

TUBE SKID

NK Group is based in the major port city of Busan, South Korea. NK Group is recognized as a world leader in the design, engineering, manufacture and supply of high pressure jumbo tubes to the international gas companies and fire protection and safety systems to the international shipping industry. NK Group works in close cooperation with the major worldwide gas companies, shipyards and shipping companies.




Green Promise for the People





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| INDUSTRIAL GAS (H₂/He/N₂, etc.) | CNG | CNG TYPE2 | ULTRA HIGH PURITY GAS (SiH₄/NF₃/SF₆/N₂O, etc.)
| MOBILE STATION | HYDRAULIC POWER SYSTEM | TON-TANK | ASME STORAGE VESSEL | AIR PRESSURE VESSEL



SPECIAL INTERNAL GRINDING
Internal Roughness : 3S
Moisture Level : Below 1.0 ppm available



HYDROGEN / HELIUM

INDUSTRIAL GAS (H₂/He/N₂, etc.)

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Skid Length	Item	Tube Q'ty & Length	Working Pressure (bar)	Total Water Capacity (liter)	Total Gas Capacity (H ₂ /m ³)
20'	TT08-1045	8 / 5,335 mm	200	8,360	1,472
	TT12-1045	12 / 5,335 mm	200	12,540	2,208
32'	TT11-1610	11 / 8,032 mm	200	17,710	3,122
	TT10-1795	10 / 8,845 mm	200	17,950	3,164
40'	TT08-2250	8 / 10,980 mm	200	18,000	3,173
	TT11-2250	11 / 10,980 mm	200	24,750	4,363
	TT12-2455	12 / 11,610 mm	200	29,460	5,336 (He/m ³)

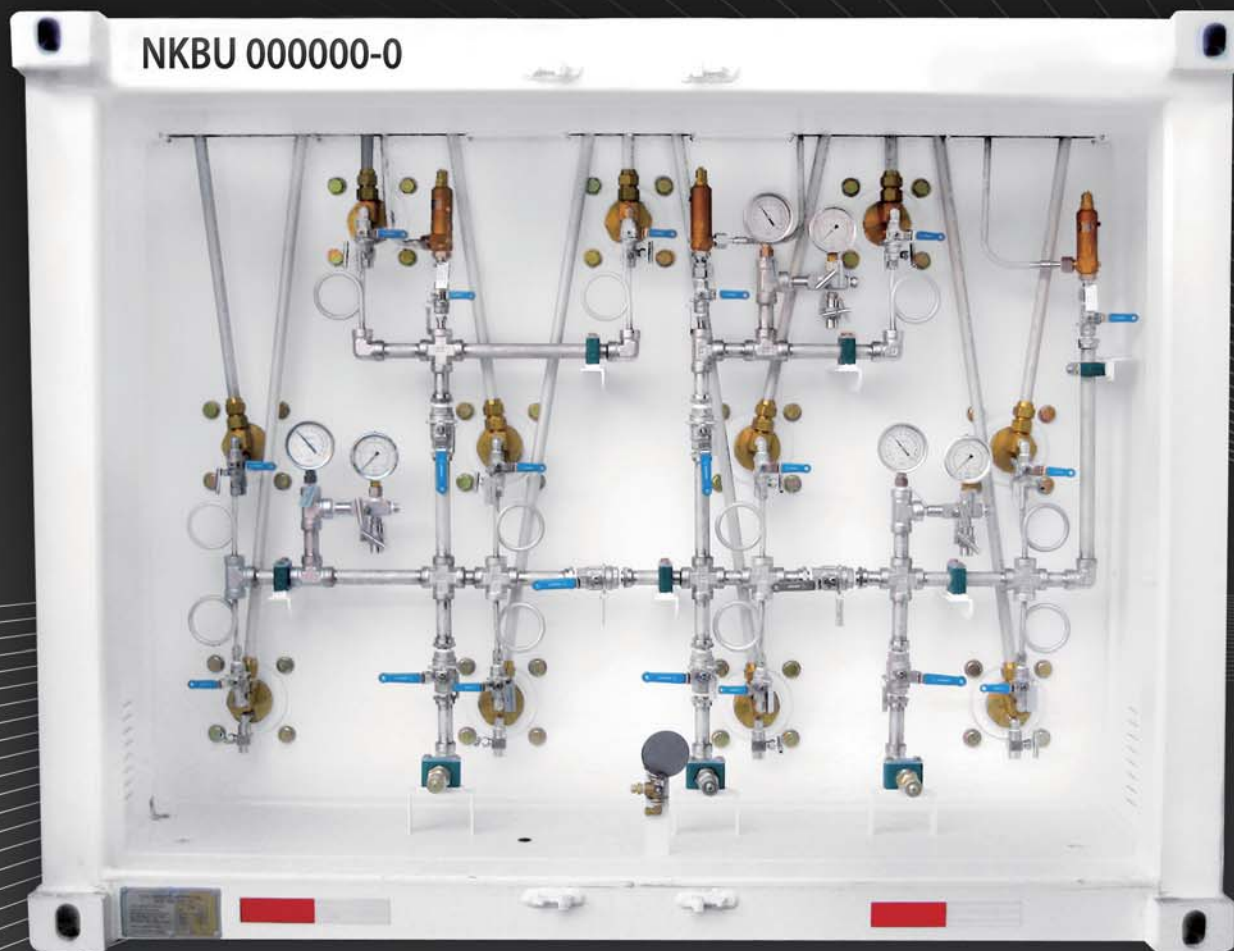
* 2455L : non-embrittlement gas use only



