

710090

02/04/009

CONFIDENTIAL

DCS (RAF)

BR57039

Science (RAF) Library

8005

CONFIDENTIAL

42

Procurement Executive Ministry of Defence

Explosives Research and Development Establishment - Rocket Propulsion Establishment



Explosives Research and Development Establishment

MINISTRY OF DEFENCE (R.A.F.)

SCIENCE LIBRARY

FILE COPY Publications

1969 to 1974 (U)

E 1385

November 1976

AVIA37/1429

M.O. D. SCIENCE (RAF)	
CLASSIFICATION	NONE
DATE RECEIVED	July 1977
NOTED UNDER	
SUBJECT	
ORIGINATOR	
MONTHLY LIST	<input checked="" type="checkbox"/>
BY:	JIT

THIS DOCUMENT IS THE PROPERTY OF HER BRITANNIC MAJESTY'S GOVERNMENT

It is issued for the information of such persons only as need to know its contents in the course of their official duties. Any person other than the authorised holder, upon obtaining possession of this document by finding or otherwise, should forward it together with his name and address in a closed envelope to

DIRECTORATE SECURITY 2
PROCUREMENT EXECUTIVE, MINISTRY OF DEFENCE
PRINCES HOUSE, KINGSWAY, LONDON WC2R 6UA

Letter postage need not be prepaid, other postage will be refunded.

ALL PERSONS ARE HEREBY WARNED THAT THE UNAUTHORISED RETENTION OR DESTRUCTION OF THIS DOCUMENT IS AN OFFENCE AGAINST THE OFFICIAL SECRETS ACT.

For overseas release conditions see inside cover

1 INTRODUCTION

During 1969 the main series of ERDE publications were changed as follows:

Reports became Technical Reports

Technical Memoranda became Technical Notes

The new series are numbered serially commencing at 1 and continuing indefinitely, eg TN 1, TN 2. However the Yearly and Half-Yearly Technical Reports retain the former style of numbering, eg TR 1/69/1, TR 1/69/2.

The classification of the reports at March 1975 is indicated by the following abbreviations:

S	Secret
C/D	Confidential Discreet
C	Confidential
R	Restricted
U	Unclassified
Unl	Unlimited

CONFIDENTIAL

2 YEARLY AND HALF YEARLY TECHNICAL REPORTS

Number	Classification	Title
TR 2/68/1	C/D	Technical Report for the Period 1 7 1968 to 31 12 1968 Explosives
TR 2/68/2	U	Technical Report for the Period 1 7 1968 to 31 12 1968 Non-Metallic Materials
TR 1/69/1	C/D	Technical Report for the Period 1 1 1969 to 30 6 1969 Explosives
TR 1/69/2	U	Technical Report for the Period 1 1 1969 to 30 6 1969 Non-Metallic Materials
TR 2/69/1	C/D	Technical Report for the Period 1 7 1969 to 31 12 1969 Explosives
TR 2/69/2	U	Technical Report for the Period 1 7 1969 to 31 12 1969 Non-Metallic Materials
TR 1/70/1	C	Technical Report for the Period 1 1 1970 to 30 6 1970 Explosives
TR 1/70/2	U	Technical Report for the Period 1 1 1970 to 30 6 1970 Non-Metallic Materials
TR 2/70/1	C	Technical Report for the Period 1 7 1970 to 31 12 1970 Explosives
TR 2/70/2	U	Technical Report for the Period 1 7 1970 to 31 12 1970 Non-Metallic Materials
TR 1/71	U	Technical Report for the Period 1 1 1971 to 30 6 1971 Non-Metallic Materials, Process Research, Analysis
TR 2/71	C	Technical Report for the Period 1 1 1971 to 31 12 1971 Explosives and Propellants
TR 1/72	U	Technical Report for the Period 1 7 1971 to 30 6 1972 Non-Metallic Materials, Process Research, Analysis
TR 2/72	S	Technical Report for the Period 1 1 1972 to 31 12 1972 Explosives and Propellants

4 TECHNICAL REPORTS (TR 1 SERIES)

Number	Year	Classification	Author	Title
TR 1	1969	U	R B Holt G A Palmer	The Effect of Porosity on the Ultrasonic Attenuation and Ballistic Performance of Cast Double-Base Propellants
TR 2	1969	Unl	B E Brokenbrow B L Hollingsworth K J Ledbury D Sims	Fibre-filled Thermoplastics: Part 1: Asbestos
TR 3	1969	R	E A Baker	Guide to Standard Rocket Cordites (U)
TR 4	1969	C	E A Baker	Very Fast Burning Cordites (U)
TR 5	1969	U	B E Brokenbrow K J Ledbury D Sims A L Stokoe	The Effect of Explosives and Propellants on some Thermoplastics and Rubbers Part 2
TR 6	1970	C/D	F I H Tunstall	The Nature of Gases Evolved from Propellant Compositions on Hot Storage: Part 1: Preliminary Studies (U)
TR 7	1969	Unl	B J MacNulty	The Structure and Behaviour of Polycarbonate Film: Part 1: Film Cast from Solution
TR 8	1969	R	J W Grindlay	The Preparation and Properties of Polyepoxides (U)
TR 9	1969	U	A L Lovecy	Recent Investigations on Burning to Detonation

Number	Year	Classification	Author	Title
TR 21	1970	R		The Sensitiveness of Barium Styphnate - Summary of Tests at ERDE, RARDE and AWRE (U)
TR 24	1970	U	A J Dedman A L Lovecy	Electrothermal Ignition and Propagation in Solid Explosives: Part 9: Proving Performance by Working Metals Underwater
TR 26	1970	U	J E Bushell T J Lewis R W Rainbird	The Role of Vapour-transported Iron in the Growth of Silicon Carbide Whiskers
TR 27	1970	U	P J Hart J Scrivener	CTPB Propellants: Part 2: K-round Ballistics
TR 28	1970	U	M J Healey W A W Smith	Smokeless Rocket Propellants: Pyrolysis of, and Smoke Production from, some Organic Components
TR 29	1970	U	B E Brokenbrow D Sims A L Stokoe	The Effect of Explosives and Propellants on some Thermoplastics and Rubbers Part 3
TR 30	1970	C/D	C G Lawson	Low Energy Solid Propellants: Problems of Steady Burning. Safety of Power Cartridges (U)
TR 31	1970	C/D	M J Harper B C Howard	Theoretical Specific Impulses of Some Double-Base Propellants (U) Part 1
TR 32	1970	Unl	M J Bagley R T M Fraser N C Paul	The Mass Spectrometry of Aromatic Azides
TR 33	1970	Unl	R T M Fraser N C Paul D H Richards N F Scilly	The Mass Spectrometry of Substituted Octadienes

