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MILITARY SPECIFICATION
TARGETS, AERIAL, POWERED,DESIGN AND CONSTRUCTION OF GENERAL SPECIFICATION FOR

This specification has been approved by the Naval Air Systems Command, Department of the Navy, .

1. SCOPE

1.1 SCOPE. - his specification embodies the general-requirements of the Naval Air Systems Command Headquarters (NAVAIR) for the design and construction of aerial powered targets, other than converted aircraft targets. The following shall apply to the specific target concerned:

Navy model designation
Designer's name
Designer's Model designation
Number and kind of engine(s)

1.1.1 MISSION. - The mission of the target shall as specified in the type or detail specification.

1.2 CLASSIFICATION. - Targets designed and constructed under this specification are classified as follows:

(a) Expermental.

(b) Developmental.

(c) Prototype.

(d) Production.

2. APPLICABLE DOCUMENTS.

2.1 EFFECTIVITY OF DOCUMENTS. - The following specifications, standards and drawings of the issue in effect on date of formal invitation to bid unless otherwise specified in the type or detail specification shall form a part of this specification, except that later revisions of material and process specifications maybe used subject to approval by the local government representative (LGR) without change in any terms of the contract.

2.1.1 SPECIFICATIONS

MILITARY

MIL-P-116	Preservation, Methods of
MIL-B-5087	Bonding, Electrical, and Lightning Protection, for Aerospace Systems
MIL-E- 5400	Electronic Equipment, Aircraft, General Specification for
MIL-T-5422	Testing, environmental Electronic Equipment
MIL-P-5518	Pneumatic System; Aircraft Design, Installation and Data Requirements for
MIL-F-5572	Gasoline, Aviation
MIL-T-5579	Tanks; Self-Sealing Oil, Aircraft
MIL-O-5606	Hydraulic Fluid, Petroleum Base, Aircraft and Missile, and Ordnance
MIL-J-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-V-5636	Valve, Lubricating Oil Cooler, Petroleum Base, Temperature Regulating with Surge Protection
MIL-C-5637	Coolers, Lubricating Oil, Aircraft, Tubular
MIL-E-6051	Electrical-Electronic System Compatibility and Interference Control Requirements for Aeronautical Weapons Systems, Associated Subsystems and Aircraft
MIL-I-6181	Interference, Controlled Requirements, Aircraft Equipment
MIL-T-6396	Tanks, Fuel, Oil, Water-Alcohol, Collant Fluid, Aircraft, Non-self-Sealing, Removable, Internal
MIL-E-7016	Electrical Load and Power Source Capacity, Analysis of; Method for Aircraft and Missiles
MIL-I-7171	Insulation Blanket, Thermal-Acoustical
MIL-F-7179	Finishes and Coatings: General Specification for Protection of Aerospace Weapons Systems, Structures and Parts
MIL-C-7244	Cap and Adapter Unit, Tank Filler
MIL-R-7705	Radomes, General Specification for
MIL-E-7729	Enamel; Gloss
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series: Gen. Spec for
MIL-T-7743	Testing: Store Suspension Equipment General Specification for
MIL-L-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-W-8160	Wiring, Guided Missile, Installation of, General Specification for
MIL-E-8189	Electronic Equipment, Guided Missiles, General Specification for
MIL-I-8500	Interchangeability and Replaceability, of Component Parts for Aircraft and Missiles
MIL-A-8591	Airborne Stores and Associated Suspension Equipment; General Design Criteria for
MIL-J-8667	Jet Assisted Take-Off Units-Installation of; in Naval Aircraft
MIL-C-8678	Cooling Requirements of Power Plant Installation
MIL-H-8775	Hydraulic System Components, Aircraft and Missiles, General Specification for
MIL-D-8804	De-Icing System, Pneumatic Boot, Aircraft, General Specification for
MIL-A-8870	Airplane Strength and Rigidity Vibration, Flutter and Divergence

2.1.1 (Cont)

MILITARY (Cont)

MIL-F-17874	Fuel Systems: Aircraft, Installation and Test of
MIL-C-18263	Colors, Exterior, Naval Aircraft; Requirements for
MIL-N-18307	Nomenclature and Nameplates for Aeronautical Electronic and Associated Equipment
MIL-H-18325	Heating and Ventilating Systems, Aircraft, General Specification for
MIL-F-18372	Flight Control Systems: Design, Installation and Test of, Aircraft (Gen. Spec. for)
MIL-T-18464	Insignia and Markings for Naval Weapons System
MIL-T-18607	Thermal Anti-Icing Equipment, Wing and Empennage
MIL-I-18802	Fuel and Oil Lines, Aircraft, Installation of
MIL-D-21625	Design and Evaluation of Cartridges (For Cartridge Actuated Devices)
MIL-R-22449	Requirements (Certification) For Pyrotechnic Items
MIL-L-23699	Lubricating Oil, Aircraft Turbine Engines, Synthetic Base
MIL-P-24014	Preclusion of Hazards from Electromagnetic Radiation to Ordnance
MIL-P-25062	Parachute Recovery Systems, Missile and Drone, General. Requirements for Development of
MIL-E-25366	Electric and Electronic Equipment and Systems Guided Missiles, Installation of, General Specification for
MIL-H-25475	Hydraulic Systems, Missile, Design Installation, Tests and Data
MIL-P-26366	Propeller Systems, Aircraft, General Specification for

WEAPONS SPECIFICATION

WS-4235	Rocket Thrust Unit, Air Launched, Development Requirements for
WS-4613	Safety Requirement Minimum for Aerial Target

WEAPON REQUIREMENTS

WR-62	Naval Weapon Requirements Specifications and Standards: Use of

STANDARDS

MILITARY

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of' U.S. Military Property
MIL-STD-210	Climatic Extremes for Military Equipment
MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization of
MIL-STD-838	Lubrication of Military Equipment

HANDBOOKS

MIL-HDBK-5	Strength of Metal- Aircraft Elements
MIL-HDBK-217	Reliability, Stress and Failure Rate Data for Electronic Equipment

2.1.1 (cont)

PUBLICATIONS

BULLETINS

ANC-18 Design of Wood Aircraft Structures
ANC-19 Wood Aircraft Inspection and Fabrication

(When requesting applicable documentS, refer to both title and number Copies maybe obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.)

2.1.1.1 OTHER. - Other Government specifications applicable to the design and construction of' aerial powered targets, in the LIST OF MILITARY SPECIFICATIONS AND STANDARDS USED BY THE NAVAL AIR SYSTEMS COMMAND, NAVAIR 00-25-544.

2.1.2 STANDARDS. - Government standards applicable to the design and construction of aerial powered targets, in the list specified in 2.1.l.1.

2.1.3 DRAWINGS. - Government drawings applicable to the design and construction of aerial powered targets, in the LIST OF AERONAUTICAL STANDARD DRAWINGS USED BY THE NAVAL AIR SYSTEMS COMMAND, NAVAIR 00-25-543.

2.1.4 SUPPLY CATALOGS OF NAVY MATERIAL. - Standard stock items as listed in bold face type in the Supply Catalogs of Navy Material shall be considered for use in all cases where applicable; however, the use of improved equipment and materials is desired arid encouraged.

2.2 USE OF SPECIFICATIONS AND STANDARDS. - Use of specifications and standards by design activities shall be in accordance with WR-62. Contract documents unless otherwise specified by applicable design specifications shall be approved or released by NAVAIR, except for those documents for which authority has been delegated to the LGR (local Government representative). Contract or documents approved by NAVAIR or LGR shall not be changed without prior approval oft the respective approving authority Approval of contractor documents for a specific contract shall not constitute approval for other contracts held by the same contractor or for contracts held by other contractors

(When requesting specifications, standards, drawings, and publications refer to both title and number. Copies of this specification and applicable specifications, standards, drawings, and publications may be obtained upon application to the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120).

3. REQUIREMENTS

3.1 TARGET. - Each aerial powered target shall be designed and constructed to efficiently serve as the vehicle to accomplish the mission of the target as specified. The design of the target shall be coordinated and integrated to enable the required over-all target performance to be accomplished with the highest practicable degree of effectiveness.

3.1.1 CHARACTERISTICS. - Characteristics of the target shall consist of the target configuration, performance, weights, center of graviy, locations, areas, dimensions and general data, and control surface movements.

3.1.1.1 TARGET CONFIGURATION. - Three-view drawings of the target 8 x 10-1/2 inches shall be inserted in the detail specification. When applicable, separate drawings showing (1) target less JATO mediums and (2) target with JATO mediums attached shall be furnished. The drawings shall be to such scale that the three views can be clearly shown on a letter size page and that the distinguishing characteristics of the design are readily recognized. The following dimensions shall be indicated on the drawings: span of wings, over-all length, and over-all height.

3.1.2 PERFORMANCE

3.1.2.1 GUARENTEED PERFORMANCE. - Guaranteed performance at specified gross weights shall be as specified by the detail specification. Performance curves shall be included for airspeed, altitude and endurance at gross weight and empty weight. External store performance curves shall also be provided when applicable.

3.1.2.2 SPECIFIC FUEL CONSUMPTION. - Performance shall be based on the specific fuel consumptions specified in the engine specification, with installation losses.

3.1.2.3 RADAR CROSS-SECTION. - Guaranteed radar cross-section, both unaugmented and augmented shall be as specified in the detail specification.

3.1.3 WEIGHTS. - Weights shall consist of gross weights, mission loads, and weight empty. Guaranteed weight shall be as specified.

3.1.3.1 GROSS WEIGHT. - The gross weight is the sum of the mission load and the weight empty. Separate gross weights for the launching condition and the normal flight condition shall be inserted where applicable.

3.1.3.2 MISSION LOAD. - Mission load shall consist of specified. combinations of fuel, oil, payload both internal and external, and miscellaneous.

3.1.3.2.1 FUEL - Fuel shall be considered to be in categories as follows (1) Internal, (2) External, and (3) Unusable.

3.1.3.2.2 OIL. - Oil shall be considered to be in categories as follows: (1) Engine and (2) Unusable.

3.1.3.2.3 ELECTRONIC AND ELECTRICAL INSTALLATIONS. - The electronic and electrical installations shall be as specified by the type or detail specification.

3.1.3.2.4 INSTRUMENTATION. - Instrumentation shall be as required by the type or detail specification. Instrumentation that is required for the normal. operation of the target is included in mission load. Flight test instrumentation and telemetry used for experimental or flight demonstration purposes may replace part or the mission load with the approval of NAVAIR.

3.1.3.2.5 MISCELLANEOUS EQUIPMENT INSTALLATION. - The miscellaneous equipment installation shall be as specified by the detail specification and shall consist of items of a miscellaneous nature, such as payload and recovery system.

3.1.3.2.6 UNIT WEIGHTS OF MISSION LOAD ITEMS. - The following unit weights shall be used in calculating mission loads.

FUEL WEIGHT (per gallon)	
Specification MIL-F-5572 Aviation Gas	6 pounds
Specification MIL-J-5624, JP-4 fuel	6.5 pounds
Specification MIL-J-5624, Grade JP-5 fuel	6.8 pounds
Other fuels	As specified by detail specification
HYDRAULIC FLUID (per gallon) MIL-H-8775	7.0 pounds
OIL WEIGHT (per gallon) MIL-L-7808	7.5 pounds
OIL WEIGHT (per gallon) MIL-G-23699	8.0 pounds

3.1.3.2.7 MISSION LOAD CONDITIONS. - Mission load conditions shall be specified in the detail specification for the primary and other important missions of the target. Mission load shall be subdivided as follows:

MISSION LOAD
- FUEL
- PROPELLANT - Usable
  - Liquid
  - Oxidizer
  - Solid
  - Secondary Power
- PROPELLANT - Unusable
- LUBRICANT
- PRESSURE MEDIUM
- TELEMETERING
- SEPARATION DEVICES
- PAYLOAD Internal & External

GROSS OR LAUNCH WEIGHT

3.1.3.3 WEIGHT EMPTY

AERO. SURFACE GROUP
    Wing
    Fin
    Stabilizer
BODY GROUP
TAKEOFF AND RECOVERY GROUP
PROPULSION GROUP
    Liquid system
    Solid System
    Air Breathing System
    Nuclear System
    Fuel and Lub System
    Oxidizer and Lub System
POWER GENERATING GROUP
    Prime Power source
    Hydraulic and Pneumatic
    Electrical
ORIENTATION CONTROL GROUP
    Aerodynamic
    Thrust and Reaction
GUIDANCE GROUP
ELECTRONIC GROUP
ENVIRONMENTAL PROTECTION GROUP
    Temp. Cont. - Struct.
                - Equip.
    Compressed Press. System
    Ground Service Prov.
ARMAMENT GROUP
MISCELLANEOUS
    step Separation system
    Destruct System
    Emergency Equipment
    Visual Identification

3.1.4 CENTER OF GRAVITY LOCATION. - Center of gravity, launching and normal flight conditions for gross weight, empty weight and external stores and full payload condition.

