Draft Report of Meeting

UNECE Informal Working Group for a GTR on Tyres
Geneva, September 21 and 22, 2006

1. **Opening of the meeting and organizational matters.** The Chairman, Mr. I. Yarnold, welcomed the Contracting Parties (CPs) and NGO representatives. Representatives from the tyre industry were asked and agreed to provide secretarial support for this and future tyre gtr working group meetings. Draft reports of meetings will be submitted by Mr. J. C. Noirhomme (ETRTO) to Mr. Yarnold and also to Mr. Hubert, GRRF Secretariat, who will, with approval from the Chairman, place reports and related documents in the appropriate location within the GRRF web site. Thus, all tyre gtr working group members will have access to the relevant documents. It is expected that the meeting reports will be submitted to GRRF.

2. **Approval of the agenda.** The draft agenda (Informal document No. GRRF-60-06) was accepted without change.

3. **Feedback from WP.29/AC.3 in June 2006.** Mr. B. Gauvin, AC3 representative from France and chairman of WP.29, reported on the June AC.3 meeting where there was agreement, by the Contracting Parties, on a roadmap for development of a tyre gtr. He indicated optimism that a suitable gtr for tyres could be accomplished through cooperation of contracting parties and industry representatives.

4. **Review of the French Government proposal to WP.29.** Mr. Gauvin outlined some of the items in the tyre gtr roadmap as set out in document ECE/TRANS/WP.29/2006/139. He stated that the gtr must establish a set of tests corresponding to the specifications considered by the contracting parties as necessary for road safety and tyre/road sound emission. Additionally, the gtr must define a unique series of worldwide standardized markings.

5. **CP participation and contribution.** The Chairman invited Contracting Parties (CPs) to comment on the importance and efficacy of a tyre gtr. There was general agreement to the tyre gtr roadmap as outlined above by Mr. Gauvin; the representatives for the European Commission, Japan, and the United States indicated their support for the principle of a tyre gtr, but also indicated that the gtr must be based on sound science and good engineering data and provide for safety and noise impact. The Chairman encouraged CP participation in developing the draft proposals, and supporting data, for testing, marking, etc and reminded delegates that this will require close CP/industry cooperation.

6. **Review of the running activities since the last meeting on April 28, 2005.** Mr. M. Spinetto (ETRTO) expressed industry appreciation to Messrs. Gauvin and Yarnold, and also to all the CPs for their support in establishing the framework and roadmap for development of a tyre gtr. He emphasized the need for cooperation by all stakeholders in providing for an open analysis of issues relative to a tyre gtr. Since 2005, the proliferation of national and regional tyre regulations has continued unabated. Mr. Spinetto presented the tyre gtr status report, which was similar to the report given originally in April 2005 (Informal document N° 58-18), with recent (September 2006) updates. A copy of the presentation is included in this meeting report as ***Attachment I***.

Based on previous discussions, the modular approach for a tyre gtr would include: Mandatory Minimum Requirements (Marking, Dimensions, Harmonized High Speed Safety test, Endurance/Low Pressure Test, and Tyre Wet Adhesion), plus either; Module 1 Permissive Requirement (Plunger Energy Test, and Bead Unseating Test); or Module 2 Permissive Requirement (Tyre Rolling Sound). It was noted that, with the possible exception of wet grip and noise (which use ISO standards) the 1998 Compendium of Candidate Standards lists possible tests and procedures for consideration in developing the tyre gtr. Tyre industry representatives in attendance indicated their commitment to work with CPs to prepare a suitable gtr.

Ms. K. Herta (ETRTO) gave a presentation entitled "Understanding Global Tyre Regulations" which compared existing national and regional tyre regulations from around the world. The report focused on the following specific topics: Dimensions (sections width, overall width, and diameter), Endurance Test Procedures, Tyre Strength Procedures, High Speed Procedures, and Bead Unseating Procedures. A copy of Ms. Herta's presentation is included in this report as ***Attachment II***.

7. Confirmation of the scope of the GTR on tyres. There was recognition that, due to the lack of global uniform classifications for vehicle types, it is difficult to specify a scope and purpose for a tyre gtr. Both the United States DOT "Light vehicle" definition and the UNECE category 1 vehicle definition in Special Resolution number 1 (SR1) were discussed. It was suggested that the scope should be carefully defined to avoid inclusion of multiple tyre categories, requiring different test conditions, which could significantly complicate the adoption and use of the gtr globally. After considerable discussion the following draft scope and purpose statement was proposed.

> "This global technical regulation (gtr) specifies performance, dimensional and marking requirements of *passenger car tyres* for [passenger vehicles] of category 1-1 with a maximum mass [not exceeding 10,000 lbs/4536 kg or 11,023lbs/5000kg/?/?]."

Passenger car tyres, as used in the above statement, means a tyre specified in the *"passenger car tyre"* section of one of the International Tyre Standards. Examples of where current UNECE and USA FMVSS regulations make reference to "International Tyre Standards" were given using UNECE regulation Number 108 and USA FMVSS 110. Also background information regarding FMVSS 139 reference to passenger car tyres and light truck (LT) tyres was also referenced. These examples are included in this report as ***Attachment III***.

As agreement on the scope was proving difficult the group decided that the types of tyres and vehicle categories to be included in the scope should be addressed later together with the USA Light Truck (LT) tyre category. The USA representative explained that he could not support a proposal which excluded LT tyres from the scope, although he did advise that he would discuss the issue further at a National level. No final decision on the wording of the scope was made and consideration of tyre selection criteria versus vehicle category will continue during the next meeting.

It was hoped that in the future there exists the possibility of a further tyre gtr, for commercial truck tyres.

8. **Confirmation of existing tests to be considered for harmonization and their Regulations**. The Chairman invited ETRTO (Mr. Spinetto) to lead the group through a review of existing criteria from existing candidate standards. This led to a discussion of tyre physical dimensions and markings, plus tests for high-speed, endurance/low pressure, wet adhesion, plunger energy, bead unseating, rolling sound and the need to agree the harmonised system of units (kg, lbs, kpa, bar, etc.).

8.1 Regarding **dimensions**, which are used to determine the tyre's width and overall diameter and the height of the tyre wear indicators when inflated, it was explained that these and other similar criteria are critical for uniform fitments and interchangeability of tyres. There are at least six different methods in use around the world today. A spreadsheet comparing the different methods was presented during the meeting and is included in this report as ***Attachment IV***. It was noted that the industry has prepared a proposal for harmonized physical dimensions which is available for presentation to the group, should it be required. The Chairman requested that for all such proposals evidence should be produced explaining why a particular test condition or limit was chosen for the proposed harmonised test method.

8.2 Regarding **markings**, Mr. Spinetto presented a comparison of DOT and ECE R 30 marking requirements. The comparisons are shown below.

DOT

1. Tyre size designation (both)
2. Max. inflation pressure
3. Max. load rating
4. DOT symbol, both sides
5. Construction info and No. of plies (one side)
6. Tubeless or Tube Type
7. Radial (as appropriate)
8. TIN – Tire Identification Number (full on intended outboard partial on other)
9. Manufacturer/brand name.

ECE R 30

1. Tyre size designation
2. Service description (SS/LI)
3. Tubeless
4. Date code
5. Trade name
6. E Mark
7. M+S if applicable
8. Reinforced or extra load if applicable
9. Run-flat symbol if applicable
10. Tyre-to-rim fitment if applicable
11. Tread wear indicator position

An example of actual sidewall marking on a tyre was also demonstrated. A copy of the slide shown during the discussion is included as ***Attachment V***.

It was suggested to consider developing at ISO level the TIN, taking as an example the ISO standard for the VIN – Vehicle Identification Number.

It was also noted that there are at least two factory code schemes in existence (US DOT and China CCC).

8.3 Regarding **endurance and low pressure testing**, there are several variants of the endurance test, mostly based on FMVSS 109. An endurance test spreadsheet comparing different methods was presented during the meeting and is included as ***Attachment VI***. The low-pressure component, which is a continuation of the endurance test (same tyre, but lower pressure), has only one variant, from FMVSS 139. Because the endurance test introduces "parasitic failures" that are only seen in the test but not in the field (tread chunking due to road-wheel curvature), industry feels that before

adoption of this test into a gtr, the 'curve-to-flat' (test drum vs road) issues need to be adequately addressed, based on sound science and good engineering data.

8.4 Regarding the **high-speed tests**, FMVSS 139 requires a test at a maximum speed of 160 km/h for 90 minutes, whereas UN/ECE R 30 has a 60 minute test regime which requires several step speed increases up to the maximum as indicated by the speed symbol. It was also noted that the R 30 test has a speed reduction provision for road-wheel curvature-if a 1.7 m drum is used instead of a 2 m drum. The FMVSS and ECE test conditions are also very different in terms of temperature, load, and pressure. Thus, comparisons are difficult to make.

The USA FMVSS 139 test is constructed to prove that a tyre is capable of being used from 140km/h to 160 km/h for a certain time; it was underlined that in the USA maximum authorized speed is never more than 75mph (120 km/h). The UN/ECE R 30 test is constructed to prove the maximum capabilities of a tyre attained at the speed indicated on the tyre by the speed symbol (from 120km/h = L to well above 300km/h = (Y)). The importance of the tyre speed symbol in the EU market for vehicle manufacturers and end-users was underlined; the EU legislation requires that for proper tyre selection and fitting, the maximum speed capability of the tyre (indicated by the speed symbol) has to be equal to or greater than the maximum speed of the vehicle.

There are three possible scenarios for a high-speed test in the tyre gtr.

- The first is to create a completely new test covering both sets of conditions. This option would require a Design of Experiment (DOE), with an extensive research and scientific study, and would take considerable time (5 years minimum) and cost to complete.
- The second option is to use both tests. In other words require candidate tyres to satisfy both sets of regulatory requirements. But, this means more testing costs for industry, and may not be acceptable to the USA because the tests would not be harmonized.
- The third option is to use the existing FMVSS 139 high-speed test for speed symbols up through “S” (180km/h), and use the R 30 high-speed test for speed symbols “T” (190km/h) and above. This option would provide for only one test per tyre, but proof must be made that all “T” and above tyres automatically pass the FMVSS 139 high-speed test and vice versa that that all “S” and below tyres automatically pass the R 30 high-speed test.

A table showing the test requirements for both FMVSS 139, UN/ECE R30, and the combined test for “S” and below and “T” and above was presented and is included in this report as ***Attachment VII***. There was a general consensus by CPs that the 3rd option could be considered as a proposal for the high-speed test harmonization.

9. **Clarification of the definition of “harmonization”.** Because of time constraints and the priority of other issues, it was agreed not to address this subject at the meeting.

10. **Working plan.** There was a discussion of how the group should move forward to harmonize tyre marking and test methods. It was decided that tyre industry groups (ETRTO, JATMA, and RMA/TRA) would be assigned areas of work for which they will be responsible for development and presentation of draft proposals for

consideration by the full working group. The areas of work and the working group leader organizations are listed below.

