

LPG based High Therm Metal Cutting Gas



NANOCUT

HI-THERM INDANE CUTTING GAS

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IndianOil

“Indane NANOCUT is additized LPG with specific use for metal cutting and related high temperature applications”

- ❖ Higher Flame temperature
- ❖ Higher heat output
- ❖ Better cutting finish
- ❖ Low consumption of LPG
- ❖ Safer than oxy-Acetylene
- ❖ Nontoxic & safe to handle
- ❖ Industrially acceptable



INDANE NANOCUT A REVOLUTIONERY TECHNICAL INNOVATION

- ❖ **8th India Nanotechnology Innovation Award- 2015**
by Prof. C.N.R. Rao, Bharatratna
- ❖ **Petrofed Innovator of the Year (Team) Award- 2015**
by Ministry of Petroleum & Natural Gas

- Indian Railways
- Bridge & Roof Co. of India Ltd.
- Neveyli Lignite Corporation, Chennai
- Braithwaite & Co. – Kolkata
- BGR Mining – Nevyeli
- Rail Wheel Plants

~ 500 MT sold so far

- Indane NANOCUT additized with indigenously prepared nanodispersion to increase inner flame temperature.
- The Additive chemically propagates “Loop Combustion” in the inner flame zone.
- Indane NANOCUT evaluated & found superior for
 - ✓ Flame temperature
 - ✓ Cutting Efficiency



Particulars	INDANE LPG	INDANE NANOCUT	Acetylene
Liquid/ Gas equivalent at 1.013 bar and at 15 °C (vol/ vol)	270	270	663
Auto Ignition Temperature (°C/ °F)	488 / 910	488 / 910	325 / 617
Gross Calorific value in MJ m ⁻³	117	117	59
Adiabatic Inner flame temperature in Oxygen (°C)*	2594	3100	3200
Inner flame temperature in air (°C)*	2037	2650	2500
Max. Inner flame temperature (°C)#	1934	>>2300	--
Backfire tendency	Low	Low	High
Shock Sensitivity	Stable	Stable	Unstable
Flammability limits in air (%)	1.8 - 9.5	1.8 - 9.5	2.4 - 83.0
Flammability limits in Oxygen (%)	2.4 - 57.0	2.4 - 57.0	3.0 - 93.0

*Calculated values

Experimental values generated at accredited lab

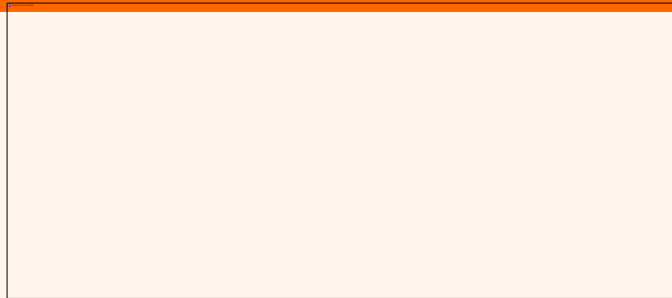


Plate thickness	% Reduction in consumption of LPG
10mm – 25mm	15
> 25mm	30

- Performed excellent at Steel Plants, ship braking yard, Alang and Bhavnagar in Gujarat. Successfully cut metal sheets upto **400 mm**.
- Able to cut Bevel with superior cut surface finish.
- Indane NANOCUT has been certified by WRI, Trichy for superior cutting performances



➤ Better performed in cutting in following

✓ Penetration	✓ Pre heat temperature, °C
✓ Length of cut	✓ LPG fuel consumption
✓ Kerf formation	✓ Oxygen consumption
✓ Key hole formation	✓ Back firing tendency
✓ Cutting Speed	✓ Surface finish

➤ Indane Nanocut outperformed in achieving

- ✓ Higher speed of cut even beyond the AWS recommended speeds for all thicknesses without compromising performance

Yellow – Neat LPG

Blue – Indane Nanocut

Plate Thickness (mm)	LPG cons. (g)	Oxygen cons. (g)	Cutting speed (mm/min)	Time for cut (min)	% Time savings	Oxygen Quantity per g of LPG per unit speed
7	25	350	350	4.34		0.040
7	40	300	480	3.17	27.1	0.016
16	55	400	290	5.52		0.025
16	55	350	380	4.21	23.7	0.017
32	80	600	250	4.23		0.030
32	80	600	310	3.41	19.4	0.024
63	100	800	250	5.60		0.032
63	100	800	290	4.83	13.8	0.028
115	100	1500	160	8.66		0.094
115	100	1400	180	7.69	11.1	0.078

- Performance on shop floor/ on site was rated EXCELLENT
- Higher cutting speeds achieved even beyond AWS recommended speeds for all thicknesses without compromising performance.
- 10-20% savings of Oxygen and LPG consumed was observed
- Has provided comparable pre-heat times for all thicknesses as against Oxy-Acetylene (DA).
- Very good surface finish and lesser oxide layer formation observed.
- Able to cut bevel at different angles (45 and 60) with good surface finish.
- No pressure drop was found up to 15 meter of LPG circuit hose
- The back firing tendency in the nozzle was observed to be NIL
- The fumes were bright with lesser odor as compared to normal LPG
- The formulation is found highly operator friendly.

