Residential Programs
Central Heat Pump Specifications

Applicability - This document outlines the equipment and installation requirements for a central heat pump (CHP).

Installation must follow manufacturer's specifications and meet local building, electrical and mechanical codes. The Tacoma Power Central Heat Pump specifications are required in addition to the manufacturer specifications and code requirements.

1. TECHNICAL QUALIFICATIONS

a) Installation of central heat pump must be performed by a technician trained and certified on the brand and model of the equipment being installed.

2. EQUIPMENT SELECTION AND SIZING

The new AHRI rated air source heat pump system must have a minimum rating of 9.0 HSPF/14 SEER rating for equipment manufactured before January 1, 2023 and 7.6 HSPF2/13.4 SEER2 rating for equipment manufactured after December 31, 2022. Must be sized using a balance point of 30°F or less. To determine the balance point, the following specifications must be used:

a) Heating capacity based on load calculation using a 70°F indoor temperature for heating and 75°F indoor temperature for cooling and ASHRAE winter/cooling design temperatures for the weather station closest to the installation address.
b) U-values and F-values consistent with those found in the "Air Conditioning Contractors of America (ACCA) Manual J," 8th edition or later.
c) An infiltration rate of 0.8 air changes per hour for homes built before 1980 and 0.5 for homes built 1980 or later, unless a house depressurization test has been conducted and an estimate is made using the result. If a duct pressurization test has not been performed on the house, a default duct system loss of 25% shall be used.

EXCEPTION:

If the air handler and all ductwork are located in the thermal envelope of the house 0% shall be used as "duct system loss" for sizing calculations.

d) The recommended method and form for calculations is available in the ACCA Manual J., 8th edition or later. Alternate computerized or manual methods of calculating heating and cooling loads may be used if approved in advance by Tacoma Power.

3. OUTDOOR UNIT MUST:

a) Use adjustable risers to allow for better drainage and prevent debris and snow build-up
b) Be installed on a stable, level surface
c) Be secured to the pad and risers using bolts and/or adhesive
d) Be located away from walkways and driveways where drainage may result in a slipping hazard

4. EXTERNAL STATIC PRESSURE

The total external pressure acting on the system air handler must not exceed 0.8 inches of water (200 Pascals (Pa)).

5. AIR FLOW

Air flow across the indoor coil must be as specified in the heat pump manufacturer's documentation. If the manufacturer's documentation is not specific, this should be set at between a minimum of 325 to less than 500 cubic feet per minute (CFM) per 12,000 Btu/hr output at AHRI rating conditions.
The approved methods of measurement include:

- TruFlow plate
- Alternate flow testing method: total static pressure. Use BPA ESP lookup table to determine air flow.
- Duct pressurization fan matching method per plate

6. REFRIGERANT TUBING

a) Create new flares using an appropriate R410A flaring tool and measurement gauge. **Do not use** manufacturer provided tubing flares and fittings.
b) Apply refrigerant oil to the end of each flare.
c) Connect tubing with R410A nuts (supplied with your outdoor unit) and tighten to manufacturer's specifications.

7. REFRIGERANT CHARGE

The technician **must** follow the manufacturer's guidelines for charging a new system and make any necessary adjustments for non-standard line set lengths. The technician is required to use a vacuum pump during installation. It is also acceptable to use any alternative refrigerant measuring methods that are approved and documented by the manufacturer.

a) **Heating** – If the outdoor temperature is 65°F or less, test in heating mode after running the heat pump for a recommended 15 minutes, if not otherwise specified by the manufacturer, with the auxiliary back-up heat turned off. The temperature change across the air handler indoor coil must be set at or above the minimum temperature split shown in the R-410A Temperature Split table located on the last page of this document.

b) **Cooling** – If the outdoor temperature is 65°F or higher, test in cooling mode after operating the heat pump for a recommended 15 minutes, if not otherwise specified by the manufacturer. The sub-cooling temperature (discharge temp. – liquid line temp) must meet the manufacturer's documented requirements. For discharge pressures and corresponding temperatures, please refer to the R-401A Pressure Temperature chart located on the last page of this document.

8. CONTROLS

a) Auxiliary heat must be controlled in such a manner that it does not engage when the outdoor air temperature rises above 35°F, unless supplemental heating is required during a defrost cycle or when emergency heating is required during a refrigeration cycle failure.

9. NOISE & VIBRATION ABATEMENT

a) The outdoor unit should be installed in a location that avoids or minimizes the transmission of objectionable noise to adjacent properties, sleeping areas or other areas where noise control is necessary.

b) Outdoor units must comply with all state and local noise control ordinances. The participating installer is responsible for making any modifications necessary to reduce noise.

c) The unit base must not be connected to the foundation.

10. LINE SET INSULATION & PROTECTION

a) Insulation must cover the length of the discharge/suction line where it runs through unheated areas.

b) Protect the outdoor portion of line set with rigid line hide to avoid premature insulation damage and for aesthetic value.

c) Line set with exposed insulation that connects the outdoor unit must have a UV protected covering.

d) Penetrations through the exterior of the home must be sealed with an insulative sealant.

e) Insulation that has been disturbed by installed line set will be returned to original (or better) condition.

