

Załącznik nr 1.1A do SWZ/OPZ

**Opis procedur weryfikacji parametrów
dla urządzeń wchodzących w zakres Zadania nr 1
- Dostawa manekinów, podzespołów i czujników**

Procedura weryfikacji parametrów szyi dla manekina Q6:

8.2 Certification of the Neck**General**

The neck test is a component test, which is performed using a pendulum as defined in CFR49 part 572. To certify the Q6 neck, remove it from the dummy. The complete neck consists of the following parts:

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Table 23. Neck Parts List for Certification

Description	Parts No.	Qty.
Neck Molding	033-2301	1
Neck Cable assembly	033-2200	1
Screw FHCS M5 x 10	5000084	4
Screw SHCS M5 x 10	5000291	4
Load cell or load cell structural replacement	IF-217 or 020-2007	1

The neck is attached upside down to the pendulum. A head form is used to load the neck. This head form consists of two flat discs connected by an interface, which allows certification of both the neck and the lumbar spine. The head form rotation during the test is measured using two rotational potentiometers. One is installed on the base of the neck-pendulum interface the second one is attached to the head form. Both potentiometers are linked with a thin shaft. The sum of the two angles measured on the potentiometers is the angle of the head relative to the pendulum. The moment is measured using an upper neck load cell IF-217 mounted between the head form and the neck.

The data acquisition system and all instrumentation must comply with the requirements of SAE J211, version March 1995. All data channels should be filtered using a hardware filter prior to A/D conversion according to SAE J211, version March 1995.

The pendulum acceleration should be measured with an accelerometer, which is located on the pendulum arm, 1657.4 mm from the pendulum pivot in accordance with the CFR 49 Part 572.

Frontal Neck Test

Set-up

1. Assemble the complete neck, as described in section 4.3 with interface plate 033-2308.

2. Attach the IF-217 6 AXIS LOAD CELL and TE-2650-11 SPACER FLEXION HEAD FORM to the head form. Slide the head form over the neck and attach with 4 M5 x 12 SHCS.
3. Attach the neck to the pendulum interface plate (4 x M5). Place the (modified) 020-2015 (TE-2650-15) intermediate plate between the neck and pendulum interface. Align the neck and the interface, making sure that longitudinal axis of the neck is in the direction of movement of the pendulum arm.
4. Attach the head form-neck system to the Part 572 pendulum. The front of the head form should point in the direction of motion of the pendulum.
5. Install the potentiometers to the mounting interface and the on the head form. Mount the balance mass for the potentiometer on the other side of the head form. This ensures that the inertial properties of the head are symmetrical in the impact direction.
6. Insert the rod connecting the axes of the potentiometers and tighten the screw on the bottom-most axis to secure the rod. The other end of the rod should be able to slide freely through the upper most transducer axis. The rod must be protruding from both sides of the transducers axes equal length.
7. The minimum time interval to observe between tests on the neck is 30 minutes.

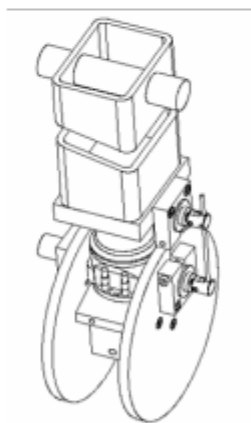


Figure 30. Q6 Neck Certification Test Set-Up for Frontal Test

Performing the Test

1. Attach honeycomb material to arrest the pendulum. Proposed is to use sheets of 28.8 kg/m³ with crush strength of 1.8 lbs./cu.ft, with a nominal length of 152.4 mm (6 inches).

2. Auto-balancing and shunt calibration of the transducer signals should be performed with the pendulum arm in the vertical position.
3. Lift the pendulum up to its pre-test height and check that the head form is in the correct initial position (symmetrical with respect to neck top yoke). Do not leave the head form-neck system in this position for more than 1 minute, as the neck will start to deform due to the mass of the head form.
4. Release the pendulum.

Data Processing

1. Filter the pendulum acceleration at CFC180.
2. Filter the potentiometer readings at CFC600.
3. Filter the load cell readings at CFC600.
4. Determine time zero of the impact by finding the 1 g deceleration level in the pendulum signal (after software filtering).
5. Software-zero all transducer readings by averaging the part of the signal before time zero and subtracting this from the transducer reading.
6. Integrate the pendulum acceleration to check the deceleration velocity of the pendulum. The velocity of the arm must be calculated at a point 1657.4 mm from the pendulum pivot point.
7. Sum the potentiometer signals to derive the total angle of the head form relative to pendulum arm.

