



VCA GUIDE

TO

THE TYPE APPROVAL OF RETREAD TYRES

**Vehicle Certification Agency
1, The Eastgate Centre
Eastgate Road
Bristol BS5 6XX**

Telephone: 0117 951 5151
e-mail: enquiries@vca.gov.uk
website: www.vca.gov.uk



A GUIDE TO THE TYPE APPROVAL OF RETREAD TYRES

INTRODUCTION

For many years countries had national requirements that had to be met by vehicles operating on their roads; the UK Construction & Use and Road Vehicle Lighting Regulations are examples. Each country's requirements were different, leading to difficulties for manufacturers exporting from one country to another.

In an attempt to overcome these barriers to trade, the Economic Committee for Europe, starting in 1958, devised a set of common standards called Regulations. Their application was not mandatory, but any country could "sign up" to apply a given Regulation if it felt that the requirements contained in it met its national needs. The Regulations covering new tyres are ECE Regulations 30 (car), 54 (commercial) and 75 (motorcycle).

In effect, a manufacturer wishing to have his product assessed for compliance with the relevant Regulation's requirements could go to any country that had signed up to that Regulation. Assuming the product passed the requirements successfully, the responsible authority in the country in which the checks were carried out would issue an Approval Certificate for the product, this being in effect a certificate of compliance with the requirements of the Regulation. The approval could then be presented in any other country that was a signatory to that Regulation, and it would be accepted as proof of compliance with the requirements. The manufacturer could sell his product in that country without having to carry out additional testing.

UK national requirements have for some years demanded approval to Regulations 30 and 54 for all tyres supplied as original equipment. This requirement was later extended to include new tyres supplied to the after-market.

Up to now the quality/specification of retread tyres in UK has been controlled by the need to comply with the requirements of BSAU 144; these requirements were purely national in extent, and other countries had differing national requirements. Steps have now been taken to place retread tyres on a similar footing to "OE" tyres with the introduction of two ECE Regulations, numbered 108 and 109, covering manufacturers producing car and commercial vehicle tyres respectively. These Regulations entered into force on 23.06.98 (i.e. were available for use as a specification as opposed to a requirement for entering the market).

The purpose of this guide is to explain how the type approval system works, and to attempt to answer some of the questions that are likely to arise. Note that it will be subject to revision from time to time in the light of experience.

1. THE LEGISLATION

There are two pieces of European legislation applicable to retread tyres. Namely:

- Regulation 108 (motor cars and their trailers) and
- Regulation 109 (commercial vehicles and their trailers)

Both are available from several sources including VCA (contact the VISTA team on +44 (0) 117 9524178 Fax 0117 9524146) for a small charge.

As regards incorporation into national requirements, France, Germany, Holland and Italy would appear, on current information, to intend to mandate the requirements of the two Regulations fairly quickly. UK mandated them in C&U in 2002.



It is an unfortunate fact of life that the world does not stand still, and legislation, once written, will require alteration to keep it in line with current developments. Therefore pieces of amending legislation will appear at irregular intervals in the form of Amendments, Supplements or Corrigenda to adapt the legislation to current conditions, developments in the retread tyre field, etc.

It is important that as part of a manufacturer's quality system, that they are aware of such changes, particularly if they are exporters, since a signatory country may mandate the latest approval level into his national legislation.

2. THE APPROVAL PROCESS

The approval of retread tyres is unusual in that, whereas other approvals cover products (e.g. a tyre), in this instance the approval covers the methods used by a manufacturer to produce the tyre. The scope of the approval (the "range" it covers) is constrained by the requirements laid down in paragraph 4 of the Regulations; note also that 2 approvals (one to each Regulation) are required if the manufacturer produces both car and commercial tyres.