Toxicology Analysis of the Product carried out through an internationally accredited laboratory.

S. No.	Analysis	Ready to Dope Additive	GHS Hazard Category
1	Oral toxicity in Rat (LD ₅₀)	>2000 mg/ kg	Category5: > 2000 < 5000mg/kg May be harmful
2	Acute Inhalation Toxicity (LC ₅₀)	>30.72 mg/ L	Category4: > 10 < 20 mg/L Harmful if inhaled Non Harmful
3	Toxicity to Fresh water fish (LC ₅₀)	>100 mg/ L	Category3: >10< 100 mg/L Harmful to aquatic life Non Toxic
4	ACGIH TLV	480 - 560 mg/ m ³	Non Toxic

The Indane Nanocut is nontoxic and safe to handle.

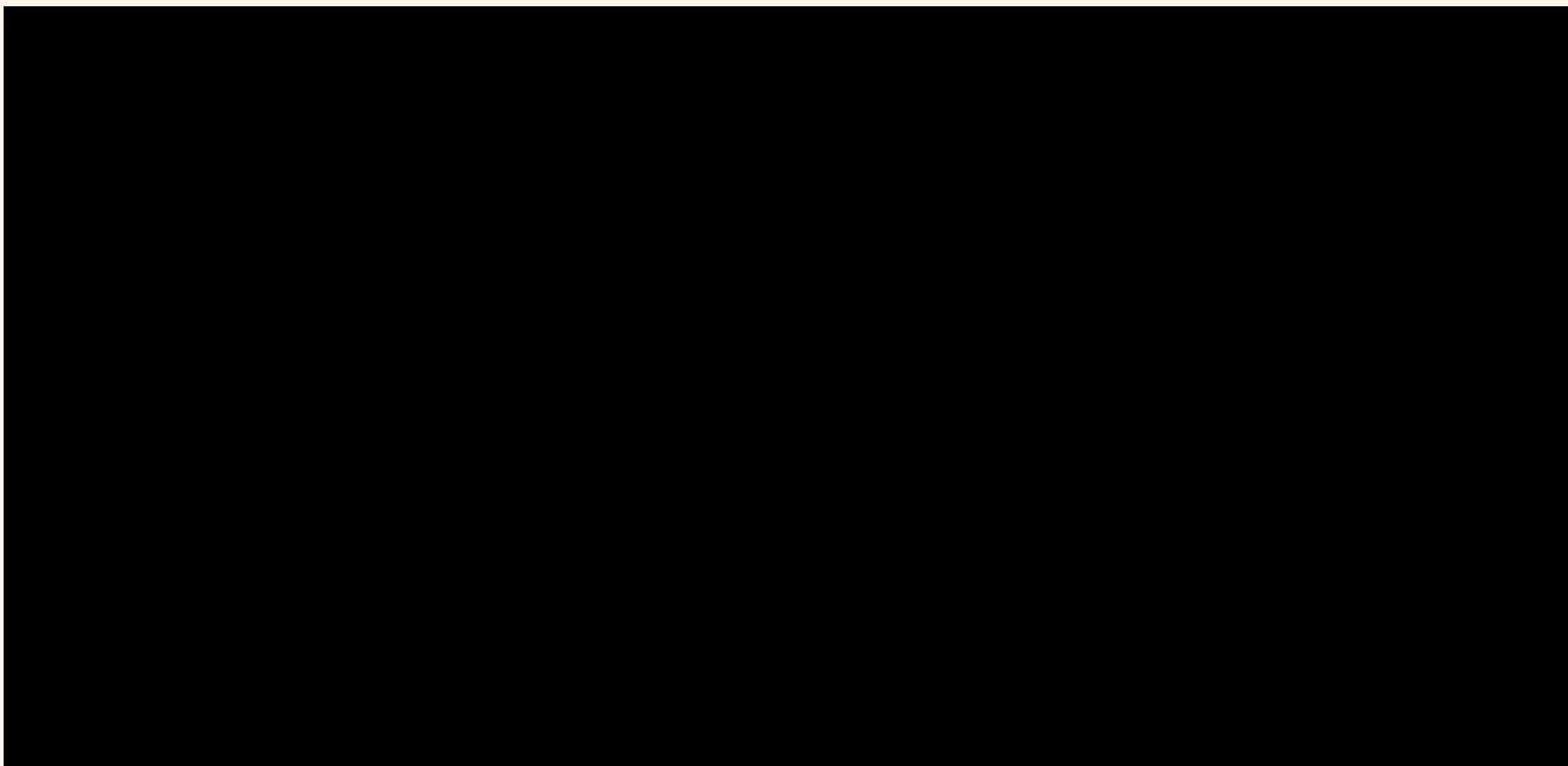
GHS: Globally Harmonized System of Classification and Labelling of Chemicals (GHS); ST/SG/AC.10/30/Rev.5, 2013

