBRIUM(PHYSIOLOGY), PHYSIOLOGY, HUMIDITY,
TEMPERATURE, PERMEABILITY, EVAPORATION, PULSE RATE,
SWEAT GLANDS, AEROSPACE MEDICINE

(U)

SEVERAL AIR-COOLED SYSTEMS AND ONE WATER-COOLED
SYSTEM WORN UNDER FLIGHT CLOTHING WERE EVALUATED.
THE SUBJECTS WERE EXPOSED TO AN ENVIRONMENT OF 43
C/45 MM HG WATER VAPOR PRESSURE AT SEA LEVEL.
SWEAT LOSS, BODY TEMPERATURE, AND HEART RATE
MEASUREMENTS WERE TAKEN. ALL SYSTEMS WERE FOUND TO
AMELIORATE DISCOMFORT WITH THE WATER-COOLED SYSTEM
SHOWING SLIGHT ENHANCEMENT OVER AIR SYSTEMS.
PROVISIONS FOR COOLING THE FACE DECREASED
DISCOMFORT. OPTIMAL VENTILATING SYSTEMS ARE
PROPOSED FOR PERMEABLE AND IMPERMEABLE CLOTHING.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-776 698 6/17 6/11
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

PROGRESS REPORT ON THE DAMAGE CONTROL SUIT
SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 71 36P AUDET, NORMAN F. ;
REPT. NO. TR-95, 5-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, DESIGN), (*LIFE
SUPPORT, PROTECTIVE CLOTHING), TEMPERATURE, CHEMICALS,
HUMIDITY, RESPIRATION, OXYGEN, DETECTORS, TOXIC
TOLERANCES, HEADGEAR, COMMUNICATION SYSTEMS, NAVAL
RESEARCH

(U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT IS DEVELOPING A DAMAGE CONTROL SUIT
SYSTEM TO PROTECT PERSONNEL IN HAZARDOUS CHEMICAL,
HIGH TEMPERATURE-HUMIDITY, AND OXYGEN DEFICIENT
ENVIRONMENTS. DATA INDICATE THE SYSTEM WILL PROVIDE
LIFE SUPPORT FOR AN INDIVIDUAL COMPLETELY
ENCAPSULATED FROM HIS ENVIRONMENT FOR A MAXIMUM OF 80
MINUTES AT 140F, WHILE PERFORMING LIGHT ACTIVITY,
AND FOR 120 MINUTES AT 70F, WHILE MODERATELY
ACTIVE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-727 021 6/17
CIVIL AEROMEDICAL INST OKLAHOMA CITY OKLA

PROTECTIVE SMOKE HOOD STUDIES:

(U)

DEC 70 66P MCFADDEN, ERNEST B. SMITH,
ROGER C. I
MONITOR: FAA-AM 70-20

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE COVERINGS, SMOKE),
(*PROTECTIVE MASKS, SMOKE), (*FIRE PROTECTIVE CLOTHING,
EFFICIENCY), RESCUES, EVACUATION, PHYSIOLOGY (U)
IDENTIFIERS: *PROTECTIVE HOODS (U)

THE REPORT DESCRIBES THE EVALUATION AND TESTING OF
A HIGH-TEMPERATURE RESISTANT, TRANSPARENT, POLYIMIDE
HOOD DESIGNED TO PROTECT AIRCRAFT PASSENGERS AND CREW
FROM THE EFFECTS OF TOXIC FUMES, SMOKE AND FLAME
RESULTING FROM AN AIRCRAFT ACCIDENT. AS A 'GET-ME-
OUT' DEVICE, THE HOOD WAS DEVELOPED TO PROVIDE
PROTECTION OF THE RESPIRATORY SYSTEM AND MAINTAIN THE
OCCUPANT IN A CONSCIOUS AND MOBILE STATE SO THAT THE
AIRCRAFT CAN BE EVACUATED BEFORE SMOKE AND HIGH
TEMPERATURES RENDER THE CABIN ENVIRONMENT
UNINHABITABLE. CONSISTING OF A SERIES OF
INDEPENDENT STUDIES, THIS REPORT ENCOMPASSES
CONTRIBUTIONS FROM THE FIELDS OF PHYSIOLOGY,
PSYCHOLOGY, AND HUMAN FACTORS. THE GENERAL SMOKE
HOOD CONCEPT IS EXAMINED WITH RESPECT TO
ENVIRONMENTAL PROTECTION, VISION, HEARING, SAFETY
BRIEFINGS, AND THE EFFECT OF THE HOOD UPON VACUATION
EFFICIENCY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-727 222 6/17
WEBB ASSOCIATES YELLOW SPRINGS OHIO

PROTECTION OF AIRCREWS FROM HIGH
TEMPERATURES; USE OF A WATER-COOLED GARMENT
FOR HEAT BALANCE STUDIES IN MAN. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUL 71 11P WEBB, PAUL ;
CONTRACT: F44620-70-C-0045
PROJ: AF-9777
MONITOR: AFOSR TR-71-1982

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, COOLING), HEAT
TOLERANCE, BODY TEMPERATURE, HEAT PRODUCTION(BIOLOGY),
PHYSIOLOGY, METABOLISM, FLIGHT, PERIODIC VARIATIONS,
RHYTHM(BIOLOGY), THERMAL INSULATION (U)

A WATER-COOLED SUIT WAS DEVELOPED FOR USE AS A
DIRECT CALORIMETER WITH ERROR OF APPROXIMATELY ONE
PERCENT WHEN HEAT LOSS WAS MATCHED TO HEAT PRODUCTION
OVER A FULL 24-HOUR METABOLIC CYCLE. THE NEW SUIT
WAS COUPLED WITH A PREVIOUSLY DEVELOPED METABOLIC
RATE MONITOR IN A SERIES OF HUMAN EXPERIMENTS. IT
WAS SHOWN THAT DURING 30-35 CONTINUOUS HOURS OF
MONITORING BODY HEAT CONTENT IS NOT CONSTANT, EVEN AT
REST, AND THERE IS CONSTANT SWING OF HEAT STORAGE OF
SOME MAGNITUDE; STORAGE IS GENERALLY TEN PERCENT OF
METABOLIC RATE. SECONDLY, IT WAS FOUND THAT THERE
ARE SINUSOIDAL RHYTHMS IN HEAT PRODUCTION AND HEAT
LOSS, WHICH ARE MATCHED BUT OUT OF PHASE, AND THE
PHASE SHIFT CAN EXPLAIN THE ESTABLISHED CIRCADIAN
RHYTHM IN RECTAL TEMPERATURE. THESE DATA ARE OF
CONSIDERABLE INTEREST TO USAF LABORATORIES STUDYING
PHYSIOLOGICAL ADJUSTMENTS FOLLOWING FLIGHTS OVER
SEVERAL TIME ZONES, CHANGES IN BIOLOGICAL RHYTHMS
DURING PROLONGED FLIGHTS, AND IN DESIGNING NEW
PROTECTIVE EQUIPMENT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-727 606 13/1 6/17
NAVAL MEDICAL RESEARCH INST BETHESDA MD

DEVELOPMENT OF A HEATER-PUMP TO PROTECT A
DIVER IN COLD WATER. (U)

DESCRIPTIVE NOTE: MEDICAL RESEARCH INTERIM REPT.,
APR 71 22P EICHER, MAYNARD ; CONNOR,
THOMAS J. ; WISEMAN, OSCAR M. ; LETO, FRANK C.
; JR. ; TAUBER, JOHN F. ;
PROJ: M4306.02
MONITOR: NAVMED M4306.02-60108-3

UNCLASSIFIED REPORT

DESCRIPTORS: (•HEATERS, •UNDERWATER CLOTHING), PUMPS,
HEATING (U)

IN AN EFFORT TO PROVIDE A MEANS OF KEEPING A DIVER
WARM IN A COLD ENVIRONMENT FOR A USEFUL PERIOD OF
TIME, A SERIES OF FIVE HEATER-PUMPS WAS PROGRESSIVELY
DEVELOPED. THEY CIRCULATED HEATED WATER THROUGH A
WELSON TUBING SUIT, WORN UNDER A NEOPRENE WET SUIT.
IN EACH UNIT THE HOT WATER WAS PRODUCED IN A BOILER
WITH A 750 WATT ELECTRIC IMMERSION HEATER AND PUMPED
IN A CLOSED SYSTEM THROUGH THE SUIT. WITH
EFFICIENCIES OF ABOUT 85 PERCENT, DIVER COMFORT WAS
MAINTAINED IN A 4 DEGREES C WATER. THE HEATER-
PUMPS WERE DESIGNED TO OPERATE ON 24 VOLTS AT A DEPTH
OF 600 FEET. THEY WERE DIVER TESTED IN AN OPEN
TANK AND WITH SIMULATED LOADS, RECORDING TEMPERATURES
AND FLOW RATES. THE RESULTS WITH THESE PROTOTYPE
UNITS INDICATED THE FEASIBILITY OF A LOW-COST,
SUCCESSFUL, HEATER PUMP FOR EITHER BATTERY OR FOR
UMBILICAL CABLE OPERATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-729 362 6/17 14/2
ARMY AEROMEDICAL RESEARCH LAB FORT RUCKER ALA

THE TESTING OF THERMAL PROTECTIVE CLOTHING IN
A REPRODUCIBLE FUEL FIRE ENVIRONMENT, A
FEASIBILITY STUDY, (U)

JUN 71 114P ALBRIGHT, JOHN D. ; KNOX,
FRANCIS S. , III ; DUBOIS, DAVID R. ; KEISER,
GEORGE M. I
REPT. NO. USAARL-71-24
PROJ: DA-3-A-062110-A-819

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIRE PROTECTIVE CLOTHING, TEST
FACILITIES), (*TEST FACILITIES, DESIGN), THERMAL
RADIATION, TEXTILES, BURNS, LIFE SUPPORT, AVIATION
SAFETY, FLAMMABILITY, AVIATION FUELS, FEASIBILITY
STUDIES (U)

THE REPORT SETS FORTH THE CONCEPTUAL DESIGN FOR A
FACILITY INTENDED FOR DEVELOPMENT AND EVALUATION OF
THERMAL PROTECTIVE CLOTHING IN A REPRODUCIBLE FUEL
FIRE ENVIRONMENT. THE METHODS DEVELOPED RELATE
THERMAL CHARACTERISTICS OF FABRICS TO BIOMEDICAL
ASPECTS OF BURN PREVENTION. A NUMBER OF
BIOENGINEERING PROBLEMS ARE IDENTIFIED, THE
RESOLUTION OF WHICH IS EXPENSIVE AND TIME CONSUMING.
IT IS CONCLUDED THAT CONSTRUCTION OF THE FACILITY
DESIGNED IS TECHNICALLY FEASIBLE. DUE TO THE
MAGNITUDE AND COMPLEXITY OF THE BIOENGINEERING
PROBLEMS IDENTIFIED, AND BECAUSE OF ADVANCES IN
LABORATORY TESTING METHODS, HOWEVER, CONSTRUCTION OF
SUCH A FACILITY IS NOT CONSIDERED TO BE A PRUDENT
EXPENDITURE OF PUBLIC FUNDS AT THIS TIME.
OPERATIONALLY ORIENTED BIOENGINEERING/AEROMEDICAL
EVALUATION OF THERMAL PROTECTIVE CLOTHING SYSTEMS
REMAINS ESSENTIAL. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-729 664 5/5
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

PRELIMINARY SURVEY OF DIVER
ANTHROPOMETRICS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 71 28P BEATTY, HUGH T. ; BERGHAGE,
THOMAS E. ; CHANDLER, DONALD R. ;
REPT. NO. NEDU-RR-7-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANTHROPOMETRY, NAVAL PERSONNEL),
(*DIVING, NAVAL PERSONNEL), (*UNDERWATER CLOTHING,
DESIGN), DATA, STATISTICAL ANALYSIS, TABLES (U)

ANTHROPOMETRIC DATA FOR NAVY DIVERS WERE
COLLECTED AND ANALYZED FOR MEAN, STANDARD DEVIATION,
SKEWNESS AND KURTOSIS. THE DATA WERE ANALYZED BY
COMPUTER PERCENTILES CALCULATED AND PRINTED OUT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-730 711 6/7 13/10.1 6/17 5/5
NAVAL SUBMARINE MEDICAL RESEARCH LAB GROTON CONN

HUMAN FACTORS EVALUATION OF SUBMARINE
ESCAPE: II-A. TOP EGRESS WITH THE
BRITISH SUBMARINE ESCAPE IMMERSION SUIT AND
THE STEINKE HOOD. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
OCT 70 29P RYACK, BERNARD L. WALTERS,
GARY B. I
REPT. NO: SMRL-644
PROJ: MF12.524.006
MONITOR: NAVMED MF12.524.006-9025B-38

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-718 855.

DESCRIPTORS: (*SUBMARINE ESCAPE, HUMAN ENGINEERING),
(*UNDERWATER CLOTHING, SUBMARINE ESCAPE), DECOMPRESSION
SICKNESS, TIME, HATCHES, SUBMARINE PERSONNEL,
CORRELATION TECHNIQUES, SEA RESCUE EQUIPMENT, TESTS (U)
IDENTIFIERS: *STEINKE HOODS, *SUBMARINE ESCAPE
SUITS (U)

THE BRITISH MARK VII SUBMARINE ESCAPE
IMMERSION SUIT (SEIS) WHICH PROVIDES THERMAL
PROTECTION AND THE STEINKE HOOD WHICH DOES NOT,
WERE EVALUATED FOR SINGLE-MAN AND GROUP ESCAPE (2-
AND 3-MAN TEAMS) FROM A SIMULATED TOP EGRESS
UNITED STATES NAVY ESCAPE TRUNK. FOR BOTH
ESCAPE APPLIANCES, EGRESS TIME INCREASED LINEARLY AS
A FUNCTION OF TEAM SIZE. THREE-MAN TEAMS AND TWO-
MAN TEAMS ESCAPED FASTER WITH THE SEIS THAN WITH
THE STEINKE HOOD; THERE WAS NO DIFFERENCE FOR
ONE-MAN ESCAPES. SINGLE-MAN ESCAPE TIMES WITH THE
SEIS WERE COMPARABLE TO THOSE OBTAINED BY THE
BRITISH. WHEN COMPARED WITH SIDE AND TUBE
EGRESS, TOP EGRESS OFFERS A SUBSTANTIAL REDUCTION IN
ESCAPE TIME AND THEREFORE IN TOTAL BOTTOM TIME.
SAFE ESCAPES FROM DEPTHS IN ACCESS OF 450 FEET BY
TEAMS OF MORE THAN TWO MEN ARE FEASIBLE FROM A TOP
HATCH CONFIGURATION BUT ARE NOT POSSIBLE FROM A SIDE
OR TUBE EGRESS CONFIGURATION. A SUBMARINE ESCAPE
SYSTEM EMPLOYING TOP EGRESS AND THE EXPOSURE
PROTECTION OF THE SEIS IS RECOMMENDED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOM08

AD-731 556 6/17
WELSON AND CO INC HARTFORD CONN

A ROCKET PROPELLANT HANDLER'S SUIT FOR
PROTECTION FROM CHLORINE TRIFLUORIDE AND
ELEMENTAL FLUORINE. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. SEP 69-OCT 70,
AUG 71 60P MARTONE, JOSEPH A. IBERGEN,

GAIL A. I

CONTRACT: F04611-69-C-0102

PROJ: AF-3058

MONITOR: AFRPL TR-71-44

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, *LIQUID ROCKET
OXIDIZERS), (*FLUORINE, PROTECTIVE CLOTHING),
DEGRADATION, CHLORINE COMPOUNDS, FLUORIDES, HALOGENATED
HYDROCARBONS, TEXTILES, LIQUEFIED GASES (U)
IDENTIFIERS: *CHLORINE FLUORIDE (CLF3), CHLORINE
FLUORIDES, FLUORINATED POLYMERS (U)

EXTREMELY POWERFUL AND HIGHLY TOXIC OXIDIZERS SUCH
AS FLUORINE (F2) AND CHLORINE TRIFLUORIDE
(CLF3) ARE CURRENTLY BEING STUDIED AT THE AIR
FORCE ROCKET PROPULSION LABORATORY. A
PROTOTYPE PROPELLANT HANDLER'S SUIT FOR PROTECTION
AGAINST GASEOUS FLUORINE AND LIQUID CHLORINE
TRIFLUORIDE HAS BEEN DEVELOPED AND OPERATIONALLY
TESTED. THE EXPOSED COMPONENTS OF THIS GARMENT ARE
MADE OF PERFLUOROPOLYMERS AND STAINLESS STEEL. THE
COMPLETE SUIT AND SAMPLE COMPONENTS WERE EXPOSED TO
BOTH GASEOUS FLUORINE AND LIQUID CHLORINE
TRIFLUORIDE. THE SUIT REACTED WITH LIQUID CHLORINE
TRIFLUORIDE AND THEREFORE FAILED TO PASS THE
OPERATIONAL TEST. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-732 194 6/17

AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

CENTRIFUGE VALIDATION OF A TACTILE 'G-
LIMIT' WARNING DEVICE.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

AUG 71 10P THORBURN, DAVID E. ;

REPT. NO. AMRL-TR-71-80

PROJ: AF-7184

TASK: 718410

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, WARNING SYSTEMS), (*JET
FIGHTERS, GRAVITY), SOLENOIDS, PULSE SYSTEMS, TESTS,
FLIGHT TESTING, HUMAN ENGINEERING (U)

THE PURPOSE OF THE EXPERIMENT WAS TO EVALUATE THE
EFFECTIVENESS OF A TACTILE, PULSATING, WARNING SIGNAL
UNDER G-LOAD CONDITIONS. SUBJECTS WERE REQUIRED
TO RESPOND TO A TACTILE PULSATING SIGNAL IN THEIR
ANTI-G SUIT WHILE UNDER VARYING G LOADS BY
PULLING A TRIGGER ON THEIR CONTROL STICK. THE
TACTILE 'G-LIMIT' WARNING PULSE PROVED TO BE A VERY
EFFECTIVE SIGNALING DEVICE. NOT ONE WARNING SIGNAL
AT ANY FREQUENCY WAS MISSED BY ANY SUBJECT. ONE
SUBJECT EVEN REPORTED FEELING THE SIGNAL AFTER HE HAD
BLACKED OUT WHICH POINTS OUT THE OBVIOUS ADVANTAGE OF
A TACTILE WARNING IN NOT REQUIRING A PILOT VISUAL OR
EVEN AUDIO ATTENTION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-732 429 11/5 6/17 13/12
ARMY AEROMEDICAL RESEARCH LAB FORT RUCKER ALA

ENGINEERING TEST OF LIGHTWEIGHT UNDERWEAR OF
THE WINTER FLIGHT CLOTHING SYSTEM:
THERMAL PROTECTION, (U)

JUN 71 46P KNOX, FRANCIS S. , III;
MCCAHAN, GEORGE R. , JR.; WACHTEL, THOMAS L. ;
TREVETHAN, WALTER P. ; MARTIN, ANDREW S. ;
REPT. NO. USAARL-71-19
PROJ: DA-3-A-062110-A-819

UNCLASSIFIED REPORT

DESCRIPTORS: (*TEXTILES, *FIRE SAFETY), (*UNDERWEAR,
THERMAL PROPERTIES), (*FLIGHT CLOTHING, UNDERWEAR), JET
ENGINE FUELS, BURNS, TESTS, ARMY RESEARCH, HEAT-
RESISTANT MATERIALS. (U)
IDENTIFIERS: NOMEX FABRIC, THERMAL PROTECTION. (U)

THE REPORT DESCRIBES THE USE OF A BIOASSAY
TECHNIQUE TO EVALUATE THE FIRE RESISTANT AND THERMAL
PROTECTION CAPABILITIES OF THE LIGHTWEIGHT UNDERWEAR
OF THE ARMY WINTER FLIGHT CLOTHING SYSTEM.
SAMPLES OF FABRICS WERE MOUNTED ON A TEMPLATE AND
HELD IN CONTACT WITH THE SIDE OF A PIG. THUS
PROTECTED, THE PIG WAS EXPOSED TO A FLAME SOURCE
CALIBRATED TO SIMULATE A WELL DEVELOPED JP-4 FIRE.
EVALUATION OF RESULTANT SKIN BURNS SHOWS THAT NONE
OF THE FABRIC SYSTEMS, AS EVALUATED, MEET THE
ESSENTIAL REQUIREMENT OF 10 SECONDS PROTECTION.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-733 312 6/17
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

INVESTIGATION OF METHODS FOR IMPROVING THE
FRICTIONAL PROPERTIES OF RUBBER COMPOUNDS
USED IN FOOTWEAR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 71 39P MAHONEY, PATRICK J. ;
REPT. NO. C/PLSEL-88
PROJ: DA-1-T-01101-A-91-A
TASK: 1-T-01101-A-91-A-C7
MONITOR: USA-NLABS TR-72-2-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHOES, RUBBER), (*PROTECTIVE CLOTHING,
FRICTION), SURFACES, POLYMERS, ADDITIVES, MOISTURE,
HARDNESS, SKIDDING, TOLERANCES(MECHANICS), DESIGN,
COMPOSITE MATERIALS
IDENTIFIERS: FOOTWEAR

(U)

(U)

EFFORTS TO IMPROVE FRICTIONAL QUALITIES ENTAILED
THE TESTING OF VARIOUS TREAD DESIGNS, ADDITIVE
MATERIALS SUCH AS CORK AND COTTON FLOCK, COMPOSITE
SPECIMENS, AND CHanneLED AND SIpED SPECIMENS. TESTS
WERE ALSO CONDUCTED AT ROOM TEMPERATURE AND IN SOME
CASES AT 0F. THE DATA OBTAINED SHOW (1)
CHANGES IN TREAD DESIGN, COMPOSITES AND COARSE
ADDITIVE MATERIALS ARE INEFFECTIVE IN IMPROVING
FRICTION ON SMOOTH SURFACES; (2) SIpING OF FLAT
SPECIMENS SHOWED SLIGHT IMPROVEMENT OF FRICTION ON
WET SURFACES; (3) COMPOUNDS THAT RESIST HARDENING
AT 0F SHOW BETTER RETENTION OF FRICTION AT THAT
TEMPERATURE; AND (4) THE ORDER OF SKID RESISTANCE
OF SEVERAL COMPOUNDS CHANGES WHEN TESTED ON A
DIFFERENT SURFACE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-734 136

6/17

NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

PHYSIOLOGICAL EVALUATION OF A COMMERCIALY
AVAILABLE ABANDON-SHIP SURVIVAL SUIT.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

NOV 71

25P

SHAMPINE, JAMES C. REINS,

DALE A. :

REPT. NO. TR-97, 1-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXPOSURE SUITS, EFFICIENCY), FLOTATION,
TEMPERATURE, TOLERANCES(PHYSIOLOGY), NAVAL PERSONNEL,
LEAKAGE(FLUID), WATER, TEST METHODS, WEIGHT, NAVAL
RESEARCH

(U)

NAVY CLOTHING AND TEXTILE RESEARCH UNIT
(NCTPU) PERSONNEL HAVE TESTED A COMMERCIALY
AVAILABLE ABANDON-SHIP SURVIVAL SUIT IN WATER AT
35F TEMPERATURE, WHICH IS COMPARABLE TO THAT FOUND
IN VARIOUS OCEANS THROUGHOUT THE WORLD. TEST
RESULTS INDICATE THAT THIS SUIT WILL GIVE PROTECTION
FROM EXPOSURE TO COLD WATER FOR PERIODS OF 13 HOURS
AND MORE WHEN WORN OVER ANY OF THE ENSEMBLES STUDIED
DURING THIS TEST PROVIDING NO OTHER STRESSES ARE
PRESENT WHICH COULD INFLUENCE THE USER'S TOLERANCE
TIME. THIS SUIT CAN BE DONNED QUICKLY BUT CANNOT
BE WORN OVER BULKY COLD-WEATHER CLOTHING.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-735 377 6/11 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

DEVELOPMENT AND EVALUATION OF AN OXYGEN-
SENSING WARNING DEVICE.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
DEC 71 33P AUDET, NORMAN F. ; ORNER,
GEORGE M. I
REPT. NO. TR-98, 6-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, DESIGN), (*SENSORS,
*OXYGEN), NAVAL RESEARCH, ELECTRONIC EQUIPMENT, METERS,
RELIABILITY, ACCURACY (U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT HAS EVALUATED AN OXYGEN-SENSING WARNING
DEVICE, DEVELOPED BY BECKMAN INSTRUMENTS, INC.,
TO BE USED AS A SAFETY FEATURE IN A DAMAGE
CONTROL SUIT SYSTEM (DCSS) PRESENTLY UNDER
DEVELOPMENT. THE O2 WARNING DEVICE, WHICH
EMPLOYS A POLAROGRAPHIC OXYGEN SENSOR IN CONJUNCTION
WITH CONTROL ELECTRONICS AND A VISUAL OUTPUT,
PROVIDES A VISUAL WARNING IN THE EVENT OXYGEN
CONCENTRATIONS IN THE DCSS ARE ABOVE OR BELOW
CERTAIN PRESELECTED THRESHOLDS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-737 099 15/5 11/5
FABRIC RESEARCH LABS INC DEDHAM MASS

DEVELOPMENT OF THERMALLY DURABLE COATED
FABRICS FOR USE IN FLIGHT GLOVES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 69-DEC 70,
SEP 71 85P SKELTON, JOHN IKASWELL, ERNEST
R. I
CONTRACT: F33657-70-C-0152
MONITOR: ASD TR-71-47

UNCLASSIFIED REPORT

DESCRIPTORS: (GLOVES, THERMAL STABILITY), (FLIGHT
CLOTHING, FIRE RESISTANT MATERIALS), FLIGHT CREWS,
EXPERIMENTAL DESIGN, COATINGS, SHRINKAGE, HAZARDS,
PERFORMANCE (HUMAN)

(U)

THE FLIGHT GLOVES CURRENTLY SUPPLIED TO AIR
FORCE FLIGHT CREW MEMBERS PROVIDE SOFTNESS, TACTILE
RESPONSE, GRIPPING POWER AND DURABILITY. BUT IN
CONTACT WITH FLAME OR IN HEATED ENVIRONMENTS, THEIR
LEATHER BURNS, SHRINKS VIOLENTLY, AND BECOMES STIFF
AND BRITTLE. BECAUSE OF POTENTIAL DANGER, AN
EFFORT IS REPORTED TO DEVELOP MATERIALS WITH
MECHANICAL PERFORMANCE CHARACTERISTICS SIMILAR TO
THOSE OF LEATHER, BUT WHICH ARE FLAMEPROOF AND
THERMALLY STABLE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-737 720 6/17 13/1
WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA

THERMOELECTRIC HEATING AND VENTILATING
SYSTEM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. OCT 69-AUG 71,

NOV 71 36P BERNARD, A. M. I

CONTRACT: DAAG17-70-C-0044

PROJ: DA-1-J-062110-AJ-33

MONITOR: USA-NLABS.C/PLSEL

TR-72-26-CE,91

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEMPERATURE
CONTROL), (*AIR CONDITIONING EQUIPMENT,
*THERMOELECTRICITY), (*HEATING ELEMENTS, PROTECTIVE
CLOTHING), FUEL METERS, FUEL TANKS, PACKAGING,
PERFORMANCE(ENGINEERING)

(U)

IDENTIFIERS: THERMOELECTRIC POWER GENERATION

(U)

MODIFICATIONS AND IMPROVEMENTS INCORPORATED INTO A
THERMOELECTRIC HEATING AND VENTILATING SYSTEM ARE
DESCRIBED. THE THERMOELECTRIC HEATING AND
VENTILATING SYSTEM IS DESIGNED TO PROVIDE A FLOW OF
TEMPERATURE REGULATED AIR FOR USE IN HEATING OR
VENTILATING A SPECIALLY DESIGNED MILITARY CLOTHING
ENSEMBLE. THE SYSTEM WEIGHS TEN POUNDS UNFUELED
AND REQUIRED 0.26 POUNDS OF FUEL FOR EACH HOUR OF
OPERATION. EIGHTEEN C.F.M. OF AIR (S.T.P.
CONDITIONS) AT FOUR INCHES WATER COLUMN PRESSURE IS
DELIVERED FOR USE IN KEEPING AN INDIVIDUAL IN THERMAL
BALANCE WHEN OPERATING IN EXTREME ENVIRONMENTS (-
40F TO +110F) OR WHEN EXPOSED TO HAZARDS.
THE ELECTRICAL POWER REQUIRED TO OBTAIN THE FLOW OF
AIR IS SUPPLIED BY A THERMOELECTRIC GENERATOR WHICH
CONVERTS THERMAL ENERGY DIRECTLY INTO ELECTRICAL
ENERGY. THE THERMAL ENERGY IS DERIVED FROM THE
COMBUSTION OF LIQUID MILITARY FUELS: LEADED GASOLINE,
KEROSENE, JP-4 AND DIESEL FUELS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-738 088 6/17
MAUCH LABS INC DAYTON OHIO

EXPERIMENTAL SPACE WORKER'S GARMENT AND
HELMET ASSEMBLY.