Requirements

1. The impact velocity should be between 3.8 and 4.0 m/s.
2. The pendulum velocity decrease should be as indicated in the table below.

Table 24. Pendulum Velocity

Time ms	Lower limit [m/s]	Upper limit [m/s]
10	0.5	1.5
20	1.3	2.5
30	2.0	3.3

To meet the requirements of the frontal neck certification test (see note below):

3. The maximum head angle (first maximum) should be between 36.9 and 45.8 degrees.

The peak moment shall be between 22.6 and 28.0 Nm.

Lateral Neck Test

Set-up

1. Assemble the complete neck, as described in section 4.3 with interface plate 033-2308.
2. Attach the IF-217 6 AXIS LOAD CELL and TE-2650-11 SPACER FLEXION HEAD FORM to the head form. Slide the head form over the neck and attach with four M5 x 12 SHCS.
3. Attach the neck to the pendulum interface plate (4 x M5). Place the (modified) 020-2015 (TE-2650-15) intermediate plate between the neck and pendulum interface. Align the neck and the interface, making sure that lateral axis of the neck is in the direction of movement of the pendulum arm. Also, make sure that the bending direction of the neck in the certification is the same as the initial bending direction experienced in the test the dummy is being certified for (LHS or RHS).
4. Attach the head form-neck system to the Part 572 pendulum. The side of the head form should point in the direction of motion of the pendulum.
5. Install the potentiometers to the mounting interface and on the head form central block. Mount the balance mass for the potentiometer on the other side of the central block. This ensures that the inertial properties of the head are symmetrical in the impact direction. The figure below indicates the proper position and orientation of the potentiometers.
6. Insert the rod connecting the axes of the potentiometers and tighten the screw on the bottom-most axis to secure the rod to the potentiometer. The other end of the rod should be able to slide freely through the upper most transducer axis. The rod must be protruding from both sides of the transducers axes equal length.
7. The minimum time interval to observe between tests on the neck is 30 minutes.

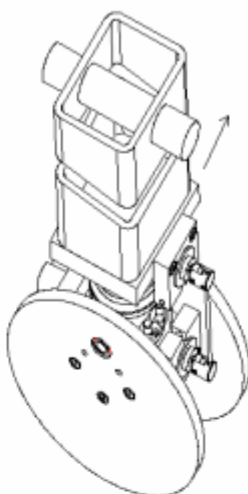


Figure 31. Q6 Neck Certification Test Set-Up for Lateral Test

Performing the Test

1. Attach honeycomb material to arrest the pendulum. Proposed is to use sheets of 28.8 kg/m³ with crush strength of 1.8 lbs/cu.ft, with a nominal length of 152.4 mm (6 inches).
2. Auto-balancing and shunt calibration of the transducer signals should be performed with the pendulum arm in the vertical position.
3. Lift the pendulum up to its pre-test height and check that the head form is in the correct initial position (symmetrical with respect to neck top yoke). Do not leave the head form-neck system in this position for more than 1 minute, as the neck will start to deform due to the mass of the head form.
4. Release the pendulum.

Data Processing

The data processing procedure of the lateral test is equal to the procedure mentioned in the frontal test.

Requirements

1. The impact velocity should be between 3.8 and 4.0 m/s.
2. The pendulum velocity decrease should be as indicated in the table below.

Table 25. Pendulum Velocity

Time ms	Lower limit m/s	Upper limit m/s
10	0.5	1.5
20	1.3	2.5
30	2.0	3.3

To meet the requirements of the lateral neck certification test (see note below):

3. The maximum head angle (first maximum) should be between 41.6 and 51.6 degrees.

The peak moment shall be between 21.6 and 26.9 Nm.

Procedura weryfikacji parametrów szyi dla manekina Q10

13.4 Neck Certification

General

The neck test is a component test, which is performed using a pendulum as defined in CFR49 part 572. The complete neck consists of the following parts:

Table 17 Neck Parts Lists

Description	Parts Q10	QTY
Neck Molding	010-2005	1
Neck Cable Assembly	010-2200	1
Screw FHCS M5 x 12	5000374	4
Screw SHCS M5 x 10	5000291	4
Loadcell	IF-217 HC	1

The neck is attached upside down to the pendulum base (TE-2650-1). A head form is used to load the neck. This head form consists of two flat disks connected by central block (TE-2650-14), which allows certification of both the neck and the lumbar spine. The head form orientation is measured using two rotational potentiometers. One is installed on the base of the neck-pendulum interface. The second one is attached to the head form. The sum of the two angles measured on the potentiometers is the angle of the head relative to the pendulum. Moment is measured using an upper neck load cell IF-217 HC mounted between the head form and the neck.

