

TECHNICAL SPECIFICATIONS VEHICLE FOR THE PHYSICALLY DISABLED

Title IV of the List of reimbursable Products and health Benefits according to article of law n° L.165-1 of the Social security System Code

Order of 26th June 2003 (Journal Officiel de la République Française of 6th September 2003)

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Chapter I - Wheelchairs

A.I - Folding and not folding manual wheelchairs

1 In general

The present specifications do not include wheelchairs for sport activities.

Wheelchair models shall comply with characteristics determined in the present specifications developed by CERAH and the French Ministry of Health and satisfy technical assessment criteria carried out by an entitled and independent body.

Wheelchairs concerned by this document shall satisfy the following standards :

ISO 9999. – Technical Aids for disabled persons. – Classification ;
ISO 6440. – Nomenclature, terms and definitions ;
ISO 7176-1. – Determination of static stability of wheelchairs ;
ISO 7176-5. – Determination of overall dimensions, mass and turning space;
Pr EN 12183 (1997). – Manual wheelchairs. – Requirements and test methods (annex 7, alinea A2 : overall dimensions) ;
ISO 7176-11. – Test dummy.

Wheelchairs are composed of :

1. a body support system containing :
a seat,
a backrest ,
two armrests,
a swing-away or removable device clothing guard device,
a footrest device;
2. a system for manual propulsion and a parking brake device.
3. wheels, out of which :
one or more drive wheel(s),
one ore more pivot wheel(s);
- 4 a frame.

Wheelchairs shall be able to have additions and options provided by the present specifications and compatible with the design and necessary to user's disability. Wheelchairs can be supplied without seat and backrest in case of custom made moulded shells to be adapted to the frame.

Regardl0ess materials used for the manufacture, stability and mechanical resistance of the wheelchairs are tested (see chapter I point.2.) None of the component pieces of the wheelchair, additions and options included, shall hurt user, deteriorate his clothing or cause damages to surroundings.

1.1 Special clause concerning wheelchairs adjustable in size.

These wheelchairs shall meet requirements of size 1 (cf. table 2.3).

A wheelchair is adjustable in size when its body support device allows to keep step with the growth of a child.

This involves :

1 the adjustment of :
the seat width,
seat depth,
armrest height,
fore and aft positioning of armrests,
headrest in height,
fore and aft positioning of headrest;

2. easy access to hand-rim regardless user's size ;

3. two braking systems:
one accessible to user ;
the other accessible only by the attendant;

4. backrest with hold-back belt.

1.2 Frame

The frame is intended to support the body support system.

Wheelchairs with rear drive wheels have a frame extension at the infero-posterior part in order to provide a foot lean point for a third person to help him with tipping the wheelchair backwards on climbing an obstacle.

Wheelchair shall be designed in a way to reduce its size in order to facilitate its transport and storage (non folding wheelchairs apart).

The wheelchair shall be equipped with a reflecting system on the front and rear end.

Its resistance shall comply with tests determined in I - 2.4.

1.3 Drive wheels

They are situated either at the front or at the rear of the wheelchair, following user's needs.

Wheels have inflatable or not inflatable tyres.

Their positioning and dimensions allow user's transfer, except wheelchairs with great front wheels.

Their resistance in conformity with tests defined in I. - 2.4..

1.4 Pivot wheels

Pivot wheels have not inflatable tyres, or as an optional extra they have inflatable tyres.

Forks are mounted on to the wheelchair with the help of ball-point stems or any other device showing comparable mechanical characteristics. The swivel axis of these forks is perpendicular to the ground ($90^\circ \pm 2^\circ$).

Their resistance is in conformity to tests determined in I. - 2.5.

1.5 Seat

It may be rigid and upholstered, or rigid and covered with a cushion , or flexible with or without additional cushion. The sling seat textile shall be easy to replace. Its resistance is in conformity with tests determined in I. - 2.6.

1.6 Backrest

It may be :

fixed,
reclining,
folding to a given height,
tilting,
foldaway.

The tilting device shall be easy to operate and guarantee an efficient locking in different positions in order to ensure comfort and safety to the user.

It is equipped with a device enabling an attendant to manoeuvre the wheelchair. This device is situated at a min. height of 850 mm from the ground.

The backrest may be rigid and upholstered or rigid and covered with a cushion, or it may be flexible.

The backrest textile shall be easy to replace.

On wheelchairs with headrest, in case of falling backwards, the headrest must not touch the ground. Its resistance is in conformity with tests defined in I.- 2.6.

1.7 Armrests

Both armrests are removable or foldaway.

In case of frame and shell models (all in one piece) fixed armrests will be accepted if their design do not hinders user in lateral transfers.

If the armrests are removable their fixation to the frame includes a locking system which allows easy installation or removal.

They are designed to facilitate access to table and washbowls. The part of the armrest where the arm is laid is upholstered.

User must be able to pick up things from the floor on gripping the opposite armrest in order to bend down et to sit up laterally. On option, the locking system may be adapted in a way to allow lifting up the wheelchair with the armrests.

1.8 Fire resistance

Backrest, seat and armrest components shall answer to classification M4, as it is edited in the booklet AFNOR P92-507.

1.9 Footrest

It ensures correct support and positioning of legs and feet.

Footrest plate (or plates), as part of the footrest, is (or are) reclinable and adjustable in height. Footrest tubes are not allowed.

Footrest ends include a bumper as protection device. Its resistance is in conformity to tests determined in I.-2.7.

1.10 Manually powered device

Regardless the adopted sort of device it enables the wheelchair user to drive the wheelchair with easy grip and push.

In case of a hand rim serving as driving device the cross section of this latter shall be > 200 mm². Hand rim shall be detachable.

It shall be made of a material which will not deteriorate neither hurt user. It shall be chromed or made of anodised light alloy.

1.11 Parking brake

Each wheelchair shall be furnished with a parking device.

This device is operated by the user. To park the wheelchair the user must inevitably push forward the control lever (except wheelchairs with great wheels at the front). As an optional proposal and on medical order a reverse system can be mounted in special medical cases.

Its resistance shall be in conformity with tests determined in I - 2.8.

1.12 Additions

Upholstered head-rest adjustable in height and depth;

Lateral head-rest with or without headband;

Backrest extension;

Backrest stiffener;

Lateral body support or pads (rigid backrest) ;

Lumbar support;

Backrest cushion;

Belts for adults and teen-agers;

Straps ;

Seat apron;

Wheelchair equipped with complete accessories (toilet bowl and cushion);

Worktable (easy to remove) ;

Brake lever extension;

Anti-abduction pad;

Support for spreading legs;

Tilting leg-rest - right and/or left;

Leg support - right and/or left or in one piece;

Right and/or left gutter or in one piece;

Hill support;

Foot-rest plates equipped with an adjustable system to compensate bumper wear;

Foot tie;

Crutch holder.

1.13 Options

Parking device independent on the pressure in tyres;

Inflatable pivot wheels;



Foot-rest plate adjustable in angle ;
Vertically adjustable, foldaway, reclinable, laterally hinge down arm-rests ;
Hand rim with lugs or nonslip equipment;
Unilateral drive device;
Moulded shell : wheelchair is delivered without seat and backrest ;
Seat for coxitis;
Arm-rest locking system.

1.14 Antirust protection;

Wheelchairs shall be protected against rust.

1.15 Manufacturer's plate

Manufacturer must indicate on the frame of the wheelchair, in a permanent and indelible way, the name of the company, type of the vehicle, serial number and order number.

1.16 Guarantee

Wheelchairs are guaranteed by the supplier for a period of two years from the date of delivery to user. This guarantee covers the wheelchair for any structural faults and raw material defect. The guarantee is limited to the free of charge replacement of pieces or units approved as defective (pieces, work and transport included)

1.17 Spare part interchangeability

For a period of five years from the date of delivery the retailer is bound to ensure replacement of all spare parts of the wheelchair.

1.18 User's and maintenance guide

At delivery an illustrated user's and maintenance guide in French is given to user by the retailer.

Furthermore, it will be mentioned that the wheelchair cannot be transported (without or with the user) by its armrests, except an armrest locking system is provided as an option.

2 RESISTANCE TESTS

2.1 Aim

In order to be approved conform the wheelchair shall meet a certain number of resistance tests. For each test, any break, change in dimensions, forms or operation of any of the components of the wheelchair shall be considered a failure.

2.2. Principle

Fatigue tests must allow to appreciate resilience and resistance of wheelchairs submitted to high stresses in short lapse of time to simulate repeated strains a wheelchair is exposed to when in normal use, for

example kerb drops climbing obstacles such as a paving stone or driving on uneven road surface.
Tests are executed for each wheelchair model.
If a wheelchair exists in several widths a medium or medium/large size wheelchair will be selected for the tests.

2.3 Conditions

Minutes help to identify the wheelchair and its manufacturer and give all test results.

All following points must be checked:

1. Tyre pressure must be recommended by the manufacturer of the wheelchair if not indication on the tyres must be respected.
2. The wheelchair is in perfect operational condition.
3. Designation of reference points following the particularities of the wheelchair and a common agreement between the manufacturer and the test laboratory.
4. The same measures are taken at the beginning and at the end of the tests.;
5. The wheelchair is tested in a set up for normal use.
6. If any adjustments are planned they must be for frequent use ;
7. Test dummy :
An anthropomorphic dummy or an ISO dummy is used, the weight of the dummy is subject to seat width as follows in the table hereunder.

SIZE	S1	S2	S3	S4
Seat width (mm)	L < 350	350 < L < 380	380 < L < 450	L > 450
Dummy (kg)	25	50	75	100

It is necessary to install correctly the dummy and to stall it in the seat without cushion. The dummy is securely fixed in the wheelchair to avoid its displacement during testing.

8. Test surface is in conformity with ISO standard in force.

2.4. Testing the frame and drive wheels

2.4.1. Test apparatus

Test apparatus may consist in a linear track, one or several drums, a circular track or any other system allowing to simulate the move of a dummy loaded wheelchair on a horizontal plane with obstacles at a speed of 8 km/h (2,22 m/s).

