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May 1, 2024

MEMBERS OF THE AGRICULTURAL TIRE AND RIM
STANDARDS SUBCOMMITTEE

Notice of Meeting

There will be a meeting of the Agricultural Tire and Rim Standards subcommittee on **Tuesday, May 21, 2024, at 9:00 a.m. Eastern** at the TRA office. For those participating remotely, use the following Microsoft Teams link:

<https://teams.live.com/join/9342428006530?p=3tDlb2AEGqtPzecF>

James Grasso, Chair

A G E N D A

- I. ADOPTION OF AGENDA
- II. TRA ANTITRUST GUIDELINES
- III. MINUTES OF MEETING OF FEBRUARY 6, 2024
- IV. **AG-19-18** – CONSIDER ADDITION OF LOAD VERSUS SPEED VARIATION TABLE FOR “IF” AND “VF” METRIC IMPLEMENT TIRES – DESIGN GUIDE

Ref: Minutes of meeting of February 6, 2024

Previously, it was proposed to add the subject as Design Guide as shown in attached document AG-19-15Rev1, page 3.

At the last meeting, the load adjustment coefficients were reviewed as shown in attached document AG-19-18. It was recommended to show different columns for IF and VF implement tires and IF and VF drive tires.

François Brassart was requested to determine ETRTO's methodology for establishing the coefficient values.

AG-20-19 – CONSIDER ADDITION OF AN “IF” METRIC IMPLEMENT LOAD CALCULATION SPREADSHEET

Ref: Minutes of meeting of February 6, 2024

Austin Fischer and François Brassart will review the results of their collaboration on further developing the spreadsheet calculator.

AG-21-3 – CONSIDER ADDITION OF “IF” AND “VF” DRIVE WHEEL TIRES USED IN CYCLE FIELD OPERATION (CFO) – TRA STANDARD

Ref: Minutes of meeting of February 6, 2024

Previously, a comparison of loads (Michelin proposal versus TRA calculation) was reviewed for the proposed sizes shown in attached document AG-21-3. It was noted that all the proposed VF CFO loads do not align with TRA calculations. It was proposed to create a new agenda item, AG-23-3, to consider the addition of Cyclic Load Tables similar to the table on page 5-40 of the Year Book.

This item is tabled pending the outcome of item AG-23-3.

AG-21-4 – CONSIDER INCREASED LOAD FOR “IF” AND “VF” DRIVE WHEEL TIRES USED IN CYCLIC FIELD OPERATION AT REDUCED SPEEDS – DESIGN GUIDE

Ref: Minutes of meeting of February 6, 2024

During previous discussion of item AG-20-8B, it was proposed to consider the subject as Design Guide for speeds ≤ 10 km/h (5 mph).

At the last meeting, it was proposed to call out applications on sprayers. It was also proposed to consolidate this item with AG-23-3.

AG-21-10 – DISCUSSION ON CYCLIC LOAD CALCULATIONS AT REDUCED SPEEDS

Ref: Minutes of meeting of February 6, 2024

Previously, it was noted for metric drive wheel tires that the load bonus (150%) for slow speed is higher than the rated cyclic load at the same speed for 160 kPa inflation pressure and lower.

At the last meeting, it was proposed to state that the load bonus is applicable for cyclic operation with a minimum total inflation pressure of 200 kPa (29 psi) instead of a 40 kPa (6 psi) increase.

It was also proposed to consolidate this item with AG-23-3.

AG-22-2 – DISCUSSION ON W AND DW RIM CONTOURS

Ref: Minutes of meeting of February 6, 2024

At the last meeting, Aaron Dahl reviewed a proposal to harmonize the Pmin. and rim flange radii dimensions for the subject rim contours between ETRTO and TRA. The scope is for rim diameter codes between 24 and 54 and rim widths of 11 inches and higher.

Members were requested to determine if they had tire information that would not work with this proposal. Mr. Dahl was requested to provide a rim to Rich Mumford for evaluation.

AG-22-11 – DISCUSSION ON LOAD VERSUS SPEED BONUSES FOR TABLE HC-1

Ref: Minutes of meeting of February 6, 2024

Referencing Table HC-1 in the Year Book, it was noted that the cyclic load bonus for a metric tractor drive wheel tire can result in a load higher than the IF version of the same size. As an example, the 380/90R46 tire at 64 psi at 15 mph has a cyclic bonus load of 12,810 pounds compared to 12,300 pounds for the IF380/90R46 tire at the same inflation pressure.

