존의 난방부하

$$Q_{h,b,mth} = d_{op}(Q_{\mathrm{sink},op} - \eta_{op} Q_{source,op}) + d_{we}(Q_{\mathrm{sink},we} - \eta_{we} Q_{source,we}) \quad (2\text{-}6)$$

$$Q_{h,b,i} = Q_{\mathrm{sink},i} - \eta_i Q_{source,i} \quad (2\text{-}1)$$

$$\eta = \frac{1-\gamma^a}{1-\gamma^{a+1}}, \ \gamma \neq 1 \quad (2\text{-}23)$$

$$\eta = \frac{a}{a+1}, \ \gamma = 1 \quad (2\text{-}24)$$

$$1-(\eta\gamma) < 0.01 \rightarrow \eta = 1/\gamma, \ (Q_{h,b} = 0) \quad (2\text{-}137)$$

$$(1-\eta)\gamma < 0.01 \rightarrow \eta = 1, \ (Q_{c,b} = 0) \quad (2\text{-}138)$$

$$\dot{V}_{mech} \geq \frac{\dot{Q}_{C,\max}}{c_{p,a}\rho_a(\vartheta_i - \vartheta_{mech})} \rightarrow \eta = 1 \quad (2\text{-}139)$$

$$\gamma = \frac{Q_{source}}{Q_{\mathrm{sink}}} \quad (2\text{-}21)$$

$$a = a_0 + \frac{\tau}{\tau_0}, a_0 = 1, \tau_0 = 16h, \quad (2\text{-}25)$$

$$\tau = \frac{C_{wirk}}{H} = \frac{C_{wirk}}{\sum_j H_{T,j} + \sum_k H_{V,k} + H_{V,mech,\vartheta}} \quad (2\text{-}22, \ 129)$$

$$H_{T,D} = \sum(U_j A_j) + \Delta U_{WB} \sum A_j \quad (2\text{-}44)$$

$$H_{T,D} = \sum(U_j A_j) + \sum(l_j \Psi_j) \quad (2\text{-}45)$$

$$H_{T,iu} = \sum(U_j A_j) \quad (2\text{-}48)$$

$$H_{T,iz} = \sum(U_j A_j) \quad (2\text{-}52)$$

$H_{T,s}$ (DIN EN ISO 13370 L_s)

$$H_{V,inf} = n_{inf} V c_{p,a} \rho_a \quad (2\text{-}58)$$

$$H_{V,mech} = n_{mech} V c_{p,a} \rho_a \quad (2\text{-}83)$$

$$H_{V,ue} = n_{ue} V_u c_{p,a} \rho_a \quad (2\text{-}94)$$

$$H_{V,z} = \dot{V}_{z,d} c_{p,a} \rho_a \quad (2\text{-}99)$$

$$C_{wirk} = 50 \ Wh/(m^2 \cdot K) A_B \quad (2\text{-}126)$$

$$C_{wirk} = 90 \ Wh/(m^2 \cdot K) A_B \quad (2\text{-}127)$$

$$C_{wirk} = 130 \ Wh/(m^2 \cdot K) A_B \quad (2\text{-}128)$$

$$H_{V,mech,\vartheta} = H_{V,mech} \frac{\vartheta_{i,h,soll} - \vartheta_{V,mech}}{6K} \quad (2\text{-}130)$$

$$Q_{source} = Q_S + Q_T + Q_V + Q_{I,source} \quad (2\text{-}16)$$

$$Q_{\mathrm{sink}} = Q_T + Q_V + Q_{I,\mathrm{sink}} + Q_S \quad (2\text{-}11)$$

존의 냉방부하

$$Q_{h,b,mth} = d_{op}(1-\eta_{op})\,Q_{source,op} + d_{we}(1-\eta_{we})\,Q_{source,we} \quad (2\text{-}7)$$

$$Q_{h,c} = (1-\eta)\,Q_{source} \quad (2\text{-}1)$$

$$\eta = \frac{1-\gamma^a}{1-\gamma^{a+1}},\ \gamma \neq 1 \quad (2\text{-}23)$$

$$\eta = \frac{a}{a+1},\ \gamma = 1 \quad (2\text{-}24)$$

$$1-(\eta\gamma) < 0.01 \rightarrow \eta = 1/\gamma,\ (Q_{h,b}=0) \quad (2\text{-}137)$$

$$(1-\eta)\gamma < 0.01 \rightarrow \eta = 1,\ (Q_{c,b}=0) \quad (2\text{-}138)$$

$$\dot{V}_{mech} \geq \frac{\dot{Q}_{C,\max}}{c_{p,a}\rho_a(\vartheta_i - \vartheta_{mech})} \rightarrow \eta = 1 \quad (2\text{-}139)$$

$$\gamma = \frac{Q_{source}}{Q_{\mathrm{sink}}} \quad (2\text{-}21)$$

$$a = a_0 + \frac{\tau}{\tau_0},\ a_0 = 1,\ \tau_0 = 16h, \quad (2\text{-}25)$$

$$\tau = \frac{C_{wirk}}{H} = \frac{C_{wirk}}{\sum_j H_{T,j} + \sum_k H_{V,k} + H_{V,mech,\vartheta}} \quad (2\text{-}22,\ 129)$$

