

Suppressor Incorporating Natural Sound Production Auditory Camouflage on Firing

By:

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Forward By:

Dr. Barton Halpern, JSSAP Program Manager, ARDEC
Picatinny Arsenal, New Jersey

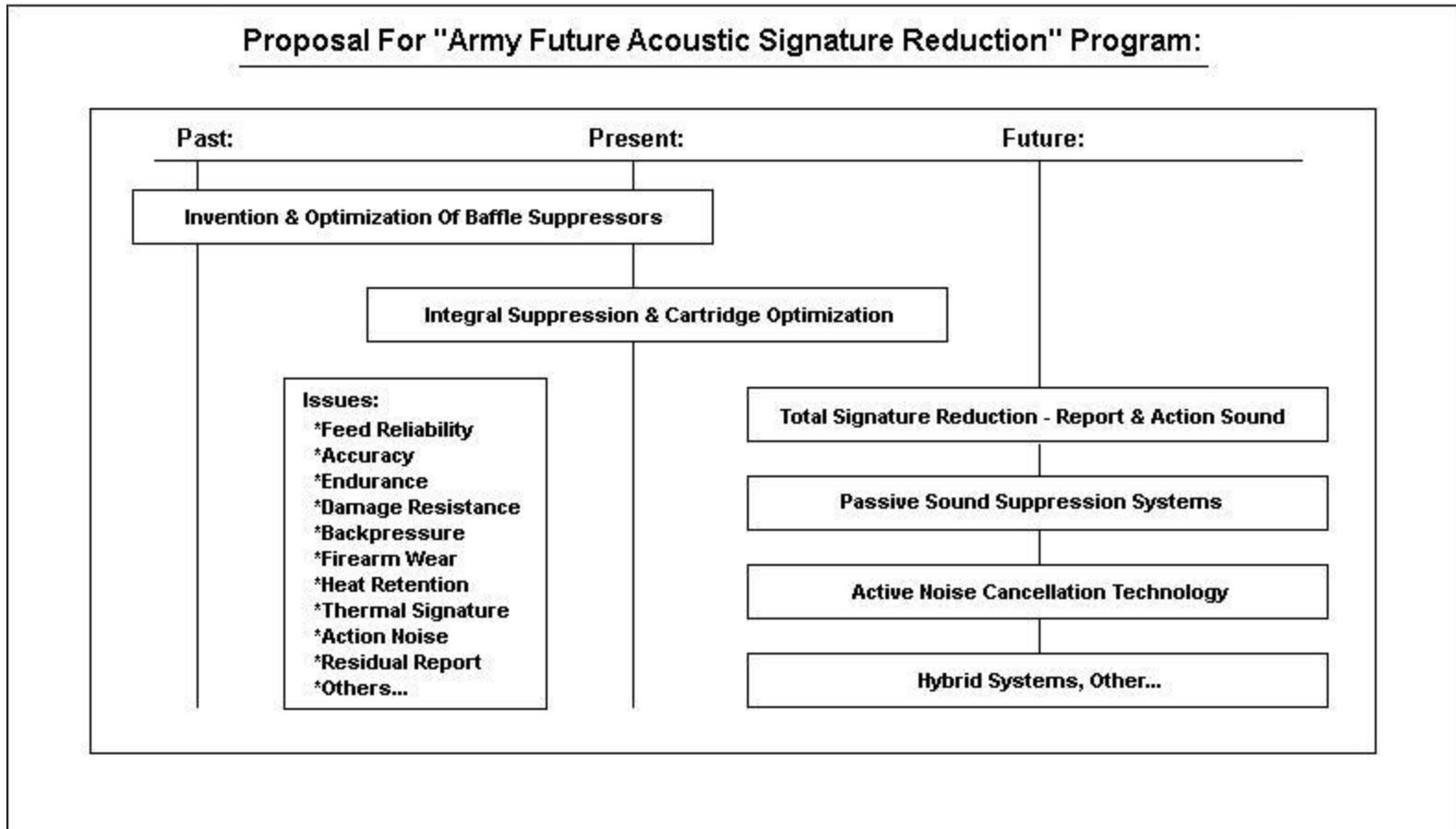


Theme:



“Defining A Path For The Future Of Acoustic Signature Reduction”

Proposed Army Future Path Of Acoustic Signature Reduction:



The Problems:

Features & Benefits Are Weighed Against Problems & Consequences:

Modern Sound Suppressors Have Come Far, And They Are Excellent At Gunfire Auditory Signature Reduction...But:

- 1) They Cause Excessive Backpressure With Related Reliability Issues
- 2) They Are Extremely Hot Causing Injuries And Thermal Detectability
- 3) They Are Prone To Both Battle & Firing Profile Related Damage
- 4) If Not Integral And On The Weapon, Likely To Be: “On The MOLLE”

The Problems

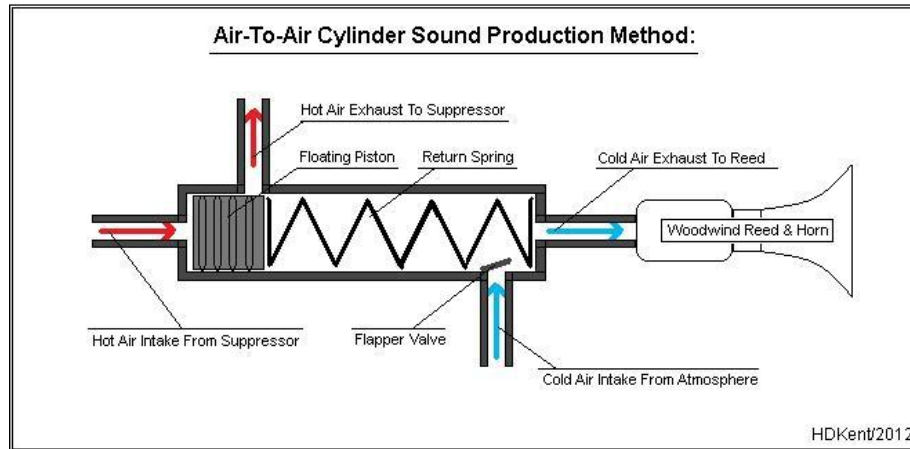
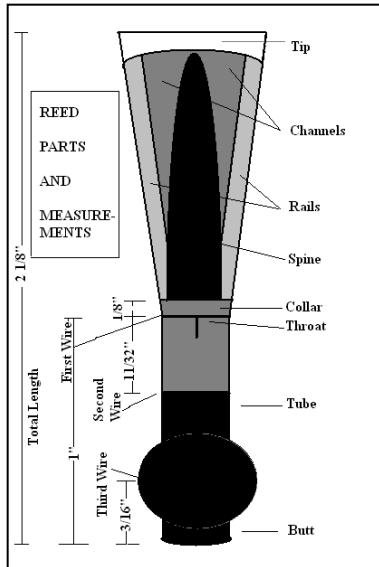
Examples Of Some Excessive Pressure, Cyclic Rate & Heat Damage Reliability Issues:



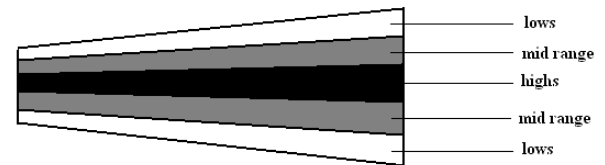
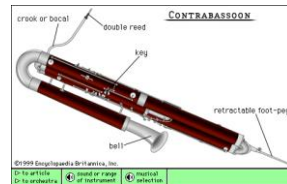
Clockwise From Upper Left: AR-15.com Photos: Blown Case In M-4 Showing Flattened Primer & Ejector Mark, Case Separations In & Out Of The Chamber, Bolt Over Base Jam Due To Magazine Spring Not Presenting Round Fast Enough, Sectioned Stainless Barrel With Burned Out Throat, Highly Eroded AR Pistol Gas Port Under Base.

The Contra-Bassoon Method:

Goal: Produce Sound Using No Power, Fuel Or Instrumentation.



