Mars Construction, LLC

Title: Rocket Propellant Plant Design (Phase I in progress)

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By: Gjr
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Design Variables need to be defined:

Starship Propellant Tanker for use in refueling in low Earth orbit of Lunar and Mars vehicles.

Design Specifications:
    Height:
    Length:
    Volume:

Zubrin Design

Dr. Robert Zubrin, NASA - Aerospace Engineer, Author, designer of CO_2 propellant plant, built prototype, 1992
    H_2O (ice) from soil, CO_2 from atmosphere, material extraction from soil (iron, etc.)

    $2H_2O + CO_2$ (abundant on Mars) --> $2O_2 + CH_4$ (propellant created on Mars)

CH_4/O_2 propellant - Deep Cryo Methanol, Methane, Design principal proven with prototype.

Also, use the Sabatier process and Sabatier images of processes
Need to identify process and generate P&ID's

Pictures of propellant plant 1, propellant plant 2, propellant plant 3, propellant plant 4, propellant plant 5

Design to Scale:
Design to scale #1 - process package to generate propellant in 2 months for re-fill Starship for return trip to Earth.
Design to scale #2 - FULL cargo package design for processing & storage for re-fill multiple Starships for return trip to Earth.

(link to Launch Details will determine amount of propellant generation and storage)

CH4 Synthesis — Sabatier process

CO2 0.06 kg
H2 0.01 kg
Heat 0.18 MJ
Waste water 0.05 kg
CH4 [MJ]

H HYDROGEN
Na SODIUM
Mg MAGNESIUM
K POTASSIUM
Ca CALCIUM
O OXYGEN
Ti TITANIUM
Cr CHROMIUM
Fe IRON
Ni NICKEL
Al ALUMINUM
Si SILICON
P PHOSPHORUS
S SULFUR
Cl CHLORINE

Propellant Processing On Mars