

Technical Specifications

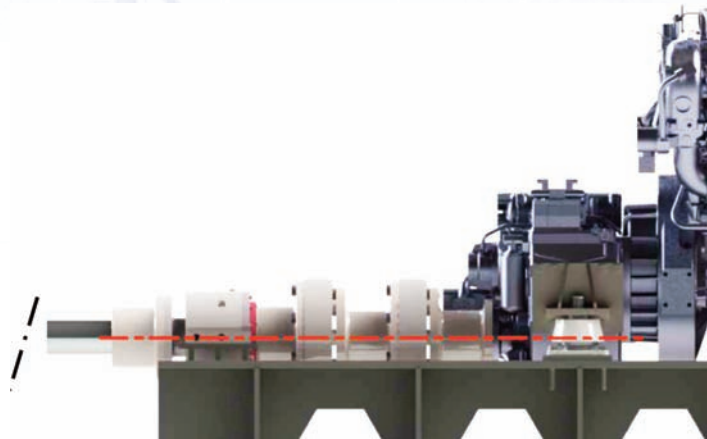
Products for Shock & Vibration Control

Proper isolation of machinery and systems facilitates lower ship board noise levels and protects equipment from shock. Achieving proper isolation requires good mounts and the technical experience to design an isolation program that meets global project requirements. Soundown supplies the know-how and equipment required to efficiently to achieve your vibration isolation, shock mitigation, and noise reduction goals.

With over 30 years of experience working with builders of pleasure boats, yachts, commercial vessels, combat craft, and specialty craft of all kinds, we understand that every project is unique. Our technical staff will work with you to understand your requirements, and design an isolation package tailored to your project. This process takes into account performance requirements as well as the particulars of the vessel, resulting in a solution that is executable within mechanical, budgetary, and logistical constraints.

Soundown's extensive selection of resilient mounts includes isolators of all sizes and configurations. While a majority of our mounts use rubber elements, spring and cable mounts are available as required by project parameters. Most of our mounts are available in multiple of configurations for ease of installation and service. Height adjusters are standard or optional on all mounts used under propulsion engines and large generators to allow precise balancing of loads and fast, easy realignment. Our Rubber Design conical mounts are even available with a split spindle allowing installation without need to lift the engine more than 1/4".

Soundown conducts static and dynamic review of the equipment to be mounted as well as reviewing the supporting structure, when appropriate. Our review process analyzes customer supplied equipment data such as weight, center of gravity, and dimensions in conjunction with mount performance data. These parameters are critical in selecting not only the type and stiffness of the mounts, but, also where they should be positioned for a stable installation. To understand the dynamics of the system we carry out a rigid body analysis. This facilitates design of a solution specific to each vessel's equipment and operating conditions. Through this analysis we are also able to calculate displacements of



Propulsion engine on RD315 mounts with Compact Thrustblock and ERD210 double flexible coupling

mounted equipment during normal operation and extreme conditions, which assists with selection of flexible connections to piping and other systems.


One often overlooked important factor for the efficacy of a mounting system is the supporting structure to which the mount is fastened. Structure with insufficient impedance will allow vibration energy to transmit across the mount and into structure. Working with your naval architects and engineers, we can provide guidance on foundation requirements. Where a higher level of engineering support is necessary, our noise and vibration engineering partners at J&A Enterprises are available for review and/or design of support structure, as well as all other aspects of a vessel's noise and vibration control package.

Proper isolation of equipment and systems is the foundation to building quiet, smooth running vessels. Get Soundown involved as early as possible in the design phase of your next build, refit, or repower, and ask us to design a mount solution for you.



2012.1.A

8" ID (203.2mm) ENGINE EXHAUST PIPE

 SOUNDOWN CORPORATION 171 BAYVIEW DRIVE HAWAII, HAWAII 96706 TEL: 808-551-1000 FAX: 808-551-1001 WWW.SOUNDOWN.COM		SOUNDOWN CORPORATION ACOUSTIC INSULATION DETAIL	
DESIGNED BY: R. HERRTZ	SIZE: A	PART NO.: AIF1010	DWG NO.: 1010
	SCALE: NONE	DATE: 03-08-03	SHEET
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Ring Bushings

	I series	3 series	4 series	6 series
Load Range Per mount lb (kg)	0.5(0.25)-12(5.45)	3(1.3)-35(16)	10(4.55)-45(20.5)	20(9)-350(159)
Natural frequency range (Hz)	16 - 28	14 - 26	8 - 16	6.5 - 10.5
Deflection range in(mm)	0 -.08(2)	0-.11(2.8)	0 - .18(4.6)	0 - .36 (9.2)

The Soundown Ring/Bushing Kits are two component mounts used in conjunction with a hold down bolt for effective isolation of equipment or panels. Ring/Bushing Mounts derive their stiffness from the rubber hardness (durometer) as well as form factor. The shape of both Ring and Bushing allow for the rubber to flex into the cavities, providing high deflection at relatively light loads. These higher deflections translate improved isolation and low level of structure borne noise.