Number	Year	Classification	Author	Title
TR 44	1971	Unl	K J Ledbury D Sims A L Stokoe	The Storage Life of Fully Compounded Rubber Stocks Part 1: Initial Studies
TR 45	1970	Unl	N J Blay I Dunstan	Compatibility and Stability Testing of Explosives and Solid Propellants
TR 46	1973	Unl	A J Dedman A L Lovecy	The ACP Tube: Initiation of Detonation without the Use of Primary Explosives
TR 47	1970	R	D J Manners R Stenson	Bonding Silicone Elastomers to Double-Base Propellants and to a Range of Commercial Polymers (U)
TR 48	1971	U	R W Bryant R A Gledhill	Effect of Variations in Composition on Physical Properties of Polybutadiene Propellants at Low Temperatures
TR 49	1970	U	A Davis D Gordon	Weathering of Acrylonitrile-Butadiene-Styrene Terpolymers: Part 1: Infrared Method of Following Degradation and its Application to Specimens Exposed in an Environmental Test Chamber
TR 50	1970	Unl	L E Grindrod G A Palmer G W Stocks	The Measurement of Rate of Burning of Cast Double-Base Propellants: Part 1: A Ballistic Assessment of ATN (D28) Casting Powder
TR 52	1971	R	J A Bell	Preparation of Some Nitrodiphenylamines (U)

Number	Year	Classification	Author	Title
TR 62	1971	U	J H Littlefair G W Stocks	An Examination of SC Propellant, Lot No RNP 1331S, for Use as a Reference Standard for Strand Burning Rate Measurements and for Calorimetric Value Determinations
TR 63	1971	C	R B Holt G A Palmer	Ballistic Drift of Some CDB Propellants (U)
TR 64	1971	R	R A Wallace J Taylor	Picrite Propellants with Improved Temperature Corrections (U)
TR 65	1971	R	J R Hughes C G Lawson	Smoke Reduction in Rocket Motors: Part 4: Modified Propellant for use in Pointer (R)
TR 66	1971	U	D A Salter R J J Simkins	The Preparation of 4,6-Dinitro-resorcinol
TR 68	1971	Unl	B E Brokenbrow D Sims J Wright	Relationships between Polyurethane Elastomer Structure and Ageing Properties: Part 4: Effect of Di-Isocyanate
TR 70	1971	U	T J Lewis	The Formation of SiC from SiO ₂ and C Part 1: A Thermodynamic and Kinetic Review
TR 71	1971	Unl	R W Bryant	Handbook of Sealants for Ammunition
TR 72	1971	U	A Davis D Gordon	Weathering of Acrylonitrile-Butadiene-Styrene Terpolymers: Part 2: Stability of ABS and Arylon, A Related Polymer Blend, to Outdoor Exposure

Number	Year	Classification	Author	Title
TR 80	1971	U	D G Davies A J Dedman	Compatibility and Stability Testing of Solid Propellants by Heat Flow Calorimetry: Part 1: The Effect of a Range of Compatible and Incompatible Materials on the Heat Generation of a Double-Base Propellant
TR 81	1972	Unl	L E Dingle H Edwards	Some Mechanical and Physical Properties of Discontinuous Carbon Fibre Reinforced Plastics
TR 83	1972	Unl	B E Brokenbrow D Sims J Wright	High Performance Polyurethane Elastomers: Part 2: Millable Elastomers and Syntactic Foams
TR 84	1971	U	A Davis D Gordon	Weathering of Acrylonitrile-Butadiene-Styrene Terpolymers: Part 4: The Effectiveness of Different Regions of the Solar Spectrum in Degrading an ABS Terpolymer
TR 85	1971	U	A Davis D Gordon	The Importance of Angle of Exposure in the Weathering of a Polymer
TR 86	1971	U	R P Ayerst G J Spickernell	The Water Sorption Characteristics of Plastic Propellant Ingredients
TR 87	1972	Unl	M Gledhill W A Dukes	Parallel Plate Plastometry of Plastic Propellant: Part 2: Determination of Plastoviscosity and the Flow Curve Equation
TR 88	1972	Unl	R W Richards D Sims	Glass Filled Thermoplastics - Effects of Glass Variables and Processing on Properties

Number	Year	Classification	Author	Title
TR 105	1972	U	E J Gallacher R J J Simkins	Application of High Pressure Liquid Chromatography to Analysis of Explosives and Propellants: Part 1: Analysis of Casting Liquid by ALC
TR 106	1972	U		Joint US/UK Seminar on TNT Chemistry and Manufacture ERDE 26 October 1971
TR 107	1972	Unl	J Wright	Outdoor and Accelerated Weathering of Elastomers and Plastics: The Assessment of an Accelerated Weathering Test Chamber
TR 108	1972	C	J D Cosgrove J Powling	Cellulose Acetate Inhibition for Double-Base Propellants: Improved Formulations for Low Smoke and Longer Storage Life (C)
TR 109	1972	U	E J Gallacher R J J Simkins	Application of High Pressure Liquid Chromatography to the Analysis of Explosives and Propellants: Part 2: Characterisation of CTPB and HTPB by Gel Permeation Chromatography
TR 110	1972	U	N J Blay E F Pembridge	The Compatibility of Epoxy Resins with Explosives
TR 111	1972	Unl	B L Hammant	The Application of Data Processing to Mechanical Testing: Part 2: Comparisons with Conventional Practice

Number	Year	Classification	Author	Title
TR 125	1973	U	H Edwards	Mechanical and Physical Properties of Discontinuous Carbon Fibre Reinforced Plastics Part 1: Effect of Temperature and Strain Rate on the Flexural Properties of Aligned Discontinuous Carbon Fibre Thermoset Composites
TR 128	1973	C	N J Blay M G Farey	Stability Studies of Propellants and their Nitrate Ester Ingredients Part 1 (U)
TR 129	1973	Unl	D A G Eldridge D H L Mansell	A Frequency Response Analysis System for the Measurement of the Dynamic Properties of Non-metallic Materials
TR 130	1973	Unl	B L Hammant	A Forced Vibration Method for the Measurement of Dynamic-Mechanical Properties of Materials
TR 131	1973	U	C C Evans	Operation of the Mk II Whisker Growing Reactors Part 1: Silicon Nitride
TR 132	1973	Unl	F S Baker A R Osborn J Williams	Development of Field Emitter Cathodes for Electron Beam Devices
TR 134	1973	U	J L McDougall R J J Simkins	Application of High Pressure Liquid Chromatography to the Analysis of Explosives and Propellants: Part 4: Comparison of GPC and VPO for Molecular Weight Determination

