REPORT OF VOTING/ANNEX B

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Member body	**COMMENTS** Comments shall be reproduced as received either by re-typing them, or directly by pasting them on this form	**OBSERVATIONS OF THE SECRETARIAT** on each comment submitted
AUSTRIA ON	- page 8 Referring to "Figure 6 - Preferred and optional angles for pelvic restraints." the measurement of the angles in both cases - the rear view and the side view - should be expressed in degrees instead, of millimeters and should read as follows: 15 o in the case of the rear view and 75 0, 45 o and 30 o in the case of the side view.	Accepted
	- page 9: Referring to Figure 7 - Clear zones for wheelchair-seated occupants." in the third paragraph of the "Notes" the abbreviation for "frontal clear-zone", “(FCZ)", should be inserted in capital letters in brackets as follows: "The frontal clear zone (FCZ) may not be achievable with wheelchair-seated drivers."	Accepted
	- page 15: In Chapter"A.3.1 An impact simulator shall be used that includes:" d) 4) should be corrected as follows: “to ➔ t_o tf ➔ t_f.”	Accepted
	- page l7: Referring to “Figure A.2 - Locations for upper anchor point(s) of centre-anchored and two-point-anchored harnesses in frontal impact test." the arrow head for lateral excursion of the anchor point of 150 mm should point accurately to the center point of the x-shaped symbol of the anchor point.	Rejected. 200 mm is not a displacement length. It is a minimum distance for positioning the adjustment device from the relative to the end fitting. Drawing will be modified to make this minimum distance more clear.
	- page 23: Referring to Figure C.1 - Test setup for webbing slippage at adjustment devices" it should be checked if the sum of tolerances of lifting height of 100 mm and displacement length of 200 mm is reflected by the tolerance of total travel.	Accepted
	- page 30: In "Figure F.1 - Preferred zones for location of shoulder belt on occupant´s torso." please replace "SH" by "StHt". With the comments listed above, we approve ISO/DIS 10542 - 1.	

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Page.....

DENMARK DS	DENMARK votes NO. to the ISO/DIS 10542-1. This vote can be changed to: YES if the following comment is accepted: Annex E (normative): Page 28 - Figure E.4 The figure with the cross section A-A: The value 30 mm (+0, -1) shall be changed to: " x mm ±0,1 mm" Add. a Footnote: " x is depending on the mass and the material of the wheelchair." Rationale: It is not possible to state a value of 30 mm as this is depending on the mass of the wheelchair. This is also reflected in Annex A, page 15.	Not Accepted. These dimensions refer to the surrogatge wheelchair, not real wheelchairs with different masses. These dimension serve as a gauge to see if the tiedown end fittings will fit on wheelchair frame tubing. It is correct at 30 mm +0, -1.
FRANCE AFNOR	**Observations generales** Le cas des autobus et autocars n'est pas prevu par cette norme qui ne considere qu'un type de choc frontal, correspondant aux decelerations subies par les vehicules legers et minibus. Ce fait pourrait etre penalisant pour l'innovation en direction de dispositifs specifiques aux autobus/autocars pour lesquels les concepteurs chercheraient des solutions plus pratiques et plus rapides ä mettre en oeuvre, en rapport avec les conditions de trafic et d'exploitation en service public. La reference d'un tel type de choc existe dans le Reglement CEE et la Directive Europeenne 96/37 sur les sieges et ceintures de securite.	WG discussion—translation required
GERMANY DIN	Comment on IS0 10542-1 and 10542-2 Reasons for; disapproval - Crashtests with wheelchair-tiedown and occupant -restraint system, for which the occupant restraint system consist of a pelvic belt only, shows that the strain of the head increase due to the jackknifing effect. Therefore an occupant-restraint system shall have in every case pelvic. belt and an upper torso belt (three- or four point belt). A pelvic belt only as an occupant restraint system is not sufficient. - The angle to the horizontal for the pelvic belt shall be as great as possible, so that the	WG discussion **:** WG recognizes the desirablility for both pelvic and torso belts but decided to allow WTORS with pelvic belt only, with appropriate warnings to users. Changing this now is desirable (many experts desired that the pelvic-belt only not be allowed from the beginning), but is not trivial. Rejected. While it is agreed that pelvic belt angles between 45 and 75 degrees are more desirable, angles as low as 30 degrees in this nominal test conditions are considered acceptable. Angles in the real world cannot be controlled and will vary further depending on wheelchair size, etc. It is not considered reasonable to specify requirements for shoulder