Applications

Pumps
Fans
Hydraulic lines
generators to 40kW

HVAC Equipment
Joinery Panels
AC/DC Motors
Transformers



MP Mounts

	MP2	MP3	MP4	MP5
Load Range Per mount lb (kg)	55(25)-551(250)	165(75)-1212(551)	275(125)-2645(1202)	661(300)-11683(5310)
Natural frequency range (Hz)	7.9-14.5	7.4-14.2	6.8-14.9	5.6-14.1
Deflection range in(mm)	.04(1)-015(4)	.04(1)-.19(4.8)	.04(1)-.19(4.8)	.04(1)-.21(5.2)

The multipurpose anti-vibration mountings (MP-mountings) are designed to be a compact, easily installed solution for isolation of vibration. Available in four sizes, this mount utilizes rubber in sheer and in compression to provide good deflection characteristics in a low profile. The cap and base components are designed to be interlocking creating a captured installation ideal for marine and mobile applications.

With 12 possible configurations between size and rubber stiffness, MP mounts can be used in developing a consistent mounting program to handles equipment of all sizes throughout a vessel. This simplifies stocking, installation, and sourcing of spares throughout the vessels operational life

Applications

Generators
Pumps
Electronics

Fans
AC/DC Motors
HPUs



TR004

	TR004 -45	TR004-55	TR004-60	TR004-70
Load Range Per mount lb (kg)	176(80)-990(450)	220(100)-1476(671)	242(110)-1829(831)	463(210)-2865(1302)
Natural frequency range (Hz)	4.8 - 11.6	4.9 - 12.8	5.31 - 14.6	5.03 - 12.5
Deflection range in(mm)	.04(1)-.41(10.6)	.04(1)-.40(10.2)	.04(1)-.19(4.9)	.04(1)-.33(8.5)

Rubber Design Type TR004 isolation mounts combine double elastic elements and a cast base to provide a durable, high-deflection mount suitable for a wide range of applications. The orientation of the rubber elements and cap design allow for static deflections as high as 13mm for land based installation and 11mm in marine applications. For projects with the most stringent noise and vibration requirements TR004's are often used as primary and secondary mounts in double elastic mounting systems.

Applications

Generators
Pumps
Exhaust Systems

Fans
Silencers
HPUs



TT Mounts

	TT2	TT3	TT1
Load Range Per mount lb (kg)	110(50)-1366(621)	220(100)-1807(821)	220(100)-2645(1202)
Maximum Thrust per mount lbs(N)	705(15500)	874(19200)	1093(2400)
Natural frequency range (Hz)	10.47-11.48	9.2-13.58	7.19-10.48
Deflection range in(mm)	.019(.5)-.078(2)	.039(1)-.118(3)	.059(1.5)-.157(4)

TT-Mountings are especially developed for high powered low weight, close coupled engine/gearbox combinations. The unique mount design characteristics enable the TTs to transmit both Thrust and Torque forces while ensuring excellent vibration isolation. The TT-mount has linear stiffness over a wide range of loads in both compression and extension, which is necessary to maintain optimum isolation properties. The maximum deflection of the mount is limited by rubber covered stoppers in all directions so there is isolation even if the mounts are highly overloaded.

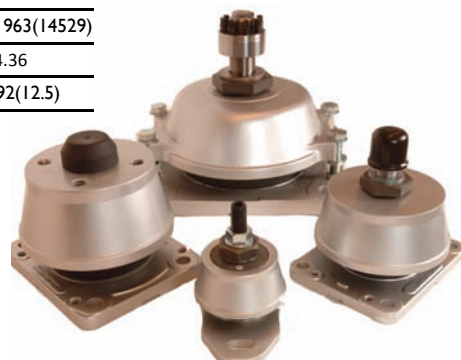


The mounts use a natural rubber compound developed to withstand high dynamic loads and to provide a long service life, even at high temperatures. The aluminum base and top castings protect the interchangeable rubber inserts from oil and fuel contamination. The aluminum used has an excellent corrosion resistance and high strength values. All TT mounts are equipped with a height adjustment unit for alignment of the engine/gearbox. TT-1 and TT3 mounts are also equipped with fixtures to prevent overloading of the mount during transportation that can also be used for the pre-alignment of the engine/gearbox.