2.4.2. Moving the wheelchair

A force makes move the wheelchair while direction is maintained without hindering any vertical or twisting moves.

2.4.3. Obstacles

Obstacles simulate kerb drops. They are constituted of two shape guarding parts fixed on the track..
Wheels must tackle obstacle edges perpendicularly.

2.4.4. Test

2.4.4.1. Simultaneous (synchronised) drops

Both wheels climb simultaneously the two obstacles. The height of the obstacles is of 150 mm and the approach ramp has a slope < 7° with a horizontal extension of min. 100 mm. The obstacles are adjusted in such a way that wheels will get in contact with the track at the same moment.
Number of obstacle climbing : 1 800.

2.4.4.2. Consecutive (not synchronised) drops

Driving a wheelchair on an uneven road surface may cause torque in the frame structure. Both wheels climb the obstacles one after the other , obstacles are at a distance sufficient to allow the wheels to regain their balance position between two consecutive torques. The height of the obstacle will be selected following the wheelchair track and the minimum lateral tilt angle imposed in I - 2.9, according to the next formula :
 $H = 2 \times V \times \sin 7^\circ$

- H = height of the obstacle in mm ;

V = back track in mm ;

H maxi = 150 mm.

The approach ramp is the same than in 2.4.4.1.

Number of obstacles climbed by wheel : 900.

2.4.5. Results

2.4.5.1. Drive wheels warping

This measure is taken on the alloy wheel with a comparator at the beginning of tests, during the tests (at each 450 tours) and at the end of tests.
Acceptable tolerance of deformation : 6 mm of warping (maximum deviation).

2.4.5.2. Play in the wheel axle

The maximum play in the axle must not generate a transversal displacement higher than 1,5 mm in one point of the alloy wheel. The measure is taken with a comparator while an alternating strain is applied in a diametrically opposed point of the measure.

2.5. Drive wheel test

Drive wheels are installed on two turning rolls and the wheelchair, loaded with a dummy, is maintained on a platform. Each obstacle, i.e. a metal lath, is fixed on a roll, lath dimensions are as follows :

Width: 20 mm ;

Hight: 10 mm ;

The upper edge is rounded off with a radius of 4 mm.
Test parameter:
Speed: 8 km/h ;
Length of time : 56 hours; there is one obstacle at each 3 meter with 1,5 m out-of-phase displacement compared to each-other.

Results:

Play in the wheel axle : it will be measured with a comparator at the alloy wheel;
Acceptable value : 0,5 mm (measure taken in the same conditions as in 2.4.5.2.).
Play value in the axis of rotation of the fork :
Control in the drive wheels' axle;
Acceptable value : play in the axis of rotation should not increase "track" value by more than 0,5 mm.

2.6 Test of seat and backrest textile

Textiles are submitted to a series of stresses in order to test :

their resistance;
their fixation ;
their deformation .

A dummy is dropped onto the seat from a height of 50 mm, then its back leans on the backrest with a strength of :

100 Newton - for size 1;
150 Newton - for size 2;
200 Newton - for size 3 ;
250 Newton - for size 4 ;
Frequency : 6 drops / minute .
Number of stresses : 10 000.

2.7 Testing foot-rest plates :

The wheelchair is loaded with a dummy, the unit plate/footrest is exposed to the following strengths :

150 Newton - for size 1;
250 Newton - for size 2;
350 Newton - for size 3 ;
450 Newton - for size 4 ;
Loads are applied with a frequency of 1 Hz perpendicularly to the upper face.
Number of stresses : 50 000.

2.8 Test of parking systems

The wheelchair loaded with a dummy, the adjustment of parking systems is carried out on a slope of 7°. In these conditions locked parking systems should not allow wheels to turn.

The wheelchair loaded with a dummy, the parking mechanism will operate 60 000 times. After this test, parking systems must remain efficient (above test).

2.9. Static stability

Static stability is controlled in conformity to standard EN NE 12183 (wheelchair with or without anti-tip device).

A.II - Wheelchairs for sport activities

1. In general

Wheelchair models shall be in compliance with characteristics determined by CERAH and the Ministry of Health in the present specifications and shall satisfy technical assessment carried out by a competent and independent organism.

Regardless the used material(s) mechanical resistance of the wheelchair will be tested according to chapter 3. None of the components of the wheelchair nor its additions or optional parts shall hurt user, damage his clothes or surroundings..

1.1. Fire resistance

Backrest, seat and armrest components shall comply with classification M4 determined in the booklet AFNOR P 92-507.

1.2. Stain-proof protection on surfaces

Wheelchairs have stain-proof protection.

1.3. Manufacturer's plate

Manufacturer indelibly and in an irremovable way indicates the following : name of the company, type of vehicle, serial number, number of order and maximum user weight.

1.4. Guarantee

Wheelchairs are guaranteed for a period of two years from the date of first use against all manufacturing and raw material defects. The guarantee is limited to manufacturer's replacing pieces or sub-units recognised defective (including pieces, labour). Conditions of the guarantee shall figure in a user's and maintenance guide.

1.5. Interchangeability of spare parts

Retailer is to ensure the replacement of any of the components of the wheelchair during a period of 4 years from the date of the first use.

1.6. User's and maintenance guide

On delivery an illustrated user's and maintenance guide in French and a certificate of guarantee shall be submitted to the user by the retailer.

2. Requirements

2.1. Definition

Sport wheelchairs are divided into three categories :

- basket-ball wheelchair;
- tennis wheelchair;
- wheelchair for several branches of sport.

2.2. Frame

For basket-ball and tennis the frame is rigid.

For several branches of sport the frame is rigid or folding.

Its resistance complies with tests defined in chapter 3..

2.3. backrest

Its maximum height is of 200 mm measured from the middle of the seat tissue. Higher backrest can be adapted.

For basket-ball and tennis, backrest is equipped with a system to lock backrest uprights in open position (without handgrips).

Its resistance complies with tests defined in chapter 3.

2.4. Seat

Several widths are available between 300 and 400 mm.

Its resistance complies with tests defined in chapter 3..

2.5. Foot-rest

Foot-rests are adjustable in height.

For basket and tennis foot-rests are not swivelling.

Their resistance complies with tests defined in chapter 3.

2.6. Rear wheels

Rear wheels position is adjustable lengthwise.

Rear wheels are easy to dismantle (without tools).

Camber is adjustable and/or adaptable. Black tyres are banned.

Wheels are equipped with removable hand rim fixed on the alloy wheel in minimum six points. Chromium is banned on hand rims.

On wheelchairs for several branches of sport the distance between hand rim and alloy wheel shall be adaptable.

Its resistance complies with tests defined in chapter 3.

2.7. Front wheels

For basket-ball, tennis or several branches of sport the wheelchair may have one or two front wheels of a diameter of maximum 125 mm. If there are two wheels on front their track is $<$ or $=$ rear wheel track.

Front wheel position is fix or adjustable lengthwise.

Rotation axis of front wheel support(s) is adjustable or fix. In both fixity cases rear wheels adjustability shall not have any influence on verticality of the rotation axis of

front wheel support(s) (the wheelchair is considered on a horizontal plane).

Its resistance complies with tests defined in chapter 3.

2.8. Parking brake system

For basket-ball wheelchair this system is banned.

This system is compulsory on wheelchairs for several branches of sport and its resistance complies with tests defined in chapter 3.

2.9. Compulsory accessories

The wheelchair shall be able to be equipped with lateral wedge plates or clothes protection.

Furthermore, for basket-ball and several branches of sport, wheelchair shall be able to be equipped with removable spoke-protection plate

3. PERFORMANCE REQUIREMENTS

Scope :

To be approved conform wheelchairs shall satisfy all tests for resistance. Any break, or change in dimensions, forms or functions of any of the wheelchair components is considered as a failure.

Principle :

Fatigue tests must allow assessment of resilience and resistance of wheelchairs against strong strains in a short lapse of time in order to simulate repeated efforts a wheelchair is exposed to in normal use. Tests are carried out on each type of wheelchair. If a type of wheelchair exists in several widths a medium or higher size will be selected for the tests.

Conditions :

Test report allows to identify the wheelchair and its manufacturer and gives all of the test results. At least the following points must be checked ::

1. Pressure in tyres recommended by the manufacturer or pressure indicated on the tyres.;
2. The wheelchair must operate perfectly.
3. The wheelchair is tested with a set-up for normal use.
4. If any, adjustments will be set in a way to ensure common use;
5. Test dummy : an anthropomorphic dummy or ISO dummy (according to ISO 7176-11) with a mass equal to or higher to user's mass recommended by the manufacturer. If this is higher than 100 kg, use a dummy of 100 kg.

It is necessary to fit the dummy and well wedge it in the seat without cushions. The dummy is solidly fixed in the wheelchair to avoid any displacement during tests.

3.1. Frame and drive wheel test

3.1.1. Test apparatus

This may be a linear track, one or two drums, a circular track or any other system allowing the simulation of a moving wheelchair loaded with a dummy on a horizontal plane with obstacles at a speed of 8 km/hour.

3.1.2. Drive of the wheelchair.

The wheelchair moves with the help of a force applied in way that the direction is maintained without hindering torsion or movement in vertical direction.

3.1.3. Obstacles.

Obstacles simulate kerb drops. They are made of two not deformable parts fixed on the track. Wheels must tackle kerb edges perpendicularly.

3.1.4. Test.

3.1.4.1. Simultaneous (synchronised) drops.

Both wheels climb simultaneously the two obstacles. The height of the obstacles is of 150 mm and the approach ramp has a slope $< 7^\circ$ with a horizontal extension of min. 100 mm. The obstacles are adjusted in such a way that wheels will get in contact with the track at the same moment.

Number of obstacle climbing : 1 800 for wheelchairs designed for several branches of sport and 900 for tennis and basket ball wheelchairs.

