

**Ministry of Defence
Defence Procurement Agency, ADRP2
Abbey Wood
Bristol
BS34 8JH**

OBSOLESCENCE NOTICE

All DTD specifications were declared obsolescent from 1st April 1999. All DTD 900 series approvals also lapsed at that time. The standards will no longer be updated but will be retained as obsolescent documents to provide for the servicing of existing equipment.

Further Guidance

The aim in declaring the specifications obsolescent is to recognise that the documents are not being updated and thus should be used with care by both purchaser and supplier. For example, a specification could contain valid technical information but may also contain type approval clauses that contradict procurement policy and/or use materials that do not comply with environmental legislation. The obsolescent specification can still be used as a basis for a purchase provided that the supplier and purchaser agree suitable changes to the specification within the purchase order/contract.

For the DTD 900 system, each specification has provided an MoD approved material and process. For these items, the declaration of obsolescence will constitute the termination of both the extant MoD approval and the continuing MoD assessment that had underpinned those approvals. Again, the technical content of the document remains valid and can be used by both purchaser and supplier as a basis for a contract but an acceptable (to the parties) approval/assessment procedure would be required.

Aircraft Material Specification
CAST IRON PISTON RING POTS
(Sand or chill cast)

NOTE. -This specification is one of a series issued by the Ministry of Aviation, either to meet a limited requirement not covered by any existing British Standard or to serve as a basis for inspection of materials the properties and uses of which are not sufficiently developed to warrant submission to the British Standards Institution for standardisation.

1. Chemical composition

(a) The chemical composition of the pots shall be :—

| | | | | |
|-----------------|----|----|----|--|
| Total carbon | .. | .. | .. | not more than 3.4 per cent. |
| Combined carbon | .. | .. | .. | not less than 0.6 nor more than 0.9 per cent. |
| Silicon | .. | .. | .. | not less than 1.6 nor more than 2.4 per cent. |
| Sulphur | .. | .. | .. | not more than 0.12 per cent. |
| Phosphorus | .. | .. | .. | not more than 0.6 per cent. |
| Manganese | .. | .. | .. | not less than 0.5 nor more than 1.5 per cent. |
| Nickel | .. | .. | .. | not less than 0.25 nor more than 1.0 per cent. |
| Chromium | .. | .. | .. | not more than 0.25 per cent. |
| Copper | .. | .. | .. | not less than 0.2 nor more than 1.0 per cent. |
| Molybdenum | .. | .. | .. | not less than 0.5 nor more than 1.2 per cent. |

(b) The complete analysis of the pots shall be supplied to the inspector.

(c) The sample for chemical analysis shall be taken from one of the pots selected for the mechanical tests (see Clause 5). Before samples for analysis are taken from any pot, the pot shall be turned down at the end which is to be sampled, to a diameter approximately equal to that of the rough machined rings which are to be made therefrom. The drillings or turnings for chemical analysis shall be taken from the metal which remains after this machining has been carried out. As an alternative the pot may be drilled parallel to its longitudinal axis in the centre of the thickness of the casting with a drill whose diameter is approximately equal to the thickness of the finished ring. The whole of the sample after drilling or turning shall be sieved in a 30-mesh sieve. The parts which pass the sieve and the parts which do not shall be weighed and proportionate parts taken for each determination.

(d) If any sample fails to satisfy the chemical composition specified in paragraph (a) above the inspector may make such arrangements with the manufacturer for increased testing as may be considered necessary.

2. Freedom from defects

The pots shall be sound and free from blowholes and all surface and other defects. They shall be within reasonable limits of the dimensions specified and capable of being machined to the finished dimensions without leaving evidence of the cast surface. The outside diameter of the casting should be such that the whole of the chilled portion is removed by the rough machining operations on the pot.

3. Elasticity test

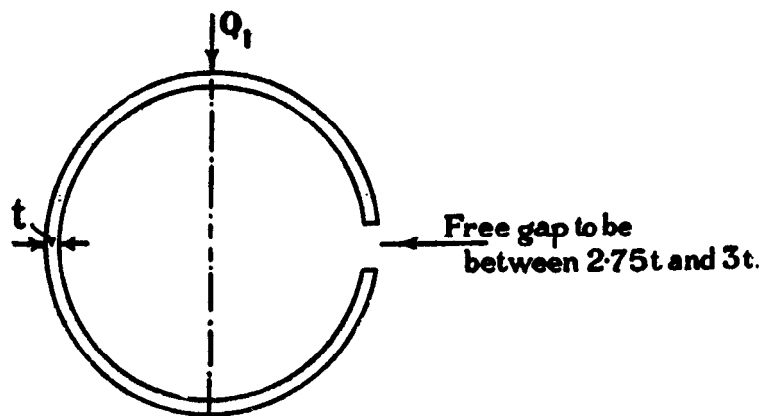
A test ring shall be machined from the pot, as specified in Clause 5, to a thickness of not less than $\frac{\text{Diameter (uncut)}}{34}$, and a piece shall be cut out of the ring so as to leave a free gap of not less than 2.75 t and not more than 3 t. The width (b) and the radial thickness (t) shall then be determined and a diametral load (Q₁) lb. sufficient to close the gap to less than 0.25 t shall be applied. The change in width of the gap (δ₁) and the mean external diameter (d) of the closed ring shall be measured and shall be such that E_n, when calculated from the following formula, is not less than 16.5 x 10⁶ lb. per square inch :—

$$E_n = \frac{5.37 \left\{ \frac{d}{t} - 1 \right\}^3 Q_1}{b \delta_1}$$

The mean external diameter (d) of the ring in the closed position shall be calculated from the measurement of the circumference taken by means of a calibrated tape or other equivalent method.

In order to remove a degree of permanent set from the ring and thus obtain uniform and strictly comparable values of E_n , the change of width of gap shall be measured on a second test, viz. after the ring has once been closed, allowed to open and again closed.

The manner of applying the load Q_1 is illustrated by the following diagram :-



4. Transverse breaking strength

The following test shall be carried out to the satisfaction of the inspector :-

A test ring cut from the pot, as specified in Clause 5, to an approximately square section or to a section approximating to that of the finished ring shall be split and pulled apart in a testing machine by a load applied at opposite ends of the diameter which is at right angles to that through the gap. It must withstand a stress of at least 24 tons per square inch before fracture, calculated by the use of the following formula :-

$$S = \frac{PD}{1200 bt^2}$$

where S = stress in tons per square inch.

D = external diameter of the unsplit ring in inches.

P = load in pounds.

b = width of ring in inches.

t = radial thickness of ring in inches.

5. Selection and preparation of test rings

(a) Three pots, which shall be taken at approximately equal intervals throughout the day, shall be selected by the inspector from each day's cast, and one test ring shall be cut from each pot for the elasticity and transverse breaking strength tests specified in Clauses 3 and 4. Should any ring fail to fulfil the test requirements, two other rings may be cut from the same pot and the test or tests repeated. If either of these test rings fails the inspector may reject all the pots from the day's cast or adopt either of the following procedures :-

(i) take one transverse breaking strength and one elasticity test from each pot in the day's cast.

(ii) make such other arrangements with the manufacturer for increased testing as may be considered necessary.

(b) The test rings shall be cut approximately from the middle of the length of the selected pot.

(c) No test ring shall be hammered or otherwise treated before being tested.

6. Identification

All pots passed by the inspector shall be stamped with the mark of the inspector and such other marking as will ensure full identification of the material.

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