

**Interpretation IC 170-2013-2 of  
ANSI/ASHRAE/ASHE Standard 170-2013  
Ventilation of Health Care Facilities**

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**Request from:** Travis English ([Travis.R.English@kp.org](mailto:Travis.R.English@kp.org)), Kaiser Permanente, 1800 Harrison Street, Oakland, CA 94612.

**Reference:** This request for interpretation refers to the requirements in ANSI/ASHRAE/ASHE Standard 170-2013, Section 7.1.a.2, regarding providing for comfort.

**Background:** Standard 170 (S170) §7.1.a.2 states that the criteria in Table 7.1 are intended to “provide for comfort”. In ASHRAE’s standards, comfort is also covered by *ASHRAE Standard 55- Thermal Comfort for Human Occupancy (S55)*. The methodologies of the two are notably different. S70 prescribes air temperature, air flow, and relative humidity ranges. S55 predicts comfort by using multiple variables (including but not limited to air temperature, speed and humidity) and comparing combinations of variables to known human comfort responses.

**Using the S55 methodology:** For typical occupant types, assuming compliant air speed and a zero degree difference between radiant and air temperatures, the nominal temperature ranges for S55 compliance are shown in the table and figure below.

Occupant Type	Clo	Met	Op T.	Max RH	PMV	PPD
Gowned Healthcare Workers	1.4	1.4	59.9	20	-0.50	10.16
Gowned Healthcare Workers	1.4	1.4	58.3	60	-0.50	10.22
Gowned Healthcare Workers	1.4	1.4	71.7	20	0.50	10.22
Gowned Healthcare Workers	1.4	1.4	69.4	60	0.50	10.22
Healthcare workers	0.5	1.4	<b>73.7</b>	<b>2</b>	-0.50	10.25
Healthcare workers	0.5	1.4	71.5	60	-0.50	10.21
Healthcare workers	0.5	1.4	<b>80.8</b>	<b>2</b>	<b>0.49</b>	10.06
Healthcare workers	0.5	1.4	<b>78.1</b>	<b>60</b>	<b>0.49</b>	10.06
Healthcare workers	1	1.4	66.4	2	-0.50	10.23
Healthcare workers	1	1.4	64.1	60	-0.50	10.17
Healthcare workers	1	1.4	76.4	2	0.50	10.28
Healthcare workers	1	1.4	73.2	60	0.50	10.26
Patients	0.31	0.7	85.7	2	-0.47	9.64
Patients	0.31	0.7	83.3	60	-0.50	10.22
Patients	0.31	0.7	88.4	2	0.50	10.23
Patients	0.31	0.7	85.9	60	0.50	10.23
Workers, patients, or guests	0.5	1	79.6	2	-0.50	10.22
Workers, patients, or guests	0.5	1	77.2	60	-0.50	10.22
Workers, patients, or guests	0.5	1	84.5	2	0.50	10.22
Workers, patients, or guests	0.5	1	81.7	60	0.50	10.22
Workers, patients, or guests	1	1	74.2	2	-0.50	10.22
Workers, patients, or	1	1	71.4	60	-0.50	10.22

Occupant Type	Clo	Met	Op T.	Max RH	PMV	PPD
guests						
Workers, patients, or guests	1	1	81.0	2	0.50	10.22
Workers, patients, or guests	1	1	77.6	60	0.50	10.22