3.1.4.2. Consecutive (not synchronised) drops

Both wheels climb the obstacles one after the other , obstacles are at a sufficient distance to allow the wheels to regain their balance position between two consecutive torques. The height of the obstacle will be selected following the wheelchair track according to the next formula :

$$H = 2 \times V \times \sin 7^\circ$$

H = height of the obstacle in mm ; V = back track in mm ;
H maxi = 150 mm.

The approach ramp is the same than in 3.1.4.1.
Number of obstacles climbed by wheel : 900 for wheelchairs designed for several branches of sport and 450 for tennis and basket ball wheelchairs.

3.1.5. Test

3.1.5.1. Drive wheels warping

This measure is taken on the alloy wheel with a comparator at the beginning of tests, during the tests (at each 450 tours) and at the end of tests. Acceptable tolerance of deformation is of 6 mm of warping (maximum deviation in absolute value).

3.1.5.2. Play in the wheel axle

The maximum play in the axle must not generate a transversal displacement higher than 1,5 mm in one point of the alloy wheel. The measure is taken with a comparator while an alternating strain is applied in a diametrically opposed point of the measure.

3.2. Drive wheel test

Drive wheels are installed on two turning rolls and the wheelchair, loaded with a dummy, is maintained on a platform. Each obstacle, i.e. a metal lath, is fixed on a roll, lath dimensions are as follows :

- Width: 20 mm ; Height: 10 mm ;
- The upper edge is rounded off with a radius of 4 mm.
- There is one obstacle at each 3 meter with 1,5 m out-of-phase displacement compared to each-other.

Test parameter:

- Wheelchairs designed for several branches of sport :
Speed: 8 km/h ; obstacle height : 10 mm, length of time of the test : 56 hours

- Basket ball and tennis wheelchairs : Speed: 8 km/h ;
obstacle height : 4 mm, length of time of the test : 30 hours

Results:

Play in the wheel axle : it will be measured with a comparator at the alloy wheel;
"Acceptable value : 0,5 mm (measure taken in the same conditions as in 3.1.5.2.)"
"Play value in the axis of rotation of the fork : Control in the castor wheels' axle; Acceptable value : play in the axis of rotation should not increase "track" value by more than 0,5 mm."

3.3. Test of seat saddle and backrest

Textiles are submitted to a series of stresses in order to test their resistance; fixation and deformation . A dummy is dropped onto the seat from a height of 50 mm, then its back leans on the backrest with a strength of :

- 180 Newton - for size 1 ;
- 200 Newton - for size 2 ;
- 230 Newton - for size 3 ;
- 250 Newton - for size 4 ;
- Frequency : 6 drops / minute .
- Number of stresses : 10 000.

3.4. Testing foot-rest plates :

The wheelchair is loaded with a dummy, the unit plate/footrest is exposed to the following strengths :

- 170 Newton - for size 1 ;
- 180 Newton - for size 2 ;
- 190 Newton - for size 3 ;
- 200 Newton - for size 4 ;
- Loads are applied with a frequency of 1 Hz perpendicularly to the upper face.
- Number of stresses : 50 000.

3.5. Test of parking systems

The wheelchair loaded with a dummy, the adjustment of parking systems is carried out on a slope of 7°. In these conditions locked parking systems should not allow wheels to turn. The wheelchair is loaded with a dummy, the parking mechanism will operate 60 000 times. After this test, parking systems must remain efficient (test here-above).

B. Electrical wheelchairs

1 In general

The present specifications do not include wheelchairs for sport activities.

Wheelchair models shall comply with characteristics determined in the present specifications developed by CERAH and the French Ministry of Health and satisfy technical assessment criteria carried out by an entitled and independent body.

Wheelchairs of this type are composed of :

A frame allowing the wheelchair to be folded or dismantled after the battery and the driving group have been taken off.

At least four wheels, out of which at least two allow to change direction;

A fixed or tilting backrest, at least on option ;

A seat;

Two armrests ;

Two adjustable plate serving as foot-rest ;

Braking and deceleration system;

One or two motor group(s);

Battery;

Control device .

An air pump with an adaptor, the whole fixed to the frame, shall be supplied with the wheelchair equipped with tyres.

Instructions must be supplied with the wheelchair and contain :

a diagram with detailed description of groups and sub-groups of components;

instructions for user including also maintenance

instructions to keep the wheelchair in the best conditions

;

rights of users, such as guarantees as well as reparations deadlines.

These wheelchairs must be able to receive additional accessories allowing adaptations to different cases of use depending on the nature of the disability of the user.

Also they can be supplied without seat and backrest in order to allow direct adaptation of moulded shell on the frame. Overall width of the wheelchair shall not be higher than 700 mm.

Wheels

Regardless dimension and disposition adopted by the constructor, wheels should allow correct operation of the wheelchair on various grounds (on gravel, pavement etc.) In the user's guide the constructor must mention the maximum height of obstacle the wheelchair can tackle.

Wheels are equipped either with inflatable tyres conform to safety standards in force for the weight and speed of the wheelchair, or with tubeless or flexible tyres.

Wheels are not equipped with hand rim..

Backrest

Backrest can be fixed or tilting, however it must be equipped with a removable locking system and an occupant restrain strap. The height of the strap shall be adjustable by the supplier at the moment of delivery.

Backrest is made of materials giving the user comfort and its resistance is calculated to avoid wear or rapid distension due to permanent use. In certain particular cases and on medical order backrest can be made of one fixed, easily removable rigid piece not hindering the folding of the wheelchair. A cushion of rub emulsion or other material giving similar comfort and coated or not with plastic fabric will be added to the rigid backrest.

For wheelchairs having a backrest with a tilt angle < 40° the offset of rear wheels compared to the backrest plane shall not be higher than 10 cm.

Push handles must allow to displace the wheelchair with the clutch disengaged.

It shall be designed to receive systems to maintain the body.

Seat

Seat can be horizontal reclining or reclining downwards and backwards. It is made of a material offering comfort to the user, with a resistance calculated to avoid rapid wear or distension due to permanent use. An "apron" linking seat and backrest is added to avoid the cushion to slide backwards. In certain particular cases and on medical order seat can be made of one rigid fixed removable piece which allows rapid dismantling without hindering the folding of the wheelchair. A rubber emulsion cushion or any other material giving similar comfort coated or not with plastic fabric will be added to the rigid seat.

Armrests

Both armrests are removable or foldaway, their form is designed to allow easy access to table or washbowl. Their fixation to the frame contains a lock enabling easy mounting or dismantling without noteworthy effort on behalf of user.

On the upper part of each armrest there is wooden or plastic arm support upholstered with rubber or any other material giving similar comfort. The surface of this arm support shall be of a size to allow the user to put his

flexing arm on it comfortably. A cloth protection must prevent friction with wheels.

Foot-rest

Plate(s) serving as footrest are adjustable in height and can be lifted, removable and/or foldaway.

On their support face plates are coated with anti slide material. Plates are free of any hurting relief that may cause trauma to the user let it be the integral part of the plate or part of the stopping device itself.

Plates are equipped with an integrated hill stop (bumper) on their rear end, if not, then with a removable stop strap mounted on the hanger brackets, and on the front, where antero-external edges are of rounded shape, there is a protection stop (bumper).

On demand, hanger brackets shall present a 90° angle compared to axis of the leg or shall be adaptable depending on needs.

Braking and deceleration systems

Braking and deceleration systems operate efficiently while the wheelchair is loaded with 80 kg on a slope of 15 %.

Systems include :

- 1) Progressive brakes acting on the drive wheels, deceleration shall in no way be violent. It must correspond to the neutral position of the control lever.
- 2) A powerful brake, automatically actionned to ensure parking and stopping the wheelchair either in case of power failure or when the wheelchair is switched off, or in case of an overload.

When clutches are disengaged, a sort of "free wheel" situation, a parking system independent on the electric circuit must equip each drive wheel.

In the case of clutch disengagement due to cancellation of electromagnetic braking by switching off its mechanical reconnection is considered as a parking brake. In case of manual control the lever is situated above the horizontal plane passing through the axle of drive wheels.

An immediate stop possibility should be obtained either by reversed manoeuvre, i.e. activating rearwards drive or by activating mechanical parking brake.

Stability

Static and dynamic stability are controlled in conformity to EN NF 12184.

Motor unit

It shall allow starting the wheelchair and the easy drive of a 70 kg weight person on a 15 % slope on tarred ground.

Starting off shall not be violent, it will work either with a speed variator or with a two-speed device where the first gear will not allow exceeding a speed of 3 km/h.

In case of overload a device shall switch off the power supply of the motor(s) and engage the braking system.

Maximum speed is of 10 km/h. Stopping

distance shall be in conformity with table here-under.

Speed in km/h	4	5	6	7	8	9	10
Stopping distance in meter	0,6	0,8	1,0	1,2	1,5	1,7	2,0

In case of a failure a third person must be able to disengage the clutch and easily move the wheelchair. To let out drive and direction clutch mechanisms the maximum force to apply is of 75° N. To move the wheelchair with disengaged clutches the maximum force to apply on the push system is of 100 N, measured horizontally. While taking these measures the wheelchair is loaded with an appropriate dummy (see table in the specifications of "manual wheelchairs"). If disengaging clutches annihilates the automatic braking by switching off (called "electromagnetic brake"), the user shall not be able to move its wheelchair. If the motor unit prevents the wheelchair from folding it should be easy to remove with the help of rapid fixation system.

Motor carbons are easy of access to facilitate their replacement.

Batteries

Batteries grant minimum 12 km of autonomy on a plane ground. Their polarisation shall not lead to a noticeable loss of power after one hour of normal use.

In order to facilitate the transport of the wheelchair batteries shall be easy to remove.

To charge batteries a charger (supplied with the wheelchair) is used allowing to obtain full charge in maximum 12 hours and it is equipped with a device cutting off automatically the electrical circuit of the wheelchair during the charge. A device is to avoid overcharging the battery and on option there is a charge indicator. Batteries are connected to the motor and to the control box with the help of a multi-pin plug. Connection of the charger is assured, on one hand, to the battery block by an electric plug, and on the other hand, to the mains by a 220 V male plug in conformity to standards of the Union Technique de l'Electricité, the wire being at least 1,5 m long.