	submarining effect will be avoided. The allowed angle from 30° (45°) and more for a fragil wheelchair is too small. The allowed angle of the upper torso belt should be between 60° and 80°. - The geometry of the occupant-restraint system shall be explained in a better way. The description of-the geometry for the occupant-restraint system should be orientated to the ECE-regulation l6.In this case the particular requirements of the wheelchair shall be considered. The geometry of the pelvic belt and of the upper torso belt shall be defined.	belt angles at this time. Rejected: Figs 5,6,A2,A3, B1,B2, F1,F2, F3, F4 provide ample information about the required and recommended geometry of pelvic and upper torso belts for testing and installation, respectively.
	- For many wheelchairs it is not possible to lead the pelvic belt in a correct way even if there existed an appropriate description of the belt geometry for the occupant-restraint system. The reasons are the different constructions of the wheelchair (e.g. arm- and backrest or wheels), so that the pelvic belt will be lead not low enough or completely wrong over the pelvis. The lead of the pelvic belt which is not low enough brings by frontal collision serious abdominal injury. Therefore the lead of the pelvic belt shall pull through the wheelchair. The pelvic belt shall be fixed direct with the adaptersystem of the wheelchair which guarantee the optimal leading of the belt. - The front and back. tiedown system of the wheelchair shall be fixed at clear visible and stable points; which reduce the misues by securing the wheelchair to a minimum. These fixation points can: be equipped additionally at different wheelchairs. - The fixation points at the back for the wheelchair tiedown system shall be connected by an adapter system with :the fixation of the pelvic belt. Hereby among other things the resulted restraint force will be reduced by a fragil wheelchair.	Not Relevant to WTORS standard. This is a wheelchair design issue. Annex B of CD 7176/19 contains procedures for rating a wheelchair's ability to accommodated effective placement of occupant restraints on the wheelchair user. Not relevant to WTORS standard. CD 7176 has a requirement for four securement attachment points that are marked by symbols that can be identified from a distance of 1 m. Not relevant to WTORS standard. Again, this is a wheelchair design issue which has been addressed in CD7176/19.
JAPAN JISC	Disagree with comment Comment: The numerical value (20) of the gravity acceleration of the collision examination prescribed in this standard is too much. Japanese Standard value is 4, therefore it isn't suitable for the actual circumstances.	Rejected: ISO 10542-1 applies to WTORS that can be used in any passenger motor vehicle. Thus, the smaller van sets the requirement for the severity of the impact test. A 48-kph, 20g deceleration pulse is a standard that has been adopted internationally for automobile crash testing. It has been used successfully in the testing wheelchair securement systems in

		common use today. A future part of 10542 will probably be developed for WTORS designed only for use in larger vehicles, and a lower crash severity will be used in this part.
KOREA KATS	There are many typos in this draft. 'The following is the list of what I found. I). In the article 3.19 in p. 3, "required for" should be "required by". 2). In the article 3. 26 in p 4, "connect to" should read "are connected to". 3). In the article 3. 27 in p 4, "connect" should read "are connected". 4). In the article 4.1 a) in .p. 5, "be for use" should be written as " be used". 5). In article 4.3.4 b) in p. 7 "to order to" should read "in order to" 6). In p. 8 in article 5.2.1. there should be only one c) instead of two c)'s. 7). In p. 10 in the article 5.3.3.a), "included with" should be "included in". 8). In p. 15 in the article A.3.l.d) 4), "to" should be replaced by "t_0" and "tf" should be replaced by "t_f". 9). In p. 16 in the article A.4.5, "+30" should read "+3°". 10). In p. 17 in the article A.4.15, "+30" should read "+3°". 11). In p. 27, in the sentence just above the caption of the Figure E.2, it is better to add otherwise right after the word "specified". 12). In p. 28., in the sentence just above the caption of the Figure E.3, it is better to add otherwise right after the word "specified". 13). In p, 29, "mm2"s in the article F.3 a) and b) should be replaced by "mm^2" 14). In the article F.4 in p. 29 the "wearer" should read as "occupant" or "person riding the wheelchair" and "wearer's" as his. 15). In the article F-5 on the same page "conform with" should be replaced by "conform to". 16). In the article F.9 in p- 29, "different size occupants" should be replaced by "different sized-occupants".	 Accepted Accepted ? Accepted Accepted-suggest « be designed for » Accepted Accepted Rejected :--« included with » intended meaning Accepted Accepted Accepted Accepted Accepted Accepted Accepted Accepted
NETHER-LANDS NNI	1) The sub-title on the front page is different from page 1: Part 1: General requirements Part 1: Requirements and test methods for all systems We suggest: Part 1: General requirements and test methods. 2) The scope narrows the standard to WTORS intended for adult-occupied wheelchairs. We can only see 3 reasons for doing so:	Rejected : Proposed title was accepted by WG-6 and SC-1 as it clarifies that the test methods in Part 1 are applicable to all types of WTORS.

	- because of conflicting requirements related to the function of the OR or the position of the OR anchor points - because of the "oversize" of the ATD used in the dynamic test - because of conflicting requirements related to the geometry of the WTD As far as we are aware non of the requirements or test methods in this standard are really thus conflicting or "overdone" that it is justified to exclude child occupancy. Knowing that a major population of wheelchair seated travellers consist of children we strongly advice not to exclude child occupancy for this standard. Therefor we suggest to change the scope to: ..... It applies to all WTORS that use belt-type occupant restraints that are intended for occupied wheelchairs used as forward-facing seats by passengers and drivers of motor vehicles. ..... Future amendments might incorporate children's aspects more explicitly.	WG Discussion :. As long as one accepts that all WTORS must be suitable for both adults and children (i.e., they must be tested to adult loading conditions using the SWC and midsize male ATD), it may be possible to implicitly include children from 6 years and older, but not explicitly. It should be noted, however, that the WG has insisted for many years, that ISO 10542-1 apply to adults only.
	1) In clause 4.1.d it is stated that: "WTORS shall provide for manual release of both the wheelchair and the occupant within 60 s by a single attendant without the use of tools". We fully agree with this requirement. As well with regard to a profitable commercial transport situation as well as in case of an emergency situation, the WTORS has to be easily detachable. However, to show compliance to this requirement it is not possible to try every wheelchair so one might be tempted to make use of the SWC. For several types of currently existing WTORS, it is much more difficult to detach from a wheelchair with 24" wheels and a small distance to between the wheel(s) and frame than from the SWC. It should be clear that in case of concerns about the fulfillment it should be not only be checked against the SWC but to any type of regularly used wheelchair	Rejected : use of the surrogate is a recognized compromise that is only a benchmark test and therefore does not necessarily represent all types and models of WCs in marketplace. The SWC securement points are designed to provide a worst-case size of structure for the tiedown end fittings for this test. The remainder of the problem is solved in CD 7176/19 through appropriate design and location of securement points. Also, recognize that ISO 10542-1 applies to WTORS with all types of tiedowns, not just those with four-point straps tiedowns.
	2) In clause 4.1.i. a manual override for power failure of an power-operated tiedown is requested. It is not clear whether this override is expected to function for non-emergency type of situations (so it might include the use of tools and may take some time) or in emergency type of situations (so for instance referring to 4.1.d).	Comment : the words « power failure » suggest emergency situation. The fact that the use of tools is not mentioned means the use is not precluded. WG discussion.
	3) Clause 4.3.2 stipulates pelvic belt angles and refers to annex B for measurement. Clause B.5.1 refers to "the angle projected onto the wheelchair reference plane" which could be read as the side-view angle only. We suggest for clause B..5.1: "Measure the rear-view and side-view angle of the pelvic belt projected onto the wheelchair reference plane with respect to the horizontal".	Accepted with modificaton. The fix suggested will not work since it won't work to project the rear-view angle onto the wheelchair reference plane. But the point is a good one. Will change B.5.1 to say : Measure the rear-view angle of the pelvic belt projected onto a plane that is perpendicular to the wheelchair reference plane, and the side-view angle of the pelvic belt projected onto the wheelchair reference plane.

