

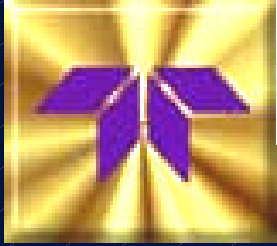


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CO₂ PURITY ANALYSIS

An Application Overview
on the need to detect impurities
in CO₂ used in the beverage industry



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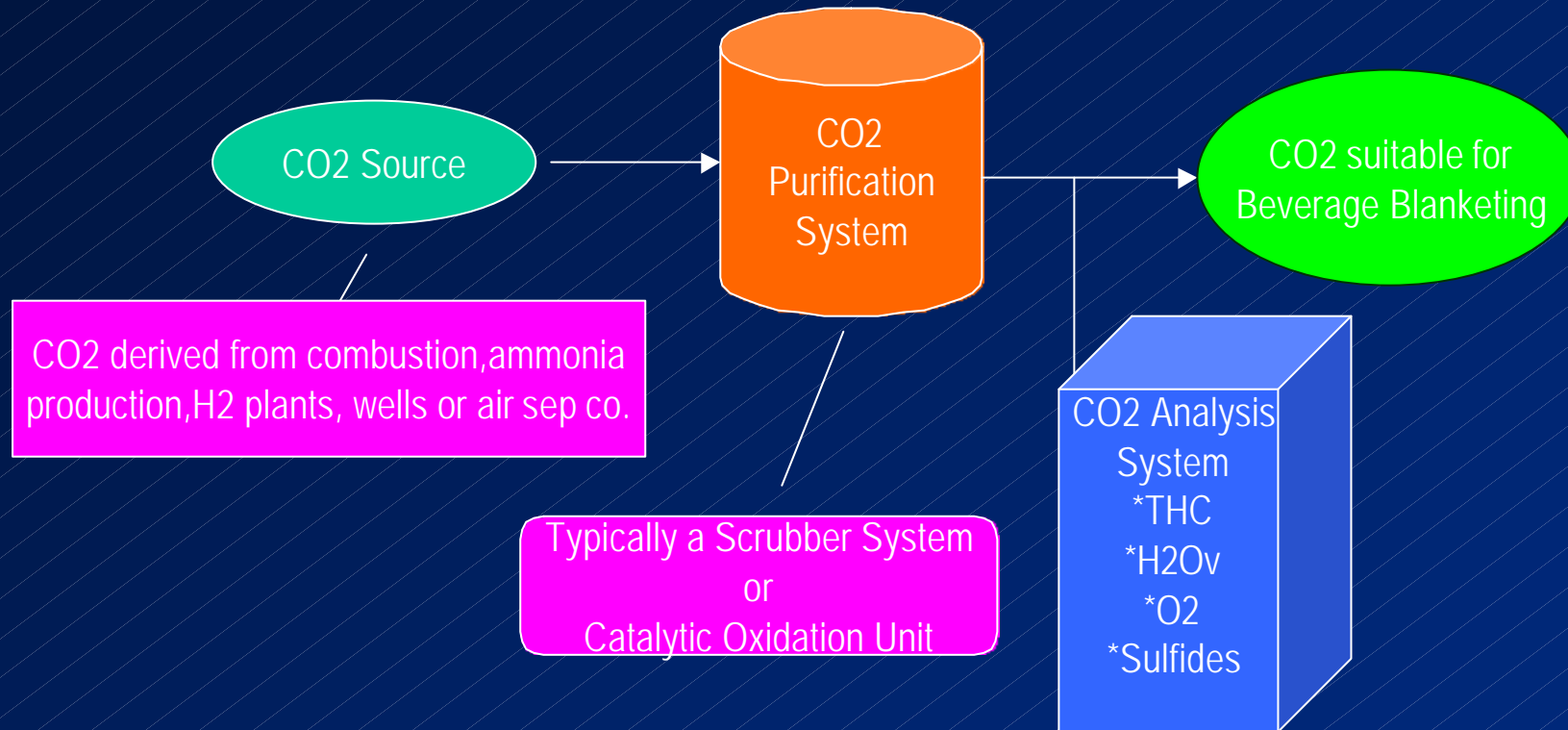
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APPLICATION DETAILS