$$H_{T,D} = \sum(U_j A_j) + \Delta U_{WB} \sum A_j \quad (2\text{-}44)$$

$$H_{T,iu} = \sum(U_j A_j) \quad (2\text{-}48)$$

$$H_{T,iz} = \sum(U_j A_j) \quad (2\text{-}52)$$

$H_{T,s}$ (DIN EN ISO 13370 L_s)

$$H_{V,inf} = n_{inf}\,V c_{p,a}\rho_a \quad (2\text{-}58)$$

$$H_{V,mech} = n_{mech}\,V c_{p,a}\rho_a \quad (2\text{-}83)$$

$$H_{V,ue} = n_{ue}\,V_u c_{p,a}\rho_a \quad (2\text{-}94)$$

$$H_{V,z} = \dot{V}_{z,d} c_{p,a}\rho_a \quad (2\text{-}99)$$

$$C_{wirk} = 50\ Wh/(m^2 \cdot K) A_B \quad (2\text{-}126)$$

$$C_{wirk} = 90\ Wh/(m^2 \cdot K) A_B \quad (2\text{-}127)$$

$$C_{wirk} = 130\ Wh/(m^2 \cdot K) A_B \quad (2\text{-}128)$$

$$H_{V,mech,\vartheta} = H_{V,mech}\frac{\vartheta_{i,h,soll} - \vartheta_{V,mech}}{6K} \quad (2\text{-}130)$$

$$Q_{\mathrm{sink}} = Q_T + Q_V + Q_{I,\mathrm{sink}} + Q_S \quad (2\text{-}11)$$

$$Q_{source} = Q_S + Q_T + Q_V + Q_{I,source} \quad (2\text{-}16)$$

열손실

$$Q_{sink} = Q_T + Q_V + Q_{I,sink} + Q_S \quad (2\text{-}11)$$

$Q_T = \sum_j H_{T,j} \cdot (\vartheta_i - \vartheta_j)t, \ \vartheta_i > \vartheta_j$ (2-12)

$Q_V = \sum_k H_{V,k}(\vartheta_i - \vartheta_k)t, \ \vartheta_i > \vartheta_k$ (2-13)

$Q_{I,sink} = Q_{I,sink,c} + Q_{I,sink,fac}$ (2-15)

$Q_S = Q_{S,op} = R_{se} UA(F_f h_r \Delta\vartheta_{er} - \alpha I_S)t, \ \alpha I_S < F_f h_r \Delta\vartheta_{er}$ (2-111)

$Q_{T,e} = H_{T,D}(\vartheta_i - \vartheta_e)t, \ \vartheta_i > \vartheta_e$ (2-42)
$Q_{T,u} = H_{T,iu}(\vartheta_i - \vartheta_u)t, \ \vartheta_i > \vartheta_u$ (2-46)
$Q_{T,z} = H_{T,iz}(\vartheta_i - \vartheta_z)t, \ \vartheta_i > \vartheta_z$ (2-50)
$Q_{T,s} = H_{T,s}(\vartheta_i - \vartheta_e)t, \ \vartheta_i > \vartheta_e$ (2-53)

$H_{T,D} = \sum(U_j A_j) + \Delta U_{WB} \sum A_j$ (2-44)
$H_{T,iu} = \sum(U_j A_j)$ (2-48)
$H_{T,iz} = \sum(U_j A_j)$ (2-52)
$H_{T,s}$ (DIN EN ISO 13370 L_s)

ΔU_{WB}:
0.1외단열
0.15 내단열
(2-24)참조

$Q_{V,inf} = H_{V,inf}(\vartheta_i - \vartheta_e)t, \ \vartheta_i > \vartheta_e$ (2-56)
$Q_{V,win} = H_{V,win}(\vartheta_i - \vartheta_e)t, \ \vartheta_i > \vartheta_e$ (2-64)
$Q_{V,mech} = H_{V,mech}(\vartheta_i - \vartheta_{V,mech})t, \ \vartheta_i > \vartheta_{V,mech}$ (2-81)
$Q_{V,z} = H_{V,z}(\vartheta_i - \vartheta_z)t, \ \vartheta_i > \vartheta_z$ (2-97)

$Q_{I,sink,c} = Q_{I,vh} + Q_{I,c}$ (2-125)
$Q_{I,sink,fac} = q_{I,sink,fac} A_B$ (2-120)
$Q_{I,sink,goods} = c\dot{m}(\vartheta_{out} - \vartheta_{in})t, \quad \vartheta_{in} < \vartheta_{out}$
(2-122)

$F_f = 1$(45°까지)
$F_f = 0.5$(45°~90°)
$h_r = 5\varepsilon$ (모를 경우 $\varepsilon = 0.9$)
$\Delta\vartheta_{er} = 10K$ (천공온도차)