Areas of Work	Task Group Leader
1. Tyre Sidewall Markings (size designation, service description, tyre identification number, type approval markings, etc.)	JATMA
2. Dimensions Test	ETRTO
3. Harmonized High Speed Test	ETRTO
I. Low/Speed Per. Test (Reg. 30-like)	
II. High speed Per. Test (USA 139-like)	
4. Endurance/Low Pressure Test	RMA - TRA
I. Endurance, followed by	
II. Low Pressure Test	
5. Plunger Energy Test (Breaking Energy)	RMA - TRA
6. Bead Unseating Test	RMA - TRA
7. Tyre/Road Sound Emission Test	ISO
8. Tyre Wet Grip Adhesion Test	ISO

There was discussion on the need for and use of **bead unseating and plunger energy tests** in various countries.

There was also brief mention of the **USA uniform tyre quality grading markings** (UTQG) for consumer information on tyre wet traction, temperature, and tread wear performance. No action items were approved, although it was noted that tyre speed symbols also provide comparative information relative to temperature performance, and that the gtr contemplates a minimum wet adhesion performance level.
These topics will be considered further during future meetings.

Regarding the eight areas of work identified above, each task group leader (ETRTO, JATMA, RMA-TRA) was asked to prepare preliminary draft documents on the relevant topics for consideration at the next meeting of the full gtr working group in February 2007. For each topic there should be developed a listing of issues, a program of work (goals, and rationale of how to achieve the goals based on data and engineering evaluation). Documents should be posted on the GRRF, tyre gtr web site no later than 29 January 2007.

11. **Harmonization of test method for tyre dimensions measurement**.
12. **Harmonization of high-speed test: feasible proposal**.
13. **Harmonization of endurance / low pressure test: discussion**.

Consideration of agenda items 11, 12, and 13 were covered under agenda items 8 above.

14. **Next steps.** The Chairman indicated that the tyre industry (principally through ETRTO, JATMA, and RMA) is expected to provide coordinated proposals, supporting data, and secretarial support to move the gtr forward. It was agreed that all documents

and proposals generated by the tyre industry would be submitted to the tyre gtr working group via Mr. Noirhomme, of ETRTO, who in turn would forward them on to Mr. Hubert (GRRF Secretariat) for placement on the GRRF web site. All posted documents will be identified by a specific identification code. It was noted again that all documents for consideration at the next meeting of the tyre gtr working group must be sent to Mr. Hubert by 29 January 2007.

15. **Any other business.** The USA representative reported briefly on activities in USA to develop a test method on tyre aging, that could be proposed for the GTR. The representative of the European Commission informed the attendees of their intention to consider Rolling Resistance performances in future Directives.

    There was agreement that the next meeting of the tyre gtr informal working group will convene on Monday 5 February 2007, at 10:00h in Geneva preceding the start of the GRRF meeting. The first part (morning) of the meeting will be without interpreters and the second part (afternoon) will have interpreters, per the normal GRRF session.

    The Japanese delegation offered to host the 3rd meeting of the tyre gtr task group in Japan in April 2007.

16. **Closure**. There was no other business to conduct and Mr. Yarnold adjourned the meeting at approximately 16:15h.

Attachments:
- I. Global Technical Regulation for Tyres – Status
- II. Understanding Global Tyre Regulations
- III. Background Documents Relating to Discussion on Scope
- IV. Physical Dimensions – Comparison of Different Methods
- V. Tyre Sidewall Markings
- VI. Endurance Test – Comparison of Different Methods
- VII. High Speed Test – Comparison of FMVSS 139 and UN/ECE R 30

ATTACHMENT I

Informal document No. **GRRF–58-18**
(58th GRRF, 20-23 September 2005,
agenda item 5.1.)
NB: updated Sep.2006

Global Technical Regulation for TYRES - status -

The European **Tyre and Rim** Technical Organisation

N°1

ETRTO analysis – updating

Current situation in Global market:

- A detailed worldwide analysis leads to a proliferation of test methods, approximately：
  - o 27 different test methods
  - o 6 different legal side-wall markings
  - o 2 factory code lists

- Various administrative prescriptions (complicated, costly, time-consuming)
- Small markets are adding to the list and are usually the most demanding

- **New regulations' proposals:**
  - **year 2004 –> Colombia, India, Indonesia, Perù**
  - **year 2005 –> Ghana, Kenya, Nigeria**
  - ***year 2006 -> Taiwan, Equador***

Proliferation of Tests & Legal Marking

	ECE	EU	USA	Australia	Gulf Country	China	Idonesia	
Tests (Pass. Car tyres)	**ECE (1958)**	**UE D.92/23**	**DOT 109 139**	**ADR**	**SASO**	**CCC**	**SNI**	**Total**
High Speed test	**X1**	**X1**	**X2**	**X3**	**X4**	**X5**	**X6**	***6***
Endurance			**Y1**	**Y2**	**Y3**	**Y4**	**Y5**	***5***
Breaking Energy			**Z1**	**Z1**	**Z2**	**Z3**	**Z4**	***4***
Low pressu re Perf.			**L1**					***1***
Bead Unseating			**U1**	**U2**	**U3**	**U4**	**U5**	***5***
5 different « safety » tests	**21 different test methods for a worldwide approval for the same tyre design**							
Physical dimensions	**M1**	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	
	6 different methods to measure the same tyr e design							
Specific sidewall legal marking	Yes	Yes	Yes	No	Yes	Yes	Yes	***COST ?***

ETRTO proposals in the framework of 1958 and 1998 agreements

Proposal to build the Test Menu

- Invite WP 29 C.P. to submit additional tests they consider not covered in the framework the 1958 agreement and that they want to include in the Test menu

- C.P. to select the most appropriate tests.
- Establish the GTR Test Menu for tyres approved by WP29.

- Define the procedure for the possible evolutions in the framework of WP29

(C.P. : Contracting Parties)

Proposal to build the Test Menu

The test menu for GTR will include :

- all the type of tests already used in the main regulations
- for each type of performance, only one harmonized test to be selected
- the best regulatory practice to be defined as reference benchmark

With the objective of:

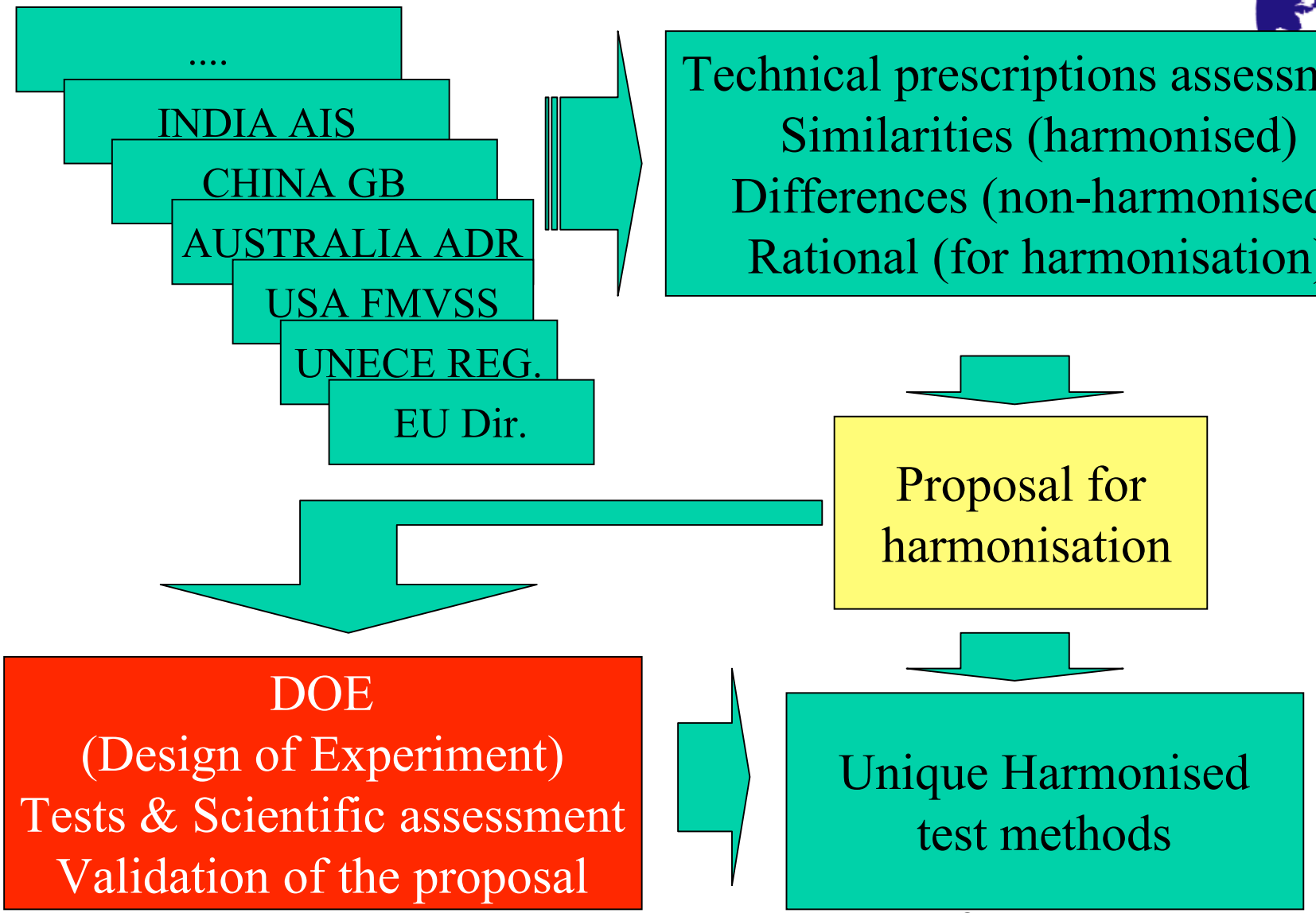
- avoid the actual proliferation of regulations

The Approved List of Components (Tests)
(GTR Tyres – working group meeting – Apr.28 '05)

1. Tyre Sidewall Markings	1. Various Regulations
2. Dimensions Test	2. Various Regulations
3. Load/Speed Perfor. Test (speed-rating)	3. Various Regulations
4. High Speed Perfor. Test (max160km/h)	4. Various Regulations
5. Endurance Test	5. Various Regulations
6. Low Pressure Endurance Test	6. USA FMVSS139
7. Plunger Energy Test (Breaking Eng.)	7. Various Regulations
8. Bead Unseating Test	8. Various Regulations
9. Tyre/Road Sound Emission Test	9. UNECE Reg.117
10. Tyre Wet Grip Adhesion Test	10. ISO standard