	4) Clause 4.3.3 refers to "structural components for attachment of upper anchorages or webbing guides" and clause B.4.4 refers to "support structures for upper anchor points or webbing guides". This term needs to be defined. See also clauses A.4.10 and A.4.11 for consistency of wording.	Not sure which term is being referred to. Webbing guide and anchorage are both defined. Not sure that structural component or support structures need to be defined, if that is what is meant. Consistency could possibly be improved but does not seem necessary.
	5) It is not important to know how the WTORS is packed as stipulated in clause 5.2.1.b, but if all components are present upon delivery. Change 5.2.1.b. into ""lists all parts of the WTORS required for installation". Note: this overlaps with clause 5.2.3.b so 5.2.1.b might also be deleted.	Rejected. While it may not seem that 5.2.1b is needed, it was decided in WG meetings some time ago that it is. As is, it is different than 5.2.3b so both should stay.
	6) The current lay-out of paragraphs 5.2.1 - 5.2.3, focussing on differences between statements, descriptions, diagrams and drawings is very confusing. It would be much easier to understand the logic and consistency of the given requirements if categorized according to the function of the parts: - general (compliance to 10542-1 [5.2.1.c], forward facing wheelchairs [5.2.1.a]) - system overview (exploded view and components list [5.2.3.b], use of system [5.2.2.c]) - fastening anchores to vehicle (acceptable methods [5.2.3.a], minimum specs of fasteners [5.2.1 .d]) - anchoring WTD to wheelchair (wheelchair features [5.2.2.a], components permanently fastened to wheelchair [5.2.1.e; 5.2.2.b]) - anchoring OR (location of pelvic belt [5.2.1.e] and shoulder belt [5.2.2.d] anchor points, clear zone [5.2.3.d]) -	Rejected. The groupings seem quite logical and were agreed to by the WG. The suggested grouping by function results in almost as many groupings as statements.
	7) The second part of clause 5.2.4.b is not a warning but a (very relevant) requirement that has to be be incorporated in 5.2.3.a.	Accepted : the second part will be moved to 5.2.2 or 5.2.3
	8) Clause 5.2.4.c is only relevant if the installer is adding any additional padding at his/her own initiative in relation to clause 5.2.3.d and 5.2.4.i. The burning performance of the WTORS has to be covered by clause 6.1.2. The original padding of the vehicle is covered by the OEM requirements. Please rephrase this clause to show it "irrelevance".	Accepted : the inserion of the word « additional » before vehicle heips to clarify. Clause 6.1.2 refers to WTORS webbing.
	9) Clause 5.2.4.f refers to "dispensation and advice to disable the airbag". It would be better to keep the type of solution more open and refer "to advice on how to cope with the airbag".	Accepted (disabling may only be a US option)

	10) Clause 5.2.4.g should be more clearly refer to the installation of a WTORS instead of just mentioning "after-market devices" since the term after-market devices might be misunderstood as being additions after installation of WTORS instead of additions after OEM delivery of vehicle. ("the WTORS should not be installed in a manner that may block deployment of an airbag"). We also suggest to change the order of the 3 clauses related to airbags to : (g), (e), (f). 11) Clauses 5.2.4.h.and 5.2.4.m do not apply to instructions for installers. Please delete here.	Accepted Accepted Rejected : clarification of 5.2.4h—by adding words » « anchor points ? » after wheelchair is intended as an installation instruction. Clause 5.2.4m is warning information for installers
	12) Clause 5.2.4.i is no warning but should be read in close connection to 5.2.3.d. Please integrate clause 5.2.4.i in clause 5.2.3.d. 13) Clause 5.2.4.i only refers to FMVSS 201. Please also refer to its European equivalents being: EC 74/60 or ECE 21 . 14) As clause 5.3.1.b is currently written it is not really user oriented. Replace this requirement to 5.3.2 "a description on how to inspect, clean and maintain the WTORS". 15) The user instructions shall include a statement that the webbing should be protected from contacting sharp corners and edges (see 5.2.4.L). 16) From investigation into daily practise in the TEST project it became clear that users are not aware of the proper geometry and fitting aspects of the OR. Although we are aware that the written instructions supplied with the product are not the "ultimate" way to communicate these aspects, we would like to be sure that they are incorporated in the user instructions. However, we do not see these aspects as "warnings" but as beloning to a proper description of how the WTORS is to be used. Therefor we suggest to have the list under clause 5.3.3.d replaced to 5.2.3.a.	Rejected; 5.2.4i is a warning to installers Accepted : Need reference Accepted Accepted Accepted with modification. Will move 5.3.3d to 5.3.2. Clause 5.2.3a is an instruction to installers.