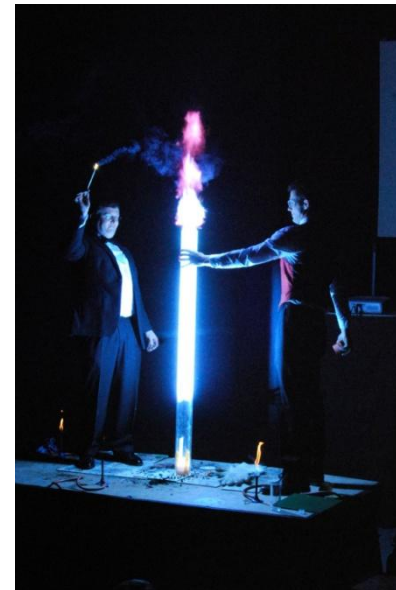
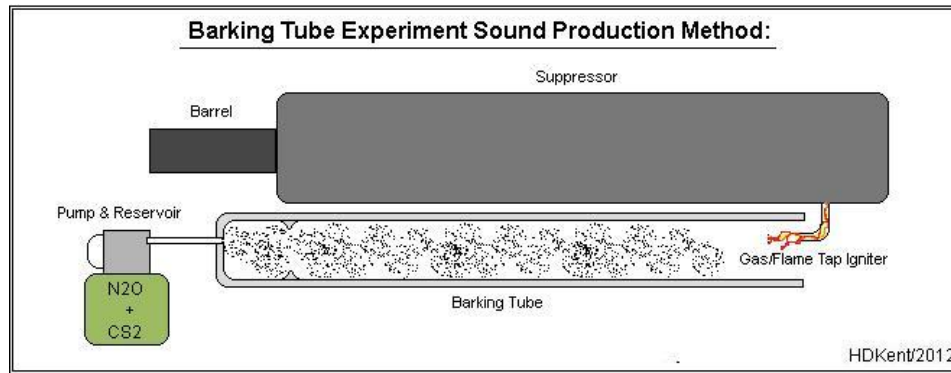
TONAL SPECTRUM OF THE BASSOON REED



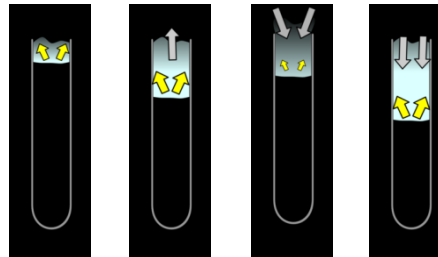
Clockwise From Upper Left: Wikipedia Bassoon Reed, Air-To-Air Cylinder Sound Production Method, Encyclopedia Britannica Contra Bassoon (Lowest Woodwind Sound), Bassoon Reed Sound Production, Actual Bassoon Reeds, Encyclopedia Britannica Contra Bassoon Components Labelled With Double Reed For Extended Range Sound.

The Barking Tube Experiment Method:

Goal: Produce More Realistic Sound Using Suppressor Gas Ignition Of Fuel



CS₂ + N₂O = Light & Sound



<http://www.youtube.com/watch?v=uNTi1jU3Lc8>

Clockwise From Upper Left: Barking Tube Experiment Based Sound Production Method, Professor Hal Barking Tube Demonstration, REmagic Barking Tube "Dieseling" Sound Principle, Chemistry World Small Scale Barking Tube Demonstration Next To Very Large Scale Glass Tubes, Minimal Pressure Produced.

The Transient Event Noise Cancellation Method:

Goal: Produce Sound To Eliminate Residual Report & Action Noise



Above: Block Diagram Of Components Required For Noise Cancellation Of Residual Suppressor Sound & Action Noise, With Option Of Added Ambient Sound If Required When Novel Acoustic Variations Occur.

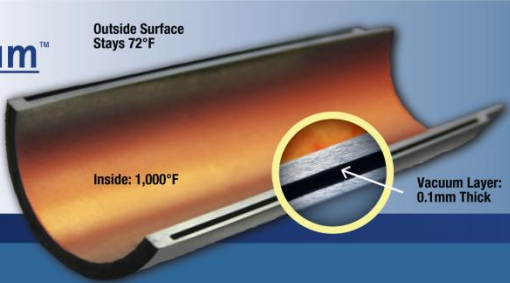
The Transient Event Noise Cancellation Method:

The Technology To Protect Electronics To Eliminate Residual Report & Action Noise

Enables Electronics, Sensors & Wiring To Coexist With Heat:

The Shaped-Vacuum™ Thermal Barrier


The world's thinnest and most powerful thermal insulator



Outside Surface Stays 72°F

Inside: 1,000°F

Vacuum Layer: 0.1mm Thick



Stops cold, too: tube carrying nitrogen at -321°F.