Control block

On demand the control block can be placed to the left or right side of the wheelchair. It must be removable but in any case adjustable in the fore and aft direction and maybe laterally to allow practical use of notched armrests..

It includes, at minimum :

One control lever with automatic return or any other device allowing to control forward, backward drive and direction.

The head of this lever is tightly fixed however allowing its replacement by a system appropriate to the handicap.

An on/off switch is accessible to user and it is situated on the front side of the control lever.

An easily accessible selector allowing the control or selection of maximum speed.

All these devices must be sufficiently responsive to be operated with a minimum force. On option an on/off reverser can be added.

The control device position shall be designed in a way to protect the user's hand during wheelchair operation.

Control options

Besides manual control other possibilities must be offered to the Disabled. The user must have the possibility to control the wheelchair:

1° with the chin : provided the levers can be used with the chin without limiting visibility ;

2° on table ;

3° with a foot ;

4° blowing ;

5° with the nape .

It must be possible to use other control device models adapted to each medical case.

These options are not compulsorily presented for testing the wheelchair.

Surface protection

Tubes and other parts can be of stainless steel, in this case they don't need to be coated.

Tubes of not stainless steel are coated with chrome and shall be conform to NF A 91 101 moderated nuance.

Light alloy metal tubes are anodised. Cast pieces and other cast materials used for manufacturing the wheelchair should be resistant to corrosion alike processed tubes. Nuts and bolts are coated with chrome, cadmium (in conformity to NF A 91 101 and NF A 91 102) or stainless.

Manufacturer's plate

The supplier fixes the manufacturer's plate on the frame of the wheelchair mentioning the name of the company, the type of the vehicle, the serial number of the type and the year of manufacture, place and date when the wheelchair was receptioned by the Department of Transport.

Interchangeability of spare parts

The wheelchair is designed in a way that parts and spare parts or sub-groups are interchangeable.

Otherwise, the supplier should compulsorily ensure servicing with the replacement of groups or sub-groups of essential pieces such as ::

Control box, motors, wheels and batteries.

A three week deadline, independent on transport deadlines, should not be exceeded for any kind of reparation.

Bolts and threading are in conformity to ISO standards.

Guarantee

The wheelchair and batteries are guaranteed by the manufacturer during one year from the date of delivery. This guarantee covers against manufacturing, quality and raw material defects when the wheelchair is exposed to normal use (time needed for the reparation is not counted).

The guarantee is limited to free of charge replacement by the supplier for approved defects of parts and sub-groups (parts, work and transport)

ADDITIONAL CLAUSES CONCERNING ELECTRICAL WHEELCHAIRS DISPOSITIONS WITH PERSONAL ADAPTATIONS

Electric wheelchairs with seat adapted to the user contain two easily dismantling units : the propulsion group and a seat adapted to the user.

Seat adapted to the user:

The backrest is tilting with a mechanical, hydropneumatic or electric system to adapt seat to different types of handicap. It contains :

an elastic wire-mesh or a curved board;
a foam with a thickness and density adapted to the patient;
a plastified fireproof textile

a pushing device allowing to move the wheelchair with clutches disengaged.
The wheelchair can have body support pads/systems.

The seat is adjustable in tilting with the help of a mechanical, hydropneumatic or electric system. It contains :

an elastic wire-mesh or a curved board;
a foam with a thickness and density adapted to the patient;
a plastified fireproof textile

Armrests have the following characteristics :

Their form enables easy access to table or to washbowl. ;
They are removable : their fixation to the seat must contain a locking system allowing quick mounting and dismantling without noticeable effort on behalf of user ;
They must be adjustable in width (distance between armrests may vary up to the overall width);
They must be adjustable in depth to ensure good forearm support and to follow backrest tilting.

The seat unit should be equipped with one of the following systems :

Either a foot-rest group made of two liftable plates and adjustable in height, removable and/or foldaway ;

Or a leg-rest unit with adjustable tilting with the help of a mechanical system or hydropneumatic or electric thrusters.

Control box:
A speed selector easy of access allowing variations or selection of speed.

C. STAND-UP TYPE WHEELCHAIRS

1. In general

Wheelchair models shall be in compliance with characteristics determined by CERAH and the Ministry of Health in the present specifications and shall satisfy technical assessment carried out by a competent and independent organism.

Wheelchairs of this type shall comply with the following standards :

Vehicles and Wheelchairs for the Disabled
NF S 90-600 : Definition and classification ;
NF S 90-601 : Determination of static stability of manually powered wheelchairs;
NF S 90-602 : Terms and definitions of basic elements;
NF S 90-603 : Overall dimensions, mass and turning space ;
NF S 90-605 : Test schedule.
ISO Standards in force.

Wheelchairs of this type are constituted of :

1. A body support system including :
a seat ;
a backrest;
two armrests;
a cloth protection device which is foldaway or removable;
foot-rest device.
2. A stand up device:
Body supports designed to prevent fore or side fall risks as well as lower limbs' bending are adjustable to fit user's morphology in limits fixed by the manufacturer. Gradual or step by step standing up is allowed only if user's safety is assured.
3. Manual powering system and parking brake system.
4. Wheels out of which :
one or two drive wheels;
one or more pivot wheels.

5. Frame.

Regardless material(s) used for the manufacture, stability and resistance to mechanical strength of the wheelchair are tested according to point 2.
None of the pieces constituting the wheelchair, nor its additions and options shall cause harm or damage

user's cloths or surroundings.

1.1 Frame

The frame is intended to hold the body support system. Wheelchairs with drive wheels at the back have a frame lengthened at its inferior-posterior part in order to present a strong point for the attendant to facilitate tipping the wheelchair backwards which is necessary to climb obstacles. Frames shall be equipped with a reflecting device on the front and at the back. Resistance complies with tests described in 2.4.

1.2 Drive wheels

Depending on models, drive wheels are placed either on the front or at the back of the wheelchair to meet user's need, wheels have inflatable or tubeless tyres. Their position and dimensions allow user's transfer, except wheelchairs with great wheels on the front. Their resistance complies with point 2.4.

1.3 Pivot wheels

Pivot wheels have tubless tyres or on option inflatable tyres. Forks are mounted on the wheelchair through pivot with balls or any other device having similar mechanical characteristics. Rotation axle of these forks is perpendicular to the ground ($90^{\circ} \pm 2^{\circ}$). Their resistance complies with tests described in 2.5.

1.4 Seat

Seat can be rigid or upholstered and covered with a cushion or sling seat with or without cushion. Seat textile shall be easy to replace. Its resistance complies with tests described in 2.6..

1.5 Backrest

It can be:
fix ;
adjustable
folding to a defined height;
reclining;
folding.
Adjusting the backrest shall meet morphological characteristics of the user. Apart this objective, no back tilting is allowed.

Backrest is equipped with a device enabling the attendant to manoeuvre the wheelchair. This device is situated at a min. height of 850 mm from the ground. Backrest can be rigid and upholstered or rigid and covered with a cushion or sling type. The backrest textile shall be easy to replace. Its resistance complies with tests defined in 2.6.

1.6 Armrests

Both armrests are removable or foldaway.

When they are removable their fixation to the frame is assured by a locking system allowing easy mounting and dismantling. They are designed in a way to give easy access to table and washbowl. The fore-arm support of the armrest is upholstered.

User shall be able to pick up objects on the ground, bending and lifting up meanwhile holding the opposite armrest.

1.7 Fire resistance

Components of the backrest, seat and armrests shall comply with classification M4 defined in the booklet AFNOR P 92 507 .

1.8 Foot-rest

It gives support and correct positioning of legs and feet. It is removable or foldaway (except wheelchairs with great wheels on the front).

Plate(s) is(are) lifting up and adjustable in height.

Tubular plates are banned.

Their extremities are equipped with protect bumper.

Their resistance complies with tests defined in 2.7.

1.9 Manual powering device

Regardless the type of the adopted device, it shall enable user to power his/her wheelchair offering comfortable grip and pushing. In the case of a hand-rim, as powering device, its cross section shall be $> 200 \text{ mm}^2$. The hand-rim shall be easy to dismantle. Its material shall not damage or hurt user. It shall be chromed or made of a light anodised alloy.

1.10 Parking brake device

All of the wheelchairs are equipped with a parking brake device. This device can be activated by user. To park the wheelchair user must compulsorily push forward the lever arm (except wheelchairs with great wheels on the front). On special demand and medical prescription an inversed system can be proposed as an option and mounted on the wheelchair.

Its resistance shall comply with tests defined in 2.8.

1.11 Antirust protection of surfaces

Wheelchairs are protected against rust.

1.12 Manufacturer's plate.

Manufacturer must make appear, in a permanent and unremovable way on the wheelchair frame, the name of the company, the type of the vehicle, its serial number and order number.

1.13 Guarantee

Wheelchairs are guaranteed by the supplier during 2 years from date of delivery to user against any manufacturing or raw material defects.

The guarantee is limited to free of charge replacement, by the supplier, of pieces or sub-parts recognised as defective (spare parts, pieces, work and transport included).

1.14 Interchangeability of spare parts

During a period of 5 years from date of delivery of the wheelchair, the retailer is to assure replacement of all pieces making part of the wheelchair.

1.15 Maintenance and user's guide

At delivery an illustrated user's and maintenance guide in French is given to user by the retailer.

Furthermore, it will be mentioned that the wheelchair cannot be transported (without or with the user) by its armrests, except an armrest locking system is provided as an option.

2. Resistance tests

2.1 Scope

In order to be recognised conform the wheelchair shall satisfy a number of resistance tests. Any breaks or alteration in dimensions, forms or function of the wheelchair components shall be considered a failure to the test.

