ISOLOSS® HD and HDF Damped Isolation Products

Hardware-equipped isolators

E-A-R's ISOLOSS HD and HDF sandwich mounts are available in four styles and numerous standard sizes. Their construction consists of a solid cylinder of ISOLOSS HD or HDF elastomer sandwiched between two round metal plates, which are chemically bonded to the elastomer during molding. The plates are formed to provide either male or female standard UNC threads for attachment.

Another variation of the sandwich mount utilizes a metal plate on just one end of the elastomeric cylinder. This style can be used as a bumper, crash stop, snubber or equipment foot by attaching the plated end of the mount to the supporting structure.

Sandwich mounts can be statically and dynamically loaded in shear or compression or any combination of the two. Tensile loading is not recommended.

Two proprietary E-A-R urethane formulations–low-outgassing ISOLOSS HD and flame-retardant ISOLOSS HDF–provide solutions to noise, shock and vibration problems in a wide variety of applications, from miniature computer disk drives to pumps and compressors, and from assembly equipment to high tech electronics systems. They meet a market need for high performance shock and vibration mounts and for durable sheet damping materials. Both formulations can be bonded to metal during the thermoset molding process, allowing E-A-R to offer isolators with molded-in fastening hardware.

ISOLOSS HD and HDF materials not only provide high damping properties, but also exhibit high strength, excellent resistance to creep and compression set and exceptional environmental characteristics. The elastomers resist physical degradation caused by most common fluids, such as solvents and hot oils, and withstand exposure to ultraviolet radiation.

Shock isolation

With this unique combination of excellent material properties, ISOLOSS HD and HDF products outperform numerous other materials traditionally used in demanding damped isolation and motion control applications.

Lightly damped rubber mounting systems, such as natural rubber or neoprene, can amplify transmitted vibration by as much as 10 times the original level. This can damage components that are subjected to instantaneous mechanical shock pulses. Damage generally occurs when the isolated device undergoes a deflection that exceeds the available sway space, thus bottoming out against a hard surface. This is an increasingly common occurrence as the size envelope of products continually decreases.

A highly damped isolation system requires far less sway space to deliver a given level of shock protection. In a system incorporating an ISOLOSS HD formulation, for example, the material's hysteretic damping properties, combined with its compliance, allow it to absorb and store mechanical energy while effectively dissipating it in the form of heat. This leaves less energy to be transmitted or reflected back into the isolated component.

Vibration damping

At the same time, treatment with ISOLOSS HD or HDF materials can also address the system resonances that may be present in a device. Imbalances in rotational systems that undergo continuous start-and-stop cycles can interact with mounting system characteristics to produce excessive vibration. A lightly damped isolation system can cause extreme mount deflections, which can ultimately end in premature mount failure. ISOLOSS HD and HDF mounts effectively control system resonances, reducing excessive deflections and stresses. The result is increased service life for the product and reduced frequency of repair.

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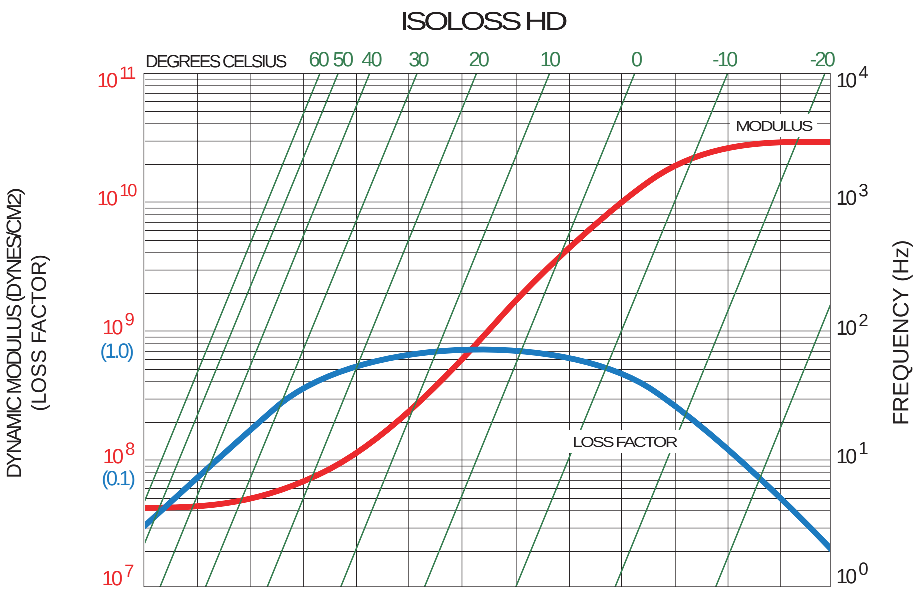
ISOLOSS HD and ISOLOSS HDF—Typical Properties

