**Ultrasonic Acoustic Stack Mounting Guidelines**

Correct acoustic stack mounting is vital to process consistency and equipment life.

1. The ultrasonic stack should be supported in two locations. The two supports should be machined together or connected by a common plate which is rigid and prevents deflection, torsion and bending of the stack. A minimum of .3” (13mm) thick aluminum or steel plate should be used.

2. The bores of the two supports must be concentric within .005” (.1mm) and must allow for a clearance of .003”-.010” oversize with respect to the booster/horn and transducer clamping ring diameters. This insures that there is no bending or excessive compression force applied to the booster/horn rings and transducer housing.

3. The booster/horn support should be designed with upper and lower ridges to prevent the ultrasonic stack from falling out of the support and to provide a thrust surface for axial forces. The support ridge should be .100”-.150” (2.5mm) wide and should allow at least .005” (.1mm) axial clearance to prevent the booster/horn clamp ring from binding in the support and to make installing and removing the ultrasonic stack easier.

4. The support design should incorporate slots or other mounting provisions which allow for variation in stack component lengths. Boosters and horns can vary up to .5” (13mm) due to material properties. This may require an adjustment to the height of the stack above the product.

5. Supports which use split clamps are preferred so that there is no contact with the horn or booster or excessive clamping force can cause premature equipment failure and/or noisy operation. The bolt compression force applied to the booster/horn rings and transducer housing.

6. Suitable supports must be used for the ultrasonic stack. (See bullet “I” on inside.)

7. Machinery should be designed so that the cutting or welding forces are axial to the centerline of the ultrasonic stack and parallel to the face of the sonitrode/horn. Offset or side loading can cause equipment failure and/or noisy operation.

8. Proper acoustic stack assembly is critical. The ultrasonic booster end which must be attached to the ultrasonic horn is marked on the booster. Refer to the Dukane……white paper for more detailed information on assembling and maintaining the ultrasonic stack.

9. Proper acoustic stack assembly is critical. The ultrasonic booster end which must be attached to the ultrasonic horn is marked on the booster. Refer to the Dukane……white paper for more detailed information on assembling and maintaining the ultrasonic stack.

10. Clean dry air for cooling must be provided to the ultrasonic stack assembly including the transducer. Cooling air must be filtered (5µ or better), to 5 micron. No electrically conductive media or condensing water vapor is permitted inside the transducer housing. Additional cooling should be provided to the booster and horn to prevent any part of the ultrasonic stack assembly from exceeding 110°F (43°C). Exhaust air from the transducer may be utilized to cool other portions of the ultrasonic stack. (See bullet “I” on inside.)

11. Dukane “S” series transducers are rated for IP65. Additional low pressure washdown is permitted but submersion and high pressure washdown may compromise the transducer seals. Consult factory for higher ratings on a case by case basis. Dukane components are made from anodized aluminum, stainless steel and titanium with Viton and Neoprene seals. Material compatibility with cleaning solutions should be verified before putting equipment into service.

**Troubleshooting Tips**

**Problem** - Excess noise or system overload.

1. Ensure proper cooling is in place.

2. Inspect complete acoustic stack for over temperature.

3. Inspect acoustic stack for missing components; inspect for nicks, cracks, scrapes or evidence of metal to metal contact.

4. Inspect mount to ensure proper clamping torque and tolerances.

5. Disassemble and re-assemble acoustic stack following proper procedures. See, Ultrasonic Probes/Stacks-Understanding and caring for the heart of your ultrasonic system white paper. (http://www.dukcorp.com/us/SE_Stackarticle.htm)

6. If problem still exists, contact manufacturer.

**Acoustic Stack Frequency** Dukane Part Number

- 20 kHz Standard Mount EX-8331-00
- 20 kHz Narrow Mount EX-8468-00
- 30/40 kHz Standard Mount EX-8471-00
- 15 kHz Standard Mount EX-8470-00

Note: All specifications are subject to change without notice. Please consult Dukane Ultrasonics for any updated information.
Acoustic stack consists of:
- Transducer/Converter/Probe
- Booster
- Horn/Sonotrode
- Mount

A. Common mounting plate to ensure concentricity between converter, booster and horn flat (+/- .0005”/.013mm).

B. Slotted mounting holes on common back plate to accommodate changes in horn and booster lengths.

C. Mount designed with undercuts to take up load from process on booster clamp ring surfaces.

D. No deflection permitted. Mount should prevent stress and deflection on booster converter interface due to misalignment.

E. Mount must maintain correct bore tolerances for booster clamp ring and probe. + .005” - .000” (.127mm - .000mm). Bores to be concentric. + or − .005” (.127mm).

F. Inadequate or excessive clamping force on these components can cause premature equipment and process failures. Bolt clamp torque specification - 15 lb.ft (20 Nm) 4 places

G. Air cooling input, sufficient to prevent acoustic stack (horn/sonotrode, booster, converter) from exceeding 110ºF (43ºC). (Application/process dependent)

H. Cable placement to eliminate strain or sharp bends.

I. Exhaust air may be plumbed to provide additional cooling to converter output end and horn (See Figure A, Page 4.)

J. Nothing to come in contact with transducer output, booster body or sonotrode/horn. Do not attach to, or modify these components.