Previously, it was discussed to replace the current double asterisk (**) note for IF and VF tires to allow a 6% load bonus for IF tires and a 3% load bonus for VF tires for 15 mph cyclic field sprayer applications. It was also proposed to remove "Transport Service" from the title on page 5-46 of the Year Book.

This item is tabled pending consolidation of the cyclic load agenda items.

AG-22-15 – CONSIDER CLARIFICATION OF STANDARDIZED RIM WIDTHS FOR DIMENSION CALCULATIONS FOR "IF" AND "VF" METRIC AGRICULTURAL TRACTOR TIRES – DESIGN GUIDE

Ref: Minutes of meeting of February 6, 2024

Previously, it was proposed to consider clarifying the Approved Rim Widths calculation on page 5-54. The parenthetical states that the result be "rounded to the closest standardized rim." The standardized rim widths are found on EDI page 5-17. The rim widths listed under the Design Rim Width calculation on EDI page 5-54 are not harmonized with page 5-17.

The rim widths not shown on page 5-54 are the 17.00, 24.00, 38.00, 42.00 and 46.00.

Members were requested to review Austin Fischer's spreadsheets and comments for further discussion.

AG-23-2 – CONSIDER CLARIFICATION OF TIRE SECTION HEIGHTS FOR AGRICULTURAL STEERING WHEEL TIRES WITH CLASSIFICATION CODES F-1, F-2D AND F-2T – DESIGN GUIDE

Ref: Minutes of meeting of February 6, 2024

Previously, it was noted that the overall diameters of F-1 and F-2 type tires are the same as shown on page 5-61 of the Year Book. Page 5-01 of the Engineering Design Information shows different section heights for F-1 versus F-2 type tires.

James Grasso was requested to obtain more clarification for the overall diameters of F-1 and F-2 type tires.

AG-23-3 – CONSIDER ADDITION OF CYCLIC LOAD TABLES FOR “IF” AND “VF” DRIVE WHEEL TIRES USED IN CYCLIC FIELD OPERATION (CFO) – TRA STANDARD

Ref: Minutes of meeting of February 6, 2024

During previous discussion of item AG-21-3, it was proposed to consider adding a table for the subject tires similar to the table on page 5-40 of the Year Book which shows the load adjustment coefficients and inflation pressure changes for various operating conditions. It was noted to exclude the high flotation sizes. Tires to be included are those in Tables CT-1B, CT-1R, IFCFO-1 and VFCFO-1.

At the last meeting, spreadsheets from François Brassart, James Grasso and Austin Fischer were reviewed. Mr. Fischer's consolidated spreadsheet was sent to members after the meeting. During discussion, there was preference to use Note 5 on Year Book page 5-33 for Note 8 on Year Book page 5-32.

Members are requested to review the draft Year Book page as shown in attached document AG-23-3 for discussion.

AG-23-7 – DISCUSSION ON DESIGN RIM WIDTH AND APPROVED RIM CONTOURS

Ref: Minutes of meeting of February 6, 2024

Members were requested to review Aaron Dahl's spreadsheet to determine any rim contour exclusions.

AG-23-11 – CONSIDER ADDITION OF THE DH23B RIM CONTOUR TO THE 710/70R42 TIRE – TRA STANDARD

Ref: Minutes of meeting of February 6, 2024

At the last meeting, it was proposed to consider using the DH23B rim contour instead of the previously proposed DD23 rim contour.

David Wilson was requested to reach out to Kilmer Santos if this proposal is acceptable.

AG-23-15 – CONSIDER CONSOLIDATION OF LOAD BONUSES FOR CONTINUOUS SERVICE OF METRIC DRIVE WHEEL TIRES – TRA STANDARD

Ref: Minutes of meeting of February 6, 2024

At the last meeting, it was proposed to consider consolidating the subject as TRA Standard.

This item is tabled pending the outcome of item AG-23-3

AG-23-17 – CONSIDER CLARIFICATION OF MINIMUM INFLATION PRESSURE FOR 90 SERIES AND HIGHER “IF” AND “VF” METRIC DRIVE WHEEL TIRES – TRA STANDARD

Ref: Minutes of meeting of February 6, 2024

At the last meeting, it was noted that EDI page 5-10 does not account for 90 series and higher minimum inflation pressures.