	17) Clause 5.3.3.e is redundant with 5.3.3.d.3 18) Clause 6.1.1 should also refer to its European equivalent EC 77/541 19) With reference to clause 5.2.4.c, the requirement of clause 6.1.2 should also include any padding used in the WTORS. 20) With respect to Table 1 the following comments have to be made: a) we suggest to delete the reference to section 6.2.1.4. In wheelchair seated transport it will be very difficult to assure that parts made of plastics will during every day use not be liable to become trapped. From extensive experience in safety belt testing for the worldwide automotive market we know that hardly none of the currently exiting plastic parts of safety belts would pass the test stipulated for plastic items that can become trapped. b) section 6.2.2.4 stipulates requirements for repeated testing as preconditioning for the dynamic test. As currently written in paragraph A.2, the dynamic test has to be performed on an unused WTORS. Seen the results of the TEST project we very strongly argue to precondition the WTORS before the dynamic test as described in ECE 16. This hold not only for the OR buckle but also for the WTD connection part (the "buckle equivalent") as far as this part is liable to any wear during attach/detach operation.	Rejected : the two clauses convey different information intended for users WG-6 needs to review if EC77/541 releveant ? ? Accepted : will add word « padding » to 6.1.2 Rejected: 6.2.1.4 doesn't deal with parts becoming trapped. WG discussion and clarification of 6.2.2.4 needed. This precondition may be prior to static testing, not dynamic testing. There is no precedence for using preconditioned equipment for dynamic testing.
	c) in line with the previous argument we also very strongly advise to incorporate section 6.2.2.5 (force required to open the buckle after the dynamic test) in table 1. This requirement should however not only apply for the OR, but also for the WTD connection points that need to be detached for release of the wheelchair (see the related clause 4.1.d of 10542-1). If this requirement for WTD is not incorporated in 10542-1 because it is seen as unrealistic to expect a wheelchair can get out of the vehicle after an incident so it is also not necessary to be able to detach it, than it would be good to express this in the standard in the form of a note. d) in line with the previous two arguments, we advise to incorporate all preconditioning requirements as given in ECE 16 under the section 6.4.1.2 (excluding clauses 6.4.1.2.3 and 6.2.1.2.4 that are not related to preconditioning but to the test setup). e) section 6.2.3.2 of ECE 16 requires a micro-slip test equivalent to the one described in Annex C. To allow WTORS to be included in "mainstream testing" of automotive products we suggest to include section 6.2.3.2 in table 1 and to add to clause 6.3 of the 10542-1: "the strap slip of a belt adjusting device shall either comply to ECE 16 paragraph 6.2.3.2 or when tested in accordance with annex C ".	WG discussion - need additional WG expertice on ECE 16 WG discussion WG discussion

	f) section 6.2.2.6 and section 6.2.3.4 require strength testing of the buckle and belt adjusting device. Both sections are currently left out of table 1. The "ultimate" strength test of the system occurs during the impact test which might have been the reason to leave these paragraphs out. In the TEST project it became very clear that the static strength test are a (cost) effective method to determine if the strength of the different parts of the WTD is such that it might be expected that it is not just "luck" when the dynamic test is passed properly. We are aware that the figures given in ECE 16 for static loads refer to expected ATD loads and therefore are not fully satisfactory for WTD load figures. We suggest to add sections 6.2.2.6 and 6.2.3.4 for OR's and refer to these sections also for WTD's, including a table with figures based on simple semi-static calculations (see the attached annex to this comment for suggested figures)	WG discussion: The commenter is correct that the dynamic test replaces the static tests. Static tests can be used by manufacturers, but are not required. Experience has shown that equipment can pass static tests and fail dynamic tests, but not visa versa.
	g) for retractors section 6.2.5 is referred to. This is OK. We would however like to warn for the fact that automotive industry tends to get away from retractors type 1 and type 2 and promotes the use of retractors of type 3 and 4. For disabled persons with hardly any control of the upper body, type 4 retractors are not at all a proper solution, and type 1 and 2 retractors can be still very useful for WTD's (and also OR's). Care should be taken that referring to this section of ECE 16 for testing has no consequences for the choice of appropriate WTORS parts. This might be covered in a note or be mentioned in Annex F.	WG discussion: Need clarification of differences in retractor types.
	23) Clause 6.2.1 should be extended with the following: "the WTORS shall exhibit no dangerous roughness, sharp edges or protrusions likely to increase the risk of severity of injury to the occupant". The reason for this requirement is that during the TEST project we encountered some products that because of their shape after testing could seriously injure the occupant.	Accepted
	24) The excursion limits given in table 3 for the head excursion seem to be very loose and will hardly be effective to sort out the poor performing products. Reconsideration of these values is advised.	Rejected pending WG discussion: It was agreed to go with these values and modify after standard has been in place as new data suggest.
	25) Like in most automotive regulations, this standard focuses only on the displacement of the upper body of the occupant. For automotive regulations this is logical since movement of the legs is restricted by the vehicle structure or seat in front of the occupant. So requirements for legs are focussed on damage caused by the restriction rather that on the displacement within the limited free space around the legs. In wheelchair testing we see however that the legs of the occupant have an enormous freedom in movement (see also under point 31 related to dummy damage). Although we are aware that it is impossible to include requirements to this respect at this stage, we want to have this point raised for incorporation in the amendment(s) which will hopefully follow soon after publication of this standard. Requirement(s) with respect to the limitations of the movement of the legs of the occupant	Rejected. The standard does call for the measurement of knee excursion and specifies limits knee excursion. The fact that the legs and feet extend forward during testing is only a function of the fact that we do not include vehicle interior components in the test, since the test is a dynamic strength test, and free movement of the legs is desirable, although not necessarily realistic to real-world conditions.