Number	Year	Classification	Author	Title
TR 146	1973	U	H Edwards C N Owston	Mechanical and Physical Properties of Discontinuous Carbon Fibre Reinforced Plastics Part 2: The Flexural Fatigue Performance of a Polymer Matrix Reinforced with Aligned Discontinuous Carbon Fibres
TR 147	1973	C	J Wright	Polyurethane Plastics: Part 1: Applications for Crosslinked Polyurethanes as Mouldings and Low Smoke Inhibitors (C)
TR 149	1973	C/D	R Campbell	Gelled Slurry Explosives in Australia, Canada, UK and USA (U)
TR 150	1973	C	R Stenson	Tensile Properties of Cast Double-Base Propellant BDI(D2)/25 (U)
TR 151	1973	Unl	R McGuchan G J Spickernell	CTPB Cure Studies Part 2: Effect of Experimental Variables on Epoxide Cure and Properties of Gumstocks
TR 154	1974	Unl	W A Dukes	Rheological Characterisation of Plastic Propellant by Extention under Constant Load
TR 155	1973	R	B B Allen J Scrivener G J Spickernell	CTPB Propellants: Part 4: Development of Compositions in the Burning Rate Range 10 to 23 mm/s at 7 MN/m ² Pressure (U)
TR 156	1973	R	K J Holloway G W C Taylor R J E Williams	The Manufacture and Properties of RD 1355 Monobasic Lead Azotetrazole (U)
TR 157	1973	R	K J Holloway A T Thomas	The Manufacture and Properties of Potassium Picrate Composition RD 1369 (U)

Number	Year	Classification	Author	Title
TR 177	1974	Unl	C M S Jones B G Tucker	The Use of the Continuous Flow Method of Surface Area Measurement for Ammonium Perchlorate
TR 178	1974	C	N J Blay M G Farey P G Maher	Stability Studies of Propellants and Their Nitrate Ester Ingredients Part 2: The Effects of Some Ballistic Modifiers (U)
TR 181	1974	R	K J Holloway J M Jenkins G W C Taylor J R White	The Development of a Priming Composition of Low Mechanical Sensitivity (RD1658) for the 30 mm ADEN Cap (U)
TR 182	1974	Unl	R A Gledhill A J Kinloch	Environmental Failure of Structural Adhesive Joints
TR 184	1974	Unl	N J Blay E F Pembridge	The Compatibility of Rubber/Resin Adhesives with Explosives
TR 201	1974	C/D	R Durrant R McGuchan G J Spickernell	HTPB Propellants - A Study of Bonding Agents (U)

Number	Classification	Author	Title
1/M/69	U	T S Costain A T Thomas	Assessment of Hazards Associated with the Storage and Transport of Wet Initiatory Explosives
2/M/69	U	R W Bryant W A Dukes	Plastic Propellant - The Effect of Prestraining on Routine Rheological Measurements
3/M/69	Unl	J A Bell	The Preparation of Some Bis-(β -Diketones)
4/M/69	Unl	R W Bryant W A Dukes R A Gledhill	The Tensile Properties of a Polybutadiene Propellant, C37
5/M/69	Unl	R W Bryant W A Dukes R A Gledhill	The Tensile Properties of Plastic Propellant RD2404/Lot 19
7/M/69	Unl	B V Howes J Roberts	Molecular Spacings Calculated from Density Measurements for the Normal Paraffins
8/M/69	Unl	B L Hammant J Roberts R L Sumner	The Elasticity and Viscosity of the Normal Paraffins
9/M/69	U	D A Salter R J J Simkins	Preparation of Trinitroethylbenzene
10/M/69	Unl	D H L Mansell	Eight-Channel Automatic Recording Viscometer
12/M/69	U	A J Dedman A L Lovecy	Electrothermal Ignition and Propagation in Solid Explosives: Part 8: Correlation Experiments with Chemical and Mechanical Sources of Ignition

Number	Year	Classification	Author	Title
TN 15	1970	Unl	C Booth A Davis N F Scilly	Characterisation and Evaluation of the Pye Liquid Chromatograph
TN 16	1970	Unl	J G Rankine H C Turner	A Design for a Rotary Machine to Assess the Friction Sensitiveness of Explosives and Propellants
TN 18	1970	Unl	W E Batty J A Bell P J Clements D F Debenham J R C Duke D C Mullenger	Some Solvates of BSX
TN 19	1970	Unl	A K Clarke J M Jenkins J G Rankine	Precipitation Unit for Initiators (600 ml Gross Capacity Vessel)
TN 20	1970	Unl	H C Turner	A Design for a Hydrostatic Pressure Chamber for Calibrating Piezo-electric Pressure Transducers
TN 21	1970	Unl	J M Jenkins J R White	The Salts of 5-Substituted Tetrazoles Part 1: 5,5'-Hydrazotetrazole and the Salts of 5-Nitrotetrazole and 5-Chlorotetrazole
TN 22	1970	Unl	R W Bryant	Composite Propellants: Statistical Evaluation of Brittle Point (Embrittlement Temperature) Tests
TN 24	1970	U	R B Holt C G Lawson	A Dual Thrust, Single CDB Propellant Rocket Motor: Preliminary Static Firings

Number	Year	Classification	Author	Title
TN 39	1971	Unl	J A Bell	Preparation of Some Polynitrophenyl Acetates
TN 40	1971	U	J H Littlefair G W Stocks	Fuseless Strand Burning Methods for the Measurement of Rates of Burning of Solid Propellants and of Liquid Monopropellants
TN 41	1971	U	M G Farey	The Gas Chromatographic Determination of Isopropyl Nitrate in Slurry Explosives
TN 42	1972	U	R J Benge C H Miller N C Paul	Analytical Investigation of "Amorphous" Boron Samples Part I and Part II
TN 44	1971	Unl	A J Barratt L R Bates J M Jenkins J R White	Some Reactions of the Azotetrazole Anion with Dilute Mineral Acids
TN 45	1971	R	P Stone	The Inflammability of Cellulose Acetate Gels Containing Nitroglycerine (U)
TN 46	1972	R	D A Liddell J A Macdonald R A Wallace W G Williams	Solvent Propellant Processing ROF Bishopton/ERDE Joint Review (U)
TN 47	1972	Unl	R Stenson	Factors Governing the Storage Life of Solid Propellant Rocket Motors
TN 48	1971	Unl	R Stenson	The Interactions of Cellulose Acetate and Ethyl Cellulose Inhibitors with Double-Base Propellants

