

AA-F-357F  
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~~SUPERSEDING~~  
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FEDERAL SPECIFICATION

FILING CABINET, STEEL, LEGAL AND LETTER  
 SIZE, INSULATED, SECURITY

This specification was approved by the Commissioner, Federal Supply Service,  
 General Services Administration, for use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers insulated filing cabinets which are designed to meet the filing and storage criteria for classified material set forth in Executive Order 10501, as amended, "Safeguarding Official Information in the Interest of the Defense of the United States." The cabinets provide resistance to surreptitious and forced entry attacks for the period of time specified hereunder and they will protect the stored material against damage by fire for one hour.

1.2 Classification.

1.2.1 Classes and sizes. The cabinets shall be of the following classes and sizes, as specified (see 6.2).

Class 1 - Resistant to 30 man-minutes surreptitious and 10 man-minutes forced entry.

Sizes

- I - 2-drawer, legal size.
- II - 4-drawer, letter size.
- III - 4-drawer, legal size.
- IV - 2-drawer, letter size.
- V - 2-drawer, special purpose (see 3.4.3).

Class 2 - Resistant to 20 man-minutes surreptitious and 5 man-minutes forced entry.

Sizes

- I - 2-drawer, legal size.
- II - 4-drawer, letter size.
- III - 4-drawer, legal size.
- IV - 2-drawer, letter size.
- V - 2-drawer, special purpose (see 3.4.3).

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issues in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Specifications:

- QQ-C-320 - Chromium Plating (Electrodeposited).
- QQ-P-416 - Plating, Cadmium (Electrodeposited).
- QQ-Z-325 - Zinc Coating, Electrodeposited, Requirements for.
- TT-C-490 - Cleaning Methods and Pretreatment of Ferrous Surfaces for Organic Coatings.
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-591 - Boxes, Fiberboard, Wood-Cleated.
- PPP-B-601 - Boxes, Wood, Cleated-Flywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple Wall.
- PPP-B-1055 - Barrier Material, Waterproofed, Flexible.
- PPP-C-650 - Crates, Wood, Open and Covered.
- PPP-T-42 - Tape: Pressure-Sensitive Adhesive, (General Packaging Application).

Federal Standards:

- Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).
- Fed. Std. No. 595 - Colors.

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(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

(Single copies of this specification and other Federal specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Washington.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from the established distribution points in their agencies.)

Military Specifications:

MIL-L-10547 - Liners, Case and Sheet Overwrap, Water-Vapor-proof or Waterproof, Flexible.

Military Standards:

MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards required by contractors in connection with specification procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

Underwriters' Laboratories, Inc. (UL) Publication:

Subject No. 768 - Standards for Combination Locks.

Subject No. 72 - Standards for Fire Resistance Classification of Record Protection Equipment.

(Application for copies should be addressed to Underwriters' Laboratories, Inc. 207 East Ohio Street, Chicago, Illinois 60611.)

3. REQUIREMENTS

3.1 Qualification. The security filing cabinets furnished under this specification shall be products which have been tested, and have passed the qualification tests and inspection specified in section 4, and have been listed on or approved for listing on the applicable qualified products list (QPL).

3.1.1 Qualification suspension.

3.1.1.1 Development of entry techniques. The cabinets qualified under this specification will be continually tested by the Government during the term of qualification to determine whether the surreptitious or forced entry protection afforded by the cabinets should or can be improved. If, at any time, entry techniques are developed within the framework of the specification which affect a cabinet's security integrity, it shall be removed from the QPL and the manufacturer will be required to modify the product to the extent necessary to defeat the techniques and have the cabinet requalified.

3.1.1.2 Change in specification requirements. This specification will be continually reviewed by the Government to determine whether specification requirements should or can be changed to improve product quality. If, at any time, requirements are changed, and such changes affect the qualification status of a qualified cabinet, it shall be removed from the QPL and the manufacturer will be required to modify the product to the extent to comply with specification changes and have the cabinet requalified.

3.2 Material. Material used in the cabinet's construction shall be as specified herein. Material not definitely specified shall be of good commercial quality, suitable in all respects for the purpose intended.

3.2.1 Steel. Steel used in the cabinet shall be of a type, thickness, and strength to meet all applicable requirements of this specification. Steel shall be free from rust, scale, pits, buckles, and other imperfections which might adversely affect the appearance or the serviceability of the finished product.

3.2.2 Insulating material. The cabinet insulation shall be such as to prevent free water which would cause damage to the cabinet's contents or its mechanical parts, sweating, swelling, or shrinkage of insulation, appreciable loss of insulation, appreciable loss of insulating value with age, or disruption from explosion of gases generated within the cabinet when exposed to fire. When wet-type insulation is used, the residual free moisture content of the wet-type insulation shall be controlled to the extent necessary to preclude subsequent damage to any part of the cabinet or its contents. The supplier shall certify in writing to the qualification activity as to the maximum percentage of free moisture that may be found in the insulation of the cabinets he proposes to furnish, and when wet-type insulation is used, each drawer of the cabinet shall be provided with a sufficient amount of silica gel to absorb the free moisture. Printed instructions for replacement or reactivation of the absorbent shall also be furnished.

3.2.3 Face hardware. The face hardware, excluding combination locks, shall be satin finished anodized aluminum or type 430 corrosion-resistant steel, or satin finished chromium on steel or on die-cast zinc, brass, or bronze. The exposed surfaces of all hardware used on a single unit shall be finished to match each other within the limits of the base material and protective coating used. The exposed surfaces of all face hardware shall be free of sharp edges, burrs, pits, nicks, or scratches that penetrate the protective plating or anodizing.

#### 3.2.4 Finishing materials.

3.2.4.1 Enamel and lacquer. The final coat for the cabinet shall be either an enamel of the baking type, or it may be an air-dry, textured finish, nitrocellulose lacquer. The quality of the final coat and its application shall be in accordance with good commercial standards and practices. The color shall be as specified in 3.2.5.

