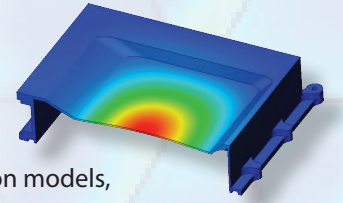
Accurate Results—
Timely and Cost Effective

Custom Services

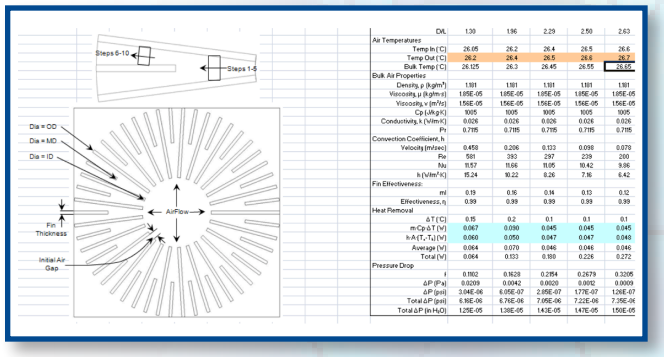
Do you have a unique engineering problem that is in your critical path? Our engineering services can be custom tailored to meet your needs.



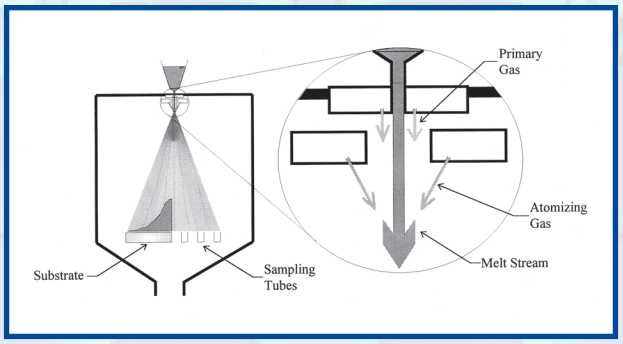
From problem solving and failure analysis, to custom built simulation models, we can work with you to remove the stumbling block that is impeding progress.

Examples of past work include:

- Particle flow simulations, including spray forming and evaporative sprays
- System level thermal models
- Partial pressure air extraction
- Pump noise reduction
- Failure analysis on parts exposed to vibration loads
- Attitude independent fluid recovery systems



DVL	1.30	1.96	2.29	2.50	2.63
Air Temperatures					
Temp In (C)	26.05	26.2	26.4	26.5	26.6
Temp Out (C)	26.2	26.4	26.5	26.6	26.7
Bulk Temp (C)	26.125	26.3	26.45	26.55	26.65
Bulk Air Properties					
Density, ρ (kg/m³)	1.101	1.101	1.101	1.101	1.101
Viscosity, μ (kg/m-s)	1.85E-05	1.85E-05	1.85E-05	1.85E-05	1.85E-05
Viscosity, ν (m²/s)	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05
Cp (J/kg-K)	1005	1005	1005	1005	1005
Conductivity, k (W/m-K)	0.026	0.026	0.026	0.026	0.026
Pr	0.7185	0.7185	0.7185	0.7185	0.7185
Convection Coefficient, h					
Velocity (m/sec)	0.458	0.206	0.133	0.098	0.078
Re	581	393	297	239	200
Nu	11.57	10.66	11.05	10.42	9.86
h (W/m²-K)	15.24	10.22	8.26	7.16	6.42
Fin Effectiveness:					
ml	0.19	0.16	0.14	0.13	0.12
Effectiveness, η	0.99	0.99	0.99	0.99	0.99
Heat Removal					
ΔT (C)	0.15	0.2	0.1	0.1	0.1
ṁ·Cp·ΔT (W)	0.067	0.090	0.045	0.045	0.045
h·A·(T_s-T_a) (W)	0.060	0.050	0.047	0.047	0.046
Average (W)	0.064	0.070	0.046	0.046	0.046
Total (W)	0.064	0.133	0.180	0.226	0.272
Pressure Drop					
f	0.1102	0.1628	0.2154	0.2679	0.3205
ΔP (Pa)	0.0209	0.0042	0.0020	0.0012	0.0009
ΔP (psi)	3.04E-06	6.05E-07	2.85E-07	1.77E-07	1.26E-07
Total ΔP (psi)	6.16E-06	6.76E-06	7.05E-06	7.22E-06	7.35E-06
Total ΔP (in H₂O)	1.25E-05	1.38E-05	1.43E-05	1.47E-05	1.50E-05



About us

While working for over a decade in the electronic thermal management industry Nathan Muoio, a licensed professional engineer with a master's degree in mechanical engineering, has gained considerable experience in the design and analysis of unique and complex products. In addition to maintaining critical thermal conditions, these products had to pass stringent military standards and survive in harsh environments.