General and Air Launch	Launching Condition	Normal Flight Condition
Horizontal (inches from datum) or (%M.A.C. aft of L.E.M.A.C.)		
Vertical (inches (above)(below) waterline or centerline reference)		

3.1.5 AREAS. - Areas shall be specified in the detail specification. (Not to be used for inspection purposes.)

Wing area, total, including ailerons, and _____ square feet of fuselage _____square feet
Aileron area, aft of hinge, including overhanging external balance forward of hinge, total including _____ square feet of tab area _____ square feet
Horizontal tail area, total _____ square feet
Stabilizer, to elevator hinge, including square feet of fuselage and ____square feet of contained elevator balance _____ square feet
Elevator, aft of hinge, including _____ square feet of overhanging external balance forward of hinge and _____ square feet of tab area _____ square feet
Vertical tail area, total _____ square feet
Fin, to rudder hinge, including _____ square feet of contained rudder balance _____ square feet
Rudder, aft of hinge, including ____square feet of overhanging external, balance forward of hinge and _____ square feet of tab area _____ square feet

3.1.6 DIMENSIONS AND GENERAL DATA. - Dimensions and general data shall be as specified in the detail specifications (Not to be used for inspection purposes.)

Wings:
Span, maximum _____feet
Chord (Streamwise):
At root _____inches
At construction tip (theoretical extended section at tip) _____inches
Span with external stores _____feet
Mean aerodynamic (leading edge located _____inches aft of reference datum) _____inches
Airfoil Section:
At root
At construction tip (theoretical extended section at tip) _____
Airfoil thickness (percent chord)(streamwise or perpendicular to sweep of 1/4 chord line):
At root _____percent
At construction tip (theoretical extended section at tip) _____percent
Average (frontal area divided by wing area) _____
Incidence:
At root _____degrees
At construction tip _____degrees
At mean aerodynamic chord _____ degrees

Wings: (Cont)

Sweepback of 1/4 chord line	_____ degrees
Dihedral (from horizontal. to leading edge of chord plane)	_____ degrees
Aspect ratio	_____
Ailerons:	
Span	_____ feet
Chord (average percent wing chord)	_____ percent
Spoilers:	
Span	_____ feet
word (average percent wing chord)	_____ percent
Position of leading edge (average percent wing chord)	_____ percent
High lift and drag increasing devices:	
Type	_____
Span, exclusive of cut-outs (percent of wing span)	_____ percent
Chord (average percent wing chord)	_____ percent

Tail:

Horizontal	
Span	_____ feet
Chord (streamwise)	_____ inches
Airfoil section	_____
Airfoil thickness (percent chord)(streamwise or perpendicular to sweep of 1/4 chord line)	_____ percent
Incidence, normal	_____ degrees
Sweep of the 1/4 chord Line	_____ degrees
Dihedral (from horizontal to leading edge of chord plane)	_____ degrees
Adjustment each side of neutral	_____ degrees
Aspect ratio	_____

Vertical:

Airfoil section	_____
Airfoil thickness (percent chord)(streamwise or perpendicular to sweep of 1/4 chord line)	_____ percent
Sweep of the 1/4 chord line	_____ degrees
Aspect ratio	_____

Height over highest fixed part of target (wing, tail or propeller disc)

Reference line level (reference is to _____):	feet
On handling truck	_____ feet

Height over highest part of tail, reference line level	_____ feet
Height in hoisting attitude, from top of hoisting sling to lowest part of target	_____ feet

3.1.6 (cont)

Length, maximum:
  Reference line level _____ feet
  On handling truck _____ feet

Length from hoisting sling to farthest after part of tail, reference line level, rudder neutral, elevator down _____ feet

Distance from wing mean aerodynamic quarter-chord point to horizontal tail mean aerodynamic quarter-chord point _____ feet

Distance from wing mean aerodynamic quarter-chord point to vertical tail mean aerodynamic quarter-chord point _____ feet

Propeller clearance (normal):
  Reference line level _____ inches

Propeller diameter _____ feet

3.1.7 CONTROL SURFACE MOVEMENTS. - Control surface movements on each side of neutral position for full movement as limited by stops shall be as specified in the detail specification. (Not to be used for inspection purposes.)

Rudder	_____ degrees right	_____ degrees left
Rudder tab or trim surface	_____ degrees right	_____ degrees left
Elevators or movable stabilizer	_____ degrees above	_____ degrees below
Elevators tab or trim surface	_____ degrees above	_____ degrees below
Ailerons	_____ degrees above	_____ degrees below
Aileron tab	_____ degrees above	_____ degrees below

3.1.8 SIMPLICITY. - The design shall provide for a maximum of simplicity commensurate with other criteria.

3.1.9 RELIABILITY. - Numerical. reliability and confidence levels of the target system shall be specified following operational aspects :

(1) Checkout reliability. - Checkout reliability means the probability, numerically expressed, that any randomly selected target will pass all prescribed checkouts required to prepare the target for launching without necessity for repair or replacement of components. Minor adjustments which may be required during these checkouts will riot be considered as deviations to this requirement. Targets which do not successfully pass all prescribed checkouts prior to the first launching, due to established defects in workmanship or material shall be reworked as necessary at contractor expense in order to pass all prescribed checkout requirements.

(2) Flight reliability. - Flight reliability means the probability, numerically expressed, that any target randomly selected from targets which have passed the ready storage checkout, shall operate in the launch phase and free flight phase in accordance with the guaranteed performance requirements

(3) Recovery reliability. - Recovery reliability means the probability, numerically expressed, that any target which has operated in flight in accordance with the guaranteed performance requirements shall be capable of operating successfully in the recovery phase, permitting retrieval on land or at sea, and permitting reuse of the target within the reliable operating life requirements and providing that proper decontamination and maintenance procedures are observed by operating personnel.

(4) Destruct reliability. - Destruct reliability shall mean the probability, numerically expressed, that any target launched shall be capable of satisfying the destruct requirements.

3.1.10 PROTECT FROM INTERFERENCE (EXTERNAL AND INTERNAL).- Interference control requirements for the target shall be in accordance with MIL-E-6051. Contractor Furnished. Equipment (CFE) and Government Furnished Equipment (GFE) electrical and electronic equipment insta1led in the target shall meet the requirements of Specification MIL-I-6181.

3.1.11 PRECLUSION OF HAZARDS FROM ELECTROMAGNETIC RADIATION. - The target design shall be in accordance with MIL-P-24014 and free from the effects of the Hazards of Electromagnetic Radiation. Shore based or shipboard requirements will be dependent upon the targets intended use.

3.1.12 PRODUCTION. - Careful consideration shall be given to the use of materials, fabrication processes, assembly, and tooling techniques that will improve the producibility of the design by reducing the number of parts and fasteners, by simplifying joints of subassemblies and major assemblies, and by the adoption of a manufacturing breakdown that will permit maximum use of machine riveting, spot welding, adhesive bonding, and other labor saving techniques. Unusual methods Of construction involving radical. departures from standard practice or involving unusual use of machinery or tooling processes, such as sculptured skin, shall be subject to NAVAIR approval. Chem. milling shall be permissible, subject to approval of process specifications by NAVAIR.

Forgings, castings, and extrusions shall be used in experimental targets in all applications where forgings, castings, and extrusions would be used in the production target. Where limited procurement time or prohibitive tooling costs necessitate the substitution of "hogged out," welded, formed, or an otherwise fabricated part of a forging, casting, or extrusion, the part shall. be made to conform as closely as possible to the configuration and physical properties of the production counterpart. The number of right and left parts shall be kept to a minimum.

Particular attention shall be given to avoiding construction which promotes corrosion by the admission and holding of salt water. Crevices, hollows, pockets, and similar details which may collect salt water and are not self-draining shall be avoided or shall be provided with suitable overboard drains. For metal sections other than watertight compartments and “tubular structures for which airtight closure by welding is provided, adequate access shall be provided to permit ready inspection, flushing with fresh water, and refinishing of all internal surfaces. Provisions shall be made for drainage of condensation of sea water after immersion. Closed sections, where used, shall have provision for drainage of condensation or sea water after immersion.- Special effort shall be made to assure free drainage.

Where any vital moving part passes close to a fixed structure or item of equipment, the point of nearest contact shall be so located or arranged that gravity will normally clear this point of loose articles or cause them to take remote positions where they cannot jam or interfere with the moving part.

3.1.13 INTERCHANGEABILITY AND REPLACEABILITY. - Parts and assemblies of a given model target (or models in the same series) of production target shall be interchangeable or replaceable in accordance with Specification MIL-I-8500.

3.1.14 INTERIOR ARRANGEMENTS. - The interior arrangement shall be such as to minimize interference between systems, assemblies, components, and parts during their assembly, servicing, and operation and provide adequate accessibility and maintainability. A Three-view drawing shall be inserted in the detail specification showing the location of all major components, recovery and flotation system, and payload.

3.1.15 SECTIONALIZATION - Targets designed for use aboard ships shall be capable of being disassembled into components suitable for transport through rectangular openings whose limiting dimensions are 48 inches wide by 39 inches high onto elevator platforms 9'-0" x 4'-0". Assembled targets shall be capable of being transported through rectangular openings whose limiting dimensions are 60 inches wide by 39 inches high onto elevator platform 14'-6" x 5'-6". Transporting trucks or dollies shall be included in clearances specified above. Detachment of minor, quickly assembled structural components to achieve this capability is permitted. Whenever possible the disassembled parts shall be capable of being handled and stowed on pallets with the following characteristics:

Each unit 4 ft. long by 4 ft. wide
Height - should be equal division of 7 ft as this is working headroom aboard ship (e.g. 3 1/2 ft., 1 3/4 ft. etc.)
Max. wt. per Unit - 2800#

3.3.16 READINESS. - The target shall be designed to have the least possible test or checkout after delivery. Unless otherwise specified in the detail specification, the target shall have the following performance with regard to readiness:

(1) Ready storage checkout. - Using related standard and/or specialized test equipment and support equipment, the time to prepare the target for checkout, to perform the checkout and to restore the target to launcher-installation readiness condition, shall not exceed 30 minutes, exclusive of time required to remove the target and/or sections from either packaged or unpackaged storage. The average time required to perform the checkout shall not exceed 10 minutes per target. The target shall maintain full effectiveness in the ready storage condition without requiring further checkout for a period of not less than two days.

(2) Installation on Launcher. - The target, having undergone ready storage checkout, shall be capable of undergoing preflight servicing and launcher installation in a time period not to exceed 20 minutes by three men utilizing related standard and/or specialized support equipment. Full effectiveness shall be maintained for eight hours following preflight servicing.

(3) Flight readiness. - Hating undergone pre-flight servicing, the target shall be capable of being brought to warmed-up ready-to-launch condition within ten minutes after power is applied to target. With power applied the target shall be capable of maintaining this warmed-up, ready-to-launch condition as specified in the detail specification.

3.1.17 RELIABLE OPERATING LIFE. - The target shall have a reliable operating life equal to that predicted utilizing MIL-HDBK-217 as a common basis. Minimum reliable operating life for complex targets shall be at least 50 hours from the time of Navy acceptance to removal for bench servicing. The reliable operating life shall be as specified in the detail specification and shall include captive and free flight operations as applicable, preflight check-outs, and systems test.

3.1.18 ENVIRONMENT. - The target and all components shall be capable of withstanding the environmental ranges specified for storage, transit, and flight, including temperature due to solar radiation, unless the environment can be mitigated by simple means.

3.1.18.1 STORAGE AND TRANSIT. - The target and components shall be capable of safe storage and transportation without the impairment of their capabilities from the effects of the climatic extremes specified for world-wide storage and transit in MIL-STD-210.

3.1.18.2 OPERATIONAL. - The target shall be capable of meeting specified performance under the following surface, flight and extreme pressure conditions.

3.1.18.2.1 SURFACE.- The target and components shall be capable of meeting specified performance during and after exposure to the climatic extremes specified for operation, ground, world-wide in MIL-STD-210.

3.1.18.2.2 FLIGHT. - The target and components shall be capable of meeting specified performance during and after exposure to the climatic extremes encountered in captive and free flight as applicable including the effects of aerodynamic heating.