Various Regulations → Harmonised Test NOT Available

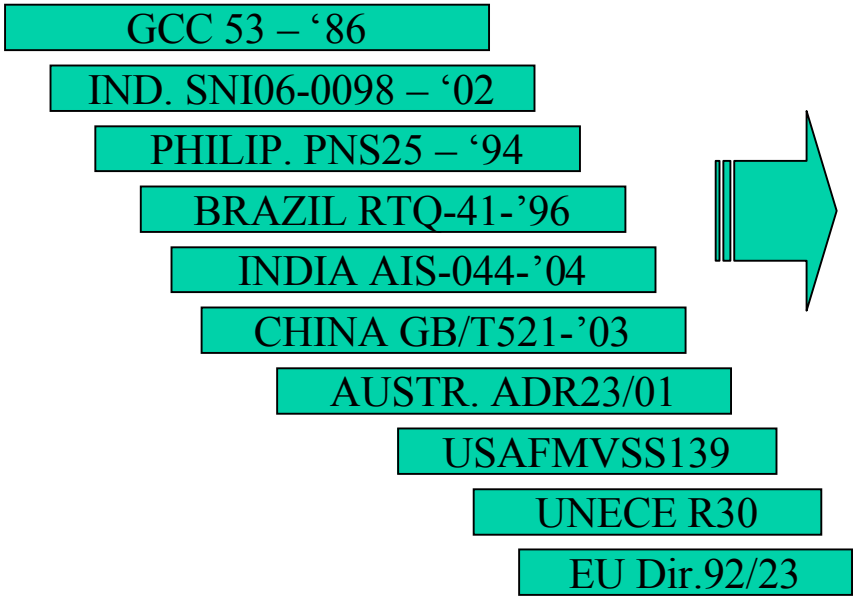
TEST METHOD HARMONISATION PROCESS



TEST METHODS HARMONISATION STATUS

REFERENCE TEST METHODS	HARMONISATION STATUS	ACTIONS
1. Tyre Sidewall Markings	1. Not harmonised	1. AD-HOC evaluation
2. Dimensions Test	2. Not harmonised	***2. Proposal***
3. Harmonised High Speed Test	3. Not harmonised and with significant differences	3. DOE to develop a new test method?
a) Load/Speed Perf. Test (Reg.30-like)	a) Not harmonised	
b) High Speed Perf. Test (USA139-like)	b) Not harmonised	
4. a) Endurance, followed by	4. a) Not harmonised	4. a) On-going eval.
b) Low Pressure Test	b) USA FMVSS139	b) Consolidation
5. Plunger Energy Test (Breaking Eng.)	5. Not harmonised	5. On-going eval.
6. Bead Unseating Test	6. Not harmonised	6. On-going eval.
7. Tyre/Road Sound Emission Test	7. UNECE Reg.117	7. ISO as reference
8. Tyre Wet Grip Adhesion Test	8. ISO standard	8. ISO as reference

2. DIMENSIONS TEST METHOD



Technical prescriptions assessment
Similarities (harmonised)
Differences (non-harmonised)
Rational (for harmonisation)

Proposal for harmonisation

~~DOE (Design of Experiment) Tests & Scientific assessment Validation of the proposal~~

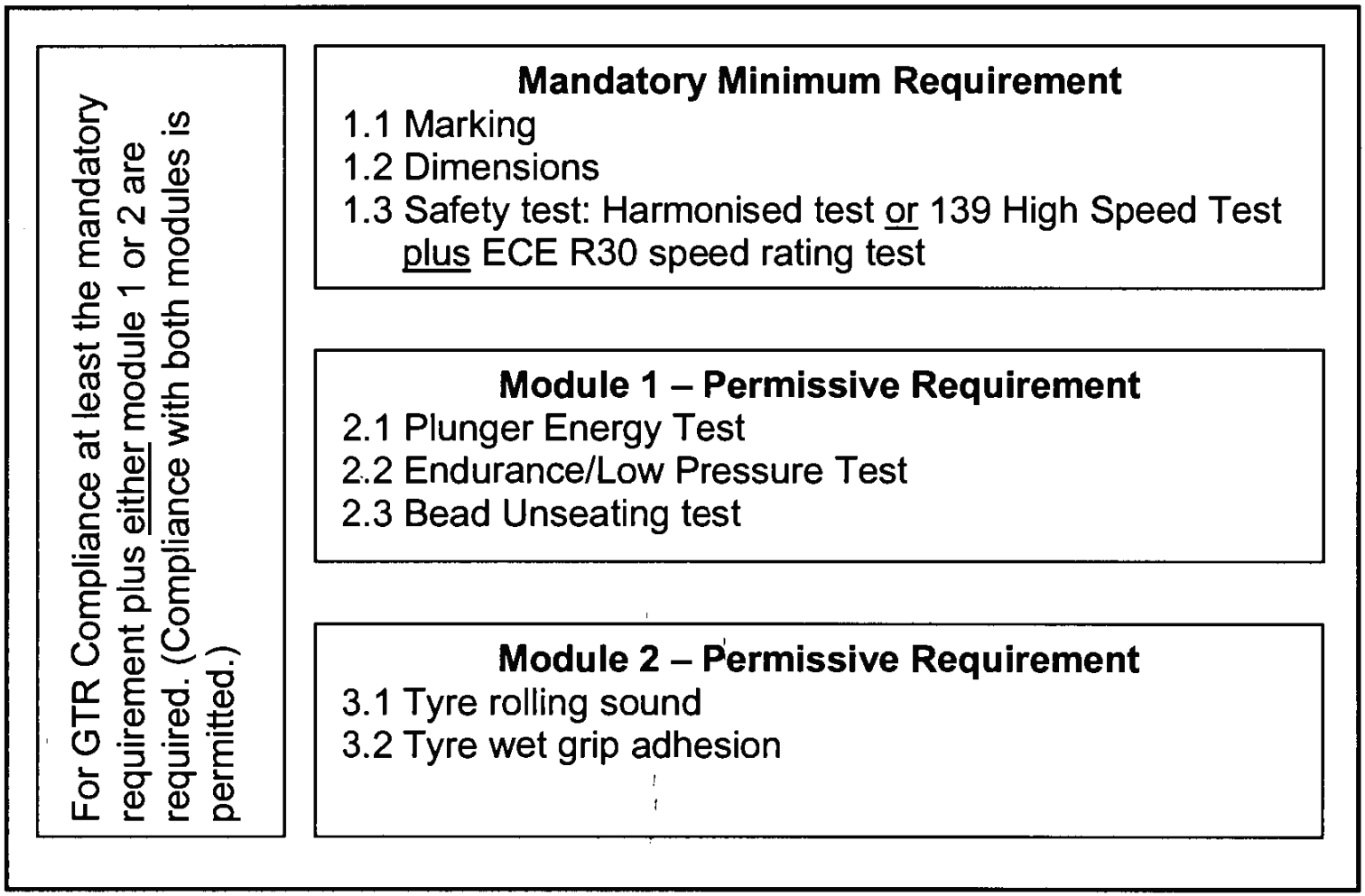
Unique Harmonised test methods

TEST METHODS HARMONISATION STATUS

REFERENCE TEST METHODS	HARMONISATION STATUS	ACTIONS
1. Tyre Sidewall Markings	1. Not harmonised	1. AD-HOC evaluation
2. Dimensions Test	2. Not harmonised	***2. Proposal***
3. Harmonised High Speed Test	3. Not harmonised and with significant differences	3. DOE to develop a new test method
a) Load/Speed Per. Test (Reg.30-like)	a) Not harmonised	a) <u>On-going eval.</u>
b) High Speed Per. Test (USA139-like)	b) Not harmonised	b) <u>On-going eval.</u>
4. a) Endurance, followed by	4. a) Not harmonised	4. a) <u>On-going eval.</u>
b) Low Pressure Test	b) USA FMVSS139	b) *Consolidation*
5. Plunger Energy Test (Breaking Eng.)	5. Not harmonised	5. <u>On-going eval.</u>
6. Bead Unseating Test	6. Not harmonised	6. <u>On-going eval.</u>
7. Tyre/Road Sound Emission Test	7. UNECE Reg.117	7. ISO as reference
8. Tyre Wet Grip Adhesion Test	8. ISO standard	8. ISO as reference

Tyre Ind. On-going Actions: evaluation of 3.a, 3.b, 4.a, 5, 6

The Modular Approach (GTR Tyres – working group meeting – Apr.28 '05)



The Modular Approach (WP29 AC3 – proposal to Tyre Industry – Jun.'05)

Mandatory Minimum Requirement
1.1 Marking
1.2 Dimensions
1.3 Safety Test: Harmonised Test or
USA139 High Speed Test plus
ECE30 Speed Rating Test

Module 1 – Permissive Requirement
2.1 Plunger Energy Test
2.2 Endurance/Low Pressure Test
2.3 Bead Unseating test

Module 2 – Permissive Requirement
3.1 Tyre Rolling Sound
3.2 Tyre Wet Grip Adhesion

Mandatory Minimum Requirement
1.1 Marking
1.2 Dimensions
1.3 Harmonised High Speed Safety Test
1.4 Endurance/Low Pressure Test
1.5 Tyre Wet Grip Adhesion

Module 1 – Permissive Requirement
2.1 Plunger Energy Test
2.2 Bead Unseating test