$\vartheta_i = \vartheta_{i,h}$ *oder* $\vartheta_{i,c}$ (난방 또는 냉방 분석-실내온도)
$\vartheta_{i,h} = \vartheta_{i,h,soll}$, (2-26) 기본 21°C
$\vartheta_{i,h} = \max(\vartheta_{i,h,soll} - f_{NA}(\vartheta_{i,h,soll} - \vartheta_e), \ \vartheta_{i,h,soll} - \Delta\vartheta_{i,NA}\frac{t_{NA}}{24h})$ (2-27) 야간감소
$\vartheta_{i,h} = \max(\vartheta_{i,h,soll} - f_{we}(\vartheta_{i,h,soll} - \vartheta_e), \ \vartheta_{i,h,soll} - \Delta\vartheta_{i,NA})$ (2-30) 주말감소
$\vartheta_{i,h} = \vartheta_{i,h,soll} - f_{tb}(\vartheta_{i,h,soll} - \vartheta_e)$ (2-33) 공간적 제한
$\vartheta_{i,h} = \vartheta_{i,NA} - f_{tb}(\vartheta_{i,NA} - \vartheta_e)$ (2-35) 공간적 시간적 제한

$\vartheta_{i,c} = \vartheta_{i,c,soll} - 2K$ (2-36) 24°C-2K=22°C

$\vartheta_{V,mech} = \vartheta_e$ (2-90) 공조처리 없는 경우
$\vartheta_{V,mech} = \vartheta_e + \eta_{V,mech} \cdot (\vartheta_i - \vartheta_e)$ (2-91) 비제어적 열교환
$\vartheta_{V,mech} = \vartheta_{V,mech,RLT}$ (2-92) 공조처리된 급기온도(**도표 3-3, 3-4, 7-5**)

$H_{V,inf} = n_{inf} V c_{p,a} \rho_a$ (2-58)
$H_{V,mech} = n_{mech} V c_{p,a} \rho_a$ (2-83)
$H_{V,ue} = n_{ue} V_u c_{p,a} \rho_a$ (2-94)
$H_{V,z} = \dot{V}_{z,d} c_{p,a} \rho_a$ (2-99)

$c_{p,a}\rho_a = 0.34 Wh/(m^3 K)$

$t_{NA} = 24h - t_{h,op,d}$, $\Delta\vartheta_{i,NA}$=4K (용도별 조건)

$f_{we} = 0.2(1 - 0.4\frac{\tau}{250h})$ (2-31) 난방감소 , $f_{NA} = 0.13\frac{t_{NA}}{24h}(-\frac{\tau}{250h})$
(2-28)

$f_{we} = 0.3(1 - 0.2\frac{\tau}{250h})$ (2-32) 난방정지 , $f_{NA} = 0.26\frac{t_{NA}}{24h}(-\frac{\tau}{250h})$ (2-29)

$f_{tb} = 0.8\left[1 - \exp(-\frac{\dot{Q}_{h,max}}{A_B 35\ W/m^2})\right] a_{tb}^2$ (2-34)

$\tau = \frac{C_{wirk}}{H} = \frac{C_{wirk}}{\sum_j H_{T,j} + \sum_k H_{V,k} + H_{V,mech,\vartheta}}$ (2-22, 129)

$a_{tb} = \frac{A_{beheizt}}{A_B}$

열획득

$$Q_{source} = Q_S + Q_T + Q_V + Q_{I,source} \quad (2\text{-}16)$$

Q_S

$$Q_S = \Sigma Q_{S,tr} + \Sigma Q_{S,op} \quad (2\text{-}17)$$

$Q_{S,tr}$

$$Q_{S,tr} = F_F A g_{eff} I_S t \quad (2\text{-}105)$$

- F_F: 창틀비율 (=0.7)
- A: 개구부면적

g_{eff}:

$$g_{eff} = F_S F_W F_V g_{\perp} \quad \text{비차양} \quad (2\text{-}106)$$

$$g_{eff} = F_S F_W F_V g_{tot} \quad \text{차양} \quad (2\text{-}107)$$

자동차양(2-108) 일단 유보

$$g_{eff} = F_W F_V min \begin{Bmatrix} a g_{tot} (1-a) g_{\perp} \\ F_S g_{\perp} \end{Bmatrix}$$

F_S:

$$F_S = min(F_h; F_o; F_f) \quad (2\text{-}109)$$

(부록A 도표)

F_W=0.9

F_V=0.9

투과율(차양유무): 도표(2-5)

$Q_{S,op}$

$$Q_{S,op} = R_{se} UA(\alpha I_S - F_f h_r \Delta\vartheta_{er}) t, \quad \alpha I_S > F_f h_r \Delta\vartheta_{er} \quad \text{일 경우} \quad (2\text{-}112)$$

F_f:

$F_f = 1$(45°까지)

$F_f = 0.5$(45°~90°)

$h_r = 5\varepsilon$ (모를 경우 $\varepsilon = 0.9$)

$\Delta\vartheta_{er} = 10K$ (천공온도차)