3.1.18.2.3 EXTREME PRESSURE. - The target shall operate satisfactorily at atmospheric pressures experienced at all operational altitudes. When necessary for satisfactory component operation, pressurizing of target sections will be acceptable. Pressurized compartments shall be so designed that access to the equipment contained therein will be possible for periodic and pre-flight checks where required and that pressure sufficient for reliable operation will be maintained during flight. Pressurized sections shall be so designed that satisfactory operation will take place after long periods in transit at high altitudes.

3.1.18.3 ACCELERATION, SHOCK, NOISE AND VIBRATION. - The target, target sections and all components shall be capable of withstanding without damage the acceleration, shock, noise and vibrations that occur in normal handling, launching and flight conditions. Design control shall be exercised over the target configuration (including shape, engine location(s), equipment location, anti-vibration mountings for engines and equipment, and other similar factors) and over structural and equipment design so as to obtain compatibility between estimated vibrations of structure and equipment and tolerable level of vibration for these items. The noise environment shall be specifically

3.1.18.3 (Cont)

considered as a source of vibration. When packed for shipment, the target and all components shall be capable of withstanding without damage the acceleration, shocks, noise and vibration encountered in shipping and storage. In addition, the following shall be included in the design of targets to be operated, stowed or transmitted on naval vessels:

(1) Shipboard high impact shock conditions.

(2) Adequate consideration shall be given to thexneans of restraining or gripping targets along each axis during handling and uncrated stowage.

(3) Adequate protection against shock and vibration, consistent with other design criteria for unpackaged targets, to preclude the necessity for special shipping or handling containers aboard ship and for extensive shipboard shock mitigation systems.

3.1.18.3.1 VIBRATION NOISE ESTIMATES. - Realistic, rational estimates of natural and induced environments which result in vibratory Loading of structures and equipment during launch and flight for application to all target and component design are required. Consideration shall be given in derivation of estimates to all operating conditions in service and to the effects of the design configuration on the induced conditions in service and to the effects of the design configuration on the induced environments The environments covered shall include structural vibration, radiated and pseudo noise and oscillatory pressures associated with engine jet effluxes, boundary layer and wakes, and other similar sources.

3.1.19 BUOYANCY. - Adequate buoyancy shall be provided to meet the flotation requirements specified in the type or detail specification. Buoyancy maybe provided by the installation of sufficient approved bulk flotation material or by the incorporation of adequate watertight compartments*

3.1.20 MATERIALS AND STANDARD PARTS. - Materials and standard parts shall conform to applicable specifications and standards specified herein.

3.1.20.l SELECTION OF MATERIALS. - Particular attention shall be given to the selection of parts and materials such as tubing, tie rods, cables, bolts, nuts rivets, steels, aluminum alloys, etc. to facilitate interchangeability, stocking and replacement in service. The number of different types, sizes and strengths of fastenings shall be kept to a minimum. Mere convenience in design, procurement, or shop processing is not justification for use of intermediate sizes, nonstandard parts, or materials which do not conform to applicable specifications.

3.1.20.2 CRITICAL AND STRATEGIC! MATERIALS. - Materials shall be chosen on the basis of suitability and availability in this country in quantity and from consideration of the additional restrictions created during a national emergency. Critical and strategic materials shall be used only to the extent considered mandatory for satisfactory operation, the contemplated use of these materials shall be brought to the attention of NAVAIR with appropriate justification therefor and shall be subject to NAVAIR approval.

3.1.20.3 SUBSTITUTE MATERIALS. - The design of target shall be based on applicable material specifications approved by NAVAIR. Contractors may use substitute materials provided strength, interchangeability and serviceability of the parts are not impaired and provided the substitutions result in a demonstrated advantage to NAVAIR and are approved by the LGR. Adjustments for substitutions involving change in weight shall be justified and shall be handled in the manner prescribed in the contract for variation in weights of government-furnished equipment.

3.1.20.4 MAGNESIUM ALLOYS. - Magnesium alloys shall only be used with specific approval of NAVAIR in each case. When used the protective finish shall be in accordance with the applicable paragraph of Specification MIL-F-7179.

3.1.20.5 LEATHER. - Leather shall not be used.

3.1.20.6 ADHESIVES. - The use of adhesives in the fabrication of structural parts, including sandwich structures, shall be subject to the specific approval of NAVAIR as specified in 3.1.20.10.

3.1.20.7 REINFORCED PLASTICS. - The use of reinforced plastics in structural parts shall be subject to the specific approval of NAVAIR as specified in 3.1.20.30.

3.1.20.8 FOAMED PLASTIC. - The use of foamed-in-place core construction in structural parts shall be subject to the specific approval of NAVAIR as specified in 3.1.20.10.

3.1.20.9 ELASTOMERIC MATERIALS. - Elastomeric components shall be fabricated from materials having maximum practicable ozone and aging resistance consistent with performance requirements and applicable specifications.

3.1.20.10 ADHESIVE BONDED, REINFORCED PLASTIC, AND FOAMED-IN-PLACE CONSTRUCTION. - All adhesive-bonded construction including reinforced plastic, sandwich, and foamed-in-place core construction shall be in accordance with contractor-prepared NAVAIR approved process specifications. The approval of such process specifications and the specific approval of the use of the materials for such construction shall be based on the demonstrated suitability of the materials and processes for the intended operating environments. A program shall be proposed for acceptance to develop reliable materials properties suitable for use in structural design, and consisting of structural tests to substantiate the adequacy of the properties and processes when used in the design and construction of prototype composite structures in all respects representative of production design and construction.

3.l.20.l0.l METAL CONSTRUCTION. - Aeronautical surfaces and body shall generally be of riveted construction except as otherwise specified herein or approved by NAVAIR and except that resistance welding may be used at locations other than the junction of main load carrying members. Bolts or screws may be used in parts of the above structures that are inaccessible for riveting operations, to secure structural parts to each other and to secure structural fittings to the target structure.

Metals in immediate contact that tend to activate electrolytic corrosion in the presence of salt water shall be avoided. Where the use of such metals in immediate contact cannot be avoided, particular care shall be given to the insulation of such parts as specified in Spec MIL-F-7179.

The design of struts and welded tube structures, where practicable, shall provide for airtight closure by welding. This is particularly applicable to steel struts and tube structures which maybe welded easily. Cases in which doubt exists as to the practicability of sealing steel members may be referred to NAVAIR for decision. Mere convenience of fabrication is not sufficient reason for not sealing steel tubes. End fittings used with open tubing shall be so designed that they do not form pockets which may collect moisture. Cork seals, dams, and metal end plugs machined to fit, shall not be used.

3.1.20.2 WOOD CONSTRUCTION. - Wood construction shall be in accordance with Bulletins ANC-18 and ANC-l9. Wood in contact with metal shall be avoided if practicable. Where the use of such parts in immediate contact cannot be avoided, suitable insulating material shall be provided between the surfaces of the wood and metal parts. The requirements of the paragraph do not apply to sandwich construction.

3.1,20.10.3 METAL COVERING. - The external skin of all parts of the target shall support all loads without buckling that will effect adversely the aerodynamic characteristics. The skin of wings in the slip stream shall be of sufficient gage or sufficiently stiffened to prevent fatigue failure due to slipstream action or vibration. The required contour of the external skin shall be maintained after riveting, welding, or any other fabricating process. If necessary, joints in the external metal skin shall be stiffened or shall be located in the immediate vicinity of stiffeners. Reinforcing material shall be incorporated around all cutouts in stressed material of the structure.

3.1.20.10.4 WOOD AND FABRIC COVERING.- Neither wood or fabric shall be used for external covering,

3.1.20.10.5 CONTROL-SURFACE COVERING. - The covering of control surfaces (ailerons, elevators, rudders, tabs, etc.), in addition to possessing strength capable of withstanding the loads imposed in the design conditions specified for the target, shall have rigidity sufficient to limit the deflections resulting from such design loads to magnitudes which will not affect adversely the aerodynamic characteristics of the control surface or of the fixed-movable surface combination. The pressures for use in design shall be not less than those determined from the spanwise and chordwise load distribution used in the target structural calculations as modified by the internal pressures due to venting of the surfaces, determined either analytically or from applicable test data. The determination of these design pressures shall properly take into account the effects of compressibility at high airspeeds as regards both magnitude and distribution of pressures.

3.1.20.11 CASTINGS. - Castings are permitted for both structural and nonstructural applications.

3.1.20.12 FITTINGS. - Structural fittings for targets shall be made from aluminum, or steel within the limitations imposed in this specification or other applicable specifications. Connections of solid end-fittings to struts using aluminum alloy rivets shall be designed for possible replacement by rivets of the next larger size. Iron and steel rivets or bolts maybe substituted for aluminum alloy rivets subject to release by NAVAIR, provided they are finished in accordance with Specification MIL-F-7179.

3.1.20.13 BEARINGS. - Bearings in flight control system shall be in accordance with Specification MIL-F-18372. Hinges on movable surfaces and moving parts of the control system shall be provided with suitable type bearings, the friction of which, together with the aerodynamic loads, will not cause control moments higher than the capacity of the control actuating mechanisms. hearings with thrust loads not greater than 5% of the radial load, may be fastened by staking or spinning. Special attention shall be given to the number and location of bearings for hinges on control surfaces in order that binding will not occur due to distortion of the surfaces.

3.1.20.14 BOLTS. - Taper bolts and self-locking bolts shall be used only upon specific approval of NAVAIR. Steel bolts smaller than one-fourth inch in diameter shall not be used in any single bolted structural connection. Aluminum alloy bolts, nuts, and screws shall be used in nonstructural lightly stressed aluminum alloy parts except electrical assemblies. Structural bolts which are loaded in tension shall be prestressed to a value consistent with minimizing the effects of fatigue in the joints. Bolts shall be inserted with the head uppermost or forward unless specifically approved otherwise by the LGR. In the mechanical portion Of the propulsion control system including induction air control, propeller control, auxiliary power plant control, etc., self-retaining bolts shall be used at all joints which serves as an axis of rotation or is designed to transmit motion which may result in relative rotation between the components of the joint. The bolts shall be additionally locked in position by slotted, self-locking nuts properly secured by cotterpins. The self-retaining bolt shall be designed to remain in place and maintain the control system function should the cotterpin or nut become disengaged. The bolt shall be designed so it can be removed without damage to the mating parts and shall be reusable.

3.1.20.14.1 CIEVIS BOLTS. - Clevis or other equivalent shear-type bolts with self-locking nuts, or with shear nuts properly secured cotterpins, shall be used in all locations where loss of the bolt would adversely affect safety of flight, for example: propulsion and flight controls and wing bolts. Clevis or shear-type bolts shall be of correct grip and length in order to prevent looseness or binding. (For self-locking nuts, see 3.1.30.17.1)

3.1.20.14.2 CLOSE-TOLERANCE BOLTS. - AN173-186, NAS464, and NAS334-340 close-tolerance series or equivalent bolts or pins shall be used in shear connections of wings, aerodynamic stabilizing surfaces, control surfaces, engine mounts, etc., to their adjacent principal assemblies, except where the number of bolts is sufficient to obtain a group effect and the connection is such as not to require the improved fatigue characteristics of close tolerance fasteners. The actual hole diameter for bolts or pins of 0.500 inch or less shall not exceed the nominal bolt diameter by more than 0.001 inch. The actual hole diameter for bolts or pins greater than 0.500 inch up to and including l.00O inch, shall not exceed the nominal bolt diamter by more than 0.0015 inch. The actual hole diameter for bolts or pins greater than 1.000 inch shall not exceed the nominal bolt diameter by more than 0.002 inch. For connections incorporating antifriction bearings, the maximum diameters of the hinge-pin holes in the supporting structure adjacent to the bearing shall be reamed to the nominal standard size allowing a total tolerance of 0.00l inch.

3.1.20.15 PINS. - Flat head pins shall not be used where loss would adversely affect safety of flight. Taper pins shall be threaded and shall be secured with nuts and cotterpins or with self-locking nuts.

3.1.20.15.1 SPRINGPINS. - Spring pins, such as “Sel-lok", “Rollpin", and “Spirol Pin” may be used.

3.1.20.16 SCREWS. - Countersunk type screws shall have a 100° countersunk head. Self-tapping-type screws may be used. Aluminum alloy screws smaller than size number 4 shall not be used. With the exception of threaded parts used in high temperature applications, only fine thread parts shall be used in sizes number 10 and above and only coarse thread parts shall be used in size number 8 and below. Self-locking-type screws may be used only when specifically approved by NAVAIR.

3.1.20.17 NUTS. - All nuts, except self-locking nuts and nuts for machine screws, shall be locked by cotterpins or safety wire. Shear or other thin types of nuts which have a fewer number of complete threads than the standard full-height castellated type shall not be used in primary structures in which the principal bolt loads are tensile or where him tensile stresses are required in the bolts to maintain tightness or rigidity of the assembly. For such applications, standard full-height nuts shall be used.