Module 2 – Permissive Requirement
3.1 Tyre Rolling Sound

Thank you

for your attention

ATTACHMENT II

Understanding Global Tire Regulations

Katie Herta

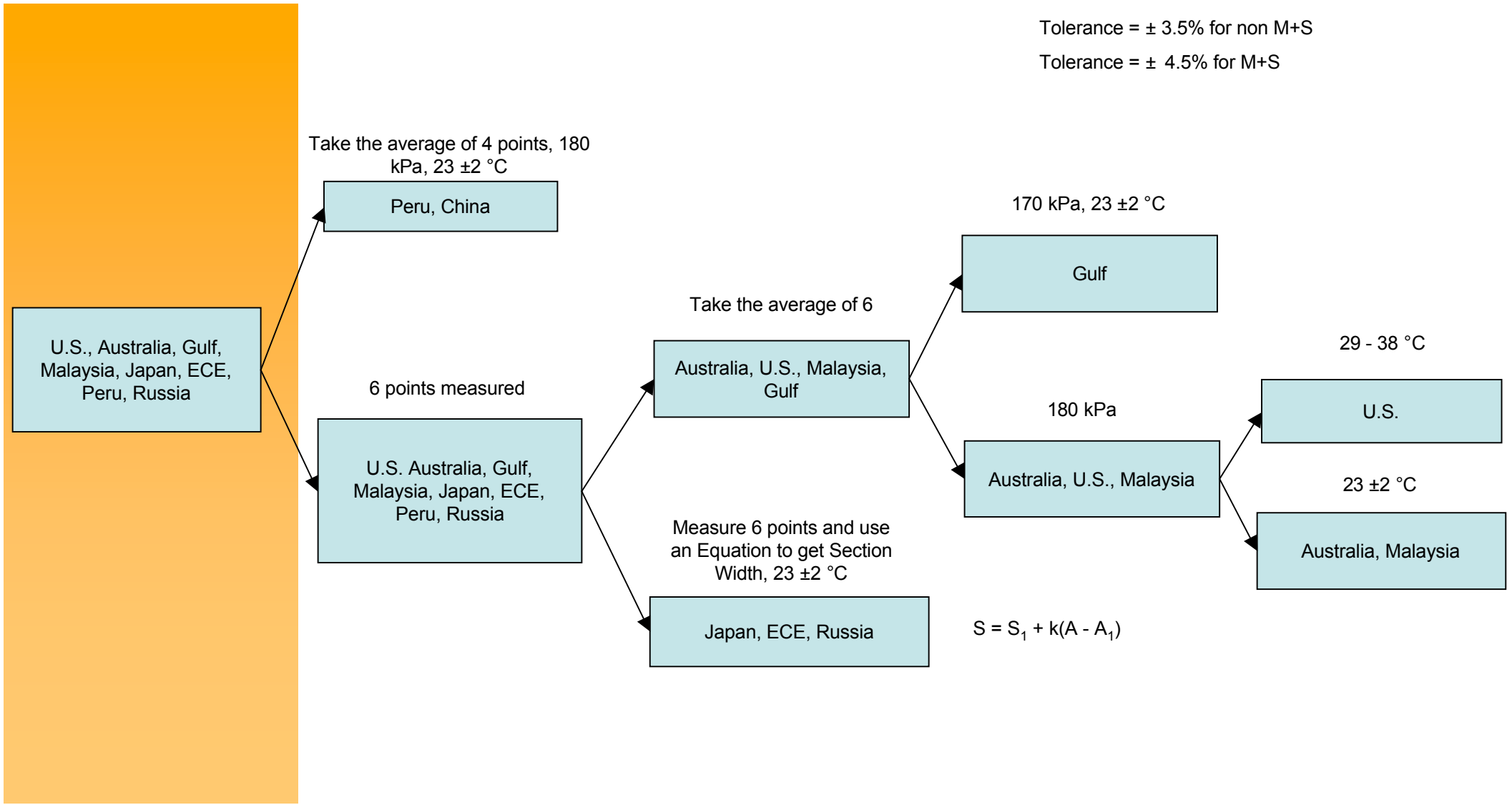
20 September 2006

General Information for Points of Clarification

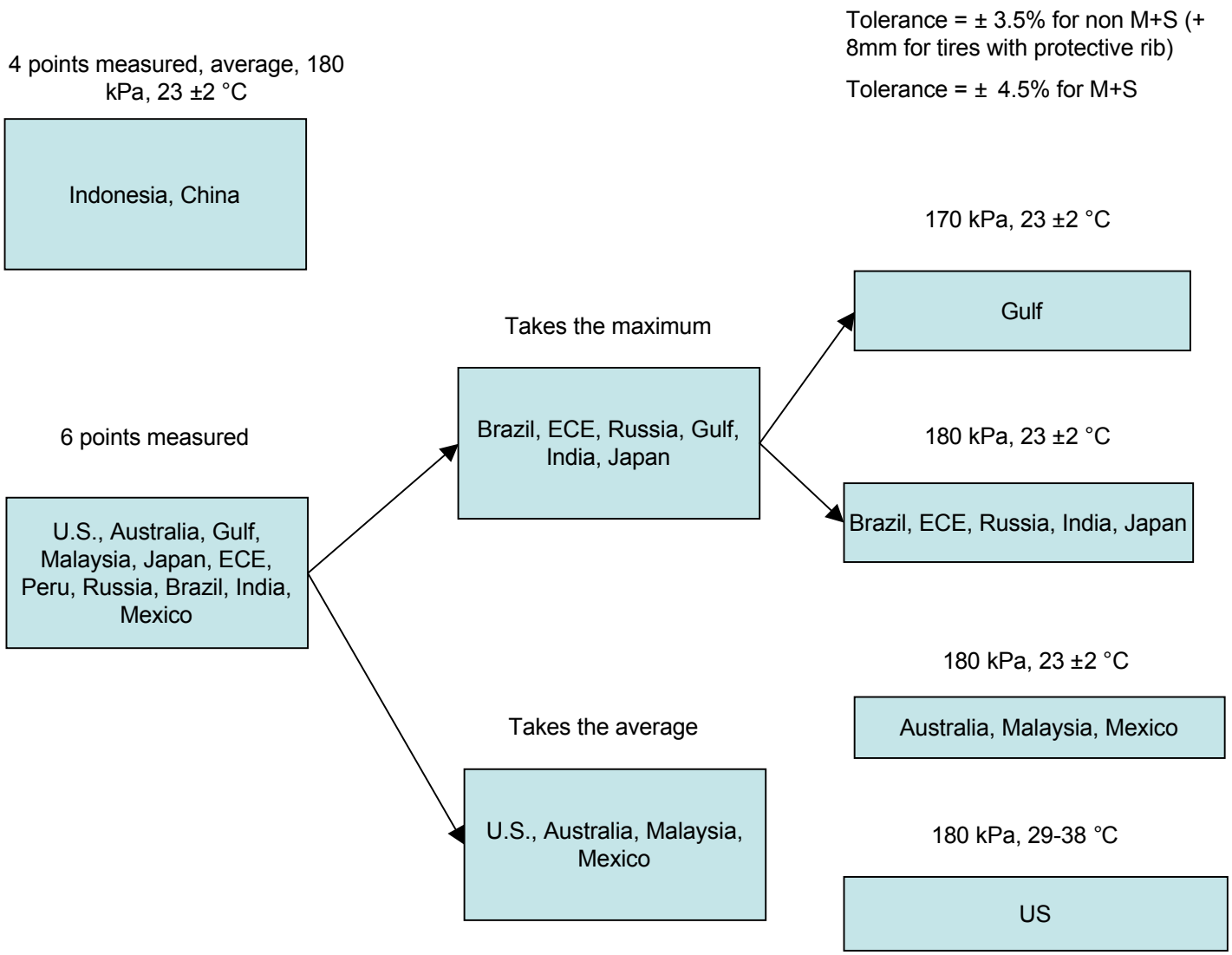
- Title
- **Goals**
- Procedure
- Dimensional Tests
- Endurance Tests
- Tire Strength Tests
- High Speed Tests
- Bead Unseating Tests
- Additional Tests
- Conclusions

- U.S. will refer to the standard: US FMVSS 109 (U.S. for remainder of presentation)
- Presentation does not provide details of the various procedures