The data acquisition system and all instrumentation must comply with the requirements of SAE J211, version March 1995. All data channels should be filtered using a hardware filter prior to A/D conversion according to SAE J211, version March 1995.

The pendulum acceleration should be measured with an accelerometer, which is located on the pendulum arm, 1657.4 mm from the pendulum pivot in accordance with the CFR 49 Part 572.

13.5 Flexion Neck Test

Set-up

1. Assemble the complete neck, as described in section 3.
2. Attach the IF-217-HC six Axis Load Cell to the top of the neck with four M5 x 10 SHCS with wires aligned with cut outs in neck plate. Attach the loadcell and neck to the head form with four M5 x 12 FHCS with loadcell wires to non-impact side.
3. Attach the intermediate plate TE-010-2015 to the pendulum base with four M5 countersunk screws see drawing TE-2650. Attach the neck to the pendulum interface plate (four, M5 SHCS).
4. Align the neck and the interface, making sure that the longitudinal axis of the neck is in the direction of motion of the pendulum arm.
5. Attach the head form-neck system to the Part 572 pendulum. The front of the neck should point in the direction of motion of the pendulum.
6. Install the potentiometers to the mounting interface and on the head form. Mount the balance weight for the potentiometer on the other side of the head form. This ensures that the inertial properties of the head are symmetrical in the impact direction.
7. Insert the rod connecting the axes of the potentiometers and tighten the screw on the bottom-most axis (head form potentiometer) to secure the rod. The other end of the rod should be able to slide freely through the upper most transducer axis (pendulum base potentiometer). The rod must be protruding from both sides of the transducers axes equal length.
8. The minimum time interval to observe between tests on the neck is 30 minutes.

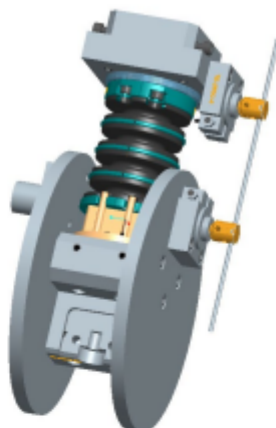


Figure 50 Q10 Neck Certification Setup for Frontal Flexion Test, View from Rear in Drop Position

Performing the Test

1. To stop the pendulum, attach honeycomb material to the pendulum anvil. It is recommended to use 152.4 mm (6") thick aluminum Hexcel density 28.8 Kg/m³ (1.8 lb/ft³) with a number of cells appropriate to meet the pulse requirement in Table 14.
2. Auto-balancing and shunt calibration of the transducer signals should be performed with the pendulum arm in the vertical position.
3. Lift the pendulum up to its pre-test height and check that the head form is in the correct initial position (symmetric with respect to neck top yoke). Do not leave the head-neck system in this position for more than 1 minute, as the neck will start to deform due to the mass-gravity loading of the head form.
4. Release the pendulum.

Data Processing

1. Filter the pendulum acceleration at CFC180.
2. Filter the potentiometer readings at CFC600.
3. Filter the load cell readings at CFC600
4. Determine time zero of the impact by finding the 1 g deceleration level in the pendulum signal (after software filtering).
5. Software zero all transducer readings by averaging the part of the signal before time zero and subtracting this from the transducer reading.
6. Integrate the pendulum acceleration to check the deceleration velocity of the pendulum. The velocity of the arm must be calculated at a point 1657.4 mm from the pendulum pivot point.
7. Sum the potentiometer signals to derive the total head angle of the head form relative to pendulum arm.

Requirements

1. The impact velocity should be at 4.8 ± 0.1 m/s.
2. The pendulum velocity decrease should be as indicated in the table below.

Table 18 Pendulum Velocity

Time (ms)	Lower Limit (m/s)	Upper Limit (m/s)
10	1.0	2.0
20	2.3	3.4
30	3.6	4.8

To meet the requirements of the frontal flexion neck certification test:

- The maximum head angle should be 50.4 – 61.6 degrees.
- The peak moment within the head angle corridor shall be 28.8 – 35.2 Nm.