3.1.20.17.1 SELF-LOCKING NUTS. - Self-locking nuts of approved type may be used.

3.1.20.17.2 SHEET SPRING NUTS. - Sheet spring nuts of approved type may be used subject to the restrictions of Drawing MS33538.

3.1.20.18 RIVETS. - Rivets shall conform to applicable ANA standard drawings. Hollow rivets maybe used only where specifically approved.

3.1,20.18.1 BLIND RIVETS. - Aluminum alloy blind rivets and monel blind rivets may be used. Design load allowable shall be in accordance with Handbook MIL-HDBK-5.

3.1.20.18.2 HI-SHEAR RIVETS AND LOCKBOLTS. - Hi-Shear rivets and approved type lockbolts maybe used subject to approval by NAVAIR. Other similar shear-type fasteners shall be used only when specifically approved by NAVAIR.

3.1.20.19 WASHERS. - Washers-used with internal wrenching or other similar high-strength tensile-type bolts shall be in accordance with Drawing MS20002. Lockwashers may be used. Where nuts and heads of bolts, or the heads of flathead pins, used in bushed fittings are not enough larger than the outside diameter of the bushing to prevent shifting of the bushings, washers of appropriate diameter and thickness shall be provided under the nuts or heads as required.

3.1.20.20 HINGES (PIANO-TYPE). - Consideration shall be given in the selection of piano-type hinges to ease maintenance and replacement of the hinge pins. Extreme length hinges shall be avoided or split into several segments for ease of maintenance and replacement.

3.1.20.21 BALL AND SOCKET JOINTS. - Ball and socket joints shall not be used in any main structural member or structural assembly, except turbine engine attachment fittings.

3.1.20.22 FLUSH RIVETING. - Flush riveting shall be of the conventional type involving driving of rivet without milling rivet head.

3.1.20.23 WELDING. - Welded joints shall be designed in accordance with applicable welding specifications.

3.1.20.24 BRAZING. - Fusion welding operations in the vicinity of a brazed joint or other operations involving high temperatures which might deleteriously affect the joint are prohibited. Whenever possible, brazed joints shall be designed for shear loading.

3.l.20.25 SOFT SOLDERING. - Soft soldering shall not be depended on for any calculated strength. Restrictions on brazing specified in 3.1.20.24 also apply to soft soldered joints.

3,1.20.26 TOLERANCES (BUSHINGS AND BEARINGS). - Tolerances on bushings or bearings to be pressed into aluminum alloy fitting parts shall be such that the constant stresses in the fitting imposed by the seated bushing shall not exceed 50 percent of the yield stress of the material. A lubricant which till not accelerate corrosion shall be used to prevent galling of the surface during the pressing operation.

3.1.20.27 TURNBUCKLE SAFETY WIRING. - Turnbuckles shall be safety-wired in accordance with Drawing MS-33591.

3.1.20.28 CABLE ASSEMBLIES. - Control cables shall be stretched and control cable assemblies shall be proof-loaded. Stretching may be accomplished in conjunction with the proof loading of terminal cable assemblies.

3.1.29 THREADS. - The use of pipe threads shall be kept to a minimum, and if practicable should be avoided entirely in favor of straight threads. The tapping of screw threads into fittings, lugs or other special parts for use with-standard or special bolts or screws shall require specific approval by the LGR in each case.

3.1.20.30 HOLES (RIVETS, BOLTS, AND PINS). - Holes for structural rivets (except Hi-Shear rivets), bolts, and pins may be punched or drilled. Holes for close fitting bolts and Hi-Shear rivets shall be reamed. All holes shall be clean-cut and shall show no evidence of deformation at the periphery. Drilled holes shall not be near or in line with welds, notches, and reentrant angles.

3.1.21 MAINTENANCE AND REPAIR. - The design shall provide for maximum ease or removal and replacement of wings, tail surfaces, all parts of the propulsion units, electrical and electronic equipment, control surfaces, control cables, and all other parts that require periodic or frequent replacement, or that may, by their nature or location, be subject to occasional damage. Special consideration shall be given to those parts which must be installed or adjusted during the final preparation for launching to assure that the installation/adjustment can be accomplished with a minimum number of tool types. Access shall be provided to fuel and oil tanks for inspection and maintenance without removing the tanks from the target. All engine installations shall be so designed that the engine, including accessories, may be rapidly removed and replaced with a minimum disturbance of fittings and connections. Connections for controls, instrument lines, hydraulic lines, etc., at major disassembly and adjustment points shall be designed to prevent the possibility of reversing the action by reversing attachments.

3.1.21.1 ACCESSIBILITY OF ELECTRICAL AND ELECTRONIC EQUIPMENT. - Accessibility shall be provided in electrical and electronic system installations for pre-flight inspections and routine preventative maintenance checks. The electronic equipment installation shall be so designed that those equipment adjustments, test points, inspection points, destructors, equipment fuses, circuit breakers, meters, etc., which are necessary for determining proper operation of electronic equipment, shall be readily accessible when all components thereof are installed and operating. Where space limitations preclude full compliance with the intent of the foregoing accessibility requirements, remote test and check points, inspection doors, hinged shelves, and other devices as necessary to facilitate inspection, test, removal and reinstallation of all installed electronic equipment shall be provided.

3.1.12.2 ACCESSIBILITY OF PROPULSION SYSTEM COMPONENTS. - All propulsion system components such as spark plugs, magnetos, generators, distributors, reciprocating engine superchargers not integral with engine, carburetors, pumps, main propulsion system control, etc., shall be readily accessible for inspection, maintenance and easy replacement without removal of target parts other than cowling. The arrangement shall permit replacement of sparkplugs and drainage of oil without removal of the cowl if practicable.

3.1.21.3 ACCESS AND INSPECTION DOORS. - Access doors, removable sections, or equivalent, shall be provided for inspection, lubrication, servicing of engine and accessories, drainage, removal of corrosion deposits, adjustment, refinishing, and replacement of parts as required. Doors shall furnish an adequate view of the parts to be inspected and provide ample access to parts involved to permit disconnection and removal. of a part without having to remove other parts or units not affected. Doors shall be externally smooth, readily opened, and securely closed by approved type fasteners. Doors shall be so designed that air blast cannot get under the edges and tear them off. Hinged doors shall be secured in the open position for maintenance use. Doors, removable sections, or similar parts, shall be made load-carrying wherever practicable if significant weight savings can be accomplished thereby. When such doors are subject to extreme temperature variations, such as jet-engine access doors or panels, in which the resultant thermal distortion will make assembly difficult,

3.1.21.3 (cont)

threaded tapered fasteners or other compensating assembly devices shall be utilized to simplify assembly and reduce maintenance. Load-carrying doors shall not be used where removal is necessary for periodic inspection. Readily operated approved flush-type fasteners of corrosion-resistant construction shall be used to secure cowling, doors and covers which must be opened at frequent intervals.

3.1.22 LUBRICATION. - Provision shall be made for adequate lubrication of all parts subject to wear. Lubrication shall be in accordance with Specification MIL-STD-838. All lubrication fittings shall be readily accessible. Provision for lubrication need not be made for antifriction bearings, or for integrally lubricated bearings. Parts subject to immersion in sea water shall be designed to exclude sea water from bearings or provide for pressure lubrication that will force sea water out of such bearings.

3.1.23 FINISH. - Finish shall be in accordance with Specification MIL-F-7179.

3.1.23.1 EXTERIOR COLOR. - Exterior color shall be in accordance with Specification MIL-C-18263.

3.1.23.2 EXTERIOR MARKINGS. -The contractor shall apply the target model designation and serial number in accordance with Specification MIL-I-18464. We contractor shall request the serial numbers from NAVAIR at least 30 days prior to delivery of the first target.

3.1.24 IDENTIFICATION AND MARKING

3.1.24.1 NAME PLATE. - A manufacturer's name plate or decalcomania as specified in MIL-STD-130 shall be provided in the interior of the fuselage. The name plate shall indicate the model designation of the target, date of acceptance, contract number and the target serial number. Components requiring nomenclature shall have nameplates in accordance with MIL-N-18307. If the target and components thereof are guaranteed or warranted by the terms and conditions of the contract under which they are delivered the expiration date of said provision shall be noted on the nameplate or decal.

3.1.24.2 MARKING OF PARTS. - Interchangeable spare parts and assemblies requiring identification by part number shall be numbered by the use of a rubber type stamp using waterproof ink, covered by one coat of clear lacquer, pressure sensitive labels or by a stencil or brush using non-hydroscopic ink, metal stamp or etch. The date of acceptance by the Government shall be clearly indicated adjacent to the part number.

3.1.25 EQUIPMENT AND FURNISHING INSTALLATION

3.1.25.1 GOVERNMENT FURNISHED EQUIPMENT. - Government furnished equipment shall be as required by Appendix 1-A and 1-B of the detail specification. Government furnished equipment shall not be altered, reworked or modified in any way without specific permission of NAVAIR in each case. Government furnished equipment required by Appendix 1-A of the detail specification shall be installed by the contractor. Government furnished equipment required by Appendix 1-B of the detail specification shall be installed by the Government, however, the contractor shall make suitable provision therefor and shall make a trial installation in the first target to insure satisfactory operation. Drawings or samples of Appendix 1-B equipment will be furnished by NAVAIR for trial installation. Contractor installation provisions shall insure that all GFE equipment can be operated within specification requirements.

3.1.25.2 CONTRACTOR FURNISHED EQUIPMENT. - The contractor shall provide and install all necessary equipment and furnishings not specified in Appendices 1-A and 1-B of the detail specification. Contractor furnished equipment and furnishings, built to and meeting government specifications, shall not be altered, reworked, or modified in any way without specific permission of NAVAIR in each case. Contractor furnished off-the-shelf electronic, instrument, and automatic-pilot equipment shall not be altered, reworked, or modified unless authorized by NAVAIR. Contractor furnished equipment shall be listed in Appendix 1-C of the detail specification.

3.1.26 TARGET PROTECTION AGAINST FIRE. - Special consideration shall be given to reducing the possibility of fire during servicing, maintenance, and normal operation of the target.

3.1.27 PHYSICAL REFERENCES. - Physical references shall be provided for measuring and leveling each target for weighing and for structural alinement. Structural members which are parallel to the reference planes shall preferably be used as the leveling references. A jig-located structural member shall preferably be used as a jig point for taking measurements. Alternatively, leveling lugs and a jig point fitting shall be provided. If such fittings are externally located, they shall be readily detachable where necessary to prevent adversely affecting target performance. Leveling provisions and the jig point shall be identified by decal. The jig point decal shall include the distance of the jig point from the reference datum for weight and balance purposes.

3.2 AERODYNAMICS

3.2.1 STABILITY AND CONTROL. - The target flying qualities shall be adequate to permit satisfactory fulfillment of the mission and utilization as specified. For this purpose, the target, when flown under the control of the remote control stabilization system, shall be capable of steady, stable flight from sea level to service ceiling with adequate damping. Adequate damping is defined as damping of any oscillatory motion of the target to one-half amplitude in three cycles or less. There shall be no tendency for undamped small oscillations to persist. The detail specification shall specify the response time of all the close loop airframe-autopilot control modes. In straight and level flight, the target shall be capable of being controlled within the corridor width specified in the detail specification for all altitudes and mission conditions

3.2.2 EXTERNAL STORES. - Limitations imposed by carrying external stores such as tanks, radar, etc. shall be specified for the mission for which the stores are carried.

3.3 STRUCTURAL DESIGN CRITERIA

3.3.1 STRENGTH REQUIREMENTS. - The following applicable data shall be tabulated in the detail specification for information. The contractual obligation shall be as required in 3.3.2 of the detail specification.

Basic flight design gross weight _____ pounds
Basic landing design gross weight _____ pounds
Basic catapulting design gross weight _____ pounds
Positive limit load factor at basic flight design gross weight _____
Catapult load factor at basic catapulting design gross weight _____
Captive flight _____

3.3.2 DETAIL STRENGTH REQUIREMENTS

3.3.2.1 STRENGTH REQUIREMENTS. - Strength and rigidity shall be provided for all captive flight, launching, free flight, recovery, and handling loads. For all conditions the gross weight shall be that with maximum load. At the design limit load, no elastic deformation which will adversely affect operation is permitted. Failure shall not occur at the design ultimate loads. Weight variations of government-furnished equipment and government responsible changes shall not increase or decrease the design gross weights specified by the original contract specification unless specifically stated otherwise by a contract change. However, the contractor shall provide the required strength at the gross weights specified by the original contract detail specification increased by any contractor responsible overweight. In the event of overweight of government-furnished equipment, strength shall be provided for actual weight of the government-furnished equipment and the useful load shall be adjusted to maintain the specified overall design gross weights and design conditions. Any weight empty increase incurred by providing strength for government-furnished equipment overweight shall be considered as government responsibility and shall be negotiated with NAVAIR.

