AEROSPACE MATERIAL SPECIFICATION

AMS6474™	REV. B

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Revised 2008-02
Reaffirmed 2012-10
Stabilized 2018-02

Superseding AMS6474A

Forgings, Hardenable Steels and Corrosion-Resistant Steels Heat-Treated, Finished-Part Properties Short-Transverse Tensile Strength and Fracture Toughness

RATIONALE

AMS6474B has been declared "STABILIZED" by SAE AMS Committee E Carbon and Low Alloy Steels as mature technology that is not expected to change and thus no further revisions are anticipated.

STABILIZED NOTICE

AMS6474B has been declared "STABILIZED" by SAE AMS Committee E Carbon and Low Alloy Steels. This document will no longer be updated and may no longer represent standard industry practice. This document was stabilized because the document contains mature technology that is not expected to change and thus no further revisions are anticipated. Previously this document was reaffirmed. The last technical update of this document occurred in February 2008. Users of this document should refer to the cognizant engineering organization for disposition of any issues with reports/certifications to this specification; including exceptions listed on the certification. NOTE: In many cases, the purchaser may represent a sub tier supplier and not the cognizant engineering organization.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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http://standards.sae.org/AMS6474B

1. SCOPE

1.1 Form

This specification establishes requirements for steel forgings of any shape or form that finished parts are to be made (See 8.4, 8.5, 8.8.4 and 8.10).

1.2 Application

Forgings are typically intended to be manufactured from consumable electrode vacuum remelted steel for use in those high performance parts where control of short transverse tensile properties or fracture toughness is important.

1.2.1 The forgings are to be manufactured in accordance with a documented process; product approval is based on first article demonstrations of tensile properties (short transverse if section size allows) and of fracture toughness, in the section size of the finished part.

1.2.2 Certain design and processing procedures may cause some of these products to become susceptible to stress corrosion cracking after heat treatment; ARP1110 recommends practices to minimize such conditions.

1.3 Classification

Forgings shall be of the following grades as specified in the ordering data (See 8.10). When grade is not specified, Grade A shall apply.

1.3.1 Grade A

Acceptance tests include verification of room temperature tensile properties and, when specified, of room temperature fracture toughness. Preproduction testing includes verification of all requirements; product approval is in accordance with AMS2376.

1.3.2 Grade B

Acceptance tests do not include verification of mechanical properties. Preproduction testing includes verification of all requirements; purchaser must approve the supplier's process control documentation and the product prior to acceptance of production forgings.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2315	Determination of Delta Ferrite Content
AMS2376	Qualification, Approval, and Control of Premium-Quality Forgings, Alloy Steels and Heat-Treatable Corrosion and Heat-Resistant Steels and Alloys
AMS2759	Heat Treatment of Steel Parts, General Requirements
AMS2808	Identification, Forgings
AMS-H-6875	Heat Treatment of Steel Raw Materials
ARP1110	Minimizing Stress Corrosion Cracking in Wrought Forms of Steels and Corrosion Resistant Steels and Alloys
ARP1820	Chord Method of Evaluating Surface Microstructural Characteristics

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A 262	Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels
ASTM A 370	Mechanical Testing of Steel Products
ASTM A 604	Macroetch Testing of Consumable Electrode Remelted Steel Bars and Billets
ASTM E 112	Determining Average Grain Size
ASTM E 384	Microindentation Hardness of Materials
ASTM E 399	Plane-Strain Fracture Toughness of Metallic Materials
ASTM E 1304	Plane-Strain (Chevron-Notch) Fracture Toughness of Metallic Materials
ASTM E 1417	Liquid Penetrant Testing
ASTM E 1444	Magnetic Particle Testing

3. TECHNICAL REQUIREMENTS

3.1 Material

Forgings shall be produced from forging stock as specified by purchaser and shall be procured from a source approved by purchaser (See 8.10 and Annex A).

3.2 Condition

3.2.1 Physical

Forgings shall not be welded, shall have acceptance test tabs, and shall be supplied descaled with all acceptance test tabs and test material prolongations, not consumed in pre-delivery testing, in place (See 8.3 and 8.8).

3.2.2 Heat Treatment As Supplied

Forgings shall be supplied in the state of heat treatment specified by the drawing or by the forging material specification (See 3.1).

3.3 Properties

Test specimens shall conform to 4.4.5.

3.3.1 Mechanical Properties

3.3.1.1 Tensile

Room temperature tensile properties, in the state of heat treatment of the finished part, shall conform to the requirements of the forging material specification (See 3.1); if no such requirement exists, these properties shall be as specified by purchaser (See 8.2). Tensile properties shall be determined in accordance with ASTM A 370.

3.3.1.1.1 Short Transverse Test Direction

Applicable when $S_{final\ HT} \geq$ 1 1/2 inches (38.1 mm); see Figure 1 for definition of $S_{final\ HT}$ (See 8.8.1).

3.3.1.1.2 Longitudinal Test Direction

Applicable when $S_{final\ HT}$ < 1 1/2 inches (38.1 mm).

3.3.1.2 Room Temperature Fracture Toughness

Applicable only when purchaser specifies the required value in the ordering data. Fracture toughness for compact specimens (ASTM E 399) and/or for short rod/short bar specimens (ASTM E 1304), in the state of heat treatment of the finished part, shall be as specified by purchaser (See 8.2). Fracture toughness shall be determined either in accordance with ASTM E 399 using compact specimens or in accordance with ASTM E 1304 using short rod or short bar specimens provided that purchaser specifies a fracture toughness value for the test method used. Crack plane orientation, as defined in ASTM E 399, shall be "R-L" for round bars and hollow cylinders, "L-R" for upset discs, and "S-L" for all other shapes.

3.3.2 Average Grain Size

The average grain size of the forged material in the state of heat treatment of the finished part shall conform to requirements of the forging material specification (See 3.1). Average grain size shall be determined in accordance with ASTM E 112. A comparison procedure (either microscopic or fractographic) or an intercept procedure (either lineal or circular) shall be used.