Members were requested to research the origin of the 50% rule shown as Note 3 on Year Book pages 5-32 (IF) and 5-36 (VF).

AG-24-1 – CONSIDER REVISION TO BIAS IMPLEMENT SPREADSHEET

Ref: Minutes of meeting of February 6, 2024

At the last meeting, Austin Fischer reviewed a proposed spreadsheet which was sent to members after the meeting.

Members were requested to review and confirm the spreadsheet.

AG-24-4 – DISCUSSION ON HARMONIZATION MEETING WITH THE ETRTO AGRICULTURAL SUBCOMMITTEE

Ref: Minutes of meeting of February 6, 2024

Members in attendance of the March 27, 2024 meeting with ETRTO will report on this subject.

AG-24-5 – CONSIDER ADDITION OF OPTIONAL BEAD HUMPS TO THE 17X16.00 RIM CONTOUR – TRA STANDARD

Ref: Minutes of meeting of February 6, 2024

At the last meeting, Aaron Dahl reviewed a proposal to add the subject as TRA Standard to page 8-22 of the Year Book which was sent to members after the meeting.

This optional bead hump is intended for the VF500/50R17 tire size.

Mr. Dahl was requested to draft the proposal for the Year Book for review.

AG-24-6 – DISCUSSION ON MINIMUM INFLATION PRESSURE FOR TIRES USED ON 15-DEGREE RIMS IN TABLE AIR-1M

Ref: Minutes of meeting of February 6, 2024

During discussion at the last meeting, it was noted that 12 psi may be considered low inflation pressure for tires used in this application. It was proposed to show loads starting at 160 kPa (23 psi) on pages 5-54 and 5-55 of the Year Book.

Members were requested to recommend a proposal.

AG-24-7 – CONSIDER ADDING A PROCEDURE FOR ADDING NEW TIRES – DESIGN GUIDE

Ref: Minutes of meeting of February 6, 2024

At the last meeting, it was proposed to consider adding the subject when creating new tire types and sizes. Discussion centered on requiring a spreadsheet calculator for new designs.

Jim Sube was requested to develop a proposal for review.

AG-24-8 – CONSIDER CLARIFICATION OF kPa INFLATION PRESSURE VALUES – TRA STANDARD

Titan (Grasso) requests discussion of this subject referencing item TB-24-4 from the April 23, 2024 Association meeting minutes.

V. **NEW BUSINESS**

1. Report on USA/TRA position of Systematic Review of ISO 7867-1:2018 (Ed 5) - Metric series for agricultural, forestry machines and construction tyres — Part 1: Tyre designation, dimensions and marking, and tyre/rim coordination
 - A vote to Revise/Amend was submitted.
 - There were 7 votes to Confirm and 5 votes to Revise/Amend the subject standard.
2. Discussion on the next ISO/TC 31/SC 5 Plenary meeting scheduled for June 19, 2024, in Fukuoka, Japan.
 - The TRA Secretary will review the meeting agenda.

REC

Page	Rev.	Date
5-??	Draft	xx/xx/xx

ENGINEERING GUIDELINES

DIMENSION CALCULATIONS FOR METRIC IMPLEMENT TIRES (MIXED APPLICATIONS) (INCLUDES STANDARD, “IF” AND “VF” TIRES)

Nominal Tire Section (S_N) (mm) = As specified in tire size nomenclature ($S_{.80}$) - End in 0.

Theoretical Rim Width (R_t) (mm) = Nominal Tire Section (S_N) x Theoretical Rim Width factor

Aspect ratio	Rim	Theoretical Rim Width Factor
40 to 85	5°	0.80
90 and above	5°	0.70
35 and below	15°	0.85
40 to 85	15°	0.80
90 and above	15°	0.70

Design Rim Width (R_m) (in.) = $\frac{\text{Theoretical Rim Width}}{25.4}$

- (rounded to closest ½ in., thru 6.00)
- (rounded to closest 1 in., 6.00 thru 16.00)
- (above 16.00, round to closest 18.00, 20.00, 21.00, 23.00, 25.00, 27.00, 28.00, 30.00, 31.00, 33.00, 36.00, 40.00, 44.00, 48.00, 50.00, 52.00)

Section Width on Design Rim (S) (mm) = $S_N + .4(25.4 R_m - R_t)$ (rounded to closest mm)
(All dimensions in mm)