3.3.2.2 FREE FLIGHT CONDITIONS. - For free flight conditions, the loads shall be all those capable of being imposed by the control system and by upsets experienced when encountering gusts. Gust velocities in level and maneuvering flight shall be based on statistical analyses. The loads shall include but not be limited to loads caused by maximum rate of control deflection; transient overshoots in excess of trimmed, "steady state" bad factors; reverse of controls at extreme attitudes; and inertia coupling loads. The limit speed shall be the maximum attainable in dives. To insure freedom from flutter, analyses and/or experimental data shall show that an increase of 15 percent in equivalent airspeeds from all points on the limit speed-altitude, design boundary, both at constant Mach number and separately at constant altitude, will not result in flutter.

3.3.2.2 (cont)

The design ultimate factor of safety, by which the limit loads resulting from the above conditions are multiplied to obtain ultimate loads, shall be 1.25.

3.3.2.2.1 MALFUNCTION. - For air launched targets, ultimate strength shall be provided to preclude breakup in way of the launching aircraft in the event of a functional failure of any part of the target.

3.3.2.3 CAPTIVE FLIGHT CONDITIONS. - For captive flight loads, Specification MIL-A-8591 shall apply. The limit speeds for captive flight shall be as required by the detail specification. The design ultimate factor of safety shall be 1.5.

3.3.2.4 LAUNCHING LOADS* - For booster launches, a forward acting load equal to two times the rated thrust of the booster shall act separately and in combination with inertial loads. Inertial loads shall be based on the weight of the fully loaded booster unit(s). The loads shall include side loads due to misalignment and orthogonal components due to use of canted nozzles. For catapult launches, the limit loads shall be based on the peak accelerations deliverable by the catapult. The ultimate factor of safety shall be 1.5.

3.3.2.5 HANDLING LOADS, - The limit load factor for hoisting shall be 2.67. For shipping by rail or truck, the maximum horizontal load factor shall be $\pm$ 7.0. The ultimate factor of safety shall be 1.5.

3.3.2.6 PROPERTIES OF MATERIAL. - Handbook MIL-HDBK-5 shall be used for determination of material properties of structural elements.

3.3.3 MASS BALANCE OF CONTROL SURFACES. - Flutter safety substantiation of the vehicle shall be consistent with the applicable requirements of Specification MIL-A-8870(ASG).

3.4 WING GROUP

3.4.1 DESCRIPTION. - The wing group includes wings, ailerons, slats, tabs, spoilers and high-drag and high-life devices.

3.4.2 CONSTRUCTION. - Separable center sections are preferred to integral center sections to facilitate overhaul and repair.

3.4.3 AILERONS. - The ailerons consist of the aileron panels with attached fittings, trim tabs, control horns, hinge-pins, bolts and nuts, or other fastenings, complete and ready for attachment of flight controls. Aileron movement on either aide of the neutral position shall be such that satisfactory control will result for all flight operations and specified maneuvers of the target. Sufficient additional movement of the ailerons shall be provided so that the limit of movement may be controlled by stops rather than by jamming the hinges or the control surfaces proper. Servo limit switches may be used as stops in lieu of mechanical stops.

3.4.4 LIFT AND DRAG INCREASING DEVICES. - High-lift or high-drag increasing devices shall be provided when required by the detail specification.

3.5 TAIL GROUP

3.5.1 DESCRIPTION. - The tail group includes stabilizers, elevators, fins, rudders and trim surfaces. Auxiliary control devices attached to any part of the tail group also shall be included in this group.

3.5.2 STABILIZER. - The stabilizer consists of panels complete with attachments. Stabilizers maybe fixed or adjustable and shall be easily removable. Stabilizers constructed as integral parts of the fuselage shall be detachable as a unit with a portion of the fuselage.

3.5.3 ELEVATORS. - Elevators shall consist of the panels with attached fittings, trim surfaces, control horns, hinge-pins, bolts and nuts, or other fastenings ready for attachment to the stabilizer and for attachment of flight controls.

3.5.3.2 ELEVATOR MOVEMENT. - The movement of the elevators shall be adequate for the control for which the target is designed. The elevator and rudder shall be so designed that there will be no mechanical interference between the surfaces and other parts of the target for any combination of control-surface settings within the range of movements of the control surfaces.

3.5.4 FINS. - Fins constructed as integral parts of the fuselage shall be detachable as a unit with a portion of the fuselage.

3.5.5 RUDDERS. - Rudders shall consist of panels with attached fittings, trim surfaces, integral, torque tubes, attached levers, control horns, pins, bolts and nuts, or other fastenings ready for attachment to the fin and for attachment of flight controls.

3.5.6 ELEVATOR AND RUDDER STOPS. - Sufficient additional movement of the elevator and rudder shall be provided so that the limit of movement may be controlled by stops or servo limit switches rather than by jamming the hinges or the control surfaces proper.

3.6 BODY GROUP. - The body group consists of fuselage.

3.6.1 FUSELAGE

3.6.1.1 DESCRIPTION. - The fuselage shall include all equipment compartments.

3.6.1.2 CONSTRUCTION. - Construction of the fuselage shall meet the requirements specified herein and in the detail specification.

3.6.1.3 EQUIPMENT COMPARTMENTS. - Equipment compartments (electronic equipment compartments, etc.) shall be provided as required by the detail specification.

3.7 LAUNCHING AND RECOVERY

3.7.1 LAUNCHING PROVISIONS

3.7.1.1 AIR LAUNCHING. - Suitable provisions shall be made for attachment to, carrying on, and release/ejection from the store suspension equipment normally fitted on the launching aircraft. A list of aircraft with which compatibility is required will be included in the system detail specification. Specification MIL-A-8591 shall be complied with where applicable, consistent with the launching arid handling provision of the system detail specification. The design shall be capable of meeting the requirements of specification MIL-T-7743.

3.7.1.2 CATAPULTING. - Provision for catapulting shall be in accordance with the detail specification.

3.7.1.3 JET-ASSISTED TAKE-OFF. - Provision shall be made, as required by the detail specification and in accordance with Specification MIL-J-8667, for the attachment of jet-assisted-take-off (JATO) units. This provision shall include all reinforcements and fittings necessary to attach the units, electrical wiring, switches and auxiliaries for firing, and provision for releasing and jettisoning the units. The JATO attachment system shall not require alignment on the target.

3.7.2 RECOVERY

3.7.2.1 RECOVERY SYSTEM. - The air recovery system includes parachute, riser cables, attaching Fittings, release and door actuating mechanism.

3.7.2.1.1 PARACHUTE. - A parachute of approved type and suspension gear shall be provided to permit normal air recovery in accordance with MIL-P-25062 with a minimum damage to the target. The parachute shall be suitable for lowering the target at a maximum sinking speed of 18 feet per second at sea level with 25% of maximum fuel aboard. Adequate flotation shall be incorporated in the parachute assembly to insure that the parachute will remain afloat for one hour after release from the target.

3.7.2.1.2 DEPLOYMENT MECHANISM. - A parachute deployment mechanism complete with all cables and plugs shall be provided to permit deployment of the parachute at will by the control operator. The deployment mechanism shall be interconnected with the engine in such manner as to permit simultaneous stopping of the engine. The system shall also provide for automatic deployment of the parachute at a specified time after loss of radio command carrier or after parachute safety channel ceases to function. Engine stoppage alone shall not cause deployment of the parachute.

3.7.2.l.3 LOCATION OF COMPONENTS. - Location of components, wing and tail surfaces, etc. shall be such as to insure positive deployment of the parachute and suspension cables without interference with my part of the target during deployment of the parachute.

3.2.1.4 QUICK RELEASE DEVICE. - A quick release device shall be installed between the riser cable and the parachute shroud to permit automatic disengaging of the parachute from the riser cable at the moment the target has decelerated on contact with the ground or water.

3.7.2.1.5 FAIL-SAFE PROVISIONS. - A parachute fail-safe system shall be incorporated to provide automatic parachute system jettison in the event of an inadvertent deployment of the drogue or the drogue and main parachutes. This fail-safe system shall not permit a parachute deployment shock bad greater than 500 pounds to be transmitted through the target to the launcher mechanism.

3.7.2.2 GROUND RECOVERY. - A suitable keel or shock absorbing system shall be provided to minimize the effect of shock during ground landings. The keel Or system shall be readily detachable and replaceable.

3.7.2.3 WATER RECOVERY. - Target design shall provide for adequate strength to absorb the shock from water landings.

3.8 SURFACE CONTROL SYSTEM. - Surface controls shall be designed in accordance with Specification MIL-F-18372 as applicable. The surface control mechanisms shall be actuated electrically hydraulically, and/or pneumatically for lateral, longitudinal and directional stability, or as specified in the detail specification. The controls shall include push-pull rods, torque tubes, follow-up systems and cables between control surfaces, controls for high lift devices and speed arresting devices, but shall not include the electronic control mechanisms specified under electronic equipment.

3.9 ENGINE SECTION OR NACELLE GROUP

3.9.1 DESCRIPTION. - The engine section or nacelle group includes engine mount and fittings, vibration isolators, nacelle structure, cowling and cowl flaps.

3.9.2 ENGINE MOUNTS

3.9.2.1 MOUNTS (RECIPROCATING ENGINES). -Engine mounts shall be attached to the fuselage structure or nacelle structure so as to be completely detachable and reinstallable without the use of jigs. Engine mounts shall afford the maximum strength and accessibility consistent with the general design of the target. Engine mounts shall be of simple construction and shall offer the least interference to installation and removal of the power plant as a unit and to removal and replacement of engine or accessories separately. Forged engine mount rings maybe used subject to specific approval of NAVAIR.

3.9.2.2 MOUNTS (TURBO ENGINES). - Engine mounts for turbo engines need not be detachable.

3.9.3 VIBRATION ISOLATORS. - Vibration isolators shall be provided for engine mounts of all reciprocating engines and turbo-propeller engines. Vibration isolators shall be provided for turbo-jet engines when required by the detail specification.

3.9.4 COWLING AND COWL FLAPS. Cowling and cowl flaps includes engine cowl, accessory compartment cowl, and cowl flaps.

3.9.4.1 COWLING DESIGN. - Cowling shall be readily removable in part or entirely to permit access to the power plant. Removable parts of the cowling shall be of size and shape convenient to handle. Reciprocating-engine cowling shall provide a tight seal with the baffles furnished with the engine. The bottom of the cowling, shall be self-draining. All cowling shall be ventilated to insure proper cooling of the engine and its vibration isolators, and to prevent high temperatures in the engine compartment or accessory compartment. Vents and joints in cowling shall be located out of the path of the exhaust gases. Cowling shall permit the maximum engine deflections without overstressing the cowling.

3.9.4.2 COWLING ATTACHMENT (RECIPROCATING ENGINES). - Cowling shall be securely attached to the engine or to the target structure, but not both at the same time if vibration isolators are employed. Cowling, fastenings, and supports shall provide minimum drag and maximum protection from the weather for the engine. Where metal parts necessarily rub, easily replaceable chafing strips of treated webbing, canvas, or other approved material shall be provided to prevent chafing of the metal. Where practicable, the rubbing strips shall be fastened to the fixed members rather than the removable members. Particular attention shall be given to the prevention of rotary and fore-and-aft movement of the cowling and to the prevention of failure due to expansion of the engine.

3.9.4.3 COWL FLAPS (RECIPROCATING ENGINES). - cowl flaps shall have minimum lost motion in operating the interconnecting parts, considering wear and vibration incident to service. Cowl-flap hinges shall be designed to localize wear in the hinge-pins or other parts easily replaceable.

3.10 PROPULSION

3.10.1 DESCRIPTION. - The propulsion system includes propulsion units, booster units, air induction system, exhaust system, cooling system, lubricating system, fuel system, propulsion system controls, starting system and propeller as applicable. The choice and design of the system shall take into consideration such factors as type or vehicle, space availability, weight restrictions, specific fuel consumption, specific impulse, variable load range, altitude performance, velocity, maneuverability, target accuracy, and operating characteristics at other than optimum design conditions.

3.10.1.1 INSTALLATIONS. - The propulsion system design shall be such as to facilitate installation and removal and/or replacement with a minimum disturbance of fittings and connections.

3.10.1.2 BOOSTERS. - Necessary provisions shall be made for attachment of auxiliary power plant or booster unit(s) as required. The requirements of the integrated propulsion system shall be analyzed to assure compatibility of the auxiliary power plant, or accelerating device, with the operational chacteristics of the main power plant.