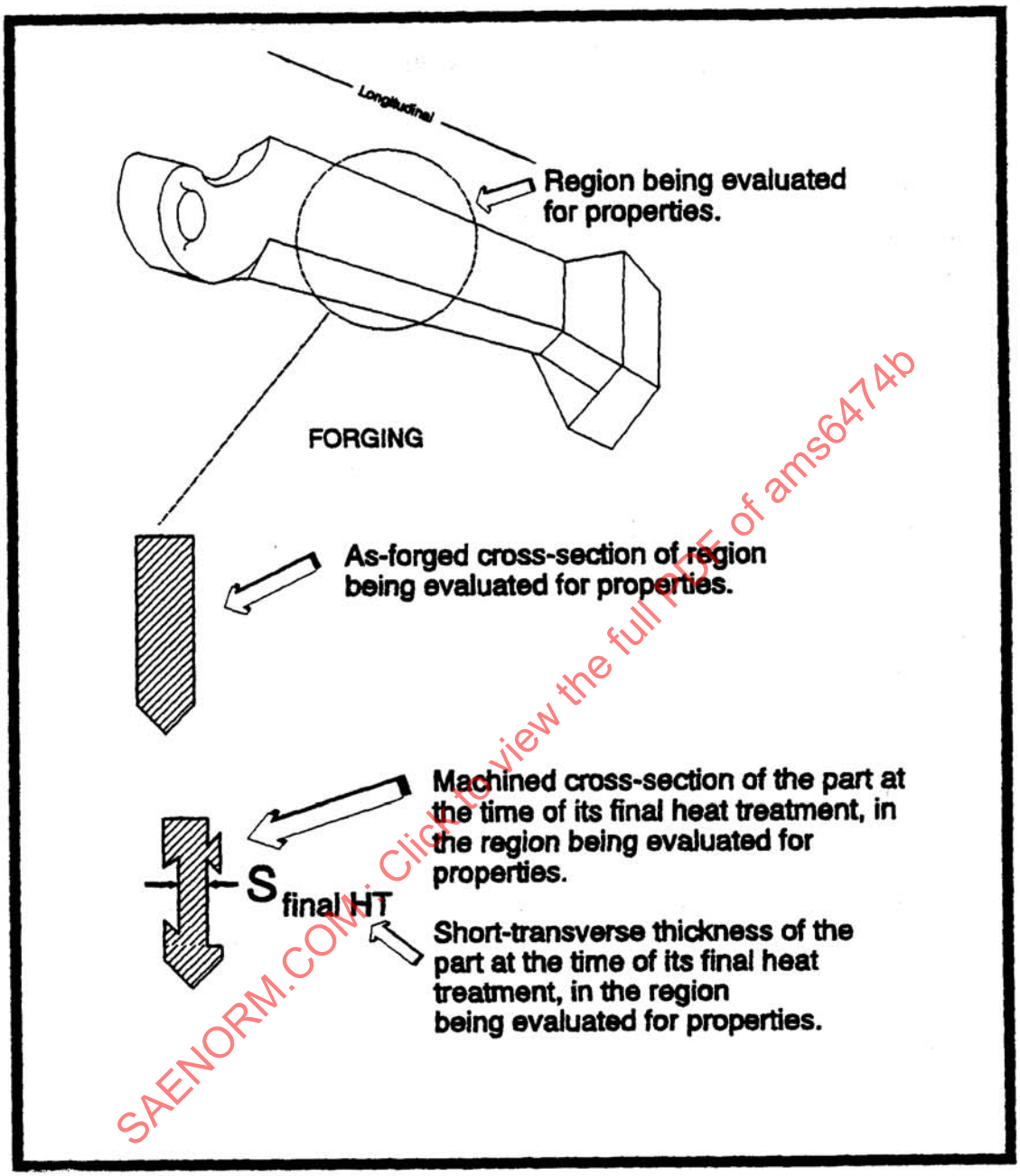

FIGURE 1 - DEFINITION OF $S_{FINAL\ HT}$

3.3.3 Delta Ferrite

The delta ferrite content in the state of heat treatment of the finished part shall conform to requirements of the forging material specification (See 3.1); if no such requirement exists, this paragraph does not apply (See 8.2). Delta ferrite content shall be measured in accordance with AMS2315.

3.4 Subsurface Chemical Uniformity

Specimens shall be taken from acceptance test tabs in the supplied state of heat treatment (See 3.2.2 and 8.3).

3.4.1 Decarburization

Applies only to hardenable carbon and alloy steels and martensitic corrosion-resistant steels. Partial decarburization shall not exceed a depth of 0.060 inch (1.52 mm) except that the depth may be as great as 0.070 inch (1.78 mm) in local areas no greater than 0.065 inch (1.65 mm) in width. Decarburization shall be evaluated at forged surfaces on metallographic specimens prepared in accordance with ARP1820. Specimens shall be microindentation hardness tested with a 500-gram load and a Knoop indenter in accordance with ASTM E 384. The definition of depth of partial decarburization shall be as defined in ARP1820.

3.4.2 Carburization and Nitridation

There shall be no detectable carburization or nitridation. Carburization and nitridation shall be evaluated at forged surfaces on metallographic specimens prepared in accordance with ARP1820. Specimens shall be microhardness tested with a 500-gram load and a Knoop indenter in accordance with ASTM E 384. The definitions of carburization and nitridation shall be as defined in ARP1820.

3.4.3 Intergranular Attack

Intergranular attack (e.g., oxidation), evaluated on metallographic specimens, shall be less than 0.004 inch (0.10 mm) deep. The plane of polish shall be normal with 10 degrees to, and shall intersect, a forged surface. The metallographically prepared specimens shall be examined at 100 to 500X magnification to evaluate the depth of any intergranular attack.