Number	Year	Classification	Author	Title
TN 60	1972	R	W E Batty	The Picrite-Carbamate Complex A Literature Survey (U)
TN 61	1973	U	R T M Fraser M J Healey N C Paul	Ion Exchange Titration of Mixtures of Ammonium Nitrate, Urea and Guanidine Nitrate
TN 63	1972	R	C G Lawson	A Survey of Methods for making Cordite Charges less Brittle (U)
TN 64	1972	R	D F Debenham	The Bithermal Method for the Nitrolysis of Hexamine A Brief Review (U)
TN 65	1972	R	W E Batty	The Manufacture of Guanidine Nitrate - A Brief Survey: Part 3: Route 3 The Reaction of Calcium Cyanamide with Ammonium Nitrate or "The Direct Fusion Process" (U)
TN 67	1972	U	J A Lewis	ERDE Filtration Alignment Process Effect of Pressure on the Rate of Filtration of Glycerol through Fibre Mats
TN 68	1972	U	N C Paul	Chemical Analysis of Delay Compositions Containing Lead and Barium Chromates and Metal Powders
TN 69	1973	U	R W Bryant R A Gledhill	Tensile Properties of HTPB Propellant RH-H-123
TN 70	1973	C	R W Bryant	Hardening of R1502B Propellant with Age, as Measured with a Wallace Pocket Hardness Tester (U)
TN 71	1973	C	J Gooding	M3 Murawa Motor Propellant Charges for Australian Ikara Missile ERDE Hot Storage Trials of Charge Segments (C)

CONFIDENTIAL

Number	Year	Classification	Author	Title
TN 89	1974	U	C H Miller	Elastic Pyrotechnics Part 6: Investigations Related to the Development of Improved Priming Compositions
TN 90	1973	Unl	R Durrant	A Titrator with Automatic End-Point Detection for Water Determinations by Karl Fischer Reagent
TN 91	1973	R	C G Lawson	Problems in the Design of Fast-Burning Charges for Rockets or Recoilless Guns (U)
TN 92	1973	Unl	B V Howes	Computer Assisted Presentations of Results from Ultra Violet Monitoring Trials
TN 93	1973	C/D	J D Cosgrove J C Wright	A Comparison of UK Cellulose Acetate Inhibition with US Material of Lower Acetyl Content (U)
TN 95	1973	Unl	A J Kinloch	Environmental Failure of Structural Adhesive Joints. A Literature Survey
TN 97	1973	Unl	B L Hammant	A Computer Program for the Calculation of Coefficients of Diffusion of Liquids in Rubbers
TN 99	1974	U	I G Costen J A Lewis	Cryogenic Transfer Hoses: Heat Leaks Tests
TN 100	1973	U	L R Bates J M Jenkins	The Development of Small Arms Ammunition (7.62 mm) Caps for Smoke Diagnosis Trials

7 SURVEYS AND TRANSLATIONS

Number	Author	Title
1/S/69	J C Beech	Forced Convection Heat Transfer to Super-critical Cryogenic Hydrogen: Part 1: Literature Survey
Translation 1	R G Ross	The Effect of Ignition of Small Quantities of Initiators in Laboratory Vessels of Glass and Polythene - S Lamnevik and A Bostrom FOA 1 Rapport A 1452-40 N, November 1968

Number	Classification	Author	Title
24/R/68	R	R P Ayerst	Triethylene Glycol Dinitrate: A Summary of Development Work (U)
25/R/68	Unl	T P Hobin	Surface Tension in Relation to Cohesive Energy with Particular Reference to Hydrocarbon Polymers
2/R/69	R	B C Howard J Powling G W Stocks	Coolants for Flameless, Smokeless Double-Base Propellants: Limiting Dilutions, Specific Impulses and Burning Rates for Different Types of Coolants (U)
3/R/69	R	M G Farey E J Gallacher D A Salter	The Determination of Antioxidant in Carboxy-Terminated Polybutadiene and Composite Propellant (R)
4/R/69	R	T M Greenall R A Wallace	An Improved Process for the Manufacture of Combustible Cartridge Cases (U)
5/R/69	C/D	R J Brown J Scrivener	CTPB Propellants: Part 1: Optimization of Propellant Physical Properties (U)
8/R/69	U	D A Salter R J J Simkins	A New Process for the Manufacture of Styphnic Acid
9/R/69	Unl	B L Hollingsworth K J Ledbury A L Stokoe	Accelerated and Climatic Ageing of Polyurethanes

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 10	1969	Unl	T P Hobin	The Binder/Oxidant Interface in Plastic Propellant
TR 11	1969	R	R T M Fraser D Howse L E Dingle	The Preparation of Basic Copper Salicylate (U)
TR 12	1969	U	A J Barratt J A Bell R T M Fraser	Spectroscopic Investigations of Carboxy-Terminated Polybutadiene Cure Chemistry: Part 2: Preparation and Evaluation of Some Cure Catalysts
TR 13	1970	U	R G Williams	Investigations of a Method for Remote Monitoring of Stirrer-to-Wall Clearances in Loaded Mixers
TR 14	1970	Unl	H Edwards	Asbestos and Surface Treated Asbestos as Reinforcing Agents for Thermoplastics and Rubbers
TR 15	1969	C/D	W E Batty T Martin	Preparation and Properties of Some Organic Amine Perchlorates(C)
TR 16	1970	Unl	B J MacNulty	The Structure and Behaviour of Polycarbonate Films: Part 2: Film Cast from the Melt
TR 17	1970	Unl	B J MacNulty	The Structure and Behaviour of Polycarbonate Films: Part 3: Stress Cracking Phenomena
TR 18	1970	Unl	A L Stokoe K J Ledbury	Permeability of Polymers to Organic Fluids Part 1
TR 20	1970	Unl	B E Brokenbrow D Sims J Wright	Polyurethane Elastomers Based on Hydroxyl-terminated Polybutadienes

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 34	1970	U	J F Sumner	The Development of a Friction Sensitiveness Test for Explosives and Propellants Part 1: Investigation of Design Requirements
TR 35	1970	U	P J Hart J Scrivener	CTPB Propellants: Part 3: Adhesion to Various Rubbers
TR 36	1970	U	J A Bell D F Debenham J V Griffiths	Preparation of the Aziridines PITA and BITA
TR 37	1970	R	J Powling R Stenson	Smoke Reduction in Rocket Motors Part 1: Smoke from Charge Inhibition; Progress on Materials Assessment (U)
TR 38	1970	C	E A Baker	Solventless Rocket Cordites. Effects of Wet Paste Storage on Ballistics (U)
TR 39	1970	Unl	B E Brokenbrow D Sims J Wright	Relationships between Polyurethane Elastomer Structure and Ageing Properties Part 1: Degree of Crosslinking
TR 40	1970	Unl	B E Brokenbrow D Sims A L Stokoe	Low Temperature Flexibility of Elastomers
TR 41	1971	U	A J Barratt R T M Fraser D Sims	The Stress-Relaxation of Carboxy-Terminated Polybutadiene Elastomers
TR 42	1970	R	F H Doe	Castable Rubbery Explosives: Polyurethane/RDX Compositions (U)
TR 43	1970	C/D	R T M Fraser D Howse N C Paul	The Preparation of Basic Copper Salicylate: Part 2: Minor Phases (U)

