

CODi[®]

**Comparative Case Performance
& Materials Analysis**

RESEARCH

CODi



During the first quarter of 2006, CODi purchased from five different brand name manufacturers, a selection of notebook carrying cases for the specific purpose of conducting an objective and direct comparison. Two independent firms conducted a variety of tests on varying components of the cases selected. Among the tests conducted were drop test performance, material strength and durability, shoulder strap strength and weight analysis. To our knowledge, this is the first time such an exhaustive and comprehensive test of such criteria has ever been conducted.

In every single category, CODi placed either first or second. Selecting a proper carrying case solution should be predicated on several important criteria. The components tested were those that are designed to protect the notebook, while ensuring longevity of the case itself. The cases from each manufacturer were selected based upon size, price and quality that most closely emulated the CODi Diplomat model. The comparisons drawn and results garnered are insightful and should be of assistance to any individual or company attempting to make a decision on which is the best case solution and overall best value.

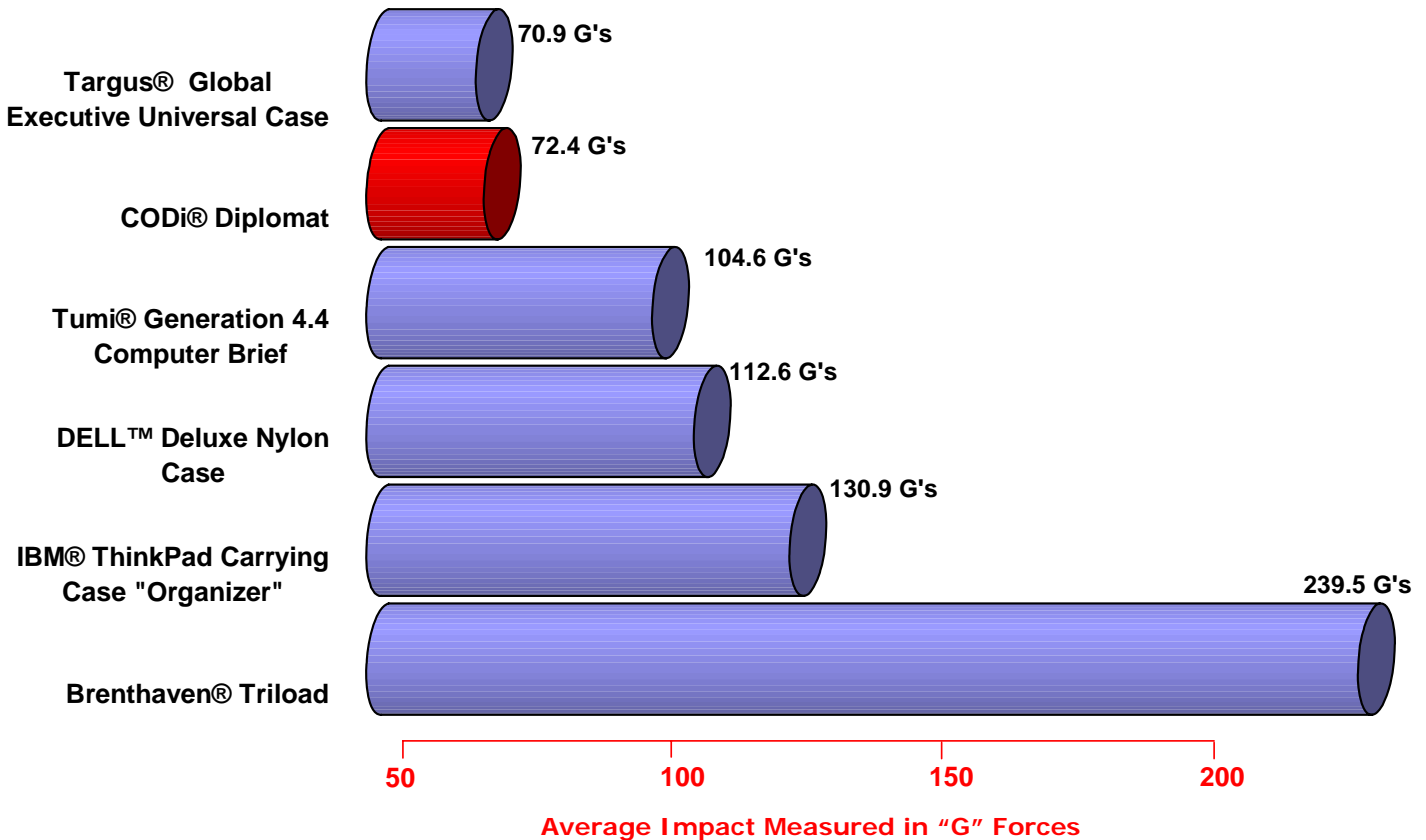
<u>Manufacturer</u>	<u>Model Name</u>	<u>Model #</u>	<u>Dimensions (LxWxH)</u>	<u>Price</u>
Brenthaven®	Triload	3480	17 1/4" x 5" x 12 1/2"	\$99.99
CODi®	Diplomat	1006F	16 1/2" x 6 1/4" x 13"	\$119.00
Dell™	Deluxe Nylon Case	310-5880	17" x 7" x 13 1/2"	\$53.95
IBM®	ThinkPad "Organizer"	73P3598	15" x 5" x 12 1/2"	\$99.99
Targus®	Global Executive Universal Case	TET-006	17" x 6 1/2" x 14"	\$129.00
Tumi®	Gen4.4 Computer Brief	26141	15" x 6 1/2" x 12"	\$335.00