Physical Properties	*ISOLOSS HD*	*ISOLOSS HDF*
Specific Gravity		
ASTM D792	1.246	1.32
Brittleness Temperature		
ASTM D746	-27C (-17F)	–
Glass Transition C (F)		
ASTM D5279, DMA, 10Hz	-8C (18F)	-8C (18F)
Dynamic Properties		
ASTM D5279, 10Hz		
Maximum Loss Factor	0.94	0.95
Temperature at Peak Loss C (F)	12C (54F)	13C
Hardness		
ASTM D2240 Shore A Durometer	58	61
Rebound (%)		
ASTM D2632 Bashore Resilience		
1st Impact at 20C (68F)	4.5	4.0
2nd Impact at 20C (68F)	0	0
Volume Resistivity ohms-cm		
ASTM D257	1.1x1012	–
Flammability		
UL 94	Listed HB	Listed V-2
MVSS-302	Meets	Meets
Compression Load Deflection kPa (psi)		
ASTM D575 at 0.51 cm/min (0.2 in/min)		
10% deflection	565 (82)	531 (77)
20% deflection	1241 (180)	1147 (166)
30% deflection	2103 (305)	1964 (285)
Compressive Modulus kPa (psi)		
ASTM D575 at 0.05 cm/min (0.2 in/min)	5826 (845)	5681 (824)
Tensile Modulus kPa (psi)		
ASTM D638	4654 (675)	–
Strength Properties		
Compression Set (%)		
ASTM D395 Method B		
22 hr @ 22C (72F)	4.5	4.3
22 hr @ 70C (158F)	6.1	7.0
22 hr @ 90C (194F)	7.9	–
Compressive Drift (% deflection)		
ASTM D2990		
24C (75F), 1 hr @ 345 kPa (50 psi)	7.1	–
24C (75F), 1 yr @ 345 kPa (50 psi)	7.7	–
50C (122F), 1 hr @ 345 kPa (50 psi)	7.7	–
50C (122F), 1 yr @ 345 kPa (50 psi)	8.2	–
Tensile Strength kPa (psi)		
ASTM D638	15414 (2236)	15995 (2320)
Elongation (%)		
ASTM D638	424	462
Tear Strength kN/m (lbf/in)		
ASTM D1004 at .318 cm (.125 in)	157 (27.5)	28.3 (-161.6)
Abrasion Resistance mg		
ASTM D3389 H22 Stone, 1000 Gram Load, 1000 Cycle Wear Factor	61	–

ISOLOSS HD and ISOLOSS HDF—Typical Properties

Environmental Resistance Properties	*ISOLOSS HD*	*ISOLOSS HDF*
Outgassing		
ASTM E595 (Modified) 24 hr at 10 -6, Torr, 50C (122F)		
Mass Loss (%)	0.46	–
Water Reabsorbed (%)	0.28	–
Optical Fogging		
FLTM B0116-3	Meets	–
Ozone Resistance		
ASTM D1149	Resistant	Resistant
Ultraviolet Resistance		
ASTM G53, 336 hr aging cycle		
4 hr UV at 60C (140F)	Resistant	Resistant
4 hr Condensation at 50C (122F)	Resistant	Resistant
Tensile Strength Change (%)	-12.8	–
Bacteria Resistance		
ASTM G22	Resistant	Resistant
Chemical Resistance (% Weight Increase)*		
ASTM D543, 1 wk immersion at temp		
Motor Oil, 23C (73F)	0.1	–
Gasoline, 23C (73F)	0.3	–
Hexane, 23C (73F)	0.6	–
Hydraulic Fluid, 23C (73F)	0.1	–
ASTM Oil #3, 70C (158F)	0.9	–
Diesel Fuel, 23C (73F)	1.1	–
1M NaOH, 23C (73F)	1.7	–
2M Sulfuric Acid, 23C (73F)	1.9	–
1% Soap Solution, 23C (73F)	1.9	–
Deionized Water, 23C (73F)	2.2	–
1M Acetic Acid, 23C (73F)	2.8	–
Freon 11, 4C (39F)	2.5	–
Methanol, 23C (73F)	17.9	–
Accelerated Aging		
ASTM D638, 100C (212F) at 50% Relative Humidity		
Tensile Strength Change (%)		
1 Day	7.6	–
7 Days	1.2	–
Elongation Change (%)		
1 Day	9.2	–
7 Days	7.1	–
Thermal Stability C (F)		
TGA Decomposition Temperature, 1.1C/min (34F/min) heat rise	210C (410F)	–

*Not compatible with immersion in strong solvents such as Benzene, MEK, Acetone



Instructions—Reduced Frequency Nomograms

The reduced frequency format is the standard method for displaying damping material performance data. To determine dynamic Young's modulus and material loss factor at a given temperature and frequency, use the following steps.

1) Select the frequency of interest on the right-hand vertical axis.
2) Follow the selected frequency line horizontally to the left until the selected *diagonal* temperature isotherm is intersected.
3) Draw a vertical line up and down through the frequency/isotherm intersection, intersecting the dynamic Young's modulus and material loss factor curves.
4) Draw horizontal lines from these points to intersect the left-hand vertical axis.
5) The dynamic Young's modulus value is read using the Dynamic Modulus scale and the loss factor from the Loss Factor scale.

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