

# INTERNATIONAL AIRCRAFT STANDARDS.

(Continued from page 1249.)

## 3S17—Specifications for Steel Wire for Electric Welding.

**GENERAL.**—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

**MATERIAL.**—2. (a) The material from which the wire is manufactured shall be made by any approved process.

(b) The I.A.S.B. standard steel No. 1015 shall be used; a carbon content of from 0.13 to 0.18 per cent. is desired.

**WORKMANSHIP AND FINISH.**—3. (a) Electric welding wire shall be of the quality and finish known as "Bright," "Bright Hard," or "Soft Finish." "Black Annealed" or "Bright Annealed" wire shall not be supplied.

(b) The surface shall be free from scale, lime, copper, or other metals. A moderate coating of rust or of lubricant used in the drawing of the wire is permissible.

**PHYSICAL PROPERTIES AND TESTS.**—4. A dead soft wire is not desired. In order to detect wire of this kind from one to three samples shall be selected from each 10,000 lb. (4,536 kg.) or less submitted for inspection, and a test made for elongation (in tension) over a gauge length of 10 in. (254 mm.). When two or more samples show an elongation greater than 5 per cent. the wire shall be rejected.

**DIMENSIONS AND TOLERANCES.**—5. (a) All wire for this purpose shall have the size specified on orders in decimal parts of an inch (or millimetre). The wire shall be supplied, inspected and reported in the same manner.

(b) Great accuracy in gauge is not necessary, but no wire varying more than 3 per cent. plus or minus shall be accepted.

**DELIVERY, PACKING AND SHIPPING.**—6. (a) Steel wire for use in electric welding shall be furnished in coils or straightened and cut to lengths as required.

(b) If not furnished in coils, the wire, straightened and cut to 36-in. (914 mm.) lengths, plus or minus 1 in. (25.4 mm.), shall be packed in bundles weighing from 50 to 75 lb. (22.68 kg. to 34.02 kg.) each and securely tied with two or more wire bands.

(c) All bundles shall be burlapped all over for shipment, and shall be marked with a metal tag containing the name of the manufacturer, the size, length of contents and the inspection mark.

**INSPECTION AND REJECTION.**—7. Inspection for gauge, finish and chemical analysis shall be made on this wire before cutting it into straightened lengths. The wire shall then be cut to length and subsequent optional check inspection may be made by the Government inspector at the plant of the manufacturer.

## 3S5—Specifications for Alloy Steel Bars and Billets. (150,000 lb. per sq. in. Tensile Strength).

**GENERAL.**—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

**MATERIAL.**—2. The material for these bars shall be chosen from among the I.A.S.B. standard alloy steels listed below. The composition chosen shall be stated by the manufacturer or contractor, and is further limited as follows: Carbon, not over 0.45 per cent.

**MANUFACTURE.**—3. (a) The steel shall be manufactured or at least finished by the open-hearth electric furnace or crucible process.

(b) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

(c) The billets from which the bars are made are to be rough turned or chipped to remove all surface defects which might produce seams in the finished bar. No undercutting in chipping will be allowed.

**Heat Treatment.**—(d) The steel manufacturer shall state the heat treatment recommended to give the physical properties specified.

(e) If the bars are furnished in the heat-treated condition, and the physical tests show that the heat treatment has not been correct, the bars may be retreated at the option of the purchaser.

**WORKMANSHIP AND FINISH.**—4. (a) The bars are to be sound, commercially straight, free from pipes, laps, cracks, twists, seams, and damaged ends, and are to have a workmanlike finish. They are to be uniform in quality, within the stipulated margins of manufacture, capable of being turned and threaded readily and of taking a good finish.

(b) Any article may be rejected because of injurious defects or faults in manufacture at any time, notwithstanding that it has previously passed the physical and chemical tests. It shall be returned to the manufacturer at the latter's expense. This clause shall not be taken to apply to materials fabricated after export.

**PHYSICAL PROPERTIES AND TESTS.**—5. (a) The bars shall have the following physical properties:—

**Tensile Test.**—(b) Minimum tensile strength, 150,000 lb. per sq. in. (105.45 kg./mm.<sup>2</sup>); minimum yield point, 115,000 lb. per sq. in. (80.85 kg./mm.<sup>2</sup>); minimum elongation in 2 in. (50.8 mm.) (or proportional gauge length), 14 per cent; minimum reduction of area, 45 per cent.

**Impact Test.**—(c) When impact-testing machines of the pendulum type are available, tests shall be carried out if required to determine the specific impact work of rupture in foot-pounds (or kilogram-metres). Results markedly lower than the average for this type of material will be sufficient cause for further investigation (or reheat treatment) of the material.