	have to be included. 26) As already mentioned under point 22e) we would like to include the possibility to conform to ECE 16 paragraph 6.2.3.2. Suggested wording: "the strap slip of a belt adjusting device shall either comply to ECE 16 paragraph 6.2.3.2 or when tested in accordance with annex C..... 27) Why need the sub-clauses of 6.2.1 all be specified under clause 7.2.d ? Isn't it sufficient to state that "the test results as specified in clause 6.2.1" shall be included? 28) Clause 7.3.b/c specifies that only the results of/compliance to 4.3.2.d have to be specified. The results of and compliance to the other sub-clauses of 7.3 should also be included. Please refer to clause 4.3.2 instead of 4.3.2.d only. 29) In the printed version for voting, in Annex A as well as in (the text of) Annex E in several places the tolerance is given as "+ x Unit". Most of these should however be "± x Unit ". All the tolerances in the document have to be checked for this typographical error and adjusted appropriately. 30) Clause A.2 specifies an unused WTORS for testing. In line with point 22b - 22d of this comment we would like have the WTORS (WTD and OR) preconditioned for the impact test, according to the stipulations of ECE 16. (this includes for instance 5500 operations and a corrosion test). 31) Clause A.3.l.e stipulates the use of a Hybrid II or Hybrid III as ATD for testing. In the TEST project it became very clearly apparent that these dummies are not designed to be used for wheelchair testing. Especially the shoulders and knees of the dummies are in wheelchair testing much more severe loaded than ever will occur in automotive testing. In order to keep the damage to the dummies at a reasonable level we had to restrain the underlegs so that the knee joint could not stretch beyond full extension. When using a Hybrid II also the upper arm must be restraint to the upperbody in order not to damage the shoulder joint. (the dummy manufacturer told they were more often confronted with these types of damages to the dummies due to usage for wheelchair testing). The standard must include a clause allowing for these precautions to be taken since it is of no use to damage the dummy at places where none of the requirements of the test put any emphasis on.	WG discussion: Need to see ECE 16 first. WG-6 discussion Accepted : needs clarification ? Accepted. These were errors that occurred in translaton and will be corrected. Rejected pending WG-6 discussion. We don't, for example, precondition child safety seats before dynamic testing. Rejected pending WG discussion. Dummies are occasionally damaged after repeated testing, and we find nothing particularly stressful to the dummies in wheelchair testing. Limitiing the movement of the legs and arms would be likely to change dummy excursions. Before this could be allowed, we would need to show that it doesn't affect excursions appreciably.
	32) Please refer in clause A.4.4.b for the tyre pressure to annex E ("inflate the tyres to the specifications of E.2.m"). Reason for this is that if the specifications in Annex E might change (see our comment point 34) this is automatically valid without having to check if all related clauses are also changed. 33)	Accepted

	Within the TEST project we encountered problems in placement of the OR as stipulated in clauses A.4.12 and A.4.13. Because of the 75 mm block in combination with the rigid chair backrest of the SWC, the shoulder belt was so loosely laid over the shoulder of the dummy that we had to use a piece of tape to keep it on the shoulder after removing the block. We suggest to use a block of 25 mm thick OR like in ECE 16 paragraph 7.7.2 place a board of 25 mm between the backrest and the dummy which is removed after firm adjustment of the dummy. To realise "snug fit" for the pelvic belt, we used also a block: 25 mm thick, 50 mm wide which was placed between the belt and the ATD's abdomen at position of the wheelchair (=ATD) reference plane. We suggest to incorporate this in the current standard as to define the belt fitting more adequate. We would encourage to put a force requirement on the effort to pull the straps when the block(s) or board is/are present as for instance done in ECE 44.	Partially accepted. The 75 x 75 x 75 mm block should have been specified as a 75 mm square block that is 13 mm think, and placed between the ATD chest and the shoulder belt with the 13 mm edges against the belt and ATD chest. The pelvic belt is pulled snug without any plates in place. Testing at Uva and UMTRI , and the round-robbin testing at several labs did not confirm the need to measure forces, which can also be difficult to do with consistency and reliability.
	34) It was impossible to get hold of the wheels for the SWC as specified in E.2.1 from any of the wheel suppliers in The Netherlands. For the TEST project we decided to stick to the dimensions of the wheels and used the highest pressure tyre available in this dimension range. We suggest to include possible providers in Annex H and/or make the specifications less stringent.	Accepted.
	35) As far as we can see is the height of the footrest determined by accomodation of the lower legs of the ATD. This is more important than the 94 mm height / 200 mm front position of the footrest. For the TEST project we had to alter the footrest position a bit for proper fitting to a Hybrid III dummy. The wheelchair description in E.2. must allow for this type of (minor) alterations.	Accepted pending WG-6 discussion.
	36) The dimensions of the securement points for 4-point strap-type tiedowns as currently given in figure E.4 is very restrictive with respect to the SWC lay-out for other tiedown systems. We strongly prefer not to stipulate the 40 mm outer radius so that the securement point can be realised by welding two perpendicular frame parts together. This is also much more realistic if compared to attaching the WTD to a standard manual wheelchair.	WG 6 discussion. Geometry is designed to test for effective engagment of hook-type end fittings. The junction of welded frame members does not allow for effective engagment. 7176/19 will specify geometry for wheelchair securement points to be used with strap-type end fittings and, in time, elmininate the need for securing to welded tubing. The dimensions of the SWC securement points dimension has been agreed upon after much debate. Used to check compliance of endfittings.
	37) Please add to Annex G the Dutch standard for WTORS: NEN 2746 Rolstoelinzittende-beveiligingssystemen - Eisen en beproevingsmethoden (NEN 2746 - Wheelchair tiedown and occupant restraint systems - Requirements and test methods)	Accepted
NEW ZEALAND SNZ	The partial engagement definition is open to intepretation	Agreed, but it's still useful.