Having said that, VCA intend to apply the same approach to what can and cannot be encompassed within one approval as we apply to approvals to "new" Tyre Regulations. Thus:

- a. If a retread manufacturer has more than one production site, or uses more than one retreading process, all can be accommodated on one approval provided that the production methods, control procedures and quality management systems are identical in all major respects at both sites. All the retreading processes and the location of all sites to be covered by the approval must be listed in the documentation.
- b. The retread manufacturer may include more than one of his trade names or marks under one approval, but all such names or marks must be specified in the approval documentation.
- c. The Approval Certificate (shown in Annex 1 of both Regulations and produced by VCA) defines the scope to the range of tyres, sizes, speeds, loads, etc. and is supported by technical specifications provided by the manufacturer. The manufacturer can increase the scope of his approval, while retaining the same approval number, by applying to the technical service which issued the original reports for the issue of an Extension (ref. Para. 5 later in this document). The Technical Service/authority (e.g. VCA) which issued the manufacturer's original approval will examine the nature of the extension required to decide whether it is possible, and, if it is, whether additional testing will be required.
- d. **Note that applications for extension must be made to the authority who issued the original approval; an approving authority cannot extend an approval issued by another authority.**
- e. The decision on the necessity for additional testing will depend on the nature of the extension being requested, and will be at the discretion of the test engineer involved. In general such decisions will be guided by a set of "worst case criteria" (see attachment 1).

3. THE TYPE APPROVAL PROCESS

To initiate the approval process, a letter or fax should be sent to VCA or the recognised VCA Technical Service of your choice (go to <http://www.vca.gov.uk/??> for further details). to request a job number. This job number is a unique reference for the work and must be quoted in all correspondence. The manufacturer will be advised of this number, and the name(s) and telephone/fax number(s) of the engineer/assessor responsible for his job.



It will save time if this initial letter is accompanied by the approval application data laid down in paragraph 4 of the Regulations. If the manufacturer is unsure on any point it can be sorted out with the test engineer/assessor at a later date, but basically the more relevant information the manufacturer can supply at this stage the better.

The approval process then splits into two streams (manufacturing assessment process and testing activity):

3.1. THE ASSESSMENT PROCESS

In this part of the approval process the retread manufacturer's quality management systems and control procedures are investigated to ensure that his products are produced to a consistent standard in line with that required by the Regulations. These requirements are defined in paragraphs 6.1-6.5.4 of the commercial Tyre Regulation and paragraphs 6.1-6.7.7 of the car Tyre Regulation. The retreader must demonstrate to VCA the methods he uses to meet with these requirements; a checklist to assist the manufacturer to compile this submission is available - see attachment 2 for an extract from the requirements.

This may or may not require a visit to the production site by the assessor; accredited certification to ISO 9002 will be taken into account when reaching a decision on the necessity for a visit. Manufacturers wishing to achieve ISO9002 certification may care to note that VCA has been appointed by the UK Accreditation Service as an accredited certification body; further details may be obtained from the Management Systems certification (MSC) team (go to <http://www.vca.gov.uk/??> for further details).

Manufacturers should include details of their ISO9000 certification, if any, in their application documentation, including the name of the body issuing the certification. A copy of the certificate and any appendices detailing its scope would be beneficial at this stage and should be included.

Note that, while certification to ISO9000 may remove the necessity for a site visit, full details of the product-specific control plans will still be required for assessment before approval can be granted. Further advice on control plans can be provided by VCA if required.

A VCA assessor will contact the manufacturer to arrange any visits; supply of any additional documentation, etc.; any queries or ambiguities should be addressed to the assessor.

3.2 PERFORMANCE TESTING

The legislation requires that tyres approved to the Regulations must meet defined dimensional and performance criteria. The dimensional requirements are laid down in paragraph 7.1 and the method of measurement in Annexes 6 of the Regulations. The performance criteria are checked by subjecting a certain number of tyres to a performance test. The number of tyres to be tested is laid down in paragraph 5.4 of the Regulations; note that these numbers are the minima to be tested for each retread process to be covered by the approval. The performance criteria are laid down in paragraphs 6.8 (car) and 6.6 (commercial) of the Regulations, the test procedures in Annexes 7.