(U)

DESCRIPTIVE NOTE: TECHNICAL DOCUMENTARY REPT.,
MAR 72 23P MARCUM, A. L. MAUCH, H.

A. I
CONTRACT: AF 33(657)-8095
PROJ: AF-6301
TASK: 630104
MONITOR: AMRL TDR-64-37

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REVISION OF REPORT DATED MAY 64.
SUPERSEDES AD-351 372.

DESCRIPTORS: (*PROTECTIVE CLOTHING, DESIGN), (*SPACE
ENVIRONMENTS, PROTECTIVE CLOTHING), PRESSURIZATION,
THERMAL PROPERTIES, PHOTOGRAPHS, PRESSURE SUITS, GLOVES,
HELMETS, MOBILITY, MATERIALS, NYLON, SYNTHETIC RUBBER(U)

A NEW TECHNIQUE FOR PRESSURIZATION AND THERMAL
CONTROL IN A SPACE WORKERS GARMENT HAS BEEN
INVESTIGATED. THE GOAL WAS TO DESIGN AND FABRICATE
COMPLETE COVERALLS AND HELMET THAT WOULD CONSIDER THE
SPACE ENVIRONMENT AND ACHIEVE PHYSIOLOGICAL
PROTECTION WITH EXCEPTIONAL RELIABILITY AND A MINIMUM
OF COMPLEMENTARY SYSTEMS. THE COVERALLS UTILIZES
MECHANICAL COUNTERPRESSURE APPLIED BY AN INTEGUMENT
OF CLOSED CELL MATERIAL CONFINED WITHIN A RESTRAINING
GARMENT. THERMAL EQUILIBRIUM IS TO BE ACHIEVED BY
ALLOWING NATURAL PHYSIOLOGICAL PROCESSES TO CONTROL
THE EVAPORATION OF PERSPIRATION INTO THE VACUUM OF
SPACE. (AUTHOR)

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-738 822 6/17
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

COLD WATER PROTECTION UNDER FIELD
CONDITIONS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
SEP 53 15P WOLFE, T. R. IDWYER, U. V.,
JR;
REPT. NO. NEDU-FORMAL-3-53

UNCLASSIFIED REPORT

DESCRIPTORS: (•UNDERWATER CLOTHING, EFFICIENCY),
(•PROTECTIVE CLOTHING, LOW TEMPERATURE), THERMAL
INSULATION, DIVING, BODY TEMPERATURE

(U)

ELEVEN RUNS WERE MADE FOR THIS EVALUATION, ALL WITH
THE SUBJECTS IMMERSED BUT NOT SUBMERGED IN 30F
WATER. FOUR RUNS WERE MADE UNDER RESTING
CONDITIONS, AND FOUR UNDER SWIMMING CONDITIONS, TO
TEST VARIOUS TYPES OF INSULATING UNDERCLOTHING WORN
BENEATH THE STANDARD SWIM SUIT. IN ADDITION, THREE
DIVES WERE MADE UNDER SWIMMING CONDITIONS TO TEST
THREE TYPES OF INSULATING SWIM SUITS. THE FOUR
UNDERCLOTHING MATERIALS WERE: 1/8 IN. FLAT
ENSOLYTE, 1/4 IN. FLAT ENSOLYTE, 1/4 IN. BUTTON
ENSOLYTE, AND ONE SUIT OF 100% WOOL UNDERWEAR.
THE THREE SWIM SUIT MATERIALS WERE: 1/4 IN. FLAT
ENSOLYTE, 1/4 IN. FLAT CHEMICALLY BLOWN NEOPRENE, AND
1/4 IN. FLAT MECHANICALLY BLOWN LATEX.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-738 981 6/17

TEXAS A AND M UNIV COLLEGE STATION DEPT OF INDUSTRIAL
ENGINEERING

EFFECT OF SAFETY GLOVES ON SIMULATED WORK
TASKS.

(U)

DESCRIPTIVE NOTE: RESEARCH REPT..

DEC 70 69P WEIDMAN, BRENT H. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: MASTER'S THESIS.

DESCRIPTORS: (*PROTECTIVE CLOTHING, TESTS), (*GLOVES,
SELECTION), SAFETY, LABOR, LEATHER, COTTON, SYNTHETIC
RUBBER, POLYVINYL CHLORIDE, SIMULATION,
PERFORMANCE(HUMAN)

(U)

THE INCREASING DEMAND BEING PLACED ON THE HUMAN
HAND TO FUNCTION IN NEW ENVIRONMENTS REQUIRES
EXAMINATION OF HOW PERFORMANCE IS AFFECTED BY THE
REQUIRED SAFETY GLOVES. THE OBJECTIVE IN THIS
RESEARCH IS TO HELP DETERMINE WHICH SAFETY GLOVE OR
GLOVE TYPES ARE BEST SUITED FOR PARTICULAR WORK
SITUATIONS WHEN THERE IS A CHOICE IN THE TYPE OF
SAFETY GLOVE WHICH WILL SATISFY THE SAFETY
REQUIREMENTS. THE PERFORMANCE OF TEN SUBJECTS
PERFORMING FIVE SIMULATED WORK TASKS UNDER FIVE GLOVE
CONDITIONS IS EXAMINED IN THIS REPORT. THE FIVE
GLOVE CONDITIONS CONSIST OF BAREHAND AND LEATHER,
TERRY CLOTH, NEOPRENE, AND PVC GLOVES.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-739 695 14/2 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

HYDROSPACE SIMULATOR FACILITY FOR MATERIALS
TESTING. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 72 34P AUDET, NORMAN F. ;
REPT. NO. TR-99: 10-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*TEST FACILITIES, *UNDERWATER CLOTHING),
DEEP SUBMERGENCE, SIMULATORS, THICKNESS, THERMAL
CONDUCTIVITY, DEFORMATION, HYDROSTATIC PRESSURE (U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT (NCTRU) DEVELOPED A HYDROSPACE SIMULATOR
FACILITY FOR TESTING MATERIAL PROPERTIES AT SEA
DEPTHS TO 1,000 FSW. THE FACILITY CONTAINS THREE
TESTERS TO STUDY MATERIAL THICKNESS, STRETCH-FLEX,
AND THERMAL CONDUCTANCE PROPERTIES FROM NORMAL
AMBIENT PRESSURES TO 1,000 FSW. THE EQUIPMENT
COMPLEX ALSO INTEGRATES THE GAS CONTROL AND
INSTRUMENTATION HARDWARE, TESTERS, AND PRESSURE
CHAMBER EQUIPMENT NECESSARY FOR STUDYING THE MATERIAL
PROPERTIES OUTLINED. THE MATERIAL PROPERTIES WHICH
CAN BE STUDIED WITH THIS FACILITY ARE OF SIGNIFICANT
IMPORTANCE IN THE DEVELOPMENT AND/OR SCREENING OF
MATERIALS SUITABLE FOR DEEP SEA SWIMMERS' SUITS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-740 738 6/17
EDGEWOOD ARSENAL MD

EVAPORATIVE COOLING OF MEN IN WET
CLOTHING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. MAR-AUG 71,
MAR 72 24P CRAIG, F. N. ;
REPT. NO. EA-TR-4629
PROJ: DA-1-W-662710-AD-25
TASK: 1-W-662710-AD-2501

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, COOLING),
EVAPORATION, PERSPIRATION, MOISTURE, HEAT, HUMIDITY,
ATROPINE, DOSAGE, EXPOSURE(PHYSIOLOGY), BODY
TEMPERATURE, SAFETY, EXERCISE(PHYSIOLOGY)
IDENTIFIERS: CHOLINESTERASE INHIBITORS, *EVAPORATIVE
COOLING

(U)

(U)

THREE GROUPS OF MEN WEARING THE CBR PROTECTIVE
UNIFORM WERE EXPOSED TO SIX CONDITIONS OF VARYING
HEAT, HUMIDITY, WIND, EXERCISE, AND INITIAL WATER
CONTENT OF THE CLOTHING. EACH CONDITION WAS
REPEATED WITH AND WITHOUT A 2-MG DOSE OF ATROPINE
SULFATE. IN TROOPS WEARING THE CBR PROTECTIVE
UNIFORM WHO INJECT A 2-MG DOSE OF ATROPINE INTO
THEMSELVES ON THE MISTAKEN ASSUMPTION OF AN EXPOSURE
TO AN ANTICHOLINESTERASE AGENT, THE RISE IN RECTAL
TEMPERATURE CAUSED BY THE INHIBITION OF SWEATING BY
ATROPINE CAN BE KEPT WITHIN SAFE LIMITS IF EXERCISE
IS AVOIDED AND THE CLOTHING IS WET WITH SWEAT AT THE
TIME OF INJECTION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-742 816 6/17 13/2
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE
VA

FUNCTIONAL SPECIAL CLOTHING FOR BUILDERS.

(U)

JAN 72 IIP SHIBANOV, N. I
REPT. NO. FSTC-HT-23-368-71
PROJ: FSTC-T7023012301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF STROIKAKH ROSSII
(USSR) N7 1970.

DESCRIPTORS: (*PROTECTIVE CLOTHING, CONSTRUCTION),
CLIMATE, PERFORMANCE(HUMAN), PRODUCTION, FIRE PROTECTIVE
CLOTHING, HEAT RESISTANT MATERIALS, COLD WEATHER TESTS,
TROPICAL TESTS, ENVIRONMENTAL TESTS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

SPECIAL PURPOSE PROTECTIVE CLOTHING FOR WORKMEN IN
VARIOUS TYPES OF EMPLOYMENT, PARTICULARLY
CONSTRUCTION ENGINEERING PERSONNEL, IS NECESSARY FOR
PROFICIENT PERFORMANCE OF PRODUCTION OPERATIONS.
THE REPORT DISCUSSES PROTECTIVE CLOTHING TO BE USED
BY THOSE IN THE BUILDING INDUSTRY. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-746 037 6/17
DEFENCE RESEARCH INFORMATION CENTRE ORPINGTON
(ENGLAND)

CALCULATION OF THE THERMAL RESISTANCE OF THE
AIR LAYERS IN AIR-PERMEABLE CLOTHING.

(U)

JUL 72 9P YANKELEVICH, V. I. ;
REPT. NO. DRIC-TRANS-2717, DRIC-BR-300094

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF IZVESTIYA VYSSHIKH
UCHEBNYKH ZAVEDENII. TEKHNLOGIYA TEKSTILNOI
PROMYSHLENNOSTI (USSR) N2 P111-115 1971, BY M. V.
MIDDLETON.

DESCRIPTORS: (*PROTECTIVE CLOTHING, THERMAL INSULATION),
HEAT TRANSFER, THERMAL CONDUCTIVITY, CLOTHING, AIR,
PERMEABILITY, MATHEMATICAL ANALYSIS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE THERMAL RESISTANCE OF THE AIR LAYERS IN
CLOTHING WHICH ALLOWS AIR TO PERMEATE THROUGH IT WAS
INVESTIGATED. THE METHOD DESCRIBED FOR CALCULATING
THE THERMAL RESISTANCE OF AIR-PERMEABLE ARTICLES
MAKING ALLOWANCE FOR THE THERMAL RESISTANCE OF THE
AIR LAYER YIELDS RESULTS CLOSE TO THE EXPERIMENTAL
ONFS. THIS MAKES POSSIBLE THE RELIABLE DESIGN OF
HEAT PROTECTIVE CLOTHING FOR ANY GIVEN CONDITIONS OF
WORK OR CLIMATE. (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-746 159 11/5 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

DEVELOPMENT OF AN INTEGRAL, NEOPRENE-COATED,
ALUMINIZED, ASBESTOS CLOTH FOR FIRE
FIGHTERS' SHIPBOARD COVERALLS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 72 21P KUPFERMAN, ZELIG I
REPT. NO. TR-103, 4-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, FIRE RESISTANT
TEXTILES), (*SHIP FIRES, NAVAL PERSONNEL), ASBESTOS,
CLOTHING, ALUMINUM COATINGS, WEAR RESISTANCE, WEIGHT,
FLEXURAL STRENGTH, SYNTHETIC RUBBER, TEST METHODS, NAVAL
RESEARCH (U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT (NCTRU) HAS DEVELOPED AN IMPROVED, NEOPRENE-
COATED, ALUMINIZED, 1.2-POUND ASBESTOS
(UNDERWRITER'S GRADE) CLOTH TO REPLACE THE
NEOPRENE-COATED, ALUMINIZED, 11-OUNCE, GLASS/
ASBESTOS, COTTON FABRIC FOR USE IN SHIPBOARD
FIREFIGHTER'S COVERALLS. IN PRIOR TESTING, THE
NEOPRENE-COATED, ALUMINIZED, 1.2-POUND ASBESTOS CLOTH
DEMONSTRATED SIGNIFICANT IMPROVEMENTS OVER THE
NEOPRENE-COATED, ALUMINIZED, 11-OUNCE, GLASS/
ASBESTOS, COTTON FABRIC IN BOTH DURABILITY OF THE
BASIC CLOTH AND ABRASION RESISTANCE OF THE ALUMINUM
COATING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-747 276 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

EVALUATION OF HEAT LOSS FROM NAVY DIVERS' WET SUIT.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 72 24P REINS, DALE A. ; SHAMPINE,
JAMES C. ;
REPT. NO. TR-102, 4-70

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, THERMAL ANALYSIS),
(*EXPOSURE SUITS, HEAT TRANSFER), SEA RESCUE EQUIPMENT,
EXPANDED PLASTICS, SYNTHETIC RUBBER, BODY TEMPERATURE,
SEA WATER, FLUID FLOW, SAFETY (U)

IN A SERIES OF OVER 200 TESTS, SUBJECTS WORE
STANDARD, 3/16 INCH, CLOSED-CELL NEOPRENE-FOAM, AIR-
SEA RESCUE SUITS IN WATER OF 55, 45, AND 35 DEG. F.
THE TESTS WERE DESIGNED TO IDENTIFY AREAS OF THE
BODY WHERE MAJOR HEAT LOSSES OCCUR. OTHER
PHYSIOLOGICAL PARAMETERS WERE MONITORED TO ASSURE THE
PHYSICAL SAFETY OF TEST SUBJECTS WHILE BODY
TEMPERATURE AND METABOLIC RATES WERE MEASURED.
RECOMMENDATIONS ARE MADE AS TO AREAS IN WHICH
INSULATIVE VALUES COULD BE INCREASED WITHOUT
HAMPERING FREE MOVEMENT OF THE WEARER, AND DESIGN
MODIFICATIONS ARE SUGGESTED TO LIMIT FREE MOVEMENT OF
WATER INTO AND OUT OF THE SUIT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-748 091 6/17 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

COMBAT UNIFORMS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON TEST OPERATIONS
PROCEDURE.

JUN 72 16P
REPT. NO. TOP-10-3-021

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPERSEDES AD-873 485.

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS),
SAFETY, TEST FACILITIES, ACCEPTABILITY, WEAR RESISTANCE,
MAINTAINABILITY, HUMAN FACTORS ENGINEERING, VALUE
ENGINEERING, ENVIRONMENTAL TESTS (U)

IDENTIFIERS: *COMBAT UNIFORMS, COMMODITY SERVICE TEST
PROCEDURE (U)

THE REPORT DESCRIBES A METHOD FOR EVALUATION OF
COMBAT UNIFORM OPERATIONAL AND FUNCTIONAL
CHARACTERISTICS. IDENTIFIES SUPPORTING TESTS,
FACILITIES, AND EQUIPMENT REQUIRED. PROVIDES
PROCEDURES FOR PREOPERATIONAL INSPECTION, PHYSICAL
CHARACTERISTICS, SAFETY, PERSONNEL TRAINING, SIZING,
FITTING, ISSUE, FUNCTIONAL SUITABILITY, DURABILITY,
MAINTAINABILITY, HUMAN FACTORS, AND VALUE ANALYSIS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-748 836 15/2 13/1
WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA

VENTILATING BACKPACK FOR THE SUIT SYSTEM,
TOXICOLOGICAL PROTECTIVE MICRO-CLIMATE
CONTROLLED (CB PROTECTIVE SYSTEM FOR EOD
PERSONNEL).

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 70-JAN 72,
JAN 72 71P NAUMER, D. A. IRITTER, R. I

CONTRACT: DAAG17-70-C-0171

PROJ: DA-1-J-664713-DL-40

MONITOR: USA-NLABS/C/PLSEL

TR-72-61-CE,96

UNCLASSIFIED REPORT

DESCRIPTORS: (*COOLING + VENTILATING EQUIPMENT, DESIGN),
(*MILITARY PERSONNEL, *PROTECTIVE CLOTHING), BREATHING
APPARATUS, CHEMICAL WARFARE AGENTS, BIOLOGICAL WARFARE
AGENTS, EXPOSURE SUITS, HOSES, CONTAINERS, ELECTRIC
CABLES, VENTILATION, FLOWERS, ENVIRONMENTAL TESTS (U)
IDENTIFIERS: EXPLOSIVE ORDNANCE DISPOSAL (U)

A VENTILATING BACKPACK ASSEMBLY WAS DESIGNED TO
PROVIDE 18 CFM OF FILTERED AIR TO A SPECIALLY
DESIGNED MILITARY CLOTHING ENSEMBLE TO PROVIDE
EXPLOSIVE ORDNANCE PERSONNEL WITH PROTECTION FROM
CB AGENTS. THIS FILTERED AIR PROVIDES BREATHING
AIR AND BODY VENTILATION WHILE A SUITED INDIVIDUAL
PERFORMS VARIOUS TASKS IN A TOXIC (CB) ENVIRONMENT.
THE REPORT DISCUSSES THE VARIOUS IMPROVEMENTS AND
INNOVATIONS WHICH WERE INCORPORATED IN THE FINAL
PRODUCTION MODEL. THE PROJECT CONSISTED OF FOUR
PHASES: A PRODUCT ENGINEERING STUDY, PRODUCTION OF
TEN PROTOTYPE UNITS, ENVIRONMENTAL TESTING AND
ENGINEERING FIELD SUPPORT, AND THE PRODUCTION OF
TWENTY-FIVE UNITS WITH EXTRA BATTERY PACKS.
(AUTHOR)

(U)

UNCLASSIFIED

/ZOM08

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-749 345 6/17

NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

THE DEVELOPMENT OF A BUOYANT-BALLISTIC VEST
FOR NAVAL FORCES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

SFP 72 36P KUPFERMAN, ZELIG ISILVIA, JOHN

REPT. NO. TR-104, 9-69

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, DESIGN), BUOYANCY,
FOAM, BALLISTICS, POLYETHYLENE PLASTICS, NYLON,
PROPENES, TEXTILES, VINYL PLASTICS, TEST METHODS, NAVAL
PERSONNEL (U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT (NCTRU) HAS DEVELOPED A BUOYANT-BALLISTIC
PROTECTIVE VEST WHICH PROVIDES INHERENT BUOYANCY BY
THE USE OF THREE PLIES OF 1/4-INCH UNICELLULAR,
POLYETHYLENE FOAM TOTALLING APPROXIMATELY 12 OUNCES.
DESIGNED PRIMARILY FOR NAVAL CREWS SUBJECTED TO
ENEMY SHELLING, THE VEST AFFORDS BALLISTIC PROTECTION
BY EMPLOYING SIX PLIES OF BALLISTIC NYLON CLOTH IN
FRONT OF EIGHT PLIES OF A LIGHTWEIGHT, NEEDLEPUNCHED,
POLYPROPYLENE FELT. IN ADDITION, EACH OF THE TWO
BALLISTIC ASSEMBLIES ARE ENCAPSULATED IN EIGHT MIL
VINYL FILM TO PREVENT WETTING-OUT AND TO IMPART ADDED
BUOYANCY. BALLISTIC TESTS HAVE SHOWN THE NEW VEST
TO HAVE EQUIVALENT BALLISTIC PROTECTION TO THE NYLON
CLOTH VEST, AND POOL TESTS HAVE SHOWN EXCELLENT
BUOYANCY CHARACTERISTICS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-750 830 6/17
DEFENCE RESEARCH INFORMATION CENTRE ORPINGTON
(ENGLAND)

ASSESSMENT OF THE THERMAL RESISTANCE OF
CLOTHING.

(U)

OCT 72 9P VOINOV, YU. F. IKARLINA, K.
V. ;
REPT. NO. DRIC-TRANS-2920, DRIC-BR-30290

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF IZVESTIYA VYSSHIKH
UCHERNYKH ZAVEDENII. TEKHNLOGIYA LOGKOI
PROMYSHLENNOSTI (USSR) NI P80-84 1972, BY B. F.
TOMS.

DESCRIPTORS: (*HEAT RESISTANT MATERIALS, PROTECTIVE
CLOTHING), (*PROTECTIVE CLOTHING, *THERMAL PROPERTIES),
HEAT TRANSFER, STRESS (PHYSIOLOGY), MATHEMATICAL MODELS,
THICKNESS, COSTS, DESIGN, USSR (U)
IDENTIFIERS: THERMAL RESISTANCE, TRANSLATIONS (U)

IN THE THERMAL RESISTANCE OF CLOTHING A SUBSTANTIAL
PART MAY BE PLAYED BY ANY OF THE COMPONENTS OF THE
THERMAL RESISTANCE DEPENDING ON THE THICKNESS OF THE
CLOTHING AND THE MAGNITUDE OF ITS OVERALL THERMAL
RESISTANCE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-752 128 6/17 15/2 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

CLOTHING AND EQUIPMENT, INDIVIDUAL,
PROTECTIVE, CB.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON TEST OPERATIONS
PROCEDURE.