SWEDEN SIS	General Comments The text must be checked for spelling errors, missing words and special characters. For example, + should be ± on several places and the character for degrees " º " is wrong on several places. Special Comments The standard specifies a crash test procedure for Wheelchair and Occupant Restraint Systems, WTORS, for use in all types of motor vehicles. The crash pulse is 50 km/h and 20 g within specified time limits. The European directives for seats and seat anchorages in motor vehicles specify different crash pulses for cars and buses. For cars, the crash pulse is 50 km/h and 20 g for at least 30 ms, which is slightly different from the pulse specified in the draft standard. For buses, the crash pulse is 30 km/h and a mean retardation between 6,5 and 8,5 g within specified time limits. For the moment there is an ongoing work on an EU directive with technical requirements for buses. This directive will include requirements on securement systems for wheelchairs. The strength requirements discussed so far are in line with the strength requirements for the seats in the bus. Therefore we propose that the ISO/DIS 10542-1 is limited to cars or that an additional crash procedure for WTORS for buses is included.	Accepted Rejected. While the test pulse of 10542-1 is higher than needed for buses and larger vehicles, WTORS tested to this level are suitable for use in all sizes of vehicles, not just passenger cars. A lower crash pulse for WTORS only intended for use in larger vehicles is under consideration. Can possibly add some words to introduction to clarify this issue relative to 10542-1.
UK BSI	We disapprove for the technical, and editorial, reasons stated below. Acceptance of specified technical modifications will change our vote to approval **UK 1** (Title page 1 - Editorial) Title does not align with the contents of this standard. *Proposed change* Requires ·clarification as to why has "test method for all systems" been deleted from page 1 heading. **UK 2 (**Introduction - Editorial) Para 1 last sentence state that part 1 shall not be used alone if an additional part exists. *Proposed change* The last line of para 1 Introduction requires clarification that any additional part should be appropriate to the particular WTORS system being tested. If it is not then Part 1 will be the only part used eg; clamps will meet Part 1 only at the moment even though there is a part 2. **UK 3** (Introduction - Technical) It is common knowledge that a two point pelvic restraint belt provides a poor level of occupant restraint when compared with a three point system. It is possible for an occupant wearing a two point lap belt to experience serious internal injuries due to the penetration of the lap belt into the abdomen. Throughout the ISO 10542/1 document there are several references to the use of two point pelvic restraints. There may be reasons to believe that a two point belt is better than no restraint at all, but it should be the intention of this standard to express its disapproval of the use of such an occupant	Accepted. Title should not have been deleted. Accepted

	restraint, and that wherever possible the use of a three point system with the upper diagonal belt supported at a belt guide as per the dimensions given in Fig A.3. *Proposed change* Add a new section Into the introduction stating that:: use of a simple pelvic restraint is not adequate for many disabled who have limited balance and/or reduced upper body control end is not recommended practice. Then delete all references to two point pelvic belts throughout the text of this standard.	WG discussion. If we change, we will need to modify table of excursion limits.
	UK 4 (General - Editorial) Tolerances throughout are not presented correct *Proposed change* Review content and update in line with ISO directives. **UK 5** (Clause 5.3 - Editorial) Carriage of one person not referred to in User instructions but is in 4.t (a) as a design requirement. *Proposed change* Add 4.1 (a) requirement to 5,3. **UK 6** (Clause 4.1 d) - Technical) The time limit makes this a performance requirement, but is not covered in test procedures or results. *Proposed change* Delete within 60s'. If this timed element is still to be retained elsewhere in this Standard a test procedure and results will be required. **UK 7** (Clause 4.1 d) - Technical) This design requirement brings in a timed element which is not included as a part of any test procedure or record. *Proposed change* A test procedure should be added with the results shown In Section 7. **UK 8** (Clause 4.1 h) - Technical l) Needs clarification as there is an apparent contradiction in requiring 'detachable hardware etc.' to be permanently connected. *Proposed change* Review intention and wording of 4.1 h to remove the contradiction.	Accepted Accepted WG-6 dicussion Accepted Accepted

	UK 9 (Figure 4 - Technical) This figure illustrates one version of a 2 point belt restraint combined with a 2 point shoulder restraint, not 'two versions...' as described in the title. *Proposed change* Correct the title or the figure as appropriate. **UK 10** (Clause 4.3.1 - Technical) It is felt that pelvic belt alone is undesirable and should only be used as last resort. *Proposed change* Suggest note to be added to this effect, See also comment in introduction. **UK 11** (Clause 4.3.1 b - Editorial) It is not the design intention that should be normative. Poor grammar *Proposed change* Delete 'be designed to' Delete the comma between 'components' and ';so' on line two	Rejected – it shows two different two-point belts WG discussion of this issue. Delete Figure 1?? Accepted Accepted
	UK 12 (Clause 4.3.1 c - Editorial) belts do not adjust themselves. *Proposed change* Redraft as: 'have...that can be adjusted in...' **UK 13** (Clause 4.3.2 - Technical) The zones shown in Fig 5 are desirable but a zone of 30 to 75 should be acceptable (as shown in Fig 6). *Proposed change* Redraft Fig 5 to reflect the maximum acceptable zone of 30-75 as Fig 6. **UK 14** (Clause 4.3.2 c & d - Technical) 'nominal se! up conditions' is introduced without explanation. *Proposed change* define nominal set up conditions **UK 15** (Clause 4.3.3 - Editorial) Poor grammar and syntax	Accepted Accepted: also supported by US comment But fix is to change Figure 5. Accepted: Will add words "of Annex B" to clarify what nominal setup conditions are.

