

ENERGY ABSORPTION BARRIER COMPARISON CHART						
BRAND	IMPACT SAFETY SYSTEMS	TECPRO	SCRIBNER	SAFER	TIRES	CONCRETE
ESTABLISHED	2000 / ProLink First Deployed 2011	1998 / First Deployed 2006	1978	1999 / First Deployed 2002	First Deployed Approx. 1970s	First Deployed Approx. 1970s
MANUFACTURED	America	France/Hong Kong (?)	America	America	VARIABLE	VARIABLE
YEARS OF R & D	5 Years	5-6 Years	NONE FOUND	5 Years	NONE FOUND	NONE FOUND
SANCTIONED/APPROVED	Yes for Karting by FEA	Yes - FIA & FIM	Yes for Karting by AKTPA	Yes - NASCAR & IndyCar	YES	YES
DRIVER APPROVED	YES - Substantiated by Press	YES - Substantiated by Press	YES - Only in Karting, Substantiated by Press	YES - Testimonials on Website & Substantiated by Press	YES - Substantiated by Press	NO
MATERIALS	Rotational Molded UV Stabilized Composite Polyethylene. Add Water or Sand to Modify Ballast Resistance	Rotational Molded Polyethylene Nylon Straps, Metal, Polyurethane Foam	Rotational Molded UV Stabilized Polyethylene Optional Hatch to Ballast	Galvanized Steel, Polystyrene (Styrofoam), Nylon Straps	Used Tire Packs	Cement & Metal
SURFACE TYPE	Flat H/D Plastic Rib Supports	Smooth Surface	Smooth Surface	Ribbed Surface	Belt Surface	Hard Surface
CONNECTION SYSTEM	Tongue & Groove w/ Anchoring Pin for Flush Fit. Pins Designed to Bend/Breakaway to Retard Speed in Severe Impacts	Linked w/ 3 Nylon Straps to Provide Flush Surface w/ Resistance up to 20T/cm2	Giant Plastic Bolt & Nut, Tightly Constrained Joint Connectors to Avoid Gaps, Optional Rub Rail (Conveyor Belt)	Nylon Straps w/ Quick Release Pins, Adjustable Steel Mounting Plates, Vertical Splice Tubes Connect Sections	Bolts or Polyethylene Tubes & Conveyor Belt	Not Connected. Held in Place by Mass and Weight
HEIGHT	40"	39" - 47"	18" - 54"	40"	VARIABLE	Approx. 40"
LENGTH	79" (48" Pin to Pin)	59"	63" (48" Pin to Pin)	28"	VARIABLE	Approx. 4'
WIDTH/DEPTH	24"	24"	15"		VARIABLE	
WEIGHT	73# Empty, 500# Filled 25% w/Water	R1 - 243-265# / R2 - 99#	24#	UNKNOWN	VARIABLE	Approx. 4500#
THICKNESS	1/2"	1/4"	2/15" - 1/8"	VARIABLE	VARIABLE	Solid Structure
RETAINING WALL DEPENDENT	NO	YES	UNKNOWN	YES	NO	NO
LAYOUT & ANGLE FLEXIBILITY	Any Configuration in Either Direction, Curves & 90° Angles	Adjustable to All Corners Installed in Variety of Ways	Almost any Layout, Either Direct. Section Joint Rotates to 45°	Wall must exist or be installed N/A to dirt or Gate & Fence Configuration	Any Configuration in Either Direction	Any Configuration in Either Direction
BUFFERING CONFIGURATIONS FOR EXISTING CONCRETE/ARMCO WALLS	6 Buffering Options Based on Speed/Weight of Vehicles. High speed=Double or Triple Lines, Approx. 10-15' Total Depth	Multi-layer System with Barriers, Tires and Retaining Wall, Approx. 13' Total Depth	Option to Stack Triple High to 54"	1 Buffering Option 30" before cement wall, Approx. 4' Total Depth	Can be Stacked in Multiple Rows	Concrete Wall in front of Cement Retaining Wall
TRACK TYPE	Road Courses, Short Tracks, Ovals	Road Courses, Short Track, Ovals	Kart Tracks, Road Courses, Ovals	Primarily Ovals & Some Road Courses	ALL	ALL
ENERGY ABSORPTION	Gives on Impact, Cumulative Snaking Effect Retards Speed, Transfers Energy Down the Line of Connected Barriers, Lowers Bouncebacks, Prevents Submerging	Transfers Momentum (Deceleration) Barriers Crumple Around Vehicle	Reduces Energy & Smooth Surface Won't Catch Tires	Technology Designed to Give on Impact. Distributes Impact Load, Extends Length of Crash, Eliminates Slingshot Effect	Softens the Impact, Specifically Before Armco or Cement	Minimal
TESTING/CERTIFICATION	ProLink Barriers based on FEA Testing/Approval. Live Testing on Car & Motorcycle Race Tracks for over 5 Years	Crash Tests Led by DEKRA & The FIA, in Conjunction w/ Rotational Molding Research Lab	Computer Simulated Analysis of Assembly & Parts Stress by DT Engineering Associates	26 Full Scale Crash Tests / Live Track Tests over 3 Years. Compared to Concrete Crash Data / Conducted by NASCAR's Research Facility	Tracks Use, but No Official Testing	Tracks Use, but No Official Testing
TEST RESULTS	KISS Barriers FEA Approved Speeds to 80MPH w/ yield 3700 PSI Range & Min Deform / ProLink tracks Report Less Damage to Vehicles & Less Injuries to Drivers	Decelerate at 55G on Frontal Impact at 135km/h (83 MPH)-187km/h (116 MPH) / Cannot be Overridden at 218km/h (135 MPH)	System Withstands Impact between 2.065 & 8.880 PSI	30-80% Crash Severity Reduction Based on Reduction in Peak Deceleration & Impact Load Reduction of G force Energy by over 50%	In Use Since Approx. 1970s	In Use Since Approx. 1970s
OPTIMUM IMPACT SAFETY ZONE (THOUGH MANY VARIABLES MAY AFFECT RESULTS)	Engineered to soften angular hits as well as frontal/head on	Head On-90° to Surface on Center	UNKNOWN	Glancing or 45° Angle, Not Head On	Large Angle or Head On, Not Low Angles	Oblique or Glancing Blows
