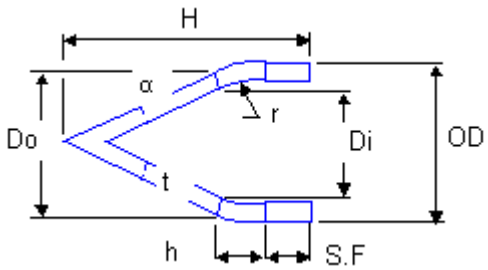
ASME SEC. VIII DIV.1 STRENGTH CALCULATION

TORICONICAL HEAD THICKNESS FOR INTERNAL PRESSURE

INPUT DATA 계산실행 ***V1.0***

* DESCRIPTION	pes21		* ITEM NO.	E-1004	
* DESIGN PRESSURE,P	5	Kg/cm^2	* DESIGN TEMP,T	300	oF
* OUTSIDE DIAMETER,OD	1219	mm	* MATERIAL	A387-21-1	
* INSIDE KNUCKLE RADIUS, r	300	mm	* JOINT EFFICIENCY,E	0.8	
* CORROSION ALLOWANCE,C	2	mm	* CONICAL ANGLE,α	30	o
* CONICAL USED THICKNESS	18	mm	* CONICAL FORMING LOSS	5	%
* KNUCKLE USED THICKNESS	12	mm	* KNUCKLE FORMING LOSS	18	%
* S.F	50	mm	* OPENING DIAMETER	300	mm



RESULT OF CALCULATION

* Allowable stress @ Design Temp	1,167.1	Kg/cm^2	* Allowable stress @ Room Temp	1,202.2	Kg/cm^2
* Conical thickness After forming	17.1	mm	* Knuckle thickness After forming	9.8	mm
* Conical used thickness check	O.K		* Knuckle used thickness check	O.K	

LIMITS AS PER UG-32(h)

* r >= 6% of OD	73.1	mmm	O.K
* r >= 3*t	51.3	mmm	O.K

GEOMETRY

* h=(r+t)*SIN(α)

=(300+17.1)*sin(30*π/180) 158.5 mm

* Do=OD -2*(r + t)*(1 - cos(α))

=1219-2*(300+17.1)*(1-cos(30*π/180) 1,134.0 mm

* Di=OD -2t -2r*(1 - cos(α))

=1219-(2*17.1)-(2*300)*(1-cos(30*π/180) 1,104.4 mm

* H=SF + h + Do/(2 * Tan(α))

=50+158.5+(1,134.0/(2*tan(30*π/180)))	1,190.7	mm

KNUCKLE SECTION THICKNESS, UG-32(h), 1-4(d-3)

* L=Di/(2*cos(α))

=1,104.4/(2*cos(30*π/180))	637.6	mm

* M=0.25*(3+(L/r)^0.5

=0.25*(3+(637.6/300)^0.5)	1.114	mm

* Mininum req'd thickness for internal pressure, tmin1=PLM/2SE-0.2P

=(5*637.6*1.114)/((2*1,167.1*0.8)-(0.2*5))	1.9	mm

* MAWP(HOT-CORRODED)=2SEt/LM + 0.2t

=(2*1,167.1*0.8*7.8)/((637.6*1.114)+(0.2*7.8))	20.6	Kg/cm^2

* MAWP(COLD-NEW=2SEt/LM + 0.2t

=(2*1,202.2*0.8*9.8)/((637.6*1.114)+(0.2*9.8))	26.6	Kg/cm^2

CONICAL SECTION THICKNESS, UG-32(g)

* Mininum req'd thickness for internal pressure, tmin2=PDi/2cos(α)*(SE-0.6P)

=(5*1,104.4)/(2*cos(30*π/180)*((1,167.1*0.8)-(0.6*5)))	3.4	mm

* MAWP(HOT-CORRODED=2SEt*Cos(α)/Di+1.2*t*cos(α)

=(2*1,167.1*0.8*15.1*cos(30*π/180))/(1,104.4+(1.2*15.1*cos(30*π/18	21.8	Kg/cm^2

* MAWP(COLD-NEW)=2SEt*Cos(α)/Di+1.2*t*cos(α)

=(2*1,202.2*0.8*17.1*cos(30*π/180))/(1,104.4+(1.2*17.1*cos(30*π/18	25.4	Kg/cm^2

REQUIRED THICKNESS AT OPENING

* Mininum req'd thickness for internal pressure, tmin2=PDi/2cos(α)*(SE-0.6P)

=(5*300.0)/(2*cos(30*π/180)*((1,167.1*0.8)-(0.6*5)))	0.9	mm

OPTION

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