INDUSTRIAL GAS TUBE SKID

With same construction of ISO containerized skid, NK Group provides various industrial Gas Tube Skids such as He (Helium), H₂ (Hydrogen), Ne (Neon), N₂ (Nitrogen), Ar (Argon) including CNG(Compressed Natural Gas), etc.

The working pressure is set to national requirements or customers' demands such as 166bar, 200bar, 250bar. The color of jumbo tube and skid frame is followed to ISO color code or designation of the customer.



CNG
(Compressed Natural Gas)

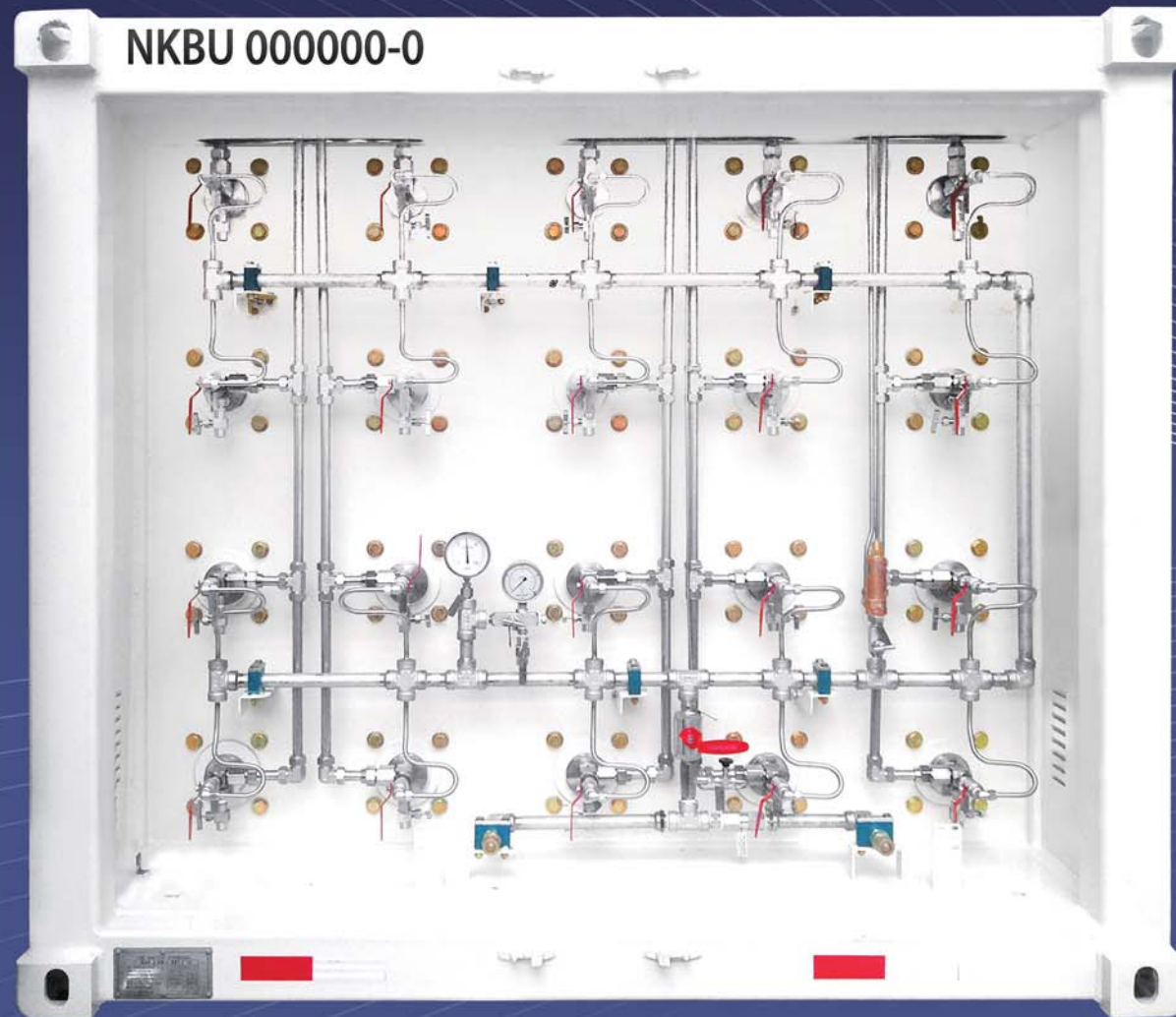
CNG (Compressed Natural Gas)