To decide which tyre variants [size, tread pattern, speed rating, etc.] are to be tested, the Technical Service's engineer will require details of the range of tyres that will be produced by each retread process that the retread manufacturer wishes to cover under the approval. Details will include such data as size designation, speed category, load capacity index and tread details/pattern. The engineer will apply the "worst case criteria" as shown in Attachment 1 (as a guide) to decide which tyres will be required for testing. The objective of worst casing is to minimise the testing and hence the cost.

When the tyre variants to be tested have been identified selection of the actual test tyres will be carried out by VCA or other bodies appointed by VCA, depending on which is most



appropriate and convenient. The selection of the tyres for test may be carried out at one of two points in the manufacturing process: -

- a. as a casing prior to remoulding, the casing being suitably marked for identification purposes, or
- b. from the stock of tyres after the remoulding process has been completed.

Carriage of tyres to the test venue is the responsibility of the manufacturer.

The test venue is at the discretion of the manufacturer; it can be at a VCA-appointed Technical Service, in which case the tests can be carried out unwitnessed by VCA, or at an approved test site of the retreader's choice, in which case the tests must be witnessed by a VCA test engineer.

Note that the test site must be VCA-approved by undergoing a test facility appraisal to ensure that it is capable of conducting the tests to the required standard; note that ideally this inspection should be carried out some time before the site is required for approval purposes to permit any modifications to equipment or procedures to be carried out. Responsibility for site approval is up to the owner of the site, not the retread manufacturer.

VCA has appointed RAPRA Technology Ltd of Shawbury, Shropshire and the Tun Abdul Razak Research Centre, (TARRC) Brickendonbury, Hertford as a Technical Service for the testing of retread tyres.

Once the tests have been concluded satisfactorily, the Technical Service (in the case of unwitnessed tests) or the test engineer will produce a test report.

Once the assessment and test work has been completed, the documentation reviewed, any omissions or amendments attended to, and any outstanding fees paid, the approval certificate will be issued; examples are shown in Annex 1 in the Regulations. Note that two certificates will be issued if the manufacturer produces both car and commercial tyres, even if they are produced on the same site.

4. THE APPROVAL NUMBER

A unique Approval Number will be issued to each retread manufacturer to cover the site or sites listed on the approval certificate. Note that separate numbers will be issued for car and commercial production, even if carried out by the same manufacturer on the same site. Examples of approval numbers as they should appear on the approved range of tyres are shown in Annex 2 of the Regulations.

In order to permit retread manufacturers to carry out modifications to their moulds to incorporate the type approval number, they can apply for a Provisional Approval Number before the completion of the assessment/testing programme. These are issued subject to the initial acceptance of the COP data and on the strict understanding that no tyres bearing the number will be sold before the approval certificate is issued.

Requests for provisional approval numbers should be addressed to VCA (go to <http://www.vca.gov.uk/??> for further details).

5. EXTENSIONS TO THE RANGE OF TYRES APPROVED

The retread manufacturer may need to alter the details contained in his approval documentation, due to additions to the range of tyres produced, additional brand names, upgrading the approval to the latest amendment level etc. This is done by the issue of an Extension to the initial approval to cover the changes made. Note that depending on the level of legislation in force at the time of the extension, that this may require a change to the prefix of the approval number. This would therefore require a change to the number marked on the sidewall of the tyre.



The method of applying for an extension is the same as for the initial approval; the application should include the number of the approval that is to be extended, details of what changes are required, and supporting documentation.

The job will be issued to a test engineer who will discuss the required changes with the manufacturer and decide whether additional testing/assessing is required. The job will then proceed as for an initial approval.