2.2 Principles

Fatigue tests shall allow to assess endurance and resistance of the wheelchair submitted to strong strains during a short lapse of time in order to simulate repeated efforts the wheelchair is exposed to during its normal use, such as kerb drops, climbing obstacles or rolling on uneven pavement.

Tests are carried out on each model of the wheelchair. If there are several widths existing for the same model, a medium or greater size will be selected for the tests..

2.3 Conditions

Test report allows to identify the wheelchair and its manufacturer and indicates all of the test results.

Following aspects shall be checked :

1. Tyre pressure shall comply with the manufacturer's recommendations or indications on the tyres;
2. The wheelchair shall be in perfect condition.
3. Designation of reference points takes into account aspects of wheelchair, manufacturer and test laboratory.
4. The same measures at the beginning and at the end of each test shall be taken.
5. The wheelchair is tested with set-up for normal use conditions;
6. If relevant, adjustments set up for normal use,
7. Dummy:

An anthropomorphic dummy or an ISO dummy (weight selected to the size of the wheelchair, see below table) is used for the tests:

Size	T1	T2	T3	T4
Seat width (mm)	L < 350	350 < L < 380	380 < L < 450	L > 450
Dummy (kg)	25	50	75	100

The dummy is installed in a way to fit the seat without cushion and it is firmly to avoid any displacement during testing.

8. Test surface complies with ISO standard in effect.

2.4 Testing the frame and drive wheels

2.4.1 Test apparatus.

It may consist of a plane track or drums, a circular track or any system allowing to simulate the rolling of a wheelchair loaded with a dummy on a horizontal surface with obstacles at a speed of 8 km/h (2,22 m/sec).

2.4.2 Driving of the wheelchair

The wheelchair is driven with a force applied in such a way that the direction is maintained without hindering vertical moves or torsion.

2.4.3 Obstacles

Obstacles simulate kerb drops. Obstacles are represented by two not deforming parts fixed on the track. Wheels shall tackle perpendicularly the edge of the obstacles.

2.4.4 Test.

2.4.4.1 Simultaneous drops

Both wheels climb obstacles simultaneously. Obstacles' height is of 150 mm, the slope of the approach ramp is inferior to 7 ° and lengthened by minimum 100 mm. The obstacles are adjusted in a way that the wheels contact the track at the same moment. The number of kerb drops : 1800.

2.4.4.2 Consecutive drops

Driving a wheelchair on an uneven road surface may cause torque in the frame structure. Both wheels climb the obstacles one after the other , obstacles are at a distance sufficient to allow the wheels to regain their balance position between two consecutive torques. The height of the obstacle will be selected following the wheelchair track and the minimum lateral tilt angle imposed in I - 2.9, according to the next formula :

$$H = 2 \times V \times \sin 7^\circ$$

H = height of the obstacle in mm ;

V = back track in mm ;

H maxi = 150 mm.

The approach ramp is the same than in 2.4.4.1.

Number of obstacles climbed by wheel : 900.

2.4.5 Results

2.4.5.1. Drive wheels warping

This measure is taken on the alloy wheel with a comparator at the beginning of tests, during the tests (at each 450 tours) and at the end of tests.

Acceptable tolerance of deformation : 6 mm of warping (maximum deviation).

2.4.5.2. Play in the wheel axle

The maximum play in the axle must not generate a transversal displacement higher than 1,5 mm in one point of the alloy wheel. The measure is taken with a comparator while an alternating strain is applied in a diametrically opposed point of the measure.

2.5. Drive wheel test

Drive wheels are installed on two turning rolls and the wheelchair, loaded with a dummy, is maintained on a platform. Each obstacle, i.e. a metal lath, is fixed on a roll, lath dimensions are as follows :

Width: 20 mm ;

Height: 10 mm ;

The upper edge is rounded off with a radius of 4 mm.

Test parameter:

Speed: 8 km/h ;

Length of time : 56 hours; there is one obstacle at each 3 meter

With 1,5 m out-of-phase displacement compared to each-other.

Results:

Play in the wheel axle : it will be measured with a comparator at the alloy wheel;

Acceptable value : 0,5 mm (measure taken in the same conditions as in 2.4.5.2.).

Play value in the axis of rotation of the fork :

Control in the drive wheels' axle;

Acceptable value : play in the axis of rotation should not increase "track" value by more than 0,5 mm.

2.6 Test of seat and backrest textile

Textiles are submitted to a series of stresses in order to test :

their resistance;

their fixation ;

their deformation .

A dummy is dropped onto the seat from a height of 50 mm, then its back leans on the backrest with a strength of :

100 Newton - for size 1 ;

150 Newton - for size 2 ;

200 Newton - for size 3 ;

250 Newton - for size 4 ;

Frequency : 6 drops / minute .

Number of stresses : 10 000.

2.7 Testing foot-rest plates :

The wheelchair is loaded with a dummy, the unit plate/footrest is exposed to the following strengths :

150 Newton - for size 1;

250 Newton - for size 2;

350 Newton - for size 3 ;

450 Newton - for size 4 ;

Loads are applied with a frequency of 1 Hz perpendicularly to the upper face.

Number of stresses : 50 000.

2.8 Test of parking systems

The wheelchair loaded with a dummy, the adjustment of parking systems is carried out on a slope of 7°. In these conditions locked parking systems should not allow wheels to turn.

The wheelchair loaded with a dummy, the parking mechanism will operate 60 000 times. After this test, parking systems must remain efficient (above test).

2.9 Stabilité statique

This test is carried out before each test for resistance. Loaded with a dummy and regardless set-up conditions of the wheelchair (sitting or standing position) and the position of the dummy (loaded on the extremity of the arm), the wheelchair shall not tilt backwards on a slope of 7°.

D. Common addings on manual wheelchairs

Electric motor propulsion device

The electric motor propulsion device, also called "kit", is not part of the manual wheelchair, it is sold separately.

It is adapted to the manual wheelchair already included in the list of reimbursable articles.

It can be mounted or dismounted by clipping to the manual wheelchair without the use of any tools, an electric plug is needed to connect the control box and the propulsion kit, the control box is mounted on the manual wheelchair without tools.

The manual wheelchair is equipped with easily removable great wheels for the case the propulsion device needs them to be removed.

The manual wheelchair and the propulsion device mounted together shall meet all requirements of the specifications of an electrical wheelchair.

From 16th January 2002 any electric motor propulsion device shall be compatible with at least two manual wheelchair types manufactured by two different companies.

Chapter II - Diverse vehicles

Pushchairs, push wheelchairs and wheeled frames designed for the passive transport of the Disabled

1. In general

The present specifications apply to vehicles intended for passive transport of the Disabled such as pushchairs, push wheelchairs, wheeled frames for seat shells. These vehicles are compact and folding or easy to dismantle by an attendant.

They are qualified as medical devices under aegis of article L 5211-1 of the Law on Public Health.

These vehicles consist of:

- a frame;
- and wheels of a diameter between 100 and 500 mm.

Pushchairs can be equipped with optional variant components provided in the nomenclature, compatible with the pushchair model and adapted to user's disability. Only wheeled frames for seat shells are supplied without seat and backrest.

Regardless the type of used materials, stability and mechanical resistance of materials are tested in conformity with point 3. None of the components of these vehicles, nor their optional variant component must hurt user, nor damage his clothing or surroundings.

Wheelchair models shall be conform to characteristics defined in the present specifications finalised by CERAH and the Ministry of Health and they must have satisfied to technical assessment carried out by a competent and independent organism.

2. Technical specifications

2.1. In general

2.1.1. Frame

The frame, including or not a body support system, contains an abdominal belt and a reflecting system on the front and back of the vehicle. Its resistance is in conformity with tests defined in point 2.2.4.

2.1.2. Body support system

Instead of traditional body support system (without any particular adjustments) the following systems are proposed :

- tilting back-rest, tilting back-rest and seat,
- back-rest adjustable in height et seat adjustable in width and depth.

2.1.3. Resistance to fire

Back-rest, seat and armrest components shall respond to regulations in force.

2.1.4. Parking device

All the models are equipped with a parking device acting on wheels of the same axle.

2.1.5. Optional variant components

Optional variant components listed in the nomenclature may complete or replace one part of the basic vehicle.

2.1.6. Stain-proof protection of surfaces

The manufacturer certifies that the whole vehicle underwent stain-proof treatment by presenting the controlling organisms the list of (spear) parts of the vehicle and realized treatments.

2.1.7. Manufacturer's plate:

The manufacturer indicates on an inviolable medium fixed on the frame of the vehicle the name of the company, type of the vehicle, maximum user's weight, serial number and the code in the nomenclature.

2.1.8. Guarantee

The vehicle is guaranteed for a period of two years from the date of delivery against all manufacturing and raw material defects. The guarantee is limited to manufacturer's replacing pieces or sub-units recognised defective (including pieces, labour and transport).

2.1.9. Interchangeability of spare parts

Replacing any of the components of the vehicle by a similar spare part shall be possible during an at least 5 year period from the date of delivery to user.

2.1.10. User's guide and maintenance guide

On delivery an illustrated user's guide and maintenance guide in French and a certificate of guarantee shall be submitted to the user by the seller.

2.2. Test for resistance

2.2.1. Scope

Vehicles must satisfy to a number of tests for resistance. Any break or alteration of dimensions, forms or function of any of the vehicle components is considered a failure.

2.2.2. Principle

Fatigue tests allow to assess resilience and resistance of vehicles submitted to strong strains in a short lapse of time to simulate repeated efforts a pushchair is exposed to during normal use such as kerb drops, climbing a paving stone or progression on an uneven road surface. Tests are carried out for each vehicle model. When a model exists in several width a medium or greater size vehicle is selected for the tests.

2.2.3. Conditions

Test report allows to identify the vehicle and its manufacturer and gives results of all of the tests. All the following points are checked :

- tyre pressure and pressure recommended by the manufacturer of the vehicle or if not pressure indicated on the tyres;
 - the vehicle is in perfect state of function;
 - the vehicle to test is set up for normal use;
 - adjustments, if any, are indicated for normal use ;
 - dummies : one of the dummies indicated in standard ISO 7176-11 is selected of the same mass or next higher as the maximum user's weight recommended by the manufacturer (if this latter is higher than 100 kg, use a 100 kg dummy).
- Dummies' weigh is of 25, 50, 75 and 100 kg.