Q_T

$$Q_T = \sum_j H_{T,j} \cdot (\vartheta_j - \vartheta_i) t, \quad \vartheta_i < \vartheta_j \quad (2\text{-}18)$$

$$Q_{T,e} = H_{T,D}(\vartheta_e - \vartheta_i) t, \quad \vartheta_i < \vartheta_e \quad (2\text{-}43)$$

$$Q_{T,u} = H_{T,iu}(\vartheta_u - \vartheta_u) t, \quad \vartheta_i < \vartheta_u \quad (2\text{-}47)$$

$$Q_{T,z} = H_{T,iz}(\vartheta_z - \vartheta_i) t, \quad \vartheta_i < \vartheta_z \quad (2\text{-}51)$$

$$Q_{T,s} = H_{T,s}(\vartheta_e - \vartheta_i) t, \quad \vartheta_i < \vartheta_e \quad (2\text{-}54)$$

$H_{T,D}$:

$$H_{T,D} = \sum(U_j A_j) + \Delta U_{WB} \sum A_j \quad (2\text{-}44)$$

$$H_{T,iu} = \sum(U_j A_j) \quad (2\text{-}48)$$

$$H_{T,iz} = \sum(U_j A_j) \quad (2\text{-}52)$$

$H_{T,s}$ (DIN EN ISO 13370 L_s)

ΔU_{WB}:

0.1외단열

0.15 내단열

(2-24)참조

Q_V

$$Q_V = \sum_k H_{V,k}(\vartheta_k - \vartheta_i) t, \quad \vartheta_i < \vartheta_k \quad (2\text{-}19)$$

$$Q_{V,inf} = H_{V,inf}(\vartheta_e - \vartheta_i) t, \quad \vartheta_i < \vartheta_e \quad (2\text{-}57)$$

$$Q_{V,win} = H_{V,win}(\vartheta_e - \vartheta_i) t, \quad \vartheta_i < \vartheta_e \quad (2\text{-}65)$$

$$Q_{V,mech} = H_{V,mech}(\vartheta_{V,mech} - \vartheta_i) t, \quad \vartheta_i < \vartheta_{V,mech} \quad (2\text{-}82)$$

$$Q_{V,z} = H_{V,z}(\vartheta_z - \vartheta_i) t, \quad \vartheta_i < \vartheta_z \quad (2\text{-}98)$$

이하 열손실과 같음

$Q_{I,source}$

$$Q_{I,source} = Q_{I,source,p} + Q_{I,source,L} + Q_{I,source,fac} + Q_{I,source,h} \quad (2\text{-}20)$$

$$Q_{I,source,p} = q_{I,p} A_B \quad (2\text{-}118)$$

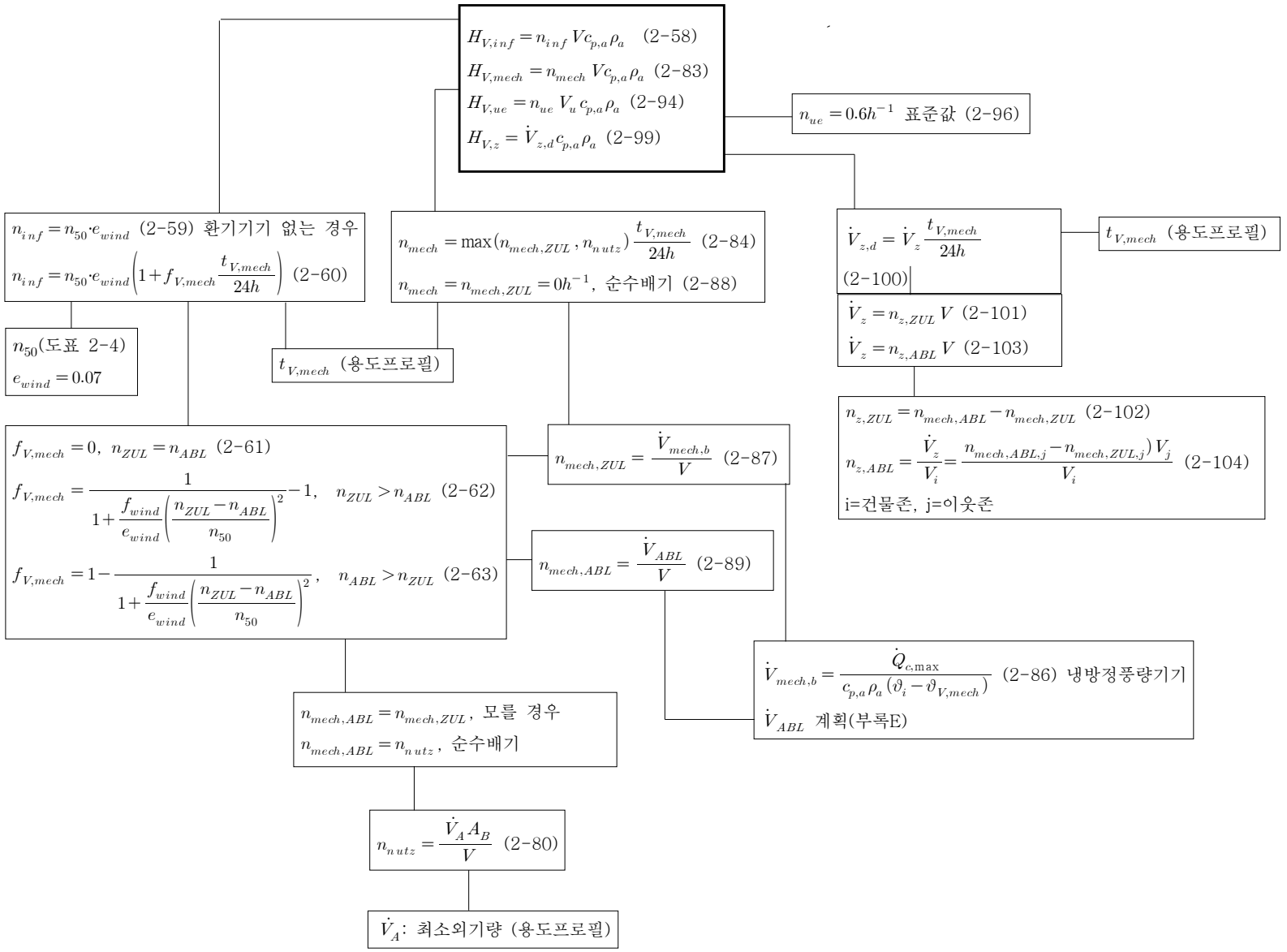
$$Q_{I,source,fac} = q_{I,fac} A_B \quad (2\text{-}119)$$