3.4.3.1 Hardenable Carbon and Alloy Steels

Metallographic specimens shall be etched either for 7 to 20 minutes in a freshly prepared, boiling solution of 16 grams of chromic acid and 80 grams of sodium hydroxide in 145 milliliters of water, or in an etchant that produces similar results, prior to evaluation.

3.4.3.2 Corrosion-Resistant Steels

Metallographic specimens shall be etched for 1 to 2 minutes either in a freshly prepared solution of 1 gram of picric acid in 5 milliliters of hydrochloric acid and 100 milliliters of ethanol, or in an etchant that produces similar results, prior to evaluation.

3.4.4 Susceptibility to Intergranular Corrosion

Intergranular corrosion susceptibility shall conform to requirements of the forging material specification (See 3.1); if such requirement does not exist, this paragraph does not apply. Susceptibility shall be measured in accordance with ASTM A 262.

3.5 Quality

3.5.1 Grain Flow

The internal grain flow pattern shall conform to requirements of the forging drawing. When not specified by the drawing, the grain flow of die forgings in regions within 0.25 inch (6.4 mm) or 25% of the section thickness, whichever is smaller, of the forged surface shall follow the general contour of the forging; this requirement shall not apply to areas of acceptance test tab attachment, of prolongation attachment, or of flash extrusion (“flash line” or “parting plane”) (See 8.2 and 8.8). Unless locations are specified by purchaser, the forging manufacturer shall select suitable locations for sectioning sufficient to fully document compliance with these requirements; as a minimum, cross sections shall be taken normal to all die closures (See 8.2). For vacuum melted alloys wherein the grain flow pattern is too faintly revealed to record photographically, an air melted steel with similar hot working characteristics may be used as a test medium. These sections shall be suitably etched in accordance with ASTM A 604, using hot hydrochloric acid, so as to develop the grain flow pattern that shall be photographed for reporting purposes (See 4.8).

3.5.2 Surface Condition

Forgings shall be free of visually verified tears, cracks, seams, laps, and imbedded scale. Surfaces shall be inspected in accordance with ASTM E 1417 for non-magnetic steels or in accordance with ASTM E 1444 for magnetic steels; the nature of any indication shall be established by visual examination. Forging surfaces shall be cleaned free of foreign material prior to such inspection. Inspection in accordance with ASTM E 1417 shall be performed as specified for machined surfaces even if the surfaces to be inspected have not been machined. Imperfections may be removed and surfaces reinspected using ASTM E 1444 or ASTM E 1417, as applicable, to identify the areas to be visually evaluated.

3.5.3 Forging Control

The forging process shall be in accordance with a documented process (See 4.5).

3.5.4 Heat Treating Control: Heat treatment of forgings shall conform to the following requirements.

3.5.4.1 Forgings

3.5.4.1.1 Delivered in the Not Finished-Part State of Heat Treatment (See 3.2.2)

Forgings shall be heat treated in accordance with AMS-H-6875 or, for alloys not listed in AMS-H-6875, with instructions from purchaser (See 8.2).

3.5.4.1.2 Delivered in the Finished-Part State of Heat Treatment

Forgings shall be heat treated in accordance with AMS2759 or, for alloys not listed in AMS2759, with instructions from purchaser (See 8.2).

3.5.4.2 Test Material

Material, that test specimens for properties are to be made (See 4.4.5), shall be heat treated in accordance with AMS2759 or, for alloys not listed in AMS2759, with instructions from purchaser (See 8.2).

3.5.5 Decarburization Control

Carbon restoration treatment to rectify excessive decarburization shall not be used.

3.6 Tolerances

Flash extension, measured from the body of the forging to the trimmed edge of the flash, shall not exceed the dimensional limits shown in Table 1.

TABLE 1A - FLASH EXTENSION TOLERANCES, INCH/POUND UNITS

Weight of Forging After Trimming Pounds	Flash Extension Limits Inch
Up to 5, incl	0 to 0.03
Over 5 to 25, incl	0 to 0.06
Over 25 to 50, incl	0 to 0.09
Over 50 to 100, incl	0 to 0.13
Over 100 to 200, incl	0 to 0.19
Over 200 to 500, incl	0 to 0.25
Over 500 to 1000, incl	0 to 0.31
Over 1000	0 to 0.38

TABLE 1B - FLASH EXTENSION TOLERANCES, SI UNITS

Weight of Forging After Trimming Kilograms	Flash Extension Limits Millimeters
Up to 5, incl	0 to 0.8
Over 2.3 to 11.3, incl	0 to 1.5
Over 11.3 to 22.7, incl	0 to 2.3
Over 22.7 to 45, incl	0 to 3.3
Over 45 to 91, incl	0 to 4.8
Over 91 to 227, incl	0 to 6.4
Over 227 to 454, incl	0 to 7.9
Over 454	0 to 9.6

3.7 Product Approval

Forgings shall have passed a preproduction inspection and subsequent periodic inspections required by purchaser (See 4.3.2 and 4.3.3).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The supplier shall be responsible for performing all tests in accordance with 4.3. The supplier may utilize his own organization or may use any commercial organization acceptable to purchaser. Purchaser reserves the right to sample and to perform testing to confirm conformance to specified requirements.

4.2 Acceptance

Only forging lots that meet all requirements for the inspection of interest, as specified in 4.3, shall be accepted, except that failure of individual forgings to meet requirements for surface condition shall not be cause for rejection of the entire lot, but only of the individual nonconforming forgings. Rejected forging lots, or rejected individual forgings, shall not be resubmitted for inspection without a statement indicating how the nonconformity was resolved. “Lot” is defined in 8.8.3.

4.3 Classification of Tests

4.3.1 Acceptance Tests

The requirements shown in Table 2 shall be performed on each lot of forgings.