K. Ensure proper orientation of booster, output end to sonotrode/horn.

L. Load to be centered and parallel to face of sonotrode/horn. Minimize side load of acoustic stack.

Proper acoustic stack assembly is critical.

Please see:
Ultrasonic Probes/Stacks-Understanding and caring for the heart of your ultrasonic system
Acoustic stack consists of:

- Transducer/Converter/Probe
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Proper acoustic stack assembly is critical.

Please see: Ultrasonic Probes/Stacks-Understanding and caring for the heart of your ultrasonic system

A. Common mounting plate to ensure concentricity between converter, booster and horn flat (+/- .0005”/.013mm).

B. Slotted mounting holes on common back plate to accommodate changes in horn and booster lengths.

C. Mount designed with undercuts to take up load from process on booster clamp ring surfaces.

D. No deflection permitted. Mount should prevent stress and deflection on booster converter interface due to misalignment.

E. Mount must maintain correct bore tolerances for booster clamp ring and probe. + .005” - .000” (.127mm - .000mm). Bore to be concentric. + or - .005” (.127mm).

F. Inadequate or excessive clamping force on the these components can cause premature equipment and process failures. Bolt clamp torque specification - 15 lb.ft (20 Nm) 4 places.

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H. Cable placement to eliminate strain or sharp bends.

I. Exhaust air may be plumbed to provide additional cooling to converter output end and horn (See Figure A, Page 4.)

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K. Ensure proper orientation of booster, output end to sonotrode/horn.

L. Load to be centered and parallel to face of sonotrode/horn. Minimize side load of acoustic stack.
**Ultrasonic Acoustic Stack Mounting Guidelines**

Correct acoustic stack mounting is vital to process consistency and equipment life.

1. The ultrasonic stack should be supported in two locations. The two supports should be machined together or connected by a common plate which is rigid and prevents deflection, torsion and bending of the stack. A minimum of .5” (13mm) thick aluminum or steel plate should be used.

2. The bores of the two supports must be concentric within .005” (.1mm) and must allow for a clearance of .003”-.010” oversize with respect to the booster/horn and transducer clamping ring diameters. This insures that there is no bending or excessive compression force applied to the booster/horn rings and transducer housing.

3. The booster/horn support should be designed with upper and lower ridges to prevent the ultrasonic stack from falling out of the support and to provide a thrust surface for axial forces. The support ridge should be .100”-.150” (2.5mm) wide and should allow at least .005” (.1mm) axial clearance to prevent the booster/horn clamp ring from binding in the support and to make installing and removing the ultrasonic stack easier.

4. The support design should incorporate slots or other mounting provisions which allow for variation in stack component lengths. Boosters and horns can vary up to .5” (13mm) due to material properties. This may require an adjustment to the height of the stack above the product.

5. Supports which use split clamps are preferred but submersion and high pressure washdown may compromise the transducer seals. Consult factory for information on assembling and maintaining the ultrasonic stack assembly from exceeding 110Fº (43ºC). Exhaust air from the transducer may be utilized to cool other portions of the ultrasonic stack. (See bullet “I” on inside.)

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7. Machinery should be designed so that cutting or welding forces are axial to the centerline of the ultrasonic stack and parallel to the face of the sonitrode/horn. Offset or side loading can cause equipment failure and/or noisy operation.

8. Machinery should be designed to allow for free ultrasonic cable movement without binding. The minimum cable bending radius is 2.5” (65mm).

9. Proper acoustic stack assembly is critical. The ultrasonic booster end which must be attached to the ultrasonic horn is marked on the booster. Refer to the Dukane ……white paper for more detailed information on assembling and maintaining the ultrasonic stack.

10. Material compatibility with cleaning solutions should be considered on a case by case basis. Dukane components are made from anodized aluminum, stainless steel and titanium with Viton and Neoprene seals. Material compatibility with cleaning solutions should be verified before putting equipment into service.

Note: All specifications are subject to change without notice. Please consult Dukane Ultrasonics for any updated information.

**Troubleshooting Tips**

- **Problem** - excess noise or system overload.
  - Ensure proper cooling is in place.
  - Inspect complete acoustic stack for over temperature.
  - Components that have experienced excessive heat may be permanently damaged, consult factory before putting units back in production.
  - Remove acoustic stack from mount. Inspect for missing components, inspect for nicks, cracks, scrapes or evidence of metal to metal contact.
  - Inspect mount to ensure proper clamp torque and tolerances.

- **Correct acoustic stack mounting is vital to process consistency and equipment life.**

**Acoustic Stack Frequency**

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<tr>
<th>Dukane part Number</th>
<th>EX-8391-00</th>
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<tr>
<td>20 kHz Standard Mount</td>
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**Visit** http://www.dukcorp.com/us/Downloads.asp for downloadable drawings PDF, DXF & STP

**Application Note**

AN504

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