3.2.4.2 Chromium plating. Chromium plating shall be in accordance with class I, type II, of QQ-C-320.

3.2.4.3 Cadmium plating. Cadmium plating shall be in accordance with class I, type I, of QQ-P 416.

3.2.4.4 Zinc coating. Zinc coating shall be in accordance with type I, class 2, of QQ-Z-325.

3.2.5 Color of finish. The color of finish shall be gray, color No. 26134, of Fed. Std. No. 595. (Sample panels of the standard color are obtainable, without charge, from the Business Service Center, Federal Supply Service, General Services Administration, Washington, D. C. 20407, or from the Business Service Center of the nearest Regional Office.)

#### 3.3 Construction and design.

3.3.1 Design. Filing cabinets shall be 1 drawer wide and shall have the same general appearance as the standard, vertical, Government type filing cabinets.

3.3.2 Fire insulation, impact, and explosion hazard protection. The insulation and design of the cabinet shall provide protection from fire, impact, and explosion hazard as required for class C, insulated record containers in UL Publication No. 72. The manufacturer shall submit with his qualification test sample cabinets either one of the certifications specified in 3.3.2.1 to establish compliance with this requirement.

3.3.2.1 Certification. UL's class C, insulated record container certification, or the manufacturer's documented proof, satisfactory to the agency responsible for the qualification of the product, will be accepted as evidence of compliance with 3.3.2. Certifications, however, do not relieve the manufacturer from responsibility for complete compliance with prescribed requirements of this specification.

3.3.3 Dimensions. The cabinet, exclusive of face hardware and caster base platform, shall be of the maximum and minimum dimensions specified in table I. The minimum depth dimension specified in table I for the lock drawer may be decreased 1/2-inch if necessary to provide security protection against entry techniques.

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TABLE I. Dimensions (all dimensions are in inches)

Size	Maximum outside - overall (excluding face hardware)			Minimum inside drawer - clear (not including follower block)			
	Height	Width	Depth	Height	Width	Depth	
						Drawer without lock	Drawer with lock
Class 1 - 30 man-minutes surreptitious entry 10 man-minutes forced entry							
I - 2 dr. legal	30-5/8	23-1/4	33-1/2	10-1/4	15-1/8	23-1/2	21-1/2
II - 4 dr. letter	58-3/4	20-1/4	33-1/2	10-1/4	12-1/8	23-1/2	21-1/2
III - 4 dr. legal	58-3/4	23-1/4	33-1/2	10-1/4	15-1/8	23-1/2	21-1/2
IV - 2 dr. letter	30-5/8	20-1/4	33-1/2	10-1/4	12-1/8	23-1/2	21-1/2
V - 2 dr. special purpose	30-5/8	23-1/4	33-1/2	10-1/4	15-1/8	23-1/2	21-1/2
Class 2 - 20 man-minutes surreptitious entry 5 man-minutes forced entry							
I - 2 dr. legal	30-5/8	23-1/4	33-1/2	10-1/4	15-1/8	25-1/2	23-1/2
II - 4 dr. letter	58-3/4	20-1/4	33-1/2	10-1/4	12-1/8	25-1/2	23-1/2
III - 4 dr. legal	58-3/4	23-1/4	33-1/2	10-1/4	15-1/8	25-1/2	23-1/2
IV - 2 dr. letter	30-5/8	20-1/4	33-1/2	10-1/4	12-1/8	25-1/2	23-1/2
V - 2 dr. special purpose	30-5/8	23-1/4	33-1/2	10-1/4	15-1/8	25-1/2	23-1/2

3.3.4 Weight. The net weight of the cabinet, complete with drawers, shall not exceed the pounds per square-foot of base area specified in table II. The cabinet base area shall be the same dimension as the cabinet top. The weight shall be permanently marked on the cabinet base or on the left or right front upright near the cabinet base. The characters shall be not less than 1/2-inch in height and shall be visible from the front of the cabinet.

TABLE II. Weights

Class	Size	Pounds per sq. Foot of base area
1	I - 2 dr. legal	250
1	II - 4 dr. letter	250
1	III - 4 dr. legal	250
1	IV - 2 dr. letter	250
1	V - 2 dr. special purpose	250
2	I - 2 dr. legal	150
2	II - 4 dr. letter	250
2	III - 4 dr. legal	250
2	IV - 2 dr. letter	150
2	V - 2 dr. special purpose	150

3.3.5 Assembly. The cabinet top, bottom, sides, back, and case frame members shall be assembled into a rigid unit. Mechanical attachments shall be firmly secured by methods to withstand loosening during the service-life of the cabinet. All welding and brazing shall be sound without porosity and shall accomplish secure connections and joints in proper alignment. All depressed or protruding welds on the cabinets exterior shall be filled and sanded or ground smooth. Interior welds shall be finished to eliminate sharp edges and rough surfaces which might cause personal injury. The cabinet shall withstand the rack test in 4.4.8.1 without sagging or binding of parts or other damage to cause interference with the smooth, easy operation of drawers, suspensions, followers, lock mechanism, and other movable parts.

3.3.6 Cabinet bottom. The cabinet bottom shall be fabricated in such a manner to accommodate the attachment of casters by means of self-tapping screws, metal screws, or machine screws. The provisions for the attachment of casters shall not weaken the security protection of the cabinet.

### 3.3.7 Drawers.

3.3.7.1 Components. Each cabinet drawer shall have drawer stops specified in 3.3.7.4, a drawer pull or handle specified in 3.3.7.5, a drawer latch with release mechanism specified in 3.3.7.6, a label holder specified in 3.3.7.7 and a follower block specified in 3.3.8. Drawer guide rods are not permitted.

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**3.3.7.2 Design.** The drawer design shall be such that when the drawer is pulled open, the file material stored therein shall be directly and immediately accessible to the user without requiring further movement or operation of any cabinet part or component. The drawer shall be properly aligned in the drawer opening and shall fit squarely equidistances on all sides. The drawer when loaded with approximately 80 pounds of typical filing material, shall travel easily, quietly, and smoothly on its suspension, and at no point in the open position shall there be contact between the drawer's top or bottom surfaces and the top or bottom surfaces of any other open drawer. The drawer shall be removable from the cabinet for service purposes. The force to move the drawer inward and outward on its suspension shall not exceed 10 pounds when tested as specified in 4.4.8.3.