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 53	1971	Unl	B E Brokenbrow D Sims J Wright	Relationships between Polyurethane Elastomer Structure and Ageing Properties: Part 2: Effect of Backbone Polyol
TR 54	1971	Unl	B E Brokenbrow D Sims J Wright	Relationships between Polyurethane Elastomer Structure and Ageing Properties: Part 3: Effective Crosslink Structure
TR 56	1971	C	D Cosgrove J Powling	Smoke Reduction in Rocket Motors: Part 3: Laboratory Appraisal of the Flame Resistance of Inhibition Materials (U)
TR 57	1971	C/D	J R C Duke R T M Fraser J R Hughes R T M Fraser J R Hughes R T M Fraser D Howse	The Characterisation of Ballistic Modifiers (C) Part 1: Introduction Part 2: Preparation and Dehydration of Lead β -Resorcylate Tetrahydrate (Phase K) Part 3: Lead Citrate
TR 60	1971	C/D	E J Gallacher J Squire J C Wright	The Characterisation of Ballistic Modifiers: Part 4: Analysis of Basic Copper Salicylate (U)
TR 61	1971	U	L E Grindrod W A W Smith G W Stocks J C Wright	The Development of a Heat-Flow Calorimeter for Use with Solid Propellants

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 73	1971	U	A Davis D Gordon	Weathering of Acrylonitrile-Butadiene-Styrene Terpolymers: Part 3: Assessment of the Stability of a Range of Natural and Pigmented Resins to Outdoor Weathering by an Infra-red Spectroscopic Method
TR 74	1971	C	B C Howard J Powling W A W Smith G W Stocks	Smoke Reduction in Rocket Motors: Part 5: Assessment of Exhaust Smoke from Open-Site Firings of 150 mm End-Burning Charges (U)
TR 75	1971	Unl	R P Ayerst B G Tucker	Improvements in Tensile Testing of Composite Propellants
TR 76	1971	R	G W C Taylor A T Thomas R J Williams	The Manufacture of RDX Composition RD 1347 (U)
TR 77	1972	Unl	B E Brokenbrow D Sims J Wright	High Performance Polyurethane Elastomers: Part 1: Laboratory Ageing Trials
TR 78	1971	C/D	K N Bascombe E L Kendrew	The Ignition of Energetic Liquids by the Adiabatic Compression of Bubbles: Further Experimental Results and the Mechanism of Ignition (U)
TR 79	1971	R	G A Palmer	Preliminary Assessment of p-Nitro-N-Methylaniline as Stabiliser in CDB Propellants (R)

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 90	1972	U	J C Cannell	Fabrication and Extrusion of Whisker Reinforced Silicon Carbide-Aluminium Composites
TR 91	1972	Unl	A L Stokoe	Heat Ageing of Rubbers
TR 92	1973	Unl	K J Ledbury R W Richards A L Stokoe	Storage Life of Fully Compounded Rubber Stocks: Part 2: 12 Months' Storage Testing: Part 3: Subsequent Ageing Behaviour
TR 93	1972	Unl	B E Brokenbrow A L Stokoe	The Effect of High Temperature and Oil Immersion on Rubbers
TR 95	1972	C/D	R T M Fraser D Howse	Characterisation of Ballistic Modifiers: Part 5: Salts of Methylene bis(Salicylic) Acid and Aurin Tricarboxylic Acid (C)
TR 96	1972	U	D G Davies	Thermal Stability Studies on Some Azotetrazoles: The Use of a Helical Spring Balance for Safe and Accurate Thermal Studies on Initiatory Explosives
TR 98	1972	C/D	N J Blay E F Pembridge	Stability Tests on Poly-X (U)
TR 99	1972	Unl	B L Hammant	The Application of Data Processing to Mechanical Testing: Part 1: Tensile Testing of Thermoplastics
TR 103	1972	Unl	R Merrifield	Shock Induced Reaction in Explosives and Propellants
TR 104	1972	U		A Joint US/UK Seminar on HMX and RDX Chemistry and Technology held at ERDE on 25/26 October 1971

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 113	1972	U	F A Armstrong R T M Fraser	The Silica Gel Process: Small Scale Studies. Part 1: Comparison of Catalysts and Labelling Experiments
TR 114	1972	Unl	B L Hammant	The Application of Data Processing to Mechanical Testing: Part 3: Flexural Tests and Tensile Tests on Rubbers
TR 115	1973	Unl	N J Blay I Dunstan	Compatibility Testing of Primary Explosives and Pyrotechnics
TR 116		C/D	B G Tucker	A Preliminary Investigation of the Use of Fine Ammonium Perchlorate in Plastic Propellant (U)
TR 118	1973	R	J D Cosgrove J Powling	The Reinforcement of Ethyl Cellulose-Based Charge Inhibition for Improved Flame Resistance and Lower Smoke (U)
TR 120	1973	Unl	R W Atkins L Greenwood T J Punter	An Investigation into the Influence of Surface Pre-Treatment by Particle Impact on the Strength of Adhesive Joints between Like Steel Surfaces
TR 121	1973	U	A J Dedman	A Time to Auto-Ignition Test
TR 122	1973	U	J L McDougall R J J Simkins	The Identification of Traces of Explosives by Field Spot Tests
TR 123	1973	R	E J Gallacher J L McDougall R J J Simkins	Application of High Pressure Liquid Chromatography to Analysis of Explosives and Propellants: Part 3: Analysis of Antioxidants in CTPB Prepolymers and Propellants (U)