13.6 Extension Neck Test

Set-up

1. Assemble the complete neck, as described in section 3.
2. Attach the IF-217-HC 6 Axis Load Cell to the top of the neck with four M5 x 12 SHCS with wires aligned with cut outs in neck plate. Attach the loadcell and neck to the head form with four M5 x 12 FHCS with loadcell wires to non-impact side.
3. Attach the intermediate plate TE-010-2015 to the pendulum base with four M5 countersunk screws. Attach the neck to the pendulum interface plate (four, M5).
4. Align the neck and the interface, making sure that longitudinal axis of the neck is in the direction against the motion of the pendulum arm.
5. Attach the head form-neck system to the Part 572 pendulum. The front of the neck should point in the direction against the motion of the pendulum.
6. Install the potentiometers to the mounting interface and to the head form. Mount the balance weight for the potentiometer on the other side of the head form. This ensures that the inertial properties of the head are symmetrical in the impact direction.
7. Insert the rod connecting the axes of the potentiometers and tighten the screw on the bottom-most axis (head form potentiometer) to secure the rod. The other end of the rod should be able to slide freely through the upper most transducer axis (pendulum base potentiometer). The rod must be protruding from both sides of the transducers axes equal length.
8. The minimum time interval to observe between tests on the neck is 30 minutes.



Figure 51 Q10 Neck Certification Setup for Frontal Extension Test, View Looking from Front in Drop Position

Performing the Test

1. To stop the pendulum, attach honeycomb material to the pendulum anvil. It is recommended to use 152.4 mm (6") thick aluminum Hexcel density 28.8 Kg/m³ (1.8 lb/ft³) with a number cells appropriate to meet the pulse requirement in Table 15.
2. Auto-balancing and shunt calibration of the transducer signals should be performed with the pendulum arm in the vertical position.
3. Lift the pendulum up to its pre-test height and check that the head form is in the correct initial position (symmetric with respect to neck top yoke). Do not leave the head-neck system in this position for more than 1 minute, as the neck will start to deform due to the mass-gravity loading of the head form.
4. Release the pendulum.

Data Processing

1. Filter the pendulum acceleration at CFC180.
2. Filter the potentiometer readings at CFC600.
3. Filter the load cell readings at CFC600
4. Determine time zero of the impact by finding the 1 g deceleration level in the pendulum signal (after software filtering).
5. Software zero all transducer readings by averaging the part of the signal before time zero and subtracting this from the transducer reading.
6. Integrate the pendulum acceleration to check the deceleration velocity of the pendulum. The velocity of the arm must be calculated at a point 1657.4 mm from the pendulum pivot point.
7. Sum the potentiometer signals to derive the total head angle of the head form relative to pendulum arm.

Requirements

1. The impact velocity should be at 3.7 ± 0.1 m/s.
2. The pendulum velocity decrease should be as indicated in the table below.

Table 19 Pendulum Velocity

Time (ms)	Lower Limit (m/s)	Upper Limit (m/s)
10	0.7	1.7
20	1.7	2.8
30	2.8	4.0

To meet the requirements of the frontal extension neck certification test:

- The maximum head angle should be 56.7 – 69.3 degrees.
- The peak moment shall be [-12.96] – [-15.84] Nm.

13.7 Lateral Neck Test

Set-up

1. Assemble the complete neck as described in section 3.
2. Attach the IF-217-HC six Axis Load Cell to the top of the neck with four M5 x 12 SHCS with wires aligned with cut outs in neck plate. Attach the loadcell and neck to the head form with four M5 x 12 FHCS, with lateral axis RH and LH aligned with the direction of motion of the head form.
3. Attach the intermediate plate TE-010-2015 to the pendulum base with four M5 countersunk screws. Attach the neck to the pendulum interface plate (four, M5 SHCS).
4. Align the neck and the interface, making sure that the lateral axis of the neck is in the direction of motion of the pendulum arm. Also, make sure that the bending direction of the neck in the certification is the same as the initial bending direction experienced in the test the dummy is being certified for (LHS or RHS).
5. Attach the head form-neck system to the part 572 pendulum. The impact side of the neck should point in the direction of motion of the pendulum.
6. Install the potentiometers to the mounting interface and on the head form. Mount the balance weight for the potentiometer on the other side of the head form. This ensures that the inertial properties of the head are symmetrical in the impact direction. The figure below indicates the proper position and orientation of the potentiometers.
7. Insert the rod connecting the axes of the potentiometers and tighten the screw on the bottom-most axis (head form potentiometer) to secure the rod to that potentiometer. The other end of the rod should be able to slide freely through the upper most transducer axis (pendulum base potentiometer). The rod must be protruding from both sides of the transducer axes equal length.
8. The minimum time interval to observe between tests on the neck is 30 minutes.