**3.3.7.3 Construction.** The drawer body shall be formed from a single sheet of the steel specified in 3.2.1. Steel thickness for back and sides shall be not less than 20 gage (0.0359-inch). The drawer back, front, and sides shall be attached to the drawer body by suitable and effective methods. The drawer head of the lock control drawer shall be removable for service purposes. The height of the drawer back shall be not less than the drawer sides. The upper edge of the drawer shall be formed in a flat fold, side bead, or ground and sanded. The inside corners of the drawer front shall be neatly closed and formed in such a manner as to present no external sharp corners or rough edges.

**3.3.7.4 Stops.** The drawer stops shall be a heavy duty type which shall prevent the drawer from hitting the back of the cabinet on the inward movement and shall prevent the drawer from falling out of the cabinet when pulled to the fully opened position. The drawer back shall be not more than 4 inches within the front face of the cabinet when the drawer is fully open and resting against the front stop.

**3.3.7.5 Drawer pull or handle.** The drawer pull or drawer handle shall be of one of the materials in 3.2.3 and of sufficient thickness and strength to withstand hard daily usage. Stamped drawer pulls are not permitted. The pull shall be securely and firmly staked to the drawer head by a method to prevent its accidental loosening during the service life of the cabinet. The lock control handle on the lock drawer may serve as the drawer pull. The drawer latch release mechanism in 3.3.7.6 may be integral with the drawer pull or handle. The drawer pull handhold and the handhold for the drawer handle shall not be less than 1 by 3 inches. The pull or handle shall easily accommodate the user's hand and shall be finished to eliminate roughness and sharp edges.

**3.3.7.6 Drawer latch and latch release control.** Each drawer, including the lock drawer shall have an automatic latch which shall be activated when the drawer is moved to the closed position. The latch for the lock drawer may be integral with the locking bolt mechanism. The latch shall hold the unlocked drawer in the closed position; and unless the latch release control is operated, it shall not be possible to open the drawer by shaking, jerking, or moving the closed drawer up and down, back and forth, or from side to side. The latch mechanism design and materials used in its construction shall be of sufficient strength to withstand hard usage. The latch release may be integral with the drawer handle or it may be a finger controlled button or lever located on the drawer front adjacent to the drawer handle or pull so that easy one-hand operation is possible to simultaneously release the latch and pull the drawer open. The latch and latch release shall operate easily and smoothly.

**3.3.7.7 Label holder.** The label holder may be sand cast, die cast, or stamped and formed. All surfaces shall be free from roughness and sharp edges. Stamped and formed label holders shall be 20 gage (0.0359-inch) steel or 0.040-inch thick aluminum. The label holder shall readily accommodate and retain without binding label cards not less than 2-3/4 by 1-3/4 inches. The label holder shall be securely and firmly attached to the drawer front and any required mounting slots in the drawer front shall not be visible after the label holder is installed.

**3.3.8 Movable follower block.** The thickness of the steel used for the follower block shall be not less than 20 gage (0.0359-inch). The follower block shall be as specified in 3.3.8.1 or 3.3.8.2. Its upper edge shall have a completely closed formation and all other exposed surfaces shall be finished in a manner which completely eliminates roughness. The follower block shall be easy to adjust and removable.

**3.3.8.1 Friction locking type.** The friction locking type follower block shall be held in place by means of pressure exerted against the drawer sides and shall be held securely in a right angle position to the drawer sides at any point along the drawer depth except for a maximum of 5 inches at the front of the drawer. The follower block shall be spring controlled and activated at one point near the upper edge of the follower by a device designed for this purpose. The follower block shall withstand the test specified in 4.4.8.5 without damage or creeping in excess of 1/2-inch.

**3.3.8.2 Positive locking type.** The positive locking type follower block shall be held in place by engaging slots along the drawer sides or bottom and shall be held securely in a right angle position to the drawer sides at no greater than 1 inch increments except for a maximum of 5 inches at the front of the drawer. The locking method shall be such as to prevent disengaging by pressure of filing material in the drawer. When the locking method does not incorporate spring action, the locking shall be accomplished solely by the weight of the follower block. Positive locking followers shall withstand the test in 4.4.8.5 without damage or disengagement from the secure right angle position to the drawer sides.

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3.3.8.3 Follower block support. The follower block support shall be constructed of not less than 11 gage (0.1196 inches) steel and shall be made corrosion resistant by zinc or cadmium plating as specified in 3.2.4.3 and 3.2.4.4. The support shall be held securely and shall move freely within the formation provided in the drawer side. The support arm extending along the drawer side shall be not more than 5 inches or less than 4-1/2 inches in length.

3.3.9 Drawer suspensions. Drawer suspensions shall be either a progressive, side-arm type or a progressive, cradle type. The steel used in the neutral and tie members shall not be less than 16 gage (0.0598-inch) thickness. All welds necessary in the assembly of the suspensions shall provide strong, secure joints and connections. Except for areas burned during welding processes, all surfaces of suspension members shall be cadmium or zinc plated as specified in 3.2.4.3 and 3.2.4.4. Alternatively, a black oxide coating may be used provided that the entire member is then coated with a clear organic finish which dries to a hard film. Suspensions shall be equipped with bumpers of a shock absorbing material and located so as to prevent metal to metal contact between the rear of the suspension and drawer track and the back of the cabinet case. Suspension slides shall travel easily, quietly, and smoothly with the drawer. Rollers and ball bearings for suspensions and drawers shall be as specified in 3.3.9.1. Suspensions shall withstand the test in 4.4.8.2.