TABLE 2 - ACCEPTANCE TESTS

Requirement	Paragraph Reference
Material	3.1
Condition	3.2
Tensile Properties (Grade A)	3.3.1.1
Fracture Toughness (Grade A)	3.3.1.2
Subsurface Chemical Uniformity	3.4
Surface Condition	3.5.2
Forging Control	3.5.3
Heat Treating Control	3.5.4
Decarburization Control	3.5.5
Tolerances	3.6
Product Approval	3.7
Preparation for Delivery	5

4.3.2 Periodic Tests

The requirements shown in Table 3 shall be performed at a frequency selected by the supplier and approved by the purchaser to confirm continuing conformance of the product (See 8.5 and 8.10).

TABLE 3 - PERIODIC TESTS

Requirement	Paragraph Reference
Tensile Properties (Grade B)	3.3.1.1
Fracture Toughness (Grade B)	3.3.1.2
Average Grain Size	3.3.2
Delta Ferrite	3.3.3

4.3.3 Preproduction Tests

All technical requirements are preproduction tests and shall be performed for first article approval and after any significant change in the method of manufacture of the product.

4.4 Sampling and Testing

Shall be as follows: The term “forging” shall denote either the forged shape, its acceptance test tab, or an associated prolongation or separately forged coupon, as applicable.

4.4.1 Acceptance Tests

4.4.1.1 Sampling

The sample size for mechanical properties (Grade A only) shall be one forging. The sample size for subsurface chemical uniformity shall be in accordance with Table 4. The sample size for surface condition shall be the entire lot. Inspection of tolerances and monitoring of processes and materials shall be at a frequency determined by supplier’s quality assurance function. (See 8.8.3 for definition of a lot.)

TABLE 4 - SAMPLING PLAN FOR SUBSURFACE CHEMICAL UNIFORMITY

Lot Size Number of Forgings	(Minimum) Sample Size, Number of Forgings from Each Lot
1 to 4	All
5 to 25	5
26 to 100	6
101 and over	7

4.4.1.2 Number of Tests

Test for subsurface chemical uniformity shall be performed on the acceptance test tab of each forging in the sample for this attribute. Every forging in the lot shall be inspected nondestructively for surface condition.

4.4.1.2.1 Grade A

In addition to the requirements of 4.4.1.2, test shall be performed on one room temperature tensile specimen and for one room temperature fracture toughness specimen, where required by purchaser, on each lot.

4.4.2 Periodic Tests

4.4.2.1 Sampling

Forgings for periodic tests shall be selected randomly from a forging lot that compliance with all acceptance testing requirements (See Table 2) has been verified. The number of forgings in the sample shall be sufficient to provide the material needed for the number of tests required for mechanical properties (Grade B only), grain size, and delta ferrite content.

4.4.2.2 Number of Tests

Average grain size and delta ferrite tests shall each be performed on three specimens.

4.4.2.2.1 Grade B

In addition to the requirements of 4.4.2.2, tests shall be performed on three room temperature tensile specimens and three room temperature fracture toughness specimens.

4.4.3 Preproduction Tests

4.4.3.1 Sampling

The sample size for mechanical properties, average grain size, delta ferrite content, subsurface chemical uniformity, grain flow, and surface condition shall be the entire preproduction lot. Inspection of tolerances and monitoring of processes and materials shall be at a frequency determined by supplier's quality assurance function.

4.4.3.2 Number of Tests

For each mechanical property, tests shall be performed on one or more test specimens from each forging and three or more test specimens from the preproduction lot. Average grain size tests and delta ferrite tests shall be performed on one or more test specimens from each forging and two or more specimens from the preproduction lot. Subsurface chemical uniformity tests shall be performed on each forging. One or more forgings shall be sectioned for grain flow. Every forging in the preproduction lot shall be inspected for surface condition.

4.4.4 Sources of Test Material for Properties (See 3.3)

The source shall be either a forging, a prolongation of a forging, or a separately forged coupon (illustrated in Figure 2). The order of preference of selection is:

4.4.4.1 A location in the forging that encompasses the region of the finished part to be evaluated, as specified on the engineering drawing. When the engineering drawing does not specify location, the thickest section in the forging shall be selected (See 8.2).

4.4.4.2 A prolongation that has reductions in the principal directions that are approximately the same as those in the location in the forging that encompasses the region of the finished part to be evaluated.

4.4.4.3 A separately forged coupon that simulates a prolongation. The purchaser approved, documented process (to the maximum practical extent) and forging stock from the same heat (preferably from the same lot), shall be used to produce a separately forged coupon.

