

### Application Information

#### Verifying the Torque & Force of Children's Toys

Children have a tendency to carelessly treat their toys in a manner not intended by the manufacturer. Children will bite, throw, twist, pull, kick, plus countless other means to potentially damage their toys. Damage producing fragmented pieces could be harmful to a child if they possess sharp edges or that are small enough to be easily swallowed. It is imperative for toy safety that the manufacturer design toys such that they can remain intact in these conditions.

According to ASTM Standard F963, "Standard Consumer Safety Specification for Toy Safety"; Section 8.8, Torque Tests for Removal of Components, all toys that have the ability to be gripped by teeth or the thumb and forefinger, must follow the standards described within and pass the directed tests accordingly. For the test, the gripped area must be evenly rotated 180 degrees over a period of 5 seconds or rotated until the torque limit is reached, then held in that position for 10 seconds. Toys designed for ages 0-18 months must withstand 2 +/- 0.2 in-lbf (0.23 N-m) of torque; ages 18-36 months must achieve 3 +/- 0.2 in-lbf (0.34 N-m); while 36-96 months 4 +/- 0.2 in-lbf (0.45 N-m). This procedure is to be performed in both the clockwise and counterclockwise direction.

The Nidec-Shimpo FG-7000T-1 Digital Torque Gauge with 8.9 in-lbf (1 N-m) capacity and pronounced resolution of 0.005 in-lbf (0.001 N-m) can prove vital to toy manufacturers in their conformity to this ASTM standard. With the FG-7000T's handheld, remote sensor with integral chuck, various toy locations may be gripped rigidly and twisted as described in the ASTM Standard F963.

ASTM F963 also provides stipulations for tensile and compression force testing. The tensile testing is required for the seams of stuffed toys, toys with suction cups and any toy that has a projection that can be gripped by teeth or the thumb and forefinger (sections 8.9, 8.9.1, and 8.9.2). The compression test (8.10) is mandatory for the surfaces of toys that could not be tested with the impact test (section 8.7). These force standards are also based on the age category of the toys and range from 10 – 15 lbf (44.5 – 66.8 N) for tensile tests and 20 – 30 lbf (89.0 – 133.5 N) for compression tests.

The Nidec-Shimpo FGV-50XY Digital Force Gauge with 50 lbf (200 N) Capacity and 0.01 lbf (0.1 N) resolution enables the full range of tension and compression tests to be measured with just one gauge. The M6 threading on the sensor allows for a variety of Shimpo adapters like hooks, grips and compression attachments to be utilized to fulfill the requirements within ASTM F963. For applications requiring a more meticulously controlled test, Nidec-Shimpo Force Test Stands provide stabilization in resultant measurements with several manual or motorized stands offered.

These Nidec-Shimpo force and torque instruments include free downloadable software where data can be saved for further analysis and stored per internal quality audit protocols.

This offering and feature set of Nidec-Shimpo force and torque instruments makes them the ideal selection for adherence to the ASTM toy safety standards. Toy manufactures can produce safe products, eliminate recalls while giving parents trust when purchasing their products.

#### Equipment Used

- FG-7000T-1 Digital Torque Gauge
- FGV-50XY Digital Force Gauge



FGV-50XY  
Digital Force Gauge



FG-7000T-1  
Digital Torque Gauge