3.3.9.1 Rollers and ball bearings. Free rolling rollers, balls, or fixed journal rollers of the ball bearing or floating type shall be used to support the suspension and drawers. There shall be at least three main bearing rollers in each side arm slide that shall not be less than 7/8-inch diameter and not less than 1/4-inch thick and slightly chamfered at both edges. Rollers shall be accurately turned from cold-rolled steel and shall be case hardened. When used, the housing or retainer for the free rolling rollers shall be of cold-rolled steel not less than 16 gage (0.0598-inch). When journal rollers are used, each suspension shall have at least six of the ball bearing type and two of the stud bearing type. When free rollers or balls are used, there shall be not less than ten to a suspension. Balls shall be not less than 3/8-inch diameter, hardened and polished, and so retained in concave races to prevent dislocation or removal unless the suspension is dismantled.

3.3.9.2 Drawer and case tracks. The drawer and case tracks shall be hot or cold-rolled steel not less than 14 gage (0.0747-inch) thick. After forming to shape, the drawer and case tracks shall have a Rockwell hardness of not less than 70 nor more than 85 on the "B" scale, or equivalent hardness on a comparable scale. All outer surfaces of the drawer and case tracks shall be finished in accordance with 3.2.4 and 3.5. Case tracks shall be secured to at least the front and rear interior reinforcing members by interlocking of lugs on the case track into appropriate openings in the reinforcing members. The interlocking shall provide secure connections without vertical or horizontal movement. Alternatively, the case track may be attached to the front and rear interior reinforcing members by interlocking lugs, bolts, or welding, or any combination thereof to provide a comparable connection. The drawer tracks shall be attached to the drawer sides by spot welds. The drawer and case tracks shall be so located as to be level and in proper relation to one another and must hold the drawer squarely in the drawer opening.

#### 3.4 Locking mechanism and lock.

3.4.1 Lock mechanism. All drawers of the cabinet shall be locked with a positive dead-bolt locking mechanism which is controlled by a changeable, combination lock specified in 3.4.2. Under the conditions specified in 4.4.8.6, it shall not be possible to secure the lock (control) drawer when any other drawer is open 12 inches or lesser distances from the fully closed position.

3.4.2 Changeable combination lock. A changeable combination lock of the type specified herein shall be installed as an integral part of the cabinet. The lock shall be of top-reading design with its dial and ring protected by a standard, snap-on dust cover. At the option of the purchaser, the lock shall be a hand-change or a key-change type (see 6.2). The lock shall resist manipulation and special techniques (see 6.4.4 and 6.6) for not less than 20 man-hours and shall be afforded protection against radiological attack (see 4.4.8.8) for not less than 20 man-hours. The lock shall meet group 1 or group 1R requirements of UL Publication No. 768. The UL's group 1 or group 1R lock label shall be affixed to the lock and will be accepted as evidence of compliance with the UL standard (see 3.4.5). The size V cabinets shall be equipped with two combinations locks specified herein. The cabinet's design shall incorporate a method for inspecting and servicing the lock and its cam assembly without completely removing the drawer head. The method used may be an inspection plate in the drawerhead installed in a manner so as not to affect the security integrity of the cabinets.

3.4.2.1 Combination lock installation. The lock's dial ring shall be mounted so as to be flush with the front surface of the drawer front, and its attachment to the drawer front shall be firm and secure without movement or side play. The lock case shall be securely attached to the lock drawer head with screws. Screws shall be retained by lock washers or other suitable and effective means so that there is no movement or side play to the lock case. The lock's spline key shall not be

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defaced in any manner and shall be inserted to within 1/32-inch of the top of the lock drive cam. The lock's rotor spindle shall be threaded to not more than 4 threads from the top of the lock drive cam. The formation of the drive cam operating spring shall not be changed or altered in any manner from the formation supplied by the lock manufacturer. Neither the lock bolt nor the drop lever shall be filed, abraded, or otherwise deformed from the formation supplied by the lock manufacturer. Metal plates, housing, or other barriers used around the lock case shall be installed in a manner so as not to abrade or otherwise damage the lock spindle. No lubricant other than that applied by the lock manufacturer shall be used within the lock case.

3.4.3 Combination locks for size V, special purpose cabinets. The size V, two-drawer, special purpose cabinets in both classes shall be equipped with two separate built-in, changeable combination locks. Both of the combination locks shall be mounted in the same drawer of the cabinet. Together the two combination locks shall control the locking of the entire container. It shall not be possible to unlock either one, or both of the drawers without dialing the correct combination settings of both locks. The locks and locking mechanism shall meet the requirements of 3.4.1 and 3.4.2.

3.4.4 Locking mechanism and lock mounting drawings. Complete, exploded-view drawings of the locking mechanism and the lock mounting, with individual parts indexed, shall be furnished by the manufacturer upon the specific request of the purchaser.

3.4.5 Government testing. The Government testing facility for the General Services Administration reserves the right of testing the combination lock in accordance with standards that are privileged to the Government. The UL's testing of the lock shall not constitute final approval.

### 3.5 Pretreatment and finish.

3.5.1 Pretreatment. All exterior and interior ferrous metal surfaces shall be treated for painting in accordance with any of the types in TT-C-490.

3.5.2 Finish. The finish coating specified in 3.2.4.1 shall be applied to all exterior and interior metal surfaces except plated metal. The minimum total finished film thickness of the final coat shall be not less than 1.0 mil. The finish shall level out to produce uniform exposed surfaces without runs, wrinkles, grit, areas of thin film or no film, or separation of color. Special attention shall be given to the base and interior to insure that all surfaces are adequately protected against rust. The final finish shall withstand the test in 4.4.8.9 without evidence of cracking, flaking, or loss of adhesion of the finish. Two test panels of 20 gage (0.0359-inch) size shall be furnished with the cabinet for the purpose of the test in 4.4.8.9. One panel shall be prepared to reflect the inner coating and one to reflect the outer coating used.

3.5.3 Plating. Bolts, screws, nuts, and similar accessories shall be made to resist rust by electrogalvanizing or by zinc, cadmium, or chromium plating. Plating shall be in accordance with 3.2.4.

3.6 Lubrication. The cabinet's moving parts requiring lubrication shall have a permanent type lubricant applied which is suitable to the varied climatic conditions likely to be encountered during the service of the product.