Note that:

1. Approvals may need a number of extensions early in their life to expand their range to the whole range of tyres produced by the manufacturer. At the initial approval stage, the manufacturer may not have available tyres of all the sizes identified for testing by a "worst case" consideration of the manufacturer's complete range. The test tyres are likely to be drawn from the outer edges of the range of size/speed/load capacity, and such tyres are likely to be fitted to the more esoteric vehicles requiring small batch production at irregular intervals. Therefore a manufacturer may have the scope of his approval limited initially by the range of tyres he has available for test, extending it later when tyres at the outer extremities of the envelope become available.
2. As part of the approval requirements, a manufacturer is required to notify VCA of major changes to their quality control system. Where for example a manufacturer has several sites operating under a single quality system listed on the approval, and then one of the sites develops a separate quality system, this would require a new approval certificate and number. Additional sites can be added to an approval by agreement with VCA so long as they operate under the same quality system.

6. CONFORMITY OF PRODUCTION

Visits will be made at intervals by VCA assessors to check that standards are being maintained and operating practices adhered to. The visits normally last about a day for each average sized plant, their duration being dependant on the range covered by the approval, complexity, etc. and the amount of information provided prior to the visit and the number of inconsistencies which require discussion. Their frequency will depend on the confidence that the manufacturer generates; e.g. a company with a valid ISO9002 certificate could expect a control plan visit once every 2 or 3 years. For companies without such a certificate, initially annual visits will probably be the norm, falling to once every 2 or 3 years as confidence is built up.

The COP requirements are contained in paragraph 9 of the Regulations, and require a number of tyres to be tested annually. The retread manufacturer must complete the tests laid down in paragraph 9.2 of the Regulations; the approving authority must complete the tests laid down in paragraph 9.4. A manufacturer's test control plan will be agreed by VCA at the time of initial approval; identification of the specific types of tyre [size, speed rating, tread, LCI, etc.) required for audit testing will be agreed annually with the manufacturer. Selection of actual tyres [carcass or finished tyre] for audit testing will be carried out by VCA or agents appointed by VCA, the cost of such audit selection visits being invoiced to the manufacturer and paid by the manufacturer to VCA/the agent direct.

Audit testing may be carried out at a Technical Service test site (as an alternative to a manufacturer's facility or a test lab commissioned by the manufacturer) and the Technical Service will produce a test report for discussion at the next visit by the assessor. Costs of the audit tests, including the cost of the test report, will be invoiced direct to the manufacturer by the Technical Service. A copy of the test report will be sent direct to VCA by the Technical Service.



By agreement with VCA alternative test sites may be used provided they have been approved; they will be designated in the control plan. Note that all such tests carried out at alternative test sites will have to be witnessed by VCA.

If a failure occurs, VCA must be informed immediately, with details of the tyre concerned, its date of manufacture and the nature of the failure; the tyre carcass should also be retained for possible inspection. Such an occurrence would probably result in a visit from an assessor to discuss the situation, possible causes and remedial action, and is likely to require additional testing.

Maximum and minimum limits for the number of tyres tested annually are laid down in the legislation; the actual number tested will depend on the confidence that VCA has in the manufacturer. VCA, as the approving authority, also reserve the right to call at a manufacturer's premises unannounced and select a tyre off the production line for test purposes. In this way VCA considers that it satisfies the requirements of the paragraphs concerned.

7. FEES

VCA is currently operating a time based charging mechanism and therefore it should be noted that all the fees figures quoted are first estimates and are likely to vary from company to company depending on the efficiency of the testing, availability of correct documentation etc. The figures below are therefore for indication purposes only and may not be the final figure charged.

7.1 Fees to obtain Initial Approval

The amount of fees needed to obtain approval will be dependent upon a large number of factors, including: -

- a. The size of the company;
- b. The number of retread processes used by that company.
- c. The range of tyre sizes produced by the company.
- d. The complexity of the control methods, operational procedures, etc.
- e. The amount of data on the above supplied to VCA before the site visit.
- f. Whether the manufacturer has accreditation to ISO 9002.
- g. Whether the approval tests are witnessed by VCA i.e. whether or not they are carried out at the technical service's test facility.