Skid Length	Item	Tube Q'ty & Length	Working Pressure (bar)	Total Water Capacity (liter)	Total Gas Capacity (CNG/m ³)
20'	TT08-1045CNG	8 / 5,335 mm	250	8,360	2,486
	TT12-1045CNG	12 / 5,335 mm	250	12,540	3,729
32'	TT11-1795CNG	11 / 8,845 mm	250	19,745	5,528
40'	TT08-2240CNG	8 / 10,980 mm	250	17,920	5,330
	TT11-2240CNG	11 / 10,980 mm	250	24,640	7,362
40' / Lighter	TT08-2420CNG	8 / 11,610 mm	250	19,360	5,760
	TT10-2420CNG	10 / 11,610 mm	250	24,200	7,200
	TT11-2420CNG	11 / 11,610 mm	250	26,620	7,918
	TT12-2420CNG	12 / 11,610 mm	250	29,040	8,640

* Please contact sales team for additional information.



Compressed Natural Gas (CNG) movable vessels are most useful technology for transporting large volumes of natural gas to areas where there is no infrastructure of natural gas supply or it is difficult to establish one and it is indispensable in areas where construction of fixed type charging stations for natural gas is difficult. The vessels can be stored up to high pressure of 250bar and after the vessels are combined into one module by multiple of ultra large vessels, large quantity of gas can be stored and transported. In particular, they are in very efficient to take the place of long distance gas pipelines in large countries like The Middle East, China, India, and Russia and the demand for them is gradually increasing. The method of combining and modularizing the vessels for optimum usage are in constant development with new models, being produced. As the demand for natural gas is constantly increasing in each country of the world for alternative energy, the role of NK Group for movable natural gas charging vehicle will be further expanded.



CNG TYPE-2

CNG TYPE-2

Skid Length	Item	Tube Q'ty & Length	Working Pressure (bar)	Total Water Capacity (liter)	Total Gas Capacity (CNG/m ³)	Gross Weight (kg)
32'	TT15-1025 CNG2	15 / 9,000 mm	250	15,375	4,575	23,237
	TT20-1025 CNG2	20 / 9,000 mm	250	20,500	6,100	29,674
40'	TT20-1260 CNG2	20 / 10,980 mm	250	25,200	7,468	33,255