### 3.7 Resistance to entry techniques.

3.7.1 Surreptitious and forced entry techniques. The cabinet shall withstand the tests in 4.4.8.7 for not less than the periods of time specified hereunder.

Class 1 - cabinets - 30 man-minutes surreptitious entry and 10 man-minutes forced entry.  
Class 2 - cabinets - 20 man-minutes surreptitious entry and 5 man-minutes forced entry.

3.7.2 Radiological techniques. The cabinet and its locking mechanism shall withstand the test in 4.4.8.8 for not less than 20 man-hours.

3.8 Caster base platform. When specified (see 6.2), a caster base shall be furnished. The casters shall be attached to the four corners of a dolly platform without mechanical attachment to the cabinet. The dolly platform shall be of the same dimensions as the cabinet base. Caster and dolly shall be manufactured of malleable steel and shall have sufficient strength to transport safely loads equal to 2-1/2 times the weight of the cabinet. Minimum width of casters for each of the four corners of the dolly shall be 1-1/2 inches. If dual casters are used, each caster wheel shall be a minimum of 3/4 inch wide.

3.9 Cabinet labels. Each cabinet supplied under a contract or orders shall bear metallic labels showing the information specified hereunder.

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3.9.1 General Services Administration label. This label shall be affixed to the outside face of the top drawer and shall show in lettering not less than 1/8-inch in height, the following:

GENERAL SERVICES ADMINISTRATION  
APPROVED SECURITY CONTAINER  
MANUFACTURER'S NAME

3.9.2 Identification label. An identification label shall be affixed to the external side of the drawer containing the lock and shall show the cabinet's model and serial number, year of manufacture, and Government contract number.

3.9.3 Certification label. A certification label shall be affixed to the external side of the drawer containing the lock and shall bear the following certification:

For the class 1 cabinet -

"This is a U. S. Government class 1 cabinet which has been approved by GSA under Fed. Spec. AA-F-357F, and it affords the following protection:

30 man-minutes against surreptitious entry.  
10 man-minutes against forced entry.  
20 man-hours against lock manipulation.  
20 man-hours against radiological techniques.  
1 hour against fire damage to contents."

For the class 2 cabinet -

"This is a U. S. Government class 2 cabinet which has been approved by GSA under Fed. Spec. AA-F-357F, and it affords the following protection:

20 man-minutes against surreptitious entry.  
5 man-minutes against forced entry.  
20 man-hours against lock manipulation.  
20 man-hours against radiological techniques.  
1 hour against fire damage to contents."

3.10 Workmanship. The workmanship shall be of a quality to produce a serviceable and neat item of office furniture able to withstand hard daily usage. The edges of all parts and sheets shall be protected by folding, beading, flanging, or grinding to eliminate burrs or sharp edges. The bending of the channels and flanges shall be straight and smooth. Welding and brazing shall be secure. Lock-washers, cotter pins, clips, retainers, or built-in features shall be used to prevent loosening of screws, bolts, and nuts which may cause disengagement of parts. To assure strict compliance with 3.4.2.1, particular attention shall be given to the quality of workmanship and the method used in the installation of the combination lock in the cabinet. Moving parts shall operate smoothly. The filing cabinet shall be free of any defects or features which may affect its appearance and its serviceability or which might cause personal injury.

3.11 Replacement of component parts. Components parts, such as drawers, suspensions, combination locks, and external face hardware shall be capable of identical replacement in the field without the use of specialized tools or specially qualified personnel and without weakening the security protection of the cabinet. Spare parts for the manufacturer's current production shall be immediately available upon the written request from the user.

3.12 Spare parts list. A spare parts list of all cabinet parts which may be subject to subsequent replacement because of wear or because of accidental damage shall be furnished with each cabinet delivered under contract. The parts list shall clearly identify the parts by description and parts' numbers. The list shall be printed on heavy paper or other suitable material and bonded by glue or adhesive to an inside surface of the cabinet in a location accessible to maintenance personnel.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection responsibility. Except that testing for qualification shall be performed by an agency designated by General Services Administration, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facility or service acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as



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specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to the prescribed requirements.

4.1.1 Component and material inspection. In accordance with 4.1, the supplier is responsible for insuring that components and materials used are manufactured, tested, and inspected in accordance with the requirements of referenced specifications and standards to the extent specified, or, if none, in accordance with this specification.

#### 4.2 Inspection and testing for acceptance.

4.2.1 Inspection. Cabinets delivered for acceptance under contract or order shall be inspected as specified in 4.4.9. Any defect shall provide reason to reject the product. Rejected cabinets may be reworked to correct defects and they may be resubmitted for acceptance. Reworked cabinets shall be so indicated to the Government inspector.

4.2.2 Testing. Periodically, during the term of contract, the Government inspector, at a time convenient to the Government, will select samples of the manufacturer's regular production and subject them to the tests in 4.4.8. This acceptance testing shall be performed by a Government agency specifically designated by the General Services Administration. Failure of the cabinet to meet any one or more of these tests shall provide reason to suspend acceptance of the manufacturer's product until the Government inspector is satisfied that all defects have been corrected.

4.3 Inspection of preparation for delivery. An inspection shall be made to determine that the packaging, packing and marking comply with those specified in section 5 of this specification. Defects shall be scored in accordance with table III of this specification. For examination of interior packaging, the sample unit shall be one shipping container fully prepared for delivery, selected at random just prior to the closing operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

TABLE III. Classification of preparation for delivery defects

Markings	Omitted; incorrect; illegible; improper size; location, sequence or method of application.
Materials	Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling, components not properly secured within container or distortion of container.
Contents	Net weight exceeds requirements.

#### 4.4 Testing procedures and tests.

4.4.1 Testing agency. Qualification tests accomplished on products submitted under this specification for approval for inclusion on the applicable Qualified Products List (QPL) and any retesting that may be required shall be performed by a testing agency specifically designated by the General Services Administration.