The dummy is fit and wedged on the seat of the pushchair without cushion. The dummy is firmly fixed to the pushchair to avoid any displacement during tests.

2.2.4. Tests of frame and rear wheels (or wheels considered to be rear wheels).

2.2.4.1. Test apparatus

The test apparatus may consist of a linear track, of one or several drums, of a circular track or any other system allowing to simulate the rolling of the pushchair loaded with a dummy on a horizontal plane and on obstacles with a speed of 5 km/h (1,39 m/s).

2.2.4.2. Vehicle drive

The vehicle is moved with the help of a force which is applied in a way to maintain direction without hindering vertical movements or twisting.

2.2.4.3. Obstacles

Obstacles simulate kerb drops or intensive conditions of use. Wheels are perpendicular to the kerb edge when obstacles are tackled.

2.2.4.4. Procedure

Simultaneous drops : both rear wheels tackle simultaneously both obstacles. Height of obstacles is of

120 mm, the slope of the approach ramp is <math><7^\circ</math>prolonged on a horizontal part of min. 100 mm The obstacles are installed in a way to ensure that wheels contact the track at the same moment.
Number of obstacles : 2000.

2.2.5. Front wheel test (or wheels considered as front wheels.)

To execute this test drive wheels are led on two rolling rolls, the vehicle is maintained on a platform and loaded with a dummy. The obstacle consists of a corrugated iron sheet (corrugation of a height of 30 mm) entirely covering both rolls.

Test parameter : speed: 5 km/h ; length of time: five hours.

2.2.6. Results

Any break or change of dimensions, forms or function of the vehicle components is considered as a failure and results in a "non-conformity notice".

2.2.7. Test for dynamic resistance

Test : a load of 13 kg is placed on a the pushchair hammock or seat ; when the vehicle is equipped with a luggage carrier a 5 kg load is added at the bottom of the carrier.

In changeable vehicles this test is carried out in landau position.

The vehicle bumps into a rigid stair step of 200 mm height at a speed of 2 m/s. The pushchair is hindered to tip over under the effect of the impact.

The test is repeated three times.

Requirement : submitted to the above described test, the vehicle shall not show any break or deformation of its mechanical elements or sewing. Besides that, the nacella of the pushchair shall not slip on the frame by more than 10 mm provided it is not fixed to an upholding frame.

2.2.8. Testing parking brake systems

Parking brake systems are adjusted on a slope of 7° while the vehicle is loaded with a dummy. In these conditions, with the parking brake systems locked, wheels concerned by the braking must not turn. The vehicle is loaded with a dummy, the parking brake mechanism is activated 1000 times. After this test the parking brake systems shall remain efficient (see above described test).

2.2.9. Static stability

Static stability is checked in conformity with standard EN NF 12183 (wheelchair with or without anti-tip system).

B. Manually or foot powered tricycle

1 In general

Manually or foot powered vehicles with three wheels are covered by these specifications. They are destined for re-education of children with locomotive impairment(s) and not designed for transport on roads or ways. They are medical devices as defined under article L 5211-1 of Health Law.

None of the parts of the vehicle nor its optional parts shall hurt user, neither it will damage his/her clothing nor surroundings.

Technical control of tricycles is carried out by an entitled and independent body. Tricycles shall comply with characteristics defined in the present specifications elaborated by the CERAH and the Ministry of Health and shall have satisfied technical assessment realised by a entitled and independent organism. Their conformity is recognised for two years, renewable on demand of the manufacturer.

1.1 Guarantee

The vehicle is guaranteed for a period of two years from date of delivery against manufacturing and raw material deficiency. The guarantee is limited to free of charge replacement by the supplier of such spare-parts or sub-parts which are recognized deficient (spare parts, work and transport included).

1.2 Interchangeability of spare parts

The replacement of any of the components of the wheelchairs is possible during a period of minimum 5 years from date of delivery to user.

1.3 Manufacturer's plate

Manufacturer indelibly and in an irremovable way indicates the following : name of the company, type of vehicle, maximum user weight, serial number and code of nomenclature.

1.4 User's and maintenance guide

An user's and maintenance guide in French accompanies the vehicle. Its is illustrated with reference drawings and photos. Gaurantee clauses are integral parts of the user's and maintenance guide.

1.4.1 General characteristics

The user's guide includes :

- a description of the type of vehicle illustrated with photos or drawings and a not technical description of the use the vehicle is intended to;

- a mention of the authorised maximum weight ;
- a description of the environment in which the vehicle can be used and of particular conditions that may harm to the vehicle, such as temperature, humidity ... ;
- a tyre pressure or a range of pressure, if the vehicle is equipped with tyres, and tyres' size.

1.4.2 Assembling and installation

If the vehicle is delivered (to the retailer) in kit, the user's guide shall include :

- the list of components ;
- information on necessary tools and equipment to assemble the vehicle;
- control list to check missing or damaged parts ;
- instructions to assemble, install and dismantle parts supplied by the manufacturer ;
- instructions concerning storage and transport of the vehicle.

1.4.3 Use of the vehicle

The user's guide include :

- full instructions about the use of the vehicle on ground surfaces user may meet and also on transfer of/in the vehicle completed by appropriated illustrations (slope up and down, kerb, walk, transfer) ;
- the possible ways of use known to the manufacturer which may hurt the user or his/her attendant or damage the vehicle.

1.4.4 Maintenance

The maintenance guide indicates periodical maintenance operations including :

- the list of all the maintenance operation and control to carry out by the user ;
- all pieces of information concerning necessary tools and equipment to repair and maintain the vehicle and its spare-parts;
- frequency of these operations ;
- circumstances of returning the vehicle to the manufacturer for maintenance ;
- cleaning instructions ;
- instructions to replace easily all of the listed parts designed by the manufacturer (tyre ...) with illustrations containing written notes ;
- all of the information concerning dangerous maintenance operations (inflating pressure of tyres ...)

1.4.5 Repairs

User's guide describes the following reparation procedures :

- identification of parts designed to be repaired by the user or a third person ;
- identification of parts to be repaired by the manufacturer or retailer in order to suit guarantee and good function conditions

1.5 Protection anti-rust of surfaces

The manufacturer certifies that the whole vehicle underwent anti-rust treatment on presenting controlling organisms the nomenclature of pieces with the mention of treatments carried out.

2 Design requirements

2.1. Manually or foot powered tricycles

Tricycles consist of the following elements :

- body support system;
- steering system;
- propulsion system;
- parking brake and brake device;
- frame ;
- one or several drive wheels ;
- one or two steering wheels;

Optimum use is obtained through seat adjustments and/or drive and/or steering system adjustments.

2.1.1. Frame

Its resistance is in conformity to tests defined in chapter 4.

2.1.2. Wheels

Drive and/or steering wheel(s) is/are equipped with inflatable or not inflatable tyres. Drive wheels are either at the front or at the back of the tricycle, depending on the model, to fit user's needs.

2.1.3. Seat / saddle

Seat with height adjustable backrest or saddle.

In order to assure stability for the trunk a dorsal and abdominal support is designated by the prescriber.

2.1.4. Driving device

Regardless the type of the device adopted, it shall allow the user to drive his tricycle with a maximum efficiency. A tricycle having a maximum saddle height of 560 mm or higher is equipped with a protection disk or any other device suitable for masking fully the external side of the upper part of the chain links on the front chain wheel. A disc has a greater diameter than the external surface of the chain this latter being fully meshed in the front chain wheel.

A protection device, other than the a disc masking the chain on a minimum 25 mm distance, measured along the chain, in forward direction from the point where the front chain wheel cogs pass between the lateral plates of the chain.

Any tricycle having a maximum saddle height of 560 mm is equipped with a chain guard which masks fully the external face and the side of the chain, the front chain wheel and the chain gear on the front chain wheel.

2.1.5. Handlebar system

A permanent mark on the handlebar stem clearly indicates the minimum depth of penetration of its rod in the handlebar pivot tube or as a variant, a fix and permanent device that maintains always this minimum depth.

This depth mark is fixed at a 65 mm distance from the lower extremity of the handlebar stem and there is at least as long as a part of the round rod under the mark as its diameter under the mark.

This depth mark shall not weaken the resistance of the handlebar stem.

2.1.6. Breaking device and parking break

A double braking system is necessary with two separate controls, except the cases where breaking is obtained by reverse rotation of the gear system or of the fix rear-wheel.

In all cases, the parking break system acting on a wheel or through a control device is compulsory.

2.1.7. Foot-rest

Adjustable foot-rests are compulsory in the case of a manual propulsion to assure the support and correct positioning of the user. In case of propulsion by foot, there shall be a fixing device for the foot.

3. Performance requirements

Vehicles must meet a certain number of resistance tests. After each test any brake, change in dimensions or shape of any of the components is considered a fail to the test.

All pieces, that need to be more than twice strengthened or adjusted during the tests described here under are considered to have failed the tests.

Manually or foot powered tricycle

3.1.1. Control

In paragraphs 3.1.3, 3.1.4, 3.1.5 and 3.1.6, the smallest value will be retained for tricycles with a crotch height less than 38 cm, the other value for tricycles with a crotch height higher than 38 cm.

3.1.1.1. Wheels

3.1.1.1.1 Tolerance of radial deviation

The radial deviation of a wheel with a break on the wheel rim will not be higher than 2 mm when measured perpendicularly to the axis in a point along the wheel rim.

The radial deviation of a wheel without a break on the wheel rim will not be higher than 4 mm.

3.1.1.1.2. Tolerance of wheel wobble

The wheel wobble of a wheel with a break on the wheel rim will not be higher than 2 mm when measured perpendicularly to the axis in a point along the wheel rim.