JUL 72 14P
REPT. NO. TOP-8-3-041

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS),
(*CHEMICAL WARFARE AGENTS, PROTECTIVE CLOTHING), ARMY
EQUIPMENT, SAFETY, MILITARY REQUIREMENTS, COMPATIBILITY,
RELIABILITY, MAINTAINABILITY, HUMAN FACTORS ENGINEERING (U)

THE REPORT DESCRIBES A METHOD FOR EVALUATION OF
INDIVIDUAL CLOTHING AND EQUIPMENT PROTECTION
CHARACTERISTICS RELATIVE TO CHEMICAL AGENTS.
IDENTIFIES SUPPORTING TESTS, FACILITIES, AND
EQUIPMENT REQUIRED. PROVIDES PROCEDURES FOR
PHYSICAL CHARACTERISTICS, SAFETY, PERSONNEL TRAINING,
SIZING, FITTING, DORNING, DOFFING, COMPATIBILITY WITH
COMBAT TASKS, DURABILITY, RELIABILITY,
MAINTAINABILITY, HUMAN FACTORS, AND VALUE ANALYSIS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-754 278 6/17
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

COLD WATER EVALUATION OF ENVIRONMENTAL
MARINE DIVING SUITS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 72 22P VEGHTE, JAMES H. IKLEMM,
FRITZ K. ;
REPT. NO. AMRL-TR-72-65
PROJ: AF-7222
TASK: 722212

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, EFFECTIVENESS), COLD
WEATHER TESTS, PROTECTIVE CLOTHING,
EXPOSURE (PHYSIOLOGY)

(U)

THE 24-HOUR COLD WATER IMMERSION - LIFE RAFT
EXPOSURES WERE CONDUCTED IN OUR LABORATORY TEST
FACILITY INVOLVING THREE SUBJECTS IN EACH EXPOSURE.
PHYSIOLOGIC DATA WERE OBTAINED DURING THESE
EXPOSURES TO DISCERN THE BETTER COLD WATER PROTECTIVE
CAPABILITIES OF TWO ENVIRONMENTAL MARINE DIVING
SUITS. THE SWEDISH UNISUIT PROVED THERMALLY
SUPERIOR TO THE DUNLOP SUIT. SEVERAL
RECOMMENDATIONS ARE MADE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AP-754 935 6/17 11/5
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

EVALUATION OF FIRE RETARDANT FABRICS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 72 21P VEGHTE, JAMES H. ; MARKO,
ADOLF R. ; WILSON, CHARLES ;
REPT. NO. AMRL-TR-72-66
PROJ: AF-7222

UNCLASSIFIED REPORT

DESCRIPTORS: (•FIRE PROTECTIVE CLOTHING, •HEAT RESISTANT
PLASTICS), EFFECTIVENESS, NYLON, BENZIMIDAZOLES, FLIGHT
CLOTHING, AIRCRAFT FIRES, HEAT TRANSFER,
BURNS (INJURIES), SKIN (ANATOMY), HEAT TOLERANCE (U)
IDENTIFIERS: •NOMEX POLYMERS, •BENZIMIDAZOLE
POLYMERS (U)

THE VALIDITY OF CURRENT EXPERIMENTAL METHODS OF
EVALUATING FIRE RETARDANT CLOTHING IS DISCUSSED.
TWO HEAT RESISTANT, SYNTHETIC MATERIALS, NOMEX
AND POLYBENZIMIDAZOLE (PBI), ARE COMPARED IN
TERMS OF THEIR PHYSIOLOGIC PROTECTIVE CAPABILITIES.
THE DATA INDICATES PBI IS SUPERIOR TO NOMEX IN
AFFORDING SLIGHTLY LONGER PROTECTION. SEVERAL
RECOMMENDATIONS ARE MADE. ALSO REPORTED BRIEFLY
ARE RESULTS OF DETERMINING THE TOLERANCE TIME OF SKIN
TO TEMPERATURE. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-755 643 15/5 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

GARMENTS, OUTER (WET WEATHER).

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON TEST OPERATIONS
PROCEDURE.

DEC 72 14P RUSH, RAY I
REPT. NO. TOP-10-3-215
PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS),
VISUAL INSPECTION, SAFETY, MAINTAINABILITY, HUMAN
FACTORS ENGINEERING, GLOVES, SHOES, OVERCOATS, MILITARY
REQUIREMENTS (U)
IDENTIFIERS: COMBAT CLOTHING, EXPANDED SERVICE TEST
PROCEDURES (U)

THE REPORT DESCRIBES A METHOD FOR EVALUATION OF WET
WEATHER CLOTHING OPERATIONAL AND FUNCTIONAL
PERFORMANCE CHARACTERISTICS. IDENTIFIES SUPPORTING
TESTS, FACILITIES, AND EQUIPMENT REQUIRED. PROVIDES
PROCEDURES FOR PREOPERATIONAL INSPECTION, PHYSICAL
CHARACTERISTICS, SAFETY, PERSONNEL TRAINING,
FUNCTIONAL SUITABILITY, DURABILITY, RELIABILITY,
MAINTAINABILITY, HUMAN FACTORS, AND VALUE ANALYSIS.
(AUTHOR) (U)

17
UNCLASSIFIED

/ZOM08

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-756 457 11/5 13/8
AMERICAN CYANAMID CO STAMFORD CONN

DEVELOPMENT OF LAMINATED FABRIC
MATERIALS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 72 26P DELAPP, DARWIN ;
CONTRACT: DAAG17-72-C-0080
PROJ: DA-1-J-662713-D-J-40
MONITOR: USA-NLABS, C/PLSEL
TS-101

TR-73-21-CE.

UNCLASSIFIED REPORT

DESCRIPTORS: (*TEXTILES, *LAMINATES), (*WEATHERPROOFING,
TEXTILES), (*PROTECTIVE CLOTHING, WEATHERPROOFING),
MILITARY REQUIREMENTS, NYLON, SYNTHETIC FIBERS,
MANUFACTURING, EXTRUSION, ACCEPTABILITY, POLYESTER
PLASTICS

(U)

IDENTIFIERS: POLYBUTENES, *LAMINATED FABRICS,
TETRAFLUOROETHYLENE RESINS

(U)

LABORATORY AND COMMERCIAL SCALE EXPERIMENTS
PRODUCED A THREE LAYER LAMINATED FABRIC (5.2 OX/SQ
YD) EXHIBITING 21.5 PSI HYDROSTATIC RESISTANCE, AND
PERMITTING 590 GRAMS PER SQUARE METER PER 24 HOURS
MOISTURE VAPOR TRANSMISSION. THE FUNCTIONAL AND
PROCESSING CHARACTERISTICS OF SIX DIFFERENT POROUS
POLYMER STRUCTURES, COMPRISING THE INNER LAMINATE
LAYER, WERE EXPLORED. THE MECHANICAL OPERATION EVEN
AT FULL SCALE PROCEEDED WITHOUT DIFFICULTY. THE
LAMINATES WERE MADE BY USING POLY(L-BUTENE)
90%-TETRAFLUOROETHYLENE 10% AS THE FIBROUS POROUS
POLYMER STRUCTURE AND POLYESTER OR NYLON AS THE TOP
AND BOTTOM FACING MATERIAL.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-759 525 6/17 11/5 1/2
ACUREX CORP MOUNTAIN VIEW CALIF AEROTHERM DIV

ANALYSIS OF THE THERMAL RESPONSE OF
PROTECTIVE FABRICS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. JUN 71-JUN 72,
JAN 73 220P MORSE, HOWARD L. ; THOMPSON,
JAMES G. ; CLARK, KIMBLE J. ; GREEN, KENNETH A.
; MOYER, CARL B. ;

CONTRACT: F33615-72-C-1298

PROJ: AF-7320

TASK: 732002

MONITOR: AFML TR-73-17

UNCLASSIFIED REPORT

DESCRIPTORS: (*TEXTILES, THERMAL PROPERTIES),
(*SKIN(ANATOMY), BURNS(INJURIES)), (*AIRCRAFT FIRES,
*PROTECTIVE CLOTHING), FLIGHT CLOTHING, MATHEMATICAL
MODELS, IGNITION, THERMAL CONDUCTIVITY, EXPERIMENTAL
DATA, CHEMICAL PROPERTIES, PHYSICAL PROPERTIES, AIR
FORCE RESEARCH

(U)

IDENTIFIERS: NOMEX FABRICS, POLYBENZIMIDAZOLE FABRIC,
JP-4 FUEL

(U)

THE OBJECTIVE OF THE PROGRAM WAS TO DEVELOP A
THEORETICAL AND EMPIRICAL MATHEMATICAL RELATIONSHIP
TO DEFINE THE FABRIC-SKIN SYSTEM'S RESPONSE WHEN
EXPOSED TO JP-4 FUEL FIRE. CRITICAL FABRIC
PARAMETERS, SUCH AS OPTICAL, THERMO-CHEMICAL AND
PHYSICAL CHARACTERISTICS ARE DEFINED IN A MANNER
WHICH WILL ALLOW THE FABRIC DESIGNER TO DEVELOP
IMPROVED THERMALLY PROTECTIVE LIGHT WEIGHT FABRICS.
THE COMPUTER CODE EVALUATES THE MODEL PARAMETER
VARIATION IN TERMS OF RESULTANT HUMAN SKIN BURNS.
A COMPARISON OF THE ANALYTICAL MODEL RESULTS WITH
LABORATORY AND FIRE PIT DATA DEMONSTRATES EXCELLENT
CORRELATION WITHIN THE LIMITS OF THE PRESENT STUDY.
(AUTHOR MODIFIED ABSTRACT)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-761 779 6/17 6/19
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX

+G(Z) PROTECTION AFFORDED BY STANDARD AND
PREACCELERATION INFLATIONS OF THE BLADDER AND
CAPSTAN TYPE G-SUITS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
73 9P BURTON, RUSSELL R. ;
PARKHURST, MICHAEL J. ; LEVERETT, SIDNEY D. ;
JR;

REPT. NO. SAM-TR-72-436
PROJ: AF-7930
TASK: 793003

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN AEROSPACE MEDICINE, V44 N5
P488-494 MAY 73.

DESCRIPTORS: (+ACCELERATION TOLERANCE, +PROTECTIVE
CLOTHING), (+PRESSURE SUITS, ACCELERATION TOLERANCE),
EFFICIENCY (U)

IDENTIFIERS: *G SUITS (U)

POSITIVE (+GZ) RAPID ONSET ACCELERATION
TOLERANCES WERE DETERMINED ON 8 MALE SUBJECTS:
WITHOUT A G-SUIT, G-SUIT NOT INFLATED AND G-
SUIT INFLATED. THREE TYPES OF SUITS WERE USED ON
EACH SUBJECT: STANDARD BLADDER, CSU-12/PI AND
TWO TYPES OF CAPSTAN SUITS WITH STANDARD AND MODIFIED
ABDOMINAL BLADDER. TWO G-SUIT INFLATION
PROCEDURES ALSO WERE USED IN DEVELOPING +G
TOLERANCES: STANDARD INFLATION, WHICH BEGAN AT 0.2
G AND CONTINUED AT THE RATE OF 1.5 PSI/G
(ABDOMINAL BLADDER) AND 3 PSI/G (CAPSTAN),
AND PREACCELERATION INFLATION (0.5, 0.7, 10 SEC.
PRIOR TO ACCELERATION ONSET), WHICH INVOLVED SUIT
PRESSURES OF 10 PSI (ABDOMINAL BLADDER) AND 12 PSI
(CAPSTAN), WITH SUIT INFLATION CONTINUING
IMMEDIATELY UPON ACCELERATION ONSET. ACCELERATION
MEAN TOLERANCES FOR THE 3 SUITS TESTED USING STANDARD
INFLATION, RANGED FROM 4.5 TO 4.7 (+GZ).
PREACCELERATION INFLATIONS OF 0.5, 0.7, OR 10 SEC
INCREASED MEAN +GZ TOLERANCES 0.4 TO 0.6 G ABOVE
STANDARD INFLATION METHODS. PROCEDURAL DIFFERENCES
IN PREACCELERATION SUIT INFLATION WERE CONSIDERED
MAJOR REASONS FOR FINDING AN INCREASE IN +GZ
TOLERANCE IN THIS INVESTIGATION AS OPPOSED TO A
DECREASE IN ACCELERATION TOLERANCES PREVIOUSLY
REPORTED IN OTHER PREINFLATION STUDIES. (MODIFIED
AUTHOR ABSTRACT) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-761 797 6/17 6/19
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
OHIO

BACKGROUND AND DEVELOPMENT OF BOYLE'S LAW
ALTITUDE SUITS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 73 SIP BOWEN, J. D. ;
REPT. NO. AMRL-TR-72-77

UNCLASSIFIED REPORT

DESCRIPTORS: (•PRESSURE SUITS, DESIGN), EFFICIENCY,
DECOMPRESSION, HIGH ALTITUDE, HUMAN FACTORS
ENGINEERING
IDENTIFIERS: IDEAL GAS LAW

(U)
(U)

ALL SIGNIFICANT AEROSPACE MEDICAL RESEARCH
LABORATORY (AMRL) INVESTIGATIONS OF DESIGN
APPROACHES AND TECHNIQUES APPLICABLE TO EMERGENCY
PRESSURE SUITS FOR FLIERS DURING THE 1960 TO 1972
PERIOD ARE DESCRIBED AND THE RESULTS SUMMARIZED.
THE FIRST PROMISING APPLICATION OF BOYLE'S LAW;
THAT IS, 'THE VOLUME OF A BODY OF GAS AT CONSTANT
TEMPERATURE IS INVERSELY PROPORTIONAL TO THE ABSOLUTE
PRESSURE' TO THE AUTOMATIC PRESSURIZATION OF A SUIT
WAS DEMONSTRATED AT THE SCHOOL OF AEROSPACE
MEDICINE, BROOKS AFB TEX., BY DAVIS,
RITZINGER, ET AL, IN 1966. SUBSEQUENT EFFORTS
CAPRIED ON BY THE AMRL ARE REVIEWED IN SUFFICIENT
DETAIL TO PROVIDE CONTINUITY AND AN OVERVIEW OF THE
PROGRAM LEADING UP TO ITS TERMINATION AT THE
AEROSPACE MEDICAL RESEARCH LABORATORY IN THE
SPRING OF 1972 AND TRANSFER TO THE SCHOOL OF
AEROSPACE MEDICINE AT BROOKS AFB, TEXAS.
FINAL CONFIGURATIONS THAT WOULD FULFILL ALL AIRCREW
OPERATIONAL REQUIREMENTS ARE NOT FULLY DEVELOPED.
HOWEVER, MAJOR PROGRESS WAS ACHIEVED IN FABRICATION
TECHNIQUES AND IN THE VALIDATION OF FEATURES THAT
SHOULD FIND APPLICATION IN A NEARLY OPTIMUM PROTOTYPE
APPROACHING THE REAL NEEDS OF THE POTENTIAL USERS.
(MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

DNC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-762 428 6/11 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

DAMAGE CONTROL SUIT SYSTEM. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 73 36P AUDET, NORMAN F. (REINS,
DALE A. (CHADWICK, ARTHUR H. (,
REPT. NO. TR-107, 1-72

UNCLASSIFIED REPORT

DESCRIPTORS: (•LIFE SUPPORT, •PROTECTIVE CLOTHING),
CLOSED ECOLOGICAL SYSTEMS, EXPOSURE SUITS, HAZARDS,
ENVIRONMENT, HIGH TEMPERATURE, GASES, TOXICITY,
HYPOXIA (U)

A PROTOTYPE DAMAGE-CONTROL-SUIT SYSTEM (DCSS) WAS
DESIGNED AND FABRICATED AS PART OF THE NAVY
CLOTHING AND TEXTILE RESEARCH UNIT'S
(NCTRU) CONTINUING PROGRAM TO CONDUCT FEASIBILITY
AND PROTOTYPE DEVELOPMENT STUDIES ON PERSONNEL LIFE-
SUPPORT CLOTHING SYSTEMS FOR PROTECTION AGAINST
VARIOUS ENVIRONMENTAL HAZARDS. THE DCSS CONSISTS
OF A LIFE-SUPPORT PACK; AN IMPERMEABLE SUIT WITH
HEADPIECE, BOOTS, AND GLOVES, AND A COMMUNICATION
HEADSET. (MODIFIED AUTHOR ABSTRACT) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-762 544 6/17 11/10
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

DEVELOPMENT OF REFLECTIVE MATERIALS FOR FIRE
FIGHTER'S BOOTS.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. JUN 71-JAN 72,
APR 73 24P STANTON, ROBERT M. I
REPT. NO. AFML-TR-72-247
PROJ: AF-7320
TASK: 732002

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELASTOMERS, FIRE RESISTANT MATERIALS),
(*PIGMENTS, REFLECTIVITY), (*SHOES, FIRE PROTECTIVE
CLOTHING), REFLECTIVITY, INFRARED RADIATION, SYNTHETIC
RUBBER, HALOCARBON PLASTICS, ANTIMONY COMPOUNDS,
SULFIDES, TITANIUM COMPOUNDS
IDENTIFIERS: BOOTS(FOOTWEAR)

(U)

(U)

THE OBJECTIVE OF THE PROGRAM WAS TO CONDUCT A
PRELIMINARY INVESTIGATION OF CURRENT BOOT MATERIALS
USED BY AIR FORCE FIRE FIGHTING PERSONNEL AND TO
DEMONSTRATE THE CAPABILITY OF DEVELOPING NEWER
MATERIALS TO ENHANCE THE REFLECTIVE CHARACTERISTICS
OF FUTURE BOOT MATERIALS TO PROVIDE SUPERIOR
PROTECTIVE QUALITIES. IMPROVED PROTECTION IS
REQUIRED TO WARD OFF RADIANT ENERGY FROM JP-4 FUEL
FIRES. PRESENT AIR FORCE BOOT MATERIALS ARE
MADE OF A NEOPRENE BINDER WITH A CARBON BLACK FILLER.
THE APPROACH TAKEN WAS TO DETERMINE THE EFFECT OF
VARIOUS PIGMENTS, INCORPORATED INTO THE PRESENT
NEOPRENE BINDER, THAT ARE KNOWN TO HAVE SPECIFIC
REFLECTIVE QUALITIES FOR SOLAR AND INFRARED
RADIATION. BY VARYING THE AMOUNT OF PIGMENT ONE
COULD THEN DETERMINE THE SPECIFIC EFFECTS OF THE
PIGMENT AND THE BINDER. AN ATTEMPT WAS ALSO MADE TO
DETERMINE THE EFFECT OF BINDER MATERIALS TRANSPARENT
IN THE INFRARED WAVELENGTH RANGE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-763 001 6/17 15/2 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

COMBAT UNIFORMS AND PROTECTIVE
EQUIPMENT.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON TEST OPERATIONS
PROCEDURE.

FEB 73 39P

REPT. NO. TOP-10-2-021

PROJ: AMCR-310-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPERSEDES REPORT DATED 11 JAN 68,
AD-721 610.

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS),
(*ARMY EQUIPMENT, PROTECTIVE CLOTHING), RELIABILITY,
PERFORMANCE(ENGINEERING), ACCEPTABILITY, ENVIRONMENTAL
TESTS (U)

IDENTIFIERS: COMBAT UNIFORMS, COMMODITY ENGINEERING
TEST PROCEDURES, PERFORMANCE EVALUATION (U)

THE PROCEDURE DESCRIBES A METHOD FOR EVALUATION OF
COMBAT UNIFORMS AND PROTECTIVE EQUIPMENT OPERATIONAL
AND FUNCTIONAL PERFORMANCE CHARACTERISTICS.
IDENTIFIED SUPPORTING TESTS, FACILITIES, AND
EQUIPMENT REQUIRED, DISCUSSES TEST PLANNING AND
PREPARATION FOR TESTS, PROVIDES PROCEDURES FOR
PHYSICAL CHARACTERISTICS, PROTECTION AGAINST AGENTS,
SIZING, FITTING, DONNING, DOFFING, FUNCTIONAL
SUITABILITY, LEAKAGE, WATER EXPOSURE, INFRARED
REFLECTANCE, STATIC ELECTRICITY, FILTER GAS LIFE,
LAUNDERABILITY, STORAGE, WATER IMMERSION,
TRANSPORTABILITY, HUMAN FACTORS, RELIABILITY,
DUPABILITY, AND MAINTENANCE EVALUATION. APPENDIXES
DISCUSS TEST COURSES, SIZING AND FITTING, DONNING AND
DOFFING DATA, BOOT IMPREGNATING PROCEDURES, AND
HANDWEAR TESTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-743 378 6/11 11/9
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

DEVELOPMENT AND EVALUATION OF DEEP-SEA
SWIMSUIT MATERIALS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 73 59P AUDET, NORMAN F. ILARRIVEE.
MAURICE N. I
REPT. NO. TR-108, 5-72

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, DESIGN); (*THERMAL
INSULATION, UNDERWATER CLOTHING); THERMAL INSULATION,
ISOCYANATE PLASTICS, FOAM, MECHANICAL PROPERTIES,
COMPRESSIVE PROPERTIES, THERMAL CONDUCTIVITY, POLYVINYL
CHLORIDE, NAVAL RESEARCH, DEEP SUBMERGENCE (U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT (NCTRU) HAS DEVELOPED A SWIMSUIT MATERIAL
THAT MEETS THE REQUIREMENTS OF NAVY PERSONNEL WHO
OPERATE AT GREAT SEA DEPTHS FOR LONG PERIODS OF TIME.
TWO CHEMICALLY DISTINCT, FLEXIBLE, SYNTACTIC FOAMS--
A UNIT-DEVELOPED, POLYURETHANE, HOLLOW-GLASS-
MICROSPHERE COMPOSITE AND A PROPRIETARY,
POLYVINYLCHLORIDE, HOLLOW-GLASS-MICROSPHERE
COMPOSITE--HAVE BEEN PRODUCED WHICH MAY PROVE USEFUL
FOR SWIMSUIT APPLICATIONS IN DEEP-SEA ENVIRONNENTS
DOWN TO 1000 PSW. TESTS SHOWED THAT BOTH
MATERIALS WERE ESSENYIALLY INCOMPRESSIBLE TO DEPTHS
OF 1000 PSW (LESS THAN 3%) AND PROVIDED MORE
INSUIATION THAN CURRENTLY USED NEOPRENE-FOAM
MATERIALS AT DEPTHS GREATER THAN 20 PSW. THE
MATERIALS, HOWEVER, WERE CONSIDERABLY HEAVIER THAN
THE FOAM ALTHOUGH SIGNIFICANTLY LESS DENSE THAN SEA
WATER. STANDARD WET-STYLE SWIMSUITS WERE
FABRICATED FROM THESE EXPERIMENTAL MATERIALS FOR
VERIFICATION OF SAMPLE THERMAL-CONDUCTIVITY DATA.
(MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-766 684 6/17
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

FOOTWEAR FOR INUNDATED AREAS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUL 73 28P SWAIN, DOUGLAS S. ISPAETH,
JEANNE F. I
REPT. NO. C/PLSEL-109
PROJ: DA-1-J-664713-D-547
MONITOR: USA-NLABS TR-73-57-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*FEET, *PROTECTIVE CLOTHING),
INTEGUMENTARY DISEASES, SKIN(ANATOMY), INFANTRY,
SOUTHEAST ASIA, VIETNAM, TROPICAL REGIONS
IDENTIFIERS: *FOOTWEAR, *IMMERSION FOOT

(U)

(U)

WARM WATER IMMERSION FOOT AND RELATED
DERMATOLOGICAL PROBLEMS IN INUNDATED AREAS OF
SOUTHEAST ASIA SERIOUSLY LIMITED THE COMBAT
EFFECTIVENESS OF LARGE NUMBERS OF OUR TROOPS. AS A
CONTRIBUTION TO MINIMIZING THE OCCURRENCE AND
INTENSITY OF THE PROBLEM, SPECIAL FOOTWEAR WAS
DEVELOPED BY THE U.S. ARMY NATICK
LABORATORIES TO PERMIT QUICKER DRYING OF THE SKIN
ON THE FEET AND LEGS. THESE ITEMS INCLUDED A
LIGHTWEIGHT NYLON SOCK TO REPLACE THE STANDARD WOOL
SOCK; A SLIDE FASTENER FOR THE TROPICAL COMBAT BOOT
TO ENCOURAGE QUICKER REMOVAL OF THE BOOTS WHEN AN
OPPORTUNITY AROSE TO TAKE THEM OFF; AND A LIGHTWEIGHT
COMFORT SHOE, SIMILAR TO A TENNIS SHOE, THAT COULD BE
TUCKED INTO A POCKET AND WORN LATER IN BIVOUAC AND
BOOT CAMP AREAS IN PLACE OF A SOLDIER'S REGULAR BOOT.
BASED UPON THEIR SUCCESSFUL TESTING IN VIETNAM,
THE ABOVE THREE ITEMS WERE ADOPTED IN MARCH 1970 AS
STANDARD A ITEMS FOR ZONES 1 AND 2.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-746 690 6/17 15/5
ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT
EQUIPMENT LAB

DEVELOPMENT OF LIGHTWEIGHT (COLD-WET)
INSULATED FOOTWEAR.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 73 124P ASSAF, JOSEPH E. ;
PROJ: DA-1-J-662713-DJ-40
MONITOR: USA-NLABS 73-15-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHOES, *ISOCYANATE PLASTICS), (*THERMAL
INSULATION, SHOES), (*PROTECTIVE CLOTHING, SHOES),
MANUFACTURING, PROTECTIVE EQUIPMENT, ENVIRONMENTAL
TESTS, MILITARY PERSONNEL, WEIGHT, MOISTUREPROOFING,
DESIGN, TEXTILES, ADHESIVES, COATINGS (U)
IDENTIFIERS: *BOOTS, PROTECTIVE EQUIPMENT (U)