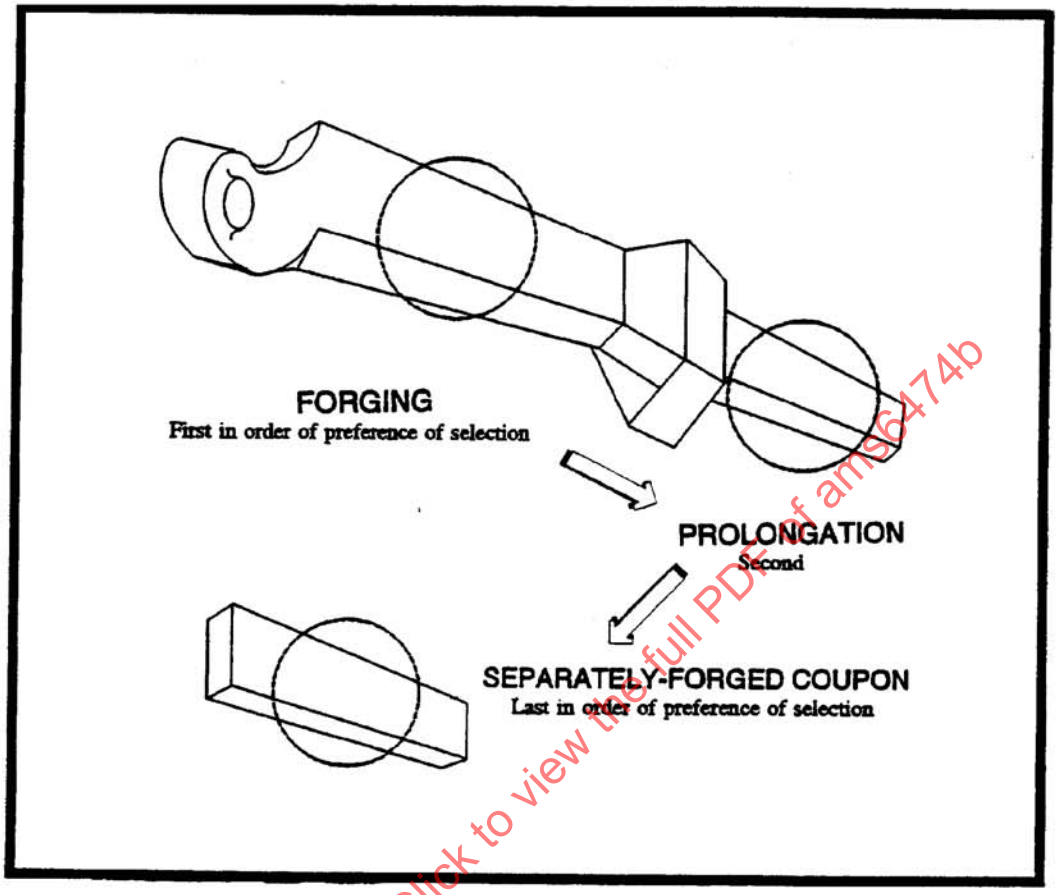

FIGURE 2 - SOURCES OF TEST MATERIAL

4.4.5 Preparation of Test Specimens for Properties (3.3)

4.4.5.1 Control of State of Heat Treatment

4.4.5.1.1 Processing

Test specimens shall be manufactured from a test material source in accordance with Figure 3, either from forgings, prolongations, and separately forged coupons heat treated to the finished part state of heat treatment, left column of Figure 3 (subject to the constraints in 4.4.5.2.1), or from test blocks heat treated to the finished part state of heat treatment, right column of Figure 3. Test blocks are volumes of test material, such as are illustrated in Figure 4, where specimen blanks are embedded to control their quench rate; the short transverse thickness of a test block is the same as that of the part at the time of its final heat treatment (Figure 1). Specimen blanks are the aggregate of one or more single test specimen blanks illustrated in Figures 5 and 6. 4.4.5.1.2 covers the design of test blocks; 4.4.5.1.3 covers the design of specimen blanks (See 8.8.2).