While *a*, *b*, *c*, *d* and *e* are likely to vary widely from company to company, *f* and *g* result in a simple yes/no answer, and fees have been calculated for various combinations of these 2 variables. The fees required have been based on those charged over a large number of years for the testing of "new" tyres (note that the test procedures for "new" and remould tyres are identical).

Note also that:

- i. all fees are calculated assuming the use of a single-station test machine,
- ii. the manufacturer pays for the hire of the test facility separately direct to the facility owner.
- iii. it has been assumed that only the minimum number of tyres permitted by the legislation (5) are tested. (Please note that up to 20 tyres may be tested at the discretion of the Test Authority.)
- iv. No VAT is payable on VCA's charges



- v. No VCA travel expenses are payable (work inside the UK only)

Typical examples of the fees for the various combinations of the variables *f* and *g* are as follows: -

7.1.1 Retread Car Tyres

a. Approval of one production process for a manufacturer without ISO accreditation (requiring a 1-day site visit by a VCA assessor); 5 consecutive tyre tests at a VCA-approved test site (requiring witnessing by a VCA test engineer). Examination of documentation and test reports, issue of approval.

£1,735

b. As a, but tyre tests carried out at VCA-appointed Technical Service test site (no test witnessing by VCA engineer, but 1-day assessment visit still required).

£1,009

c. As a, but manufacturer has ISO accreditation and acceptable documented control plans. (No assessment visit, but witnessed tyre tests).

£1,184

d. As a, but manufacturer has ISO accreditation, acceptable documented control plans and tyre tests carried out at Technical Service test site. (No assessment visit or witnessed tests).

£458

7.1.2. Retread Commercial Tyres

While the contents of the individual test fees *a*, *b*, *c* and *d* below are identical to those for car tyres given above, the fees are different due to the differences in the test programmes.

a.	£4,997
b.	£1,009
c.	£4,446
d.	£458

Notes.

1. "Consecutive" tests are tests carried out one after another, requiring a single test site visit, and no necessity for test machine recalibration, etc. Additional fees will be charged if tests are non-consecutive (requiring repeated visits to the test site).
2. Assessment visits taking more than one day attract additional fees at the rate of £630 per day.
3. Reductions in fees are possible if a multi-station machine is used, or if 2 single-station machines are used simultaneously.
4. Witnessing of the car tyre tests (1-hour duration) will be continuous; commercial tyre tests are witnessed on an intermittent basis due to their duration (up to 47 hours).
5. All the above fees for commercial tyres are calculated assuming a test duration of 47 hours; there will be no reduction for the 34 hour test required for tyres with a load index of 121 or less, and a speed rating of M, N or P, since the amount of work involved is unaltered. However, if the load index is 121 or less, and the speed rating is Q or above, a test of only 1 hour duration is required. If one or more of these tests is included in a test programme carried out at an approved test site, i.e. in which the tests must be witnessed, there will be a **reduction** of £615 in the fees for each such test.



As with “Scope” and “Extensions”, these are only some of the queries likely to arise on the fees subject; additions of general interest will be advised by a similar “interpretation” system.

7.2 Fees for Monitoring Visits

The duration and frequency of these visits will depend on the size and complexity of the company, the “confidence level” that VCA has in the company, the number of inconsistencies found, any problems with the test programme, etc.

It is estimated that, for an average size company without any major inconsistencies in its procedures, a 1-day visit should be sufficient. For the first, and each subsequent day required, the fee will be £630 per day; this figure includes all additional work carried out “back at base”, e.g. production, copying and distribution of reports, etc.

7.3 Payment of Fees

An estimate will be made by the test engineer/assessor of the fees required to obtain initial approval based on the data supplied by the manufacturer. At the conclusion of the approval process the actual amount of work involved will be assessed and the amount of the fees to cover it will be calculated. Fees for monitoring visits will be invoiced retrospectively.