**Table 1: S55 Temperature and Humidity Ranges yielding  $-0.5 < PMV > 0.5$**

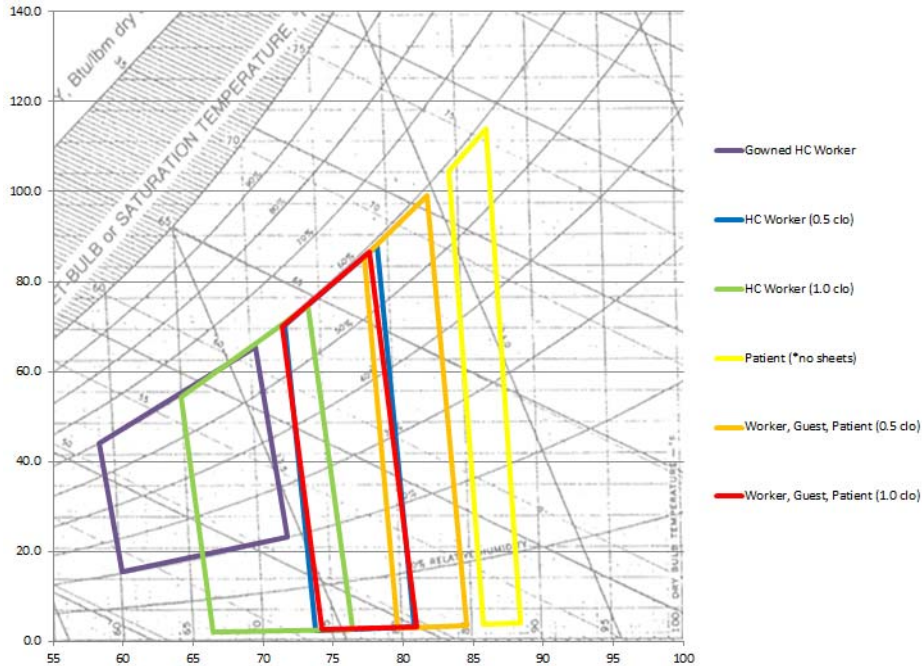


Fig. 1: S55 Temperature and Humidity Ranges yielding  $-0.5 < PMV > 0.5$

Using the S170 methodology: There are 15 unique comfort criteria indicated in S170 Table 7.1. They are shown in the table below.

	Temperature (F)	Humidity Range (RH)	(No of Spaces), e.g. Space
A	68 – 73	20 – 60	(1) e.g. Gastrointestinal Endoscopy procedure room
B	68 – 75	20 – 60	(3) e.g. Classes B&C operating rooms
C	70 – 75	20 – 60	(5) e.g. Recovery Room
D	70 – 75	30 – 60	(2) e.g. Critical and intensive care
E	72 – 78	30 – 60	(1) e.g. Newborn intensive care
F	70 – 75	40 – 60	(1) e.g. Wound intensive care
G	70 – 75	Max 60	(14) e.g. Intermediate care
H	72 – 78	Max 60	(3) e.g. X-ray, diagnostic and treatment
I	72 – 80	Max 60	(1) e.g. Physical therapy
J	70 – 75	Max 60	(1) e.g. ER Waiting Rooms
K	68 – 73	NR	(1) e.g. Bronchoscopy, sputum collection and pentamidine administration
L	70 – 75	NR	(19) e.g. Resident Room
M	72 – 78	NR	(9) e.g. Dialysis treatment room
N	72 – 80	NR	(1) e.g. Hydrotherapy
O	NR	NR	(28) e.g. Substerile service area

**Table 1: S170 Temperature and Humidity Ranges, as listed in Table 7-1**

Using standard assumptions for clothing insulation and metabolic activity, PPD in these spaces can be calculated using the S55 methodology. The results are shown in the table below:

Condition	Temp	RH.	Clo	Met	Air Speed	PMV	PPD	S55 Result	
A	Min.	68	20	0.5	1.0	30	-2.59	95.17	Does not comply
	Max.	73	60	1.0	1.4	30	-1.25	37.57	Does not comply
B	Min.	68	20	0.5	1.0	30	-2.59	95.17	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
C	Min.	70	20	0.5	1.0	30	-2.17	83.93	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
D	Min.	70	30	0.5	1.0	30	-2.11	81.35	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
E	Min.	72	30	0.5	1.0	30	-1.68	60.81	Does not comply
	Max.	78	60	1.0	1.4	30	-0.14	5.4	Complies
F	Min.	70	40	0.5	1.0	30	-2.04	78.54	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
G	Min.	70	2	0.5	1.0	30	-2.29	88.01	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
H	Min.	72	2	0.5	1.0	30	-1.88	71.1	Does not comply
	Max.	78	60	1.0	1.4	30	-0.14	5.4	Complies
I	Min.	72	2	0.5	1.0	30	-1.88	71.1	Does not comply
	Max.	80	60	1.0	1.4	30	0.31	6.96	Complies
J	Min.	70	2	0.5	1.0	30	-2.29	88.01	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
K	Min.	68	2	0.5	1.0	30	-2.7	96.77	Does not comply
	Max.	73	60	1.0	1.4	30	-1.25	37.57	Does not comply
L	Min.	70	2	0.5	1.0	30	-2.29	88.01	Does not comply
	Max.	75	60	1.0	1.4	30	-0.81	18.68	Does not comply
M	Min.	72	2	0.5	1.0	30	-1.88	71.1	Does not comply
	Max.	78	60	1.0	1.4	30	-0.14	5.4	Complies
N	Min.	72	2	0.5	1.0	30	-1.88	71.1	Does not comply
	Max.	80	60	1.0	1.4	30	0.31	6.96	Complies

**Table 3: Predicted PMV and PPD of S170 Temperature and Humidity Criteria**

**Interpretation:** The criteria in Table 7.1 fully provide for comfort. Compliance to Standard 170 yields spaces that comply with the scope, purpose and intent of ASHRAE Standard 55 without further analysis.

**Question:** Is this interpretation correct?

**Answer:** No

**Comments:** Compliance with Standard 170 -2013 does not assure compliance with Standard 55 -2013.