4.4.2 Testing costs. All testing costs entailed in determining the qualification of the supplier's product, including costs of retesting of a qualified product if subsequently disqualified under 3.1.1.1 or 3.1.1.2, shall be borne by the supplier, and shall be payable to the General Services Administration as directed by Standardization Division, Federal Supply Service.

4.4.3 Test procedures. The following procedures shall govern the testing of all products submitted for qualification under this specification.

- (a) Samples shall be submitted for qualification only after the supplier has obtained written authorization from the General Services Administration.
- (b) A qualification test may be discontinued at the Government's testing facility at any time the product fails to meet any one or more of the requirements set forth in this specification. The manufacturer may be permitted to make modifications on the sample during the testing phase where such modifications, in the judgment of the General Services Administration and the testing facility, are clearly in the interest of the Government.

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- (c) In case of failure of the sample, consideration will be given to the request of the manufacturer for resubmission for retest only after it has been clearly shown that changes have been made in the product which the Government considers sufficient to warrant retest.
- (d) The manufacturer or his representative will not be permitted to observe the actual tamper resistance tests conducted on his product at the testing facility. However, when samples tested fail to comply with the requirements of this specification, the sample may be examined by the manufacturer or his representatives and full details of the failure may be made known to them in a manner which, for reasons of security, will be in the best interest of the Government.

4.4.4 Test samples. Two test samples of the class and size cabinets for which qualification is desired shall be forwarded at a time and to a place designated by the General Services Administration. In the event the samples are destroyed or damaged to such an extent during the testing that testing cannot be completed, the Government reserves the right to require the manufacturer to furnish additional samples necessary to complete the testing. Samples delivered for qualification testing shall have a tag attached which shall reference this specification by symbol and shall identify the sample by its class and size.

4.4.5 Drawings and lists of materials. The manufacturer shall furnish two complete sets of construction and assembly drawings and lists of materials with samples submitted for qualification. When the samples are tested and are approved for inclusion on the applicable QPL, the manufacturer shall furnish three additional sets of the drawings and list of materials for the Government's approval and use in inspections of products offered under contract. All material so furnished by the manufacturer will be held in proprietary confidence.

4.4.5.1 Changes in construction or drawings. Once a product under this specification has been tested and approved for QPL, no subsequent change of any kind shall be made in its construction or in the construction drawings unless prior written authorization to make a change is obtained by the manufacturer from the Federal Supply Service, General Services Administration.

4.4.6 Qualification testing and inspection. Qualification testing and inspection shall consist of the following tests and inspections. Failure to meet any one or more of these requirements shall provide reason to consider the product as having failed to meet requirements for qualification.

- (a) Rack test - 4.4.8.1
- (b) Suspension test - 4.4.8.2
- (c) Drawer pull test - 4.4.8.3
- (d) Moving test - 4.4.8.4
- (e) Follower Block test - 4.4.8.5
- (f) Lock drawer test - 4.4.8.6
- (g) Surreptitious and forced entry test - 4.4.8.7
- (h) Radiological test - 4.4.8.8
- (i) Inspections - 4.4.9

4.4.7 Inspection and tests after award of contract. The Government reserves the right to inspect and test each cabinet, including all component parts thereof, delivered for acceptance under this specification after award of contract.

#### 4.4.8 Test methods.

4.4.8.1 Rack test. The cabinet shall be placed in a level position. Each drawer of the cabinet shall be loaded with 60 pounds of typical filing material for letter size and with 80 pounds of similar material for legal size, which shall be equally distributed from front to back of cabinet drawers. Examinations shall be made to determine the ease of operation of the drawers, the lock and locking mechanism, the latches, and other moveable parts, under conditions of loaded level uniform support. The drawer pull test as specified in 4.4.8.3 shall be conducted at this time. The drawer operating force shall not exceed 10 pounds. The loaded cabinet shall then be raised not less than one inch to a position of being supported at two diagonally opposite corners. The area of support shall be not greater than 6 inches from each corner. Two hundred and fifty pounds of additional weight shall be still-loaded on the top of each of the two unsupported corners. The loaded cabinet shall remain in this position for a minimum of 24 hours. The cabinet shall be returned to a level position and shall be re-examined to determine the ease of operation of the drawers, the lock and locking mechanism, the latches, and other moveable parts. The drawer pull test shall again be conducted. The cabinet shall be considered to have failed the test if the drawer operating force exceed 10 pounds. Additionally, any resulting damage to any design feature incorporated in the cabinet to provide security shall be considered as failure to meet the test.

4.4.8.2 Suspension test. In accordance with 3.3.9 the cabinet drawer suspensions shall be tested. The cabinet shall be bolted or otherwise secured in its normal upright position. The cabinet drawer selected for the test shall be loaded as specified in 4.4.8.1. The loaded drawer shall be connected by its drawer pull to a machine which shall operate the drawer. The machine shall have a positive means (no springs) for adjusting its stroke so that the suspension will travel the full distance (not more than 1/4 inch clearance at each end of the stroke) from front to back stop. The machine shall drive the suspension at a rate of 20 cycles per minute,  $\pm 2$  cycles. The machine shall in no way contribute to the support of the suspension. The suspension shall be cleaned and lubricated with a lubricant of the type used by the manufacturer at the end of 10,000 cycles and shall have no further attention until the test is completed. At the beginning of the test and at each increment of 10,000 cycles, a test shall be conducted to determine the force required to start the suspension forward and move it to its full outward limit and the force required to start the suspension inward and move the drawer to the point to engage the latch or locking mechanism. The suspension shall have failed the test if the operating force exceeds 10 pounds before, or at 50,000 cycles when tested as specified in 4.4.8.3.

4.4.8.3 Drawer pull test. The drawer pull test shall be conducted with the drawer loaded as specified in 4.4.8.1. The force required to start the loaded drawer forward to move it to its full outward limit and the force required to start the drawer inward and move it to the point to engage the latch or locking mechanism shall not exceed 10 pounds when tested with an appropriate force gauge measuring device.