Prior work includes graduate research into atomized sprays and into rapid solidification processes. With a broad background that includes structural vibration, multiphase and particulate fluid flow, and convective and evaporative heat transfer applications, we have the technical capabilities to help you solve problems.

Skookum Consulting
7920 7th Ave SW
Seattle, WA 98106
1-800-578-4933
www.skookumconsulting.com

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Engineering Analysis Services

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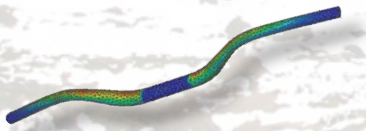
Problem Solving through Engineering and Analysis

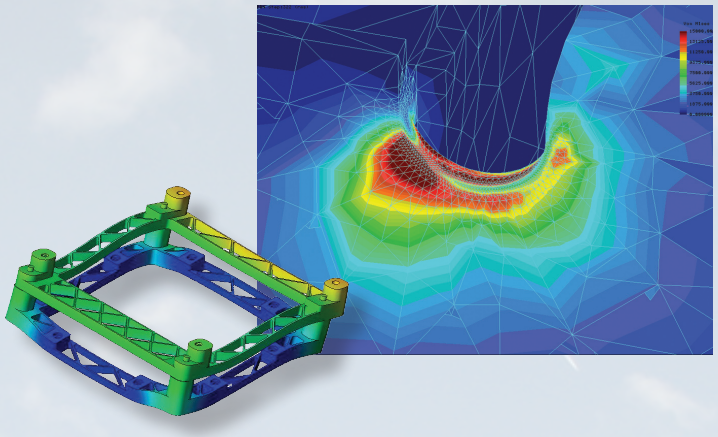
Finite Element Analysis

Whether you are looking to conduct "what if" scenarios on an individual part, or are looking for potential failure points on a critical assembly, you will receive the information you need to proceed with your development.

We use NEiNastran, by Noran Engineering, as our FEA software. It is an industry proven and robust analysis software package. We can also assist you in getting the most out of your in-house FE software.

- Static, linear and nonlinear
- Thermal analysis, steady state and transient
- Vibration
- Normal modes
- Buckling
- Optimization
- Drop test, Impact
- Parts, assemblies, composites





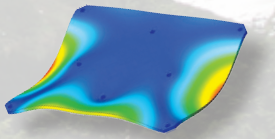
Structural Dynamics

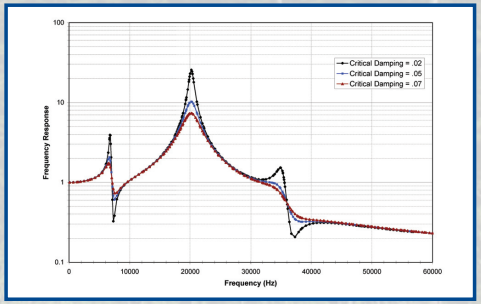
Structural dynamics is a complex and not easily understood topic. We will work with you to predict how your product will respond to expected dynamic inputs.

We can predict when resonance will occur and can estimate the response to dynamic loads. This may include a prediction of the deflections and stresses that your products will see, as well as a fatigue life estimate.

We can work with your engineers to dampen the response of your system, or to isolate your system from dynamic inputs.

- Frequency response
- Random response
- Modal frequencies
- Mass participation and mode shapes
- Fatigue life





Heat Exchangers

We will work with you to create custom designs or to select off the shelf components. We can create thermal models that will simulate the performance of your heat exchanger, evaporator, and condenser designs.

With an accurate thermal model, your heat exchanger can be optimized for maximum thermal performance, with the smallest possible size, for your fluid and environmental conditions.

- Compact heat exchangers
- Plate-fin
- Tube-fin
- Microchannel
- Cross-flow
- Counter-flow
- Multi-pass
- Evaporation
- Condensation
- Subcooling