ADJUSTABLE TO SPEED & WEIGHT OF VEHICLES	Yes-Both with Ballast Levels & Buffering Configurations	Yes - in Buffer Configuration Only	Yes - in Buffer Configuration Only	Yes - Foam Allows Variable Compression Amounts	Possibly	NO
DURABILITY	Thicker Composite with Impact Ridges desugbed ti withstand High Speed Impact - Minimal Broken Barrier Replacements to Date	Per TP, One Circuit Only Replaced 4 Barriers in 4 Crashes over 8 Years	Parts Withstand Impact between 3.245 & 9.864 PSI	Steel Components can Last 70 Years Foam Components can Last 5+ Years	Tracks Replace an Average of 300/Year	Long Term
EASE OF INSTALLATION & REPAIR	1000 Linear Fee = 250 Barriers, 2 Men, 1 Day 1 Barrier Replaced by 1 Man in 10 Minutes	750 R1 & 370 R2 Barriers, 4 Men, 15 Days or 4000 Barriers, 48 days. 4 Men Can Repair a Line of Barriers Changed in 1 Hour	(Assume Similar to ISS)	Depends on Availability of Steel Tubing Retains Integrity w/ little or no Debris Localized Deformation & Tearing of Tubes Quickly Repaired w/ Welded Patch Plates	Per TP: 18,000 Tires, 8 Men, 53 Days or 84,000 Tires, 230 Days/8 Months 5 Men to Repair. Per ISS: 8000 Tires, 200 Palets, 2 Men, 150 Days	144 Linear Feet = 36 Barriers, 2 Men, 1 Day, or 1000 Linear Feet = 248 Barriers, 2 Men, 7 Days
PERMANENT & TEMPORARY APPLICATIONS	YES	YES	YES	NO	YES	YES
ADVERTISING/SPONSORSHIP OPPORTUNITIES	YES	YES	YES	NO	NO	YES
ESTIMATED COST/LINEAR FOOT (Including Labor & Materials, without shipping)	\$70	\$176	\$160	\$500	\$289 or \$89 if tires free	\$86
POTENTIAL PROS	In use over 5 years with no reported serious injuries or damage	FIA Tested & Approved	Can be stacked for greater strength	Winner of several awards	Can be cost efficient	Can be cost efficient
	Cushions impact & pull of connected barriers cause deceleration	2006 Innovation Award Winner	Tight joint connectors to avoid gaps	Foam cartridge deformation absorbs energy & extends crash length	Flexible applications	Flexible applications
	Thicker composite, rugged construction, link & anchoring systems reduce scattering/shattering	Tension System reduces bouncebacks	Hollow design absorbs energy	Eliminates slingshot affect	Provides some protection against Armco/Concrete	Designed to protect spectators
	Ballast helps prevent submerging	Research conducted for optimal strength & compliance of link joint between barriers	Long history in molded plastics	Foam blocks can be formatted to correct compression density	Minor impact results in minimal vehicle damage	Accommodates advertising/sponsorships
	Versatile placement & modifiable ballast provide maximum safety in any area	Data shows barriers cannot be over-riden	Relatively east to install	Has been proven to save lives		
POTENTIAL CONS	Third party testing on kart barriers only	Issues reported with cars buried beneath barriers	Joint limited to 45 degrees	Cost prohibitive	Known to cause bounce-backs, flips & submerging	Approx. 100 pro drivers died after hitting cement walls
	Best used as buffers against concrete/Armco versus stand-alone in high speed areas	Test results based on barriers used in conjunction with tires/Armco	Ballast hatch sold separately	Complicated to install & lengthy to repair	Can scatter when struck, creating hazardous debris	Inflexible, hard surface shocks chassis & causes blunt force trauma & driver concussions
	Established for 11 years in karting before introducing motorsports barrier & may still be perceived as karting barriers	Cost prohibitive	Thin walls can be punctured unless covered by conveyor belt	Not idea or feasible in some areas or on non-oval tracks	May not absorb enough impact in high speed collisions	Concrete is known to crush cars
		System depth requires too much space to fit many areas.	Connections can easily pop apart.	Not as safe for large angle or head-on impact.	Hardened tires or tires abutting concrete can be rigid and harmful.	Concrete is usually buffered by Armco or tires to protect drivers, further complicating installation and adding to the expense.
					Heavy, unwieldy and time consuming to install & repair	Extremely time & labor intensive to install
					Presents ecohazard and can harbor disease	

IN-DEPTH RESEARCH WAS CONDUCTED ON BEHALF OF IMPACT SAFETY SYSTEMS OVER A PERIOD OF 9 MONTHS TO DEVELOP A COMPREHENSIVE COMPARISON. RESOURCES INCLUDED MANUFACTURER WEBSITES, LITERATURE AND TESTING REPORTS, AS WELL AS PUBLIC DOMAIN INFORMATION AND PUBLISHED ARTICLES. MANY CLAIMS AND BENEFITS ARE QUOTED FROM MANUFACTURER'S MARKETING, AND SOME DATA WAS PULLED FROM OPINION EDITORIALS, THIS CANNOT BE CONSIDERED OBJECTIVELY FACTUAL.