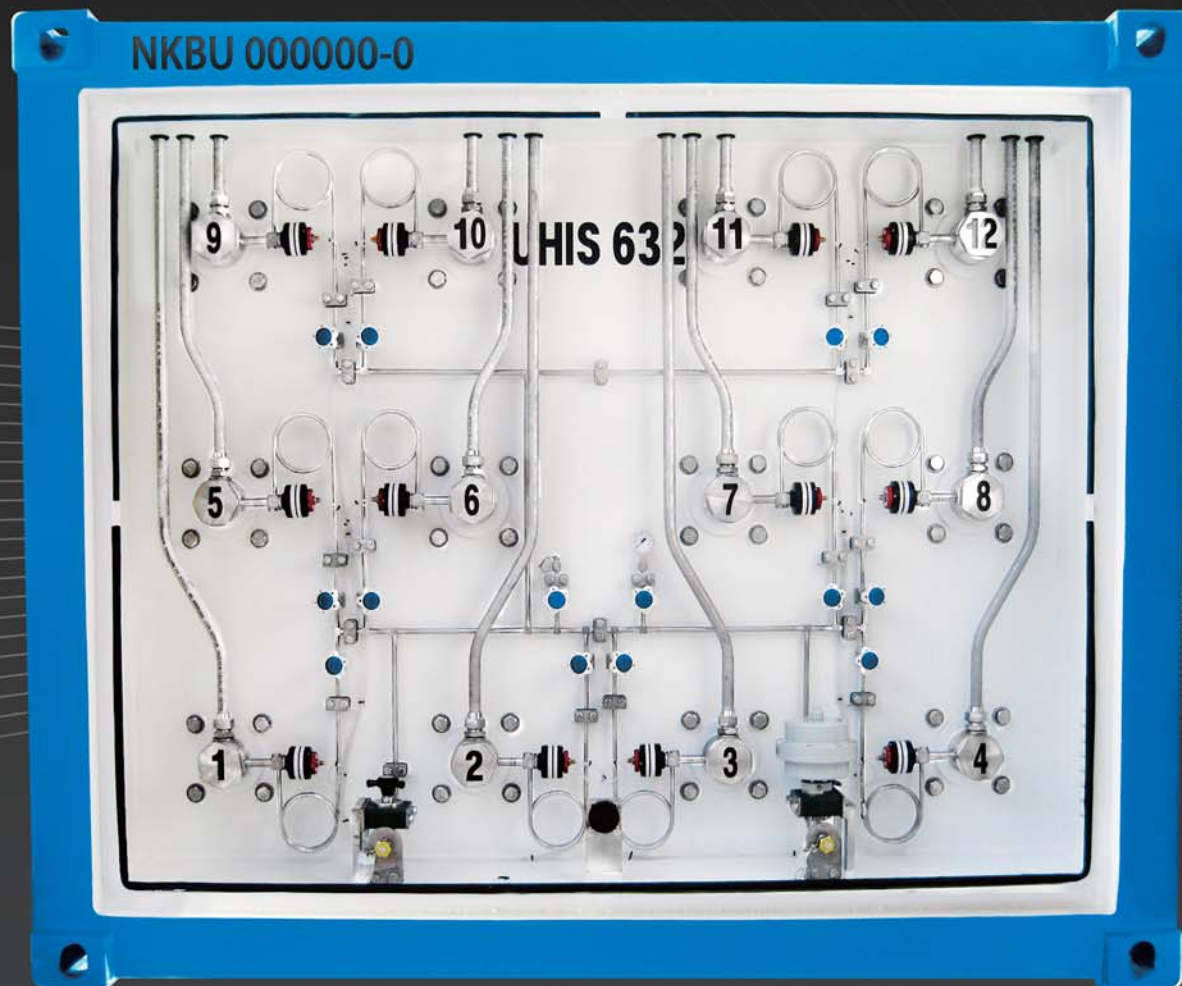


TYPE-2 JUMBO TUBE SKID

NK Group provides new products to enlarge efficiency of gas transportation with higher volume in lighter weight of jumbo tube, which has thinner steel liner with reinforced composite. This is competitive more than 10%~15% than conventional steel jumbo tube in volume and weight control.

The working pressure is set to 250bar, according to the customers' requirements.

The Type-2 jumbo tubes are protected by the enclosure of ISO skid and always keep in good order against environmental weather condition.



ULTRA HIGH PURITY GAS
($\text{SiH}_4/\text{NF}_3/\text{SF}_6/\text{N}_2\text{O}$, etc.)

ULTRA HIGH PURITY GAS (SiH₄/NF₃/SF₆/N₂O, etc.)

Skid Length	Item	Tube Q'ty & Length	Working Pressure (bar)	Total Water Capacity (liter)	Total Gas Capacity (air/m ³)
20'	TT08-1045 SiH ₄	8 / 5,335 mm	200	8,360	1,617
	TT12-1045 NF ₃	12 / 5,335 mm	200	12,540	2,426
	TT08-1100 SiH ₄	8 / 5,490 mm	166	8,800	1,439
	TT12-1100 SiH ₄	12 / 5,490 mm	166	13,200	2,159
40'	TT09-2250 NF ₃	9 / 10,980 mm	200	20,250	3,918
	TT08-2310 SiH ₄	8 / 10,980 mm	166	18,480	3,022
	TT05-2330 SF ₆	5 / 10,870 mm	166	11,650	1,905
	TT08-2330 NF ₃	8 / 10,870 mm	166	18,640	3,048
	TT06-2330 N ₂ O	6 / 10,870 mm	166	13,980	2,286



IMDG MEGC

This is specially designed for transportation of dangerous gas in both ocean and land area.