4.4.8.4 Moving test. The cabinet with all drawers loaded as specified in 4.4.8.1 and with the follower block in each drawer drawn up tight against the loaded material, shall be tipped over on its back on a furniture moving dolly. The cabinet shall remain in this position for not less than 3 hours. It shall then be returned to its normal position and examined. There shall be no damage to the cabinet or its components or displacement of the drawer's contents as a result of the test.

4.4.8.5 Follower block test. A drawer of the cabinet shall be loaded with approximately 60 pounds of typical filling material which shall be held against the front of the drawer by the follower block. The location of the follower block shall be indicated by a mark placed on the bottom of the drawer. The machine specified in 4.4.8.2 for operating the drawer shall be connected to the drawer and set in motion and made to operate 500 cycles. Upon completion of 500 cycles of operations, the position of the follower block shall again be indicated by a second mark on the bottom of the drawer. Any rearward movement of the follower block, as indicated by the distance between the two marks, shall not exceed 1/2-inch. The follower blocks shall be examined for compliance with 3.3.8.1 or 3.3.8.2, as applicable.

4.4.8.6 Lock-drawer test. For the purpose of this test, the following shall apply: The cabinet shall be unlocked and all drawers opened. The non-lock drawers shall be positioned so as to be open 12 inches and lesser distances from the fully closed positions (measured from the front face of the cabinet case to the front face of the drawers). Testing shall be made by one of the following methods, as appropriate:

- (1) Cabinets with the locking mechanism designed to permit the lock-drawer to be closed but prevents it from being secured (locked) until all other drawers are fully closed, shall have a torque not to exceed 10-foot-pounds applied to the lock-drawer control handle of the closed lock-drawer in attempt to activate the locking mechanism and secure the lock drawer and leave any drawer unsecured. In the event it is possible to secure the lock-drawer and leave any drawer unlocked, the cabinet shall have failed to withstand the test.
- (2) Cabinets with the locking mechanism designed to hold the lock-drawer open until all other drawers are fully closed shall have a force not to exceed 20 static-pounds applied against the front face of the lock-drawer in attempt to override the locking mechanism and close and secure the lock-drawer and leave any drawer unlocked. If this is possible, the cabinet shall have failed the test.

4.4.8.7 Surreptitious and forced entry tests. There shall be sufficient time and opportunity to study the design and construction of the cabinet and to develop testing methods prior to the start of the testing. There shall be no limit on the number of methods of surreptitious and forced entry attempted. Not more than two men shall be used simultaneously during each attempt at entry. The man-minute working time shall cover the period during which a surreptitious or forced entry test on the cabinet is in progress and shall be exclusive of time required for safety first precautions and rest periods. The test tools and devices used in the test shall be limited to those powered by hand, such as, but not limited to, cutters, hammers, sledges, wedges, chisels, levers and prybars, saws, and drills. Tools and devices shall be capable of being carried in a case not exceeding 1.5 cubic feet in volume and nine inches in thickness, and which do not exceed a total weight of 25 pounds, exclusive of weight of case. Neither explosives nor the application of heat such as from a blow torch or electric arc shall be used. The test tools and devices selected for a test shall be weighed and packed in the carrying case specified prior to commencement of the test. The time clock shall be started when the test equipment carrying case is opened and shall not be stopped during a test, except as specified above. Any change or repair of tools taken from the carrying case during a test shall only be done while the clock is running. Any surreptitious or forced entry into the cabinet under the above conditions within the time specified for the cabinet's class, shall provide reason to consider the cabinet as having failed to meet test requirements.

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4.4.8.8 Entry by Radiological techniques. The cabinet shall successfully meet the following test to demonstrate resistance to entry by radiological techniques. For example, the cabinet structure shall be radiographed, and the resulting radiographs shall not permit determination of the lock combination to the extent that entry is made into the cabinet in less than the time specified. Radioactive isotopes such as Cobalt 60 will be used in the test. Any effective radiation shielding provided in the cabinet will be included in the test. The test is intended to simulate attempted entry within the specification limits of time and equipment, utilizing practicable and feasible procedures and equipment available to Government testing agencies performing the tests. Any entry made under the preceding conditions within 20-man-hours shall provide reason to consider the cabinet as having failed to meet requirements of the test.

4.4.8.9 Finish test. The steel panel prepared as specified in 3.5.2 shall, at room temperature, be bent around a 1/4-inch rod to an angle of 180 degrees and then examined for compliance with 3.5.2.

4.4.9 Inspection. A visual inspection shall be made of the product to determine compliance with requirements specified in the following paragraphs:

- 3.2 - Material.
- 3.2.4.1 - Finish materials.
- 3.3.3 - Dimensions.
- 3.3.4 - Weight.
- 3.3.5 - Assembly.
- 3.3.6 - Cabinet bottom.
- 3.3.7 - Drawers, including design, construction, face hardware, stops, and latching mechanism.
- 3.3.8 - Follower block.
- 3.3.9 - Drawer suspensions.
- 3.4 - Locking mechanism and lock.
- 3.5 - Pretreatment and finish.
- 3.9 - Cabinet labels (for cabinets offered under contract).
- 3.10 - Workmanship.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A, B or C, as specified (see 6.2).

5.1.1 Levels A and B. The filing cabinets, with drawers closed, shall be protected from marring or surface abrasion by cushioning with fiberboard pads, cellulosic cushioning material or comparable fiberboard pads of sufficient width and thickness to afford maximum protection against stresses of shipment and storage. The fiberboard pads and cushioning material shall be secured in place with tape conforming to PPP-T-42.

5.1.2 Level C. The filing cabinets shall be cushioned and protected in accordance with the *manufacturers commercial practice*, provided that it insures protection for the cabinets during shipment for safe delivery at destination.

5.2 Packing. Packing shall be level A, B or C, as specified (see 6.2).

### 5.2.1 Level A.

5.2.1.1 Cabinets weighing 1,000 pounds or less. Each cabinet packaged as specified in 5.1.1, shall be packed in a close-fitting box conforming to PPP-B-585, class 3; PPP-B-591, class II; PPP-B-601, overseas type; PPP-B-621, class 2 or PPP-B-640, class 2, style A. Each shipping container shall be provided with a sealed case liner conforming to MIL-L-10547. Closure and strapping shall be in accordance with the appendix to the applicable box specification.

