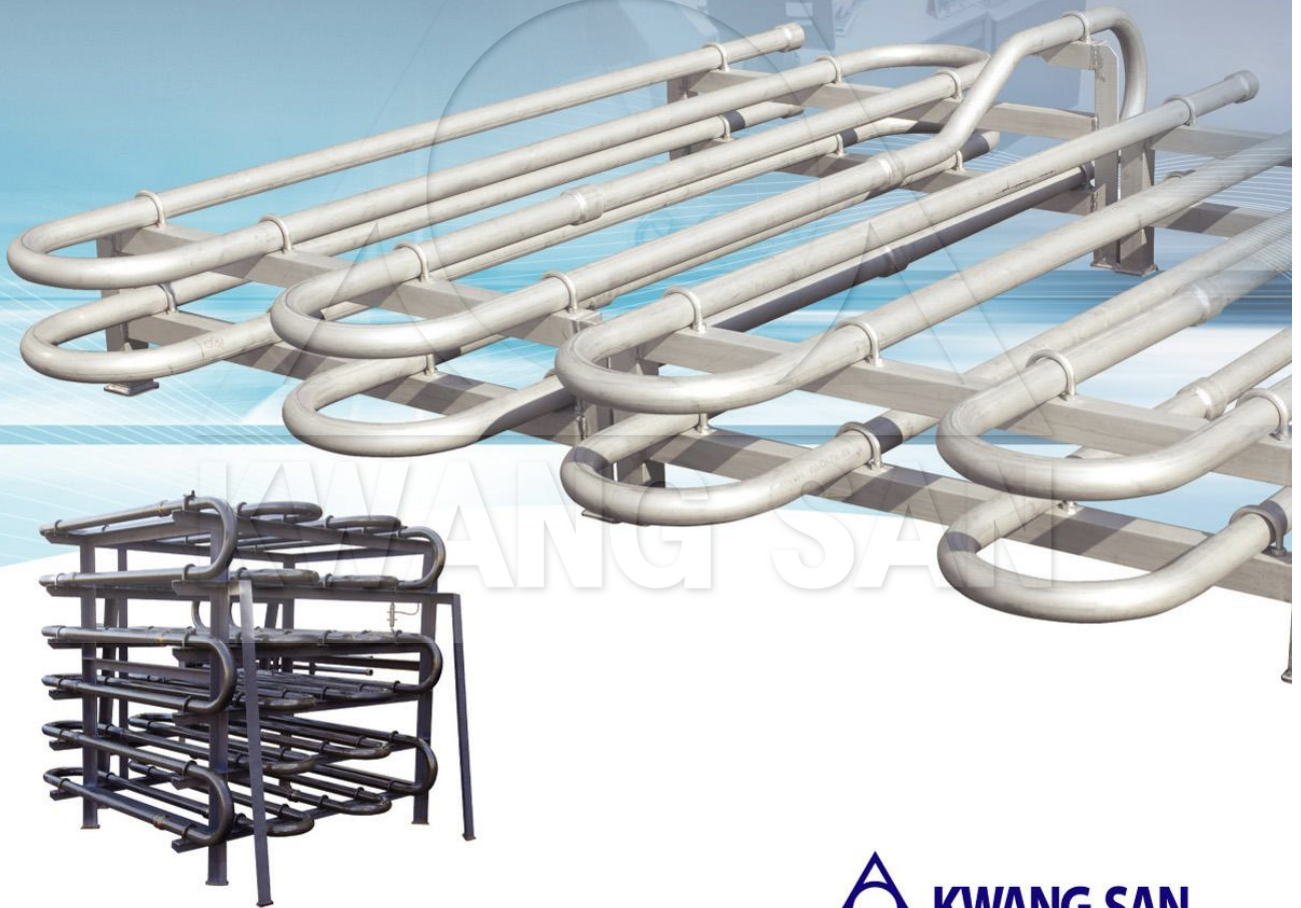


Heating Coil Unit

FORMULA OF HEATING COILS

HEATING COIL APPLICATION & MATERIAL

HEATING COIL UNIT BY MATERIAL





FORMULA OF HEATING COILS

1) Heating surface(As)

At the time of heating up, calculation of heating surface(Asx) to meet temp. of oil is

$$Asx = \frac{\{(\beta \times Tx) - \alpha\} + \{(Tf - Ti) \times rx \times V \times C\} / t}{\{Ks \times (Ts - Tx)\}}$$

Hence, at initial and final stage of heating up

$$x = Ti : Asx = Asi$$

$$x = Tf : Asx = Asf$$

Heating surface (As) = $\eta \times (Asi + Asf)$, $0.4 \leq \eta \leq 0.6$
But this should satisfy the formula indicated below

$$Tm = \frac{\alpha + (As \times Ks \times Ts)}{\beta + (As \times Ks)}$$

2) Heating time (t) ;

$$t = \frac{rx \times V \times C}{\beta + (As \times Ks)} \text{LN} \left(\frac{Tm \times Ti}{Tm \times Tf} \right)$$

3) Heating ratio (H,R) ; H,R = As/V

4) HEATING COIL HENGTH (Lact) ; Lact = As/($\pi \times D$)