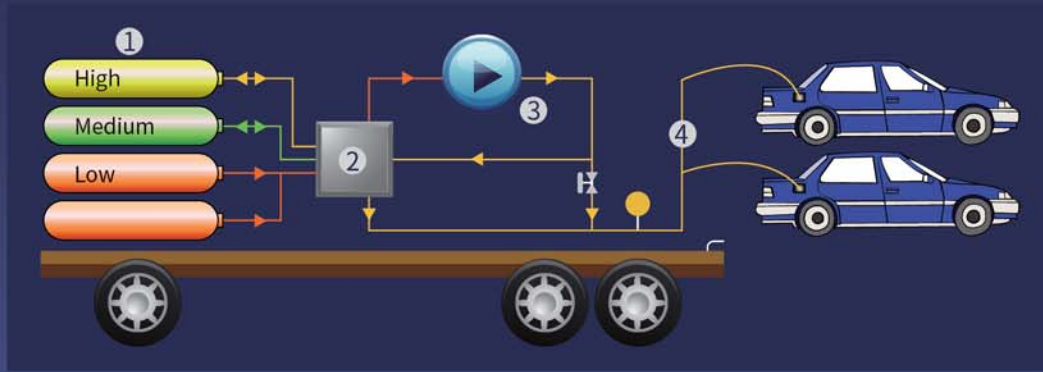
There is a strict regulation for ocean transportation of dangerous gas by MEGC (Multiple Element Gas Container) ruled by IMDG (International Maritime Dangerous Goods). NK Group has type approval of global inspection classes for MEGC and provides MEGC with certificate in compliance with CSC, TIR, UIC, ADR, RID, IMDG, TPED, SELO, KGS, DOT, ISO, KHK. The dangerous gases such as SiH₄ (Monosilane), NF₃ (Nitrogen Trifluoride), SF₆ (Sulphur Hexafluoride), NH₃ (Ammonia), N₂O (Nitrous Oxide), etc. must be filled into a certified MEGC of IMDG for Transportation. For high purity gases such as SiH₄, NF₃, NK Group provides internal polished tube with grade of 3S, 25S, etc. depending on the customers' requirements and keeps the moisture level below than 1ppm or 3ppm by heated vacuum process so that the gas quality can be maintained in high purity.

MOBILE STATION

Skid Length	Item	Tube Q'ty & Length	Working Pressure (bar)	Total Water Capacity (liter)	Total Gas Capacity (CNG/m ³)
32'	TT12-1025 / 3-620 CNG2	12 / 9,000 mm	250	14,160	4,215



MOBILE STATION



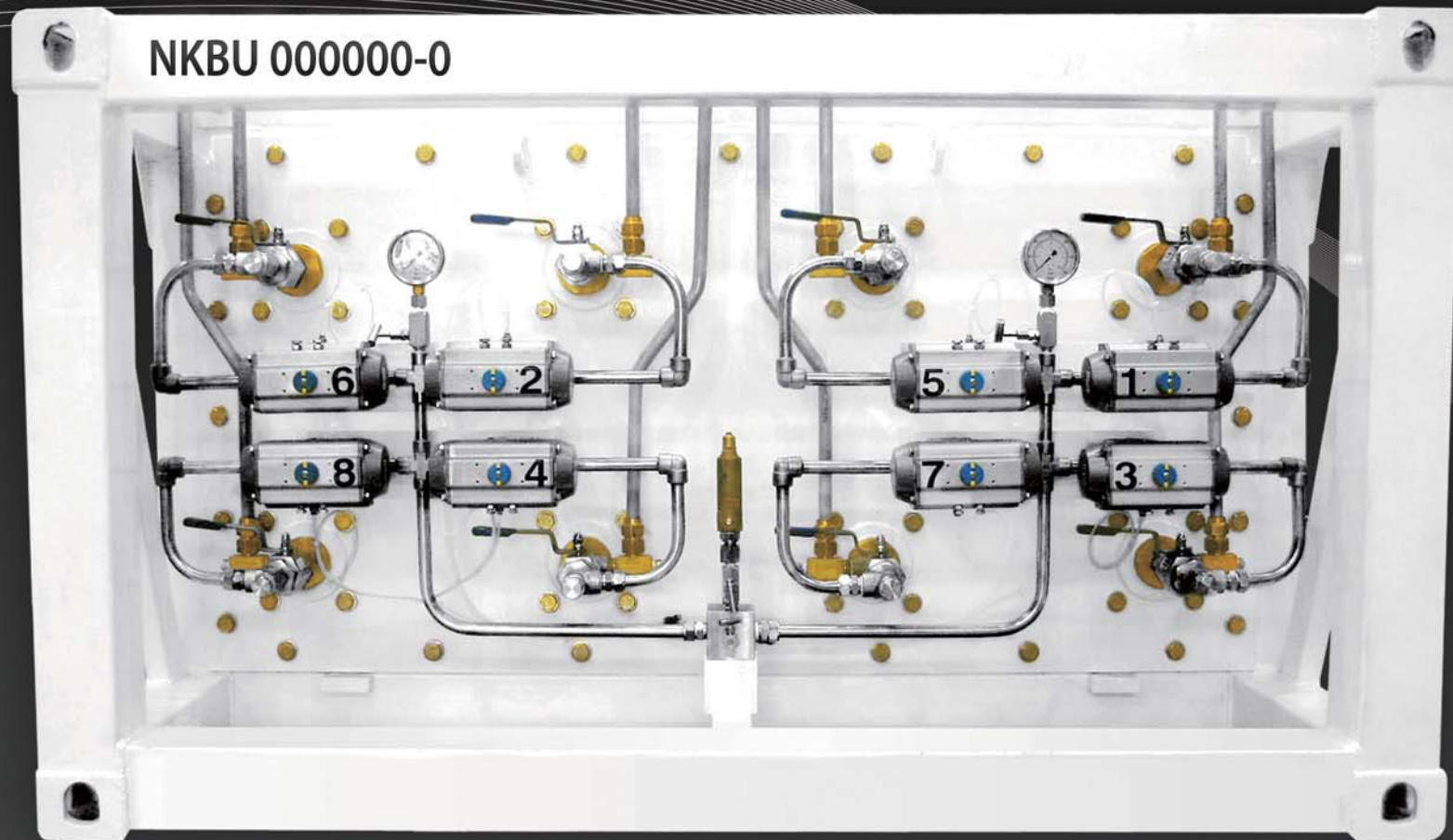
- ① 3 Bank Storage System
- ② Priority Panel
- ③ Compressor
- ④ Dispenser