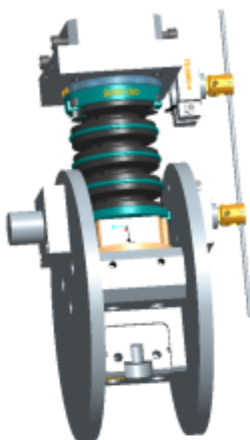


Figure 52 Q10 Neck Certification Setup for Lateral Test, View from Rear in Drop Position

Performing the Test

1. To stop the pendulum, attach honeycomb material to the pendulum anvil. It is recommended to use 152.4 mm (6") thick aluminum Hexcel density 28.8 Kg/m³ (1.8 lb/ft³) with a number cells appropriate to meet the pulse requirement in Table 16.
2. Auto-balancing and shunt calibration of the transducer signals should be performed with the pendulum arm in the vertical position.
3. Lift the pendulum up to its pre-test height. Do not leave the head-neck system in this position for more than 1 minute, as the neck will start to deform due to the mass-gravity loading of the head form.
4. Release the pendulum.

Data Processing

1. Filter the pendulum acceleration at CFC180.
2. Filter the potentiometer readings at CFC600.
3. Filter the load cell readings at CFC600
4. Determine time zero of the impact by finding the 1 g deceleration level in the pendulum signal (after software filtering).
5. Software zero all transducer readings by averaging the part of the signal before time zero and subtracting this from the transducer reading.
6. Integrate the pendulum acceleration to check the deceleration velocity of the pendulum. The velocity of the arm must be calculated at a point 1657.4 mm from the pendulum pivot point.
7. Sum the potentiometer signals to derive the total head angle of the head form relative to pendulum arm.

Requirements

1. The impact velocity should be 3.7 ± 0.1 m/s.
2. The pendulum velocity decrease should be as indicated in the table below.

Table 20 Pendulum Velocity

Time (ms)	Lower Limit (m/s)	Upper Limit (m/s)
10	0.7	1.7
20	1.7	2.8
30	2.8	4.0

To meet the requirements of the lateral neck certification test:

- The maximum head angle should be between 45.9 – 56.1 degrees.
- The peak moment shall be 14.85 – 18.15 Nm.

Procedura weryfikacji parametrów wkładki brzusznej dla manekina Q1

8.4 Certification of the Abdomen

8.4.1 General

The abdomen test is a component test. The abdomen should be removed from the dummy. The test equipment is described in paragraph 7.2. To test the correct performance of the dummy abdomen performance an “Additional weight” is placed on the top plate.

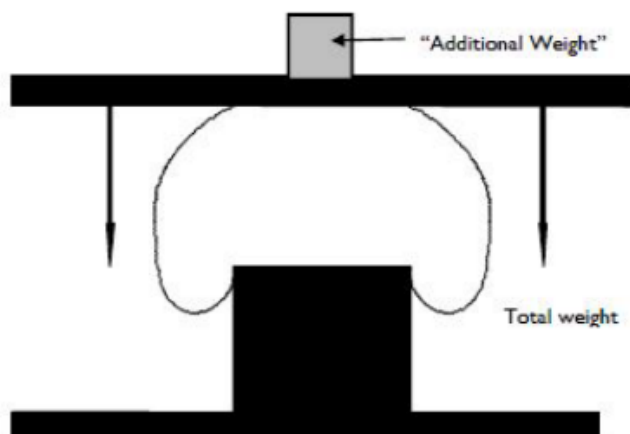


Figure 39. Abdomen Certification

8.4.2 Instrumentation

The only instrumentation necessary to perform this test is a dial test indicator, tape measure or caliper rule to measure the distance between the two plates.