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 135	1973	Unl	R W Richards	The Permeability of Polymers to Gases, Vapours and Liquids
TR 136	1973	R	E A Baker	Cast Double-Base Propellants Containing Lead Beta-Resorcylate and Basic Cupric Salicylate (R)
TR 137	1973	U	A L Stokoe J Wright	The Ageing of Polyurethane Elastomers
TR 138	1973	U	J Wright	An Assessment of Recently Developed Thermoplastic Polyurethane and Polyester Elastomers
TR 139	1973	Unl	R McGuchan G J Spickernell	CTPB Cure Studies: Part 1: Effect of Catalysts on Epoxide Cure of Gumstocks
TR 140	1973	Unl	A J Barratt R T M Fraser M J Healey	Determination of Water in Rubbers
TR 141	1973	Unl	A Davis D Gordon G V Howell	Continuous World Wide UV Monitoring Programme
TR 144	1973	U	D G Davies	Heat Evolved in the Propellant/Nitrogen Dioxide Reaction and its Variation with Time of Ageing of the Propellant: Measurement of Effective Stabiliser Content of Propellants
TR 145	1973	Unl	B J MacNulty	The Strength of Thermoplastic Materials Part 1: Critical Stress Cracking in Uniaxial Tension of Polymers with Phenylene Groups in the Main Chain

CONFIDENTIAL

Number	Year	Classification	Author	Title
TR 158	1973	R	P R Freeman G J Spickernell	Investigations at ERDE on CTPB Binders and Propellants: A Summary of Results (U)
TR 159	1973	U	L R Bates	Some Metallic Salts of Aliphatic Dinitramines
TR 163	1974	U	N J Blay D G Davies D G Mullenger R J Rapley	Silver Nitrotetrazole: Its Stability and Compatibility with other Materials
TR 165	1974	U	D B Campbell H Edwards	Mechanical and Physical Properties of Discontinuous Carbon Fibre Reinforced Plastics: Part 3: The Creep Behaviour of Aligned Discontinuous Carbon Fibre Thermoset Composites above Room Temperature
TR 166	1974	U	G E G Bagg	Process Control of Press Cycles for the Matched Die Moulding of Aligned Discontinuous Carbon Fibre/Epoxy Resin Composites
TR 168	1974	Unl	N J Blay E F Pembridge	The Compatibility of "Loctite" Sealants with Explosives
TR 172	1974	R	J M Jenkins J R White	The Salts of 5-Substituted Tetrazoles: Part 3: Further Investigations into the Preparation and Properties of Silver 5-Nitrotetrazole and Mercuric 5-Nitrotetrazole (U)

5 TECHNICAL MEMORANDA (1/M/68 AND 1/M/69 SERIES)

Number	Classification	Author	Title
3/M/68	R	J V Griffiths E Roberts R J J Simkins	The Preparation and Properties of 1,3-Dinitrazacyclopentane (R)
10/M/68	Unl	L D Cole R Pape	The Testing of Safety Spectacles, Lenses, Goggles and Visors. Part 2
11/M/68	Unl	B E Brokenbrow D Sims A L Stokoe	Fibre Filled Rubbers
13/M/68	Unl	J A Burgess M J Harper J A Hicks	Optical Effects in Underwater Explosions of Spherical Symmetry
15/M/68	Unl	R W Bryant W A Dukes	Measurement of Embrittlement Temperatures (Brittle Points) of Composite Propellants by the Bending Beam Method
17/M/68	Unl	S J Hawkins J A Hicks	Some Measurements on the Sonic Bangs Produced at Exercise WESTMINSTER
18/M/68	U	J M Jenkins	Manufacture of RD 1364 i (Tetragonal Lead Oxide)
21/M/68	R	A J Dedman A L Lovecy	Electrothermal Ignition and Propagation in Solid Explosives: Part 6: Experiments on the Mechanics of Displacement, Deformation and Damage (R)
22/M/68	Unl	R T M Fraser	The NMR Spectra of Nitrate Esters

6 TECHNICAL NOTES (TN 1 SERIES)

Number	Year	Classification	Author	Title
TN 3	1969	Unl	L E Grindrod	Calorimetric Values (Water Liquid) of Propellant Ingredients
TN 4	1969	R	C H Miller A M Whittaker	Manufacture of Fuseheads Using ERDE Compositions Part 1: Fusehead Combs (U)
TN 5	1969	R	G W C Taylor A T Thomas R J E Williams	Manufacture of Fuseheads Using ERDE Compositions Part 2: Preparation of Fuseheads (U)
TN 6	1969	R	W A W Smith	High Burning Rate Double-Base Propellants: An Indication of Rates Attainable with Metal Laminates in Experimental Test Specimens (U)
TN 10	1970	U	F I H Tunstall	The Spectrophotometric Determination of Resorcinol in Colloidal Propellants
TN 11	1970	Unl	R W Bryant W A Dukes R A Gledhill	The Tensile Properties of Plastic Propellant RD 2428
TN 12	1970	R	C H Miller A M Whittaker	Manufacture of Fuseheads Using ERDE Compositions Part 3: Performance of Fuseheads and Equipment for Assessment (U)
TN 13	1970	Unl	R W Bryant W A Dukes R A Gledhill	Tensile Properties of Plastic Propellants RD 2435, E 3342 and E 4058

CONFIDENTIAL

Number	Year	Classification	Author	Title
TN 25	1970	Unl	L R Bates J M Jenkins	The Salts of 5-Substituted Tetrazoles Part 2: Some Metallic Salts and Complexes of Tetrazole, 5-Aminotetrazole, 5-Phenyltetrazole and 5-Methyltetrazole
TN 26	1971	R	J A Bell J W Grindlay	Preparation of β -Methylepichlorohydrin (U)
TN 27	1971	Unl	R T M Fraser	Analysis in the Near Infrared - A Short Review
TN 28	1971	Unl	N C Paul	Mass Spectrometric Analysis of Complex Gas Mixtures
TN 29	1971	U	R J Rapley	Spectrophotometric Determination of Azide with Ferric Perchlorate
TN 30	1971	Unl	V M Chudyszewicz W A Dukes	Plastic Propellant Rheology: The Velocity Profile in Tubular Flow
TN 31	1971	R	J Gooding	Rocket Motor L9A1 for Giant Viper: ERDE Investigations and Ordnance Board Trials, Properties of Propellant EU (U)
TN 33	1971	Unl	V M Chudyszewicz W A Dukes	Plastic Explosive Rheology
TN 34	1972	Unl	W E Batty	The Setting Point of Dimethyl Phthalate (DMP) as a Criterion of its Purity
TN 35	1971	R	W E Batty	The Manufacture of Guanidine Nitrate - A Brief Survey Part 5: Route 5. The Catalysed Reaction of Urea and Ammonium Nitrate or "The Silica Gel Process" (U)

