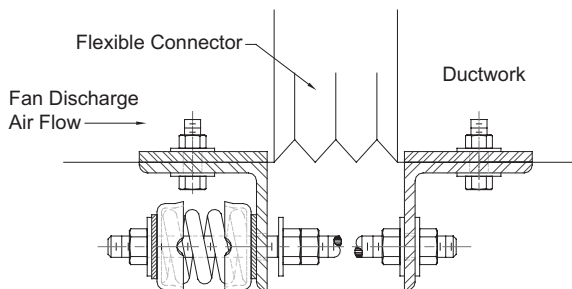


Description

Kinetics Model HSR Thrust Restraints are used to counteract the discharge force created by fans during operation. HSR Thrust Restraints are used in pairs and best utilized when located on the centerline of the discharge outlet of the fan, bridging the flexible duct connector.

Kinetics Model HSR Thrust Restraints consist of high deflection, large diameter, laterally stable steel coil springs assembled into a threaded rod and bracket assembly. The coil springs have a lateral spring stiffness greater than 1.0 times the rated vertical stiffness to assure coil stability. The coil springs are designed to provide a minimum of 50% overload deflection capability to solid. The coil springs are epoxy powder coated for corrosion protection, having passed a 1,000 hour salt spray test per ASTM Standard B-117. HSR Thrust Restraints feature molded neoprene end load plate assemblies for light capacities. For heavier capacities, Model HSR utilizes stamped steel end cups. HSR Thrust Restraints include threaded adjustment rod with hardware, fan and ductwork mounting bracket angles, bracket back-up plates, and all attachment hardware.

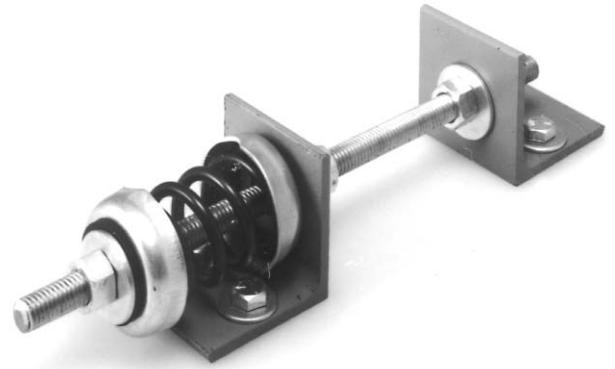


Specification

Thrust Restraints shall consist of high deflection, large diameter, laterally stable steel coil springs assembled into a threaded rod and angle bracket assembly. Coil springs shall have a lateral spring stiffness greater than 1.0 times the rated vertical stiffness to assure coil stability. Coil springs shall provide a minimum of 50% overload deflection capability to solid and shall be safe when temporarily loaded to solid capacity. Coil springs shall be epoxy powder coated for corrosion protection and shall demonstrate successful completion of a 1000 hour salt spray test per ASTM Standard B-117. Thrust Restraints shall feature molded neoprene end load plate assemblies for light capacities or stamped steel end cups for heavier capacities. Thrust Restraints shall include threaded adjustment rod with zinc-plated hardware, and shall include primer painted fan and ductwork mounting bracket angles, bracket back-up plates, and complete fan / ductwork attachment hardware.

Thrust Restraints shall be Model HSR as manufactured by Kinetics Noise Control, Inc.

KINETICS™ Thrust Restraint Model HSR



Application

ASHRAE recommends that thrust restraints such as Kinetics Model HSR incorporate the same coil spring deflection as the support isolators. HSR Thrust Restraints are to be used for all fan heads, suspended fans, and all base-mounted and suspended air-handling equipment operating at 2 inches or greater total static pressure (TSP). HSR Thrust Restraints are always installed in pairs and often work in conjunction with inertia bases for floor-mounted fans to counteract fan thrust.