Nominal Aspect Ratio = Expressed as a percentage and shall be a multiple of 5

Design Section Height (H) = Nominal Tire Section x (Nominal Aspect Ratio/100) (rounded to closest mm)

Overall Diameter = $(2 \times H) + D_r$ (rounded to closest mm)

Approved Rim Widths = Nominal Section Width (S_N) x Approved Rim Width Factor
(rounded to closest standardized rim)

Aspect Ratio	Rim	Rim Width Factor	
		minimum	maximum
40 to 85	5°	0.70	0.90
90 and above	5°	0.60	0.80
35 and below	15°	0.85	0.90
40 to 85	15°	0.75	0.90
90 and above	15°	0.60	0.80

Nominal Design Tread Depths: See page 5-04

NOTE - ALL CALCULATIONS ARE MADE IN S.I. UNITS - CORRESPONDING ENGLISH UNITS ARE DIRECT CONVERSIONS OF FINAL S.I. NUMBERS

Load vs. Speed Variation: TO BE DETERMINED

as per ETRTO Standard Manual 2023 pp. A.47, A.50 & A.52

		% change to loads in load-pressure table, at service speed		
Speed symbol	Maximum Service Speed	Metric radial implement (Table AIR-1M)		IF (Table IF-2) & VF
		A8	D	D
	Stationary	+65% (Free Rolling), +135% (Drive Wheel)	+130%	+104%
	10 km/h (5 mph)	+40%	+80%	+64%
	15 km/h (10 mph)	+33%	+73%	+58%
	20 km/h (12.5 mph)	+26%	+65%	+52%
	25 km/h (15 mph)	+19%	+58%	+46%
	30 km/h (20 mph)	+12%	+51%	+41%
	35 km/h (22.5 mph)	+5%	+44%	+35%
A8	40 km/h (25 mph)	None (Ref)	+36%	+29%
	45 km/h	-5%	+29%	+23%
B	50 km/h (30 mph)	-10%	+21%	+17%
	55 km/h	—	+14%	+11%
	60 km/h	—	+7%	+6%
D	65 km/h (40 mph)	—	None (Ref)	None (Ref)
	70 km/h	—	-9%	-9%

PROPOSED TRA STANDARD

TABLE IFCFO-1

Tire Size Designation	Basic Tire Load Index	Rated Inflation		Cyclic Load ≤ 10 mph (15 km/h)		Cyclic Load > 10 mph (15 km/h)	
		psi	kPa	lbs.	kg	lbs.	kg
IF1000/55R32CFO	188	41	280	34100	15500	28600	13000
IF800/65R32CFO	181	41	280	28100	12800	23600	10700
IF800/70R32CFO	185	41	280	31500	14300	26500	12000
IF800/70R42CFO	189	41	280	35100	16000	29500	13400
IF680/75R38CFO	180	41	280	27300	12400	22900	10400
IF680/80R38CFO	182	41	280	29000	13200	24300	11100

TABLE VFCFO-1

Tire Size Designation	Basic Tire Load Index No.	Rated Inflation		Cyclic Load ≤ 10 mph (15 km/h)		Cyclic Load > 10 mph (15 km/h) ≤ 20 mph (30 km/h)	
		psi	kPa	lbs.	kg	lbs.	kg
VF750/50R26CFO	174	46	320	19950	9100	16750	7600
VF1000/50R25CFO	190	46	320	31600	14400	26500	12000
VF1000/55R32CFO	197	46	320	38300	17400	32100	14600
VF900/60R32CFO	191	41	280	32500	14800	27200	12400
VF900/60R38CFO	196	46	320	37300	16900	31200	14200
VF900/60R42CFO	195	41	280	36200	16500	30300	13800
VF710/65R30CFO	179	41	280	23100	10500	19350	8800
VF750/65R26CFO	180	41	280	23800	10800	20000	9100
VF620/70R26CFO	173	41	280	19400	8800	16250	7400
VF620/70R30CFO	175	41	280	20550	9350	17250	7850
VF710/70R42CFO	188	41	280	29800	13600	25000	11400
VF520/80R26CFO	168	41	280	16700	7600	14000	6350
VF500/85R34CFO	172	41	280	18800	8550	15750	7150
VF520/85R30CFO	172	41	280	18800	8550	15750	7150

