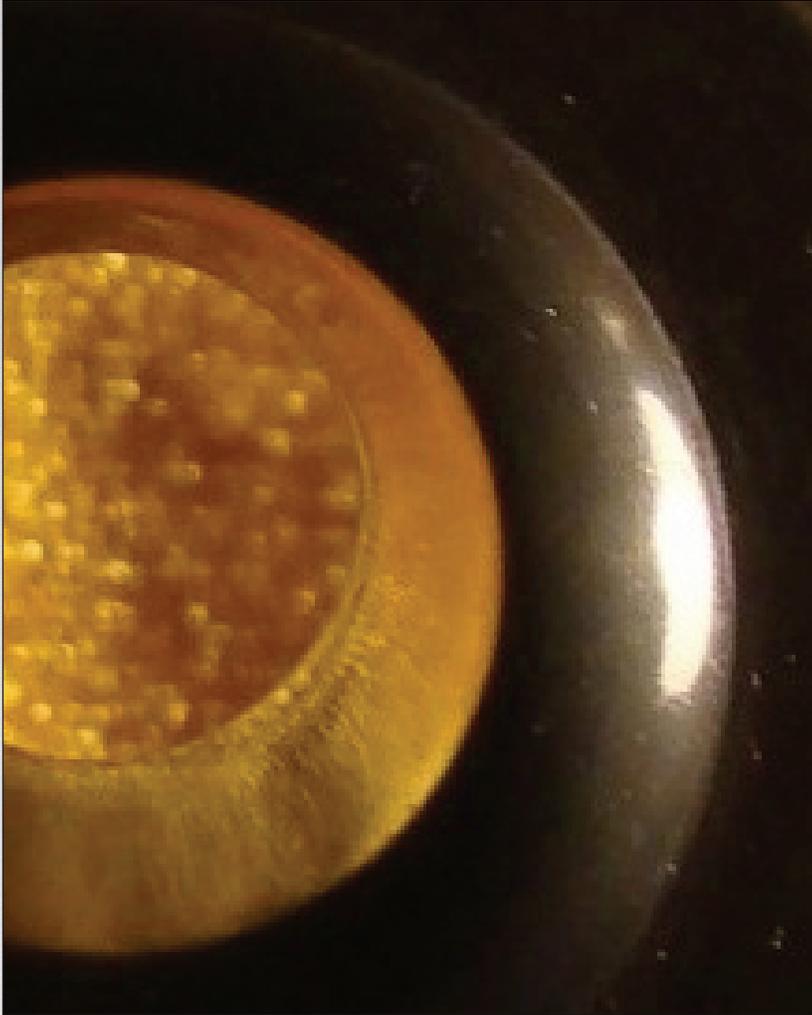


Nano-Dies® NANO-DIAMOND AMERICA, INC.

Nano-Die® is a registered trademark



Nano-Die® Applications:

Compacting & Stranding
Wire & Tube drawing
Rod breakdown

Materials:

Aluminium and alloys, Copper, Brass,
Low carbon and Stainless steel

Nano-Die® Hardness

The multiple layers of uni-directional nanocrystalline diamond coating applied using a highly controlled high pressure CVD process to pattern lock the diamond particles - this renders Nano-Die® an exceptional lifespan free of wear. Nano-Dies® are harder than a PCD die. For compacting applications, Nano-Dies® hold zero tolerance for an average of 500 to 800 km of cable compacted.

Lower Friction

The Nano-Die® is as smooth as it is hard. Friction causes damage and increases electrical resistance. Nano-Dies® have lower surface friction than PCD or Tungsten Carbide dies, hence they do less damage to the micro-structure of the individual conductor. The smooth Nano-Die® surface facilitates use of less material for the same electrical resistance specification. Please see the finish, characteristics, and costings for the two cables shown below.



*The left side cable: Compacted using very high quality PCD dies
Cost of Final Ø30.5mm compacting PCD Die: approx. \$36,000
Cable Resistance: 0.0469 ohm/km
Cable Weight: 1,746 kg/km*

*The right side cable: Compacted using Nano-Dies®
Cost of Final Ø30.13mm Compacting Nano-Die: \$2,046
Cable Resistance: 0.0469 ohm/km (same)
Cable Weight: 1,702 kg/km.
The cable on the right is 2.5% lighter.
Enormous copper or aluminium savings*

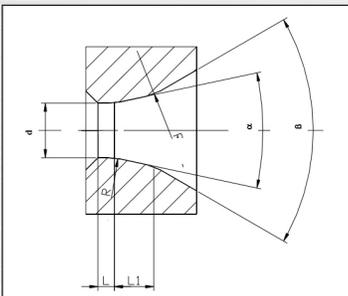
Price Performance

The cost of a Nano-Die® can be around the same as the cost of a PCD die for a 2mm diameter. However for 3mm diameter or larger, the price difference increases by an order of magnitude (as is shown in the cable example above). Nano-Die® can also be supplied at much greater diameter than is possible for a PCD die. Our customers have reported that for many of their applications, Nano-Die® from Nano-Diamond America, Inc. is the most cost effective option. Forget servicing requirements and keep Nano-Die® spares in stock as you see fit.

Customer specified or NDA recommended profile

The profile of a Nano-Die® can be delivered based on our recommendation for your materials, drawing or compacting parameters. Alternately, if you prefer, NDA agents will work with you exactly to your die profile specifications. Conoptica report verification is available as required.

Attention to detail in the compacting profile is an important part of the Nano-Diamond America service



Example Compacting Profile Notes

1. RA $\alpha=20^\circ \sim 22^\circ$ unless specified.
2. Approach angle $\beta=60^\circ \sim 80^\circ$
3. Blending γ (between α and $\beta =40^\circ \sim 55^\circ$)
4. All zones well blended

Nano-Dies® for Cable Compacting and Stranding



There is a huge amount of raw material and money to be saved or lost in the stranding and compacting operations of energy cable manufacture.

Using Nano-Dies® equates to maximum savings and best practice.

Many cable manufacturers have found replacing tungsten-carbide dies with Nano-Dies has resulted in raw material savings.

Nano technology has now delivered dramatic improvements. Nano-Dies® enable an additional 2% of total raw material to be saved due to zero wear during the entire life of the die. Nano-Dies® are available up to Ø100mm. PCD dies can be more expensive than Nano-Dies® by a factor of 20 times or more depending on diameter.

Nano-Dies® for Wire and Tube Drawing

Low cost, low friction, and long life can result in very significant price/performance improvements over PCD dies. Some such wire and tube applications include:

- Low carbon and Stainless steel
- Non-Ferrous Metals
- Copper, Aluminium and Al Alloys, especially where mechanical and electrical properties must be optimized.



Low carbon and Stainless steel wire and tube



Copper/Aluminium Rod breakdown



Copper/Brass tube etc.

Customer advice feeds directly back from around the world into the Nano-Die® production processes and technical product understanding. In this way, Nano-Die® has been continuously improving its technology and production processes since inception.

The latest generation of Nano-Die® is proving to be the best yet again.

Nano-Diamond America is constantly growing its global footprint and improving product distribution and sales support processes.

NDA is focused on its vision to make the Nano-Die® readily available everywhere and to ensure that customers have access to sales, distribution and support channels that work most effectively and cost efficiently for their requirements.

Trial Nano-Dies® and take advantage of the benefits.



NANO-DIAMOND AMERICA, INC.

2025 Woodbrook Court, Charlottesville, VA 22901 U.S.A.

Tel: +1 434.220.0435 • Fax: +1 804.980.7770

www.nano-die.com