PURCHASE SPECIFICATIONS

RENAULT

30 - 03 - 212 / - - D

AIRTIGHTNESS OF CASTINGS

Normalisation Renault Automobiles
Service 65830
Section Normes et Cahiers des Charges

This document is to be considered as a whole the parts of which shall not be separated.

DATE OF ISSUE

April 1996	- - -	Supersedes document 32-05-841. This issue originates from Draft NC 96 166 / - - B.

REVISIONS

November 1996	- - A	§ 2.1. exhaust duct leakage threshold being defined. § 3.2. Additional requirement. § 4. "Repairs by sealing" paragraph revised. Annex 1 "Undertaking of conformity" added. Annexes 2 and 3 added. This issue originates from draft NC 96 643 / - - C.
February 1997	- - B	Modification to headings of pages 7 and 8. This issue originates from draft NC 97 083 / - - -.
June 1997	- - C	Exhaust duct leakage threshold of paragraph 2.1. modified. Annex 1 and 2 modified. This issue originates from draft NC 97 323 / - - -.
June 1998	- - D	Updating of Annex 3. This issue originates from draft NC 98 295 / - - -.

REFERENCED DOCUMENTS

Standards	:	00-10-001, 00-10-415, 03-50-000, 03-80-500, 03-80-600.
Product Specifications	:	39-02-010, 41-01-001.
Test Methods	:	D47 1098, D45 1933, D47 1165, D49 1836.
Production equipment standards	:	E41.36.416.N.

SCOPE AND FIELD OF APPLICATION

These product specifications define the requirements concerning air tightness of castings in the as-cast condition or in the machined condition prior to assembly, and having a "tightness function". The part number is entered on the RENAULT Engineering Centre drawing and on the Supplier's drawings validated by RENAULT.

1. GENERAL CONDITIONS

The provisions of Standard 00-10-415 "Manufacture and supply of products - General requirements" are wholly applicable to these product specifications unless express and written instructions are given to the contrary.

2. PART REQUIREMENTS

2.1. TIGHTNESS FUNCTION

The tightness requirements for finished castings are determined according to the functions to be ensured. These are characterized y the conditions and the results of "air in air" tests listed in the table below, and which does not apply to assemblies.

FUNCTIONS TO BE ENSURED on unitary part	RELATIVE TEST PRESSURE	LEAKAGE THRESHOLD "Conforming parts"
Intake duct	650 mbar	85 cm^3/min
Exhaust duct	1 bar	300 cm^3/min
Fuel feed	2,5 bar	1 cm^3/min
Engine cooling	1 bar	3,6 cm^3/min
Manual gearbox pressurized circuit	1 bar	7 cm^3/min
Automatic gearbox pressurized circuit	1 bar	5 cm^3/min
Engine pressure lubrication	1 bar	12 cm^3/min
Gearbox splash lubrication	1 bar	12 cm^3/min
Engine splash lubrication	1 bar	25 cm^3/min

LEAKAGE THRESHOLDS of "Conforming parts": corresponding to the volumes measured at atmospheric pressure and temperature 20 °C.

2.2. MARKING

If the definition file specifies a 100 % test, each part checked as air tight shall be identified by an identification marking defined on the Supplier's drawing (codification and area).

3. QUALITY MONITORING OF SERIES PRODUCTION PARTS

3.1. FINISHED PART QUALITY GUARANTEE

It is the task of the Supplier of the finished part (after machining) to guarantee the "air tightness" requirement of the parts, in accordance with the drawing specifications. The Supplier shall define his tests and sampling frequencies allowing for the results obtained on quantities representative of series production.

The "quality" organization of the Supplier of the finished part shall enable him to detect anomalies during manufacture, to take corrective action and to prevent shipment of defective supplies.

3.2. AS-CAST PART QUALITY GUARANTEE: CONTRACT BETWEEN FOUNDRY AND MACHINING PLANT

The Supplier of as-cast parts shall:

- guarantee the air tightness requirement which he has undertaken to provide with respect to his machining plant,

- define the tests and frequency of sampling according to the results recorded on quantities representative of series production.

A percentage of non-airtight as-cast parts is accepted when a unitary leakage test is specified after machining.

If this percentage is exceeded, the as-cast part Supplier shall:

- improve his "material health" procedures,

- perform a unitary leakage test or sealing of as-cast parts before delivery for machining.

The parts detected as non-airtight after machining are rejected or repaired according to § 4. or § 5.. The maximum percentage of sealable parts after machining shall be the subject of periodic negotiations between the Supplier and the customer (machining plant).

3.3. LEAKAGE TESTS

The tests are performed using the facilities and under suitable conditions to satisfy quality, costs, delivery time and quantity conditions.

It is the Supplier's task to correlate the test conditions (temperature, pressure and flow rates) and the Engineering Centre specifications.

Capability studies of the "air in air" leakage testing facilities are to be performed according to Standard E41.36.416.N (Moyens de production - Agrément capabilité des moyens de mesure et des moyens de contrôle d'étanchéité air dans air) and guide GE.41-014 R (Fascicule de documentation - Exemples de fiches pour l'agrément capabilité des moyens de contrôle d'étanchéité air dans air).

The Supplier of as-cast parts and machined parts shall record the quantities tested and the results obtained on a monthly basis. These records are to be kept available for RENAULT for a period of three years.

