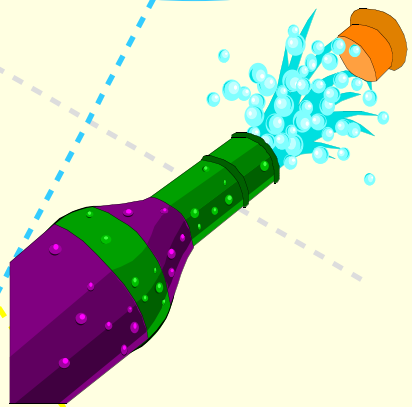
COZ

ALCOHOL

MISERY - MYSTERY

SOLVED



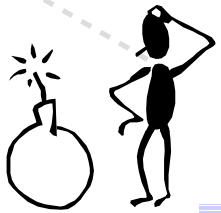
8/8/2000

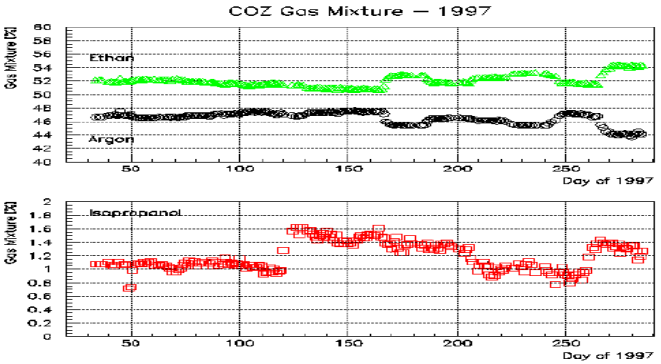
T.Kurca

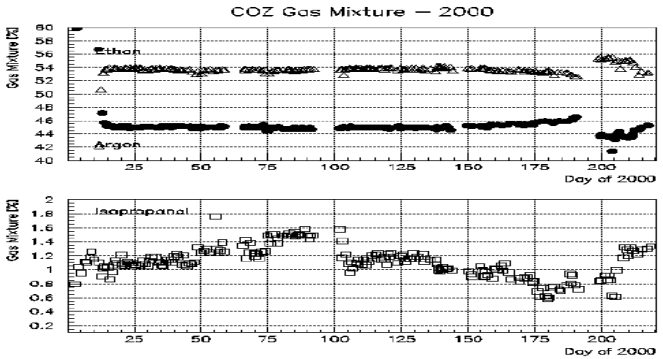
COZ Alcohol Problems

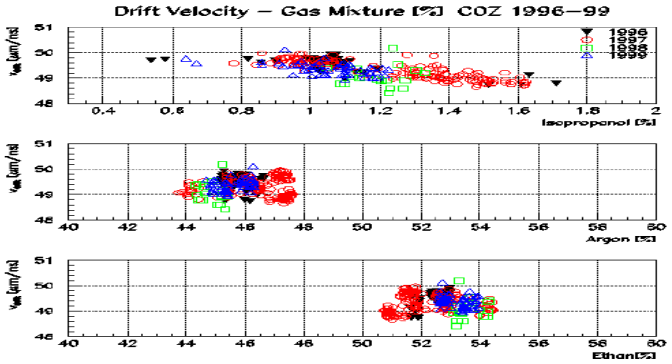
- COZ gas mixture Ar/Ethan (48/52) + 1 % Isopropanol

- Isopropanol
  - originally mainly as anti-aging additive
  - experience :
    big effect on the operation stability
    ---> 1.2-1.5 % needed
- Not understood instabilities 0.7 - 1.7 %
  - trips ----> reduction of HV & Ar fraction,
    low efficiency, damages ?
  - unstable drift velocity




COZ Gas Mixture — 1997
Gas Mixture [%]
Ethan
Argon
Day of 1997
Isopropanol
Gas Mixture [%]
Day of 1997


COZ Gas Mixture — 2000
Gas Mixture [%]
Ethan
Argon
Day of 2000
Gas Mixture [%]
Isopropanol
Day of 2000


Drift Velocity – Gas Mixture [%] COZ 1996–99
1996
1997
1998
1999
Isopropanol [%]
Argon [%]
Ethan[%]

$CH_3(CH_2)_2OH$

1-Propanol

$CH_3 \bullet CH_2 \bullet CH_2 \bullet OH$

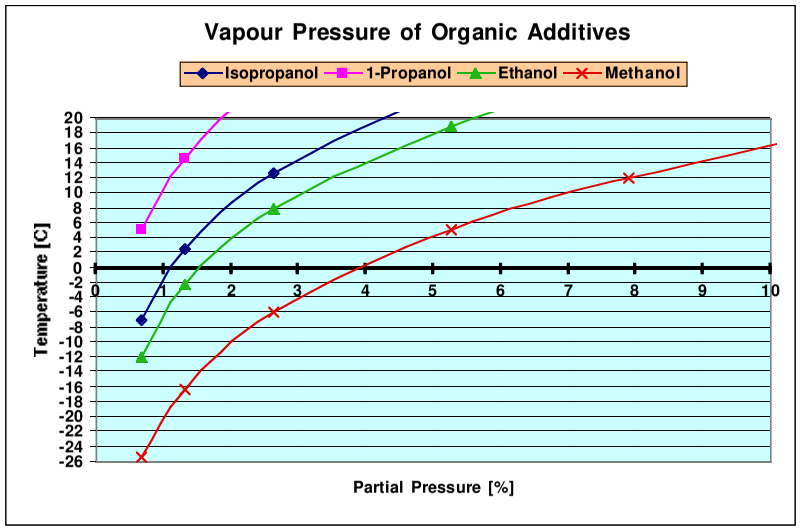
$\Leftrightarrow$

$(CH_3)_2CHOH$

2-Propanol

$CH_3 \bullet CH \bullet OH \bullet CH_3$

- There are 2 Propanols …
- General confusion - e.g. M.Atac -FN-376,CDF 146, 1982
  - Which one is Isopropanol ?
  - Makes it any difference ?
  - Look ⇨ Vapour Pressure vs Temperature
- 2-Propanol = Isopropanol
- COZ refilled randomly with both Propanols !


Vapour Pressure of Organic Additives
Isopropanol
1-Propanol
Ethanol
Methanol
Temperature [C]
20
18
16
14
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
0
1
2
3
4
5
6
7
8
9
10
Partial Pressure [%]

Use Only Real Isopropanol

- Heating of the Iso-bath limited to $9^0 C$
- Not perfect thermal isolation of Iso-container
- ⇨ effective temperature < $9^0 C$
- ➡ with 1-Propanol impossible to reach > 1%
- From 19.7.2000 used only 2-Propanol = Isopropanol
- ➡ Stable and high content 1.36 % at $6^0 C$
- ➡ Stable COZ at relatively high HV
- ➡ Gas Mixture back at higher Argon fraction ~ 47 %