Total fan thrust can be calculated using the following formula:

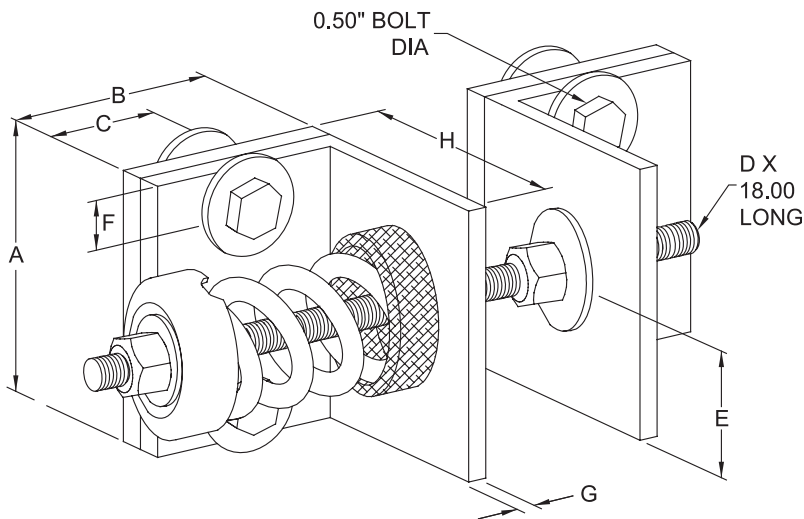
$$\text{Thrust (lbs.)} = \frac{0.036 \times \{TSP \text{ (in.)}\} \times \{Fan \text{ Discharge Outlet Area (sq. in.)}\}}{2}$$

To select the correct HSR Thrust Restraint to be used, this total calculated thrust is to be divided by two (2) and then rounded up to the next highest standard coil spring capacity.

Kinetics HSR Thrust Restraints are best utilized when located on the centerline of the discharge outlet of the fan. Fan instability can occur when attempts are made to control fan thrust only at the (floor-mounted) isolator locations. The attachment of the HSR brackets must be made at structurally sound locations and cannot be attached to bare unreinforced sheet metal ductwork.

The HSR coil spring is to be preloaded to allow for approximately 0.25" (6 mm) of additional deflection due to fan motion upon start-up. HSR Thrust Restraint movement adjustment must be made under normal fan operational static pressures.

Isolator Type	Spring Color	Rated Capacity		Spring O.D.		Coil Free Height		A		B		C		D		E		F		G		H	
		lbs.	kg	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
HSR-1-35	Blue	35	16	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-70	Green	70	32	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-120	Gray	120	54	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-220	Brown	220	100	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-370	Orange	370	168	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-500	Beige	500	227	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-600	Chrome	600	272	1.75	44	3.19	81	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-1-250	Blue	250	113	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-450	Green	450	204	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-625	Black	625	284	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-800	Gray	800	363	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-1000	Red	1000	454	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-1250	Brown	1250	568	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-1700	Orange	1700	772	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-2200	Org/Gry	2200	999	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-2465	Blue	2465	1119	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-2865	Blu/Gry	2865	1301	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-1-3500	Blu/Brn	3500	1589	3.00	76	4.20	107	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	3.25	83
HSR-2-35	Blue	35	16	1.75	44	4.13	105	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-2-70	Green	70	32	1.75	44	4.13	105	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-2-120	Gray	120	54	1.75	44	4.13	105	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-2-220	Brown	220	100	1.75	44	4.13	105	3.50	89	3.00	76	1.25	32	0.50	13	1.75	44	0.50	13	0.25	6	3.25	83
HSR-2-100	Gray	100	45	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-135	Beige	135	61	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-185	Brown	185	84	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-225	Gry/Brn	225	102	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-250	Blue	250	113	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-375	Blu/Brn	375	180	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-500	Green	500	227	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-625	Grn/Brn	625	283	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-750	Black	750	340	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-875	Blk/Brn	875	397	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-995	Orange	995	451	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-1120	Org/Brn	1120	508	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-1400	Org/Grn	1400	635	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-1600	Red	1600	726	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133
HSR-2-1975	Red/Grn	1975	896	3.50	89	6.09	155	5.00	127	3.00	76	1.00	25	0.63	16	2.50	64	0.50	13	0.25	6	5.25	133



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