Tube Skid	250bar Type2 Cylinder (1,025L) x 12Cyl. 3 Bank System : High (2Cyl), Medium (3Cyl), Low (7Cyl)
Total Gas Capacity	304m ³ x 12 bottle = 3,648m ³
Compressor	CNG Gas Engine + Mechanical Compressor (32kw)
Flow Rate	Average. 900m ³ /h
Gas Engine Consumption	11m ³ /hr, 57m ³ /1 Tube Skid
Discharging Amount	3,648m ³ x 0.9 = 3,283m ³ (Efficiency : 90%)
Discharging Time	4.5 Min/Passenger Vehicle
Discharging Capability	CNG Vehicle (60L, 15m ³), 218 Cars

Weight (kg)	
Skid	17,242
CNG	2,633
Compressor Module	3,500
Chassis	5,410
Trailer Head	8,500
Total	37,285



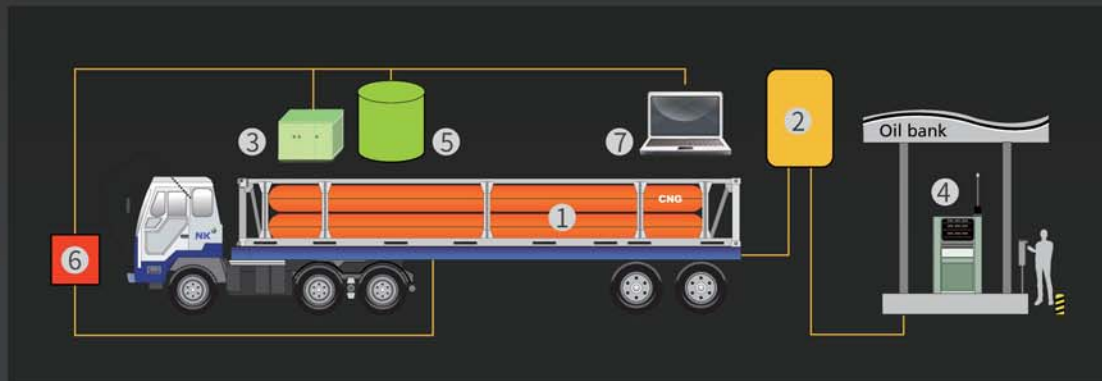
You can fill CNG into a car from the tube skid at any place if you have mobile station which gas pipe line and electricity are not necessary. It is 3 (three) bank system in the mobile station and vehicles can be directly refueled from the tube skid which was filled with 250bar at the mother station. As pressure is dropped during filling, compressor recovers the pressure of the high bank cylinders. So, mobile station makes it possible very efficient and quick filling.