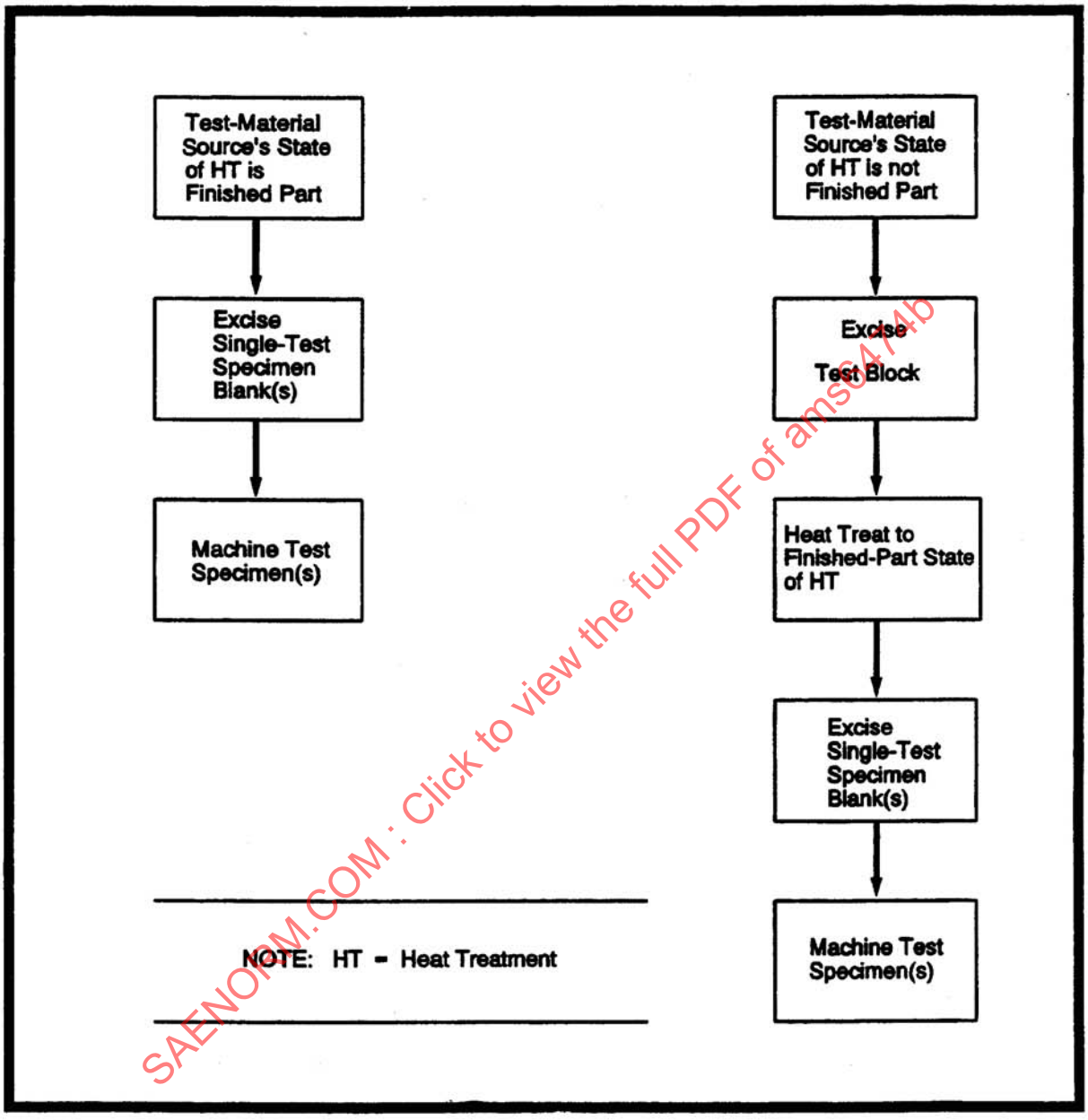

FIGURE 3 - PREPARATION OF SPECIMENS FOR PROPERTIES

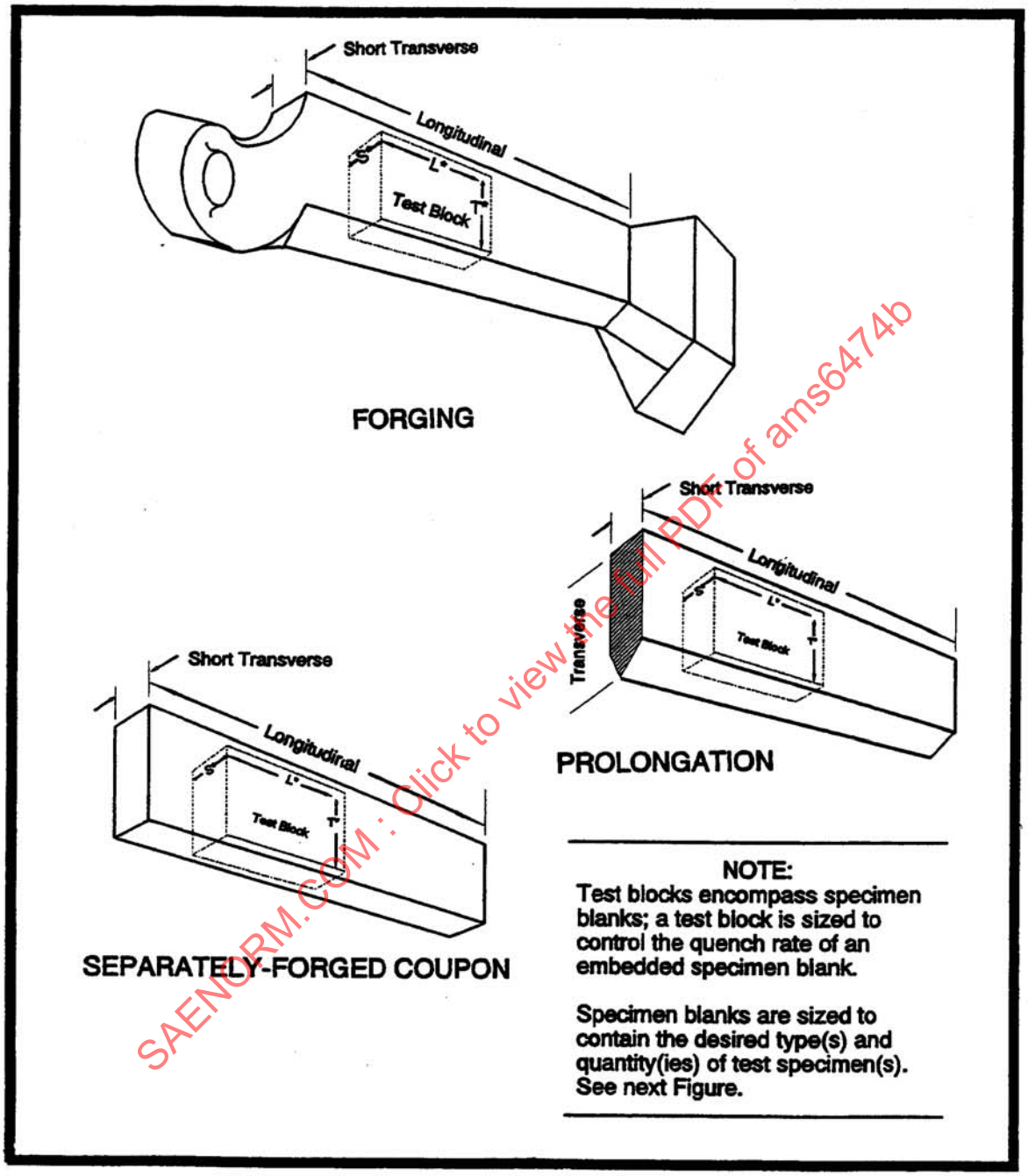

FIGURE 4 - TEST BLOCK SOURCES AND ORIENTATIONS

4.4.5.1.2 Design of Test Blocks

4.4.5.1.2.1 Size

The dimensions of a test block L*, T*, and S*, shall be based on the dimensions of the encompassed specimen blank, L^*_b, T^*_b, and S^*_b (4.4.5.1.3), in accordance with Figures 5 and 6.

4.4.5.1.2.2 Orientation

The dimensions of a test block, L*, T*, and S*, shall be aligned with respect to the metallurgical directions of the forging in accordance with Figure 4.

4.4.5.1.3 Design of Specimen Blanks

Specimen blank dimensions shall be denoted as L^*_b, T^*_b, and S^*_b; these dimensions shall be sufficient to encompass the desired number(s) and type(s) of test specimens as depicted in Figures 5 and 6. Note that while the figures illustrate a case for three smooth tensile specimens, the concept is applicable to any number of tensile and fracture toughness specimens (See 8.8.2).