RD Conical Mounts

	400 series	300 series	200 series	100 series
Load Range Per mount lb (kg)	220(100)-3086(1402)	551(250)-10140(4609)	1543(701)-17084(7765)	3300(1503)-31963(14529)
Natural frequency range (Hz)	5.95-18.08	4.68-6.5	4.44 -7.27	5.45-4.36
Deflection range in(mm)	.078(2)-.295(7.5)	.078(2)-.472(12)	.078(2)-.492(12.5)	.078(2)-.492(12.5)

The RD conical mount series was designed to provide optimized isolation characteristics for medium and high speed diesels, in a package that is both durable and easy to install. Internal rubber isolation elements are designed with a ratio of height to results in high vertical deflections in conjunction with stiffness that is equal in all lateral directions. The load of the equipment is evenly distributed onto the element via a cast iron or aluminum cap that also protects from oil and solvents. The central spindle (stud) passes through the mounting cap and into a cavity in the base casting where it acts as a limit stop. By turning the spindle the limit stop can be raised or lowered to ensure smooth, safe running across a range of deflections.



All rubber elements for 100, 200, and 300 series mounts are subjected to a rigorous quality program. This includes testing of every single rubber element and the recording of its specific performance characteristics. Data from this testing allows delivery of mount packages with stiffness characteristics in a matched to at a much higher tolerance than normally recognized rubber stiffness tolerances, in order to provide consistent, reliable operation.

EPM Shock Mounts

	165-95 H&S	165-126 H&S	250-154 H&S
Load Range Per mount lb (kg)	110(50)-1000(2200)	220(100)-2645(1202)	1102(501)-8817(4008)
Natural frequency range (Hz)	2.6-5.04	1.44-5.63	5.8-10.27
Deflection range in(mm)	.39(10)-1.57(40)	.39(10)-2.16(55)	.39(10)-1.77(45)

The unique Equipment Protection Mounting design enables the mounting to protect equipment in the event of large shock displacements and provide excellent vibration isolation. The RDS EPM has a linear stiffness when loaded in compression or extension, providing superior dynamic protection during shock events. This mounting range is the ideal solution for small rotary equipment which needs a combination of vibration and shock isolation. The maximum deflection of the mount due to shock impact can be up to 50 mm in all directions. RDS EPM's shape results in identical stiffness characteristics in longitudinal and transverse directions.



The EPM mountings (type RDS-C165/95, RDS-C165/126 & RDSC250/ 154) provide the ideal solution for small equipment shock protection (up to 10 kN per mounting) such as water makers, pump sets, generator sets and hydro-packs, while also isolating the vibrations. These mounts are used extensively in naval fleets around the world where it is critical that equipment remain operational in the event of rough weather, collision, or explosions.

Cable

	Series A-01	Series A-04	Series A-10	Series A-22
Load Range Per mount lb (kg)	4.8(2.2)-11.6(5.3)	39(18)-88(40)	77(35)-330(150)	440(200)-2200(1000)
Natural frequency range (Hz)	10-15	9-15	7-15	8-12
Maximum Dynamic Travel in(mm)	.86(22)	.98(25)	2.55(65)	4.06(103)

RD Cable Mounts are designed to provide very high deflections with inherently high damping for equipment of all sizes. This capability makes RD Cable Mountings ideal for use on equipment requiring excellent isolation to reduce structureborne noise, protect from shock, or isolate sensitive components from inherent machinery or engine vibration. Manufactured from 6060-T6 aluminum bars and 316 stainless cable these mounts have a high level of corrosion resistance and maintain consistent isolation from -180 to 300C



Available in 11 different sizes (each with multiple configurations) RD Cable Mountings can be specified to protect equipment of all sizes.

Semi-elastic Gear Mounts

While modern vessel designs generally incorporate isolation mounts for the engines, they often leave the reduction gear mounted hard to the ship structure. This results in high levels of gear meshing tone (gear whine) throughout the vessel, negatively impacting quality of life aboard. The distinct tonal nature of gear whine occurs in the middle of the speaking frequencies and is particularly bothersome to crew and guests. Our 095/097 Semi-elastic Gear Mounts are designed to isolate marine reduction gears from ship structure, thereby reducing bothersome gear whine and improving on board comfort levels.