4. REPAIR BY SEALING

4.1. EXTENT OF REPAIRS

If necessary, the specifications (drawings, product specifications, etc.) indicate whether it is authorized or prohibited to perform repairs by sealing.

Only non-treated parts can be repaired, unless otherwise specified by RENAULT.

Cracked parts shall be scrapped.

The maximum leakage threshold for a repair by sealing is 400 cm^3/minute at 1 bar (for information this leakage threshold corresponds to a hole of ∅ 150 µm).

A part which has been sealed in the as-cast condition can be sealed a second time in the machined condition. In such cases, the sealing products shall be compatible.

4.2. SEALING PRODUCTS

4.2.1. Product approval conditions (resins)

The test conditions applied depend on the environment where the part concerned is localised (see table in annex 2).

4.2.2. Approved products

The list of products tested by RENAULT at the date this document was issued is adjoined in annex 3.

The utilisation of other resins is subject to the prior approval of RENAULT.

4.3. REPAIR OF PARTS BY SEALING

4.3.1. Conditions preparatory to repairs

For each part, the supplier shall:

- submit a conformity undertaking in accordance with annex 1,
- obtain the approval of RENAULT by return of the endorsed conformity undertaking,
- draw up a repair process including the following items:
  - . the references of the company which performed the repairs,
  - . the references of the site where the repairs where performed,
  - . the designation of the approved part,
  - . the application process (the impregnation operators shall observe the process and instructions specified by the resin manufacturer),
  - . the process for testing the parts after sealing,
  - . the identification of sealed parts (location and type of marking, see § 4.3.2.1.).

These items shall be classified in the Supplier part file and shall be available to RENAULT on demand.

4.3.2. General conditions

4.3.2.1. Identification

All sealed parts shall be identified by the letter E affixed either by punching or by indelible marking.

The identification area is indicated on the part drawing.

4.3.2.2. Cleanliness after sealing

Delivered parts shall have no traces of excess resin (drops, runs, deposits, etc.), in particular in fluid circuits and blind holes.

4.3.2.3. Sealing of machined parts

Repair of machined parts by sealing is the responsibility of the foundry after agreement regarding the cost and quantity has been concluded between the RENAULT Purchasing Department and the Supplier. Under no circumstances, should the cost of repairs exceed the cost price of the casting.

5. OTHER REPAIRS

In given conditions, category 1 precoated screws can be used subject to the approval of RENAULT (cf. Product Specifications 39-02-010 "Nuts, screws, bolts precoated with a sealing product").

6. OTHER REQUIREMENTS

As supplementary requirements may prove necessary, RENAULT reserves the right to modify or complete these product specifications at any time with additional clauses.

ANNEX 1

RENAULT

AIRTIGHTNESS OF CASTINGS

UNDERTAKING OF CONFORMITY

SUPPLIER:
PART:
P/N:
SEALING PRODUCT:

In accordance with Product Specifications 30-03-212 we hereby undetake:

- to repair no cracked part or part with a leakage corresponding to an airflow greater than 400 cm^3/min at 1 bar,
- to use products approved by RENAULT and to implement the process recommended by the supplier of the products.

Supplier represented by Mr	Approval of RENAULT quality official Mr
At Date	At Date
Signature	Signature

ANNEX 2

SEALING PRODUCT APPROVAL CONDITIONS

	TEST CONDITIONS	REQUIREMENTS
CORROSION SEALING AFTER AGEING (Test Method D45 1933)	after 7 days in engine oil (03-80-600) at 150°C pressure 4 bars	no leakage no corrosion
	after 7 days in manual gearbox oil (03-80-500) at 150°C	no leakage no corrosion
	after 7 days in automatic gearbox oil (03-80-500) at 150°C	no leakage no corrosion
	after 7 days in type D coolant (41-01-001) at 120°C pressure 2 bars	no leakage no corrosion
	after 7 days in liquid petroleum type O (03-50-000) at 60°C pressure 2 bars	no leakage no corrosion
	after thermal shocks * (D49 1836)	no leakage no corrosion
	after damp ageing * (D47 1165 R7)	no leakage no corrosion

***** : These test conditions shall be implemented for each case of use.

ANNEX 3

SEALING

List of products approved according to RENAULT procedures and requirements

PRODUCTS	USED FOR PRODUCTS IN CONTACT WITH:				
	ENGINE OILS	GEARBOX OILS (M.G.B. / A.G.B.))	TYPE D COOLANT	GAS GUEL	LIQUID FUEL
LX 70-11 LOXEAL	yes (1995)	yes (1995)	yes (1995)	yes (1995)	yes (1995)
LX 70-90 LOXEAL	yes (1995)	yes (1995)	yes (1995)	yes (1995)	yes (1995)
PMS 10 LOCTITE	yes (1990)	yes (1990)	yes (1990)	yes (1990)	yes (1990)
PMS 75 LOCTITE	yes (1990)	yes (1990)	not checked by RENAULT	yes (1990)	yes (1990)
ULTRASEAL PC 504 MALDANER	yes (1980)	yes (1980)	yes (1997)	yes (1984)	yes (1980)
IM 3 000 MALDANER	yes (1996)	yes (1996)	yes (1996)	yes (1996)	yes (1998)
IM 4 000 MALDANER	yes (1996)	yes (1996)	yes (1996)	yes (1996)	yes (1998)
IM 4 500 MALDANER	yes (1998)	yes (1998)	yes (1998)	yes (1998)	yes (1998)

NOTE: Brackets indicate year RENAULT performed the tests.