4.4.5.1.3.1 Layout and Sizing

Specimen blanks shall be sized to encompass the single test specimen blank(s) for the desired number and type(s) of test specimen(s); Figures 5 and 6 illustrate the concept. The length of S^*_b shall be in accordance with Figure 5 for short-transverse specimen blanks. The positioning of tensile specimen blank(s) and of fracture toughness specimen blank(s) within a specimen blank shall conform to the following constraints:

4.4.5.1.3.1.1 The preferred positioning shall be single file and lined up parallel to L^*_b for the short-transverse test direction (Figure 5), or parallel to T^*_b for the longitudinal test direction (Figure 6).

4.4.5.1.3.1.2 Short rod/short bar fracture toughness specimen in accordance with ASTM E 1304 blanks may be stacked end-to-end parallel to the test direction and treated as though they were a single test specimen blank.

4.4.5.2 Extraction of Specimen Blanks and Manufacture of Specimens

4.4.5.2.1 Test Material Source (Figure 2) in Finished-Part State of Heat Treatment

A specimen blank shall be considered to be embedded in the test material source, centered in the source within $1/8 S_{final\ HT}$, and with its edges parallel to those of the source within 10 degrees. Single test specimen blanks(s) shall be excised from the specimen blank; test specimen(s) shall be machined from the single test specimen blank(s). Constraints shall be as follows:

4.4.5.2.1.1 The short-transverse thickness of the region of the forging, prolongation, or separately forged coupon to be evaluated for properties shall be the same as that of the part at the time of its final heat treatment, $S_{final\ HT}$.

4.4.5.2.1.2 The forging, prolongation, or separately forged coupon shall have been heat treated to the state of heat treatment of the finished part (See 8.2).

4.4.5.2.2 Test Block in Finished-Part State of Heat Treatment

The specimen blank shall be considered as centered in the test block within $1/8\ S_{final\ HT}$, with its edges parallel to those of the test block within 10 degrees. Single test specimen blank(s) shall be excised from the specimen blank; test specimen(s) shall be machined from the single test specimen blank(s).