THE FIRST GENERATION OF WHAT MAY BE CONSIDERED A
NEW CONCEPT IN LIGHTWEIGHT INSULATED MILITARY
FOOTWEAR IN A PULL-ON TYPE CONSTRUCTION WAS PRODUCED
BY INTEGRALLY CASTING AND EXPANDING LIQUID
POLYURETHANE SYSTEMS. THE FOOTWEAR DEVELOPED MEETS
THE ORIGINAL REQUIREMENTS ESTABLISHED UNDER THIS
PROGRAM TO DEVELOP A LIGHTWEIGHT IMPERMEABLE BOOT
WITH INSULATION SUFFICIENT TO PROVIDE PROTECTION FOR
2 HOURS INACTIVITY AT -20F. THE AVERAGE WEIGHT OF
A SIZE TEN BOOT IS 24 OUNCES, AS COMPARED WITH 44
OUNCES FOR THE STANDARD (BLACK) INSULATED COLD-
WET BOOT. THE WATER ABSORPTION OF THE NEW FOOTWEAR
IS LESS THAN 5% BY WEIGHT. THE DEVELOPED
LABORATORY PROCEDURES WERE USED TO DESIGN AND PUT
INTO OPERATION A PILOT PLANT FACILITY. INITIAL
PRODUCTION OF FOOTWEAR INDICATES THAT THE ECONOMICS
AND PROCESSES INVOLVED MAY BE SATISFACTORY FOR THE
FINAL COMMERCIALIZATION OF THIS NEW CONCEPT OF
LIGHTWEIGHT INSULATED FOOTWEAR. (MODIFIED AUTHOR
ABSTRACT)

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-768 313 6/17
NAVAL SUBMARINE MEDICAL RESEARCH LAB GROTON CONN

A REVIEW OF AVAILABLE HEATED WET-SUIT
PROTECTION FOR DIVERS AND SWIMMERS. (U)

FEB 73 23P RENTZ, FREDERICK P. I
REPT. NO. NSMRL-739
PROJ: MF099.01
TASK: MF099.01.01

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIVING, PROTECTIVE CLOTHING),
(*UNDERWATER CLOTHING, HEATERS), THERMAL INSULATION,
ELECTRICITY, BATTERY COMPONENTS, ELECTRIC BATTERIES,
RADIOACTIVE ISOTOPES, CHEMICALS (U)

A REVIEW OF CURRENT INFORMATION CONCERNING HEAT
REPLACEMENT WET-SUITS FOR DIVERS IS PRESENTED. THE
LIMITATIONS OF PHYSIOLOGIC RESPONSE TO COLD, AIDED BY
MODERN INSULATIVE GARMENTS, ARE DEFINED. AND THE
NECESSITY FOR SUPPLEMENTAL HEAT IS DEMONSTRATED.
DEVELOPMENTS IN ELECTRICALLY HEATED WET-SUITS AND
HOT WATER SUITS ARE PRESENTED, AS WELL AS INFORMATION
CONCERNING BATTERIES, CHEMICAL HEATERS AND
RADIOISOTOPE-FUELED HEATERS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-770 375 6/17
EDGEWOOD ARSENAL ABERDEEN PROVING GROUND MD

THERMAL BALANCE OF MEN UNDER ATROPINE
THERAPY WEARING CHEMICAL PROTECTIVE
CLOTHING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. SEP 71-JAN 73,
OCT 73 34P CRAIG, F. N. CUMMINGS, E.
G. I

REPT. NO. EA-TR-4757, EB-TR-73011
PROJ: DA-1-W-662710-AD-25
TASK: 1-W-662710-AD-2501

UNCLASSIFIED REPORT

DESCRIPTORS: *ATROPINE, *BODY TEMPERATURE, *SWEAT
GLANDS, *PROTECTIVE CLOTHING, THERAPY,
DEHYDRATION, HEAT PRODUCTION, EVAPORATION,
COOLING

(U)

IN WARM ENVIRONMENTS THE USE OF ATROPINE IN THE
TREATMENT OF CASUALTIES FROM ANTICHOLINESTERASE
AGENTS PRESENTS A POSSIBLE HAZARD BECAUSE THE
INHIBITION OF SWEATING BY ATROPINE MAY LEAD TO A
DANGEROUS RISE IN BODY TEMPERATURE. RECENTLY IT
WAS SHOWN THAT AFTER A 2-MG DOSE OF ATROPINE SULFATE
THE EFFECTS OF A DEFICIT IN SWEATING COULD BE AVOIDED
BY ARTIFICIAL WETTING THE CLOTHING. ONE OBJECTIVE
WAS TO TEST THIS CONCEPT WHEN THE DOSE WAS INCREASED
TO 4 MG. AT THIS DOSE AND AN INDOOR TEMPERATURE OF
41C, AN INITIAL WETTING OF THE CLOTHING WITH A
LITER OF WATER WAS SUFFICIENT TO PREVENT AN UNDESIR-
ABLE RISE IN BODY TEMPERATURE FOR 3 HOURS WHENAS WHEN THE
CLOTHING WAS INITIALLY DRY THE BODY TEMPERATURE ROSE
AT AN UNSAFE RATE. A SECOND OBJECTIVE WAS TO
EVALUATE THE EFFICIENCY OF EVAPORATIVE COOLING FROM
WET CLOTHING AS A FRACTION OF THE EVAPORATIVE COOLING
REQUIRED TO BALANCE THE HEAT EQUATION. THE
CONCLUSIONS WERE AS FOLLOWS: THE ELEVATION OF
BODY TEMPERATURE IN MEN WEARING THE TWO-LAYER
CHEMICAL PROTECTIVE ASSEMBLY IN CONSEQUENCE OF THE
INHIBITION OF SWEATING BY ATROPINE GIVEN FOR
TREATMENT OF THE EFFECTS OF ANTICHOLINESTERASE AGENTS
CAN BE PREVENTED BY ARTIFICIAL WETTING OF THE
CLOTHING. THE EFFICIENCY OF EVAPORATIVE COOLING OF
CLOTHED MEN DECREASES AS THE WATER CONTENT OF THE
CLOTHING INCREASES. (MODIFIED AUTHOR
ABSTRACT)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-773 828 6/17 6/19
AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB
0-10

PHYSIOLOGICAL EFFECTS OF WEARING THE FIRE
PROXIMITY SUIT ON CRASH TRUCK ALERT
STATUS TO HOT-DRY AND HOT-HUMID
ENVIRONMENTS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
NOV 73 14P KISSEN, ABBOTT T. ; GERDING,
JAMES J. ; SMILES, KENNETH A. ;
REPT. NO. AMRL-TR-73-82
PROJ: AF-7222
TASK: 7222:2

UNCLASSIFIED REPORT

DESCRIPTORS: *FIRE FIGHTING, *PROTECTIVE CLOTHING,
HUMAN FACTORS ENGINEERING, ENVIRONMENTS,
PHYSIOLOGICAL EFFECTS, FIRE RESISTANT TEXTILES,
EXPOSURE (PHYSIOLOGY), HIGH TEMPERATURE,
STRESS (PHYSIOLOGY)

(U)

TESTS WERE CONDUCTED IN THE ALL WEATHER TEST
FACILITY TO DETERMINE THE PHYSIOLOGIC PENALTY OF
WEARING THE FIRE FIGHTER'S PROXIMITY SUIT FOR A 2-
HOUR ALERT CYCLE IN THE CRASH TRUCK. HOT-DRY AND
HOT-HUMID ENVIRONMENTS WERE PRODUCED IN THE CHAMBER
WHICH DUPLICATED THE MOST SEVERE THERMAL CONDITIONS
ANTICIPATED AT HOT WEATHER BASES. THREE SUBJECTS
WEARING THE PROXIMITY SUIT (EXCEPT FOR GLOVES AND
HELMET) WERE EXPOSED (TWICE EACH) TO EITHER THE
HOT-DRY OR HOT-WET ENVIRONMENTS FOR 2 HOURS. IN
HALF OF THE TESTS, THE PROXIMITY SUIT COAT WAS ALSO
ELIMINATED FROM THE CLOTHING ASSEMBLY. FOR THE
GIVEN HYPERTHERMIC CONDITIONS, THE 2-HOUR EXPOSURE
PERIODS DO NOT ELICIT PHYSIOLOGIC RESPONSES OR
SYMPTOMS INDICATIVE OF INCIPIENT HEAT EXHAUSTION
ALTHOUGH SIGNIFICANT PHYSIOLOGICAL DECREMENTS WERE
OBSERVED. FOR OPERATIONAL RELEVANCY, WHERE A
RESCUE PROCEDURE COULD BE CALLED FOR TOWARD THE
CONCLUSION OF THE THERMAL STRESS PERIOD, THE
SUGGESTION IS MADE TO CONTINUE THIS EFFORT WITH A
SERIES OF TESTS IN WHICH AN EXERCISE REGIMEN IS
SUPERIMPOSED ON THE THERMAL STRESS EXPOSURE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-777 740 6/17 15/5
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

EVALUATION OF MODIFIED DIVERS' DRESS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
SFP 60 14P GREENE, J. L. ;
REPT. NO. NEDU-EVALUATION-3-61
PROJ: NS-186-200

UNCLASSIFIED REPORT

DESCRIPTORS: *DIVER EQUIPMENT, *UNDERWATER CLOTHING,
DEEP DIVING, DIVER EQUIPMENT, EVALUATION,
FABRICS

(U)

A DIVING DRESS OF SOMEWHAT MORE FLEXIBLE MATERIAL
THAN IS IN THE STANDARD DRESS WAS EVALUATED ON A
SIDE-BY-SIDE SUBJECTIVE EVALUATION WITH NEGATIVE
RESULTS. THE EVALUATION IS CONSIDERED OF
QUESTIONABLE VALUE SINCE THE DEPARTURE FROM STANDARD
MATERIAL WAS NOT SIGNIFICANT. RECOMMENDATIONS TO
CONTINUE EFFORTS TO IMPROVE THE STANDARD DRESS ARE
MADE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-779 886 11/5 6/17
NAVY CLOTHING AND TEXTILE RESEARCH UNIT NATICK MASS

FLAME-RETARDANT CLOTHING AND TEXTILE ITEMS
FOR USE IN OXYGEN-ENRICHED ENVIRONMENTS OF
DECOMPRESSION CHAMBERS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 74 29P HIGGINBOTTOM, GEORGE S. ;
SILVIA, JOHN ; JR;
REPT. NO. TR-110, 1-74

UNCLASSIFIED REPORT

DESCRIPTORS: *FIRE PROTECTIVE CLOTHING, *UNDERWATER
EQUIPMENT, DIVER EQUIPMENT, OXYGEN, ENVIRONMENTS,
DECOMPRESSION, CHAMBERS, LABORATORY TESTS, FIRE
RESISTANT MATERIALS, FLAMMABILITY

(U)

THE NAVY CLOTHING AND TEXTILE RESEARCH
UNIT (NCTRU) HAS DEVELOPED CLOTHING AND TEXTILE
ITEMS FOR USE IN THE FIRE-HAZARDOUS, OXYGEN-ENRICHED
ATMOSPHERES OF DIVERS' DECOMPRESSION CHAMBERS.
SMALL-SCALE LABORATORY TESTS ON THE FLAME
RETARDANCY OF MATERIALS IN OXYGEN-ENRICHED
ENVIRONMENTS LED TO THE SELECTION OF CANDIDATE
MATERIALS OFFERING A POTENTIAL FOR USE. FULL-SCALE
FLAMMABILITY TESTS WERE PERFORMED ON ITEMS MADE FROM
MATERIALS SELECTED FOR FURTHER STUDY. ANALYSES OF
ALL TEST RESULTS LED TO THE SELECTION OF DURETTE
(MODIFIED NOMEX) FABRICS AS OFFERING THE BEST
COMPROMISE CHOICE OF MATERIALS FOR USE IN END-ITEM
CONSTRUCTIONS. CLOTHING AND TEXTILE ITEMS WERE
MANUFACTURED AND FORWARDED TO SELECTED NAVY
DECOMPRESSION-CHAMBER SITES, WHICH ARE USING THEM ON
A PERMANENT BASIS. INFORMATION BASED UPON A LIMITED
USE HAS SHOWN THE ITEMS TO BE ACCEPTABLE IN TERMS OF
DESIGN, PERFORMANCE AND DURABILITY. STATIC
GENERATION ON DURETTE MATERIALS, REPORTED BY SOME
ACTIVITIES, CAN BE EFFECTIVELY CONTROLLED BY THE USE
OF ANTI-STAT SOFTENERS DURING THE LAUNDRY CYCLE.
(MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-781 304 11/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

FABRIC-PROTECTORS,

(U)

JUN 74 7P KUZNETSOV, YU. ;
REPT. NO. FTD-HT-23-1557-74
PROJ: FTD-T74-03-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF IZVESTIYA (USSR)
N280 P4, 29 NOV 73, BY FRANCIS T. RUSSELL,

DESCRIPTORS: *FABRICS, *PROTECTIVE CLOTHING, USSR,
TRANSLATIONS

(U)

THIS NEWSPAPER ARTICLE TRANSLATION CONCERNS FABRICS
MADE IN THE USSR FOR PROTECTIVE CLOTHING FOR
CHEMISTS, PETROLEUM WORKERS, RAILROAD WORKERS AND
WORKERS IN THE CELLULOSE, PAPER AND METAL INDUSTRIES (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-781 520 6/17 15/2
DEFENCE RESEARCH ESTABLISHMENT OTTAWA (ONTARIO)

COVERALL, CW PROTECTIVE: STORAGE AND
PACKAGING.

(U)

JUN 74 18P HART, J. A. IFUOCO, R. P.
;
REPT. NO. DREO-R-696

UNCLASSIFIED REPORT

DESCRIPTORS: *PROTECTIVE CLOTHING, *CHEMICAL WARFARE
AGENTS, STORAGE, PACKAGING, TEMPERATURE,
DETERIORATION, HUMIDITY, POLYURETHANE RESINS,
MOISTURE, CANADA

(U)

NORMAL AND ACCELERATED STORAGE TESTS SHOWED THAT
THE MATERIALS OF THE COVERALL CW PROTECTIVE WOULD
REMAIN IN SERVICEABLE CONDITION FOR AT LEAST FIVE
YEARS OF STORAGE UNDER TEMPERATE CONDITIONS.
DETERIORATION OF THE CHEMICAL BARRIER IN HOT AND
HUMID CONDITIONS WAS ATTRIBUTED TO HYDROLYSIS OF
POLYURETHANE. PACKAGING TO PROTECT THE MATERIALS
FROM ATMOSPHERIC POLLUTANTS AND HIGH HUMIDITY IS
DISCUSSED. TESTS OF THE MOISTURE-PROOF,
DEHYDRATED, PACKAGING SPECIFIED FOR THIS ITEM SHOWED
THAT IT WAS ADEQUATE TO ENSURE SATISFACTORY STORAGE
UNDER ADVERSE CONDITIONS. THE FEASIBILITY OF
PREPARING GARMENTS FOR PACKAGING BY OVEN-DRYING WAS
ESTABLISHED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-792 112 6/17 15/6 1/3
ARMY LAND WARFARE LAB ABERDEEN PROVING GROUND MD

UH-1 DOOR GUNNER PROTECTION.

(U)

DESCRIPTIVE NOTE: FINAL REPT.:

MAR 74 29P WOOD, BENJAMIN F. ;
REPT. NO. LWL-TR-74-13
PROJ: LWL-Q1-M-73

UNCLASSIFIED REPORT

DESCRIPTORS: *PROTECTIVE CLOTHING, *GUNNERS,
ACCEPTABILITY, TEST METHODS, KITS, AIRCRAFT
DOORS, COLD WEATHER, PROTECTION, THERMAL
INSULATION, ALASKA, HELICOPTERS

(U)

IDENTIFIERS: UH-1D AIRCRAFT, H-1 AIRCRAFT, UH-
1H AIRCRAFT

(U)

A COLD WEATHER PROTECTION KIT FOR DOOR GUNNERS AND
CREW WAS DEVELOPED FOR THE UH-1D/H HELICOPTER.
THE KIT CONSISTS OF A BULKHEAD AND SLIDING DOORS
WHICH PERMITS THE GUNNER'S COMPARTMENT TO BE
PARTITIONED FROM THE REST OF THE AIRCRAFT INTERIOR.
THE GUNNER IS DRESSED IN CLOTHING TO PROVIDE HIM
SUFFICIENT PROTECTION WHILE THE REST OF THE CREW AND
PASSENGERS ARE NOT EXPOSED. SEVERAL CLOTHING
ENSEMBLES WERE TESTED. THE KIT AND TWO SETS OF
COLD WEATHER CLOTHING WERE EVALUATED IN ALASKA.
THE EVALUATION WAS FAVORABLE, EXCEPT FOR COMMENTS
THAT THE DOOR GUNNERS WERE TOO WARM WHEN THE DOORS
WERE CLOSED, AND LITTER AND PASSENGER CAPACITY WERE
AFFECTED. (MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-805 099 15/2
GAGLIARDI RESEARCH CORP EAST GREENWICH R I

DEVELOPMENT OF CHARCOAL IMPREGNATION PROCESS FOR CW
PROTECTIVE OVERGARMENT. (U)

DESCRIPTIVE NOTE: FINAL REPT. 25 JUN 65-24 OCT 66,
OCT 66 41F GAGLIARDI, D. D. I
CONTRACT: DA-19-129-AMC-675(N)
PROJ: DA-1M643303-D547

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, CHEMICAL WARFARE
AGENTS), (*PROTECTIVE TREATMENTS, MANUFACTURING),
IMPREGNATION, CHARCOAL, ISOCYANATE PLASTICS, EXPANDED
PLASTICS, LAMINATED PLASTICS, REINFORCED PLASTICS,
BINDERS, ADHESIVES, BONDING, TEXTILES, SCATTERING,
ACRYLIC RESINS (U)

THIS IS A FINAL REPORT ON THE DEVELOPMENT OF A
CHARCOAL IMPREGNATION PROCESS FOR CW PROTECTIVE
OVERGARMENT USING ACTIVATED CARBON A DISPERSING AGENT
AND AN ACRYLIC EMULSION POLYMER BINDER ON A
POLYURETHANE FLAME BONDED LAMINATE FABRIC.
LABORATORY STUDIES, PLANT TRIALS AND PRODUCTION OF
8045 SQUARE YARDS OF FABRIC DELIVERED TO THE
SPONSOR ARE DESCRIBED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-813 AB3 15/5
IIT RESEARCH INST CHICAGO ILL

DEVELOPMENT, FABRICATION AND PROOFTESTING OF OPTIMUM
FOOT PROTECTION AGAINST ANTIPERSONNEL MINES USING A
SUPPLEMENTARY DEVICE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 1 FEB-30 JUL 66 ON
PHASE 2.

DEC 66 19P FUJINAKA, E. S. MACDONALD,

J. L. I

CONTRACT: DA-19-129-QMC-379

PROJ: DA-1-K-643303-D-547

MONITOR: USA-NLABS, C/OM

TR-67-45-CM, TS-149

UNCLASSIFIED REPORT

DESCRIPTORS: (*LAND MINES, COUNTERMEASURES),
(*PROTECTIVE CLOTHING, *SHOES), DESIGN, PRODUCTION,
COMBAT READINESS, OPTIMIZATION, ANTIPERSONNEL
AMMUNITION (U)

THE REPORT COVERS PHASE 2 OF A PROGRAM TO DEVELOP
A SUPPLEMENTARY ITEM OF PROTECTIVE FOOTWEAR TO BE
USED IN CONJUNCTION WITH A PREVIOUSLY DEVELOPED
PROTECTIVE COMBAT BOOT. IT WAS DIRECTED TOWARD
FABRICATION OF TEST PROTOTYPES FOR BLAST EVALUATION.
THE SUPPLEMENTARY DEVICES WERE OF TWO TYPES,
CONCEPT A AND CONCEPT B, BOTH USING AN
IDENTICAL SOLID ALUMINUM SHANK. CONCEPT B
INCORPORATED A SYSTEM OF REINFORCEMENT FOR THE UPPER
PORTION OF THE FOOT. A DISCUSSION OF PRELIMINARY
PROOFTESTING CONSIDERATIONS IS PRESENTED. THIS
DISCUSSION INCLUDES THE RECOMMENDATION OF TEST
PERSONNEL, THE QUANTITY OF TESTS, AND THE PROTECTIVE
FOOTWEAR TO BE USED DURING TESTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-814 366 6/17
ARMY CONCEPT TEAM IN VIETNAM SAN FRANCISCO CALIF
96243

EVALUATION OF CREW MEMBER'S IMPROVED FIRE RESISTANT
FLIGHT COVERALLS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1-30 APR 67,
MAY 67 16P OAKES, KEITH W. I
PROJ: ACTIV-ACA-45/671

UNCLASSIFIED REPORT

DESCRIPTORS: (•FIRE PROTECTIVE CLOTHING, •FLIGHT
CLOTHING), AVIATION SAFETY, FLIGHT CREWS, GASOLINE,
BURNS(INJURIES), SKIN(ANATOMY), FIRE SAFETY, FIRE
RESISTANT MATERIALS, FIRE RESISTANT TEXTILES, AIRCRAFT
FIRES, SURVIVAL(PERSONNEL), VIETNAM, ACCEPTABILITY,
MAINTAINABILITY (U)
IDENTIFIERS: NOMEX FABRIC, SOUTH VIETNAM (U)

FLIGHT COVERALLS MADE OF AN IMPROVED NOMEX FIRE
RESISTANT MATERIAL WERE EVALUATED BY AVIATION UNITS
IN VIETNAM. IF CERTAIN MODIFICATIONS ARE MADE,
THE FIRE RESISTANT COVERALL TESTED IS SERVICEABLE,
MAINTAINABLE, AND ACCEPTABLE FOR USE BY US ARMY
AIRCRAFT MEMBERS IN VIETNAM. SINGLE LAYER NOMEX
HAS LITTLE BETTER FIRE RESISTANT QUALITIES THAN
CHEMICALLY TREATED UNIFORMS. DOUBLE-LAYER NOMEX
PROVIDES A SIGNIFICANT INCREASE IN PROTECTION OVER
OTHER MATERIALS, TREATED OR UNTREATED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-815 845 6/17
ARMY CONCEPT TEAM IN VIETNAM SAN FRANCISCO CALIF
96243

TROPICAL COMBAT UNIFORM (PONCHOS AND
GROUND CLOTHS).

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 FEB-15 APR 67.
JUN 67 SP DLUGOS, KARL J. I
PROJ: ACTIV-ACI-84.4/67I, ACTIV-ACL-84.3/67I

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, EFFECTIVENESS),
(*PROTECTIVE COVERINGS, EFFECTIVENESS),
COUNTERINSURGENCY, ISOCYANATE PLASTICS, ACCEPTABILITY,
SHELTERS, DESIGN, MILITARY REQUIREMENTS, TROPICAL
REGIONS, VIETNAM

(U)

LIGHTWEIGHT PONCHOS AND GROUND CLOTHS WERE EVALUATED
IN VIETNAM TO DETERMINE SUITABILITY, DURABILITY,
AND ACCEPTABILITY FOR USE BY US TROOPS IN
VIETNAM. EVEN THOUGH FABRICATION MATERIAL WAS
DURABLE IT WAS SOMETIMES AFFECTED BY TERMITE ATTACK
AND INSECT REPELLENT. IF MATERIALS CAN BE
DEVELOPED WHICH WILL NOT BE AFFECTED BY TERMITES AND
INSECT REPELLENT SPRAYS, THE LIGHTWEIGHT PONCHO
SHOULD BE PROCURED FOR ISSUE TO US ARMY TROOPS
OPERATING IN VIETNAM. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-R17 192 6/17
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF PONCHO, LIGHTWEIGHT
(LINCLOE).