$$Q_{i,L} = \mu_L Q_{i,L,elektr} \quad (2\text{-}123)$$

$$Q_{I,source,h} = Q_{I,w} + Q_{I,h} + Q_{I,vh} + Q_{I,ch} \quad (2\text{-}124)$$

- $q_{I,p}$: 도표 2-A.4
- $q_{I,fac}$: 도표 2-A.4
- $Q_{i,L,elektr}$ (조명)

환기에 의한 열손실계수


$H_{V,inf} = n_{inf} V c_{p,a} \rho_a$ (2-58)
$H_{V,mech} = n_{mech} V c_{p,a} \rho_a$ (2-83)
$H_{V,ue} = n_{ue} V_u c_{p,a} \rho_a$ (2-94)
$H_{V,z} = \dot{V}_{z,d} c_{p,a} \rho_a$ (2-99)
$n_{ue} = 0.6h^{-1}$ 표준값 (2-96)
$n_{inf} = n_{50} \cdot e_{wind}$ (2-59) 환기기기 없는 경우
$n_{inf} = n_{50} \cdot e_{wind} \left(1 + f_{V,mech} \frac{t_{V,mech}}{24h}\right)$ (2-60)
n_{50}(도표 2-4)
$e_{wind} = 0.07$
$t_{V,mech}$ (용도프로필)
$n_{mech} = \max(n_{mech,ZUL}, n_{nutz}) \frac{t_{V,mech}}{24h}$ (2-84)
$n_{mech} = n_{mech,ZUL} = 0h^{-1}$, 순수배기 (2-88)
$\dot{V}_{z,d} = \dot{V}_z \frac{t_{V,mech}}{24h}$ (2-100)
$t_{V,mech}$ (용도프로필)
$\dot{V}_z = n_{z,ZUL} V$ (2-101)
$\dot{V}_z = n_{z,ABL} V$ (2-103)
$n_{z,ZUL} = n_{mech,ABL} - n_{mech,ZUL}$ (2-102)
$n_{z,ABL} = \frac{\dot{V}_z}{V_i} = \frac{n_{mech,ABL,j} - n_{mech,ZUL,j}) V_j}{V_i}$ (2-104)
i=건물존, j=이웃존
$f_{V,mech} = 0$, $n_{ZUL} = n_{ABL}$ (2-61)
$f_{V,mech} = \frac{1}{1 + \frac{f_{wind}}{e_{wind}} \left(\frac{n_{ZUL} - n_{ABL}}{n_{50}}\right)^2} - 1$, $n_{ZUL} > n_{ABL}$ (2-62)
$f_{V,mech} = 1 - \frac{1}{1 + \frac{f_{wind}}{e_{wind}} \left(\frac{n_{ZUL} - n_{ABL}}{n_{50}}\right)^2}$, $n_{ABL} > n_{ZUL}$ (2-63)
$n_{mech,ZUL} = \frac{\dot{V}_{mech,b}}{V}$ (2-87)
$n_{mech,ABL} = \frac{\dot{V}_{ABL}}{V}$ (2-89)
$\dot{V}_{mech,b} = \frac{\dot{Q}_{c,\max}}{c_{p,a} \rho_a (\vartheta_i - \vartheta_{V,mech})}$ (2-86) 냉방정풍량기기
$\dot{V}_{ABL}$ 계획(부록E)
$n_{mech,ABL} = n_{mech,ZUL}$, 모를 경우
$n_{mech,ABL} = n_{nutz}$, 순수배기
$n_{nutz} = \frac{\dot{V}_A A_B}{V}$ (2-80)
$\dot{V}_A$: 최소외기량 (용도프로필)

공조처리

$$Q_{V,i,m} = q_{i,m}\,\dot{V}_{mech,m} \quad (3\text{-}36) = Q_{vi,b} \quad (7\text{-}2,\ 7\text{-}8,\ 7\text{-}14)\ [\mathrm{Wh}]$$

$$q_{i,m} = q_{i,12h,m}\frac{t_{V,mech,m}}{12} f_{h,i}\frac{d_{V,mech,m}}{d_{\max,m}} \quad (3\text{-}28)$$