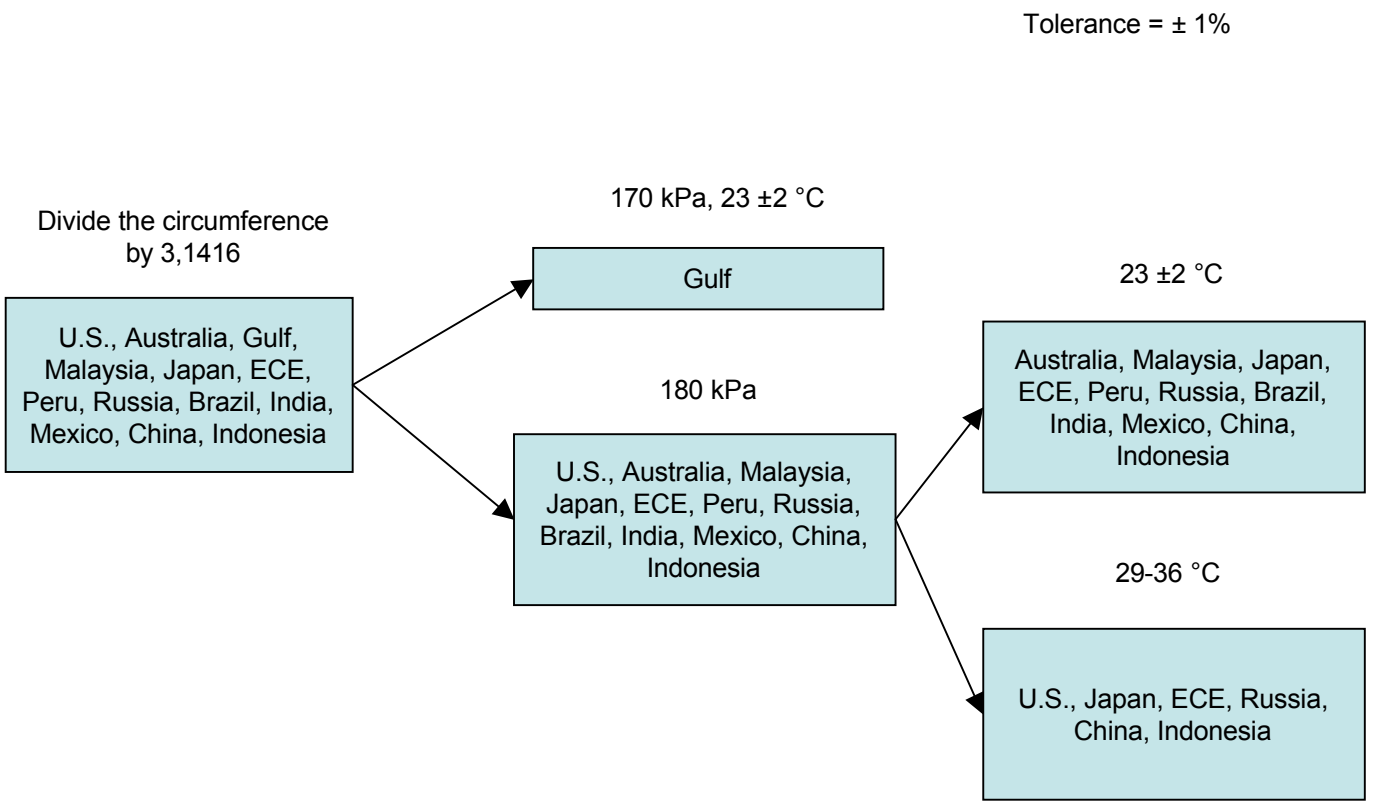
Dimensions – Section Width Grouping



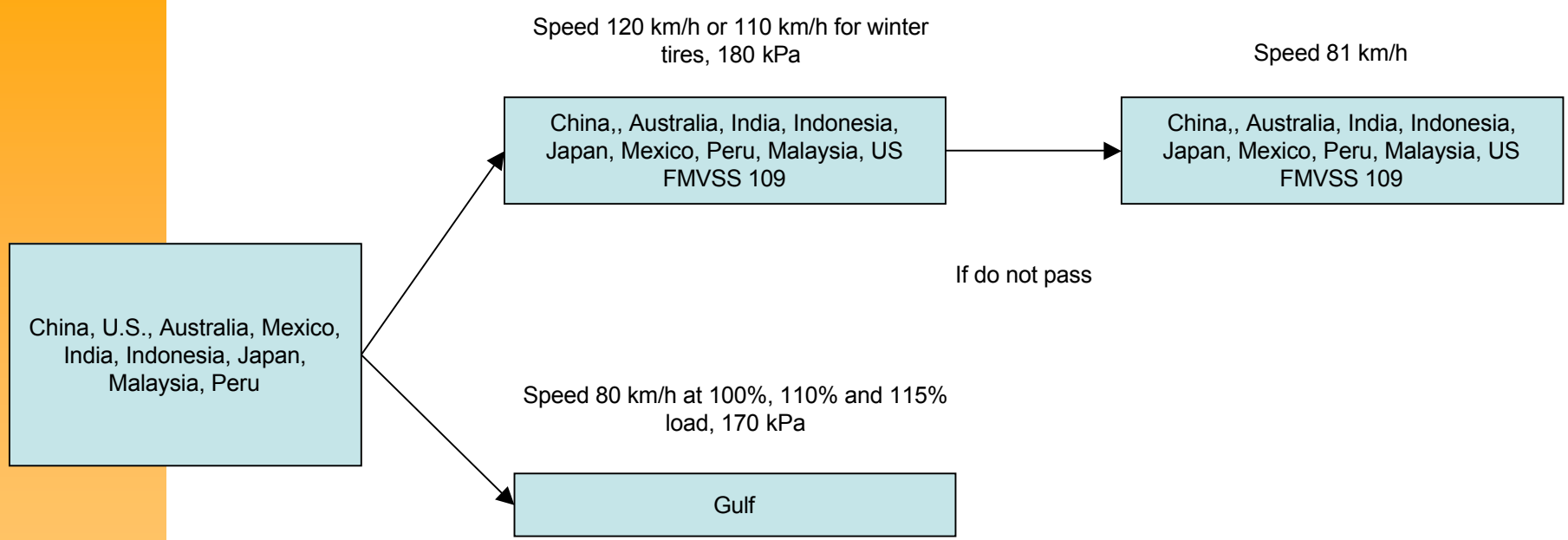
Dimensions – Overall Width Grouping



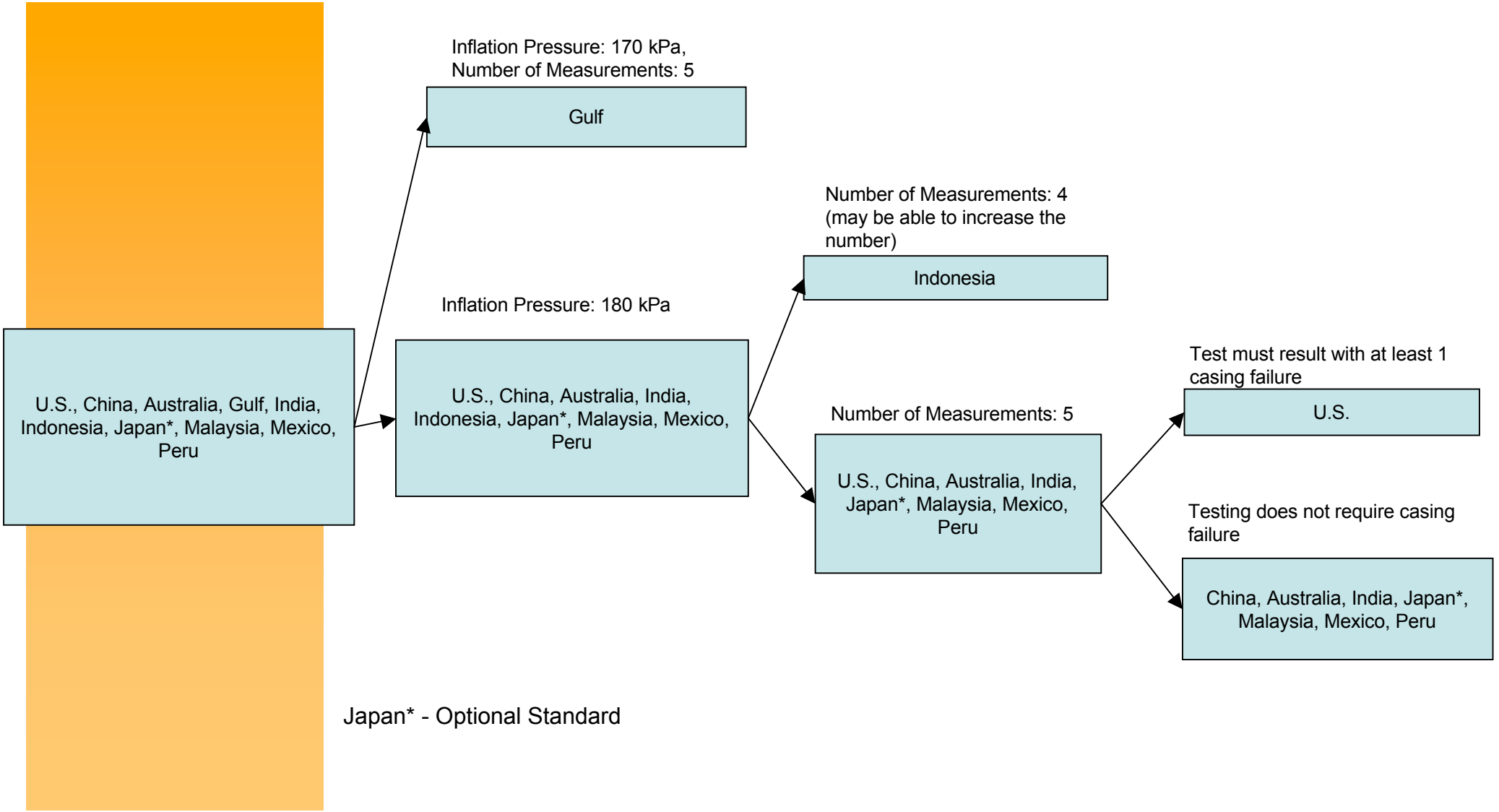
Dimensions – Diameter Grouping



Tire Endurance Test Procedure Grouping

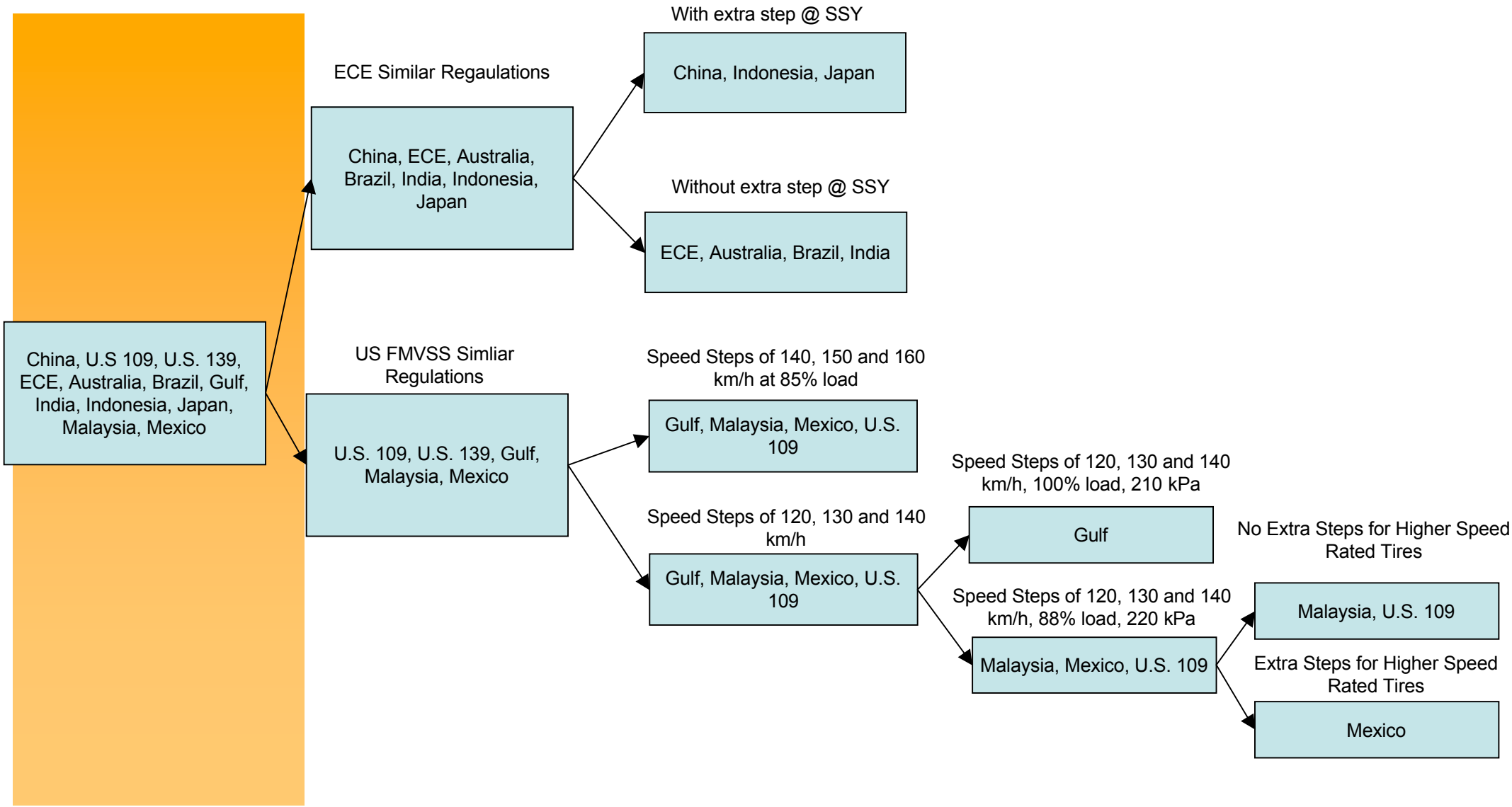


Tire Strength Procedure Grouping



Japan* - Optional Standard

High Speed Procedure Grouping



Bead Unseating Procedure Grouping

China, U.S., Australia, Gulf, India, Indonesia, Japan*, Malaysia, Mexico

4 Points Measured

India, Indonesia, Japan*

Block A

Indonesia, Japan*

Block B

India, Japan*

5 Points Measured

China (4 pt. min.), U.S., Australia, Gulf, Malaysia

180 kPa

China, U.S., Australia, Mexico

Block C

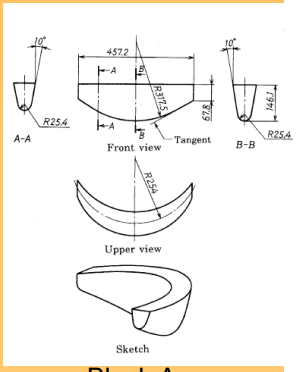
China, Mexico (10 mm longer), Australia

Block B

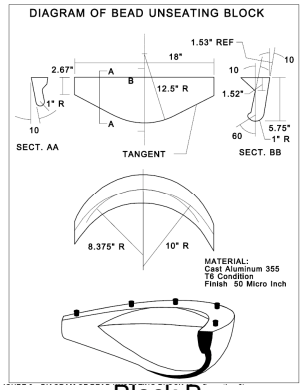
U.S., Australia

170 kPa, Block C

Gulf



Block A



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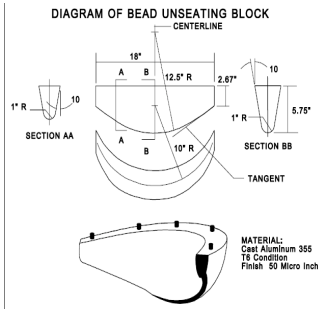


Block C

Katie Herta, Understanding Global Tire Regulations

Japan* - Optional Standard

UNECE Regulation No. 108

2.26. "International Tyre Standard" means any one of the following standard documents:
(a) The European Tyre and Rim Technical Organisation (ETRTO) 1/: 'Standards Manual'
(b) The European Tyre and Rim Technical Organisation (ETRTO) 1/: 'Engineering Design Information - obsolete data'
(c) The Tire and Rim Association Inc. (TRA) 2/: 'Year Book'
(d) The Japan Automobile Tire Manufacturers Association (JATMA) 3/: 'Year Book'
(e) The Tyre and Rim Association of Australia (TRAA) 4/: 'Standards Manual'
(f) The Assiciacao Brasileira de Pneus e Aros (ABPA) 5/: 'Manual de Normal Technicas'
(g) The Scandinavian Tyre and Rim Organisation (STRO) 6/: 'Data Book'

USA FMVSS 110

(a) A designation that indicates the source of the rim's published nominal dimensions, as follows:
(1) "T" indicates The Tire and Rim Association.
(2) "E" indicates The European Tyre and Rim Technical Organization.
(3) "J" indicates Japan Automobile Tire Manufacturers' Association, Inc.
(4) "L" indicates ABPA (Brazil), a.k.a. Associacao Latino Americana De Pneus E Aros.
(5) "F" indicates Tire and Rim Engineering Data Committee of South Africa (Tredco).
(6) "S" indicates Scandinavian Tire and Rim Organization (STRO).
(7) "A" indicates The Tyre and Rim Association of Australia.
(8) "I" indicates Indian Tyre Technical Advisory Committee (ITTAC).
(9) "R" indicates Argentine Institute of Rationalization of Materials, a.k.a. Instituto Argentino de Racionalización de Materiales, (ARAM).
(10) "N" indicates an independent listing pursuant to S4.1 of §571.139 or S5.1(a) of §571.119.