Additional weight:

Table 25. Abdomen Certification Weights

Description	Q1 & Q1.5 Abdomen test weight
"Additional weight"	5.60 ± 0.025 kg.
"Total weight"	7.65 ± 0.050 kg.
Abdomen support part no.	TE-036-9910

Test Procedure

Place the abdomen on the certification support. Ensure a good fit and orientation of the abdomen over the block. Place the support on the fixture base. Put the 2.05 ± 0.025 Kg weight on the platform but do not lower onto the abdomen. Lift the plate with the weight up and down a few times to free up any friction in the guides. Lower the top plate (with weight 2.05 ± 0.025 kg.) on the abdomen. Within 10 seconds determine this point as zero for the displacement measurement.

Place the "additional weight" (5.60 ± 0.025 Kg) on the top plate. Let the force exerted by this mass apply. This must be done within 10 seconds after placing the initial load as mentioned in 1 above.

Let the top plate compress the abdomen for a period of 2 minutes (± 10 sec.).

Read the measurements.

Remove the mass and top plate. Observe an interval of at least 30 minutes between successive tests on the same abdomen.

Data Processing

Subtract the final reading from the initial reading.

Requirement

The deformation of the abdomen should be between and including 11 mm and 15 mm.

Procedura weryfikacji parametrów wkładki brzusznej dla manekina Q1,5:

8.4 Certification of the Abdomen

8.4.1 General

The abdomen test is a component test. The abdomen should be removed from the dummy. The test equipment is described in paragraph 7.2. To test the correct performance of the dummy abdomen performance an "Additional weight" is placed on the top plate.

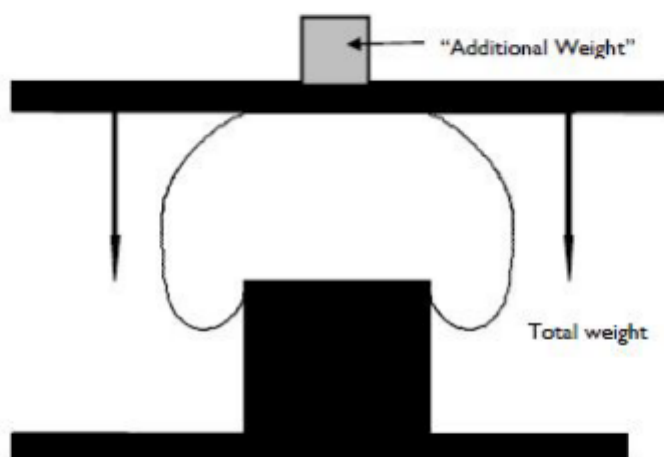


Figure 38. Abdomen Certification

8.4.2 Instrumentation

The only instrumentation necessary to perform this test is a dial test indicator, tape measure or caliper rule to measure the distance between the two plates.

Equipment required:

Table 25. Abdomen Certification Parts List

Description	Q1 & Q1.5 Abdomen test weight
"Additional weight"	5.60 ± 0.025 kg.
"Total weight"	7.65 ± 0.050 kg.
Abdomen support part no.	TE-036-9910

Test Procedure

Place the abdomen on the abdomen certification support. Ensure a good fit and orientation of the abdomen over the block. Place the support on the fixture base. Put the 2.05 ± 0.025 Kg weight on the platform but do not lower onto the abdomen. Lift the plate with the weight up and down a few times to free up any friction in the guides. Lower the top plate (with weight 2.05 ± 0.025 kg.) on the abdomen. Within 10 seconds determine this point as zero for the displacement measurement.

Place the "additional weight" (5.60 ± 0.025 kg) on the top plate. Let the force exerted by this mass apply. This must be done within 10 seconds after placing the initial load as mentioned above.

Let the top plate compress the abdomen for a period of 2 minutes (± 10 sec.).

Read the measurements.

Remove the mass and top plate. Observe an interval of at least 30 minutes between successive tests on the same abdomen.

Data Processing

Subtract the final reading from the initial reading.

Requirement

The deformation of the abdomen should be between and including 12 mm and 16 mm.

Procedura weryfikacji parametrów wkładki brzusznej dla manekina Q3

8.4 Certification of the Abdomen

General

The abdomen test is a component test. The abdomen should be removed from the dummy. The test equipment is described in paragraph 7.2. To test the correct performance of the dummy abdomen an "Additional mass" is placed on the top plate.

Instrumentation

The only instrumentation necessary to perform this test is a dial test indicator, tape measure or caliper rule to measure the distance between the two plates. Equipment required.