	Proposed change Replace by: - If occupant restraints include structural components for the attachment of upper anchorages or guides for upper torso belts, locations for the anchor points shall be provided that are: **UK 16** (Clause 4.3.4 b - Editorial) Incorrect English *Proposed change* Delete "to" following airbag and replace by "in". **UK 17** (Clause 5.1.1 c - Technical) There is no International symbol with which to show that WTORS conform to IS0 10542 - 1 *Proposed change* Delete 'or symbol'. **UK 18** (Clause 5.2 - General) This section is primarily concerned with the initial installer of WTORS anchorages in the vehicle. For systems involving rail sold separately from WTORS, these instructions should be provided with the anchorages.	Accepted Accepted Accepted
	Proposed change Improved wording required. First sentence should be: Manufacturers of WTORS or anchorage systems for WTORS shall provide written instructions.....etc. **UK 19** (Clause 5.2.3 d - Editorial) "as applicable to the particular transportation and WTORS situation" is meaningless. *Proposed change* Delete **UK 20** (Clause 5.2.4 c - Technical) Materials that have been tested for flame resistance are not suitable for subsequent use in vehicles. *Proposed change* Replace by: 'materials...padding should have a burning rate that does not exceed 100 mm/min when tested in accordance with IS0 3795 **UK 21** (Clause 5.2.4 f - Technical) The term 'too close' needs to be more specific and advice may include air bag and disabling. *Proposed change* Define "too close" and delete "for dispensation...etc" and replace by: ‘for advice which may include disabling the air bag.'	Rejected. Covered by 5.4 Accepted Accepted Accepted—discuss with previous comment from NL

	UK 22 (Clause 5.3.3 Fig 8) Fig 8 only shows improper positioning. *Proposed change* Add "figure to show good practice In addition to existing fig 8. **UK 23** (Clause 6.2.2 Table 3 - Technical) Table 3 includes pelvic restraint only and does not include rearward head excursion limits. The use of only a pelvic belt should not be encouraged for wheelchair seated occupants in vehicles (latest draft of 7176-!9 does not include pelvic belt only). Also rearward excursion of the head should be included In the requirements during the test in view of the serious effect on users of head movement. *Proposed change* Update 6.2.2 to align with the latest draft of 7176-19 finalised at ISO WG 8 Vlenna May 99 i.e. delete table 3 column for pelvic restraint and add definition for X head rear with limit of 400 mm. A general statement could be added to the introduction to highlight the need to use a pelvic and shoulder restraint unless clinical need denotes that a shoulder restraint would not be appropriate. **UK 24** (Clause 6.2.2 - Technical) At present the consideration give to occupant injury levels is by way of head, knee and wheelchair excursion values aimed at the consequences of head impact and occupant restraint to wheelchair thrust loading of the occupant. *Proposed change* As a further consideration for the welfare of the occupant, add the following at...6.2.2c).	WG-6 discussion. Why was this not raised before? How about Figure 3? Rejected : rearward excursion is a Wheelchair issue that cannot be controlled by the WTORS. Also, rearward excursion not meaninfull with rigid-back surrogate wheelchair. WG-6 discussion regarding deletion of pelvic belt only
	The maximum value of seatbelt load will not exceed 7.5kN. measured at the shoulder of a three point restraint and 12.5kN in a two point pelvic restraint. Also see below for necessary test kit. This is a major concern. UK will submit paper to (WG 6 Nov 99) meeting for consideration. **UK 25** (Clause 7.2 - Technical) The results of 6.2,2 a) and b) are not included within 7.2. These results are important. *Proposed change* Suggest add 6.2.2 a) and b) results to section 7.2 d). **UK 26** (Clause 7.2 - Technical) Report should also contain Statement of Horizontal Excursion Values obtained from film analysis. *Proposed change*	WG discussion. What is the basis for the prposed value? We have decided on excursions and failure of materials as performance criteria. Belt load limits has been discussed and rejected long ago. There is no basis for it in other testing. Accepted

	Insert at 7.2 d) 'results of head, knee and wheelchair horizontal excursion values according to the requirements given in 8.2.2 (6.2.2???) Table 3. Then move d) to e), e) to f) and f) to g). **UK** 27 (A.3.1 - Technical) If seat belt loading is added to standard then add to dynamic test equipment. *Proposed change* A.3.1 A means to measure occupant seatbelt load with a CAC of 12.5kN. 12.5kN. To be included in UK paper Nov 99 WG6. See 6.2.2 comment above. **UK 28** (A.3.1 d 2 & 3 - Editorial) Incorrect symbol, see ISO/IEC Directives Part 3: 1997 *Proposed change* Replace 'gs' by 'g'. **UK 29** (A.3.2 onwards Annex C, D & E incl Figs 1 & 2 - General/Technical and Editorial) Throughout the text tolerances are shown incomplete and or incorrect. The term 'with a precision of' is not in accordance with ISO rules *Proposed change* Complete and/or correct all tolerances. use 'to a tolerance of.	Accepted based on WG discussion Rejected, pending WG6 discussion - too late in the process to introduce and validate new procedures and criteria. Accepted. Accepted.
	UK 30 (A.4.4 b - Technical) The inflation range is very high for the front tyres and the tolerance is incomplete. *Proposed change* If the range is accurate then it may be appropriate to give a guidance note on possible specifications or sources in Annex E or in Annex H. **UK 31** (A.4.4 c - Technical) It is not reasonable to Inspect tyres for abrasion and cracking then only replace them if worn. It is importance that all parts of the tyres are checked. *Proposed change* Replace by: Inspect the tyres for cracks and wear. If cracks are found and/or the wear exceeds (an amount to be defined), replace the tyres.' **UK 32** (A.4.8 - Editorial) The ATD's elbows should only be placed on the thighs if there are no armrests fitted to the wheelchair. Elbows will not reach thighs when dummy is upright. *Proposed change*	WG-6 discussion. See Netherlands comments. Accepted :--suggest eliminate reference to « wear » as that can hardly be an issue in SWC wheels? ? ?