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 67 57P CARLISLE, C. WALLACE ;
PROJ: USATECOM-8-6-6400-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING,
PERFORMANCE(ENGINEERING)), ARMY EQUIPMENT, RAIN,
ATMOSPHERIC PRECIPITATION, DESIGN, WEIGHT, THERMOPLASTIC
RESINS, ISOCYANATE PLASTICS, PLASTIC COATINGS, NYLON,
WEAR RESISTANCE, MOISTUREPROOFING, LIFE EXPECTANCY,
ACCELERATED TESTING, SIMULATION, ACCEPTABILITY,
ABRASIVES, ADHESION, SEALS, CHEMICAL WARFARE AGENTS,
BIOLOGICAL WARFARE AGENTS (U)
IDENTIFIERS: LINCLOE(LIGHTWEIGHT INDIVIDUAL COMBAT
CLOTHING AND E, PONCHOS (U)

AN ENGINEERING TEST OF PONCHO, LIGHTWEIGHT
(LINCLOE) WAS CONDUCTED TO DETERMINE THE TECHNICAL
PERFORMANCE AND SAFETY CHARACTERISTICS OF THE
EXPERIMENTAL LIGHTWEIGHT PONCHO AS DESCRIBED IN THE
QMR, WITH SPECIFIC OBJECTIVES (1) TO DETERMINE
THE PERFORMANCE OF THE TEST ITEM IN COMPARISON WITH
THE STANDARD PONCHO AS A RAIN GARMENT AND (2) TO
PROVIDE A TECHNICAL ESTIMATE OF THE LIFE EXPECTANCY
OF THE EXPERIMENTAL PONCHO IN COMPARISON WITH THE
STANDARD PONCHO CONSIDERING THE APPLICABLE
CHARACTERISTICS IN THE QMR AND THE INSTRUCTIONS FOR
USE IN FM 21-15. IT WAS CONCLUDED THAT UNDER
CONTROLLED CONDITIONS OF ACCELERATED WEAR AND
SIMULATED RAINFALL, THE EXPERIMENTAL PONCHO HAD LESS
MOISTURE PENETRATION IN THE SEAM AREAS THAN THE
STANDARD PONCHO. HOWEVER, THE EXPERIMENTAL PONCHO
HAD EXCESSIVE MOISTURE PENETRATION IN THE BASE FABRIC
AREA WHEREAS THE STANDARD PONCHO HAD NEGLIGIBLE
LEAKAGE IN THE BASE FABRIC AREA. IT WAS ALSO
CONCLUDED THAT THE EXPERIMENTAL PONCHO DID NOT MEET
THE REQUIRED MINIMUM LIFE EXPECTANCY OF 120 DAYS
UNDER COMBAT CONDITIONS AS REQUIRED BY THE QMR.
IT WAS RECOMMENDED THAT THE TOTAL AMOUNT OF
POLYURETHANE COATING REQUIRED TO COAT THE OUTSIDE
AREA OF THE EXPERIMENTAL PONCHO BE DIVIDED EQUALLY
AND APPLIED TO BOTH SIDES OF THE BASE FABRIC,
PROVIDING MORE UNIFORMITY TO THE COATED MATERIAL AND
ALLOWING THE EXPERIMENTAL PONCHO TO REMAIN AT THE (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-819 964 6/17 22/1
LITTLE (ARTHUR D) INC CAMBRIDGE MASS

RESEARCH TO ADVANCE EXTRAVEHICULAR PROTECTIVE
TECHNOLOGY.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUL 65-30 JUN 66.
APR 67 169P RICHARDSON, DAVID L. 1
CONTRACT: AF 33(615)-2963
PROJ: AF-6301, AF-7164
TASK: 630104, 716411
MONITOR: AMRL TR-66-250

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXTRAVEHICULAR ACTIVITY, *EXPOSURE
SUITS), PROTECTIVE CLOTHING, JOINTS(PHYSIOLOGY), SPACE
ENVIRONMENTS, ENCAPSULATION, REMOTE CONTROL, SPACE
STATIONS, HARDNESS, LIFE SUPPORT, METABOLISM, LIQUID
COOLED, SEALS

(U)

THE PRESENT STATE-OF-THE-ART IN EXTRAVEHICULAR
PROTECTIVE GARMENTS AND POSSIBLE NEW APPROACHES AND
IDEAS SUITABLE FOR DEVELOPMENT HAVE BEEN
INVESTIGATED. RECOMMENDATIONS ARE MADE FOR
EXPLORATORY DEVELOPMENT PROGRAMS WHICH CAN ACHIEVE
MAJOR ADVANCEMENTS IN EXTRAVEHICULAR PROTECTIVE
TECHNOLOGY IN THE TIME PERIOD 10 TO 15 YEARS HENCE.
THE STUDY INCLUDES A BRIEF LOOK AT THE POSSIBLE
MISSIONS AND TASKS, A DEFINITION OF THE PROBLEMS OF
PROTECTING MAN IN EARTH-ORBITAL SPACE, AN ANALYSIS OF
THE PENDING TORQUES OF JOINTS IN PRESENT SPACE SUIT
CONSTRUCTIONS, A DISCUSSION OF TOTAL ENCAPSULATION
AND REMOTE HANDLING TECHNIQUES AND A DISCUSSION OF
PROPOSED ADVANCED CONCEPTS, SOME OF WHICH MAY
CONTRIBUTE TO ADVANCEMENT OF EV PROTECTIVE
TECHNOLOGY. THE NEXT GENERATION OF EV PROTECTIVE
GARMENTS, FOR ACTIVITY ON OR NEAR THE SURFACE OF A
SPACE STATION IN A 300 N.M. EARTH ORBIT, WILL
PROBABLY BE ANTHROPOMORPHIC AND CONSIST OF (1)
HARD-SUIT CONSTRUCTION FOR THE TORSO AND THE
SHOULDER, WAIST AND ELBOW JOINTS, (2) SOFT-SUIT
CONSTRUCTION BELOW THE WAIST, (3) PORTABLE LIFE
SUPPORT COMPONENTS WHICH ARE INTEGRATED INTO THE HARD
SHELL, (4) LIFE SUPPORT COMPONENTS WHICH CAN BE
REPLENISHED WHILE THE ASTRONAUT IS OUTSIDE OF THE
SPACE STATION, (5) A LIQUID-COOLED UNDERGARMENT
FOR REMOVAL OF EXCESS METABOLIC HEAT, AND (6) AN
EMERGENCY SEALING AND PRESSURIZATION SYSTEM WHICH IS
AUTOMATICALLY ACTUATED IN THE EVENT OF GARMENT
FAILURE. (AUTHOR)

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UNCLASSIFIED

/ZOM08

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-819 324 6/17
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

OPERATIONAL CHARACTERISTICS OF THE 1964
EXTRAVEHICULAR RESEARCH MODEL FULL PRESSURE
ASSEMBLY.

(U)

DESCRIPTIVE NOTE: FINAL REPT. MAY 64-JAN 65,
MAY 67 SIP ROCK, LEE C. I
REPT. NO. AMRL-TR-66-179
PROJ: AF-7164
TASK: 716411

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *EXTRAVEHICULAR
ACTIVITY), SPACE FLIGHT, FLIGHT CLOTHING, HELMETS,
GLOVES, SHOES, DESIGN, CONSTRUCTION, INFLATABLE
STRUCTURES, LEAKAGE (FLUID), HUMAN FACTORS ENGINEERING,
TEMPERATURE CONTROL, BODY TEMPERATURE, ACOUSTIC
PROPERTIES, PERFORMANCE (ENGINEERING),
FAILURE (MECHANICS), VENTING, PRESSURE,
PERFORMANCE (HUMAN)

(U)

THE FIRST EXTRAVEHICULAR RESEARCH MODEL FULL
PRESSURE ASSEMBLY DESIGNED FOR OPERATION AT 5 PSIG
WAS SUBJECTED TO A SERIES OF TESTS TO DETERMINE THE
OPERATIONAL CHARACTERISTICS OF THE ASSEMBLY. TEST
DATA WERE OBTAINED AT 3.5-PSIG OPERATING PRESSURE TO
PERMIT PERFORMANCE DATA COMPARISON WITH THE A/
P22S-2 DATA AND DATA OBTAINED ON OTHER
EXPERIMENTAL ASSEMBLIES DESIGNED TO OPERATE AT 3.5
PSIG. TEST DATA WERE ALSO OBTAINED AT 5-PSIG
OPERATING PRESSURE. THESE TESTS INCLUDED THOSE
CONSIDERED TO BE BASIC STANDARD PERFORMANCE TESTS FOR
PROTECTIVE ASSEMBLIES. PARTICULAR EMPHASIS WAS
PLACED ON TESTS CONDUCTED TO DETERMINE MOBILITY
CHARACTERISTICS. IN GENERAL, THE MOBILITY OBTAINED
WAS AN IMPROVEMENT OVER THAT OF THE A/P22S-2
FULL PRESSURE ASSEMBLY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-823 299 6/17 22/1 5/9
FORIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SPACE SUITS - SPACE FASHION (RAUMANZUEGE - MODE DES
KOSMOS). (U)

DESCRIPTIVE NOTE: UNEDITED ROUGHT DRAFT TRANSLATION,
JUN 67 7P PFAFFE, H. I
REPT. NO. FTD-HT-66-683

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF ARMEE-RUNDSCHAU N6 P79-
81, 84 1965, BY J. STOCK.

DESCRIPTORS: (•PRESSURE SUITS, ASTRONAUTS), SPACE
FLIGHT, EAST GERMANY, DESIGN, SAFETY, EXTRAVEHICULAR
ACTIVITY, SPACECRAFT, HUMAN FACTORS ENGINEERING (U)
IDENTIFIERS: TRANSLATIONS (U)

THE SCIENTIFIC SECRETARY OF THE EAST GERMAN
ASTRONAUTICAL SOCIETY H. PFAFFE, PREDICTS
THAT ASTRONAUTS IN THE VERY NEAR FUTURE WILL EXTEND
THE DURATION OF THEIR EXTRAVEHICULAR ACTIVITIES.
THIS IS STATED TO BE ONE OF THE MOST PRESSING
CURRENT PROBLEMS WHICH SPACE EXPERIMENTS ARE DESIGNED
TO SOLVE. THE REQUIREMENT FOR ASTRONAUTS TO REMAIN
LONGER OUTSIDE THEIR SPACECRAFT IS DUE TO SUCH
EVENTUALITIES AS THE NEED TO REPAIR SPACECRAFT, THE
ERECTION OF LARGE MANNED SPACE STATIONS, AND THE
ACCOMPLISHMENT OF A MANNED LUNAR MISSION, A MANNED
LANDING ON THE MOON'S SURFACE BEING SCHEDULED FOR
1970. BESIDES THE METHOD OF EGRESS USED BY
LEONOV, THRUSTERS IN THE FORM OF A 'ROCKET
BELT' WILL ALSO BE USED TO CONTROL MOVEMENTS IN
SPACE. COMPRESSED AIR OR HYDROGEN PEROXIDE ARE
SUGGESTED FOR USE AS PROPELLANTS. THE 'ROCKET
BELT' WILL BE PROVIDED WITH A STABILIZING DEVICE TO
PREVENT THE ASTRONAUT FROM SPINNING, AS WOULD OCCUR
IF THE IMPULSES OF THE SMALL ROCKET ENGINES DID NOT
PASS THROUGH THE CENTER OF GRAVITY OF THE SYSTEM
CONSISTING OF ASTRONAUT, SPACESUIT, AND EQUIPMENT.
ANOTHER POSSIBILITY FOR WORKING OUTSIDE OF A
SPACECRAFT IS TO USE A CAPSULE PROVIDED WITH
MANIPULATORS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-826 388 6/17 15/5 1/3
ARMY CONCEPT TEAM IN VIETNAM SAN FRANCISCO CALIF 96384

EVALUATION OF FIRE RETARDANT FLIGHT GLOVES(NOMEX).
(ACA-63/671). (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JAN 68 8P ISAAC, JAMES E. ;

UNCLASSIFIED REPORT

DESCRIPTORS: (*GLOVES, *FIRE RESISTANT TEXTILES),
(*FLIGHT CLOTHING, GLOVES); NYLON, FLIGHT CREWS,
AIRCRAFT FIRES, PROTECTION, QUESTIONNAIRES,
ACCEPTABILITY, PERFORMANCE(ENGINEERING), LIMITED WAR,
VIETNAM (U)
IDENTIFIERS: NOMEX (U)

THE EVALUATION WAS CONDUCTED BECAUSE OF A
REQUIREMENT TO AFFORD PROTECTION TO THE HANDS OF AIR
CREWMEN WHO MAY BECOME EXPOSED TO FLASH FIRES WHILE
IN PERFORMANCE OF THEIR AIRCREW DUTIES. THREE
HUNDRED PAIRS OF FLIGHT GLOVES COMPOSED OF A
COMBINATION OF 'NOMEX' MATERIAL AND CABRETTA
LEATHER PRESENTLY IN USE BY THE US NAVY WERE
SELECTED. THEY WERE DISTRIBUTED ON 21 AUGUST
1967 AMONG A VARIETY OF UNITS THROUGHOUT VIETNAM
AND USED BY AIRCREW MEMBERS UNDER VARIOUS CONDITIONS
AND CLIMATE WHILE PERFORMING DUTIES AS AIR CREWMEN IN
A VARIETY OF AIRCRAFT. A QUANTITATIVE AND
QUALITATIVE ANALYSIS WAS MADE THROUGH THE USE OF
QUESTIONNAIRES TO DETERMINE SUITABILITY, RUGGEDNESS,
COMFORT, ACCEPTANCE AND UTILITY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-835 066 15/5
TACTICAL AIRLIFT CENTER POPE AFB N C

QUICK DONNING FLIGHT BOOT.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 23 OCT 67-23 FEB 68.
JUN 68 27P CAMP. JAMES B. ;
MONITOR: TAC TEST-67-234

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, SHOES), (*SHOES,
ACCEPTABILITY), DESIGN, LIFE EXPECTANCY, PERMEABILITY,
WATER, LUBRICANTS, OILS, FASTENINGS (U)

THE OBJECTIVES OF THIS TEST WERE TO DETERMINE THE
OPERATIONAL SUITABILITY AND AIRCREW ACCEPTABILITY OF
THE QUICK DONNING FLIGHT BOOT AS WELL AS TO IDENTIFY
ANY DESIGN DEFICIENCIES OR MAINTENANCE PROBLEM AREAS.
IT WAS CONCLUDED THAT THE BOOT IS SATISFACTORY FOR
AIRCREW USE AND IS RECOMMENDED FOR PROCUREMENT AFTER
THE ADOPTION OF A DIFFERENT NON-SKID SOLE AND HEEL.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-R35 403 6/17 15/5
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF JUNGLE HAT WITH HEADNET. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 68 37P LAUGHLIN, ROBERT C. I
PROJ: RDT/F-1-J-643303-D-547, USATECOM-866415
TASK: 1-J-643303-D-54734, 86641501

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TROPICAL REGIONS),
(*HEADGEAR, JUNGLES), TROPICAL TESTS, MOISTUREPROOFING,
DETERIORATION, ARMY EQUIPMENT, SHRINKAGE,
DEFECTS(MATERIALS), COLORING, LIFE EXPECTANCY, NETS,
MAINTENANCE, LAUNDRY OPERATIONS, ENVIRONMENTAL TESTS,
VISUAL INSPECTION, WEAR RESISTANCE, WEIGHT,
CONFIGURATION, COTTON TEXTILES, NYLON, VIETNAM (U)
IDENTIFIERS: SIZES(DIMENSIONS), SOUTH VIETNAM (U)

AN ENGINEERING TEST OF A JUNGLE HAT WITH
HEADNET WAS CONDUCTED TO DETERMINE THE TECHNICAL
PERFORMANCE AND SAFETY CHARACTERISTICS OF THE TEST
ITEM AS DESCRIBED IN THE SDR AND AS INDICATED BY
THE PARTICULAR DESIGN AND TO DETERMINE THE TECHNICAL
AND MAINTENANCE SUITABILITY OF THE JUNGLE HAT
WITH HEADNET FOR SERVICE TESTING. IT WAS
CONCLUDED THAT THE JUNGLE HAT WITH HEADNET IS
SUITABLE FOR SERVICE TESTING. IT WAS
RECOMMENDED THAT THE HATS BE MARKED: *FOR HAND
LAUNDERING ONLY*. (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-835 549 6/17 15/5
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF BOOT, COMBAT, MOUNTAIN AND
SKI. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 68 33P MANGUM, EDWIN W. I
PROJ: RDT/E-1-J-643303-D-547, USATECOM-837020
TASK: 1-J-643303-D-54712-D, 83702006

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, ENVIRONMENTAL
TESTS), (*SHOES, MOUNTAINS), SOCKS, MAINTENANCE,
MOISTUREPROOFING, VISUAL INSPECTION, THERMAL INSULATION,
LEATHER, COLD WEATHER TESTS, ARMY EQUIPMENT, MILITARY
REQUIREMENTS, HEAT TRANSFER, PROTECTION, FIRE RESISTANT
MATERIALS, FIRE PROTECTIVE CLOTHING (U)
IDENTIFIERS: SIZES(DIMENSIONS), TEMPERATURE
CYCLING (U)

AN ENGINEERING TEST OF THE BOOT, COMBAT,
MOUNTAIN AND SKI, WAS CONDUCTED TO EVALUATE THE
MODEL NO. 1070 BOOT; TO EVALUATE THE SIZING AND
FITTING CHARACTERISTICS IN CONSIDERATION OF THE
TECHNICAL CHARACTERISTICS; AND TO PROVIDE
TECHNICAL ASSISTANCE TO THE U. S. ARMY ARCTIC
TEST CENTER (USAATC) IN THE INITIAL FITTING AND
ISSUE OF THE TEST ITEM IN THAT PHASE OF THE SERVICE
TEST. IT WAS CONCLUDED THAT THE MODEL 1070
MOUNTAIN AND SKI BOOT IS SATISFACTORY AS TO THE
TECHNICAL CHARACTERISTICS INCLUDED IN THE QMR
FOR THE SYSTEM OF LIGHTWEIGHT CLOTHING AND
EQUIPMENT (LINCLOE) FOR WHICH TESTS WERE
CONDUCTED. (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-938 627 6/17 5/9
TACTICAL AIR WARFARE CENTER EGLIN AFB FLA

VENTILE ANTI-EXPOSURE SUIT.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 68 15P HENRIE, GORDON C. ;
MONITOR: TAC TEST-68-203

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXPOSURE SUITS, SURVIVAL(PERSONNEL)),
(*FLIGHT CREWS, EXPOSURE SUITS), PERMEABILITY, DESIGN,
HUMAN FACTORS ENGINEERING, FLIGHT CLOTHING,
ACCEPTABILITY, ADAPTATION(PHYSIOLOGY), QUESTIONNAIRES,
JET FIGHTERS, ARCTIC REGIONS, COLD WEATHER TESTS,
COMPATIBILITY, WEAR RESISTANCE, VENTILATION, THERMAL
INSULATION, SHOES, FASTENINGS

(U)

IDENTIFIERS: F-4 AIRCRAFT, ZIPPERS

(U)

THE PURPOSE OF TAC TEST 68-203, VENTILE ANTI-EXPOSURE SUIT, WAS TO DETERMINE THE COMFORT AND COMPATIBILITY OF THIS SUIT WHEN USED IN THE TACTICAL FIGHTER MISSION. THIS TEST WAS PERFORMED AT THE REQUEST OF THE AIR DEFENSE COMMAND (ADC) AND WAS A PORTION OF THE OVERALL VENTILE ANTI-EXPOSURE SUIT TEST PERFORMED BY ADC. MEMBERS OF THE 33 TAC FTR WG WORE THE VENTILE SUIT ASSEMBLY ON ALL TYPES OF MISSIONS IN F-4 AIRCRAFT. DATA WERE COLLECTED USING DAILY QUESTIONNAIRES, PLUS A MORE DETAILED QUESTIONNAIRE ADMINISTERED 30 DAYS AFTER THE TEST BEGAN. UPON COMPLETION OF THE TEST, EACH PILOT PROVIDED A STATEMENT COVERING PROBLEMS ENCOUNTERED, RECOMMENDATIONS FOR IMPROVEMENT, AND AN OVERALL STATEMENT OF ACCEPTANCE OR REJECTION OF THE SUIT DESIGN. ALL PILOTS INVOLVED IN TESTING THE SUIT STATED IT WAS ACCEPTABLE. PROBLEM AREAS WERE FOUND AND RECOMMENDATIONS SUBMITTED. AFTER THESE PROBLEMS ARE CORRECTED, THIS EXPOSURE SUIT IS RECOMMENDED FOR AIR FORCE PURCHASE.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-839 425 6/17 13/8
UNIROYAL INC WASHINGTON IND CONSUMER AND INDUSTRIAL
PRODUCTS DIV

FULL PRESSURE SUIT FOR SPACE CREWS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 25 JUL 64-23 APR 67.
JUL 68 29P BOYD, H. D. IRUNYAN, B. F.

CONTRACT: AF 33(615)-1762
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-67-215

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, *SPACE CREWS), DESIGN,
MOBILITY, UNDERWEAR, VENTILATION, JOINTS, MANUFACTURING (U)

THE PURPOSE OF THIS INVESTIGATION WAS TO CONDUCT A
RESEARCH AND DEVELOPMENT PROGRAM ON FULL PRESSURE
SUIT MOBILITY TO EVOLVE NEW TECHNIQUES AND DESIGNS TO
BE USED IN FABRICATION OF FULL PRESSURE SUITS USING
THE CORD RESTRAINED PRINCIPLE. THREE WORKING
LABORATORY MODELS WERE FURNISHED WITH MOBILITY JOINTS
THAT INCORPORATED CORD, RING AND STRETCH MATERIAL
COMBINATIONS. A VENTILATION LINER, FURNISHED WITH
THE GARMET PROVIDED SUFFICIENT AIR FLOW TO MAINTAIN
AN ATMOSPHERE ADEQUATE FOR THE PHYSIOLOGICAL WELL-
BEING OF THE WEARER. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-841 293 15/2 6/17
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D
C

STORAGE OF CHEMICAL AGENTS (I). SPECIAL CLOTHING FOR
WORKING IN WAREHOUSES (II). (U)

68 11P PANAFIDIN, K. A. ; KOBRIYS,
G. A. ;
REPT. NO. FSTC-HT-23-352-68
PROJ: FSTC-82236272301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF ZASHCHITA RASTENII
(USSR) N12 P35-38 1967, BY GEROGE G.
WEICKHARDT.

DESCRIPTORS: (*CHEMICAL WARFARE AGENTS, STORAGE), (*ARMY
PERSONNEL, PROTECTIVE CLOTHING), HANDLING, WAREHOUSES,
VENTILATION, WALLS, COTTON, PENETRATION, DUST, PLASTIC
COATINGS, HUMIDITY, ATMOSPHERIC TEMPERATURE, SAFETY,
PERSONNEL, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE TWO-PART ARTICLE CONCERNS THE STORAGE OF
CHEMICAL AGENTS AND SPECIAL CLOTHING FOR WORKING IN
WAREHOUSES WHERE THESE CHEMICALS ARE STORED.
VOLATILE CHEMICALS MUST BE STORED IN DRY, WELL-
VENTILATED WAREHOUSES OF THICK WALLS AND SMOOTH
CONCRETE FLOORS. THE CHEMICALS ARE STORED IN
CONTAINERS (ACCORDING TO THE NATURE OF THE
CHEMICAL) AND STORED SEPARATELY ACCORDING TO
DESIGNATION. PERSONNEL WORKING IN THESE WAREHOUSES
MUST WEAR GOOD PROTECTIVE CLOTHING TO PREVENT THE
VOLATILE CHEMICALS FROM COMING INTO CONTACT WITH
THEM. COVERALLS OF COTTON, WHICH ARE IMPENETRABLE
BY DUST, RUBBERIZED OR PLASTIC-COATED APRON AND
BREASTPLATE, COMBINATION MITTENS, AND A COTTON HOOD
MAKE UP THE STANDARD UNIFORM. VARIATIONS OF THESE,
PLUS ADDITIONAL CLOTHING FOR WORKING DURING THE
WINTER ARE ALSO MENTIONED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-842 833 6/17 22/2
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB
OHIO

EVALUATION OF MANNED ORBITING LABORATORY
DESIGN DEFINITION PRESSURE GARMENTS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JAN-SEP 66.
JUL 68 65P BOWEN, J. DONALD ;
REPT. NO. AMRL-TR-66-235
PROJ: AF-7164
TASK: 716411

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, SPACE STATIONS),
PERFORMANCE(ENGINEERING), CONFIGURATION, SAFETY, MANNED
SPACECRAFT, TEST METHODS, HUMAN FACTORS ENGINEERING,
MOBILITY, TABLES(DATA)

(U)

IDENTIFIERS: EVALUATION, *MOL(MANNED ORBITING
LABORATORIES)

(U)

FOUR DESIGN DEFINITION PRESSURE SUITS PROCURED IN
CONNECTION WITH THE MANNED ORBITING LABORATORY
PROGRAM WERE INVESTIGATED. THESE PRESSURE GARMENT
ASSEMBLIES WERE DESIGNED TO FIT IN WITH THE PROPOSED
CREW CABINS AND RELATED EQUIPMENT AS WELL AS TO
SATISFY SAFETY AND FUNCTIONAL REQUIREMENTS
ANTICIPATED FOR THE TWO MAN CREW. THE REPORT
DESCRIBES THE PRESSURE GARMENT ASSEMBLIES, GIVES SOME
OF THE LOGIC INVOLVED IN DESIGN SELECTION, REVIEWS
THE EVALUATION PROCEDURES, AND PRESENTS THE RESULTS
OBTAINED IN THE BATTERY OF TESTS. CONCLUSIONS
COVER THE GENERAL CHARACTERISTICS AND SHORTCOMINGS OF
THE ASSEMBLIES AND OFFER AN UNOFFICIAL ESTIMATE OF
THE GENERAL SUITABILITY FOR THE MOL PROGRAM.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-844 923 6/17

NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

CHEMICAL HEAT SOURCE FOR WET SUITS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT. FEB-OCT 68,

NOV 68 24P HEARST, PETER J. :

REPT. NO. NCEL-TN-998

PROJ: Z-R011-01-01-122

UNCLASSIFIED REPORT

DESCRIPTORS: (•UNDERWATER CLOTHING, HEATING), CHEMICALS,
SOURCES, DIVING, EXPOSURE(PHYSIOLOGY), HEAT OF REACTION,
CRYSTALLIZATION, LITHIUM COMPOUNDS, NITRATES, HYDRATES,
MODELS(SIMULATIONS), MAINTENANCE, CONSTRUCTION (U)

IDENTIFIERS: GRAPHS(CHARTS) (U)

AN INTERNAL CHEMICAL HEAT SOURCE FOR WET SUITS,
BASED ON THE HEAT OF CRYSTALLIZATION OF A CHEMICAL OR
MIXTURE OF CHEMICALS, HAS BEEN PROPOSED. INITIAL
EXPERIMENTS INDICATE THAT THIS METHOD SHOWS
CONSIDERABLE PROMISE, AND LITHIUM NITRATE TRIHYDRATE,
M.P. 30C (86F), IS A GOOD CANDIDATE MATERIAL.
THE INSIDE OF SAMPLE SUITING CONTAINING THIS
MATERIAL WAS MAINTAINED WITHIN A FIVE-DEGREE RANGE
FOR FIFTY MINUTES WHEN IMMERSSED IN ICE WATER.
PRELIMINARY TESTS WITH PROTOTYPE VESTS HAVE BEEN
PERFORMED AND FURTHER INVESTIGATIONS ARE PLANNED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-846 419 6/17
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE
MEDICAL RESEARCH DEPT

A METHOD AND RATING SYSTEM FOR EVALUATION OF
THERMAL PROTECTION.