GUIDANCE NOTES FOR THE WORST CASE SELECTION OF RETREAD TYRES

With the wide variety of tyres that are likely to require inclusion under a retread tyre approval, it is impossible to give a dogmatic set of rules to cover the worst case procedure for all approvals. However, the following are put forward as general guidelines when confronted with the problem. Other criteria which may affect the test performance of a retreaded tyre may be considered when making the selection.

It should be noted that the selection may be constrained by what the manufacturer has available at the time of the worst case meeting; this may result in the approval being repeatedly extended as tyres at the outer ends of the manufacturer's range become available for test.

The guidelines below are applicable to approval of passenger car and commercial vehicle tyre retreaders. It assumes that only the minimum number of tyres will be tested, i.e. 5. In exceptional circumstances, at the discretion of the Technical Service, more tyres may be selected. (e.g. more than five processes)

INITIAL APPROVAL OF A CAR TYRE RETREADER

Select 5 tyres only from the retreaders range, using the following criteria in the order given. Not all criteria need to be met; once five tyres have been selected using as many of the criteria as is possible, the selection ends. Criteria are not absolute unless marked "*" i.e. if the combinations suit a tyre with a fairly high speed rating, but not the highest, then that is acceptable.

- one tyre per manufacturing process *
- one tyre high load rating
- one tyre high speed rating
- one tyre with a worst case tread pattern (e.g. chunky tread likely to suffer from heat build up
- on test)
- one tyre incorporating special features (e.g. provision for fitment of studs)
- one tyre of the largest diameter
- one car tyre of the widest section

For example, a retreader has two manufacturing processes for retreading car tyres. Tyre 1 is produced by process A, has a high load rating and has one of the largest diameters. Tyre 2 is process B has highest speed rating. Tyre 3 has a chunky 4x4 type tread pattern. Tyre 4 could have provision for fitting studs. Tyre 5 has widest section. The selection is complete.

INITIAL APPROVAL OF A GOODS VEHICLE TYRE RETREADER

Select 5 tyres only from the retreaders range, using the following criteria in the order given. Not all criteria need to be met; once five tyres have been selected using as many of the criteria as is possible, the selection ends. Criteria are not absolute unless marked "*" i.e. if the combinations suit a tyre with a fairly high speed rating, but not the highest, then that is acceptable.

- one tyre per manufacturing process *

- one tyre per test procedure (R54 van - Annex VII Para 3, R54 truck - Annex VII App. 1) *
- one tyre high load rating
- one tyre high speed rating
- one tyre of each size known to be particularly difficult to retread (e.g. super singles)
- one tyre with a worst case tread pattern (e.g. chunky tread likely to suffer from heat build up
- on test)
- one tyre incorporating special features (e.g. provision for fitment of studs)
- one tyre of the largest diameter
- one goods vehicle tyre of the narrowest section

For example, a retreader has two processes for retreading goods vehicle tyres. Tyre 1 is highest speed rating and may also have a wide section and is made by process A and requires testing to the R54 van procedure. Tyre 2 is a high load, narrow section tyre, process B and requires test to R54 truck procedure. Tyre 3 is a super single, process A, R54 truck test procedure. Tyre 4 is a 4x4 chunky tread, process B, able to take studs and requires testing to the van procedure. Tyre 5 is a large diameter tyre, process A and requires testing to the truck procedure. The selection is complete.

If a manufacturer requires approval for both car (Reg. 108) and truck (Reg. 109) retreads five samples will be required for each approval

CONFORMITY OF PRODUCTION SURVEILLANCE

Selection to be based on 3 criteria, not necessarily equivalent to the initial test criteria. Number of tyres tested to be 0.01% of production min 5 max 20 per annum for a car tyre retreader and 0.01% of production min 2 max 10 per annum for a commercial vehicle tyre retreader per the Regulations for each approval.

one tyre from each process must be chosen

one tyre of each size with high production volume

one tyre of each size known to be difficult to retread Again, these criteria can be combined in one tyre.