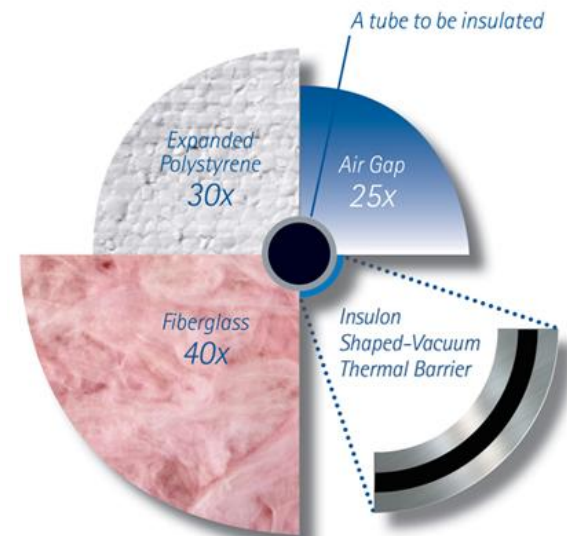
The Insulon® Shaped-Vacuum™ Thermal Barrier. It gives you an amazingly thin vacuum layer **manufactured right into the wall of your tube, can, or other product shape.**

With no molecules to transmit thermal energy, the vacuum layer (10^{-7} Torr) simply stops thermal conduction through the wall; it's a nearly impenetrable barrier to heat (or cold). Yet it's as thin as a human hair.

You get extraordinary thermal insulation with almost no penalty in added size. Imagine what this perfect – and perfectly thin – thermal insulator could do for your designs, stopping heat or cold.

CONCEPT Group

You'll be surprised at how big a boost *your* product's performance could get. Call us today at 800-424-7325 or visit <http://conceptgroupinc.com/thermal.html>.

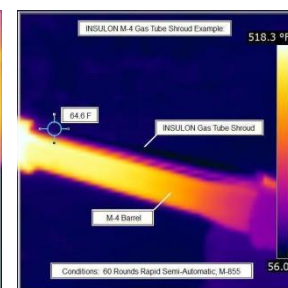
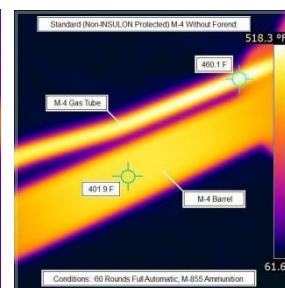
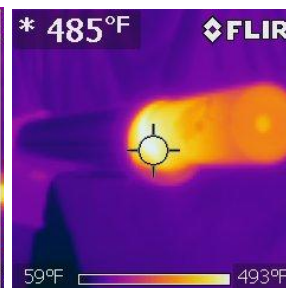
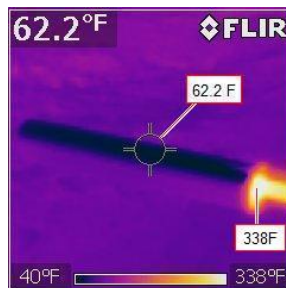
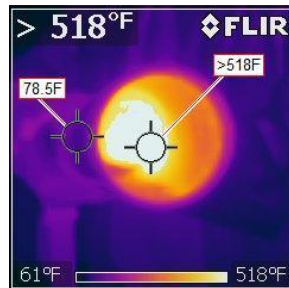
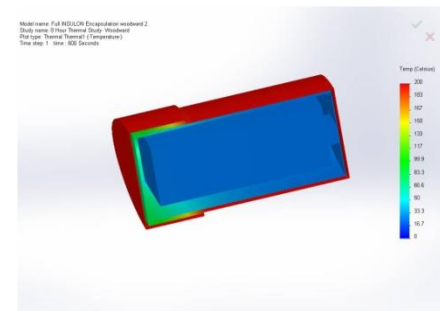


Clockwise From Upper Left: Concept Group INSULON Thermal Barrier Enables Electronics To Coexist With Firearms, INSULON Comparison To Conventional Insulation Materials, Use In Extreme Conditions.

The Transient Event Noise Cancellation Method:

The Technology To Protect Electronics To Eliminate Residual Report & Action Noise

