A. Lorenz, C. Tuozzolo and M.Y. Louge: "Measurements of impact properties of small, nearly spherical particles," *Experimental Mechanics* **37** (3), 292-298 (1997).

We report impact properties for collisions of small, nearly spherical particles that present interesting experimental challenges. We consider difficulties arising with surface reflectivity, slight asphericity, surface damage, and collisions with particles affixed to a rigid plate. To measure these impact properties, we refine the experimental technique of Foerster, et al ((1994), *Phys. Fluids* **6**, 1108-1115). To permit straightforward incorporation in rapid granular theories, the impacts are described with three coefficients. The first is the Newtonian coefficient of normal restitution. The second represents the frictional properties of the contact surfaces. The last characterizes the restitution of the tangential component of the contact point velocity for impacts that involve negligible sliding.

Sphere Material	Collisions of	Sphere Diameter (mm)	Impact Parameters			Relative contact velocities (m/sec)	
			e	μ	β_0		
Polystyrene	Two Spheres	4.00	0.952 ± 0.009	0.189 ± 0.009	0.46 ± 0.05	$0.34 \le \lvert g.n \rvert \le 1.23$	$0.11 \le \lvert g.t \rvert \le 1.1$
Acrylic	Two Spheres	4.00	0.934 ± 0.009	0.096 ± 0.006	0.22 ± 0.07	$0.35 \le \lvert g.n \rvert \le 1.25$	$0.07 \le \lvert g.t \rvert \le 1.14$
Stainless Steel	Two Spheres	5.00	0.95 ± 0.03	0.099 ± 0.008	0.32 ± 0.08	$0.17 \le \lvert g.n \rvert \le 1.2$	$0.15 \le \lvert g.t \rvert \le 1.2$
Fresh Glass	Two Beads	2.97±0.02	0.922 ± 0.021	0.048 ± 0.006	0.37 ± 0.07	$0.43 \le \lvert g.n \rvert \le 1.14$	$0.07 \le \lvert g.t \rvert \le 1.08$
Spent Glass	Two Beads	2.97±0.02	0.972 ± 0.015	0.177 ± 0.020	0.25 ± 0.08	$0.24 \le \lvert g.n \rvert \le 1.11$	$0.14 \le \lvert g.t \rvert \le 1.1$
Fresh Glass Bead	Bead on Aluminum Plate	2.97±0.02	0.816 ± 0.013	0.131 ± 0.007	0.46 ± 0.24	$0.80 \le \lvert g.n \rvert \le 1.92$	$0.07 \le \lvert g.t \rvert \le 1.64$
Spent Glass Bead	Bead on Spent Aluminum Plate	2.97±0.02	0.800 ± 0.010	0.141 ± 0.009	0.35 ± 0.31	$0.91 \le \lvert g.n \rvert \le 1.94$	$0.07 \le \lvert g.t \rvert \le 1.53$
Spent Glass Bead	Bead on Similar Stationary Bead	2.97±0.02	0.865 ± 0.011	0.126 ± 0.014	0.34 ± 0.16	$0.73 \le \lvert g.n \rvert \le 1.67$	$0.29 \le \lvert g.t \rvert \le 1.51$