	Suggest delete "or on the ATD thighs" and replace with "or the hands resting on the ATD's thighs'.	Accepted
	UK 33 (Annex A 4.10 & Figs. A.2 & A.3 - Technical) There may be some conflict between the test set-up and the recommended clear zones in Figure 7. *Proposed change* Re-examine upper anchorage position for impact test.	Accepted, pending clarification of conflict.
	UK 34 (A.4.13 a new point - Technical) If- seat belt loading is added to the standard then add to Test Prep. Procedure. *Proposed change* Between A.4.13 and A.4.14. . (A.4.13a) 'fit an appropriate seat belt load transducer at, In the case of a three point restraint, the point where the upper diagonal bell webbing makes contact with the ATD, and !n the case of a two point pelvic restraint, at the point where the seat belt makes contact with the pelvis of the ATD on the side opposite to the lap belt buckle. To be included in UK paper WG 6 Nov 99.	Rejected pending WG discussion
	UK 35 (A.4.14 - Technical) No mention of target requirements for the film analysis at the ATD's head. *Proposed change* Insert at A.4.14 c) 'the ATD head Centre of Gravity. Note: Care must be taken to ensure that the value obtained for head max. horizontal excursion conforms to the requirement given In 6.2.2 Table 3. The head C of G to the top of the head for a Hybrid ll 50th percentile ATD is approx. 120mm and for a Hybrid III 50th percentile 100mm, Further details are given in the ATD manufacturer's calibration procedures'.	Rejected. Most forward point on head, not head c.g., is used.
	UK 36 (B.2 - Editorial) Redundancy *Proposed change* delete: 'shall be provided for testing'. **UK 37** (B.3.1 & B.4.2 - Editorial/Technical) The term 'SWC-like' is introduced without explanation. *Proposed change* introduce a new item of test equipment at B3.1 and renumber the other items of test equipment.	Accepted

	B 3.1. a test wheelchair that is either the SWC specified in Annex E or a test wheelchair made to the same dimensions, but, that may not meet the strength requirements' Change the references to; 'SWC-like chair/seat' to 'test wheelchair' **UK 38** (B.5 all clauses - Technical) The measurements should be recorded. *Proposed change* Change all references to 'measure' to 'measure and record' **UK 39 (**B.6 new clause - Technical) It is necessary to determine if the sample met the requirements. *Proposed change* Add a new clause: B 6 Determine if the test sample met the requirements of 4.3.2 **UK 40** (C.5 new clause - Technical) It is necessary to determine if the sample met the requirements. *Proposed change* Add a new clause: B 6 Determine if the test sample met the requirements of 6.3. **UK 41** (D.5 new clause - Technical) It is necessary to determine if the sample met the requirements. *Proposed change* Add a new clause: B 6 Determine if the test sample met the requirements of 6.4. **UK 42** (Clause F.2 - Editorial) This is already covered by 4.2 b. *Proposed change* Delete F 2	Accepted. SWC-like is a mistake. Should have been just SWC. Accepted Accepted Accepted Accepted Reject : this is informative design information
	UK 43 (Annex G - Editorial) The content is Bibliography but the title is design, performance and documentation recommendations. *Proposed change* Suggest delete the title and keep the heading of Bibliography.	Accepted. Error in printing.

REPORT OF VOTING/ANNEX B

Page.....

U S A ANSI	**US 1** 4,3.4 Change...airbag "in" order to....	Accepted
	US 2 5.2.I c) remove extra	?? unclear
	US 3 5.2.4 f), . . injury to a wheelchair.....	?? unclear
	US 4 5.3.3 d) z) is the same as 5.3,3e) remove one	
	US 5 General comment on tolerances - there should be ± signs but only the + signs appear in the text	Accepted
	US 6 Figure 5b should show a required angle range of 30 to 75 degrees, not 45 to 75 degrees. 'The correct figure is attached. It would also be a good idea to include this range in the wording of 4,3.2b as follows: b) produce sideview projected angles of the pelvic belt between 30 and 75 degrees to the horizontal as shown by the zone in figure 5b.	Accepted
	US 7 Throughout the document there are many places where a minus sign has been dropped from the tolerance of "+/ ". These need to be checked with the original document and corrected.	Accepted
	US 8 In A.3.13, "75mmx75mmx75mnn block placed between the belt and the ATP sternum or chest..." should bc changed to say "a 75-mmx75·mmx12-mm thick plate inserted between the ATDs chest and the belt webbing, so that one edge of the plate is against the chest and the square surface of the plate extends outward perpendicular to the chst.. ," to more accurately reflect how this is done in the lab.	Accepted
	US 9 We recommend that Figure E.1 of the surrogate wheelchair be changed to more accurately reflect the design of the surrogate wheelchair. This will primarily involve a few changes to the front region of the wheelchair drawing and the geometry of the securement points for 4-point tiedown. The US will provide a drawing for this shortly.	Accepted