(U)

DEC 68 25P STOLL, ALICE M. ICHIANTA,
MARIA A. ;
REPT. NO. NADC-MR-6809
PROJ: A34531/202/69F3253401

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, *THERMAL
INSULATION), TEXTILES, BURNS(INJURIES), PAIN,
PHYSIOLOGY. THERMAL RADIATION

(U)

THERMAL PROTECTION RATING SYSTEMS FOR FABRICS,
BASED ON PAIN AND BLISTER EFFECTS IN HUMAN SKIN, ARE
CONSIDERED IN TERMS OF: (1) PRECISE EVALUATIONS
APPLICABLE TO ANY KNOWN TEMPERATURE-TIME PATTERN, AND
(2) SIMPLE LABORATORY PROCEDURES TO PROVIDE A
UNIVERSALLY USEFUL STANDARD RATING SYSTEM. THE
FIRST SYSTEM WHICH IS MORE COMPREHENSIVE IS DIFFICULT
AND REQUIRES COMPUTER OPERATIONS ROUTINELY. THE
SECOND, DESCRIBED IN DETAIL, OFFERS A RATING SYSTEM
WHICH IS SIMPLE, DIRECTLY RELATED TO PAIN AND BLISTER
PARAMETERS, AND MAY BE UNDERSTOOD BY THE UNINITIATED
AS WELL AS THOSE KNOWLEDGEABLE IN THE FIELD.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-848 605 6/17 5/9
ASTRO RESEARCH CORP SANTA BARBARA CALIF

SLIP NET MOBILITY JOINTS FOR PRESSURE
SUITS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 APR 67-31 MAY 68,
NOV 68 96P FRASER, A. F. PREISWERK, P.

R. ;
REPT. NO. ARC-R-286
CONTRACT: F33615-67-C-1586
PROJ: AF-7164
TASK: 716411
MONITOR: AMRL TR-68-94

UNCLASSIFIED REPORT

DESCRIPTORS: (*SPACE ENVIRONMENTS, LIFE SUPPORT),
(*SPACE CREWS, PRESSURE SUITS), MANNED SPACECRAFT,
FATIGUE(MECHANICS), DACRON, JOINTS(PHYSIOLOGY),
MODELS(SIMULATIONS), HUMAN FACTORS ENGINEERING

(U)

THE RESULTS OF A 1-YEAR EXPERIMENTAL PROGRAM TO
DEVELOP AND EVALUATE FABRIC CONSTRAINT LAYERS FOR
PRESSURIZABLE SUITS ARE DESCRIBED. THE PRINCIPAL
OBJECT OF THE DEVELOPMENT WAS TO PRODUCE SOFT-
PRESSURE-SUIT COMPONENTS WITH MINIMUM CONSTRAINT TO
MOTION AND WITH MAXIMUM RANGE OF MOTION. A
SECONDARY GOAL WAS TO DEVELOP JOINT DESIGNS THAT
ALLOW THE USER TO MAINTAIN DISPLACED POSITIONS OF THE
LIMBS WITH MINIMUM USE OF SUSTAINING FORCE.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-850 180 15/5 6/17
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF CLOTHING SYSTEM (SUMMER
UNIFORM) FOR ARMY AVIATION CREW
MEMBERS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
DEC 68 73P MERCER, DONALD G. ;
PROJ: RDT/F-1-M-643303-D-547, USATECOM-46530004

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ORIGINAL CONTAINS COLOR PLATES;
ALL DDC REPRODUCTIONS WILL BE IN BLACK AND WHITE.
ORIGINAL MAY BE SEEN IN DDC HEADQUARTERS.

DESCRIPTORS: (*FLIGHT CLOTHING, ENVIRONMENTAL TESTS),
(*CLOTHING, ACCEPTABILITY), FLIGHT CREWS, STATIC
ELECTRICITY, COLORS, FASTENINGS, TEXTILES, TENSILE
PROPERTIES, POLYAMIDE PLASTICS, LAUNDRY OPERATIONS,
NYLON, HUMIDITY, ATMOSPHERIC TEMPERATURE, HEAT
TOLERANCE, SKIN (ANATOMY), AVIATION SAFETY, FIRE SAFETY,
WEIGHT, INFRARED RADIATION, GLOVES, SHOES, VENTILATION,
OBSERVATION AIRCRAFT, HELICOPTERS (U)
IDENTIFIERS: SUMMER UNIFORMS, UNIFORMS (U)

AN ENGINEERING TEST OF CLOTHING SYSTEM
(SUMMER UNIFORM) FOR ARMY AVIATION CREW
MEMBERS WAS CONDUCTED DURING THE PERIOD 10 JUNE -
15 NOVEMBER 1968 TO DETERMINE THE TECHNICAL
PERFORMANCE AND SAFETY CHARACTERISTICS AS DESCRIBED
IN THE SDR, THE TECHNICAL CHARACTERISTICS, AND
AS INDICATED BY THE PARTICULAR DESIGN, AND TO
DETERMINE THE TECHNICAL AND MAINTENANCE SUITABILITY
OF THE UNIFORM FOR SERVICE TEST. IT WAS CONCLUDED
THAT: THE SUMMER UNIFORM, AS DESCRIBED IN THE
REPORT, MEETS THE OPERATIONAL REQUIREMENTS TO A
DEGREE SUFFICIENT TO WARRANT SERVICE TESTING. IT
WAS RECOMMENDED THAT: THE SLEEVE FASTENER BE
ALTERED TO ALLOW A SNUG FIT; THE PATCH-TYPE SLEEVE
POCKET ZIPPER BE REPLACED WITH A VELCRO FASTENER
ALLEVIATING THE ACCESSIBILITY PROBLEM; SERIOUS
CONSIDERATION BE GIVEN TO FAILURE OF MATERIAL TO
EXHIBIT A HIGH DEGREE OF LIGHT FASTNESS NOT ONLY TO
THE RESULTANT COLOR CHANGE, BUT ALSO TO THE EXTREME
LOSS OF STRENGTH BEFORE THE UNIFORM IS APPROVED FOR
ISSUE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-856 281 6/17 19/3
ARMY ARMOR AND ENGINEER BOARD FORT KNOX KY

SERVICE TEST OF FUNCTIONAL UNIFORM FOR
ARMORED VEHICLE CREWMEN (SUMMER).

(U)

DESCRIPTIVE NOTE: FINAL REPT. MAY-OCT 68,
FEB 69 44P KLEIN, JOHN M. ISTERRETT,
DALE E. I
PROJ: RDT/E-1-M-643303-D-547, USATECOM-18786131
TASK: 1-M-643303-D-54735

UNCLASSIFIED REPORT

DESCRIPTORS: (•PROTECTIVE CLOTHING, ARMY PERSONNEL),
(•FIRE PROTECTIVE CLOTHING, ARMORED VEHICLES), HUMAN
FACTORS ENGINEERING, CLOTHING, GASPROOF CLOTHING,
CHEMICAL WARFARE AGENTS, RESPONSE(BIOLOGY),
ACCEPTABILITY, COMPATIBILITY, DESERT TESTS,
MAINTAINABILITY, POLYAMIDE PLASTICS, FASTENINGS,
DEFECTS(MATERIALS), LIFE EXPECTANCY, TANKS(COMBAT
VEHICLES), LAUNDRY OPERATIONS (U)
IDENTIFIERS: ARMORED VEHICLES, PASSENGER VEHICLES, M-
113 VEHICLES, M-114 VEHICLES, M-551 VEHICLES, M-60
TANKS, SIZES(DIMENSIONS), SUMMER (U)

THE TEST OBJECTIVE WAS TO DETERMINE THE SUITABILITY
OF THE SUMMER FUNCTIONAL UNIFORM FOR US ARMY USE.
TESTING WAS CONDUCTED ON ARMORED VEHICLES INCLUDING
M113 SERIES ARMORED PERSONNEL CARRIERS,
M60 SERIES TANKS, M114 SERIES COMMAND AND
RECONNAISSANCE CARRIERS AND M551 SHERIDAN
VEHICLES FOR A TOTAL OF 113 WEAR DAYS AND 29
LAUNDERINGS. THE UNIFORM MET SPECIFIED CRITERIA OF
THE SDR EXCEPT FOR SIZE, DURABILITY (LIFE OF 12
MONTHS) AND THE CAPABILITY OF BEING CLEANED IN THE
FIELD WITHOUT APPRECIABLE CHANGE IN SIZE, PROTECTION,
OR COLOR. EIGHT DEFICIENCIES AND TWO SHORTCOMINGS
WERE REVEALED. DEFICIENCIES WERE CATEGORIZED AS
ONE IN SIZING, THREE IN SEAM FAILURES, TWO ZIPPER
FAILURES, AND TWO HUMAN FACTORS. THE USAAREND
CONCLUDED THAT THE SUMMER FUNCTIONAL UNIFORMS FOR
ARMORED VEHICLE CREWMEN REQUIRE CORRECTION OF THE
DEFICIENCIES TO MAKE THEM SUITABLE FOR ARMY USE
UNDER INTERMEDIATE CLIMATIC CONDITIONS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-856 438 6/17 19/3
ARMY GENERAL EQUIPMENT TEST ACTIVITY FORT LEE VA

ENGINEERING TEST OF FUNCTIONAL SUMMER
UNIFORM FOR ARMORED VEHICLE CREWMEN.

(U)

DESCRIPTIVE NOTE: FINAL REPT. MAY 68-MAR 69.
JUN 69 109P BECKER, JACK M. I
PROJ: RDT/E-1-A-650212-D-618, USATECOM-18786101

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIRE PROTECTIVE CLOTHING, ARMORED
VEHICLES), (*PROTECTIVE CLOTHING, ENVIRONMENTAL TESTS),
SAFETY, MAINTAINABILITY, HUMAN FACTORS ENGINEERING,
DEFECTS(MATERIALS), WEAR RESISTANCE, HEAT TOLERANCE,
SHRINKAGE, STATIC ELECTRICITY, REFLECTIVITY, COLORS,
LAUNDRY OPERATIONS, POLYAMIDE PLASTICS, ACCEPTABILITY,
GASPROOF CLOTHING, TROPICAL TESTS (U)
IDENTIFIERS: SUMMER (U)

THE ENGINEERING TEST OF THE FUNCTIONAL
SUMMER UNIFORM FOR ARMORED VEHICLE CREWMEN
WAS CONDUCTED TO DETERMINE ITS TECHNICAL PERFORMANCE
AND SAFETY CHARACTERISTICS AND TO DETERMINE THE
TECHNICAL AND MAINTENANCE SUITABILITY OF THE UNIFORM
FOR SERVICE TEST. IT WAS CONCLUDED THAT THE SUMMER
UNIFORM MEETS THE OPERATIONAL REQUIREMENTS TO A
DEGREE SUFFICIENT TO WARRANT SERVICE TESTING. THE
ONLY KNOWN USER SAFETY HAZARD IS WHEN THE FABRIC
IDENTIFICATION TAGS ARE STAPLED TO THE INNER LAYER
AND ARE NOT REMOVED FROM THE UNIFORMS. IT IS
RECOMMENDED THAT: THE SHORTCOMINGS BE CORRECTED; A
CHECK SIZING AND FITTING STUDY BE CONDUCTED TO
ESTABLISH ADEQUACY OF PATTERN CORRECTIONS; AND
LIMITED ADDITIONAL CHECK TESTING BE CONDUCTED TO
ESTABLISH EFFECTIVENESS OF OTHER CORRECTIVE ACTIONS. (U)

UNCLASSIFIED

DNC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-856 542 6/17 22/2
DOUGLAS AIRCRAFT CO INC HUNTINGTON BEACH CALIF MISSILE
AND SPACE SYSTEMS DIV

MOL ZERO G DEVELOPMENT TEST REPORT. DD
FORM 1423 DATA ITEM UT-(110).

(U)

APR 67 23P
CONTRACT: F04695-67-C-0029

UNCLASSIFIED REPORT

DESCRIPTORS: (*MANNED SPACECRAFT, WEIGHTLESSNESS),
(*SPACE STATIONS, WEIGHTLESSNESS), (*PRESSURE SUITS,
SPACE CREWS), SPACE CAPSULES, SAFETY BELTS, MODEL TESTS,
TEST METHODS, PERFORMANCE(HUMAN), HELMETS, SHOES, GLO(U)
IDENTIFIERS: GEMINI, *GEMINI B PROJECT, *MANNED
ORBITING LABORATORIES, *MOL(MANNED ORBITING
LABORATORIES)

(U)

THE REPORT DESCRIBES THE PRESSURE SUIT
DONNING TESTS PERFORMED BY THE CREW STATIONS
UNASSISTED IN A MOCK-UP OF THE MOL SUIT STOWAGE
AREA DURING ZERO GRAVITY CONDITIONS. THE OBJECT OF
THESE TESTS WAS TO DETERMINE THE SUITABILITY OF THE
SPACE ALLOTTED FOR SUIT DONNING UNDER ACTUAL ZERO-G
CONDITIONS AND TO EVALUATE VARIOUS PROPOSED
RESTRAINTS FOR SUIT, HELMET, GLOVES, AND BOOTS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-A56 632 6/17
ARMY ARMOR AND ENGINEER BOARD FORT KNOX KY

SERVICE TEST OF FUNCTIONAL UNIFORM FOR
ARMORED VEHICLE CREWMEN (WINTER).

(U)

DESCRIPTIVE NOTE: FINAL REPT. DEC 68-MAY 69,
JUL 69 39P PESCI, ROBERT A. IDUNHAM,
LAWRENCE E. I
PROJ: RDT/E-1-M-643303-D-547, USATECOM-18786132
TASK: 1-M-643303-D-54735

UNCLASSIFIED REPORT

DESCRIPTORS: (*EXPOSURE SUITS, COLD WEATHER TESTS),
(*ARMY PERSONNEL, EXPOSURE SUITS), ARMORED VEHICLES,
TANKS (COMBAT VEHICLES), PROTECTIVE CLOTHING,
ACCEPTABILITY, WEAR RESISTANCE, MANEUVERABILITY, SAFETY,
LAUNDRY OPERATIONS, MOISTUREPROOFING, SHRINKAGE,
FASTENINGS (U)
IDENTIFIERS: ARMORED VEHICLES, PASSENGER VEHICLES,
MILITARY UNIFORMS, M-114 VEHICLES, M-113 VEHICLES, M-
551 VEHICLES, M-60 TANKS (U)

TEST OBJECTIVE WAS TO DETERMINE THE SUITABILITY OF
THE WINTER FUNCTIONAL UNIFORM FOR US ARMY USE.
TESTING WAS CONDUCTED ON ARMORED VEHICLES INCLUDING
M113 SERIES ARMORED PERSONNEL CARRIERS,
M60 SERIES TANKS, M114 SERIES COMMAND AND
RECONNAISSANCE CARRIERS, AND THE M551 ARMORED
RECONNAISSANCE/AIRBORNE ASSAULT VEHICLES FOR
A TOTAL OF 83 WEAR DAYS AND 22 LAUNDERINGS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-856 673 6/17 13/7 22/2
MCDONNELL CO ST LOUIS MO

REVERSE PRESSURE EFFECT ON SUIT DEMAND
REGULATOR. (U)

DESCRIPTIVE NOTE: FINAL REPT.

MAR 68 14P

REPT. NO: 058-ATC.06

CONTRACT: F04695-67-C-0023

UNCLASSIFIED REPORT

DESCRIPTORS: (*MANNED SPACECRAFT, PRESSURE SUITS),
(*SPACE STATIONS, PRESSURE SUITS), (*PRESSURE SUITS,
*PRESSURE REGULATORS), SPACE CAPSULES, PNEUMATIC VALVES,
OXYGEN, ENVIRONMENTAL TESTS, RELIABILITY (U)

IDENTIFIERS: GEMINI, *GEMINI B PROJECT, *MANNED
ORBITING LABORATORIES, *MOL(MANNED ORBITING
LABORATORIES) (U)

A GEMINI B SUIT OXYGEN DEMAND AND
RELIEF REGULATOR VALVE, P/N 52-83700-1171,
WAS EXPOSED TO A SIMULATED CABIN PRESSURE OF 0.1 PSIA
FOR 33 DAYS. THE GAS SUPPLY TO THE REGULATOR WAS
CLOSED DURING THE 33 DAY EXPOSURE, PERMITTING THE
SIMULATED SUIT CIRCUIT PRESSURE TO DECAY TO 0.1 PSIA.
FOLLOWING THE 33 DAY EXPOSURE THE REGULATOR OUTLET
DEMAND DIAPHRAGM WAS SUBJECTED TO A REVERSE
PRESSURIZATION OF 3.5 PSI SIMULATING THE REACTIVATION
OF THE GEMINI B ENVIRONMENTAL CONTROL
SYSTEM. THESE TESTS WERE PERFORMED TO
DEMONSTRATE THAT THE QUALIFIED NASA GEMINI
REGULATOR VALVE WOULD OPERATE SATISFACTORY WHEN
EXPOSED TO THE GEMINI B CONDITIONS OF ORBITAL
STORAGE AND REVERSE PRESSURE. FUNCTIONAL TESTS
PERFORMED ON THE REGULATOR BEFORE AND AFTER THE 33
DAY EXPOSURE INDICATED THAT THE REGULATOR PERFORMANCE
WAS SATISFACTORY EXCEPT THAT THE MAXIMUM SUIT
PRESSURE CONTROL POINT AFTER THE EXPOSURE WAS OUT OF
SPECIFICATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-856 891 6/17 13/1 22/2
MCDONNELL CO ST LOUIS MO

CONDENSATE WETTING OF SUIT HEAT EXCHANGER
WATER SEPARATOR PLATES. (U)

DESCRIPTIVE NOTE: FINAL REPT.

JUL 67 21P

REPT. NO: 058-ATC.02

CONTRACT: F04695-67-C-0023

UNCLASSIFIED REPORT

DESCRIPTORS: (*MANNED SPACECRAFT, HEAT EXCHANGERS),
(*SPACE STATIONS, HEAT EXCHANGERS), (*HEAT EXCHANGERS,
WETTING), (*PRESSURE SUITS, HEAT EXCHANGERS), SPACE
CAPSULES, SPACE SIMULATION CHAMBERS, STORAGE (U)
IDENTIFIERS: GEMINI, *GEMINI B PROJECT, *MANNED
ORBITING LABORATORIES, *MOL(MANNED ORBITING
LABORATORIES) (U)

IT IS ANTICIPATED THAT THE WATER SEPARATOR PLATES
IN THE SUIT HEAT EXCHANGER WILL BECOME DRY DURING THE
ORBITAL STORAGE PHASE OF THE GEMINI 'B' MISSION.
DRY WATER SEPARATOR PLATES PROVIDE A PATH FOR
LEAKAGE OF CABIN ATMOSPHERE THROUGH THE SUIT HEAT
EXCHANGER CONDENSATE OUTLET LINE TO THE WATER
EVAPORATOR AND THEN OVERBOARD THROUGH THE RELIEF
VALVE. THE PURPOSE OF THIS TEST WAS TO DETERMINE
THE FEASIBILITY OF WETTING THE WATER SEPARATOR PLATES
IN A DRY SUIT HEAT EXCHANGER WITH THE CONDENSATE
NORMALLY COLLECTED WITHIN THE UNIT. THIS WAS DONE
BY SUBJECTING THE HEAT EXCHANGER TO CONDITIONS THAT
SIMULATED ITS OPERATION IN THE SPACECRAFT AND
CONCURRENTLY MEASURING THE WATER OUTPUT AND GAS
LEAKAGE THROUGH THE WATER SEPARATOR PLATES.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-857 571 6/17 19/3
ARMY TROPIC TEST CENTER FORT CLAYTON CANAL ZONE

TROPIC SERVICE TEST OF FUNCTIONAL UNIFORM
FOR ARMORED VEHICLE CREWMEN.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 20 APR-15 DEC 68,
MAY 69 53P VAUGHN, CHARLES W. JURCZAK,
RAY A. I
REPT. NO. USATTC-6903002
PROJ: RDT/E-1-M-643303-D-547, USATECOM-18786180
TASK: 1-M-643303-D-54735

UNCLASSIFIED REPORT

DESCRIPTORS: (*ARMORED VEHICLES, PROTECTIVE CLOTHING),
(*PROTECTIVE CLOTHING, TROPICAL TESTS), (*ARMY
PERSONNEL, PROTECTIVE CLOTHING), DEFECTS(MATERIALS),
HUMAN FACTORS ENGINEERING, HUMIDITY, HEAT, WEAR
RESISTANCE, MAINTAINABILITY, SELF PROPELLED GUNS,
POLYAMIDE PLASTICS, FASTENINGS
IDENTIFIERS: M-42 GUNS(40-MM), SUMMER

(U)
(U)

THE PURPOSE OF THE TEST WAS TO DETERMINE THE
SUITABILITY OF THE ARMORED VEHICLE CREWMEN'S
UNIFORM FOR USE BY THE US ARMY IN A NATURAL
HUMID TROPIC ENVIRONMENT. THE UNIFORM WAS TESTED
USING PERSONNEL REPRESENTATIVE OF THOSE WHO WOULD
NORMALLY WEAR THE UNIFORM TO PERFORM THEIR DUTIES.
TESTS WERE CONDUCTED TO DETERMINE FUNCTIONAL
SUITABILITY, MAINTAINABILITY, AND DURABILITY.
DURING THE TEST, TEST PARTICIPANTS RELATED THEIR
APPRAISAL OF THE TEST UNIFORM TO THE STANDARD FIELD
UNIFORM. RECORDERS FROM THE US ARMY TROPIC
TEST CENTER MADE OBSERVATIONS AND ADMINISTERED
QUESTIONNAIRES TO COLLECT DATA FOR THIS TEST.
DURING THE TEST ONE DEFICIENCY AND THREE
SHORTCOMINGS WERE FOUND. THE DEFICIENCY WAS
UNSUITABILITY FOR USE IN HUMID TROPIC ENVIRONMENT DUE
TO LACK OF TROOP ACCEPTANCE. THE FIRST TWO
SHORTCOMINGS INVOLVED FAILURES OF SLIDE FASTENERS ON
THE DROP SEAT AND BREAST POCKET. THE THIRD
SHORTCOMING CONSISTED OF SEAM SEPARATIONS AT THE
BREAST POCKET AND ADJUSTABLE WAIST. IT IS
CONCLUDED THAT THE TEST UNIFORM IS UNSUITABLE FOR USE
IN THE HUMID TROPIC ENVIRONMENT BASED ON TROOP
ACCEPTANCE. NO DEFINITE CONCLUSIONS WERE
FORMULATED CONCERNING COMFORT AND DURABILITY DUE TO
THE WIDE LATITUDE OF PARTICIPANT RESPONSE, LACK OF
CONTROL UNIFORM, AND STATISTICALLY SMALL SAMPLE SIZE.
IT IS RECOMMENDED THAT THE TEST ITEM NOT BE ADOPTED (U)

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/ZOM08

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-862 006 6/17
ARMY ELECTRONIC PROVING GROUND FORT HUACHUCA AR12

ENGINEERING TEST OF PROTECTIVE HELMET SPH-4.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUL-SEP 69.
OCT 69 66P MARTINEZ, VICTOR S. I
REPT. NO. USAEPG-FR-525
PROJ: USATECOM-4-EI-820-PH4-001

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELMETS, PERFORMANCE(ENGINEERING)),
(*HEADGEAR, FLIGHT CLOTHING), PROTECTION, EFFECTIVENESS,
ENVIRONMENTAL TESTS, FUNGI, FAILURE, HUMIDITY,
TABLES(DATA), EARPHONES, SENSITIVITY, HEATING,
AGING(MATERIALS), MICROPHONES, ACOUSTIC IMPEDANCE,
RELIABILITY, MAINTAINABILITY, ACOUSTIC INSULATION, SHOCK
RESISTANCE, IMPACT SHOCK, SAFETY, ADHESIVES (U)
IDENTIFIERS: SPH-4 HELMETS (U)

THE U. S. ARMY ELECTRONIC PROVING
GROUND (USAEPG), FORT HUACHUCA, ARIZONA,
CONDUCTED AN ENGINEERING TEST OF PROTECTIVE
HELMET SPH-4 TO DETERMINE ITS TECHNICAL
PERFORMANCE, ENGINEERING ADEQUACY, AND SAFETY
CHARACTERISTICS. THIRTEEN TEST ITEMS WERE BENCH
TESTED AT USAEPG FROM JULY THROUGH SEPTEMBER
1969. WHITE SANDS MISSILE RANGE PROVIDED
SUPPORT AND FACILITIES FOR THE TEMPERATURE-SHOCK,
FUNGUS, AND HUMIDITY SUBTESTS; THE REMAINING
ENVIRONMENTAL SUBTESTS WERE CONDUCTED AT FORT
HUACHUCA. ONE DEFICIENCY (FUNGUS) AND FIVE
SHORTCOMINGS WERE FOUND DURING THE ENGINEERING TEST
PROGRAM. THESE FAILURES DID NOT AFFECT THE
OPERATIONAL PERFORMANCE OF THE SPH-4. IT IS
CONCLUDED THAT THE TECHNICAL PERFORMANCE, ENGINEERING
ADEQUACY, AND SAFETY CHARACTERISTICS OF THE SPH-4
ARE SATISFACTORY. THE MASSIVE FUNGAL GROWTH FOUND
ON THE SPH-4 COMPONENTS RESTRICTS ITS USE IN
TROPICAL AREAS. IT IS RECOMMENDED THAT THE
DEFICIENCY AND SHORTCOMINGS BE CORRECTED AND THE
SPH-4 BE CONSIDERED SUITABLE FOR SERVICE TESTING.
(AUTHOR)

(U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-843 709 15/7 13/10+1 6/17 6/6
STANFORD RESEARCH INST MENLO PARK CALIF NAVAL WARFARE
RESEARCH CENTER

NAVAL APPLICATIONS OF MAN-IN-THE-SEA
CONCEPTS - MISSION DEFINITION.