$f_{h,i}$ 그림(3-4)

$$q_{H,12h,m} = q_{H,18^\circ C,12h,m} + g_{H,o,m}(\vartheta_{HC} - 18^\circ C),\ 18^\circ C < \vartheta_{HC} \le 22^\circ C \quad (3\text{-}23)$$

$$q_{H,12h,m} = q_{H,18^\circ C,12h,m} + g_{H,u,m}(\vartheta_{HC} - 18^\circ C),\ 14^\circ C < \vartheta_{HC} \le 18^\circ C \quad (3\text{-}24)$$

$$q_{C,12h,m} = q_{C,18^\circ C,12h,m} - g_{C,o,m}(\vartheta_{HC} - 18^\circ C),\ 18^\circ C < \vartheta_{HC} \le 22^\circ C \quad (3\text{-}25)$$

$$q_{C,12h,m} = q_{C,18^\circ C,12h,m} - g_{C,u,m}(\vartheta_{HC} - 18^\circ C),\ 14^\circ C < \vartheta_{HC} \le 18^\circ C \quad (3\text{-}26)$$

$$q_{St,12h,m} = q_{St,18^\circ C,12h,m} \quad (3\text{-}27)$$

도표 A.1~A.13

$q_{i,18°C,12h,m}$

$g_{H,o,m}$, $g_{H,u,m}$

$g_{C,o,m}$, $g_{C,u,m}$

$$\vartheta_{HC,m} = \vartheta_{V,mech,m} - \frac{Q_{V,E,ZUL,m}}{t_{V,mech,m}\,d_{V,mech,m}\,c_{p,L}\rho_L\,\dot{V}_{mech,m}} + 1.4K \quad (3\text{-}22)$$

$$Q_{V,E,ZUL,m} = P_{V,ZUL,m}\,t_{V,mech,m}\,d_{V,mech,m} \quad (3\text{-}10)\ \text{정풍량}\ [\mathrm{Wh}]$$

$$Q_{V,E,ZUL,m} = \sum_j t_{V,mech,j,m}\,P_{V,ZUL,j} \quad (3\text{-}14)\ \text{시간, 용도 변풍량}\ [\mathrm{Wh}]\ \text{아래(3-16)도 같은 단위}$$

$$Q_{V,E,ZUL,m} = \frac{\Delta p^*_{ZUL} f_{p,ZUL}}{\eta_{ZUL}} \sum_m \dot{V}_{ZUL} + \frac{\Delta p^*_{ZUL}(1-f_{p,ZUL})}{\eta_{ZUL}\,\dot{V}^{*2}_{ZUL}} \sum_m \dot{V}^3_{ZUL} \quad (3\text{-}16)\ \text{변풍량 냉방부하}$$

$$P_{V,ZUL,m} = \frac{\dot{V}_{ZUL}\Delta p^*_{ZUL}}{\eta_{ZUL}} /3600 \quad (3\text{-}7)\ \text{정풍량}\ [\mathrm{W}]$$

$$P_{V,ZUL} = \left(\frac{\dot{V}_{ZUL}\Delta p^*_{ZUL} f_{p,ZUL}}{\eta_{ZUL}} + \frac{\dot{V}^3_{ZUL}\Delta p^*_{ZUL}(1-f_{p,ZUL})}{\eta_{ZUL}\,\dot{V}^{*2}_{ZUL}}\right) /3600\ [\mathrm{W}]$$

(3-11) 변풍량

$$f_p = \frac{\Delta p_{konst}}{\Delta p^*} = 0.4 \quad (3\text{-}13,\ 7\text{-}1)$$

$$\eta_{ZUL} = \eta_{tot} \quad (\text{도표 } 7\text{-}3)$$

$$\Delta p^*_{ZUL} = \Delta p_{tot} \quad (\text{도표 } 7\text{-}3)$$

$$\dot{V}_{ZUL} = \dot{V}_{ABL} = \dot{V}_{mech,m} \quad (3\text{-}18)$$

$$\dot{V}_{mech,b,m} = \dot{V}_{mech,m} = \dot{V}^* \quad (3\text{-}1)\ \text{정풍량}$$

$$\dot{V}_{mech,b,m} = \dot{V}_{mech,m} = \frac{\sum_j \dot{V}_j \cdot t_{V,mech,j,m}}{t_{V,mech,m} \cdot d_{V,mech,m}} \quad (3\text{-}2)\ \text{시간, 용도}$$

$$\dot{V}_{mech,m} = \dot{V}_{mech,b,m} + \frac{1000 \cdot Q_{c,b}}{t_{V,mech,m}\,d_{V,mech,m}\,c_{p,L}\rho_L(\vartheta_{i,c,m} - \vartheta_{V,mech,m})} \quad (3\text{-}4)\ \text{냉방부하}$$

$$\sum_m \dot{V} = t_{V,mech,m}\,d_{V,mech,m}\,\dot{V}_{mech,b,m} + \frac{1000 \cdot Q_{c,b}}{c_{p,L}\rho_L(\vartheta_{i,c,m} - \vartheta_{V,mech,m})} \quad (3\text{-}5)\ \text{냉방부하}$$