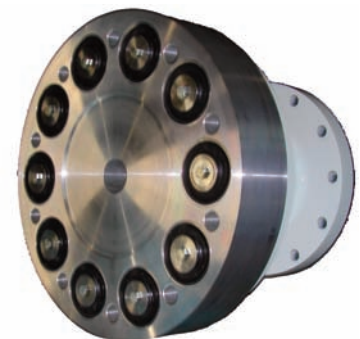
The 095/097 Semi-elastic Gear Mounts are specially designed to achieve exceptional isolation of gear mesh vibration, while maintaining the stability of the gear box and low displacements at the output flange. This is achieved through the use of elements that provide lowest possible vertical deflections while providing isolation at the gear mesh frequency. These elements are typically fabricated into custom brackets designed to mate with the specific gear box bolting flange and stringers for a seamless installation.

Flexible Shaft Couplings

	ERD03	ERD04	ERD05	ERD06	ERD07	ERD08	ERD09	ERD10	ERD11	ERD12
Nominal Torque kNm	1.25	2.2	3.35	4.05	5.6	7.3	11.2	16.2	24.5	40.5
Maximum Torque kNm	3.75	6.6	10.05	12.15	16.9	21.9	33.6	48.6	73.5	121.5
Maximum Thrust kN	30	30	60	60	90	90	90	125	125	150

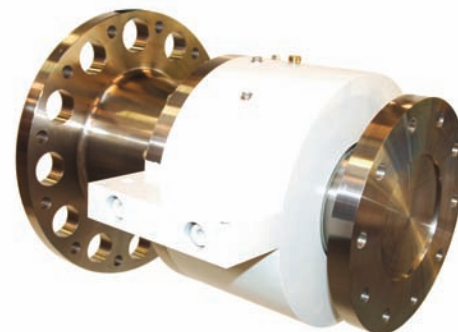
ERD Flexible Shaft Couplings provide an elastic connection between the output of the reduction gear and the propeller shaft to allow for a higher deflection (more effective) engine mounting than a rigid shaft coupling system, without overstressing the shaft or reduction gear output bearing. In vessels with jets, out drives, thrusters (pods), or remote thrust bearings an ERD Coupling offers a higher-performance alternative to cardan shafts, through low angular stiffness and eliminating metal to metal connections. In such applications the low overall length and no need for angular offset can simplify installation as well.

ERD couplings further promote lower noise levels and overall on board comfort by reducing gear whine that travels down the shaft line and into the ship structure via seals, bearings, and water. This improves habitability in aft cabins and on deck areas



Thrust Bearings

	TB01	TB02	TB03	TB04	TB05
Maximum Thrust Load lb(kN)	6744(30)	11240(50)	15736(70)	21356(95)	29225(130)
Maximum Kw/RPM	0.41	0.70	2.12	3.96	6.63
Typical Coupling Range	ERD04	ERD05-06	ERD07-09	ERD10-11	ERD12



RD Compact Thrustblocks are remote thrust bearings designed to be installed in combination with ERD Couplings for high performance isolation of propulsion equipment in yachts and ships. The double tapered roller bearing design efficiently transfers thrust directly to the ship structure through a durable and easily aligned housing. The Thrustblock isolates thrust forces from the engine/ reduction gear combination facilitating a higher deflection mounting than would otherwise be possible. Such installations are typically installed in conjunction and with an ERD double elements coupling between the bearing and reduction gear as well as 200 or 300 series conical mounts below the engine and reduction gear. This system provides the highest levels of isolation needed for vessels with the most demanding noise and vibration targets.

Shaft Systems

Soundown in conjunction with Rubber Design have been designing, building, and supplying water and oil lubricated shaft systems to super yachts and commercial vessels for over 30 years. Our expertise is recognized worldwide as innovative providers of reliable, smooth running, and quiet propeller shaft and rudder installations. Together with our thrust blocks, flexible shaft couplings, and gearbox and engine mounts we can provide a complete, cost effective propulsion solution of the highest quality.

These advantages are gained by having our team of engineers involved in the early stages of design. This allows us to ensure that all system components including shaft, oil bath shaft tube, seals, struts, bearings, propellers and rudders are integrated seamlessly. The result is a unique solution that incorporates innovative design features to meet the specific needs and requirements of the client as well as numerous classification societies.

Upon completion of the design all system components are 3-dimensionally modelled in Solidworks, then built and tested in our ISO certified facility. Our state of the art facility utilizes the latest in automated machining technology and is staffed by engineers with the training and experience to execute your design correctly, the first time.

Completed systems are then delivered to the shipyard where Rubber Design engineers provide oversight or provide all full installation services. Throughout the operational life of the vessel this engineering support will be available for refit, repair or classification society inspections.

