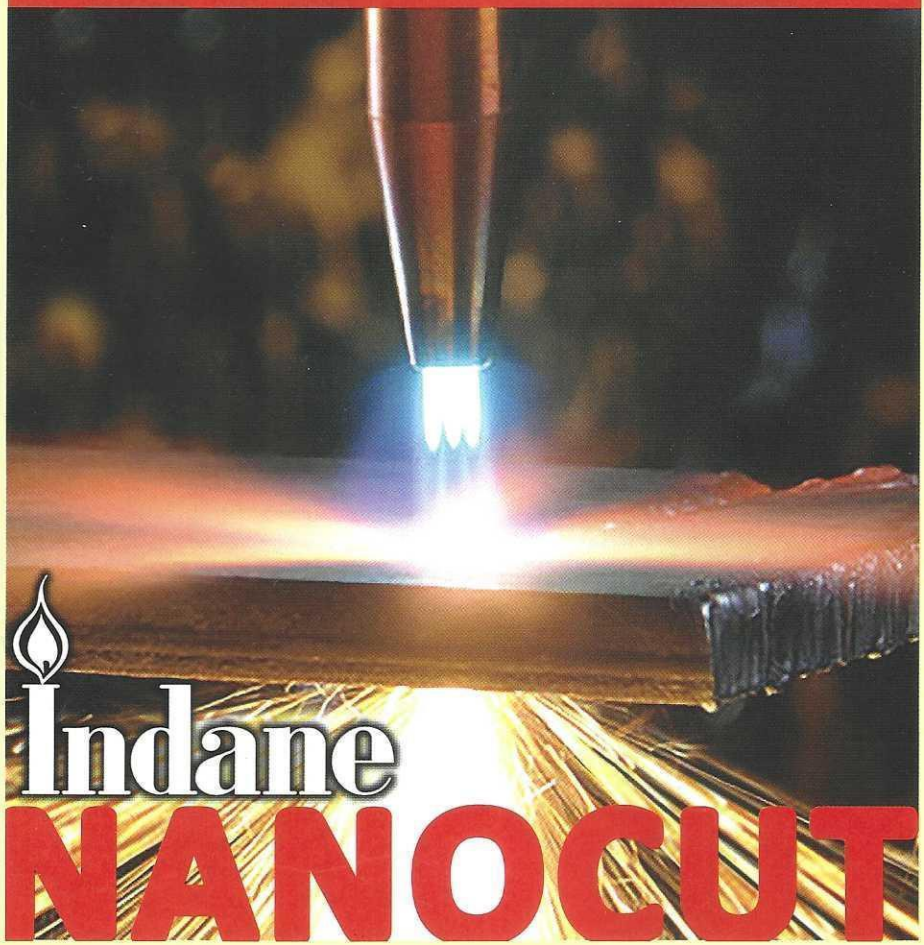
SLICE THROUGH METAL WITH POWER OF NANO



Cost-effective metal cutting solution from IndianOil.

इंडियनऑयल
IndianOil

NANOCUT

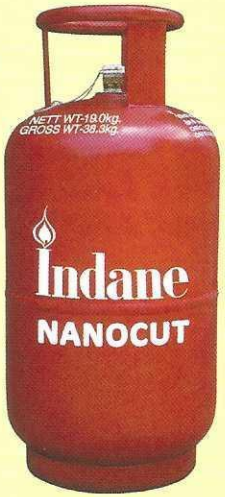
HI-THERM INDANE CUTTING GAS

Indane NANOCUT

High Therm Indane Cutting Gas

Besides being India's largest commercial enterprise and the highest ranked Indian company in Fortune's Global 500 listing, IndianOil is also India's most valuable and most trusted petroleum superbrand. With its 42,000 retail touch points, IndianOil is the undisputed leader in petroleum marketing, reaching out to every nook and corner of the country. IndianOil through its advanced R&D facility with over 250 national and international patents to its credit, has now developed Indane **NANOCUT**.

Indane **NANOCUT**, the high-therm cutting gas is a brand new product from the stable of IndianOil's brands personifying the ethos of IndianOil to design products around the customer needs.



Why Indane NANOCUT?

Conventionally metal cutting applications involve the use of oxy-acetylene mixture. Owing to its high shock sensitivity and very large flammability range, use of oxy-acetylene gas in metal cutting is fraught with the potential hazard of explosion during usage/ storage and hence is being increasingly discouraged despite its advantages of higher flame temperature and calorific value. The search for a safer, cheaper and widely available alternative to oxy-acetylene has led to Liquefied Petroleum Gases (LPG) emerging as an effective option for metal cutting applications. However, the comparatively lower flame temperature of LPG, imposes a limitation on high temperature applications like metal cutting. This has been a dampening factor in the wider use of LPG as a cutting gas.

Make in India

With the primary objective of enhancing the performance of LPG for high flame temperature applications, IndianOil's R&D with its cutting edge technology has developed an innovative proprietary additive formulation. This additive, developed in-house enhances multi-fold the efficiency of LPG as a cutting gas in terms of high flame temperature, heat throughput, lower oxygen consumption and cost effectiveness. Indane **NANOCUT** - a new product from IndianOil, additised with this new formulation, is a superior cutting gas that provides a range of solutions for high temperature industrial applications including metal cutting.