USA FMVSS139

Passenger car tyres : reference is made to P-metric tyres
Light truck (LT) tire :means a tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.

[7] Americans have shifted toward a significantly higher use of minivans, pickup trucks, and SUVs for personal travel. (Journal of Transportation and Statistics, December 2000). Sales of light trucks have risen steadily for over the past 20 years and now account for almost half of the U.S. light vehicle market - more than twice their market share as recently as 1983. (Industries in Transition, 1/01/00; Journal of Transportation and Statistics, December 2000.) Sales growth of heavier light trucks, those that have GVWRs above 6,000 pounds, increased at a much faster rate than their lighter counterparts, with larger SUVs (6,000-10,000 pounds GVWR) showing an average increase of 38 percent annually between 1990 and 1998.

Approximately 90 percent of these light trucks use passenger car (P-metric) tires. The other 10 percent use light truck (LT) tires load range C, D, or E tires, which are typically used on heavier light trucks with a gross vehicle weight rating (GVWR) between 6,000 and 10,000 pounds. Continued growth in the sales and production of light truck vehicles also drove the number of original equipment light truck (LT) tires to a record high of approximately 8.4 million units or a 25.2 percent increase over 1998's figures. (RMA 2000 Yearbook)

Introduction

Below is a table containing pertinent information about all of the physical dimensions tests that are required in the various regulations for passenger car tires around the world.

PHYSICAL DIMENSIONS - COMPARISON OF DIFFERENT METHODS										
	Conditioning at test temperature	**Temperature**	**Rim width**	**Pressure Normal Load**	**Pressure Extra Load**	**Section width, number of points**	**Section width, calculation method**	**Diameter, method**	**Others?**	**Comments**
1958 Agreement CPs, UN/ECE R30	24 hours	ambient room temperature	specified by manufacturer	1,8 bar	2,3 bar	6, equally spaced	largest measured value of the 6	circumference divided by π (3.1416)	TWI height required, but specified in another section of R30.	These 2 test methods are strictly identical. For the purposes of this comparison, they are taken as the Reference method.
European Union 25 Countries, Dir 92/23	24 hours	ambient room temperature	specified by manufacturer	1,8 bar	2,3 bar	6, equally spaced	largest measured value of the 6	circumference divided by π (3.1416)	TWI height required, but specified in another section of Directive.	
USA, FMVSS 139	24 hours	38°C	specified by manufacturer	1,8 bar	2,2 bar	6, approximately equally spaced; section width AND overall width	average of 6 values	circumference divided by π (3.14)	Yes, overall width (includes markings, etc.)	Different temperature, different pressure for Extra Load tires.

Australia, ADR 23/01	24 hours	ambient room temperature	specified by manufacturer	Measurement pressure specified in "Nominated Standard"; for ETRTO, 1,8 bar	Measurement pressure specified in "Nominated Standard"; for ETRTO, 2,2 bar	6, approximately equally spaced	average of 6 values	circumference divided by π	Yes, overall width (includes markings, etc.)	Different pressure for Extra Load, different calculation for overall width (average instead of largest value).
China, GB/T 521-2003	3 hours uninflated, 24 hours inflated	18 - 36°C	Standard rim	Pressure given in GB 9743 - 1997 tables; 1.8 bar	Pressure given in GB 9743 - 1997 tables; 2.3 bar	4, approximately equally spaced	average of 4 values	circumference divided by π	Yes, tread depth and TWI height	Initial certification measurements are performed by Chinese lab, but COP is done by manufacturer. Temperature, pressures are different.
Gulf Countries, Gulf Standard 53/1986	24 hours	23±2°C	a measuring rim	1,7 bar	2,0 bar	6, approximately equally spaced	average of 6 values	circumference divided by π (3.1416)	No	Different pressures.
Indonesia SNI-06-0098-2002	24 hours	20 - 30°C	from Tables included in Standard, similar to ETRTO	1,8 bar	2,2 bar	Overall width, not section width 4, approximately equally spaced	average of 4 values	circumference divided by π (3.1416)	Yes, TWI height.	
Phillipine PNS 25-(1994)	24 hours	ambient room temperature	from Tables included in Standard	1,8 bar	2,2 bar	Overall width, not section width 4, equally around	average of 4 values	circumference divided by π (3.1416)	Yes, TWI	

India AIS-044 (2004)	24 hours	ambient room temperature	specified by the manufacturer	1,8 bar	2,3 bar	Overall width 6, equally spaced	Highest measurement	circumference divided by π (3.1416)	Yes, TWI height.	
Brazil RTQ-41 (1996)	24 hours	ambient room temperature	specified by the manufacturer	1,8 bar	2,3 bar	Overall width, 6, equally spaced	Highest measurement	circumference divided by π (3.1416)	Yes, TWI height.	
Proposal for GTR on Tyres	**24 hours**	**ambient room temperature**	**Standardized measurement rim**	**1,8 bar**	**2,2 bar**	**6, approximately equally spaced**	**Average of the 6 measurements**	**circumference divided by π (3.14)**	**TWI Height**	

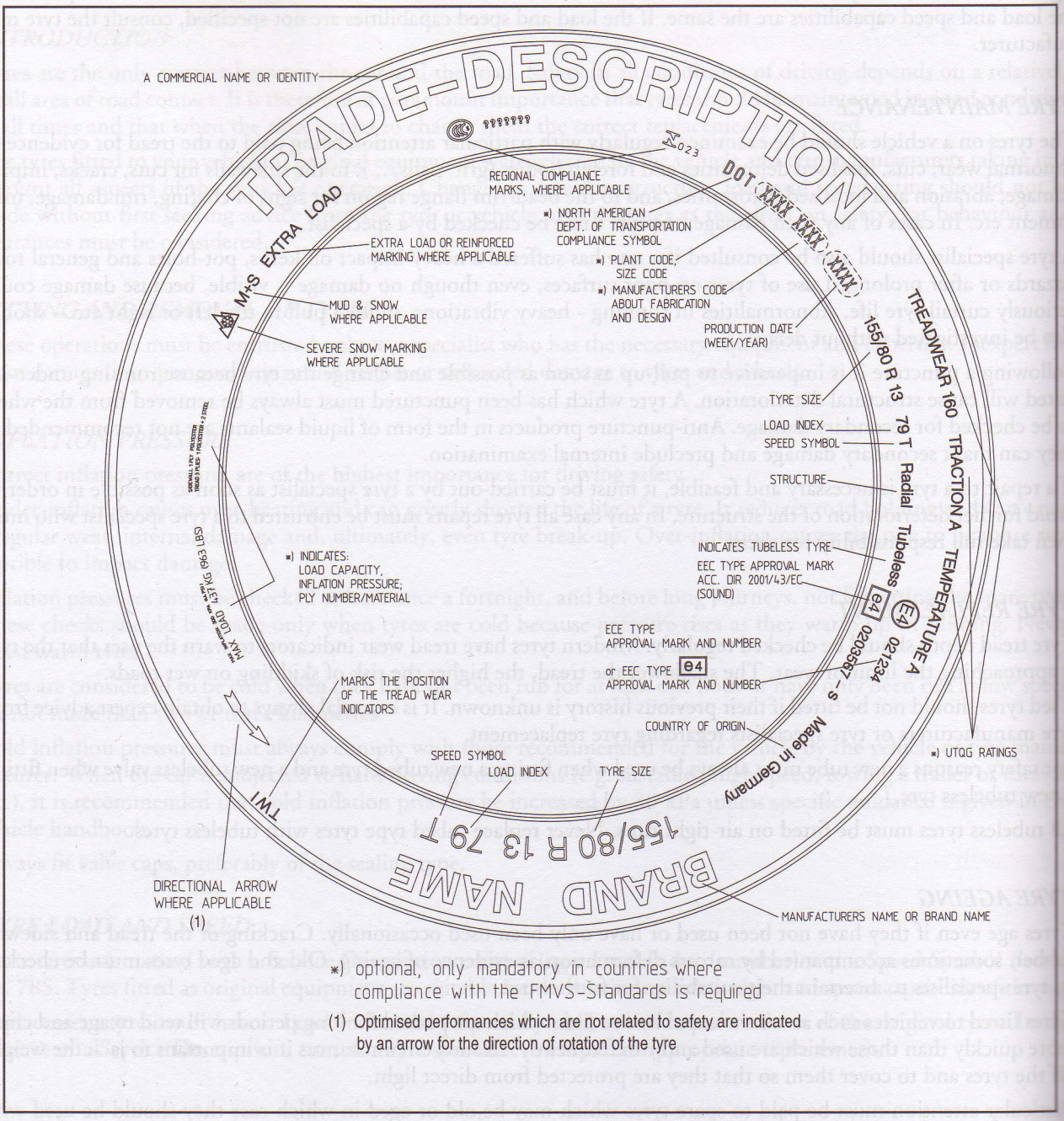
Proposal to harmonize the physical dimensions test

Conditioning: 24 hours inflated to the nominal test pressure at ambient room temperature.
Temperature: Ambient room temperature.
Justification: The physical dimensions of PC tires are not very sensitive to temperature variations between 18 and 38°C. In order to avoid the additional cost of measurement rooms with climate control systems, and the constraints of requiring workers to do these measurements in very hot conditions, the measurements can be done at ambient temperature.
Measurement rim width: The test will be performed on the standardized measuring rim.
Inflation pressure: Normal Load, 180 kPa. Extra Load, 220 kPa, T type temporary spares, 420 kPa.
Section width and overall width: Measure both overall width and section width at 6 points approximately equally spaced around the tire. Use the average of the four values as the reported value for each.
Overall diameter and circumference: Measure the circumference with a steel tape, and report this value and the calculated diameter after dividing by 3.14.
TWI Height: Measure the height of the TWI at 6 points approximately equally spaced around the tire. Report the TWI height as the average of the 6 measurements. For tires with rim codes of 12 or less, the minimum number shall be 4.