3.10.1.2.1 THRUST ALIGNMENT. - Target design shall prevent exceeding the specified permissible thrust misalignment. Provisions shall include means for automatic release and jettisoning of the auxiliary units, unless otherwise specified.

3.10.1.2.2 SAFETY FEATURES. - The unit shall have easy access for installation and removal of all components, as necessary, and shall be provided with effective, approved weather seals in the thrust chamber opening, if required. Any solid propellant pressurizing charge, as maybe utilized, shall be mounted in the unit to prevent damage due to adverse handling and environmental conditions. Solid propellant pressurizing charge(s) and igniter booster charge(s), if utilized, shall be stored and shipped as an integral part of the thrust unit.

3.10.2 PROPULSION UNIT. - Propulsion units shall be as required by the detail specification.

3.10.2.1 RESIDUAL OIL AND GREASE. - The weight of each engine shall include an allowance for residual oil and grease as specified in the engine model specification.

3.10.3 Propellants - Propellants having suitable specific impulse, density and energy release rate shall be used. These shall be chemically stable, capable of withstanding long periods (minimum of 5 years) of storage and or withstanding the shock and vibrations encountered in handling, shipping, launching and flight, without any degradation in safety, reliability or performance.

3.10.3.1 LIQUID ROCKET PROPELLANTS. - Liquid propellants selected shall be capable of being packaged and hermetically sealed at the contractor's facility. Appropriate structural material shall be selected to provide compatibility between the propellants and tankage for storage periods as approved by the procuring activity.

3.10.3.2 SOLID PROPELLANTS. - Solid propellant(s), if utilized, shall be developed and tested in accordance with WS-4235.

3.10.4 TANKS. - Propellant tankage shall be fabricated from materials compatible with the propellants selected.

3.10.4.1 VALVES, FITTINGS, LINES, PUMPS, ETC. - Valves, fittings, lines, pumps, etc., as may be required, shall be designed to withstand without failure the pressures, vibrations, and shocks encountered in handling, launching and flight. They shall be capable of resisting deterioration during long-term storage.

3.10.5 IGNITION SYSTEM. - All parts of the ignition system shall be shielded. Ignition or igniter circuits shall be secured against excessive vibration and shall be protected against shortcircuits or grounds due to chafing. Ignition circuits shall be protected from spray, excessive dampness, and excessive heat. Ignition wire terminals shall be of an approved type. Sufficient clearance shall be provided around shielding devices to prevent interference with engine cowling and engine accessories. The ignition system shall be designed and tested to withstand the hazards of electromagnetic radiation.

3.10.5.1 IGNITORS. - Ignitors under the cognizance of NAVAIR shall, if utilized, be developed and tested in accordance with WS-4235.

3.10.6 AIR INDUCTION SYSTEM

3.10.6.1 DESCRIPTION. - Air induction systems shall be as required by the detail specification and shall have sufficient strength so that vibration or flexing, normally expected in service,will not cause rupture of the system.

3.10.6.2 AIR INTAKES

3.10.6.2.1 AIR INTAKES (RECIPROCATING ENGINES). - Particular attention shall be given to a minimum disturbance of intake flow in all flight attitudes and minimum induction of spray or dust. The duct areas and routing shall provide the maximum practicable engine intake air pressure and velocity over the entrance area to preclude erratic metering. Pockets which may collect fuel or water shall be avoided. All joints between carburetors and air intake ducts shall be gasoline-tight. In the event of backfire, flames shall be discharged into the open air or into spaces free of flammable materials or explosive mixture and shall not damage the air intake duct or other parts of the engine installation.

3.10.6.2.2 AIR INTAKES (TURBO ENGINES). - The permissible variation in total pressure at the engine compressor inlet face shall not be greater than that established by the engine manufacturer and approved by NAVAIR.

3.10.6.2.3 AIR INTAKES (PULSE JETS, RAMJETS, AND AIR AUGMENTED ROCKETS). The permissible variation in total pressure at the diffuser outlet shall not be greater than that established by the engine manufacturer and approved by NAVAIR,

3.10.6.3 DUST PROTECTION SYSTEM RECIPROCATING, JET, TURPOPROP, AND TURBOSHAFT ENGINES). - When required by the detail specification, an air filter shall be provided.

3.10.7 EXHAUST SYSTEM

3.10.7.1 DESCRIPTION. - Exhaust system includes all pipes, stacks, manifolds, and collectors together with flanges, and necessary supports and attachments therefor used in carrying off exhaust gas. Exhaust system joints, connections, and necessary supports shall allow for thermal expansion without damage to the engine or exhaust system. Suitable clearance shall be provided between the exhaust system and nonstructural parts. Due consideration shall be given to thermal effects on the adjacent structure

3.10.7.2 EXHAUST SYSTEMS (RECIPROCATING ENGINES). - The open end of any exhaust pipe shall have suitable clearance in every direction from flammable parts, and the exhaust gases shall not directly impinge on any structural member.

3.10.7.3 PROPULSION OR ROCKET EXHAUST SYSTEMS (OTHER THAN RECIPROCATING). The exhaust pipe nozzle shall be so located that the portion of the jet within 15° included angle shall not impinge upon any part of the target. If this is impracticable, protection as necessary shall be provided for the target. The exhaust system outlet areas shall conform to the value upon which the engine performance guarantees are based as specified in the applicable engine specification. In the event that an area or a range of areas (variable tailcone) differing from the above is employed, approval shall be obtained from NAVAIR.

3.10.8 COOLING SYSTEM

3.10.8.1 DESCRIPTION. - The cooling system shall be as required by the detail specification.

3.10.8.2 COOLING SYSTEMS (RECIPROCATING ENGINES). - The cooling system shall meet the temperature requirements of Specification MIL-C-8678. Means shall be provided. to conduct or deflect the heat from exhaust stacks or collectors away from the engine and accessory compartment.

3.10.8.3 COOLING SYSTEMS (TURBO ENGINES). - Cooling for engine components shell be provided in accordance with the requirements of Specification MIL-C-8678.

3.10.9 LUBRICATING SYSTEM

3.10.9.1 DESCRIPTION, - The lubricating system includes tanks, coolers, pumps not integral with the engine, piping exterior to the engine, strainers, pipe fittings, valves, etc. A separate oil tank and necessary accessories shall be provided for each engine not having a self-contained oil system.

3.10.9.1.1 ARRANGEMENT. - The lubricating system shall be so arranged that, with the engine running at any speed from idling to full power, the delivery of oil to the engine inlet to provide the required engine lubricating system pressure will be automatically maintained for normal flight and over the range of extreme flight attitudes encountered during the fulfillment of mission specified in the detail specification down to zero usable oil capacity level.

3.10.9.2 OIL TANKS. - Oil tanks shall be of the type construction specified in the detail specification. Metal oil tanks, including corrosion-resistant steel tanks, shall be in accordance with Specification MIL-T-6396.

3.10.9.2.1 OIL TANK CAPACITY. - The usable capacity of oil tanks (excluding expansion and foaming space) shall be as follows:

(1) Reciprocating Engines. - One twenty-fifth (by volume) or normal mission fuel load or one-thirtieth (by volume) of maximum overload fuel whichever is greater. (For definition of unusable oil see 6.4.6)

(2) Turbo Engines. - The engine oil consumption unit rate specified in the engine specification, times the maximum target endurance times a factor of l 1/2. (For definition of unusable oil see 6.4.6)

3.10.9.2.2 EXPANSION AND FOAMING SPACE

3.10.9.2.2.1 OIL TANKS (RECIPROCATING ENGINES). - Expansion and foaming space shall be provided in service oil tanks in a volume equal to 20 percent of total oil tank capacity plus 20 percent circulating oil with circulating oil defined as the quantity of oil which circulates during engine oil dilution.

3.10.9.2.2.2 OIL TANKS (TURBOENGINE). - Expansion and foaming space shall be provided in the service oil tanks in a volume equal to 10 percent total oil but not less than one quart.

3.10.9.2.3 OIL TANK FILLER UNITS. - Oil tank filler units shall have a nominal diameter of 3", unless otherwise approved by NAVAIR, and shall be designed in accordance with MIL-C-7244. Remote filling provisions shall be in accordance with paragraph 3.10.9.2.3.4 of this specification.

3.10.9.2.3.l TANK FILLER CAP SECURITY. - Filler caps installed under access doors shall be so arranged that the access door cannot be completely closed if the cap is not in place, or in place but not secured.

3.10.9.2.3.2 FILLER UNIT SCREEN (RECIPROCATING ENGINES). - A large capacity oil screen of number 10 mesh, or equivalent, shall be provided in the oil tank for screening only the service oil. The screen shall have sufficient capacity to permit servicing the oil tank in 2 minutes, except that the rate need not exceed 20 gallons per minute, using the oil specified for normal use with the engine, at a servicing oil temperature Of 15°C. (59°F)

3.10.9.2.3.3 FILLER UNIT SCREEN (TURBO ENGINE). -A filler unit screen shall be provided and shall be as approved by NAVAIR.

3.10.9.2.3.4 REMOTE FILLING PROVISIONS. - Remote filling shall be provided as needed and shall be as approved by NAVAIR. The service and the overflow lines shall be of different diameter and shall be designed such that mismating of these lines with other aircraft lines cannot occur.

3.10.9.2.4 OIL TANK INSTALLATION. - When a separate oil tank is required, it shall be located as near the oil pump as possible, but shall not be located in any compartment where it is subjected to high temperature (see MIL-C-8678 for temperature requirements) and shall conform with the requirements of either MIL-T-5779 or MIL-T-6396. The bottom of the oil tank shall be as high above the level of the oil pump as practicable. If the engine oil pump is above the mean normal capacity level of the tank with the vehicle in its normal static position, an oil booster pump or other suitable means (subject to NAVAIR approval) shall provide a positive head of oil to the engine-driven pump. Oil tanks shall be supported in fireproof cradles or other fireproof means for distributing the weight throughout the entire tank structure. Oil tanks, except integral structures, shall be so installed that they may be removed or replaced with minimum disassembly of the vehicle structure. Aluminum, bladder, or self-sealing tank construction shall be protected as necessary to provide fire resistance equivalent to 0.012 inch corrosion-resistant steel construction.

3.10.9.2.4.1 STANDARD PARTS. - Standard parts (MS or AN) shall be used wherever they are suitable for the purpose, and shall be identified on the drawing by their part number. Non-standard parts maybe used where the standard parts will not fulfill the design objectives because of size, weight or performance.

3.10.9.2.4.2 THREADS. - Only straight threads conforming to Specification MIL-S-7742, National Fine Thread Series, class 3 (NF3) or Unified Thread Series, classes 3A or 3B shall. be used.

3.10.9.2.5 OIL COOLERS. - Oil coolers for reciprocating-engine targets shall be in accordance with Drawing MS29591 or MS29590 meeting the requirements of Specification MIL-C-5637. Oil coolers for turbo-engine targets shall conform with the requirements of Specification MIL-C-5637 as applicable to the range of performance of the particular target. Elliptical and round oil coolers shall be in accordance with Drawing MS29591 and MS29590, respectively, while coolers of other shapes shall be subject to specific approval of NAVAIR.

3.30.9.2.5.1 TEMPERATURE REGULATION. - Temperature regulating valves for Drawing AN4124 and AN4125 cooler installations shall be in accordance with Drawing AN4103 meeting requirements of Specification MIL-V-5636. Temperature regulating valves for other types of oil coolers shall be subject to specific approval by NAVAIR. All temperature regulating valves used in reciprocating engine installations shall be compatible with and readily converted for satisfactory use of either grade 1100 or grade 1065 oils.

3.10.9.2.6 DRAINAGE PROVISIONS. - A main drain valve at the lowest point in the engine oil-in-line and a tank sump drain shall be provided to obtain complete drainage of the oil tank. The drain valve for tank sump shall be one-half inch with Drawing MS33656 outlet port. The main drain valve shall be of the same size as the engine oil-in-line with Drawing MS33656 outlet port except that the valve need not exceed a size 1 1/2 inches. Drain valves shall be self-locking.

3.10.9.2.6.1 OIL COOLER DRAINAGE. - The oil cooler drain plug shall be accessible for drainage and oil shall drain clear of the target. Complete-oil cooler drainage is not required, however, oil coolers shall be drained to a “wet" weight not exceeding 50 pounds to facilitate removal.

3,10.9.2.6.2 ENGINE OIL DRAIN. - Engine oil drain plugs shall be readily accessible and shall permit oil to drain from the engine clear of the target.