$\vartheta_{i,c} = \vartheta_{i,c,soll} - 2K$ (2-36)

$Q_{c,b}$ (2-2)

$\vartheta_{V,mech,m}$ 도표(3-3, 3-4)

공조기 최대 가열성능

$Q_H^* = \dot{V}^* \rho_L \cdot (h_{ZUL,Wi} - h_{AUL,Wi} - \Delta h_{WRG})/3600$ [kW] (3-57) 증기가습 있음

$Q_H^* = \dot{V}^* \rho_L \cdot (c_{p,L}(\vartheta_{ZUL,Wi} - \vartheta_{AUL,Wi}) - \Delta h_{WRG})/3600$ [kW] (3-58) 증기가습 없음

$\rho_L = 1.204 kg/m^3$

$c_{p,L} = 1.006 kJ/kg \cdot K$

$\dot{V}^* = \dot{V}_{mech,m}$

$h_{ZUL,Wi} = 1.01\vartheta_{ZUL,Wi} + 0.001(2501 + 1.86\vartheta_{ZUL,Wi})$ (3-38) 습도요구 없음

$h_{ZUL,Wi} = 1.01\vartheta_{ZUL,Wi} + 0.006(2501 + 1.86\vartheta_{ZUL,Wi})$ (3-42) 편차가 있는 습도요구

$h_{ZUL,Wi} = 1.01\vartheta_{ZUL,Wi} + 0.008(2501 + 1.86\vartheta_{ZUL,Wi})$ (3-48) 편차가 없는 습도요구

[kJ/kg

$\vartheta_{ZUL,Wi} = \vartheta_{h,mech,\min}$ (도표 3-3)

$c_{p,L} = 1.006 kJ/kg \cdot K$

$\Delta h_{WRG} = 0$ (3-54) 열 회수기 없음

$\Delta h_{WRG} = \Phi_{WRG} c_{p,L}(\vartheta_{ABL,Wi} - \vartheta_{AUL,Wi})$ (3-55) 순수 현열 회수기

$\Delta h_{WRG} = \Phi_{WRG} c_{p,L}(h_{ABL,Wi} - h_{AUL,Wi})$ (3-56) 현열 및 습기 회수기

Φ_{WRG} (제품사양)

$h_{ABL,Wi}$ (도표 3-7)

$\vartheta_{ABL,Wi}$ (도표 3-7)

$\vartheta_{AUL,Wi}$ (도표 3-6)

$h_{AUL,Wi}$ (도표 3-6)

공조기 최대 냉각성능

$$Q_C^* = \dot{V}^* \rho_L \bullet (h_{AUL,So} - h_{ZUL,So} - \Delta h_{WRG}) / 3600 \quad [kW]$$

(3-62)

$\dot{V}^* = \dot{V}_{mech,m}$

$\rho_L = 1.204 kg/m^3$

$c_{p,L} = 1.006 kJ/kg \bullet K$

$\Delta h_{WRG} = 0$ (3-59) 열 회수기 없음

$\Delta h_{WRG} = \Phi_{WRG}\, c_{p,L} (\vartheta_{AUL,So} - \vartheta_{ABL,So})$ (3-55) 순수 현열 회수기

$\Delta h_{WRG} = \Phi_{WRG} (h_{AUL,So} - h_{ABL,So})$ (3-56) 현열 및 습기 회수기

Φ_{WRG} (제품사양)

$h_{AUL,So}$ (도표 3-6)

$h_{ABL,So}$ (도표 3-7)

$\vartheta_{AUL,So}$ (도표 3-6)

$\vartheta_{ABL,So}$ (도표 3-7)

$h_{ZUL,So} = 1.01\,\vartheta_{ZUL,So} + 0.012\,(2501 + 1.86\,\vartheta_{ZUL,So}), \quad ps(\vartheta_{ZUL,So}) > 1892Pa$ (3-39) 습도요구 없음

$h_{ZUL,So} = 1.01\,\vartheta_{ZUL,So} + x_{ZUL,So}\,(2501 + 1.86\,\vartheta_{ZUL,So}), \quad ps(\vartheta_{ZUL,So}) \le 1892Pa$ (3-40) 습도요구 없음

$h_{ZUL,So,t} = 1.01\,\vartheta_{ZUL,So} + 0.011\,(2501 + 1.86\,\vartheta_{ZUL,So}), \quad ps(\vartheta_{ZUL,So}) > 1737Pa$ (3-43) 편차가 있는 습도요구

$h_{ZUL,So,t} = 1.01\,\vartheta_{ZUL,So} + x_{ZUL,So}\,(2501 + 1.86\,\vartheta_{ZUL,So}), \quad ps(\vartheta_{ZUL,So}) \le 1737Pa$ (3-44) 편차가 있는 습도요구