Conclusions
Conditioning requirements are slightly different for one country.
Two different test methods are required to cover the different temperature requirements from room temperature up to 38°C.

Three different methods are required for the differing pressures of Normal Load tires (1.7 b, 1.8 b and 2.5 b).
4 Different test methods are required for Extra Load tires to cover the pressure differences (2.0 b, 2.2 b, 2.3 b and 3.0 b)
Although the same test method and conditions can be used to determine section width and overall width, each tire has to be measured at 8 different points to comply with the 2 requirements (6 points or 4 points). In addition, some requirements call for the maximum, some call for an average of the 4 or 6 measures. The only difference in overall diameter is that the constant pi (π) is sometimes cited as 3.14, sometimes as 3.1416. The difference is negligible. TWI measurements are not always cited in the same part of the regulations, but in general it is required to measure their height. One country requires TWI, but doesn't specify how many and how high.

ATTACHMENT V



The above sktech is given as an example only. All legal requirements have to be taken into account.

ATTACHMENT VI

ENDURANCE TEST - COMPARISON OF DIFFERENT METHODS

Standards / Regulations	Conditioning at test temperature	Measuring rim	Pressure	Step / time / % load	Speed	Performance requirements	Drum	Notes
USA FMVSS 139	Condition the assembly at 38° (+0, -6°) for not less than 3h.	Mount the tire on the measuring rim specified by the manufacturer or in one of the publications listed ..	1,8 bar for standard load 2.2 bar for extra load	1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.	not less than 120 km/h	* there shall be no visual evidence of tread, sidewall, ply, cord, belt or bead separation, chunking, open slices, cracking or broken cords. * the tyre pressure, when measured at least one hour after the end of the test, shall not be less than the initial pressure.	Drum 1700 +/- 1%	During the test the ambient temperature at a distance of not less than 150 mm and not more than 1 m from the tyre shall be less than 38°C.
AUSTRALIA ADR 23/01	Condition the tyre assembly at a temperature not less than 35° C for at least 3 hours. Readjust tyre pressure before testing.	Mount the tyre on a 'Test Rim' and inflate it to the pressure specified for measurement in the 'Nominated Standard'	1,8 bar for standard load 2.2 bar for extra load	1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.	not less 80 km/h	no tyre is to have 'TreadSeparation', 'Ply Separation', 'Cord Separation', 'BeltSeparation' or 'Bead Separation', 'Chunking', or broken cords.	Drum not greater than 1.71m and at least as wide as the 'Section Width' of the tyre to be tested, or an 'Approved' equivalent test wheel	During the test the ambient temperature at a distance of not less than 150 mm and not more than one metre from the tyre shall be at least 35°C. No provision is to be made for cooling the tyre during the test.
CHINA - GB 9743 (GB/T 4502)	temperature of 38°C +/- 3°C for the least 3h	Mount the tyre on the standard rim specified in GB/T 2978	1,8 bar for standard load 2.3 bar for extra load	1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.	80 km/h - shall be reached within 5 minutes from drum start-up on average acceleration	* the inflation pressure of the tyres shall be not lower than the specified initial inflation pressure. * there shall be no visual evidence of (tread, sidewall, cord ply, innerliner, belt, bead) separation, cord ply splitting, cords stripping, cord broken, chunking, open splices and cracking.	Diameter of test drum shall be 1707mm +/- 17mm (1.7m +/- 1% or 2.0m +/- 1%) The surface of the drum shall be smooth steel that the width shall exceed the section width of the test inflated tyres.	Environmental temperature shall be 38 °C ±3°C during the test, the measuring device for environmental temperature shall be in the range of 150mm-1000mm from tyre. the tyre must not be coolod by man-nmade during the test
GULF STANDARD - GS 53/1986	temperature 38°C +/- 3°C for minimum of 3h	A measuring rim	1,7 bar for standard load 2.0 bar for extra load	1st step 4h at 100% L.I. 2nd step 6h at 110% L.I. 3rd step 24h at 115% L.I.	80 km/h	The tyre shall be checked for evidence of tread, ply, cord or bead separation, tread chunking or broken cord	Drum 1700 mm +/- 5 mm	
INDONESIA SNI-06-0098-2002	at least 3 h in temperature 15°C- 30°C or higher if permitted by manufacturer - TEMPERATURE of the test 38°C +/- 3°C	Mount the tyre on a test rim specified on table Dimension and Rim (attachment D)	1,8 bar for standard load 2.2 bar for extra load	1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.	81 km/h	there shall be no visual evidence or damage such as separation, chunking, open splice, cracking and broken cord	Drum 1707mm +/- 1%	immediately stop the test if the whole stage completed. Allow the tire to cool to the room temperature and then check whether is damage or an abnormal.
PHILIPPINE PNS 25:1994	temperature 38°C +/- 3°C for at least 3 h	Mount the tire on a test rim and inflate it to the applicable pressure specified in tables 5 for passenger tires	1,8 bar for standard load 2.2 bar for extra load	1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.	80 km/h	* The tires shall show no visual evidence of tread, sidewall, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices. * The tire pressure at the end of the test shall not be less than the adjusted pressure at the beginning of the test run	Drum 1707,6 mm	Prior to testing, the tire shall exhibit no visual evidence of tread, sidewall, ply, cord, inner liner or bead separation, chunking, broken cords, cracking or open splices
INDIA AIS-044 (2004)	not less 3 h - temperature of 20 to 40°C or higher if acceptable to manufacturer	Mount the tire on the measuring rim specified by the manufacturer or in one of the pubblications listed ..	1,8 bar **(for all vesion)**	1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.	81 km/h	A tyre which after undergoing the endurance performance test does not exhibit any tread separation, ply separation, cord separation, chunking or broken cords shall deemed to have passed the test.	Drum 1.7m +/- 1%	
1958 Agreement CPs, UN/ECE R30	**No endurance test**							
European Unoin 25 Countries, Dir 92/23	**No endurance test**							
BRAZIL RTQ-41 (1996)	**No endurance test**							
ETRTO Proposal	**at least 3 hours at 35 +-3°C**	**Mount the tire on the measuring rim specified by the manufacturer or in one of the publications listed ..**	**180 kPa for Standard Load 220 kPa for Extra Load**	**1st step 4h at 85% L.I. 2nd step 6h at 90% L.I. 3rd step 24h at 100% L.I.**	**120 km/h**	*** there shall be no visual evidence of tread, sidewall, ply, cord, belt or bead separation, chunking, open slices, cracking or broken cords. * the tyre pressure, when measured at least one hour after the end of the test, shall not be less than 95% of the initial pressure.**	**Diameter of test drum shall be 1.7m +/- 1% or 2.0m +/- 1% (ISO 10191 conditions). The surface of the drum shall be smooth steel and the width shall exceed the section width of the inflated test tyres.**	**During the test the ambient temperature at a distance of not less than 150 mm and not more than 1 m from the tyre shall be 35°C +-3°C.**

GULF STANDARD - GS 53/1986 = SAUDI ARABIA - SS 445/1986 = KUWAIT - KKS 281/89

For all standard / Regulation readjust the pressure to the initial pressure specified immediately before testing.

FMVSS 139 High Speed Performance Test Conditions and Procedures
ECE R 30 Procedures for Load/Speed Performance Test
Draft Proposal for Tire Global Technical Regulation

FMVSS 139 (High Speed)		Tire GTR (High Speed)	ECE R 30 (High Speed) *[see note1]*	
Ambient Temp. (ºC)	38 (32 to 38)	**Draft for Consideration**	25± 5 or higher	**Ambient Temp. (ºC)**
Inflation Press. (kPa)			**Inflation Press. (kPa)**	**Pass. SL / EL** *[see note 2]*
Pass. SL / EL	220 / 260		240 / 280 260 / 300 280 / 320 300 / 340 320 / 360	Speed Rating L, M, N Speed Rating P, Q, R, S Speed Rating T, U, H Speed Rating V Speed Rating W, Y
Light Truck LR C D E	 320 410 500			
Load (% Max)	85	For passenger tires labeled with speed category "S" and slower, follow FMVSS 139 test conditions.	80	**Load (% Max)** *[see note3]*
Sequence Passenger Steps (minutes)	30		For speed symbol "L" to "W" inclusive Start-up to ITS 10 min. ITS for 10 min. ITS plus 10 km/h for 10 min ITS plus 20 km/h for 10 min ITS plus 30 km/h for 20 min	**Sequence** (minutes) **I**nitial **T**est **S**peed = speed category *[see notes (4)(5) below]*
Pass. Speed (km/h)	140, 150, 160	For passenger tires labeled speed category "T" and faster, follow ECE R 30 test conditions.		
Sequence Light Truck: Steps (minutes)	30		For speed symbol "Y" Start-up to ITS 10 min ITS for 20 min. ITS plus 10 km/h for 10 min ITS plus 20 km/h for 10 min ITS plus 30 km/h for 10 min	
LT Speed (km/h)	140, 150, 160			
Pressure Drop After Test	Not < 95% initial	Industry will demonstrate that all tires "S" and slower, tested to FMVSS 139, will also pass ECE R 30.	Outer diameter, measured 6 hours after the test must not differ more than ± 3.5% from the outer diameter as measured before the test.	**Post Test Outer Diameter**
Shall be deemed to pass if:	When tested in accordance with above criteria, there shall be no evidence of tread, sidewall, ply, cord, innerliner, belt or bead separation, chunking open splices, cracking, or broken cords.	Industry will demonstrate that all tires "T" and faster, tested to ECE R 30, will also pass FMVSS 139.	After test no: tread separation, ply separation, cord separation, chunking, or broken cords.	**Shall be deemed to pass if:**

(1) If a method other than that described below is used, its equivalence must be demonstrated.
(2) See inflation pressure table on following pages for inflation pressure for Diagonal (bias-ply) tyres and T-type temporary use spare tyres.
(3) Apply to the test axle a load equal to 80% of the tyre's maximum application load capacity. See Load Index Table and Maximum Application Load Capacity tables on following pages.
(4) Initial test speed is equal to speed category, less 40 km/h on a 1.7 m ±1 % drum, or less 30 km/h on a 2.0 m ± 1% drum. Maximum test speed is equal to the maximum speed of the prescribed speed category for the type of tyre if tested on a 2.0 meter drum; and, if tested on a 1.7 m drum, the maximum test speed is 10 km/h less than the prescribed maximum for the type of tyre.
(5) [*The following, though maybe not part of R30, may be worth considering.]* For tyres with a "ZR" in the size designation. If the tyre is also marked with speed symbol "W" or "Y", test the tyre at the load and inflation for a "W" or "Y" rated tyre, respectively, and according to the procedures specified in the column to the left. If the tyre has a maximum speed rating that is > 300 km/h, two high speed endurance tests are required: Test #1: On one tyre sample, test to the conditions and requirements specified by the service description. Test #2: Inflate a second sample of the same tyre to 320 kPa (for standard load, 360 kPa for extra load). Apply a load to the test axle that is equal to 80 percent of the load specified by the tyre manufacturer. Accelerate the equipment at a constant rate such that the rated speed of the tyre is reached at the end of 10 minutes from the start-up. Then test at the rated speed for 5 minutes. NOTE: Both test #1 and Test #2 may be carried out on the same tyre sample if the tyre manufacturer agrees.