3.10.9.2.7 DEAERATION PROVISION. - The expansion and foaming space requirements of 3.10.9.2.2.1 are representative of’ reasonable tank design and lubricating system characteristics. Deaeration provisions may be incorporated with a reduction of the foam space requirements of 3.10.9.2.2.1. Additional deaeration provisions and/or increase in foam space shall be provided as necessary to prevent excessive tank pressures or overboard discharge of oil due to the engine foaming characteristics or compromise of tank design characteristics.

3.10.9.2.8 VENT AND BREATHER SYSTEM. - Main oil tanks shall be vented to the appropriate engine connection. Liquid pockets shall not form in the oil tank vent lines. If no vent connection is furnished on the engine, the oil tank shall be vented overboard and designed to prevent discharge of solid oil from the vent outlet. The inlet to the vent line shall be uncovered within the angular limits of climb and dive specified for the fuel system of the target. When a breather connection is provided on the engine, breather pipes shall be designed to conduct oil vapors from the engine breather to the open air clear of the exhaust outlets. The discharge line shall be located on the under side of the engine accessory compartment, so that approximately ambient air pressure is imposed on the outlet. Particular attention shall be given to the prevention of vent and breather icing at low temperature. Vent and breather lines which pass through unheated areas shall be lagged or provided with means of heating to prevent ice accumulation within the lines.

3.10.10 FUEL SYSTEM

3.10.1 DESCRIPTION. - The fuel system shall include tanks, plumbing, functional equipment, arrangement necessary for required fuel feed to the engine, and fuel transfer system. The fuel system shall be in accordance with Specification MIL-F-17874. (For target protection against fire see 3.1.26).

3.10.10.2 FUEL TANKS (FIXED). - Fuel tanks shall be of the the required by the detail specification. All metal and nonmetallic tanks (except integral) shall be in accordance with Specification MIL-T-6396. Integral fuel tanks shall be in accordance with the following:

(1) Integral tanks shall normally be of clad aluminum alloy construction. Where it is not practicable to have internal tank surfaces so clad, they shall be protected against corrosion by means approved by NAVAIR.

(2) Closed section stiffeners shall not be used inside integral fuel tanks. Stiffeners shall not be continuous through fuel-tight bulkheads unless the compartments are intended to contain fuel.

(3) Since rows of rivets, screws, or bolts shall not be used in fuel-tight joints if the thickness of either piece of material to be joined is less than 0.125 inch

(4) Water and sediment shall drain to the lowest point in the tank with the target on handling truck or launching device.

(5) The tanks shall be capable of being sealed and maintained fuel-tight throughout in service.

3.10.10.2.l FUEL TANK CAPACITY. - The usable capacity of fuel tanks shall be sufficient for the missions of the target and shall be as required by the detail specification. The usable capacity shall be the quantity of fuel which can be placed in the tanks when the target is on handling truck or launching device. In determining tank capacities, allowance shall be made for a 3% expansion space. (For definition of unusable fuel, see 6.4.5)

3.10.10.2.2 FUEL TANK INSTALLATION. - All fuel tanks shall be securely anchored to the target structure to prevent movement of the tank in any direction with respect to the target. Fuel tanks shall be removed Or replaced with minimum disassembly of the target structure. It shall not be necessary to jack the target to maintain alignment of the fuselage or wings for fuel cell replacement. It is desired that it is possible to remove and replace any fuel tank without disturbing the remaining tanks or major components of the structure.

3.10.10.3 PIPING AND FITTINGS. - Piping and fittings, and their installation shall be in accordance with Specification MIL-I-18802. AN or MS standard fittings shall be used unless other fittings are approved for use by NAVAIR.

3.10.10.4 DRAINAGE PROVISIONS. - Fuel system components having shaft seal compartments such as in pumps, and strainers, and any other fuel system component requiring cleaning, shall include adequate drainage provisions. Drain valves, in other than a vertical configuration of the lowest point, shall be installed in such a manner that the valve will be at the lowest practicable point and tilted efficiently to permit adequate draining when the target is in its maximum nose-up and nose-down attitudes on handling truck or launching device. Drain valves shall be designed to permit removal and replacement of the rubber goods without draining the fuel tank.

3.10.10.4.1 DRAINAGE (TURBO ENGINES). - A container shall be provided for collecting fuel drainage from the fuel manifold dump valves and drains from pertinent accessories such as flow dividers, pumps, etc., when the target is at rest in the normal attitude on the handling truck or launching device, leaving no raw fuel in the fuel-manifold. The container shall be of sufficient capacity to provide one normal shutdown and two false starts and shall be capable of being drained automatically in flight so that fuel will drain clear of all parts of the target, and manually through a drain valve while at rest so that fuel will not be discharged on the target.

3.10.10.5 FUEL EVAPORATION CONTROL. - A fuel tank pressure system in accordance with Specification MIL-F-17874 shall be provided for all targets operated above 25,000 feet.

3.10.10.6 VENT SYSTEM. -A fuel tank vent system shall be in accordance with Specification MIL-F-17874.

3.10.10.7 VALVES. - Valves shall be of an approved type.

3.10.10.8 STRAINERS AND FILTERS. - Strainers and filters shall be as required by Specification MIL-F-17874.

3.10.10.9 REFUELING PROVISION. - Single point type ground pressure refueling shall be provided in accordance with Specification MIL-F-17874.

3.10.10.10 DEFUELING PROVISION. - Defueling provisions of all pressure fueled targets shall be in accordance with MIL-F-l7874.

3.10.11 PROPULSION SYSTEM CONTROLS

3.10.11.1 ENGINE CONTROLS. - Engine controls shall be so designed that the tendency to creep due to vibration or unbalanced loads is reduced to a minimum.

3.10.11.2 PRIMER AND STARTER CONTROLS. -Primer and starter controls shall be so arranged that all operations necessary to start an engine can be conveniently carried out.

3.10.11.3 COOLING AIR CONTROLS. - When air flow around the engine is required, automatic controls shall be provided for regulating the cooling air flow with minimum cooling drag.

3.10.12 STARTING SYSTEM

3.10.12.1 STARTER

3.10.12.1.1 RECIPROCATING ENGINES. - Starting shall be accomplished as specified in the engine model specification.

3.10.12.1.2 TURBO-JET ENGINE. - The starter with necessary accessories and the priming system shall be subject to the approval of NAVAIR. The design requirements for starter wiring, fuses, switches, and circuit breakers, not integral with the starter assembly itself, are included under “electrical".

3.10.12.1.3 PULSE-JET ENGINE. - The contractor shall make provision for the use of ground portable equipment for starting the pulse-jet engine. This equipment consists essentially of a source of compressed air and the means of applying it to the engine.

3.10.12.1.4 ROCKET ENGINE AND OTHER ENGINE TYPES. - Rocket engines and other engine types shall be equipped with a starting or ignition device and the accessories specified in the detail specification.

3.10.12.1.5 STARTING SEQUENCE (PULSE-JET LIQUID AND SOLID ROCKETS AND OTHER ENGINEER PROPULSION TYPES). - Special consideration shall be given to simplicity of the starting sequence.

3.10.12.2 PRIMING SYSTEM (RECIPROCATING). - Priming maybe accomplished manually or electrically as specified in the detail specification

3.10.13 PROPELLER

3.10.13.1 PROPELLER COMPONENTS (RECIPROCATING ENGINES). - The propeller includes the propeller proper (blades, hub assembly, bolts, propeller attaching parts, etc.), and spinner.

3.10.13.2 TYPES. - Propellers shall be of the fixed or automatic pitch type and shall be of wood or metal construction as specified in the detail specification. Fixed pitch wooden propellers shall be in accordance with Specification MIL-P-26366. Metal propellers shall be in accordance with specification MIL-P-26366.

3.10.13.3 FINISH. - Metal propellers shall be finished in accordance with Specification MIL-F-7179 and wood propellers in accordance with Specification MIL-P-26366 as applicable. Propeller tips shall be painted glossy orange yellow conforming to color number 13538 of Federal Standard No. 595 with enamel conforming to Specification MIL-E-7729 at a distance of approximately two inches inboard from the tips.

3.10.13.4 PROPELLER CLEARANCE. - Propeller clearance shall take into consideration deflections of engine-mount vibration isolators and supporting structures to the extent which would result from accelerations consistent with the condition assumed.

3.10.13.4.l RADIAL CLEARANCE. - Radial clearance between tips of propellers and the catapult or launching airplane structure, shall be not less than two inches. Surfaces near propeller tips shall be stiffened against vibration, ice from the propeller, and subsequent failure. Ample clearance shall be provided in a direction parallel to the axis of the propeller to allow for blades deflection under load.

3.11 INSTRUMENTS

3.11.1 INSTRUMENTS. - The installation of instruments that are required for normal operation of the target shall be as required by the detail specification. Instruments used for flight test purposes shall be approved by NAVAIR.

3.12 HYDRAULIC AND PNEUMATIC SYSTEMS

3.12.1 HYDRAULIC SYSTEM* - Hydraulic systems shall be provided in accordance with Specification MIL-H-25475.

3.12.1.1 DESCRIPTION. - The type and class of system shall be as required by the detail specification.

3.12.1.2 SUMMARY OF ACTUATED ITEMS. - Items operated hydraulically shall be as required by the detail specification.

3.12.1.3 HYDRAULIC FLUID WEIGHT0 - For design purposes, the weight of Specification MIL-O-5606 hydraulic fluid shall be calculated at 7 pounds per gallon.

3.12.1.4 FINISH OF DETAIL PARTS. - Finishes of detail parts shall be provided in accordance with Specification MIL-H-8775.

3.12.2 PNEUMATIC SYSTEM. - Pneumatic systems shall be provided in accordance with Specification MIL-P-5518.

3.12.1 DESCRIPTION. - The type and class of system shall be as required by the detail specification.

3.12.2.2 SUMMARY OF ACTUATED ITEMS. - Items operated pneumatically shall be as required by the detail specification.

3.13 ELECTRICAL

3.13.1 DESCRIPTION. - The electrical system includes all components required for generation, storage, conversion, distribution, and control of electric power.

3.13.2 ELECTRICAL POWER SUPPLY. - An electrical prime-power system shall be provided subject to NAVAIR approval. The selection of equipment shall be based on an acceptable preliminary load analysis conforming to MIL-E-7016.

3.13.3 ELECTRIC POWER CONVERSION SYSTEM. - An electric power conversion system shall be subject to NAVAIR approval. The selection of equipment shall be based on acceptable preliminary load analysis conforming to MIL-E-7016.

3.13.4 ELECTRICAL POWER UTILIZATION. - The electric input power to utilization equipment shall be in accordance with MIL-STD-704. The power demand characteristics of utilization equipment shall be within the limits prescribed by MIL-STD-704.

3.13.5 EQUIPMENT INSTALLATION. - The installation of electrical equipment shall be in accordance with Specification MIL-E-25366. In general circuit breakers or fuses shall not be used. However, protection may be employed for certain circuits and for clearing temporary faults, provided operation and protection does not result in abortion of the mission.

3.13.6 WIRING. - Electrical wiring shall be provided in accordance with Specification MIL-w-8L60 except that routing and grouping of cables need only be made in such a manner as to facilitate manufacture of the target without compromising reliability.

3.13.7 BONDING. - Bonding shall be in accordance with Specification MIL-B-5087.

3.13.8 IGNITION AND STARTING SYSTEM

3.13.8.1 RECIPROCATING-ENGINE TARGET. - The ignition and starting system shall be provided in accordance with applicable specifications.

3.13.8.2 TURBO-ENGINE TARGET. - The ignition and starting system shall be provided as required by the detail specification.

3.13.9 GROUND SERVICING RECEPTACLE. - A receptacle shall be provided for ground checking and warm-up of all electrical and electronic equipment by external power and control prior to launching the target.

3.13.10 UMBILICAL CORD RECEPTACLE. - A receptacle shall be provided for attachment of an umbilical cord to the target for pre-launching tests of the control functions, and for launching the target as required.

3.13.11 EQUIPMENT COOLING. - Cooling shall be provided for all electrical equipment in accordance with the specifications covering that equipment. In the case of blast cooled electrical equipment the cooling airflow shall be unidirectional under all target operating conditions and the air duct shall be of rigid nonporous material except that flexible connections will be allowed as necessary to meet the installation requirements. When blast-cooled generators are specified, the cooling installation shall meet the require-ments of Specification MIL-C-8678.

3.13.12 EXTERIOR LIGHTNING. - An exterior lighting system for visual tracking of the target shall be installed when specified.

3.14 ELECTRONICS

3.14.1 DESCRIPTION. - Electronic equipment includes the remote and/or programmed control; telemetering; radomes; antennas; altitude control devices; destructor actuator devices; beacons; IFF and shoo-away devices; stabilization system and such other electronic devices as may be specified in the detail specification. Unless otherwise specified, electronic equipment shall be in accordance with Specification MIL-E-8189 or MIL-E-5400 as specified in detail specification.