(U)

DESCRIPTIVE NOTE: RESEARCH MEMO.,
DEC 68 159P BIEN, ALBERT MCDONOUGH,
PETER J. ;
REPT. NO. NWRC-RM-50
CONTRACT: N00014-68-A-0243-0002
PROJ: RF-018-02-06, NR-274-008

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO ADDENDUM DATED DEC 68,
AD-506 461L.

DESCRIPTORS: (*NAVAL OPERATIONS, UNDERWATER),
(*UNDERWATER VEHICLES, HUMANS), (*UNDERWATER CLOTHING,
PERFORMANCE(HUMAN)), MILITARY REQUIREMENTS, PRESSURE,
SCUBA DIVERS, SWIMMING, DEEP SUBMERGENCE, SALVAGE,
RECOVERY, MARINE ENGINEERING, DIVING, NAVAL PERSONNEL,
PERFORMANCE(ENGINEERING), CONTINENTAL SHELVES, PRESSURE
VESSELS, LIFE SUPPORT, HYDROSTATIC PRESSURE (U)
IDENTIFIERS: DIVERS, *MAN IN THE SEA PROJECT, SEALAB
CLASS VESSELS, SWIMMERS (U)

NAVAL UNDERSEA MISSIONS AND OPERATIONS IN THE 1975-
1985 TIME FRAME THAT REQUIRE THE USE OF MAN-IN-
THE-SEA CONCEPTS ARE DELINEATED. THE MAN-
IN-THE-SEA CONCEPT IS BROADLY DEFINED IN THIS
STUDY TO INCLUDE ALL UNDERSEA SYSTEMS REQUIRING MAN'S
EXPOSURE TO THE AMBIENT OCEAN PRESSURE. MAN-IN-
THE-SEA MISSIONS AND OPERATIONS WITHIN THE
OVERALL SPECTRUM OF NAVAL UNDERSEA MISSIONS AND
OPERATIONS ARE ISOLATED ON THE BASIS OF COMPARISONS
OF FUNCTIONAL PERFORMANCE CAPABILITIES OF ALTERNATIVE
SYSTEMS. THE FUNCTIONAL REQUIREMENTS RELATED TO
THE NAVAL UNDERSEA MISSIONS AND OPERATIONS, TOGETHER
WITH THE ISOLATED MAN-IN-THE-SEA MISSIONS AND
OPERATIONS, ARE INITIAL RESULTS OF A CONTINUING STUDY
OF NAVAL APPLICATIONS OF MAN-IN-THE-SEA
CONCEPTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-872 758 6/17 13/10 13/12
BIOTECHNOLOGY INC FALLS CHURCH VA

INVESTIGATION AND RECOMMENDATIONS CONCERNING
PROTECTIVE CLOTHING AND EQUIPMENT FOR NAVY
PERSONNEL ON FLIGHT AND HANGAR DECKS OF
AIRCRAFT CARRIERS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUL 70 235P SANDERS, JAMES H. , JR.;
PARKER, JAMES F. , JR;
CONTRACT: N00014-70-C-0051
PROJ: NR-145-259

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, AIRCRAFT CARRIERS),
FLIGHT DECKS, HANGARS, EAR PROTECTORS, FIRE PROTECTIVE
CLOTHING, SHOES, LIFE PRESERVERS, UNDERWEAR, THERMAL
INSULATION, HEADGEAR, GLOVES, EYEGASSES, ENVIRONMENT,
STORAGE, LAUNDRY OPERATIONS, MAINTENANCE, NAVAL
PERSONNEL, SAFETY, SHIP FIRES, HAZARDS,
SURVIVAL (PERSONNEL), VULNERABILITY, CASUALTIES, WOUNDS
AND INJURIES, COSTS, AIRCRAFT NOISE, QUESTIONNAIRES (U)
IDENTIFIERS: THERMAL UNDERWEAR (U)

THIS STUDY DETERMINED THE REQUIREMENT FOR AND
PRESENTED RECOMMENDATIONS CONCERNING USE OF
PROTECTIVE CLOTHING AND EQUIPMENT BY PERSONNEL
WORKING ON THE FLIGHT AND HANGAR DECKS OF AIRCRAFT
CARRIERS. A REVIEW OF THE LITERATURE AND A COMPUTER
ANALYSIS OF 3560 INJURY REPORTS, DEFINED THE NATURE
AND EXTENT OF THE HAZARDS FOR EACH WORK STATION.
SHIPBOARD VISITS AND STRUCTURED QUESTIONNAIRES
PROVIDED INFORMATION REGARDING CARRIER OPERATIONS AND
USE OF AVAILABLE PROTECTIVE EQUIPMENT. CURRENT
EQUIPMENT WAS EXAMINED WITH RESPECT TO ADEQUACY,
AVAILABILITY, AND COST. SPECIFIC PROTECTION
REQUIREMENTS WERE IDENTIFIED FOR EACH PART OF THE
BODY. ON THE BASIS OF THESE, RECOMMENDATIONS ARE
MADE FOR AN INTEGRATED PROTECTIVE SYSTEM SUITED TO
THE NEEDS OF FLIGHT AND HANGAR DECK PERSONNEL,
INCLUDING SUCH ITEMS AS COVERALLS, LIFEVESTS, THERMAL
UNDERGARMENTS, HEADGEAR, GLOVES, AND BOOTS. SOME OF
THE ISSUES INVOLVED IN IMPLEMENTING THESE DESIGN
RECOMMENDATIONS ALSO ARE DISCUSSED.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-873 485 15/5 14/2
ARMY TEST AND EVALUATION COMMAND ABERDEEN PROVING GROUND
MD

COMBAT UNIFORMS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. ON MATERIEL TEST PROCEDURE.

JUL 70 11P
REPT. NO. MTP-10-3-021
PROJ: AMCR-310-6

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, TEST METHODS),
SAFETY, ACCEPTABILITY, HUMAN FACTORS ENGINEERING, VALUE
ENGINEERING, ENVIRONMENTAL TESTS (U)
IDENTIFIERS: *COMBAT UNIFORMS, COMMODITY SERVICE TEST
PROCEDURE (U)

THE ARMY SERVICE TEST PROCEDURE DESCRIBES
TEST METHODS AND TECHNIQUES FOR EVALUATING THE
CHARACTERISTICS OF COMBAT UNIFORMS, AND FOR
DETERMINING THEIR SUITABILITY FOR SERVICE USE BY THE
U. S. ARMY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-876 647 15/2 6/17
GRACE (W R) AND CO CLARKSVILLE MD RESEARCH DIV

RESEARCH AND FEASIBILITY STUDIES ON CLOTHING
AND DECONTAMINATION.

(U)

DESCRIPTIVE NOTE: FINAL REPT. JUL 64-NOV 69,
SFP 70 81P BRAUDE, G. L. I
REPT. NO. RES-70-41
CONTRACT: DA-18-035-AMC-287(A)
PROJ: DA-1-B-662706-A-095

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL WARFARE AGENTS,
*DECONTAMINATION), (*GASPROOF CLOTHING, SURFACE
PROPERTIES), SALTS, PHENOLS, ION EXCHANGE RESINS,
TEXTILES, ADSORPTION, LIQUIDS, COMPLEX COMPOUNDS,
VAPORS, NERVE AGENTS, GB AGENT, VX AGENT, MUSTARD
AGENTS, PENETRATION, GAS CHROMATOGRAPHY, PERSPIRATION,
UREA, IMPREGNATION
IDENTIFIERS: GF AGENT, SURFACE CHEMISTRY

(U)
(U)

STUDIES ON DECONTAMINATION AND ON PERCUTANEOUS
PROTECTION AGAINST CHEMICAL AGENTS WERE CONDUCTED.
NEW OR IMPROVED CHEMICAL AGENT DECONTAMINANTS WERE
INVESTIGATED, WITH SELECTED METAL SALTS AND
COMPOUNDS, PHENOLS, AND PLASTICIZED ION EXCHANGE
RESINS SHOWING THE MOST PROMISE. ATTEMPTS TO
CATALYTICALLY DECONTAMINATE AGENTS BY FREE RADICAL
INITIATED OXIDATION WERE NOT SUCCESSFUL. SILICONES
AND SILAZANES WERE ALSO NOT EFFECTIVE. THEORETICAL
AND EXPERIMENTAL VARIABLES WERE CORRELATED FOR
PREDICTING THE PERFORMANCE OF FABRIC IMPREGNANTS AS
VAPOR BARRIERS. THE INTERACTION BETWEEN FABRICS OR
SOLID SORBENT AND LIQUID CHEMICAL AGENTS WERE
DEFINED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-876 932 6/17
WELSON AND CO INC HARTFORD CONN

ROCKET PROPELLANT HANDLER'S SUIT.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. SEP 69-JUL 70,
OCT 70 80P KORABOWSKI, JOHN J. I
CONTRACT: F04611-69-C-0102
PROJ: AF-3058
MONITOR: AFRPL TR-70-135

UNCLASSIFIED REPORT

DESCRIPTORS: (*PROTECTIVE CLOTHING, DESIGN), (*ROCKET
PROPELLANTS, HANDLING), WEIGHT, MOBILITY, GLOVES,
LEAKAGE(FLUID), HELMETS, SAFETY BELTS, VALVES, DROP
TESTS, MAINTAINABILITY, HALOCARBON PLASTICS (U)
IDENTIFIERS: ROCKET PROPELLANT HANDLER SUITS,
TETRAFLUOROETHYLENE RESINS (U)

THE REPORT COVERS THE DESIGN, DEVELOPMENT,
FABRICATION AND TESTING OF ONE ROCKET PROPELLANT
HANDLER'S SUIT. THE SUIT ON COMPLETION OF
FABRICATION WAS DELIVERED TO THE AIR FORCE
ROCKET PROPULSION LABORATORY FOR FUEL TESTS.
PRESENTED IN THE DOCUMENT ARE THE DESCRIPTION OF
THE SUIT, ITS OPERATION, THE TEST REQUIREMENTS,
PROCEDURES AND DOCUMENTATION PROBLEMS, AND
RECOMMENDATIONS. (AUTHOR) (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-877 249 6/17
AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

WINDBLAST TEST OF HIGH-ALTITUDE FLYING
OUTFIT A/P22S-4.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 70 48P HOCHWALT, JOHN R. ;
REPT. NO. ASD-TR-70-11
PROJ: AF-412A

UNCLASSIFIED REPORT

DESCRIPTORS: (•FLIGHT CLOTHING,
PERFORMANCE(ENGINEERING)), (•WIND, FLIGHT CLOTHING),
FLIGHT TESTING, HIGH ALTITUDE, TAPES, SIMULATION,
EJECTION

(U)

AN INVESTIGATION WAS UNDERTAKEN TO DETERMINE THE
EFFECT OF WINDBLAST ON THE A/P22S-4 HIGH
ALTITUDE FLYING OUTFIT DURING SIMULATED PILOT
EJECTION AT A MAXIMUM SEA-LEVEL FLIGHT MACH NUMBER
OF 0.91 (600 KNOTS). TWO A/P22S-4
OUTFITS WERE TESTED. THE INTEGRITY OF BOTH
OUTFITS WAS SATISFACTORILY DEMONSTRATED, ALTHOUGH
SLIGHT DAMAGE RESULTED. THE TEST FURTHER
DEMONSTRATED THAT VELCRO TAPE IS A SATISFACTORY
SUBSTITUTE FOR THE LACING CORD CURRENTLY USED FOR
FASTENING THE EXTERIOR COVER AND RESTRAINT LAYER AT
THE VENTILATION PORT, ALTIMETER, AND CONTROLLER
LOCATIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-880 047 11/5 6/17
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

NONFLAMMABLE PBI FABRICS FOR PROTOTYPE AIR
FORCE FLIGHT SUITS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. AUG 69-MAR 70;
NOV 70 39P SCHULMAN, STANLEY INSTANTON,
ROBERT M. I
REPT. NO. AFML-TR-70-178
PROJ: AF-7320
TASK: 732002

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIRE RESISTANT TEXTILES, *FLIGHT
CLOTHING), (*HEAT RESISTANT PLASTICS, SYNTHETIC FIBERS),
FIRE PROTECTIVE CLOTHING, AIRCRAFT FIRES, FLAMMABILITY,
TEST METHODS, COTTON TEXTILES, NYLON, BENZIMIDAZOLES,
POLYMERS (U)
IDENTIFIERS: *BENZIMIDAZOLE POLYMERS, NOMEX POLYMERS,
POLYIMIDE RESINS (U)

CANDIDATE FLIGHT SUIT FABRICS HAVE BEEN EVALUATED
ALONG WITH CURRENT AIR FORCE ISSUE FLIGHT SUIT
FABRICS FOR PERSONNEL PROTECTION IN SIMULATED
AIRCRAFT ACCIDENT FIRES. MANNEQUINS CLOTHED IN THE
VARIOUS COVERALL FABRICS WERE EXAMINED FOR AVERAGE
PERCENT BODY AREA BURNED WHERE SECOND DEGREE OR WORSE
BURNS OCCURRED. USE OF COTTON AND FIRE RETARDANT
TREATED COTTON FLIGHT SUITS RESULTED IN AN AVERAGE OF
GREATER THAN 60 PERCENT BODY AREA BURNED. NOMEX
COVERALLS RESULTED IN GREATER THAN 30 PERCENT AVERAGE
BODY AREA BURNED. POLYBENZIMIDAZOLE (PBI)
RESULTED ON THE AVERAGE, LESS THAN TEN PERCENT BODY
AREA BEING BURNED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZON08

AD-884 560 6/11
NAVAL SHIP RESEARCH AND DEVELOPMENT LAB PANAMA CITY
FLA

EVALUATION CRITERIA FOR HEATED DIVER SUIT
SYSTEMS.

(U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT REPT.,
APR 71 33P AUSTIN, GEORGE B. IPAYNE,
ROBERT H. I
REPT. NO. NSRDL/PC-3458
PROJ: WR-1-5126-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*SCUBA DIVERS, PROTECTIVE CLOTHING),
(*PROTECTIVE CLOTHING, HEATING), THERMAL INSULATION,
SAFETY, CONTROL SYSTEMS, TESTS, HUMAN FACTORS
ENGINEERING, LIFE SUPPORT

(U)

IDENTIFIERS: *DIVING SUITS, EVALUATION, HEATED DIVING
SUITS

(U)

THE CRITERIA FOR EVALUATING HEATED SUITS FOR DIVERS
ARE DESCRIBED. THE MOST STRINGENT REQUIREMENT IS
THE ESTABLISHMENT OF CRITERIA FOR TESTING SELF-
CONTAINED HEATED SUIT SYSTEMS TO PROTECT A DIVER
THERMALLY IN 28 DEG F WATER TO 1000-FOOT DEPTHS
FOR DURATIONS OF 6 HOURS. SYSTEMS UTILIZING REMOTE
HEAT SOURCES VIA AN UMBILICAL CORD TRANSFER SYSTEM
ARE INCLUDED AND REQUIREMENTS FOR THREE CATEGORIES OF
TESTING CRITERIA ARE DESCRIBED: (1)
PREOPERATIONAL TESTS, (2) OPERATIONAL TESTS
(MAN SIMULATED), AND (3) OPERATIONAL TESTS
(MANNED). THE DOMINANT EVALUATION CRITERION
REQUIREMENT FOR ALL TESTS IS SAFETY AND STRESS IS
PLACED ON THE REQUIREMENT FOR BACKUP CONTROLS AND
FAIL-SAFE COMPONENTS FOR ALL SYSTEMS.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-885 304 6/17
AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

THE DESIGN REQUIREMENTS, DESCRIPTION AND
FUNCTIONAL OPERATION OF THE A/P22S-4 AND
A/P22S-6 HIGH ALTITUDE, FLYING
OUTFITS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 71 102P GILLESPIE, KENT W. HOCHWALT.
JOHN R. I
REPT. NO. ASD-TR-70-58
PROJ: AF-412A

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, DESIGN), FLIGHT CLOTHING,
HELMETS, GLOVES, PRESSURIZATION, VENTILATION,
MICROPHONES, HIGH ALTITUDE, QUESTIONNAIRES (U)
IDENTIFIERS: A/P22S-4 PRESSURE SUITS, A/P22S-6
PRESSURE SUITS (U)

IN THIS REPORT THE DESIGN REQUIREMENTS, DESCRIPTION
AND FUNCTIONAL OPERATION OF THE A/P22S-4 AND
A/P22S-6 OUTFITS ARE PRESENTED. THE BASELINE
MODEL WAS THE IMPROVED A/P22S-2 HIGH
ALTITUDE, FULL PRESSURE, FLYING OUTFIT.
PERTINENT ASPECTS OF THE PROGRAM ARE PRESENTED.
IN ADDITION, PRODUCTION OF AN IMPROVED OUTFIT,
IDENTIFIED AS A/P22S-6A, IS DISCUSSED.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-885 575 6/17 15/5
AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

THERMAL PROTECTION CAPACITY OF THE A/
P22S-4 HIGH ALTITUDE FLYING OUTFIT.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
A/R 71 38P HOCHWALT, JOHN R. ;
REPT. NO. ASD-TR-71-3
PROJ: AF-412A

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, THERMAL INSULATION),
(*AVIATION SAFETY, *FIRE PROTECTIVE CLOTHING), FIRES,
JET ENGINE FUELS, TESTS, ARMY RESEARCH
IDENTIFIERS: JP-4 FUEL

(U)
(U)

THE REPORT DESCRIBES AND ILLUSTRATES THE THERMAL
PROTECTION PROVIDED BY THE A/P22S-4 HIGH
ALTITUDE FLYING OUTFIT. IT INDICATED THAT AN
INDIVIDUAL SUBJECTED TO A JP-4 FUEL FIRE WITH
TEMPERATURES FROM 1800 TO 2300 DEGREES FAHRENHEIT,
FOR A PERIOD OF THREE SECONDS, WOULD NOT HAVE BEEN
BURNED IF HE WERE WEARING THIS OUTFIT.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-886 642 6/11
AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

DESIGN AND DEVELOPMENT OF A HIGH ALTITUDE
PROTECTIVE ASSEMBLY.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 71 41P GILLESPIE, KENT W. I
REPT. NO. ASD-TR-71-8

UNCLASSIFIED REPORT

DESCRIPTORS: (*PRESSURE SUITS, FLIGHT CREWS), HIGH
ALTITUDE, LIFE SUPPORT, BAROMETRIC PRESSURE, HELMETS,
DIAPHRAGMS(MECHANICS), EXPANDABLE STRUCTURES,
VENTILATION, OXYGEN MASKS, PROTECTION, RESPIRATION, HEAT
TRANSFER, NYLON, OXYGEN EQUIPMENT, PARACHUTES,
INFLATABLE STRUCTURES, LIFE PRESERVERS, EXPOSURE
SUITS

(U)

IDENTIFIERS: CWU-3/P ANTIGRAVITY SUITS, CWU-12/P
ANTIEXPOSURE SUITS, HAPA(HIGH ALTITUDE PROTECTIVE
ASSEMBLIES), *HIGH ALTITUDE PROTECTIVE ASSEMBLIES,
LPU-3/P LIFE PRESERVERS, MA-3 VENTILATION GARMENTS,
PARACHUTE HARNESSSES, PARTIAL PRESSURE SUITS

(U)

THIS REPORT PRESENTS EXCERPTS FROM A DESIGN STUDY
REPORT AND INFORMATION REGARDING THE REQUIREMENT FOR
AND THE DEVELOPMENT AND FABRICATION OF A HIGH
ALTITUDE PROTECTIVE ASSEMBLY.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-886 843 6/17
NAVAL SHIP RESEARCH AND DEVELOPMENT LAB PANAMA CITY
FLA

EVALUATION OF SWIMMER EXPOSURE SUITS IN
SURFREEZING WATERS.

(U)

JUL 71 34P JENKINS, WALLACE T. I
REPT. NO. NSRDL/PC-3471
PROJ: 54619
TASK: 11897-10

UNCLASSIFIED REPORT

DESCRIPTORS: (EXPOSURE SUITS, UNDERWATER), POLAR
REGIONS, TEMPERATURE, SYNTHETIC RUBBER, PROTECTION,
GLOVES, ACCEPTABILITY, NAVAL RESEARCH, DIVING
IDENTIFIERS: SWIMMER EXPOSURE SUITS

(U)

(U)

THREE TYPES OF EXPOSURE SUITS FOR UNDERWATER
SWIMMERS WERE EVALUATED IN THE ARCTIC OCEAN AT
WATER TEMPERATURES BETWEEN 28.9F AND 30.6F: A 3/
8-INCH THICK, CLOSED CELL NEOPRENE, STANDARD WET
SUIT; A 1/4-INCH THICK, CLOSED CELL NEOPRENE DRY SUIT
WORN OVER FULL NYLON FUR UNDERWEAR; AND A 3/8-INCH
THICK WET SUIT FABRICATED OF NONCOMPRESSIBLE
MATERIAL. FOUR DIVER-OCEANOGRAPHERS USED AND
EVALUATED THE SUITS IN SUBFREEZING WATER BENEATH THE
ICE. IT WAS CONCLUDED AFTER A SERIES OF 40 DIVES,
RANGING IN DURATION FROM 37 TO 115 MINUTES, THAT THE
DRY SUIT AFFORDS MORE PROTECTION AND IS MORE
SATISFACTORY THAN EITHER WET SUIT. THE WET SUIT OF
NONCOMPRESSIBLE MATERIAL PROVIDES MORE PROTECTION AT
DEPTH THAN THE STANDARD WET SUIT. NONE OF THE
GLOVES OR MITTENS, OR ANY COMBINATION, AFFORDED
ADEQUATE PROTECTION FOR THE HANDS. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-892 055 6/17
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

CANADIAN SELF-CONTAINED DIVING EQUIPMENT
PERFORMANCE TESTS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAR 53 25P THOMPSON, E. D. IKINCAID, C.
T. IDWYER, J. V. I
REPT. NO. NEDU-FORMAL-1-53

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING,
PERFORMANCE(ENGINEERING)), DIVING, UNDERWATER
EQUIPMENT, BREATHING APPARATUS, DESIGN,
INSTRUMENTATION, CANADA
IDENTIFIERS: MINE RECOVERY SUITS

(U)
(U)

THE EXPERIMENT EVALUATES THE PERFORMANCE OF A
MODIFIED MINE RECOVERY SUIT UNDER VARIOUS
WORKING CONDITIONS TO A DEPTH OF 99 FEET. THE
OUTFIT CONSISTED OF A HUNCHBACK CANVAS LIGHTWEIGHT
DIVING DRESS WITH AN INTEGRATED FACEMASK HAVING A
HINGED FACEPLATE. A MINE RECOVERY SUIT
(MRS) BREATHING APPARATUS SUPPLIED BREATHING MEDIUM
TO THE FACEMASK BY MEANS OF A VENTURI JET WHICH
METERED THE SUPPLY AND PROVIDED RECIRCULATION OF THE
BREATHING MEDIUM THROUGH A CARBON DIOXIDE ABSORBENT.
A NECK YOKE BREATHING BAG PROVIDED A RESERVOIR FOR
HIGH BREATHING RATE DEMANDS. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-893 971 6/17 6/11
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

SECOND SERIES U.S. RUBBER COMPANY
LIGHTWEIGHT DIVING OUTFITS WITH AIRLINE AND
DEMAND SUPPLY. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JAN 53 17P WOLFE, T. R. , IIIIDWYER,
J. V. ;
REPT. NO. NEDU-8-52
PROJ: NS-185-005

UNCLASSIFIED REPORT

DESCRIPTORS: (*UNDERWATER CLOTHING, DIVING), (*BREATHING
MASKS, UNDERWATER CLOTHING), DESIGN, NYLON, RUBBER
COATINGS, FASTENINGS, SHOES, TEXTILES, LEAKAGE (FLUID),
MOISTUREPROOFING, SHALLOW WATER, UNDERWATER EQUIPMENT,
UNDERWATER COMMUNICATION SYSTEMS, UNDERWATER TELEPHONES,
HAZARDS, ELECTRICITY (U)
IDENTIFIERS: CANVAS, ELECTRIC SHOCK (U)

THIS EVALUATION CONCERNS THE SUITABILITY OF THE
COMPONENTS OF THREE EXPERIMENTAL LIGHTWEIGHT DIVING
DRESSES AS DETERMINED BY A SERIES OF DIVING RUNS.
IN GENERAL, THE DRESSES AND THEIR INTEGRATED
FACEMASKS ARE SATISFACTORY. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-922 273 6/17 5/5 11/9
TACTICAL AIR WARFARE CENTER EGLIN AFB FLA

FOAMED-IN-PLACE HELMET.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 15 SEP 70-28 APR 72,
JUL 72 63P BALENTINE, DOYLE E. I
MONITOR: TAC TEST-70A-057F

UNCLASSIFIED REPORT

DESCRIPTORS: (*HELMETS, *EXPANDED PLASTICS), MOLDINGS,
ISOCYANATE PLASTICS, VISIBILITY, EJECTION,
RETENTION(PSYCHOLOGY), NOISE, EAR PROTECTORS,
INSTRUCTION MANUALS, MANUFACTURING, AGING(MATERIALS),
CATALYSTS, HUMIDITY, TEMPERATURE, ASSEMBLY, DRYING,
FLIGHT CREWS, MOLDING MATERIALS, LEATHER, ADHESIVES,
HUMAN FACTORS ENGINEERING, MODEL TESTS, PILOTS, TACTICAL
AIR COMMAND, ACCEPTABILITY, TECHNICIANS, QUESTIONNAIRES,
ANTHROPOMETRY (U)

IDENTIFIERS: FLIGHT CLOTHING, HELMETS, FOAMED IN PLACE
HELMETS, *HELMET LINERS, HGU-2A/P HELMETS,
SIZES(DIMENSIONS) (U)

THE FOAMED-IN-PLACE HELMET PROCESS EVALUATED
IN THIS OT AND E WAS AN ATTEMPT TO CORRECT THE
DEFICIENCIES THAT EXISTED IN THE FORMER HELMET.
LIFE SUPPORT TECHNICIANS ARE CAPABLE, WITH
PRACTICE, OF LOCAL FABRICATION OF ACCEPTABLE
FOAMED-IN-PLACE HELMETS. MOST OF THE MATERIAL
AND EQUIPMENT PROVIDED WERE SATISFACTORY; HOWEVER,
SOME WERE UNACCEPTABLE AND CONSIDERABLE SUPPLIES WERE
REQUIRED THAT WERE NOT PROVIDED. INSTRUCTIONS FOR
THE HELMET LINER FOAMING PROCESS, ISSUED BY
AERONAUTICAL SYSTEMS DIVISION, WERE FOUND TO BE
ADEQUATE. THE INSTRUCTIONS SHOULD BE REFINED AND
PHOTOGRAPHS AND ILLUSTRATIONS SHOULD BE ADDED.
INSTRUCTIONS FOR THE HELMET FABRICATION WERE
INADEQUATE. PARTICIPATING AIRCREWS RATED THE TEST
HELMET SUPERIOR TO THE PREVIOUSLY USED HELMETS IN THE
AREAS OF COMFORT (82 PERCENT) AND STABILITY (80
PERCENT). NO SIGNIFICANT DIFFERENCE WAS NOTED IN
RESTRICTIONS TO VISIBILITY. NOISE ATTENUATION WAS
RATED ACCEPTABLE. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-909 926 6/17
NAVY EXPERIMENTAL DIVING UNIT WASHINGTON D C

EVALUATION OF LIGHTWEIGHT DEEP SEA DIVING
DRESS.