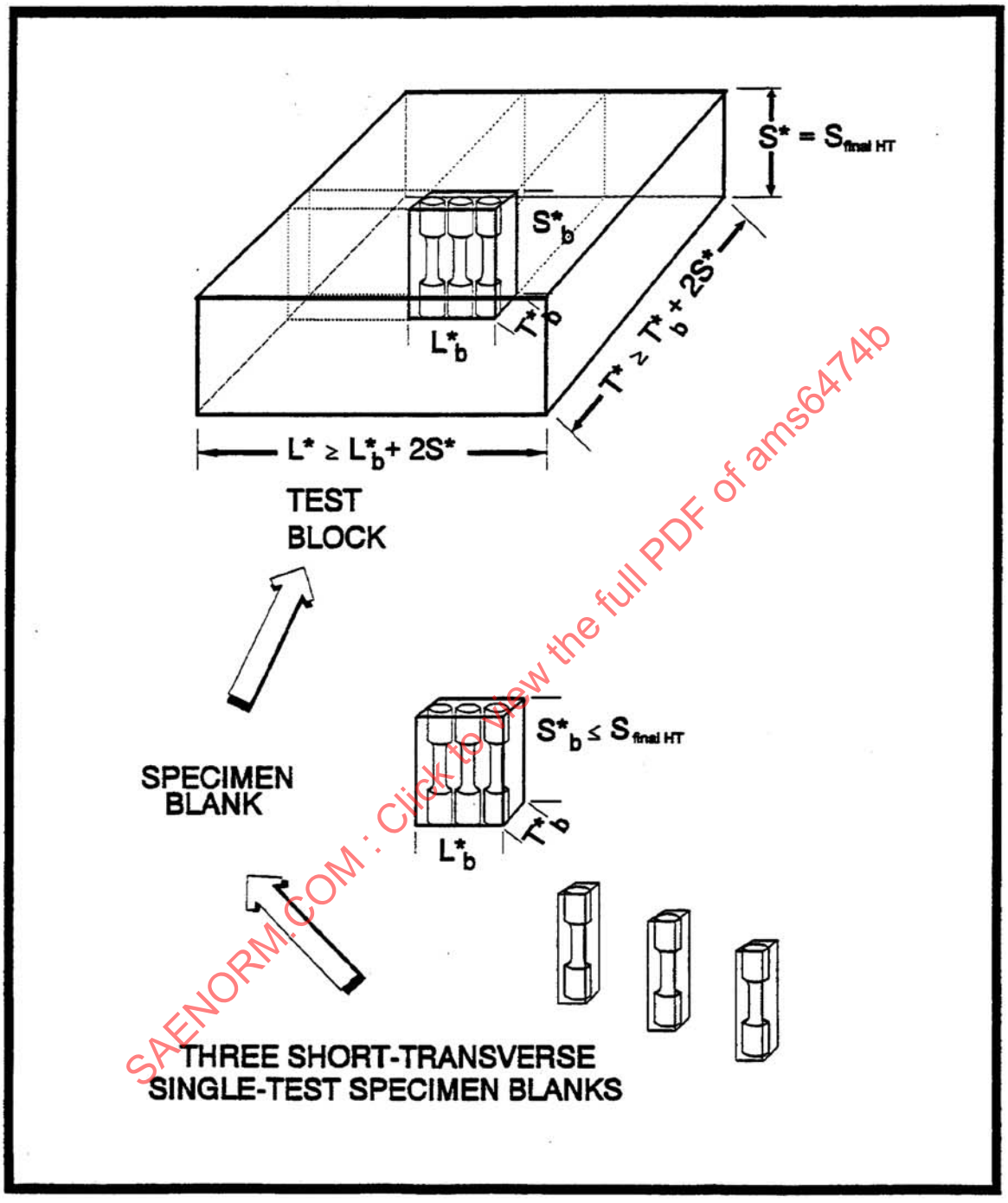

FIGURE 5 - SHORT-TRANSVERSE SPECIMEN BLANK DESIGN AND TEST BLOCK DESIGN

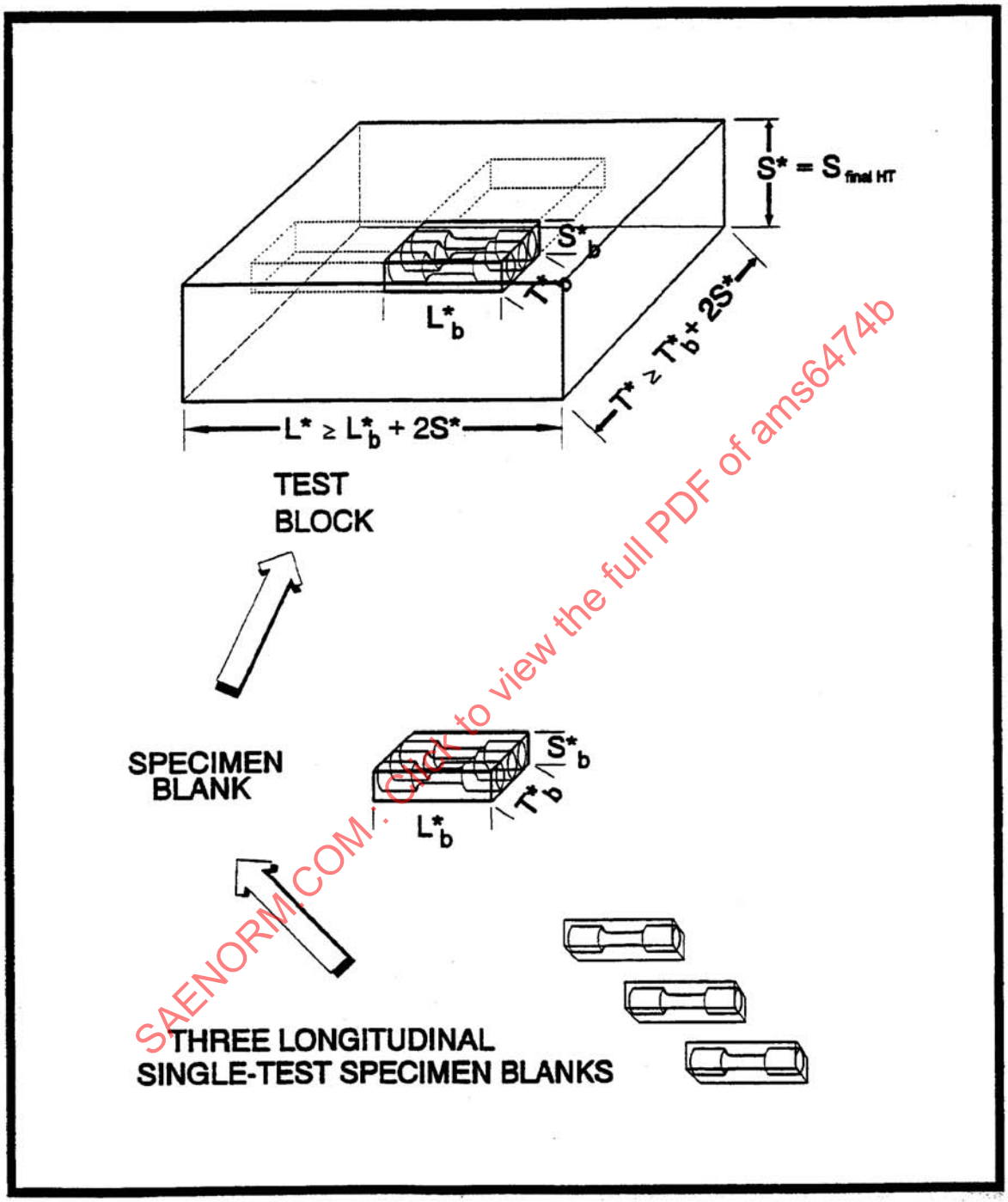

FIGURE 6 - LONGITUDINAL SPECIMEN BLANK DESIGN AND TEST BLOCK DESIGN

4.5 Approval

4.5.1 Grade A

Approval shall be in accordance with AMS2376.

4.5.2 Grade B

4.5.2.1 Processing Documentation

A process control document shall be generated, approved by purchaser, and complied with by the supplier in the manufacture of forgings. This document shall detail the procedures, sequences, and controls for the forging operation (starting with the procurement of forging stock and ending with preparation for delivery) at the level of detail needed to ensure reliable reproduction of first article characteristics in production forgings. As a minimum, the document shall include control factors such as:

Forging alloy specification, size, grain direction, and form (cast, preforged, extruded, or rolled stock)

Forging operations and their sequence, number and type of dies, identification of blocker and closed dies, forging start and finish temperatures and their tolerances, straightening, and machining

Thermal treatments used prior to, during, and subsequent to the forging operation

Inspection methods used. Records of dimensional checks of the first forging, the first forging after more than 5% of the die cavity has been reworked, and the first forging after the die has been replaced.

The process control document shall be made available to purchaser for review and approval. If supplier proprietary information is involved, the supplier may certify that the information is proprietary and is on file. The information shall be available for review by personnel representing purchaser or the cognizant quality control function. A copy of the purchaser approved document shall be retained by the supplier. Supplier shall maintain the process control document in an up-to-date condition. Any change in the method of manufacture that could affect any of the properties or characteristics of the forgings (including machining location points) or compliance with the requirements of this specification, or any change in the manufacturing facility, shall require reapproval by purchaser.

4.5.2.2 First Article Evaluation

A forging, or forgings, taken from a pilot lot or from the first production lot and produced in accordance with purchaser approved process control document, shall conform to all requirements of a preproduction inspection as specified in 4.3.3.

4.5.2.3 Product Approval Report

A written report certifying product approval shall be generated, approved by purchaser, and furnished to the supplier as evidence of approval of the product and of the process control document (3.5.3). Purchaser reapproval of the process control document or failure to pass a periodic inspection, shall be cause for update and purchaser reapproval of this report.