HYDRAULIC POWER SYSTEM

Hydraulic Power Unit Tube Skid Specification

Working Pressure	200 bar
Number of Tube	8 EA
Water Volume	18,000 L
Gas Capacity	4,544 m ³
Gas Weight (approx.)	3,272 kg
Length	10,980 mm
Height	1,400 mm
Tube Weight (approx.)	2,780 kg
Service Application	CNG
Outer Diameter	Ø558.8



- ① Tube Skid
- ② Separator
- ③ Main Hydraulic Unit
- ④ Dispenser
- ⑤ Oil Tank
- ⑥ Lift Hydraulic Unit
- ⑦ Controller

Hydraulic Power Unit Tube Skid is filled with oil and keeps discharging CNG at even pressure below 200bar, by which the CNG in the tube can be discharged maximum 95% and minimize residual gas less than 5% in the tube.



1 TON-TANK

TON-TANK

Tube O.D	Item	Gas	Total Water Capacity (liter)	Working Pressure (bar)	Gas Capacity (air/m ³)
24"	Y-TON 360L	SiH ₄ , PH ₃ , NH ₃ , SF ₆ , NF ₃ , N ₂ O	360	166	59
	Y-TON 434L		434	166	71
	Y-TON 440L		440	166	73
	Y-TON 470L		470	166	78
22"	Y-TON 340L		340	200	66
	Y-TON 360L		360	200	70
	Y-TON 380L		380	200	74



Ton-tank (Y-ton) is designed to deliver Ultra High Purity and ordinary industrial gases to semiconductor factories or any of manufacturers who have demand of small quantity of gases. NK Group is qualified to produce quality ton tanks in compliance with international codes such as DOT3AA, DOT3AAX, SELO and KGS as per the customers' demands.



ASME STORAGE VESSEL

ASME STORAGE VESSEL

Item	Gas	Tube Length (mm)	Working Pressure (bar)	Total Water Capacity (liter)	Total Gas Capacity (CNG/m ³)
ASME 585	H ₂ , CNG & Industrial Gases	3,125	248	585	173
ASME 1000		4,890	248	1,000	296
ASME 1300		6,250	248	1,300	385
ASME 1000		6,555	400	1,000	380
ASME 1300		7,740	320	1,300	447



The storage vessels are mainly used for CNG charging stations, industrial factories & ships. Three vessels of 1,300 liters combined into one module are standard structure. In case of larger storage stations, several more modules can be installed. The specifications for vessel design, manufacture and inspection comply with the ASME standard of USA as well as the standard of Korea Gas Safety Corporation.