Throughout this report, the results of each test are graphically illustrated. For each test, the case that performed the best is shown at the top of the graph with the poorest performer at the bottom.



Drop Protection

Notebook hard-drives and screens are vulnerable to shock and vibration, otherwise known as “G” forces. In the world of physics, these are expressed as a Formula: $\{ \frac{1}{2} \times \text{Mass} (\text{Velocity})^2 \}$. The best performance is one that offers the **lowest** “G” forces experienced upon impact. **A quality notebook case should provide a performance rating of 100 G's or LESS.** As the numbers rise, so does the potential for damage to your notebook. To best protect your hard-drive and the data it contains, one should always consider this performance factor as a primary consideration.



The Test Method:

To conduct this test, the selected notebook cases were provided to an INDEPENDENT Testing Lab, Architectural Testing (ATI), to perform free-fall drop tests. Each notebook case was fitted with a notebook computer weighing 6.4 lbs. A spring loaded platform supported the case. When released, the platform accelerated out from under the case allowing it to free fall from a desk-top height of 30 inches.

The shock load (G-forces) generated upon impact was recorded by an accelerometer which was secured to each notebook. Each case model was drop-tested five times to gather a proper statistical average for each. The tests were conducted March 14th, 2006. The complete report is available upon request.

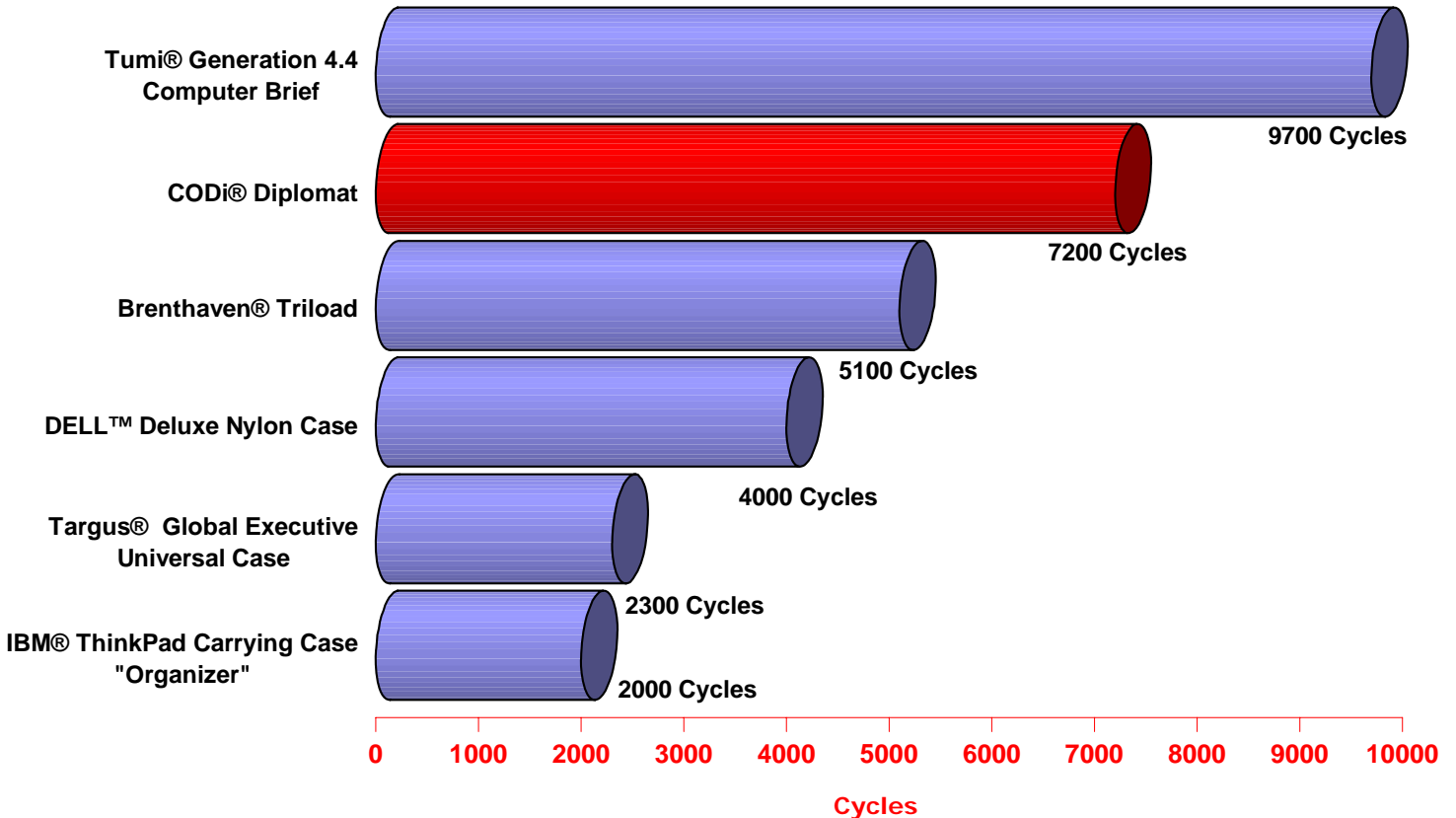


Materials Performance Tests

Each case and its material was subjected to the American Society for Testing and Materials (ASTM) standardized testing. The technical tests performed on the outer shell materials of each case were the Abrasion Resistance (ASTM D3884) and Tearing Strength (ASTM D2261).

Abrasion Resistance:

A critical measurement of durability is the abrasion (abrade) resistance, also known as the wear through test. This test measures the amount of abrasion a case can withstand before the material fails. **The higher the number, the better the abrasion resistance** and durability factor. Each factor of 1000 cycles can equate to months and even years of additional use and enhanced durability.



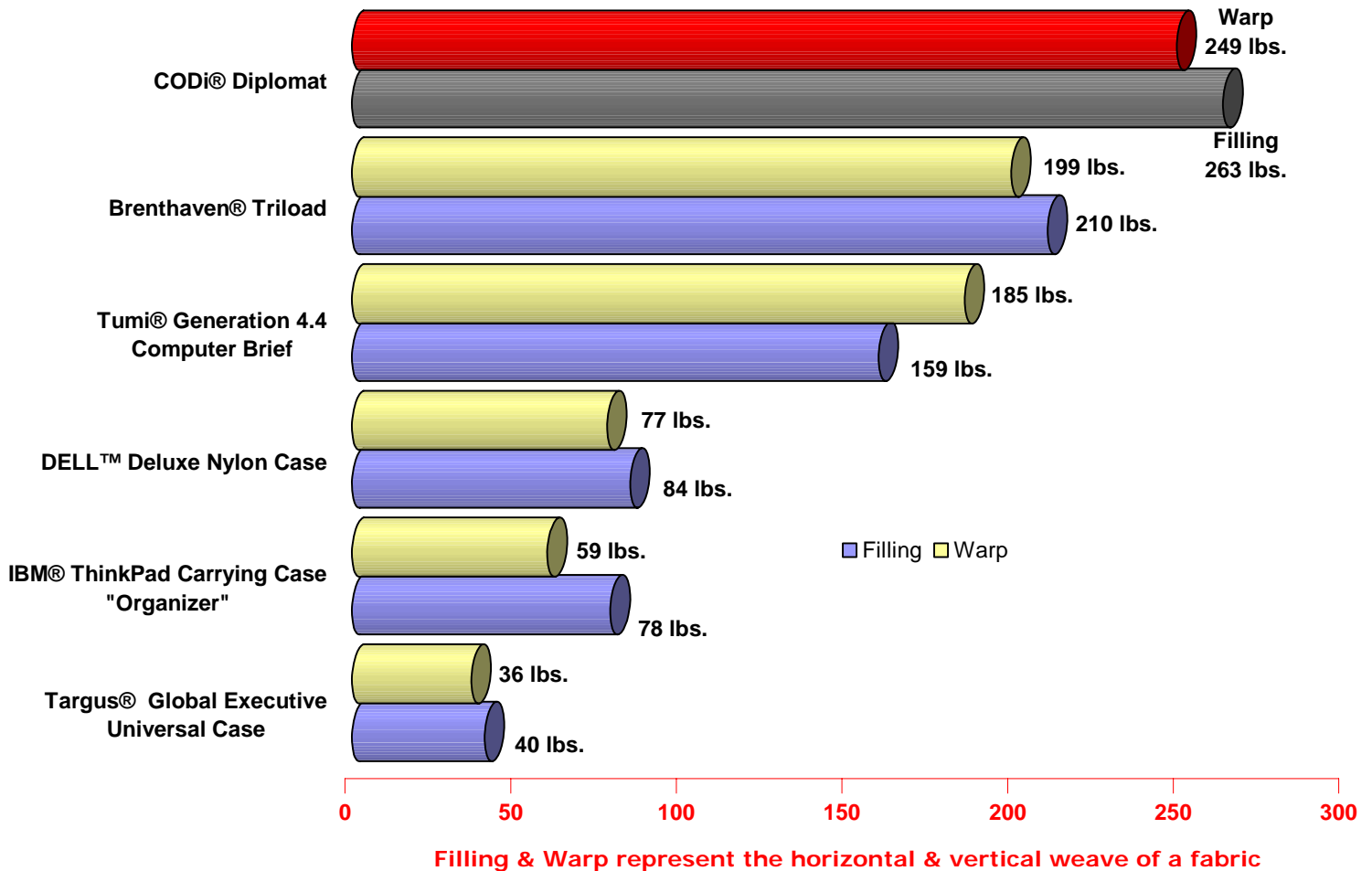
The Test Method:

Conducted by Glen River Materials, this test method covers the determination of the abrasion resistance of textile fabrics using the rotary platform, twin-head test. A conditional specimen is abraded using rotary rubbing action under controlled conditions of pressure and abrasive action. The test specimen, mounted on a platform, turns on a vertical axis against the sliding rotation of two abrading wheels. One abrading wheel rubs the specimen outward toward the periphery and the other inward toward the center. The resulting abrasion marks form a pattern of crossed arcs over an area of approximately 30 sq. cm. Resistance to abrasion is evaluated by the number of cycles completed before the material begins to show wear.



Tear Strength:

An important quality of the materials used to manufacture cases is resistance to tearing. The higher quality fabrics used in today's top performing cases are 2 ply woven fabrics. This is expressed also in the "warp" and "filling" components that comprise the fabric itself. ***The higher the number, the stronger the fabric.*** This is an important, contributing factor to the durability of any case.



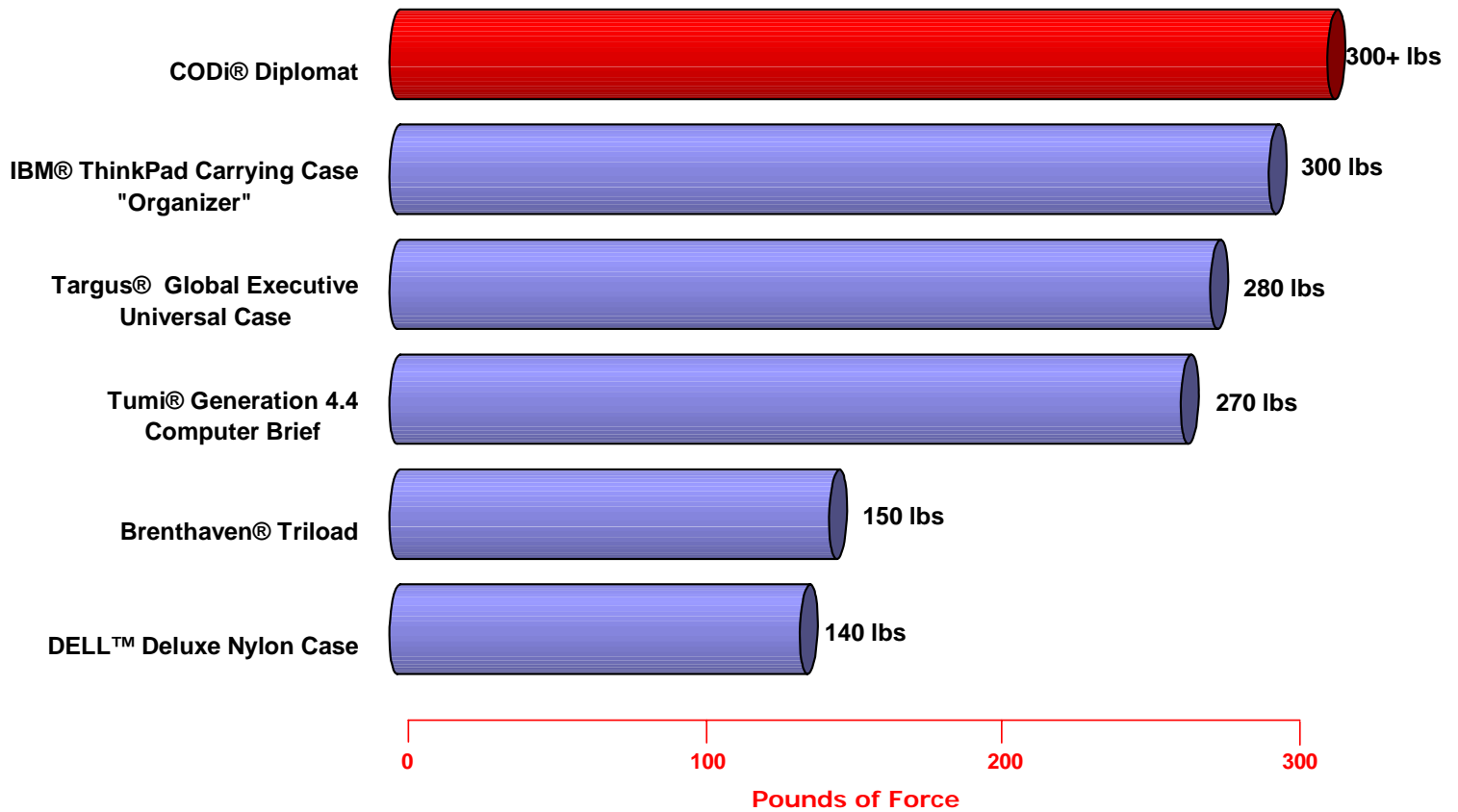
The Test Method:

This test, also conducted by Glen River Materials, covers the measurement of the tearing strength of textile fabrics by the tongue (single rip) procedure using a CRE-type tensile testing machine. This test measures peak force, tearing force and tearing strength. Two samples are cut into 3" x 8" rectangles. One sample is cut 3" in the filling direction, the other in the warp. The rectangular specimens are placed into the CRE tester. One side of the cut end is clamped into the upper jaw and the other is clamped into the lower jaw. The jaws move apart at a constant rate until the fabric begins to tear.



Shoulder Strap Pull Test:

A common failure of a carrying case is the shoulder strap. Since 2001 CODi has utilized an ergonomically designed strap that is as comfortable as it is strong. **CODi's shoulder strap can support in excess of 300 pounds.** A strap with a threshold **below 200 lbs.** is **five times** as likely to fail. CODi's failure rate is **LESS THAN** 3 straps per 1000.