(U)

DESCRIPTIVE NOTE: SUMMARY REPT.,
APR 71 9P CHANDLER, DONALD R. IREIMERS,
STEPHEN D. I
REPT. NO. NEDU-LR-1-71

UNCLASSIFIED REPORT
AVAILABILITY: MICROFICHE COPIES ONLY.

DESCRIPTORS: (•UNDERWATER CLOTHING, SCUBA DIVERS),
WEIGHT, HELMETS, DEEP SUBMERGENCE, SALVAGE, DIVING,
FLEXIBLE STRUCTURES, MANEUVERABILITY,
FATIGUE (PHYSIOLOGY), SEALS, GLOVES, MAINTENANCE,
TEXTILES, ACCEPTABILITY, NAVAL PERSONNEL, JAPAN
IDENTIFIERS: •DIVING SUITS, JAPANESE EQUIPMENT

(U)

(U)

COMMERCIAL DEEP SEA DIVERS IN JAPAN AND ON THE
U.S. WEST COAST USE A DEEP SEA DRESS MADE OF
A LIGHTER WEIGHT, MORE FLEXIBLE MATERIAL THAN THE
STANDARD USN DEEP SEA DRESS. THREE OF THE LIGHT
WEIGHT DRESSES WERE TESTED AT NAVY EXPERIMENTAL
DIVING UNIT AND NAVAL SCHOOL, DIVING AND
SALVAGE OVER A PERIOD OF 6 MONTHS.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM08

AD-914 019 15/5 11/5
FABRIC RESEARCH LABS INC DEDHAM MASS

DEVELOPMENT OF PBI FABRIC FOR FLIGHT SUIT
WEAR TEST.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. SEP 68-SEP 70,
SEP 71 79P COSKREN, ROBERT J. IKASWELL,
ERNEST R. I
CONTRACT: F33657-69-C-0256
PROJ: AF-412A
MONITOR: AFML TR-71-195

UNCLASSIFIED REPORT

DESCRIPTORS: (*FLIGHT CLOTHING, BENZIMIDAZOLES),
(*BENZIMIDAZOLES, *FIRE RESISTANT TEXTILES), POLYMERS,
TEST METHODS, FLAMMABILITY, WEAR RESISTANCE, HEAT
TRANSFER, THERMAL STABILITY, AIRCRAFT FIRES, SHRINKAGE,
SIMULATION (U)
IDENTIFIERS: *POLYBENZIMIDAZOLE (U)

THE OBJECTIVE OF THIS PROGRAM WAS THE DEVELOPMENT
OF PBI FABRIC FOR EVALUATION IN SUMMER WEIGHT
FLYING COVERALLS. THE WORK WAS CARRIED OUT IN TWO
PHASES. DURING PHASE I A GROUP OF SPUN PBI
FABRICS WAS DESIGNED, WOVEN, EVALUATED IN THE
LABORATORY AND TWENTY COVERALLS FABRICATED FOR
EVALUATION BY AFML. IN PHASE II 600 PBI
COVERALLS WERE FABRICATED AND DISTRIBUTED TO VARIOUS
AIR FORCE, ARMY, NAVY, AND NASA
INSTALLATIONS FOR IN-SERVICE O.T. AND E.
(OPERATIONAL TEST AND EVALUATION). A
LABORATORY PROCESS WAS DEVELOPED TO MINIMIZE THE
THERMAL SHRINKAGE OF SPUN PBI FABRIC RESULTING FROM
HIGH TEMPERATURE EXPOSURE. FURTHER DEVELOPMENT MUST
BE CONDUCTED TO REFINE AND OPTIMIZE THE PROCESS TO
PREVENT DARKENING OF THE FABRIC. THE PBI FABRIC
ULTIMATELY CHOSEN FOR THE 600 COVERALLS WAS WOVEN
FROM 21'S SINGLES (COTTON COUNT) 3.6 TWIST
MULTIPLIER YARN. THE FABRIC SELECTED WAS A 69X64,
2X1 TWILL WEIGHING 4.7 OUNCES PER SQUARE YARD. THE
COVERALLS WERE SINGLE LAYERED THROUGHOUT, EXCEPT IN
AREAS CONTAINING POCKETS. BASED ON FLAMMABILITY
TESTS CONDUCTED IN THE LABORATORY AND IN SIMULATED
AIRCRAFT FUEL FIRES, THIS PBI FABRIC WAS FOUND TO
BE SUPERIOR TO THE FLYING SUITS CURRENTLY USED BY THE
AIR FORCE IN PREVENTING DANGEROUS THERMAL
PENETRATION AND DESTRUCTION BY FIRE. (U)

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CORPORATE AUTHOR - MONITORING AGENCY

•ACUREX COMP MOUNTAIN VIEW CALIF
AEROTHERM DIV

• • •
ANALYSIS OF THE THERMAL
RESPONSE OF PROTECTIVE FABRICS.
(AFML-TR-73-17)
AD-759 525

•AERONAUTICAL SYSTEMS DIV WRIGHT-
PATTERSON AFB OHIO

• • •
ASD-TDR63 729
INTEGRATED BACK-PACK
MANEUVERING UNIT PROPULSION STUDY
AND EXHAUST PLUME HEATING ANALYSIS.
AD-609 206

• • •
ASD-TR-70-11
WINDBLAST TEST OF HIGH-ALTITUDE
FLYING OUTFIT A/P225-4.
AD-877 249

• • •
ASD-TR-70-58
THE DESIGN REQUIREMENTS,
DESCRIPTION AND FUNCTIONAL
OPERATION OF THE A/P225-4 AND
A/P225-6 HIGH ALTITUDE, FLYING
OUTFITS.
AD-885 304

• • •
ASD-TR-71-3
THERMAL PROTECTION CAPACITY OF
THE A/P225-4 HIGH ALTITUDE FLYING
OUTFIT.
AD-885 575

• • •
ASD-TR-71-8
DESIGN AND DEVELOPMENT OF A
HIGH ALTITUDE PROTECTIVE ASSEMBLY.
AD-885 641

• • •
ASD-TR-71-147
EVALUATION OF THERMALLY
STABLE POLYMER FABRICS FOR USE IN
SPACE SUITS.

• • •
AERONAUTICAL SYSTEMS DIV WRIGHT-
PATTERSON AFB OHIO

• • •
ASD-TR-71-147
EVALUATION OF THERMALLY
STABLE POLYMER FABRICS FOR USE IN
SPACE SUITS.

CONCEPTUAL DESIGN FOR A PERSONAL
THERMAL CONDITIONING SYSTEM.
AD-670 212

•AEROSPACE MEDICAL RESEARCH LAB WRIGHT-
PATTERSON AFB OHIO

• • •
AMRL-66-173
SENSIBLE HEAT TRANSFER IN THE
GEMINI AND APOLLO PRESSURE SUITS.
AD-647 828

• • •
AMRL-TDR-64-37
EXPERIMENTAL SPACE WORKER'S
GARMENT AND HELMET ASSEMBLY.
AD-738 088

• • •
AMRL-TDR64 60
EMERGENCY BREATHING AND SUIT
PRESSURIZATION SYSTEM.
AD-608 088

• • •
AMRL-TDR64 66
HEIGHT-WEIGHT SIZING OF
PROTECTIVE GARMENTS, BASED ON
JAPANESE AIR SELF-DEFENSE FORCE
PILOT DATA, WITH FIT-TEST RESULTS.
AD-606 039

• • •
AMRL-TR-64-110
MOMENTS OF INERTIA AND CENTERS
OF GRAVITY OF THE LIVING HUMAN BODY
ENCUMBERED BY A FULL-PRESSURE SUIT.
AD-609 863

• • •
AMRL-TR64 118
THE USE OF LINES OF
NONEXTENSION TO IMPROVE MOBILITY IN
FULL-PRESSURE SUITS.
AD-610 519

• • •
AMRL-TR-66-186
STUDY AND DEVELOPMENT OF
MATERIALS AND TECHNIQUES FOR
PASSIVE THERMAL CONTROL OF FLEXIBLE
EXTRAVEHICULAR SPACE GARMENTS.
AD-624 886

• • •
AMRL-TR-66-4
A STUDY OF TECHNIQUES AND
EQUIPMENT FOR THE EVALUATION OF

UND-WIN

UNCLASSIFIED

EXTRA-VEHICULAR PROTECTIVE GARMENTS.
AD-635 206

• • •
AMRL-TR-66-143
RESEARCH AND DEVELOPMENT OF
EXTRA-VEHICULAR PROTECTIVE ASSEMBLY.
AD-647 197

• • •
AMRL-TP-66-183
RESEARCH ON CLOSED-CELL SPONGE
AS A PRESSURE TECHNIQUE FOR
PROTECTIVE ASSEMBLIES.
AD-652 653

• • •
AMRL-TP-66-193
RESEARCH AND DEVELOPMENT OF
HELMET FACEPIECES FOR SPACE
PROTECTIVE ASSEMBLIES.
AD-652 248

• • •
AMRL-TR-66-260
RESEARCH TO ADVANCE
EXTRA-VEHICULAR PROTECTIVE
TECHNOLOGY.
AD-816 964

• • •
AMRL-TR-67-59
PRESSURE SEALING CLOSURES FOR
FULL PRESSURE PROTECTIVE SUIT
ASSEMBLIES.
AD-658 204

• • •
AMRL-TR-67-128
TECHNIQUES AND MATERIALS FOR
PASSIVE THERMAL CONTROL OF RIGID
AND FLEXIBLE EXTRA-VEHICULAR SPACE
ENCLOSURES.
AD-666 940

• • •
AMRL-TR-67-190
VARIABLE THERMAL CONDUCTIVITY
HEAT TRANSFER RESEARCH FOR PERSONAL
PROTECTIVE ASSEMBLIES.
AD-668 765

• • •
AMRL-TR-67-216
FULL PRESSURE SUIT FOR SPACE
CREWS.
AD-939 425

• • •
AMRL-TR-67-236

AN AUTOMATIC ANALOG BREATHING
SYSTEM FOR MULTICELL PRESSURE
SUITS.

AD-687 436

• • •
AMRL-TR-68-74
A PORTABLE TEST BATTERY FOR
COMPARATIVELY EVALUATING OPERATOR
PERFORMANCE IN FULL-PRESSURE SUIT
ASSEMBLIES.
AD-680 825

• • •
AMRL-TR-68-86
METEOROID THREAT TO
EXTRA-VEHICULAR SPACE SUIT
ASSEMBLIES.
AD-691 461

• • •
AMRL-TR-68-87
SURVEY OF THERMAL CONTROL
TECHNIQUES FOR EXTRA-VEHICULAR SPACE
SUITS.
AD-687 149

• • •
AMRL-TR-68-94
SLIP NET MOBILITY JOINTS FOR
PRESSURE SUITS.
AD-848 605

• • •
AMRL-TR-68-122
ENGINEERING DESIGN STUDY OF A
SPACE SUIT WITH AN INTEGRATED
ENVIRONMENTAL CONTROL SYSTEM.
AD-680 826

• • •
AMRL-TR-68-187
VORTEX TUBE AS A THERMAL
PROTECTIVE DEVICE.
AD-706 455

• • •
AMRL-TR-69-6
ANTHROPOMETRIC DIMENSIONS OF
AIR FORCE PRESSURE-SUITED PERSONNEL
FOR WORKSPACE AND DESIGN CRITERIA.
AD-697 022

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AMRL-TR-69-54
EFFICACY OF VENTILATING
SYSTEMS.
AD-726 076

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AMRL-TR-69-56
RESEARCH AND DEVELOPMENT ON A
PASSIVELY PRESSURIZED FLIGHT
UNIFORM.
AD-702 537

AMRL-TR-69-64
EXPLORATORY DEVELOPMENT OF
PRESSURE SUIT MOBILITY JOINTS,
GLOVES AND HELMET.
AD-711 676

AMRL-TR-69-112
INVESTIGATION OF VIBRATION AND
IMPACT PROTECTION OF THE HUMAN HEAD
AND NECK.
AD-702 124

AMRL-TR-69-127
ZOOM BAG SCENARIO.
AD-697 455

AMRL-TR-69-132
INTEGRATED MANEUVERING LIFE
SUPPORT SYSTEM.
AD-714 577

AMRL-TR-70-3
ANTHROPOLOGICAL APPLICATIONS IN
HIGH ALTITUDE FLIGHT SYSTEMS.
AD-706 888

AMRL-TR-70-111
EXPLORATORY DEVELOPMENT OF
PARTIAL PRESSURE HELMET AND
MOBILITY JOINTS FOR EMERGENCY
PRESSURE SUIT OUTFITS.
AD-720 275

AMRL-TR-70-120
DESIGN AND FABRICATION OF A
PASSIVELY PRESSURIZED SUIT.
AD-720 827

AMRL-TR-71-80
CENTRIFUGE VALIDATION OF A
TACTILE 'G-LIMIT' WARNING DEVICE.
AD-732 194

AMRL-TR-72-65
COLD WATER EVALUATION OF

ENVIRONMENTAL MARINE DIVING SUITS.
AD-754 278

AMRL-TR-72-66
EVALUATION OF FIRE RETARDANT
FABRICS.
AD-754 935

AMRL-TR-72-77
BACKGROUND AND DEVELOPMENT OF
BOYLE'S LAW ALTITUDE SUITS.
AD-761 797

AMRL-TR-73-82
PHYSIOLOGICAL EFFECTS OF
WEARING THE FIRE PROXIMITY SUIT ON
CRASH TRUCK ALERT STATUS TO HOT-DRY
AND HOT-HUMID ENVIRONMENTS.
AD-773 828

AEROSPACE MEDICAL RESEARCH LABS
WRIGHT-PATTERSON AFB OHIO

AMRL-TDR64 36
X-20A FULL-PRESSURE SUIT
QUANTITATIVE PERFORMANCE.
AD-603 701

AMRL-TDR64 41
FINGER DEXTERITY OF THE
PRESSURE-SUITED SUBJECT.
AD-603 705

AMRL-TDR64 79
RESPIRATORY AND MICROCLIMATE
TEMPERATURES WITHIN THE PARKA HOOD
IN EXTREME COLD.
AD-608 139

AMRL-TR-65-4
EFFECTS OF VARIOUS GASES ON
HANDGEAR INSULATION.
AD-628 367

AMRL-TR-65-58
EFFICACY OF PRESSURE SUIT
COOLING SYSTEMS IN HOT
ENVIRONMENTS.
AD-627 190

AMRL-TR-65-65

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MOBILITY OF PRESSURE-SUITED
SUBJECTS UNDER WEIGHTLESS AND LUNAR
GRAVITY CONDITIONS.
AD-676 979

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AMRL-TR-65-86
ACOUSTICAL EVALUATION OF X-20A
DYNA-SOAR FULL-PRESSURE SUIT
ASSEMBLIES.
AD-618 715

• • •
AMRL-TR-66-147
BIOCHEMICAL AND PHYSIOLOGICAL
EVALUATION OF HUMAN SUBJECTS
WEARING PRESSURE SUITS UNDER
SIMULATED AEROSPACE CONDITIONS.
AD-626 619

• • •
AMRL-TR-66-179
OPERATIONAL CHARACTERISTICS OF
THE 1964 EXTRAVEHICULAR RESEARCH
MODEL FULL PRESSURE ASSEMBLY.
AD-819 324

• • •
AMRL-TR-66-235
EVALUATION OF MANNED ORBITING
LABORATORY DESIGN DEFINITION
PRESSURE GARMENTS.
AD-842 833

• • •
AMRL-TR-67-124
APPLICATION OF THE RANQUE-
WILSCH VORTEX TUBE TO AIRCREW
COOLING PROBLEMS.
AD-673 345

• • •
AMRL-TR-67-234
PRINCIPLES OF THE BOYLE'S LAW
EMERGENCY PRESSURE SUIT AND THEIR
APPLICATION.
AD-685 720

• • •
AMRL-TR-68-24
CLEARANCE AND PERFORMANCE
VALUES FOR THE HARE-HANDED AND THE
PRESSURE-GLOVED OPERATOR.
AD-681 457

• • •
AMRL-TR-68-140
DESCRIPTION AND OPERATING
INSTRUCTIONS FOR A 7-CHANNEL

TELEMETRY SYSTEM FOR PHYSIOLOGICAL
TEMPERATURES AND THE
ELECTROCARDIOGRAM.
AD-686 067

• • •
TR-64-126
A COMPARISON OF THREE FULL-
PRESSURE SUITS IN TERMS OF CONTROL
ACTIVATION TIME.
AD-613 597

• AIR FORCE MATERIALS LAB WRIGHT-
PATTERSON APB OHIO

• • •
AFML-TR-70-178
NONFLAMMABLE PBI FABRICS FOR
PROTOTYPE AIR FORCE FLIGHT SUITS.
AD-880 047

• • •
AFML-TR-71-195
DEVELOPMENT OF PBI FABRIC FOR
FLIGHT SUIT WEAR TEST.
AD-914 019

• • •
AFML-TR-72-247
DEVELOPMENT OF REFLECTIVE
MATERIALS FOR FIRE FIGHTER'S BOOTS.
AD-762 544

• • •
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•ARMY NATICK LABS MASS CLOTHING AND
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•ARMY NATICK LABS MASS CLOTHING AND
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AD-712 994

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• ARMY NATICK LABS MASS PIONEERING
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* ASTRO RESEARCH CORP SANTA BARBARA
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* BIOTECHNOLOGY INC ARLINGTON VA
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* BIOTECHNOLOGY INC FALLS CHURCH VA
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NAVHED-M4306.02-6010B-2
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NAVHED-M4306.02-6010B-3
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SYSTEM.
AD-706 064

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NAVMED-MF-011.99-1001.7
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NEOPRENE 'DIVER'S WET SUIT' AS A
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• CHANCE VOUGHT CORP DALLAS TEX

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• CIVIL AEROMEDICAL INST OKLAHOMA CITY
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• • •
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HOOD.
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PROTECTIVE SMOKE HOOD STUDIES.
(FAA-AH-70-20)
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• CLARK (DAVID) CO INC WORCESTER MASS

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RESEARCH AND DEVELOPMENT OF
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• COAST GUARD BALTIMORE MD FIELD

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• CORNELL AERONAUTICAL LAB INC BUFFALO
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AD-722 774

• DEFENCE RESEARCH ESTABLISHMENT OTTAWA
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DREC-R-496
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STORAGE AND PACKAGING.
AD-781 520

• DEFENCE RESEARCH INFORMATION CENTRE
ORPINGTON (ENGLAND)

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ASSESSMENT OF THE THERMAL
RESISTANCE OF CLOTHING.
AD-750 830

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CALCULATION OF THE THERMAL
RESISTANCE OF THE AIR LAYERS IN AIR-
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AD-746 037

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CALCULATION OF THE THERMAL
RESISTANCE OF THE AIR LAYERS IN AIR-
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AD-746 037

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DRIC-TRANS-2920
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RESISTANCE OF CLOTHING.
AD-750 830

• DOUGLAS AIRCRAFT CO INC HUNTINGTON
BEACH CALIF MISSILE AND SPACE
SYSTEMS DIV

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- EDGEWOOD ARSENAL ABERDEEN PROVING
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PROTECTIVE CLOTHING.
AD-770 378
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FA-TR-73011
THERMAL BALANCE OF MEN UNDER
ATROPINE THERAPY WEARING CHEMICAL
PROTECTIVE CLOTHING.
AD-770 378
- EDGEWOOD ARSENAL MD
• • •
FA-TR-4629
EVAPORATIVE COOLING OF MEN IN
WET CLOTHING.
AD-740 738
- FABRIC RESEARCH LABS INC DEDHAM MASS
• • •
DEVELOPMENT OF THERMALLY
DURABLE COATED FABRICS FOR USE IN
FLIGHT GLOVES.
(ASD-TR-71-47)
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• • •
DEVELOPMENT OF PBI FABRIC FOR
FLIGHT SUIT WEAR TEST.
(AFYL-TR-71-195)
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- FEDERAL AVIATION ADMINISTRATION
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FAA-AH-67-4
A PROTECTIVE PASSENGER SMOKE
HOOD.
AD-657 436
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FAA-AH-70-20

- PROTECTIVE SMOKE HOOD STUDIES.
AD-727 021
- FLYING PERSONNEL RESEARCH COMMITTEE
LONDON (ENGLAND)
• • •
FPRC-1307
A LABORATORY COMPARISON OF
THREE METHODS OF PERSONAL
CONDITIONING.
AD-722 857
- FOREIGN TECHNOLOGY DIV WRIGHT-
PATTERSON AFB OHIO
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SPACE CLOTHING OF SUBJUGATORS
OF OUTER SPACE.
(TT-65-63335)
AD-620 099
- GAGLIARDI RESEARCH CORP EAST
GREENWICH R I
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DEVELOPMENT OF CHARCOAL
IMPREGNATION PROCESS FOR CW
PROTECTIVE OVERGARMENT.
AD-805 099
- GENERAL ELECTRIC CO PHILADELPHIA PA
MISSILE AND SPACE DIV
• • •
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(AHLR-YOR44 60)
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•GRACE (W R) AND CO CLARKSVILLE MD
RESEARCH DIV

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RES-70-41
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•HAMILTON STANDARD WINDSOR LOCKS CONN

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ENVIRONMENTAL CONTROL SYSTEM.
(AMRL-TR-68-122)
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• • •
INTEGRATED MANEUVERING LIFE
SUPPORT SYSTEM.
(AMRL-TR-69-132)
AD-714 577

•HAMILTON STANDARD DIV UNITED AIRCRAFT
CORP WINDSOR LOCKS CONN

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HSE-3671
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•HONEYWELL INC ST PAUL MINN RESEARCH
DEPT

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AUTOMATIC TEMPERATURE CONTROL
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