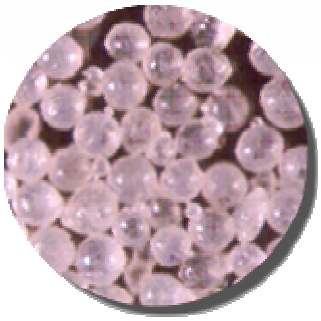
A D N



For more than 10 years, our R&D teams perform research and development of new energetic substances to satisfy the future requirements of our customers. Leading worldwide specialist in the field of high explosives, EURENCO offers further new energetic molecules like ADN, thanks to its modern multipurpose units. ADN is manufactured by the company since 1997, using a method invented by FOI, the Swedish Defense Research Agency.

PRODUCT

- Trade name: ADN
- Chemical name: ammonium dinitramide
- Chemical formula: $NH_4^+N_3O_4^-$
- Purity: minimum 98%
- Strong oxidizer and high explosive with 3 qualities: crystalline ADN, prilled and coated ADN and a special ultra-pure grade for spacecraft application.
- ADN is also compatible with different polymeric binders and can be cured with some isocyanates

CHARACTERISTICS

- Density: 1.8183 g/cm^3
- Melting point: 92 °C
- Heat of formation: -148 kJ/mole
- Heat of combustion: 980 kJ/mole
- Vacuum stability at 85°C/40h: 0.88 ml/g (0.33 ml/g for prilled ADN)
- Drop weight sensitivity: 31 cm (RDX: 38 cm) and 40 cm for prilled ADN
- Friction sensitivity (ISF): > 350 N
- Impact sensitivity (ISI) : 3-4 J
- Autoignition temperature: 160°C
- Detonation velocity: Approx. 7000 m/s

USES

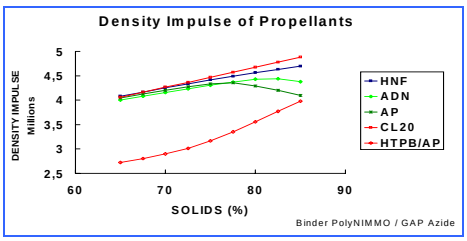
ADN has many potential applications as an oxidant replacing ammonium perchlorate (AP): ADN can be used in composite rocket motor propellants for surface-to-air and air-to-air missiles and rockets, with no secondary smoke burning and higher impulse than ammonium perchlorate. Furthermore, ADN has nearly the same performance as CL-20 and HNF with lower prices.

ADN can also be used as an oxidizer and a high explosive in depth charges, such as underwater ammunition (torpedoes, underwater mines, etc.). ADN, in combination with the fuel Al, has shown to outperform compositions of AP/RDX/Al type in terms of higher bubble energies for depth charges.

ADN is also used as a liquid mono propellant, in replacement of hydrazine, for rocket motors used in spacecraft propulsion. Non-toxic mono propellant, ADN brings a higher impulse than hydrazine with reduced risks and costs

RESULTS

Calculated specific impulse in MNs/m^3 for ADN-based HTPB formulations compared with formulations based on HNF, CL20 and AP:



Performance and toxicity compared with hydrazin and HAN:

	PERFORMANCE I_{sp} (Ns/kg)	**TOXICITY** LD50 rat, orally (mg/kg)
ADN/glycerol/water	2420	1360
HAN/glycine/water	2001	325 (pure HAN)
Hydrazine	2325	59

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