ECE R 30 Inflation Pressure (kPa)

Speed Category	Diagonal (bias-ply) Tyres			Radial & bias-belted Tyres	
	Ply Rating			Standard	Extra Load (Reinforced)
	4	6	8		
L, M, N	230	270	300	240	280
P, Q, R, S	260	300	330	260	300
T, U, H	280	320	350	280	320
V	300	340	370	300	340
W,Y	-	-	-	320	360

Note: For T-type temporary use spare tyres, the tyre shall be inflated to 420 kPa.

Maximum Application Load Capacity (1)
Percentage of Maximum Load Capacity versus Vehicle Speed (2)

Speed Capability of' Vehicle (km/h)	Speed symbol of tyre (3)			
	H %	V %	W %	Y %
210	100	100	100	100
220	-	97	100	100
230	-	94	100	100
240	-	91	100	100
250	-	-	95	100
260	-	-	90	100
270	-	-	85	100
280	-	-	-	95
290	-	-	-	90
300 (4)	-	-	-	85

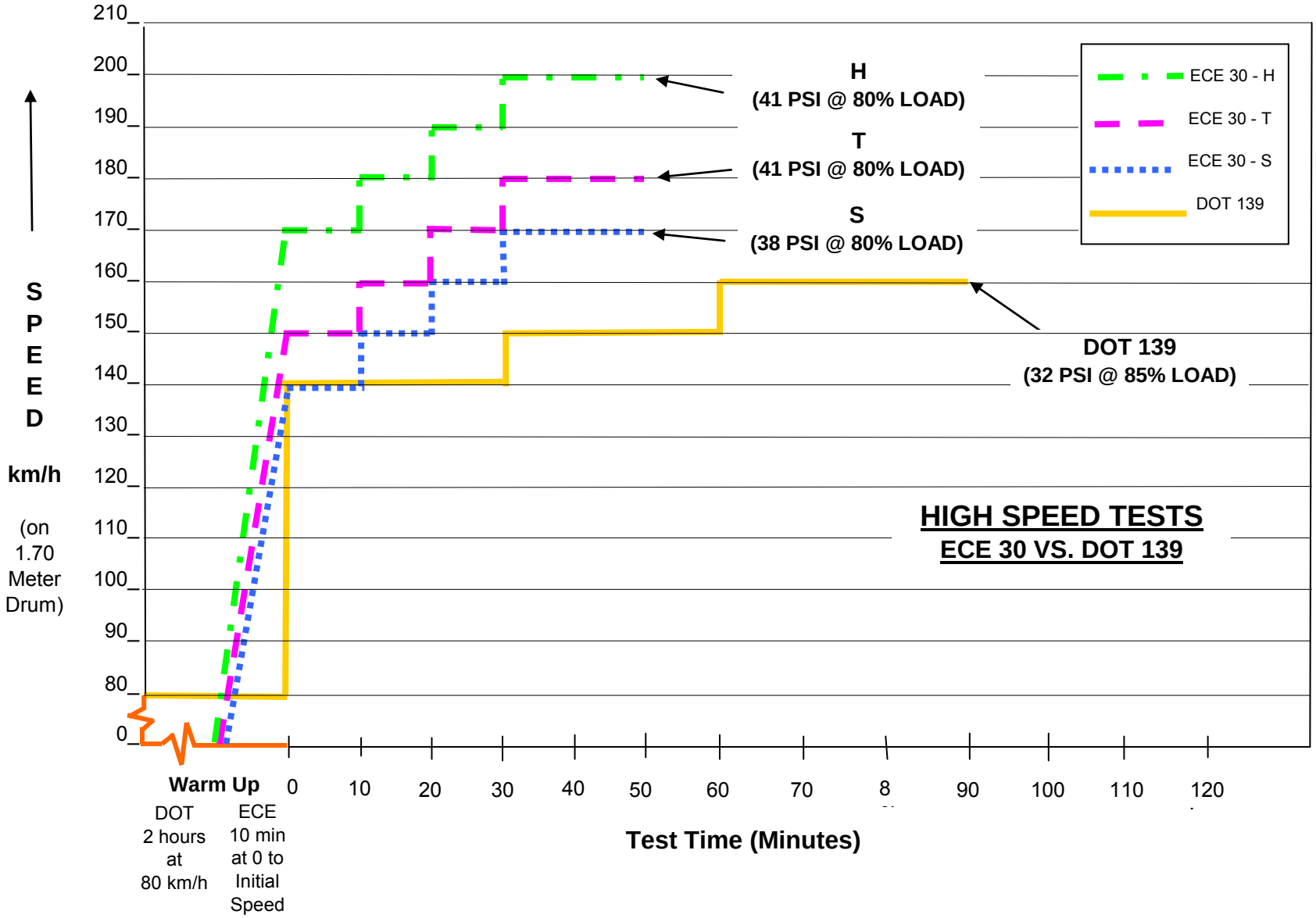
(1) Maximum application Load capacity means the maximum load the tyre can carry in a specific application, and is dependent on the speed category of the tyre and the speed capability of the vehicle to which the tyre is applied.
(2) For intermediate vehicle speeds, linear interpolation of the tyre load rating is permitted.
(3) For all tyres with speed category symbol H and below, the tyre/s maximum application load capacity is equal to 100 percent of its maximum load rating, at its rated speed.
(4) For speed capabilities of ZR tyres over 300 km/h, the tyre load rating will be specified by the tyre manufacturer.

Speed Category Table

Speed Symbol	Corresponding Speed (km/h)
L	120
M	130
N	140
P	150
Q	160
R	170
S	180
T	190
U	200
H	210
V	240
W	270
Y	300

Load Index Table
LI = Load-capacity index
Kg = corresponding mass in kilograms

LI	kg	LI	kg	LI	kg	LI	kg
0	45	30	106	60	250	90	600
1	46.2	31	109	61	257	91	615
2	47.5	32	112	62	265	92	630
3	48.7	33	115	63	272	93	650
4	50	34	118	64	280	94	670
5	51.5	35	121	65	290	95	690
6	53	36	125	66	300	96	710
7	54.5	37	128	67	307	97	730
8	56	38	132	68	315	98	750
9	58	39	136	69	325	99	775
10	60	40	140	70	335	100	800
11	61.5	41	145	71	345	101	825
12	63	42	150	72	355	102	850
13	65	43	155	73	365	103	872
14	67	44	160	74	375	104	900
15	69	45	165	75	387	105	925
16	71	46	170	76	400	106	950
17	73	47	175	77	412	107	975
18	75	48	180	78	425	108	1000
19	77.5	49	185	79	437	109	1030
20	80	50	190	80	450	110	1060
21	82.5	51	195	81	462	111	1090
22	85	52	200	82	475	112	1120
23	87.5	53	206	83	487	113	1150
24	90	54	212	84	500	114	1180
25	92.5	55	218	85	515	115	1215
26	95	56	224	86	530	116	1250
27	97.5	57	230	87	545	117	1285
28	100	58	236	88	560	118	1320
29	103	59	243	89	580	119	1360
						120	1400


SPEED km/h (on 1.70 Meter Drum)
210
200
190
180
170
160
150
140
130
120
110
100
90
80
0
H
(41 PSI @ 80% LOAD)
T
(41 PSI @ 80% LOAD)
S
(38 PSI @ 80% LOAD)
DOT 139
(32 PSI @ 85% LOAD)
ECE 30 - H
ECE 30 - T
ECE 30 - S
DOT 139
HIGH SPEED TESTS
ECE 30 VS. DOT 139
Warm Up
DOT 2 hours at 80 km/h
ECE 10 min at 0 to Initial Speed
0
10
20
30
40
50
60
70
8
90
100
110
120
Test Time (Minutes)

INFORMAL WG GTR ON TYRES
Geneva, 21 &22 September 2006

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INFORMAL WG GTR ON TYRES
Geneva, 21 &22 September 2006

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INFORMAL WG GTR ON TYRES
Geneva, 21 &22 September 2006

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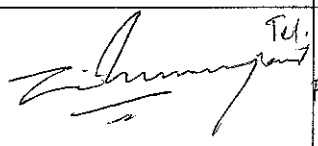
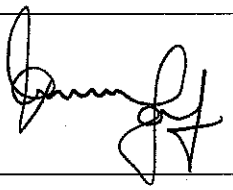
Z.A. MUJAWAR	MAHINDRA & MAHINDRA LTD INDIA		Tel. +91-253-2352629 Fax +91-253-2352302 mujawar.zia@mahindra.com
P. VENUGOPAL	BRAKES INDIA LTD PADI, CHENNAI INDIA-600050		+91 44 26529621 venugopal.p@brakesindia.co.in FAX +91 44 26253847
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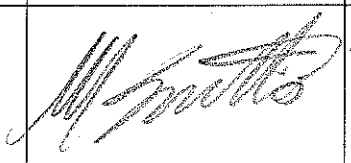
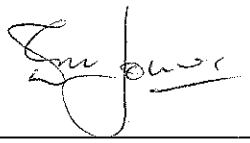
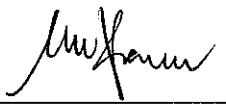
MARCO SPINETTO	(ETRTO) PIRELLI		+39 02 6442.7405 marco.spinetto@pirelli.com
Mrs Lucy JONES	COOPER TIRE		+44 1225 357667 (Tel) +44 1225 357794 (FAX) M.jones@cootertire.com.
MAURIZIO PARCA	BRIDGESTONE EUROPE		+3906 5056264 (Tel.) +3906 5056 303 (FAX) maurizio.parca@bridgestone-eu.com
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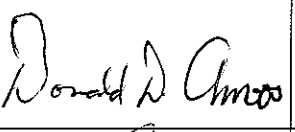
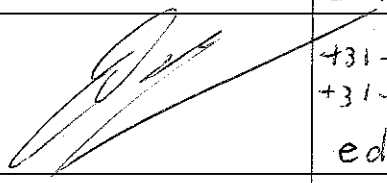
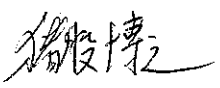
DONALD D. AMOS	CONTINENTAL TIRE-NORTH AM		1-704-583-8852 1-704-583-3975 don.amos@conti-na.com
Eddy de Haes	RDW Netherlands		+31-79-3459392 (tel) +31-79-3459041 (fax) edehaes@rdw.nl
Hiroyuki INOMATA	JAPAN (JASIC)		+41-022-731-3111 +41-022-731-3512 inomata@jasic.org

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