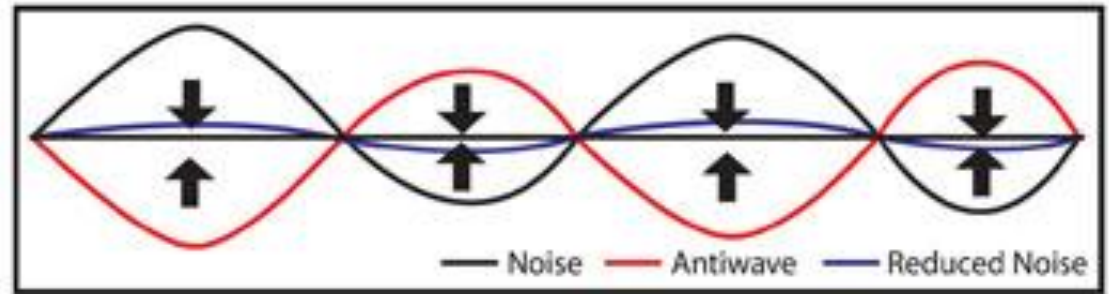
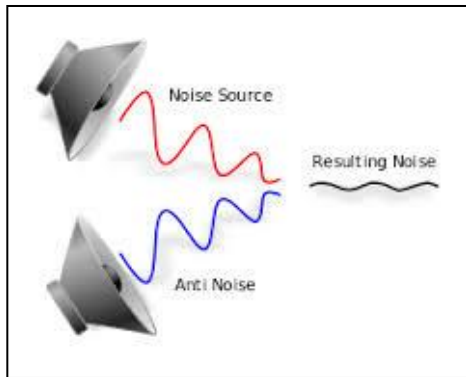
Enables Electronics, Sensors & Wiring To Coexist With Heat:



Clockwise From Upper Left: Concept Group INSULON Thermal Barrier Enables Electronics To Coexist With Firearms, INSULON Barrier Cutaway, 8 Hour Heat Sink Test, INSULON M-4 Gas Tube Shroud, M-4 Without Gas Tube Shroud, Bare Suppressor With INSULON Forend, INSULON Suppressor Thermal Shroud Side View, INSULON Suppressor Thermal Shroud Front View Showing >600F Temperature Differential.

The Transient Event Noise Cancellation Method:

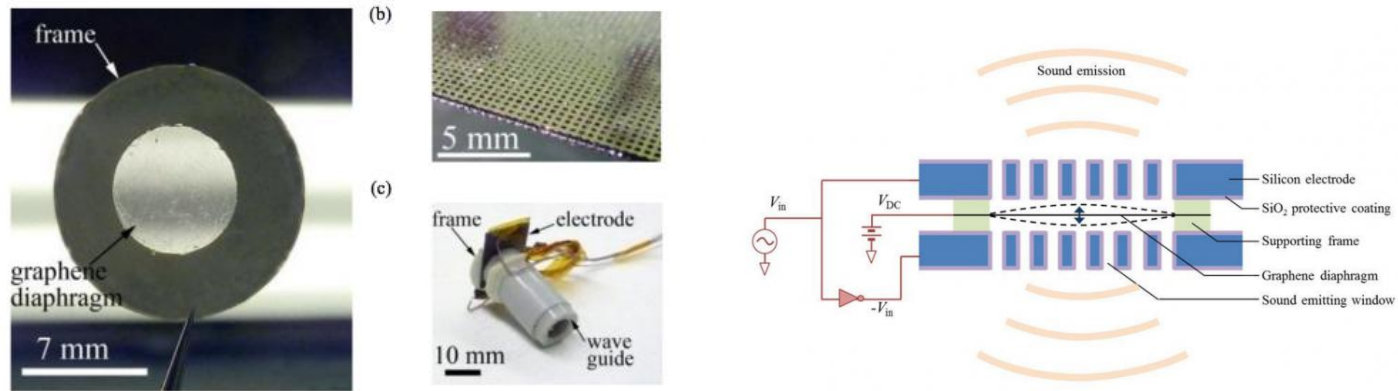
The Technology To Produce Sound To Eliminate Residual Report & Action Noise



Clockwise From Upper Left: Wikipedia NCT, NC200D NCT Channel, Maxell NCT Kit, Braven BRV-1 All Weather Speaker 140+ dB, Bode Omnidirectional Sound Sampler Smart Phone App, AMS NCT Chip.

The Transient Event Noise Cancellation Method:

The Technology To Produce Sound To Eliminate Residual Report & Action Noise



<http://www.gizmag.com/graphene-speaker-beats-sennheiser-mx400/31660/pictures>



Clockwise From Upper Left: Tiny High Output Graphene Speaker, Diagram Of Sound Production (Web Link Below), CMC Drop In Trigger Cassettes, CMC Trigger With TI Sensor, CMC Installation, TI LDC-1000.

Conclusion:

Suppressors Are An Important Tool For Both Military & Civil Authorities...

Suppressors Are Essential To Protect Both User & Bystander Hearing...

Current Suppressors Are Reaching A Design Plateau While Issues Remain...

Recommendation:

“Explore New Technology To Address Problems & Advance ***Total Signature Reduction***”



Thanks For Listening-HK & MW

NDIA White Paper Series, Joint
Small Arms Conference 2014

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