- ❑ **INDUSTRY:** Food & Beverage (Soft Drink Producers, Breweries) & Air Separation Companies
- ❑ **CUSTOMERS:** Coke, Pepsi, A/L, Praxair, APCI, Linde, etc
- ❑ **LOCATION:** World-wide bottling plants
- ❑ **APPLICATION:** Detection of trace (ppm) levels of THC, O₂, H₂O_v and Total Sulfides in CO₂ used in bottling & canning process
- ❑ **TAI PRODUCT (System Concept):**
 - ▶ Model 402REU (THC); Model 3190 (PPM O₂)
 - ▶ Model 8800A (H₂O_v), Model 6200A (Sulfides)



Process Diagram





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MARKET DISCUSSION

- ❑ The International Society of Beverage Technologists (ISBT) have suggested standards upon which impurities in CO₂ must be analyzed for public safety.
- ❑ Coca-Cola, PEPSI Co, etc install CO₂ Impurity Analysis Systems to ensure compliance & product quality.
- ❑ Benzene impurities in Perrier Water as well as an H₂S concern for Coke in Europe have heighten awareness and propelled this new market opportunity.
- ❑ Breweries have been analyzing ppm O₂ in CO₂ for product quality purposes for years. Too much O₂ in a beverage (beer or soft drink) makes the product taste "flat."



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LEADING BEVERAGE PRODUCER STANDARDS

COCA-COLA

- ❑ Purity = 99.9% CO₂
- ❑ H₂Ov = < 20ppm
- ❑ Oxygen = < 30ppm
- ❑ Total HC's (as CH₄ eq)
= < 50ppm
- ❑ Total Sulfides = < 1ppm

PEPSI - COLA

- ❑ Purity = 99.9% CO₂
- ❑ H₂Ov = < 20ppm
- ❑ Oxygen = < 30ppm
- ❑ Total HC's(as CH₄ eq)
= < 20ppm
- ❑ Total Sulfides = < 1ppm



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TAI SOLUTION

❑ ANALYZERS

- ▶ Model 402REU Total Hydrocarbons *0-10 & 100ppm CH₄ eq.*
- ▶ Model 3190 Trace Oxygen Analyzer (A-2C) *0-10 & 0-100ppm O₂*
- ▶ Model 8800A Trace H₂O_v Analyzer *0-20ppm H₂O_v*
- ▶ Model 6200A for Total Sulfides Analysis *0-50ppb to 20ppm*
- ▶ Model IR-7000T Trace CO Analyzer *0-5 & 0-50ppm CO (Optional)*

❑ SAMPLE SYSTEM

- ▶ See Attached Piping Diagram

❑ SYSTEM ENCLOSURE

- ▶ Free-standing Phone-Booth Type Enclosure with Rear Access Door incorporating all analyzers and sample conditioning system



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MARKET STRATEGY

- ❑ Approach all Soft Drink & Brewery Bottling Plants World-wide with TAI Solution via TAI rep network.
- ❑ Cooperate with all major Air Separation companies who provide Beverage grade CO₂ to bottling plants. Try to integrate our system into their CO₂ Purity Solution. *Same concept as Gas Purifier in Semicon plant.*
- ❑ Provide a cost-effective, modular system design to allow for system flexibility based on individual user requirements.
- ❑ Obtain ISBT Approval for TAI System as a suitable device for CO₂ Purity Analysis within the beverage industry.
- ❑ Offer cost effective system without Sulfides Analysis(option)



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TAI Proven Track Record

TAI has provided analyzers to the following user's for this appl:

- ❑ BOC(China) - 7 x 402R THC units
- ❑ Malaysia Oxygen - 2 x 402R's
- ❑ Air Liquide (N.Z.) - 1 x 402R &
 - ▶ 1 x IR-7000T for 0-5ppm CO
- ❑ Coca-Cola (Brasil)
 - ▶ 1 x 6200A Total Sulphides in CO₂ and 1 x 402R THC in CO₂

Pending Projects:

- ❑ Praxair (Korea)
- ❑ Messer (Brasil)
- ❑ Coca-Cola (Argentina)