ACGIH: American Conference of Governmental Industrial Hygienists



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- ❖ **Highly recommended for applications which involve**
 - **Metal cutting**
 - **Cutting of carbon steel, Low, Medium & High alloy steel plates / Ingots of any desired thickness**
 - **Heating**
 - **Straightening, soldering, brazing.**
- ❖ **Flame hardening applications**
- ❖ **Others....**



NANOCUT

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Distribution network

North Zone	
Nabha	Punjab
Jalandhar	Punjab
Una	Punjab
Karnal	Haryana
Kanpur	Uttar Pradesh
Loni	Uttar Pradesh
Jaipur	Rajasthan

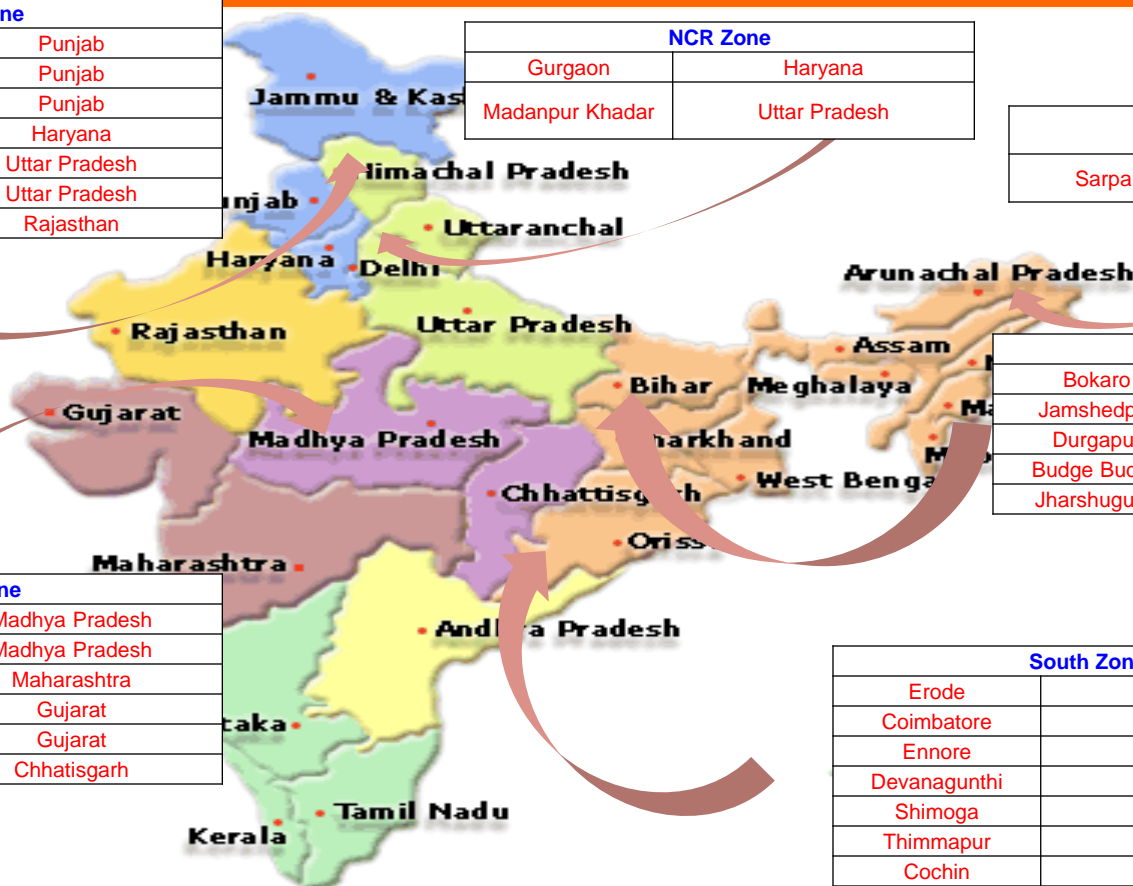
NCR Zone	
Gurgaon	Haryana
Madanpur Khadar	Uttar Pradesh

NE Zone	
Sarpara	Assam

East Zone	
Bokaro	Jharkhand
Jamshepur	Jharkhand
Durgapur	West Bengal
Budge Budge	West Bengal
Jharshuguda	Odisha

West Zone	
Bhopal	Madhya Pradesh
Ujjain	Madhya Pradesh
Pune	Maharashtra
Ahmedabad	Gujarat
Bhavnagar	Gujarat
Raipur	Chhatisgarh

South Zone	
Erode	Tamilnadu
Coimbatore	Tamilnadu
Ennore	Tamilnadu
Devanagunthi	Karnataka
Shimoga	Karnataka
Thimmapur	Telangana
Cochin	Kerala



- ✓ **BE SAFE**
- ✓ **SAVE YOUR FUEL**
- ✓ **HIGHER PRODUCTIVITY**
- ✓ **ENHANCED REVENUE**
- ✓ **WORKFORCE'S DELIGHT**

Thank you!