5.2.1.2 Cabinets weighing over 1,000 pounds. Each cabinet, packaged as specified in 5.1.1, shall be packed in a close fitting crate conforming to PPP-C-650. The cabinet shall be blocked, braced and anchored to prevent movement within the crate during transit and shall be shrouded with paper conforming to PPP-B-1055, class E-2, H-1 or H-5. The shroud shall completely enclose the cabinet and shall extend to the base of the crate.

5.2.1.3 Bases. When bases are provided (see 3.8), the bases shall be removed, cushioned with any of the materials specified in 5.1.1 and secured in the container with the associated cabinet to affect the maximum utilization of the available cube.

5.2.2 Level B. The cabinets shall be packed as specified in 5.2.1, except that the containers shall be domestic class and type. The case liners and waterproof shrouds shall not be required. Closures, strapping, blocking and bracing shall be in accordance with the appendix to the applicable container specification.

5.2.3 Level C. The cabinets shall be packed to insure carrier acceptance and safe delivery to destination in containers complying with the rules and regulations applicable to the mode of transportation.

5.3 Marking. Marking shall be in accordance with 5.3.1 or 5.3.2 as specified (see 6.2).

5.3.1 Civil agencies. In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military agencies. In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with MIL-STD-129.

## 6. NOTES

6.1 Intended use. Cabinets furnished under this specification are intended for the filing and storing of classified material as prescribed by the using activity.

6.2 Ordering data. Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

- (a) Title, symbol, and date of this specification.
- (b) Class and size required (see 1.2.1).
- (c) Hand or key change type of combination lock required (see 3.4).
- (d) Whether caster base platform required (see 3.8).
- (e) Levels of packaging, packing, and marking required (see 5.1, 5.2, and 5.3).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion on the applicable Federal Qualified Products List, whether or not such products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer the Federal Government tested for qualification so that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is Standardization Division, Federal Supply Service, General Services Administration, Washington, D. C. 20406, and information pertaining to qualification may be obtained from that activity.

6.4 Definitions of terms used in this specification.

6.4.1 Surreptitious entry. For the purpose of this specification "surreptitious entry" means (1) The provision of a gap or crevice of any dimension between the edges of the drawerhead and the front frame of the drawer compartment from which material can be extracted without leaving evidence of the act which would be readily discernible in normal use of the cabinet, or (2) The provision of any other type of opening of a size not less than 3 square inches for access into the cabinet with the minimum for any one dimension being 1/4-inch and such opening made without leaving evidence of the act which would be readily discernible in the normal use of the cabinet.

6.4.2 Forced entry. For the purpose of this specification "forced entry" means provisions of an opening in the cabinet of not less than 9 square inches for access into the cabinet with the minimum for any one dimension being 1/2-inch and the opening made in such a manner which may leave evidence of the act which could be readily discernible in the normal use of the cabinet.

6.4.3 Normal use. For the purpose of 6.4.1 and 6.4.2 "normal use" means the opening of the combination lock, releasing the locking mechanism, opening the cabinet drawer to the extent necessary for the reception or withdrawal of material; and closing and relocking the cabinet. During normal use it is considered that the cabinet's top and front are exposed to view and touch; the rear and sides exposed to view only; and the base neither exposed to view nor touch.

6.4.4 Lock manipulation. For the purpose of this specification, "lock manipulation" is defined as the opening of the combination lock without alteration of the physical structure, or disarranging of parts. Ordinarily manipulation would be accomplished by movement of the lock dial.

6.5 All samples required for test purposes shall be furnished at no expense to the Government and the manufacturer shall pay all transportation charges to and from the point where the tests are performed. All tested samples shall become the property of the Government but may be released to the

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manufacturer at the option of the Government. Upon request, the manufacturer shall furnish to the Government testing facility, a cabinet equal in every respect to that of the qualified sample for use of inspection and test during the term of qualification. The cabinet shall be furnished at no expense to the Government and will be returned to the manufacturer upon removal of his product from the qualified products list.

6.6 Special techniques. Information relating to the requirements of 3.4 in respect to special techniques will be disclosed to qualified suppliers and personnel of the Federal agencies on a need to know basis.

Preparing activity:

GSA

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Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain copies and other documents referenced herein. Price 15 cents each.

<b>GENERAL SERVICES ADMINISTRATION - FEDERAL SUPPLY SERVICE</b>	BUDGET BUREAU NO.
<b>SPECIFICATION COMMENT SHEET</b>	<b>29-R0175</b>

**INSTRUCTIONS**

This form provides a way for users of this specification to inform the originator of problems encountered in its use. It is not to be used to request changes to accommodate proprietary features. All comments will be considered and appreciated, but please do not expect a reply. To comment: detach, complete, and mail to General Services Adm., FSS (FMSO), Washington, D. C. 20406.  
 NOTE: Comments on this form do not constitute or imply authorization to waive any part of the document or serve to amend contractual requirements.

**1. SPECIFICATION**

**AA-F-357F Filing Cabinet, Steel, Letter and Legal Size, Insulated, Security**

**2. CONTRACT NO. (If any)**

**3. QUANTITY ON CONTRACT (Optional)**

**4. DOLLAR VALUE (Optional)**

**5. GENERAL NATURE OF PROBLEM (e.g., inspection difficulties, manufacturers unable to meet tolerances, containers collapse under normal warehousing conditions, etc.)**

**6. SPECIFIC REQUIREMENTS AFFECTED (include paragraph number and lines of wording)**

**7. SPECIFIC PROBLEMS (e.g. tests in 4.2.2 will not assure that the battery will last required time; temperature ranges in table 2 do not conform to commercially available items.)**

**8. RECOMMENDATIONS**

**9. NAME OF MANUFACTURER, ASSOCIATION, GOVT., AGENCY, ETC.**

**10. ADDRESS (Number, Street, City, State and Zip Code)**

**11. NAME AND TITLE OF SUBMITTER**

**12. DATE**