Table 27. Abdomen Certification Parts List

Description	Q3
Top plate mass	2.05 ± 0.025 kg
"Additional mass"	8.05 ± 0.025 kg.
"Total mass"	10.10 ± 0.050 kg.
Abdomen support block part no.	TE-020-9910

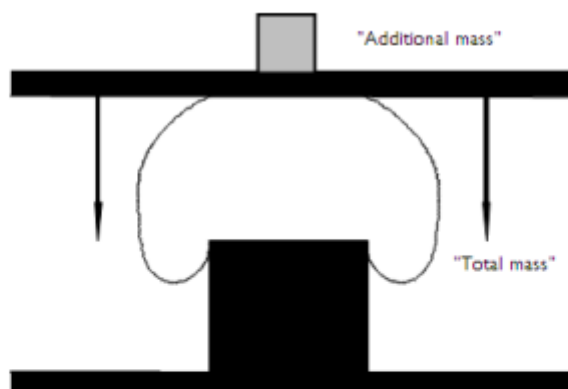


Figure 32. Abdomen Certification Test Set-Up

Test Procedure

1. Place the abdomen on the appropriate Q3 abdomen certification support block TE-020-9910. Ensure a good fit and orientation of the abdomen over the block. Lower the top plate (with a mass of 2.05 ± 0.025 kg) on the abdomen. Determine this point as zero for the displacement measurement.
2. Place the "additional mass" (8.05 ± 0.025 kg.) on the top plate. Let the force exerted by this mass apply as indicated in Figure 32. This must be done within 10 seconds after placing the initial load.
3. Let the top plate compress the abdomen for a period of 2 minutes (± 10 sec.).
4. Read the displacement measurement.
5. Remove the mass and top plate.
6. Observe an interval of at least 30 minutes between successive tests on the same abdomen.

Data Processing

1. Subtract the final reading from the initial reading.

Requirement

The deformation of the abdomen should be between 13 and 17 mm.

Procedura weryfikacji parametrów wkładki brzusznej dla manekina Q6

8.4 Certification of the Abdomen

General

The abdomen test is a component test. The abdomen should be removed from the dummy. The test equipment is described in paragraph 7.2. To test the correct performance of the dummy abdomen an "Additional mass" is placed on the top plate.

Instrumentation

The only instrumentation necessary to perform this test is a tape measure, dial test indicator, calipers or rule to measure the distance between the two plates.

Equipment Required

Table 29. Abdomen Certification Weights

Description	Q6
Top plate mass	2.05 ± 0.025 kg
"Additional mass"	8.05 ± 0.025 kg
"Total mass"	10.10 ± 0.05 kg
Abdomen support part no.	TE-033-9910

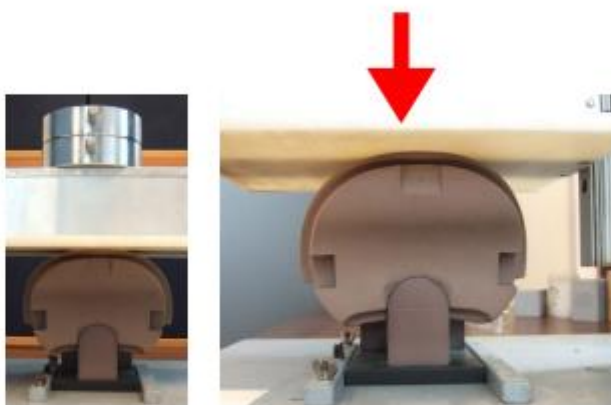


Figure 34. Abdomen Certification Test Set-Up

Performing the Test

1. Place the abdomen on the Q6 abdomen certification support block TE-033-9910.
Ensure a good fit and orientation of the abdomen over the block. Put the 2.05 ± 0.025 kg weight on the platform but do not lower onto the abdomen. Lift the plate with the weight up and down a few times to free up any friction in the guides. Lower the top plate with a mass on the abdomen. Within 10 seconds determine this point as zero for the displacement measurement.
2. Place the "additional mass" (8.05 ± 0.025 kg.) on the top plate within the 10 second time frame as mentioned above.
3. Let the force exerted by this mass apply.
4. Let the top plate compress the abdomen for a period of 2 minutes (± 10 sec.).
5. Read the displacement measurement.
6. Remove the mass and top plate.
7. Observe an interval of at least 30 minutes between successive tests on the same abdomen.

Data Processing

1. Subtract the final reading from the initial reading

Requirement

The deformation of the abdomen should be between 6 and 10 mm.