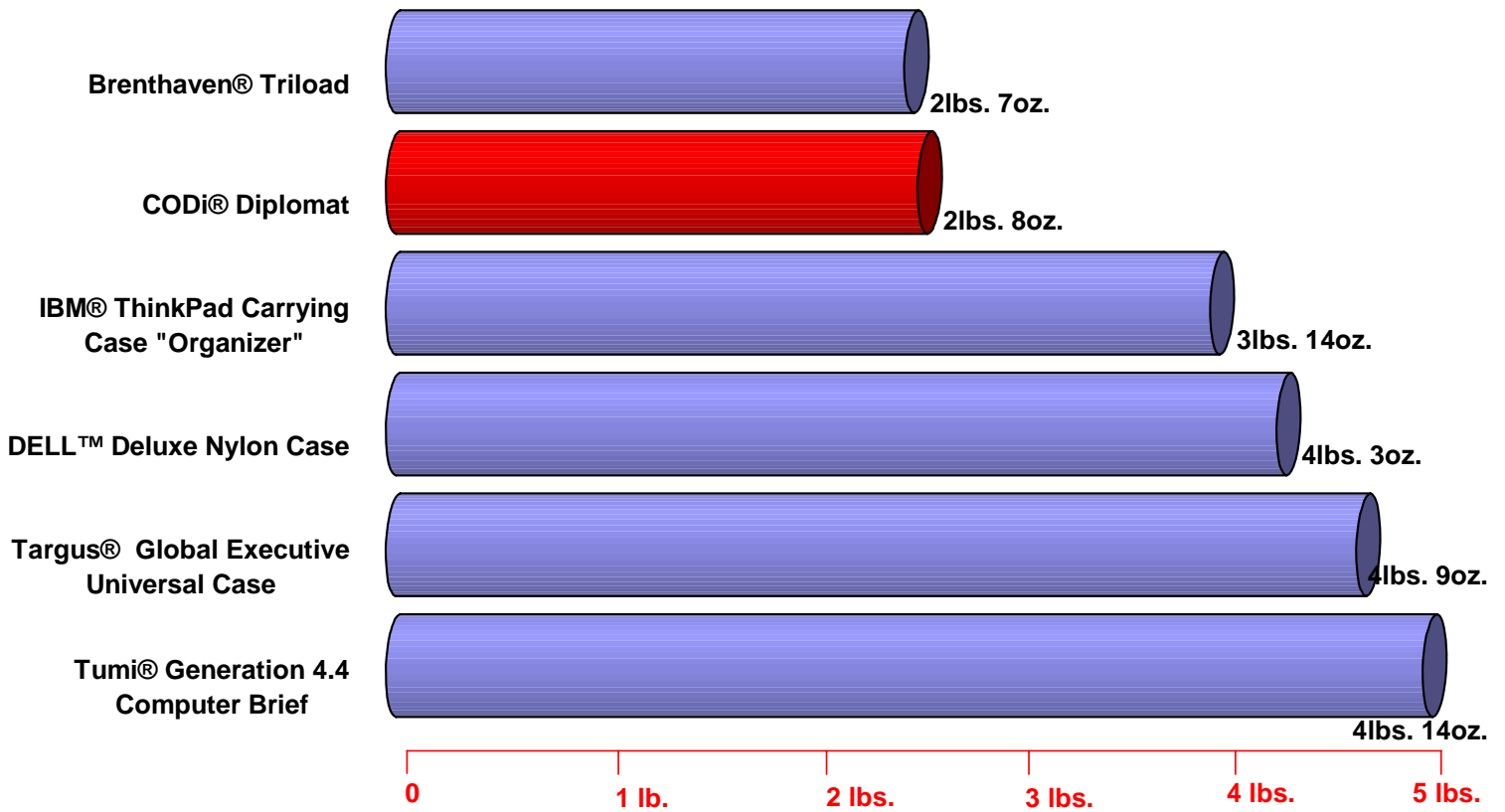
The Test Method:

The methodology applied is known as a "slow-draw" test. One end of each strap was held in a fixed position while force was applied to the opposite end. The force exerted was measured in pounds and was slowly increased until the point of failure was realized.



Case Weight:

Notebook manufacturers spend millions of dollars attempting to reduce the weight of the actual notebook. Unfortunately, not all case manufacturers share that sentiment. **At 3.5 pounds CODi has the lowest average case weight across our entire notebook case line** (including all wheeled cases) by comparison to other case companies.



Based upon the comprehensive test data contained within this report, CODi has illustrated that you do **NOT** have to sacrifice durability **OR** protection while being lightweight. In fact, CODi has proven that the lower the weight of the carrying case, the greater the ergonomic benefit to the end-user. You will simply experience more comfort and less fatigue or stress while still protecting your notebook in a CODi case.

In Summary:

Based upon the test results, each model was assigned a score per test category. An overall score was calculated by totaling the result of each category. The lower the score, the better the result.

The results show that the CODi Diplomat:

- Has the #1 overall score!
- Is the only notebook case that scored either 1st or 2nd in every test category.
- Overall score was almost twice better than the 2nd place results.

Manufacturer	Drop Protection	Abrasion Test	Tear Strength	Shoulder Strap Pull Test	Case Weight	<u>Overall Rank Score</u>
CODi® Diplomat 1006F	2	2	1	1	2	9
Tumi® Gen4.4 Computer Brief 26141	3	1	3	4	6	17
Brenthaven® Triload 3480	6	3	2	5	1	17
Targus® Global Universal Case TET-006	1	5	6	3	5	20
IBM® ThinkPad "Organizer" 73P3598	5	6	5	2	3	21
Dell™ Deluxe Nylon Case 310-5880	4	4	4	6	4	22