**LOAD ADJUSTMENTS FOR DRIVE WHEEL TIRES USED ON AGRICULTURAL EQUIPMENT
IN CYCLIC LOADING FIELD SERVICE AND ROAD TRANSPORT
(EXCLUDING HILLSIDE COMBINES AND HIGH-CLEARANCE SPRAYERS)**

TIRES USED AS SINGLES

TIRE AND RIM ASSOCIATION STANDARD

TABLE CYC-1

CATEGORY	REFERENCE LOAD TABLE	CHANGE IN COLD INFLATION PRESSURE (Δ)	MAXIMUM SERVICE SPEED	CHANGE IN LOAD CAPACITY
DIAGONAL (BIAS) PLY AGRICULTURAL DRIVE WHEEL TIRES ^{(a)(b)(d)}	WT-3	$\Delta = +30\%$ with $\Delta \leq 15$ psi	6 mph (10 km/h)	+87%
			10 mph (15 km/h)	+70%
RADIAL PLY AGRICULTURAL DRIVE WHEEL TIRES ^{(b)(d)}	RT-2, RT-4	$\Delta = +25\%$ with $6 \text{ psi} \leq \Delta \leq 12 \text{ psi}$	6 mph (10 km/h)	+70%
			10 mph (15 km/h)	+55%
"CFO"-DESIGNATED "IF" RADIAL PLY AGRICULTURAL DRIVE WHEEL TIRES ^(c)	IF-1	NO CHANGE	6 mph (10 km/h)	+70%
			10 mph (15 km/h)	+55%
			20 mph (30 km/h)	+30%
"CFO"-DESIGNATED "VF" RADIAL PLY AGRICULTURAL DRIVE WHEEL TIRES ^(c)	VF-1	NO CHANGE	6 mph (10 km/h)	+48.5%
			10 mph (15 km/h)	+35.5%
			20 mph (30 km/h)	+13.5%

- NOTES: 1. For tires used in dual or triple service, calculated tire load limits must be reduced - multiply figures by 0.88 or 0.82, respectively.
2. The load adjustments described above reflect a different operating cycle when compared to agricultural tractors. This cyclic service is intended for use on a vehicle with a minimum requirement for torque transmission and with appreciable total weight fluctuations (e.g. combines, grain carts, air seeders, etc.). Unloading is to occur before off-field transport.
3. Due to the higher loads and/or inflation pressures specific for these tires, the tire and wheel manufacturers must first be consulted.
4. The above field service cyclic load adjustments only apply to vehicles operating on up to 11° (20%) lateral slopes. For operations on greater than 11° (20%) lateral slopes, no cyclic service load adjustments apply.
5. Refer to the General Data section corresponding to the appropriate reference load table for tire dimensions, approved rims, etc.
6. Refer to Table HC-1 on page 5-46 for loads and inflations applicable to usage on high-clearance sprayers.

^(a) For log-skidder tires with the same size and ply rating, the above cyclic load adjustments can be applied.

^(b) For grain cart applications, the 10 mph (15 km/h) load adjustment may be applied at speeds up to 15 mph (25 km/h) and distances up to 1 mile (1.6 km).

^(c) For grain cart applications, the 10 mph (15 km/h) load adjustment may be applied at speeds up to 20 mph (30 km/h) and distances up to 1 mile (1.6 km).

^(d) Road transport load capacity at speeds up to 25 mph (40 km/h) is the load shown in the reference load table corresponding to the adjusted inflation pressure determined above.

FOR RIM AND WHEEL LOAD INFORMATION, SEE NOTE 4, PAGE 5-62.

THE TIRE AND RIM ASSOCIATION ANTITRUST GUIDELINES **FOR MEETINGS**

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2. Each meeting will be conducted pursuant to a written agenda that is distributed in advance of the meeting. TRA will keep accurate minutes of each meeting. No comments may be made “off the record.”
3. Meeting participants shall not discuss matters where their companies compete with each other or matters that are sensitive from a competitive standpoint. Such matters include, but are not limited to, the following:
 - Individual company information on price (or any aspect of price), costs, production, capacity, inventories, sales, shipping rates.
 - Individual company bids or bidding procedures.
 - Individual suppliers, distributors, or customers.
 - Product designs or plans.
4. Participants must respect any warning by the meeting chair or by a TRA staff member that a particular subject is off limits. If such a warning is disregarded, the meeting chair and/or the TRA staff member shall adjourn the meeting immediately and report the matter to counsel for TRA.

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