The wheel wobble of a wheel without a break on the wheel rim will not be higher than 4 mm.

3.1.1.1.3. Free rotation

The alignment of the wheel on a tricycle keeps free rotation with a distance higher than 2 mm between the tyre and any other pieces of the frame or fork.

3.1.1.2. Pedal - Free top-toe

The tricycle has free space of at least 89 mm between the pedal and the tyre or the mudguard on the front (when the top toe is turned in any direction). This free space is measured forward and parallel to the length-wise axis of the tricycle, from the centre of each pedal to the tyre or mud-guard arch, taking always the one that offers the less free space (fig. 1).

3.1.1.3. Saddle Seat post

A permanent mark on the seat post clearly indicates the minimum depth of penetration of the rod in the frame. This depth mark is situated at a distance at least twice as long as the diameter of the rod measured from the basis of the cylinder of the rod and it shall not weaken the rod's resistance.

3.1.1.4. Alarm device

The tricycle is equipped with a bell or any other audible device.

3.1.2. Test according to the test method "determination of static stability" (alinea 4)

The tricycle shall be laterally stable on a slope of 7°.

3.1.3. Test according to the test method "test for loading the braking unit"

3.1.3.1. Manual breaking

A strength of 300 Newtons (N) or 400 N is applied to the braking lever.

3.1.3.2. Breaking with backpedalling

A strength of 600 N or 1000 N is applied to the right side pedal during 15 seconds:

3.1.4. Test according to test method "testing handlebar stem."

3.1.4.1. Test couple

With the help of a test bar a couple of 30 Nm or 80 Nm is applied to the STEM.

3.1.4.2. Static load test

Test parameter : a strength of 500 N or 1500 N at 45°.

3.1.4.3. Test for the tightening between the handlebar and STEM

Test parameter: strength of 130 N or 180 N applied to the handlebar

3.1.4.4. Test for the tightening between the handlebar stem and the pivot rod tube

Test parameter: couple of 15 Nm or 20 Nm.

3.1.5. Test according to test method "impact test on frame and frame fork"

Test parameter : of a height of 50 or 120 mm a mass of 22,5 m is dropped in the front wheel axis.

Test result : No visible sign of breaks or permanent deformation of the piece measured between the axis of the hubs, if any, it shall not exceed 20 mm.

3.1.6. Test according to the test method "drop test of the frame and fork" "

Test parameter : dropping the frame and fork twice with a mass of 30 or 50 kg fixed to the rod of the saddle, its centre of gravity situated in the axis of the seat post at a height of 75 mm of the seat post, measured along its axis.

Test results : there is no visible sign of breaks.

3.1.7 Test according to the test method "testing the efficiency of manual brakes"

Test parameter: a strength between 45 and 90 N is applied in a point situated at 25 mm of the extremity of the brake lever.

Test results : measuring braking force while pulling tangentially the wheel.

3.1.8 Test according to the test method "Testing the braking efficiency by backpedalling"

Test parameters : 20 to 100 N applied perpendicularly to the crank and in the braking direction.

Test results : braking force is measured through pulling the wheel tangentially.

4. Test methods

Fatigue tests allowing to assess resilience of vehicles

exposed to strong strains in a short lapse of time in order to simulate repeated efforts to which the vehicle is exposed to in normal use, such as tackling and mounting kerbs, rolling on pavements and or on uneven road surface.

Tests are carried out on each vehicle model. When there are several possible configurations on the same model (e.g. crotch height) the vehicle is tested in its maximum configuration.

The vehicle shall operate perfectly. If any adjustment is proposed it must be done for a normal use.

Tyre pressure shall be in conformity to manufacturer's recommendation, if not, to indications on the tyre. If a range of tyre pressure is specified, the maximum pressure shall be used.

4.1. Testing the whole braking unit by loading

4.1.1. Handbrake

This test is to carry out on an entirely mounted tricycle. After having inspected the correct adjustment of both brakes, a load is applied on the lever of the brake in a point situated at a distance of 25 mm of the lever extremity, perpendicularly to the handgrip on the handlebar in the plane of the course of the lever, as indicated in figure 2.

The strength is indicated in 3.1.3.1. or lower and so that it :

- make function the brake through the cable in contact with the surface of the handgrip on the handlebar.;
- make function a brake lever through a rod on top of the handgrips of the handlebar.

This test is repeated ten times on each handbrake.

4.1.2 Braking with backpedalling.

This test is to carry out on an entirely mounted tricycle. It must be checked if the adjustment of the braking system is correct and the right crank is in horizontal position, as indicated in figure 3. A force described in 3.1.3.2. is gradually, vertically applied in the centre of the axis of the right pedal and this force is maintained during maximum 15 seconds.

This test is repeated ten times.

4.2. Testing the steering unit

4.2.1. Couple applied on the handlebar stem

The handlebar stem is inserted in the frame at minimum depth and rigidly tightened. A rod or a test handlebar is rigidly tightened in the stem and the couple described in 3.1.4.1. is applied on the stem through the rod or the test stem unit in a plane parallel to the axis of the latter. (fig. 4).

4.2.2. Static load test

The handlebar stem is inserted in the frame at minimum depth and the force defined in 3.1.4.2. is applied in forward direction, in the joint point, at 45 ° to the axis of the stem. (fig. 5).

4.2.3. Testing handlebar and stem tightening

With the handlebar stem tightly fixed at the minimum depth into the lock nut a force defined in 3.1.4.3 is applied simultaneously on each side of the handlebar in a direction and at a point that assures a maximum torsion couple in the junction point between the handlebar and the stem. When the loading point is on the extremity of the handlebar the force is applied as close as possible to the extremity but in no way farther than 15 mm from the extremity. (fig. 6).

4.2.4 Testing the tightening between the stem and the head tube

With the stem correctly mounted in the head tube and the locking device tightened with the minimum couple recommended by the manufacturer, a couple defined in 3.1.4.4. is applied to the locking device and the fork. (fig. 7).

4.3. Impact test of the unit frame/fork

4.3.1. Dropping a mass

This test is to carry out on the unit frame/fork. Whenever a frame can be adapted according to whether the tricycle is to be used by a boy or a girl the tricycle must be tested with the cross bar removed.

Distance between hub axes is measured. A low mass roll is fixed to the front fork, while the frame/fork unit is held in vertical position, and it is tightened in a rigid assembly to the rear-hub anchor point (fig. 8)

A mass, as it is in 3.1.5, is dropped on to the roll in a point situated on the axis of the wheel, in the opposite direction of the fork off-set.

4.3.2. Drop test of frame/fork unit

This test is executed on the unit frame-fork-roll as in 4.3.1.

The unit is fixed by the anchor point of the rear hub in a way that gives free rotation around this latter in a vertical plane. The fork is supported on a plain base made of steel so that the frame be in its position intended for normal use. A mass is fixed as defined in 3.1.6. The whole unit is submitted to rotation around the rear hub in a way that the centre of gravity of the 30 kg mass is vertical to the rear hub axis. Let it drop in free fall onto the base (fig. 9). The test is repeated and two chocs are reproduced.

4.4 Testing the efficiency of manual brakes

This test is executed on a tricycle without saddle and seat post, otherwise complete, and with correctly adjusted brakes.

The tricycle is fixed into an appropriate support and the braking force measuring device is attached to the wheel affected by the brake. (fig. 10).

A force as in 3.1.7. is applied to the brake lever perpendicularly to the handgrip surface and in the plane of the sense of the lever (fig. 2).

The wheel is pulled tangentially to the tyre circumference in the forward direction with the help of the force measuring device. After one turn of the wheel the braking force is recorded meanwhile the wheel is pulled continuously.

The average value of three recorded forces on the brake lever is calculated. The test is repeated at least five times with different forces on the brake lever.

4.5. Testing the efficiency of braking by backpedalling.

This test is carried out on an entirely mounted tricycle with correctly adjusted brakes.

The tricycle is fixed to an appropriate support and the force measuring device is tied to the concerned wheel. (fig. 11).

A force described in 3.1.8. is applied on the pedal.

The wheel is pulled tangentially to the tyre circumference in the forward direction with the help of the force measuring device. The braking force value is recorded after one turn of the wheel while it is continuously pulled.

The average value of three recorded forces on pedal is calculated. The test is repeated at least five times with different forces on the pedal.