5) Max. steam consumption (Gm) ;

$$Gm = \frac{Ks}{H1 - h2} \times As \times (Ts - Ti)$$

6) Steam consumption for keeing (Gk) ;

$$Gk = \frac{(Ks \times Tf) - \alpha}{H1 - h2}$$

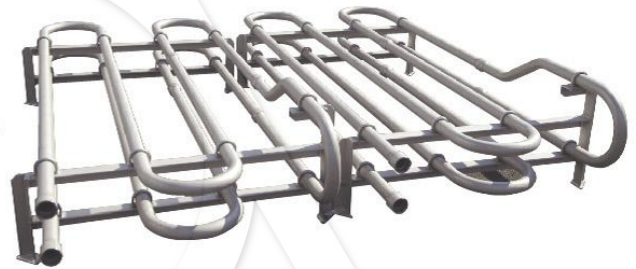
7) Effective length of heating coil (Leff) ;

$$Leff = \frac{dx \sqrt{\{1 - (P2/P1)^2\}} \times g \times P1 \times d^2 \times (H1 - h2)^2}{2 \times \sqrt{Ks^2 \times D^2 \times (Ts - Tf)^2} \times \lambda \times m \times v1}$$

v : specific volume

g : 127100000 (m/jr2)

λ : 0.0134



HEATING COIL APPLICATION & MATERIAL

STAINLESS STEEL

- CRUDE OIL TANK, PRODUCT CARRIER, CHEMICAL TANK
- LNGC, FPSO, ATC (CARGO HOLD OR SLOP TANK)

CARBON STEEL

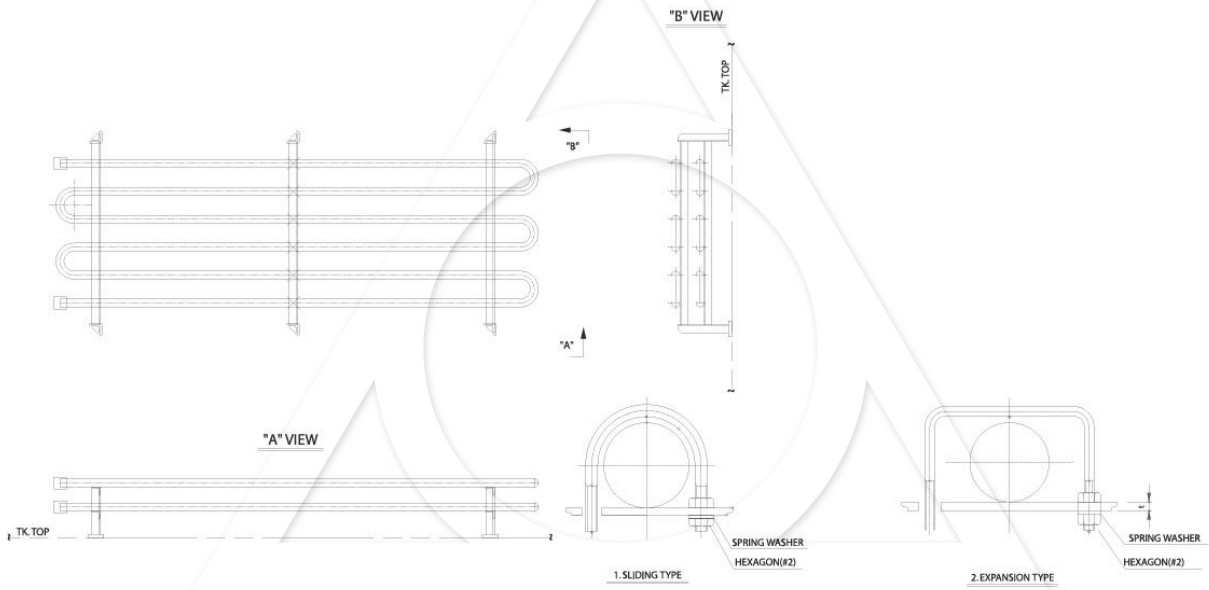
- H.F.O. TANK FOR ALL TYPE SHIPS.

AL-BRASS, CU-NI, STEEL + ALUMINIUM

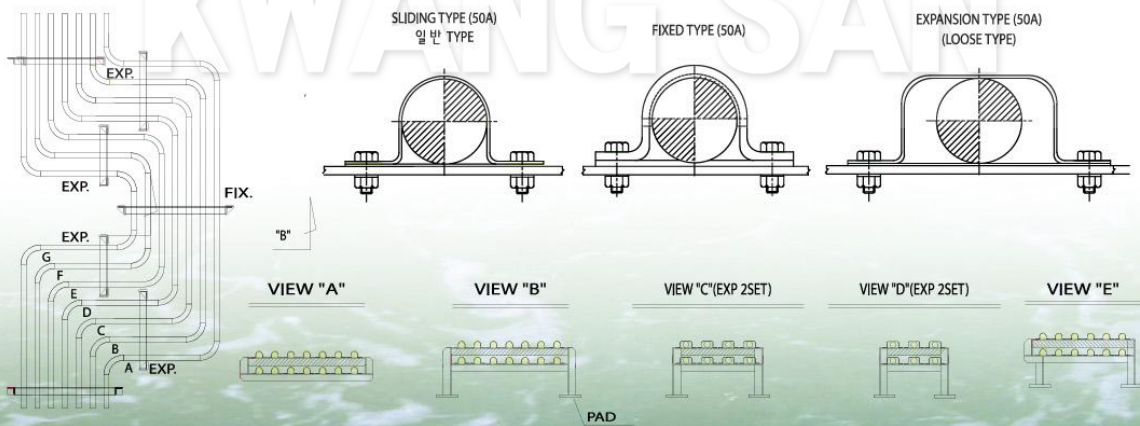
- CRUDE OIL TANK

HEATING COIL UNIT BY MATERIAL

1. STAINLESS STEEL / CARBON STEEL HEATING COIL



2. AL-BRASS HEATING COIL





KWANG SAN



KWANG SAN CO., LTD.

HEAD OFFICE & FACTORY

#1173-2 Jisa-Dong, Gangseo-Gu, Pusan, Korea 618-230.

tel. 82-51-974-6301(rep) fax. 82-51-974-6305

website : www.kwangsan.com

e-mail : kwangsan@kwangsan.com