$h_{ZUL,So,t} = 1.01\,\vartheta_{ZUL,So} + 0.008\,(2501 + 1.86\,\vartheta_{ZUL,So}), \quad ps(\vartheta_{ZUL,So}) > 1269Pa$ (3-49) 편차가 없는 습도요구

$h_{ZUL,So,t} = 1.01\,\vartheta_{ZUL,So} + x_{ZUL,So}\,(2501 + 1.86\,\vartheta_{ZUL,So}), \quad ps(\vartheta_{ZUL,So}) \le 1269Pa$ (3-50) 편차가 없는 습도요구

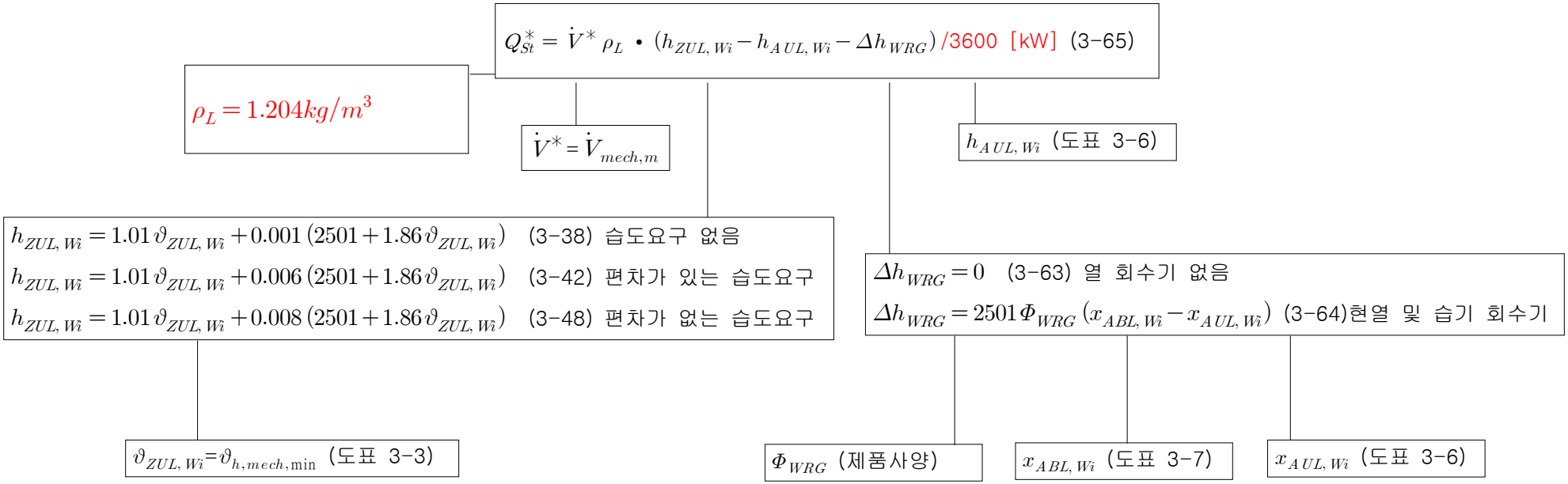
$$x_{ZUL,So} = \frac{0.5911}{\frac{100\,000}{ps(\vartheta_{ZUL,So})} - 0.95}$$ (3-41)

$\vartheta_{ZUL,So} = \vartheta_{c,mech,\min}$ (도표 3-3)

$$ps(\vartheta) = e^{23.621 - \frac{4065}{\vartheta + 236.2506}}, \qquad 0.01\,^\circ C \le \vartheta \le 80\,^\circ C$$

(3-37) -수정됨 체크요망

공조기 최대 가습성능


$Q_{St}^{*} = \dot{V}^{*}\,\rho_L \bullet (h_{ZUL,Wi} - h_{AUL,Wi} - \Delta h_{WRG})/3600$ [kW] (3-65)
$\rho_L = 1.204 kg/m^3$
$\dot{V}^{*} = \dot{V}_{mech,m}$
$h_{AUL,Wi}$ (도표 3-6)
$h_{ZUL,Wi} = 1.01\,\vartheta_{ZUL,Wi} + 0.001\,(2501 + 1.86\,\vartheta_{ZUL,Wi})$ (3-38) 습도요구 없음
$h_{ZUL,Wi} = 1.01\,\vartheta_{ZUL,Wi} + 0.006\,(2501 + 1.86\,\vartheta_{ZUL,Wi})$ (3-42) 편차가 있는 습도요구
$h_{ZUL,Wi} = 1.01\,\vartheta_{ZUL,Wi} + 0.008\,(2501 + 1.86\,\vartheta_{ZUL,Wi})$ (3-48) 편차가 없는 습도요구
$\Delta h_{WRG} = 0$ (3-63) 열 회수기 없음
$\Delta h_{WRG} = 2501\,\Phi_{WRG}\,(x_{ABL,Wi} - x_{AUL,Wi})$ (3-64)현열 및 습기 회수기
$\vartheta_{ZUL,Wi} = \vartheta_{h,mech,\min}$ (도표 3-3)
Φ_{WRG} (제품사양)
$x_{ABL,Wi}$ (도표 3-7)
$x_{AUL,Wi}$ (도표 3-6)