3.14.2 INSTALLATION. - Electronic equipment installations shall be in accordance with Specification MIL-E-25366 insofar as applicable and detail equipment installation specifications and drawings. Where detail equipment installation specifications and drawings are not available, GFE installations shall be made in accordance with applicable equipment handbooks or such other instructions as maybe furnished or approved by NAVAIR. Electronic equipments shall be as listed in the detail specification.

3.14.3 PERFORMANCE. - The entire electronic equipment installation shall provide acceptable performance as defined by the applicable detail equipment test specifications, equipment handbooks, and such other information as may be furnished or approved by NAVAIR.

3.14.4 CONTRACTOR FURNISHED ELECTRONIC EQUIPMENT. - Contractor furnished electronic eqipment shall conform to, and shall withstand, environmental conditions required by the detail specification.

3.14.5 REMOTE AND/OR PROGRAMMED CONTROL EQUIPMENT. - The remote and/or programmed control equipment shall include radio control receivers and remote and/or preset control devices for terminating flight.

3.14.6 STABILIZATION SYSTEM. - The stabilization system shall be suitable for all specified target airspeeds, altitudes, maneuvers, flight and environmental conditions required by the detail specification.

3.14.7 RADAR AUGMENTATION. - Radar augmentation devices or equipment shall be provided as specified in the detail specification. Suitable scale model tests shall be made to verify the radar cross-section that the target represents. Additional test shall be required where augmentation devices (either active or passive) are required.

3.14.8 INFRA-RED AUGMENTATION. - Infra-red augmentation shall be provided as specified in the detail specification.

3.14.9 MISS-DISTANCE INDICATING EQUIPMENT. - Miss-distance indicating equipment shall be provided as specified in the detail specification.

3.14.10 TELEMETERING. - When telemetering is required, the smallest and simplest system practicable shall be used which will reliably provide the required data. Telemetering equipment shall conform to Inter-Range Instrumentation Group (IRIG) standards. The telemetering system shall operate with the recording station designated by the procuring activity. The telemetering transmitter shall radiate the minimum power commensurate with reliable operation under all operating conditions. The telemetering system shall be so designed that there will be no deleterious interference between it and other systems within the target. The telemetering equipment shall be capable of withstanding all the environments which the target may encounter. The equipment shall be designed to be as rugged as arid to have equal or greater precision than, the equipment it is expected to test. The selection of telemetering equipment shall be in accordance with the “Navy Department Guided Missile Telemetering Standardization Program" and subject to approval by NAVAIR.

3.14.11 RADOMES. - Radomes shall be in accordance with specification MIL-R-7705.

3.14.12 ANTENNAS. - Antenna and antenna systems shall present minimum aerodynamic drag consistent with the equipment and target performance requirements. Antenna lead-ins shall be of minimum or specified lengths and so routed as to minimize coupling of interference from nearby sources. Design aims shall be as follows:

(1) Antenna mechanical design and location shall represent an optimum compromise between weight and drag taking into account the required range, speed, size and aerodynamic performance of the target. If the weight of a zero drag antenna is more of a penalty on fuel or range or both, than a lighter weight, plus the drag, of an external antenna is on fuel, range, or aerodynamic performance, then the best compromise shall be effected consistent with the electrical requirements.

3.14.12 (Cont)

(2) Antenna electrical design and location shall be such as to provide optimum radiation of energy in the spatial zones of primary interest considering the desired function of the particular electronics equipment involved and as set forth in the detail specification. Design consideration shall be given to avoiding locations of antennas which might result in corona discharge due to precipitation static.

(3) Scale model of full scale antenna tests shall be made to verify antenna pattern requirements as called for in the detail specification.

3.14.13 EQUIPMENT COOLING. - Cooling shall be provided as necessary to insure that the maximum contimuous ambient temperatures specified for the various installed electronic equipments are not exceeded.

3.14.14 WIRING. - Wiring installations for all electronic equipment shall be provided in accordance with Specification MIL-W-8160 and shall be waterproof.

3.14.15 BONDING. - Bonding shall be in accordance with Specification MIL-B-5087.

3.15

3.15.l DESCRIPTION. - Armament includes the destructor system, visual identification system and such other systems as may be specified in the detail specification.

3.15.2 DESTRUCTOR. - A destructor system shall be provided to destroy the target or parts thereof during flight for reasons of safety or security. A flight terminator system shall be provided as specified in the detail specification.

3.15.3 VISUAL IDENTIFICATION SYSTEM. - A visual identification system shall be provided for visual tracking the target. The system may consist of a pressurized smoke tank, flares, interior or exterior lights or other systems specified by NAVAIR or mutually agreed upon by NAVAIR and the contractor. The arrangement shall permit intermittent or continuous operation of the system by remote control or by programmed control as specified by NAVAIR.

3.15.4 PYROTECHNICS. - The requirements for certification of all pyrotechnic items for manufacture, stocking and issue, shall be in accordance with Specification MIL-R-22449.

3.15.5 CARTRIDGES. - The design and evaluation testing of explosive cartridges shall be in accordance with Specification MIL-D-21625

3.16 MISCELLANEOUS EQUIPMENT

3.16.1 COMPONENTS. - Miscellaneous equipment includes heating and ventilating equipment, insulation, ballast, etc.

3.16.2 HEATING AND VENTILATING. - Thermal environmental conditions within equipment compartments shall be controlled in accordance with Specification MIL-H-18325.

3.16.3 INSULATION. - Suitable thermal insulation shall be installed when required by the detail specification and shall be in accordance with Specification MIL-I-7171.

3.16.4 BALLAST. - When required for balance purposes, ballast shall be furnished and installed by the contractor. Ballast is considered part of mission. Ballast shall be securely attached to the target structure.

3.16.5 ANTI-ICING. - Anti-icing provisions shall be in accordance with Specification MIL-T-18607 or Specification MIL-D-8804 as applicable.

3.17 HANDLING PROVISIONS. - Handling provisions include provisions for hoisting and jacking.

3.17.1 HOISTING PROVISIONS. - All targets shall be provided with fittings for attachment of slings to petit hoisting, lifting and handling the complete target on the ground, on a handling truck, or onto the launching device. Hoisting fittings also shall be provided on wing panels, tail surfaces, and other components when the weight is great enough to make manual handling for maintenance operations impracticable. Handling provision may consist of inherent or built-in strong points in the fuselage structure. Such points shall be suitably marked.

3.17.2 JACKING. - Provision shall be made for jacking when specified in the detail specification.

3.18 SAFETY. - Safety requirements shall be in accordance with Weapons specification WS-4613.

3.19 WORKMANSHIP. - Workmanship shall be of a quality to insure safety, proper operation and service life. Workmanship shall be subject to the inspection and approval of the cognizant inspection activity.

4. QUALITY ASSURANCE PROVISIONS

4.1 RESPONSIBILITY FOR INSPECTION. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 CLASSIFICATION OF INSPECTION. - The classification of tests, qualification, preproduction, or quality conformance, sampling procedures, and criteria for acceptance or rejection shall be as specified in the contract specification.

4.3 INSPECTION METHODS

4.3.1 EXAMINATION. - The system shall be thoroughly examined to determine conformance with the contract specification and applicable drawings with respect to all the requirements not covered by tests therein.

5. PREPARATION FOR DELIVERY

5.1 PRESERVATION AND PACKAGING. - Preservation and packaging of each target and component parts shall be as specified by the procuring activity. Methods of preservation shall be in accordance with Specification MIL-P-116, as applicable.

5.2 MARKING. - Marking for shipment shall be in accordance with Standard MSL-STD-129, as applicable.

6. NOTES

6.1 USE OF THIS SPECIFICATION~ - This general specification shall be used as the standard form for the preparation of detail and type specifications. Detail and type specifications shall be prepared as follows:

6.1.1 DETAIL SPECIFICATIONS. - Detail specifications shall conform to the following:

6.1.1.l All paragraph numbers and topic headings shall be listed in the order shown in this general specification except that, where a paragraph and all of its subparagraphs are either applicable, not applicable or not required in their entirety, the paragraph and all subparagraph numbers may be listed under one topic heading and appropriately labeled, e.g.

6.1.1.2 Paragraphs of this general specification which are completely applicable to the particular design shall be labeled "applicable"; paragraphs which completely supersede the requirements of this general specification shall be completely rewritten; paragraphs which contain deviations or supplementary requirements shall be labeled “applicable" and the deviation or supplementary requirement incorporated therein; paragraphs of the general specification containing requirements that are not applicable to the particular design shall be labeled “not applicable”; and paragraphs which waive a requirement of the general specification normally applicable to the particular design shall be labeled “not required”.

6.l.l.3 Add paragraphs as required.

6.1.2 TYPE SPECIFICATIONS. - The instructions applicable to the preparation of detail specifications apply to the preparation. of type specifications except that only those paragraphs of the general specification necessary to define the essential characteristics of the particular design need be listed.

6.2 EXPLANATORY INFORMATION

6.2.1 NAVAIR. - Any reference to "NAVAIR" herein shall mean the Naval Air Systems Command, Headquarters, Department of the Navy, Washington, D. C. 20360.

LGR. - Any reference to "LGR" herein shall mean the local Government representative.

6.3 DEVIATIONS. - Deviations from this specification will not be permitted unless specifically approved by NAV.. Deviations may be requested when realistic and material weight savings and performance improvements are attainable and the deviations are fully justified, Deviations approved for a specific contract shall not constitute approval for other contracts held by the same contractor or for contracts held by other contractors.

6.4 DEFINITIONS

6.4.1 PROVISIONS, ETC. - The various degrees of "provision" for a specific item or installation are defined as follows:

6.4.1.1 SPACE PROVISION. - "Space provision" means that suitable space only shall be reserved.

6.4.1.2 WEIGHT PROVISION. - "Weight provision" means that suitable weight allowance to simulate later incorporation of the item or complete installation shall be included in the design gross weights for the target, and in all applicable structural design conditions.

6.4.1.3 POWER PROVISION. - "Power provision" means that the primary electrical, hydraulic, or pneumatic power and distribution system shall be sufficient to permit later incorporation of the installation without primary power and distribution system modification.

6.4.1.4 PROVISION FOR. - "Provision for" includes "SPACE PROVISION", "WEIGHT PROVISION", and "POWER PROVISION" and means that complete installation provisions, including all necessary supports bracketry, wiring, tubing, connectors interconnecting cables, fittings, etc., are provided for securing the item or equipment in place, ready tier operation, without further alterations or additional fabrication of parts. Associated fastenings such as nuts and bolts for the item or equipment are not included. The item or equipment, including its provisions, shall be included in the weight empty, unless specifically stated in the detail specification to be mission load or special equipment.

6.4.1.5 FIELD INSTALLATION. - Equipment listed in the target detail specification for installation by the Government in the field will not require target modification when complete "Provision for" is required by the specification. Special field installation kits may require alteration of wiring, drilling, riveting and cutting. The detail specification shall stipulate requirements for field installation of special equipment if complete "Provision for" has not been provided.

6.4.2 SHALL BE PROVIDED. - The expression "shall be provided''- means that the item or equipment is to be furnished and installed by the contractor.

6.4.3 SHALL BE INSTALLED. - The expression “shall be installed” means that the item or equipment is to be furnished by the Government and installed by the contractor.

6.4.4 NOT INCLUDED IN NORMAL WEIGHT. - The expression “not included in normal weight" means that the items or equipment are not intended for installation on missions for which the target is designed. The weight of such. items or equipment is not included in weight empty, mission load or special equipment, and hence does not influence the basic structural or aerodynamic design of the target. However, supports for such items or equipment shall possess strength consistent with the special conditions under which the item or equipment will be carried.

6.4.5 UNUSABLE FUEL. - "Unsable fuel" is defined as the total fuel that is unavailable to the engine under the conditions specified in Specification MIL-F-17874 for normal flight and landing conditions and includes “trapped fuel".

6.4.6 UNUSABLE OIL. - "Unusable oil” is defined as the total oil that is unavailable to the engine and other auxiliaries serviced by the engine oil tanks under the conditions specified in 3.11.9.1.1 and includes “trapped oil".

6.4.7 NON-STRUCTURAL. - Non-structural parts or components are those which are not depended upon and not considered by stress analysis to carry structural loads.

7. INDEX

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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*.

SPECIFICATION

MIL-T-18232B(AS) TARGETS, AERIAL, POWERED, DESIGN AND CONSTRUCTION OF GEN SPEC FOR

ORGANIZATION *(Of submitter)*	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*	DATE

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