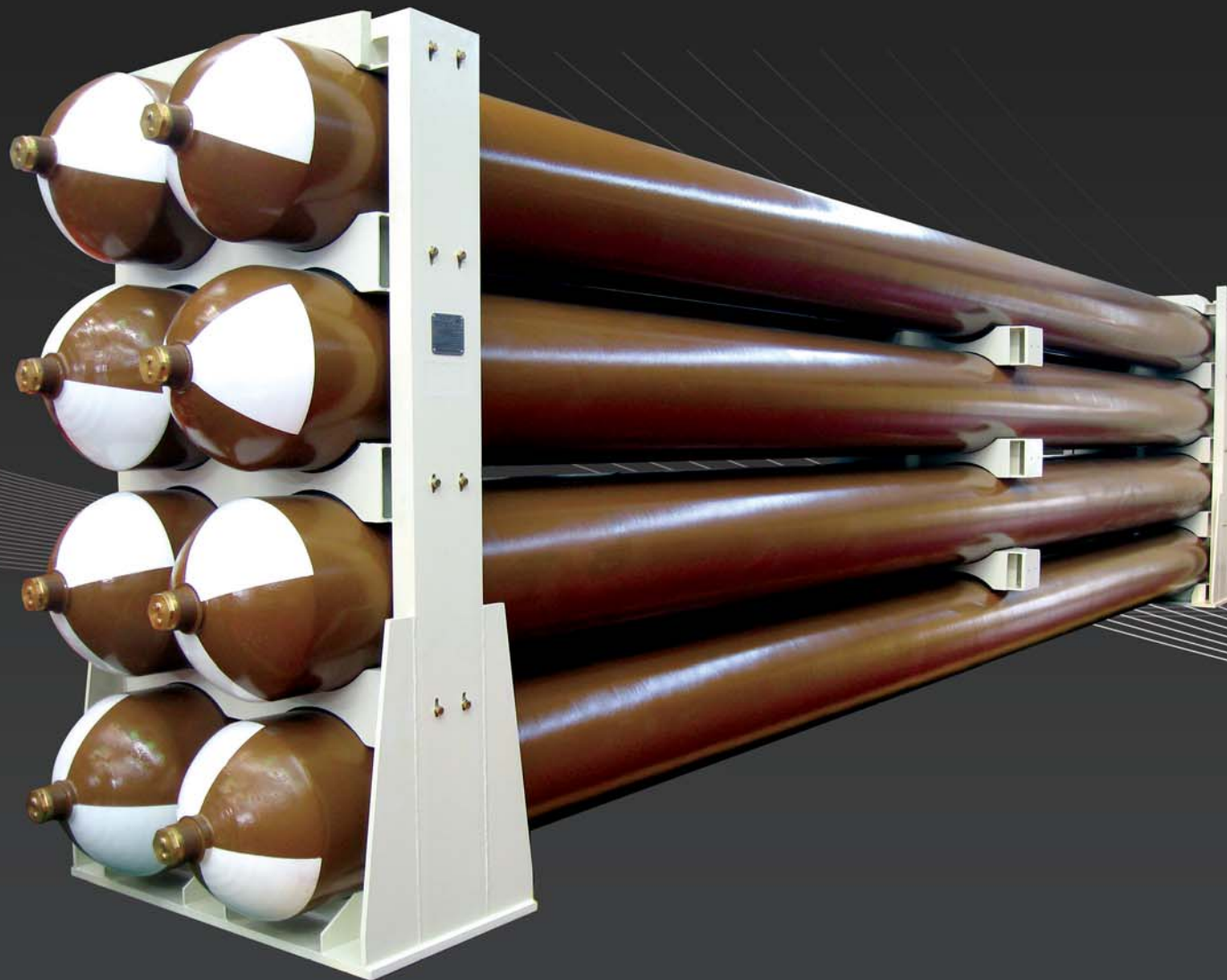
AIR PRESSURE VESSEL FOR DRILLSHIP

AIR PRESSURE VESSEL

Class	DNV, ABS
Code	EN ISO 11120, DNV-OS-E101, ABS+CDS
Type	Horizontal, Vertical
Pressure	100 bar ~ 400 bar
Capacity	440 L ~ 2210 L
Tube O.D	Ø500 ~ Ø622
Tube Length	1,000 mm ~ 10,000 mm
Main Valve	2" up to class 2500 (413 bar) 3" up to class 1500 (255 bar)



NK Group has delivered various Air Pressure Vessels to customers in order to obtain constant tension in the marine drilling riser. Air Pressure Vessel is connected to the Piston accumulators air-side in Marine riser tensioner system. This means that the riser tensioner unit acts like a hydro/pneumatic spring by using the compressed air from Air Pressure Vessel. These ultra high pressure vessels have also special demands from aerospace centers for rocket launching program.



AIR PRESSURE VESSEL FOR DIVING SYSTEM

DIVING SYSTEM SPECIFICATION

Working Pressure	200 bar	
Number of Jumbo Tube	8 EA	
System Water Volume	23,200 L	
System Height	2,900 mm	
Jumbo Tube	Code & Standard	ISO 11120 & DNV
	Length	11,675 mm
	Water Volume	2900 L
	Weight (Approx.)	3,098 Kg
	Outer Diameter	Ø609.6



The storage vessel is designed to store breathing gas for diving system. NK Group is qualified to manufacture this storage vessel and the specifications for vessel design, manufacture and inspection comply with DNV and ISO.

www.nkcf.com
eng.enkcf.com



NK CO., LTD.

ADDRESS 113, Noksansandan 17-ro, Gangseo-gu, Busan, South Korea
TEL +82-51-974-7613
FAX +82-51-974-1316
E-MAIL sales@nkcf.com

NK SHANGHAI

ADDRESS NO.1505 Luodong RD, Baoshan, Shanghai, China
TEL +86-21-3385-1800
E-MAIL sales@enkcf.com

ENK CO., LTD.

ADDRESS 502, Gwahaksandan-ro, Gangseo-gu, Busan, South Korea
TEL +82-51-974-7616
FAX +82-51-974-1316
E-MAIL sales@enkcf.com

GAS TANK ENK CO., LTD.

ADDRESS 53-B, Sh.Rustavelli str., Yakkasaray district, Tashkent, Uzbekistan
TEL +82-51-974-7610
E-MAIL sales@enkcf.com



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