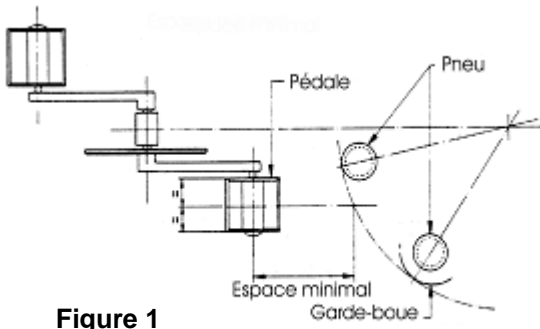


Figure 1

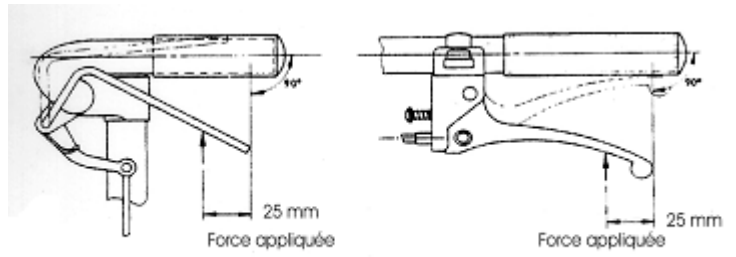


Figure 2

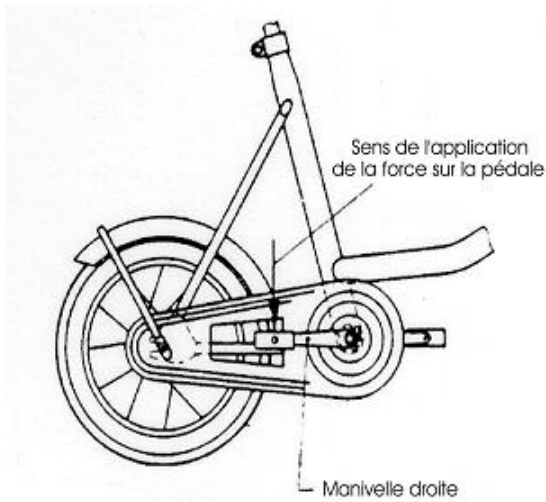


Figure 3

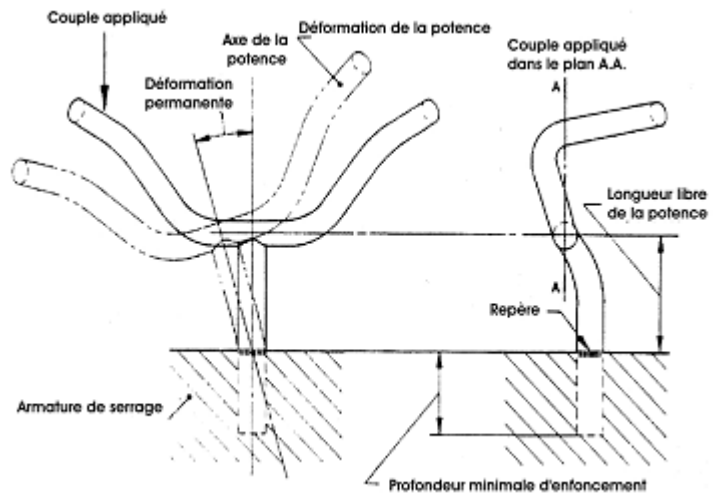


Figure 4

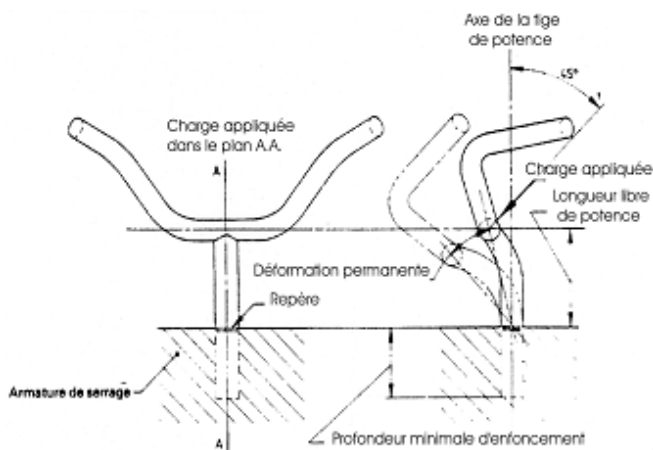


Figure 5

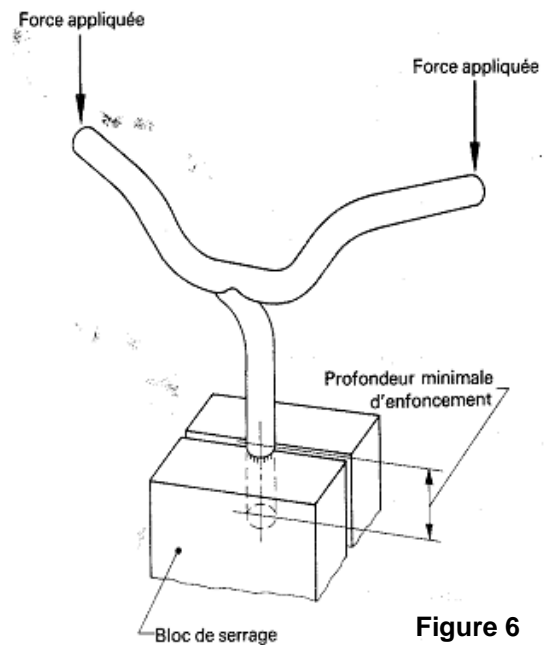


Figure 6

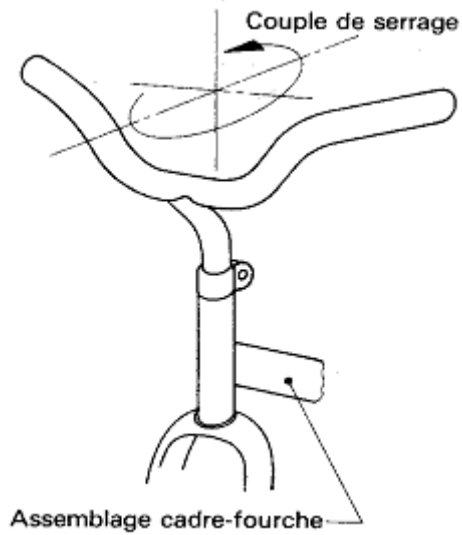


Figure 7

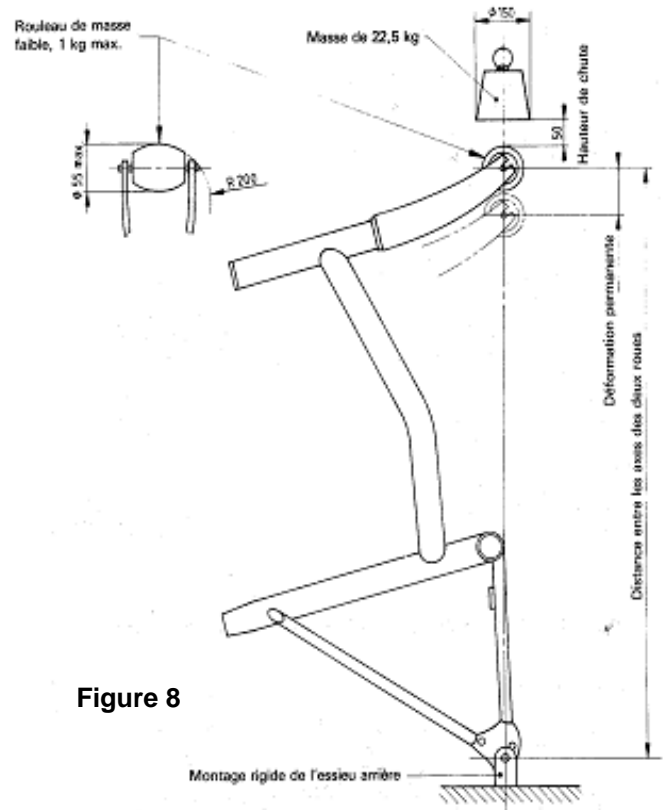


Figure 8

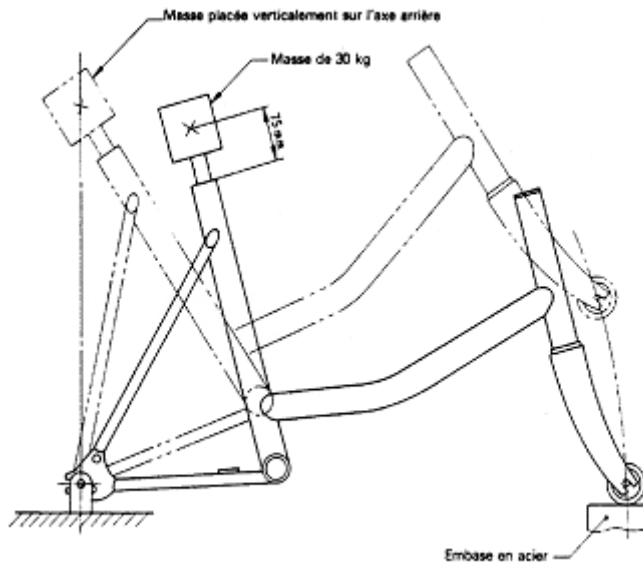


Figure 9

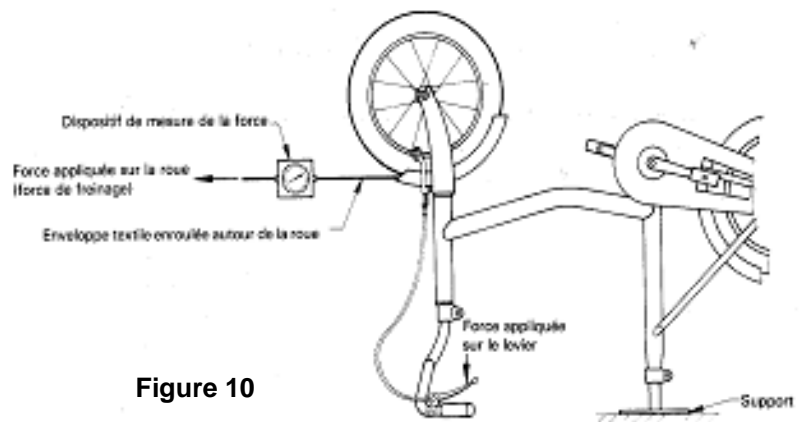


Figure 10

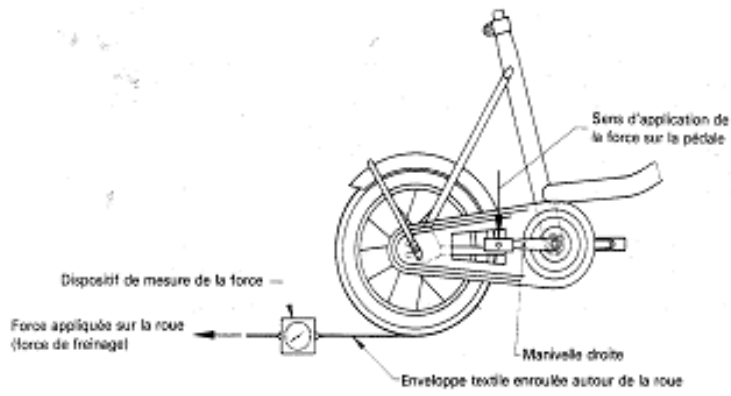


Figure 11