CONFIDENTIAL

Number	Year	Classification	Author	Title
TN 50	1971	C/D	J Powling G W Stocks	Propellant Smoke: A Comparison of High Energy Double-Base Propellants (U)
TN 51	1971	Unl	A L Stokoe	Resistance of Rubbers to Tropical and Temperate Climates: Part 2: Four and Five Years Exposure
TN 52	1972	U	E J Gallacher	The Determination of Residual Potassium Nitrate in Igniter Powder Compositions by Flame Emission Spectrophotometry
TN 53	1972	U	J A Bell D F Debenham J W Grindlay	Preparation of Some Primary Nitramines and their N-Glycidyl Derivatives
TN 54	1972	R	J Gooding R J Walley	Rocket Motor, Guided Missile K41A1 (Swingfire) Ordnance Board Service Life Assessment Trials ERDE Investigation of the Propellant Charge (U)
TN 55	1972	Unl	N J Ely E F Pembridge	Compatability of Compounded Rubbers Containing the Anti-Oxidants Octamine and Flectol H with High Explosives and Propellants
TN 57	1972	R	J Gooding R J Walley	Nord Aviation SS11 Type B1 Missile Ordnance Board Service Life Assessment Trials End of Life Trials ERDE Investigations (U)
TN 58	1972	R	J Gooding G A Palmer	"Cook-off" of Small Propellant Charges: A Summary (U)
TN 59	1972	U	R J Rapley	Determination of Azotetrazole

CONFIDENTIAL

Number	Year	Classification	Author	Title
TN 73	1973	Unl	P R Hart	Improvements to Automatic Oxygen Absorption Apparatus
TN 74	1973	U	R B Holt	An Improved Former Design and Filling Technique for the Cast Double-Base Propellant K-Round Motor
TN 75	1973	Unl	D Sims	The Effect of Weathering on the Impact Strength of Nylons
TN 76	1973	U	J E Bushell C C Evans	A Note on the Compatibility of SiC Whiskers with Various Glasses
TN 78	1973	R	E A Baker R B Holt	The Ballistic Assessment of CDB Propellants from 12.7 mm Strands (U)
TN 82	1973	Unl	R J J Simkins J Square	The Rapid Determination of Volatile Matter by the Mytron FAB-1 Moisture Meter
TN 83	1973	Unl	A C Cleves J M Jenkins A G Parkinson	The Determination of Particulate Size by an Automated Quantimet 'B' Image Analysing Computer
TN 85	1973	R	R B Holt G A Palmer	The Thermal Cycling Capability of Case-Bonded CMDB Compositions (U)
TN 86	1973	Unl	J Gooding	The Scope and Methods of Environmental Testing of Double-Base Propellant Rocket Motors: Choice of Conditions and Interpretation of Results
TN 87	1973	C	F I H Tunstall	Gas Evolution from Poly-X Underwater Explosive (U)
TN 88	1973	C	N J Hlay M G Farey E F Pembridge	Compatibility Studies on Ethylene-Propylene Rubbers (C)

CONFIDENTIAL

Number	Year	Classification	Author	Title
TN 101	1973	R	A Davis G H W Deane G V Howell	Infrared Method for Determination of Composition of Styrene-Butadiene Latexes (U)
TN 102	1973	R	K N Bascombe R L East	Destructive Test for Separator Vessel for MOD(N) (U)
TN 104	1973	U	J H Littlefair G W Stocks	The Measurement of Rate of Burning of Cast Double-Base Propellants Part 2: A Measurement Technique for Use with 12.7 mm Cast Strands
TN 106	1974	U	M G Farey	The Gas Chromatographic Determination of Triethylene Glycol Dimethacrylate in Single Base NRN Gun Propellants
TN 108	1974	R	L R Bates J M Jenkins	The Stability of Basic Lead Initiatory Explosives in Humid Atmospheres (U)
TN 109	1973	U	R P Ayerst A J B Thomas	Plastic Propellant Manufacturing Procedures at ERDE
TN 121	1974		G Martin	Hydrogen Chloride Evolution from Poly (Vinyl Chloride) under Simulated Weathering Conditions
TN 127	1974	U	M G Farey	The Micro Determination of Chlorate in No 8 Mk NC3 Electric Detonators
TN 128	1974	Unl	W J Pullen	The Effect of Notch Geometry on the Charpy Impact Strength of Certain Thermoplastics

8 AUTHOR INDEX

Allen B B	TR 155
Armstrong F A	TR 113
Atkins R W	TR 120
Ayerst R P	24/R/68, TR 75, TR 86, TN 109
Bagg G E G	TR 166
Bagley M J	TR 32
Baker E A	TR 3, TR 4, TR 38, TR 136, TN 78
Baker F S	TR 132
Barratt A J	TR 12, TR 41, TR 140, TN 44
Bascombe K N	TR 78, TN 102
Bates L R	TR 159, TN 25, TN 44, TN 100, TN 108
Batty W E	TR 15, TN 18, TN 34, TN 35, TN 60, TN 65
Beech J C	1/S/69
Bell J A	TR 12, TR 36, TR 52, 3/M/69, TN 18, TN 26, TN 39, TN 53
Benge R J	TN 42
Blay N J	TR 45, TR 98, TR 110, TR 115, TR 128, TR 163, TR 168, TR 178, TR 184, TN 55, TN 88
Booth C	TN 15
Brokenbrow B E	18/R/68, TR 2, TR 5, TR 20, TR 29, TR 39, TR 40, TR 53, TR 54, TR 68, TR 77, TR 83, TR 93, 11/M/68
Brown R J	5/R/69
Bryant R W	22/R/68, TR 48, TR 71, 15/M/68, 2/M/69, 4/M/69, 5/M/69, TN 11, TN 13, TN 22, TN 69, TN 70
Burgess J A	13/M/68
Bushell J E	TR 26, TN 76
Campbell D B	TR 165
Campbell R	TR 149
Cannell J C	13/R/68, 16/R/68, TR 90
Chudyszewicz V M	TN 30, TN 33
Clarke A K	TN 19
Clements P J	TN 18