Indane **NANOCUT**, widely available through the extensive distribution network of IndianOil, ensures faster, cleaner and sharper cuts with reduced slag and wastage. The cost effective **NANOCUT** consumes much lesser oxygen and gives out a soot-free and low glare flame while operating at lower operating pressures. Indane **NANOCUT** can be easily transported and stored at site and is also absolutely safe to handle with much lower torch nozzle maintenance.

Indane **NANOCUT** has a proven compatibility to industrial cutting gas distribution systems made of

Indane NANOCUT provides:

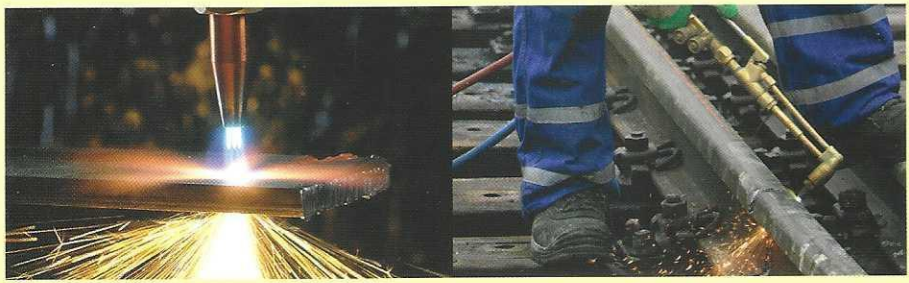
- Industrially acceptable safe alternative to the oxy-acetylene cutting process
- Extremely high flame temperature (adiabatic inner flame temperature in oxygen-3100^{0}C)
- Superior metal cutting ability in terms of higher heat output compared to the commercial reference cutting gas, enabling cutting jobs with larger cross sections
- Lower consumption rates, shorter pre-heat time, excellent cut surface finish, improved penetration & cutting speed, finer kerf, sharper key-hole formation and less oxide/slag formation for all thicknesses of plates

Indane NANOCUT - Potential Applications

- Indane **NANOCUT** is highly recommended for sectors involving metal cutting, heating, straightening, hardening, welding, soldering, brazing, coating etc. which are currently using either oxy-acetylene or standard LPG. Indane **NANOCUT** will provide a thermal temperature much higher than that of LPG or other commercially available LPG based products. The superior performance of Indane **NANOCUT** has been established through extensive field trials and testing by various laboratories
- Cutting of carbon steel, low, medium & high alloy steel plates/ingots of any desired thickness
- Flame hardening applications
- Other industrial heating applications

Typical savings potential from usage of Indane NANOCUT

Plate thickness	% Reduction in consumption of cutting gas (vis-a-vis commercial LPG products)
10mm – 25mm	15%
> 25mm	30%



Indane NANOCUT

Compatible to both automated and manual hand held torch systems

Particulars	Propane	n- Butane	INDANE LPG	Acetylene	INDANE NANOCUT
PHYSICAL PROPERTIES OF GASEOUS FUELS					
Chemical Formulae	C_3H_8	C_4H_{10}	n-Butane & Propane Mix	C_2H_2	AdditisedButane - Propane Mix
Max. Vapour Pressure in kPa at 40°C	1550	520	1050	6000	1050
Liquid Density at 1.013 bar & at Boiling Point (kg m^{-3})	580.88	601.26	560.54	378.20	560.54
Specific Gravity of Gaseous Phase air=1	1.55	2.08	1.75	0.91	1.75
Boiling Points at 1.013 bar (°C)	-42.11	-0.49	-2	-84.7	-2
Liquid /Gas equivalent at 1.013 bar and at 15°C (vol/ vol)	306	236	270	663	270
COMBUSTION PROPERTIES					
Auto Ignition Temperature (°C/°F)	480/896	405/761	488/910	325/617	488/910
Ideal Combustion Ratio (Oxygen to gas)	4.3:1	5.1:1	4.7:1	1.2:1	4.7:1
Ideal Combustion Ratio (Air to Gas)	20.5:1	24.3:1	22.4:1	5.7:1	22.4:1
Gross Calorific Value (MJ m^{-3})	101	133	117	59	117
Adiabatic Inner Flame Temperature in Oxygen (°C)*	2588	2596	2594	3200	3100
Inner Flame Temperature in Air (°C)*	2034	2039	2037	2500	2650
Max. Inner Flame Temperature (°C)#	--	--	1934	--	>>2300
HSE DATA					
Backfire Tendency	Low	Low	Low	High	Low
Shock Sensitivity	Stable	Stable	Stable	Unstable	Stable
Toxicity	Low	Low	Low	Low	Low
Flammability Limits in Air (%)	2.20-9.50	1.50-8.50	1.80-9.50	2.40-83.00	1.80-9.50
Flammability Limits in Oxygen (%)	2.40-57.0	1.60-51.0	2.40-57.0	3.0-93.0	2.40-57.0

*Calculated values #Experimental values using thermocouple

Handling & Protection:

Personal protective equipment (PPE) is critical in a fabricating shop involved in metal cutting operations for several reasons. The Occupational Safety is of immense importance for the industrial sector. Hazards exist in every workplace in many different forms and controlling a hazard at its source is the best way to protect employees.

Employers must provide personal protective equipment (PPE) to their employees and ensure its use. Examples of PPE but not limited to items as gloves, foot and eye protection, protective hearing devices (earplugs, muffs) hard hats, and full body suits.

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HI-THERM INDANE CUTTING GAS

Available at all Indane Distributors.