

# Q0 Child Dummy

The Q0 child dummy represents a six week old infant. The mass and inertia are based on the anthropomorphic data collection called CANDAT (Child Anthropometry Data). The total mass of the dummy (including suit) is  $3.4 \pm 0.05$  kg.



The Q0 child dummy is designed as a tool to evaluate the protection offered to newborn children by appropriate child restraints used in cars as specified in the restraint manual for frontal, rear, side impact, and rollover crash conditions.

The dummy design is suitable for use in the standard EuroNCAP and ECE R44 child restraint evaluation test procedures. In the current evaluation test procedures, the P0 dummy is specified. This dummy allows a qualitative and quantitative assessment of child restraint safety; in terms of retainment of the dummy in the child restraint as well as not exceeding certain specified space envelopes. The data obtained by the built in instrumentation can also be used for application in accident scenario research.

## Simulation Models

Humanetics offers highly detailed and fully validated Finite Element (FE) models of its dummies in the codes LS-DYNA, PAM-CRASH, ABAQUS and RADIOSS, along with FE modeling consultancy services.

## Dummy Features

### Head & Neck

The head comprises of 3 main components: 1 Polyurethane (PU) core with a bonded vinyl (PVC) skin, 1 upper neck load cell, and 1 accelerometer mounting bracket.

The molded neck has two steel end plates connecting the head, the thorax and two aluminum intermediate disks. The three rubber sections in the neck are equipped with transverse holes and incisions to decrease the bending stiffness of the neck in the extension (rearward) mode. The neck cable protects the rather fragile neck for tension loads that may be too severe in combination with extensive bending.

### Shoulders & Arms

The shoulder and arms comprise of 3 main components: 1 shoulder bracket, 1 shoulder plate, and 1 arm (left/right).

The shoulder bracket also serves as the top plate on the polyurethane thoracic spine.

### Thorax

The thorax comprises of 3 main components: 1 polyurethane thoracic spine, 1 lower thoracic spine end plate, and 1 torso flesh foam part covered with vinyl skin.

### Lumbar Spine

The lumbar spine comprises of 2 main components: 1 molded lumbar spine containing two end plates and aluminum intermediate disks, and 1 through cable. The lumbar spine cable protects the fragile molded part during tension loads as the neck.

### Pelvis & Leg

The pelvis and legs comprise of 2 main components: 1 pelvis bracket, and 1 leg (left/right).

The pelvis bracket is equipped with a recess for pelvis accelerometers at the rear side.

# Technical Specifications

## Weight Specification

Body Segment	Mass (kg)	Principle Content
Head & Neck	$1.10 \pm 0.10$	Head, upper neck load cell, accelerometer mounting bracket, neck assembly and 3 sets of screws
Arm (each)	$0.14 \pm 0.015$	Arm, shoulder and screw
Torso	$1.50 \pm 0.15$	Shoulder bracket, thoracic spine, thoracic spine end plate, lumbar spine, pelvis bracket and 5 sets of bolts
Leg (each)	$0.290 \pm 0.03$	Leg and shoulder screw
<b>Total</b>	<b><math>3.46 \pm 0.34</math></b>	<b>(Tolerance including instrumentation allowance)</b>

## Dimensions

Measurement	Distance (mm)
Sitting Height	$355 \pm 7$
Shoulder Height	$255 \pm 5$
Shoulder Width	$145 \pm 5$
Shoulder Top to Elbow	$100 \pm 2$
Elbow to Hand	$127 \pm 2$
Buttock to Knee	$130 \pm 5$
Knee to Foot	$112 \pm 2$

## Instrumentation (Standard\*)

Locations	Descriptions
Head	Linear Acceleration (Ax, Ay, Az)
Neck	Upper Neck Load Cell (Fx, Fy, Fz)
	Lower Neck Load Cell (Mx, My, Mz)
Thorax	Linear Acceleration (Ax, Ay, Az)
Pelvis	Linear Acceleration (Ax, Ay, Az)

\*Optional instrumentation listed on [www.humaneticsatd.com](http://www.humaneticsatd.com)