**Selection of Test Specimens.**—(d) Three bars of each size rolled from a heat shall be taken, and test pieces prepared in accordance with the I.A.S.B. standards. Each test piece and the bar from which it is cut shall be stamped with an identifying number. Should any of the test pieces, after being heat treated in the manner recommended by the steel manufacturer, fail to show the prescribed physical properties, new test pieces similarly identified shall be made from the same three bars. At the option of the purchaser the steel manufacturer may recommend a different heat treatment for the second set of test specimens, and to that end he may make such tests as he desires from the remainder of the three bars taken for the tests. Should any of the three specimens taken for the final tests fail to show the required physical properties, the bars of that heat of the size represented by the specimens shall be rejected.

**DIMENSIONS AND TOLERANCES.**—6. The dimensions and tolerances shall be those given in the Specification 3S11.

**DELIVERY, PACKING AND SHIPPING.**—7. (a) The bars may be delivered in the annealed or in the heat-treated condition.

(b) The bars shall in general be grouped in bundles weighing not more than 250 lb. (113.4 kg.), unless otherwise agreed between manufacturer and purchaser. The heat number and the I.A.S.B. steel serial number shall be plainly marked on a metal tag attached to each bundle. If bars are not so grouped and bundled, each bar shall be plainly marked with the heat number and the I.A.S.B. steel serial number.

### Chemical compositions of standard alloy steels.

| Number.                   | NICKEL STEELS. |            |                      |                   | Nickel.   | Chromium. |
|---------------------------|----------------|------------|----------------------|-------------------|-----------|-----------|
|                           | Carbon.        | Manganese. | Phosphorus, maximum. | Sulphur, maximum. |           |           |
| 2325 ..                   | 0.20-0.30      | 0.50-0.80  | 0.040                | 0.045             | 3.25-3.75 | ..        |
| 2330 ..                   | 0.25-0.35      | 0.50-0.80  | 0.040                | 0.045             | 3.25-3.75 | ..        |
| 2335 ..                   | 0.30-0.40      | 0.50-0.80  | 0.040                | 0.045             | 3.25-3.75 | ..        |
| NICKEL-CHROMIUM STEELS.   |                |            |                      |                   |           |           |
| 3130 ..                   | 0.25-0.35      | 0.50-0.80  | 0.040                | 0.045             | 1.00-1.50 | 0.45-0.75 |
| 3135 ..                   | 0.30-0.40      | 0.50-0.80  | 0.040                | 0.045             | 1.00-1.50 | 0.45-0.75 |
| 3140 ..                   | 0.35-0.45      | 0.50-0.80  | 0.040                | 0.045             | 1.00-1.50 | 0.45-0.75 |
| 3230 ..                   | 0.25-0.35      | 0.30-0.60  | 0.040                | 0.045             | 1.50-2.00 | 0.90-1.25 |
| 3240 ..                   | 0.35-0.45      | 0.30-0.60  | 0.040                | 0.045             | 1.50-2.00 | 0.90-1.25 |
| X3330 ..                  | 0.25-0.35      | 0.45-0.75  | 0.040                | 0.045             | 2.75-3.25 | 0.70-0.95 |
| X3340 ..                  | 0.35-0.45      | 0.45-0.75  | 0.040                | 0.045             | 2.75-3.25 | 0.70-0.95 |
| 3330 ..                   | 0.25-0.35      | 0.30-0.60  | 0.040                | 0.045             | 3.25-3.75 | 1.25-1.75 |
| 3340 ..                   | 0.35-0.45      | 0.30-0.60  | 0.040                | 0.045             | 3.25-3.75 | 1.25-1.75 |
| X3440 ..                  | 0.35-0.45      | 0.30-0.60  | 0.040                | 0.045             | 4.00-5.00 | 1.00-1.50 |
| CHROMIUM VANADIUM STEELS. |                |            |                      |                   |           |           |
|                           |                |            |                      |                   | Chromium. | Vanadium. |
|                           |                |            |                      |                   | minimum.  | minimum.  |
| 6130 ..                   | 0.25-0.35      | 0.50-0.80  | 0.040                | 0.045             | 0.80-1.10 | 0.15      |
| 6140 ..                   | 0.35-0.45      | 0.50-0.80  | 0.040                | 0.045             | 0.80-1.10 | 0.15      |

When electric or crucible furnace steel is specified in the order the maximum allowable percentages of phosphorus and sulphur may, at the option of the purchaser, be limited to 0.03 per cent.

## 3S6—Specifications for Alloy Steel Bars and Billets. (175,000 lb. per sq. in. Tensile Strength).

**GENERAL.**—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

**MATERIAL.**—2. The material for these bars shall be chosen from among the I.A.S.B. standard alloy steels listed below. The composition chosen shall be stated by the manufacturer or contractor, and is further limited as follows: Carbon, not over 0.45 per cent.

**MANUFACTURE.**—3. (a) The steel shall be manufactured or at least finished by the open-hearth, electric furnace, or crucible process.

(b) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.