Again, these criteria can be combined in one tyre.

Any tyre in having been passed fit for despatch which shows evidence of poor quality retreading (e.g. insufficient flash, incomplete moulding, poor bonding/finishing at carcass/cap join) may also be selected within the above limit on numbers of tyres for test.

ECE REGULATION 108 (CARS) AND REG 109 COMMERCIAL VEHICLES

RETREAD TYRES - CONTROL PLAN AND PROCESS CHECK SHEET

CONTROL REQUIRED		AVAILABLE Y.N.? N/A DOC REF NO
1.	Examination of Finished Tyre - for correct Trade Name/Mark, date code and Type Approval Number	
2.	Availability of specifications for repair material used	
3.	Availability of process specifications/instructions	
4.	Availability of limits of repairable damage	
5.	Availability of limits of damage/penetrations allowable in process	
6.	Receiving procedures to check for 'E' mark,[rejection of previously retreaded tyres and 7 year age limit.] <i>[text in brackets not applicable in REG 109 & E mark check not mandatory until 1/1/2000]</i>	
7.	Rejection criterion for visible overload/underinflation damage to carcass	
8.	Availability of list of acceptance criterion as defined in paragraph 6.4.4.1 and 6.4.5 (6.2.4.1 and 6.2.4.2) of standard	
9.	Post buffing inspection instruction availability to detect overheating, lacerations or loose material and inspection requirements as defined in paragraphs 6.5.4 to 6.5.7.5 (6.3.4 to 6.3.6)	
10.	Contour check for pre-cured material where used	
11.	Suitable process and materials to treat exposed steel parts	
12.	Availability of repair material/patch application methods, storage conditions, and damage coverage limits, (and in appropriate language).	
13.	Availability of standards for reinforced patches including maximum inflation pressure for all patches. Limits (maximum x 2 of tyre pressure). Plus standards for any other repair materials used.	
14.	Availability of post repair inspection instructions	

	CONTROL REQUIRED	AVAILABLE Y.N.? N/A DOC REF NO
15.	Availability of tread/sidewall material specifications and conditions of storage and use (and in appropriate language)	
16.	Compound certification check carried out	
17.	Processed tyre, maximum time limit before cure specified	
18.	Cure time, temperature and pressure specified and within process/specification requirements	
19.	Use of radial/radially divided moulds for radial ply tyres. <i>[Mould dimensions appropriate to size of buffed tyres and thicknesses of new material]</i>	
20.	Control checks for minimum thickness of original material above belt after buffing and average thickness of new material (Radial/Bias belted) as defined in 6.6.8.1, (6.4.8.1)	
21.	Control checks for minimum thickness of original material above breaker, average thickness of new material and combined thickness (Bias/Ply/Diagonal) as defined in 6.6.8.2, (6.4.8.2)	
22.	Availability of procedure or check to ensure retread tyre does not show higher speed symbol or load index than first life tyre <i>[unless allowed by original tyre approved]</i>	
23.	Tread wear indicator height checks including checks for correct spacing and tolerance (+0.6/-0.0 mm) Tyre is at least 'L' rated, at most 'V' rated. <i>[These requirements not applicable in REG 109]</i>	
24.	Post cure inspection for defects and 1.5 bar inflation check carried out	
25.	Specific Examination and determination of any defect cause carried out	
26.	Tyre structural integrity check carried out together with destructive/non-destructive test and recording of results	
27.	Dimensional checks including runout. Refer paragraphs 7.1 to 7.1.5.2.	
28.	Performance check (drum test) arrangements made and record kept of tyre growth (+3.5%) and any damage observed	
29.	Procedure in place to notify VCA of changes to any retreading production unit	
30.	Performance (drumtest) carried out on 5-20 tyres (2-10 tyres) representing range throughout year (0.01% of production minimum) by independent (VCA approved) test house	

Retread Tyre Type Approval Procedure