CONFIDENTIAL

Greenwood L	TR 120
Griffiths J V	TR 36, 3/M/68
Grindlay J W	TR 8, TN 26, TN 53
Grindrod L E	TR 50, TR 61, TN 3
Hammant B L	TR 99, TR 111, TR 114, TR 130, 8/M/69, TN 97
Harper M J	TR 31, 13/M/68
Hart P J	TR 27, TR 35, TN 73
Hawkins S J	9/R/68, 10/R/68, 17/M/68
Healey M J	TR 28, TR 140, TN 61
Hicks J A	9/R/68, 10/R/68, 13/M/68, 17/M/68
Hobin T P	12/R/68, 25/R/68, TR 10
Hollingsworth B L	18/R/68, 20/R/68, 9/R/69, TR 2
Holloway K J	TR 156, TR 157, TR 181
Holt R B	TR 1, TR 63, TN 24, TN 74, TN 78, TN 85
Howard B C	2/R/69, TR 31, TR 74
Howell G V	TR 141, TN 101
Howes B V	7/M/69, TN 92
Howse D	TR 11, TR 43, TR 57, TR 95
Hughes J R	TR 57, TR 65
Jenkins J M	TR 172, TR 181, 18/M/68, TN 19, TN 21, TN 25, TN 44, TN 83, TN 100, TN 108
Jones C M S	TR 177
Kendrew E L	TR 78
Kinloch A J	TR 182, TN 95
Lawson C G	TR 30, TR 65, TN 24, TN 63, TN 91
Ledbury K J	20/R/68, 9/R/69, TR 2, TR 5, TR 18, TR 44, TR 92
Lewis J A	TN 67, TN 99
Lewis T J	TR 26, TR 70
Liddell D A	TN 46
Littlefair J H	TR 62, TN 40, TN 104
Lovecy A L	TR 9, TR 24, TR 46, 21/M/68, 12/M/69
Macdonald J	TN 46
McDougall J L	TR 122, TR 123, TR 134
McGuchan R	TR 139, TR 151, TR 201
MacNulty B J	TR 7, TR 16, TR 17, TR 145

CONFIDENTIAL

Smith W A W	TR 28, TR 61, TR 74, TN 6
Spickernell G J	TR 86, TR 139, TR 151, TR 155, TR 158, TR 201
Squire J	TR 60, TN 82
Stenson R	TR 37, TR 47, TR 150, TN 47, TN 48
Stocks G W	2/R/69, TR 50, TR 61, TR 62, TR 74, TN 40, TN 50, TN 10
Stokoe A L	18/R/68, 20/R/68, 9/R/69, TR 5, TR 18, TR 29, TR 40, TR 44, TR 91, TR 92, TR 93, TR 137, 11/M/68, TN 51
Stone P D	TN 45
Sumner J F	TR 34
Sumner R L	8/M/69
Taylor D J	TR 64
Taylor G W C	TR 76, TR 156, TR 181, TN 5
Thomas A J B	TN 109
Thomas A T	TR 76, TR 157, 1/M/69, TN 5
Tucker B G	TR 75, TR 116, TR 177
Tunstall F I H	TR 6, TN 10, TN 87
Turner H C	TN 16, TN 20
Wallace R A	4/R/69, TR 64, TN 46
Walley R J	TN 54, TN 57
White J R	TR 172, TR 181, TN 21, TN 44
Whittaker A M	TN 4, TN 12
Williams J	TR 132
Williams R G	TR 13
Williams R J	TR 76
Williams R J E	TR 156, TN 5
Williams W G	TN 46
Wright J	TR 20, TR 39, TR 53, TR 54, TR 68, TR 77, TR 83, TR 107, TR 137, TR 138, TR 147
Wright J C	TR 60, TR 61, TN 93

Cleves A C	TN 83
Cole L D	10/M/68
Cosgrove J D	TR 56, TR 108, TR 118, TN 93
Costain T S	1/M/69
Costen I G	TN 99
Davies D G	TR 80, TR 96, TR 144, TR 163
Davis A	TR 49, TR 72, TR 73, TR 84, TR 85, TR 141, TN 15, TN 101
Deane G H W	TN 101
Debenham D F	TR 36, TN 18, TN 53, TN 64
Dedman A J	TR 24, TR 46, TR 80, TR 121, 21/M/68, 12/M/69
Dingle L E	TR 11, TR 81
Doe F H	TR 42
Duke J R C	TR 57, TN 18
Dukes W A	22/R/68, TR 87, TR 154, 15/M/68, 2/M/69, 4/M/69, 5/M/69, TN 11, TN 13, TN 30, TN 33
Dunstan I	TR 45, TR 115
Durrant R	TR 201, TN 90,
East R L	TN 102
Edwards H	TR 14, TR 81, TR 125, TR 146, TR 165
Eldridge D A	TR 129
Evans C C	TR 131, TN 76
Evans D J	20/R/68
Farey M G	3/R/69, TR 128, TN 41, TN 88, TN 106, TN 127
Fraser R T M	TR 11, TR 12, TR 32, TR 33, TR 41, TR 43, TR 57, TR 95, TR 113, TR 140, 22/M/68, TN 27, TN 61
Freeman P R	TR 158
Gallacher E J	3/R/69, TR 60, TR 105, TR 109, TR 123, TN 52
Gledhill R A	TR 48, TR 182, 4/M/69, 5/M/69, TN 11, TN 13, TN 69
Gledhill V M	TR 87
Gooding J	TN 31, TN 54, TN 57, TN 58, TN 71, TN 86
Gordon D	TR 49, TR 72, TR 73, TR 84, TR 85, TR 141
Greenall T M	4/R/69

CONFIDENTIAL

Maher P G	TR 128, TR 178
Manners D J	TR 47
Mansell D H L	TR 129, 10/M/69
Martin G	TN 121
Martin T	TR 15
Merrifield R	TR 103
Miller C H	TN 4, TN 12, TN 42, TN 89
Mullenger D C	TR 163, TN 18
Osborn A R	TR 132
Owston C N	TR 146
Palmer G A	TR 1, TR 50, TR 63, TR 79, TN 58, TN 85
Pape R	10/M/68
Parkinson A G	TN 83
Paul N C	TR 32, TR 33, TR 43, TN 28, TN 42, TN 61, TN 68
Pembridge E F	TR 98, TR 110, TR 168, TR 184, TN 55, TN 88
Powling J	2/R/69, TR 37, TR 56, TR 74, TR 108, TR 118, TN 50
Pullen W J	TN 128
Punter T J	TR 120
Rainbird R W	TR 26
Rankine J G	TN 16, TN 19
Rapley R J	TR 163, TN 29, TN 59
Richards D H	TR 33
Richards R W	TR 88, TR 92, TR 135
Roberts E	3/M/68
Roberts J	7/M/69, 8/M/69
Ross R G	Translation 1
Salter D A	3/R/69, 8/R/69, TR 66, 9/M/69
Scilly N F	TR 33, TN 15
Scrivener J	5/R/69, TR 27, TR 35, TR 155
Simkins R J J	8/R/69, TR 66, TR 105, TR 109, TR 122, TR 123, TR 134, 3/M/68, 9/M/69, TN 82
Sims D	TR 2, TR 5, TR 20, TR 29, TR 39, TR 40, TR 41, TR 44, TR 53, TR 54, TR 68, TR 77, TR 83, TR 88, 11/M/68, TN 75