11. CONDENSATE SYSTEM

a) Condensate drain line must slope downhill to allow for gravity to direct the flow of condensate to drain outside the home. Condensate drain lines must run to an open drain or location outside the building's foundation. Under no circumstances may condensate drain into a crawl space or onto a walkway.

b) Condensate drain piping must meet International Mechancial Code (IMC) requirements and should be made of copper, plastic or other corrosion-resistant material.

c) Condensate pumps are not recommended unless there is no other alternative. If a condensate pump is required, follow the manufacturer's installation requirements.

12. ELECTRICAL

a) Must be installed on a dedicated electrical circuit.

b) An outdoor receptacle must be installed if required by code.

13. CUSTOMER EDUCATION

a) Demonstrate, and emphasize, the importance of cleaning the filters. Explain the maintenance requirements.

b) Give the homeowner the manufacturer's operation manual. Refer to the manual during the heat pump operation walk-through/training.

c) Show the customer how to operate the thermostat.

R-410A Pressure-temperature chart

PSI	°F	PSIG	°F	PSIG	°F	PSIG	°F	PSIG	°F	PSIG	°F
12	–37.7	**114**	37.8	**216**	74.3	**318**	100.2	**420**	120.7	**522**	137.6
14	–34.7	**116**	38.7	**218**	74.9	**320**	100.7	**422**	121	**524**	137.9
16	–32.0	**118**	39.5	**220**	75.5	**322**	101.1	**424**	121.4	**526**	138.3
18	–29.4	**120**	40.5	**222**	76.1	**324**	101.6	**426**	121.7	**528**	138.6
20	–36.9	**122**	41.3	**224**	76.7	**326**	102	**428**	122.1	**530**	138.9
22	–24.5	**124**	42.2	**226**	77.2	**328**	102.4	**430**	122.5	**532**	139.2
24	–22.2	**126**	43	**228**	77.8	**330**	102.9	**432**	122.8	**534**	139.5
26	–20.0	**128**	43.8	**230**	78.4	**332**	103.3	**434**	123.2	**536**	139.8
28	–17.9	**130**	44.7	**232**	78.9	**334**	103.7	**436**	123.5	**538**	140.1
30	–15.8	**132**	45.5	**234**	79.5	**336**	104.2	**438**	123.9	**540**	140.4
32	–13.8	**134**	46.3	**236**	80	**338**	104.6	**440**	124.2	**544**	141
34	–11.9	**136**	47.1	**238**	80.6	**340**	105.1	**442**	124.6	**548**	141.6
36	–10.1	**138**	47.9	**240**	81.1	**342**	105.4	**444**	124.9	**552**	142.1
38	–8.3	**140**	48.7	**242**	81.6	**344**	105.8	**446**	125.3	**556**	142.7
40	–6.5	**142**	49.5	**244**	82.2	**346**	106.3	**448**	125.6	**560**	143.3
42	–4.5	**144**	50.3	**246**	82.7	**348**	106.6	**450**	126	**564**	143.9
44	–3.2	**146**	51.1	**248**	83.3	**350**	107.1	**452**	126.3	**568**	144.5
46	–1.6	**148**	51.8	**250**	83.8	**352**	107.5	**454**	126.6	**572**	145
48	0	**150**	52.5	**252**	84.3	**354**	107.9	**456**	127	**576**	145.6
50	1.5	**152**	53.3	**254**	84.8	**356**	108.3	**458**	127.3	**580**	146.2
52	3	**154**	54	**256**	85.4	**358**	108.8	**460**	127.7	**584**	146.7
54	4.5	**156**	54.8	**258**	85.9	**360**	109.2	**462**	128	**588**	147.3
56	5.9	**158**	55.5	**260**	86.4	**362**	109.6	**464**	128.3	**592**	147.9
58	7.3	**160**	56.2	**262**	86.9	**364**	110	**466**	128.7	**596**	148.4
60	8.6	**162**	57	**264**	87.4	**366**	110.4	**468**	129	**600**	149
62	10	**164**	57.7	**266**	87.9	**368**	110.8	**470**	129.3	**604**	149.5
64	11.3	**166**	58.4	**268**	88.4	**370**	111.2	**472**	129.7	**608**	150.1
66	12.6	**168**	59	**270**	88.9	**372**	111.6	**474**	130	**612**	150.6
68	13.8	**170**	59.8	**272**	89.4	**374**	112	**476**	130.3	**616**	151.2
70	15.1	**172**	60.5	**274**	89.9	**376**	112.4	**478**	130.7	**620**	151.7
72	16.3	**174**	61.1	**276**	90.4	**378**	112.6	**480**	131	**624**	152.3
74	17.5	**176**	61.8	**278**	90.9	**380**	113.1	**482**	131.3	**628**	152.8
76	18.7	**178**	62.5	**280**	91.4	**382**	113.5	**484**	131.6	**632**	153.4
78	19.8	**180**	63.1	**282**	91.9	**384**	113.9	**486**	132	**636**	153.9
80	21	**182**	63.8	**284**	92.4	**386**	114.3	**488**	132.3	**640**	154.5
82	22.1	**184**	64.5	**286**	92.8	**388**	114.7	**490**	132.6	**644**	155
84	23.2	**186**	65.1	**288**	93.3	**390**	115	**492**	132.9	**648**	155.5
86	24.3	**188**	65.8	**290**	93.8	**392**	115.5	**494**	133.3	**652**	156.1
88	25.4	**190**	66.4	**292**	94.3	**394**	115.8	**496**	133.6	**656**	156.6
90	26.4	**192**	67	**294**	94.8	**396**	116.2	**498**	133.9	**660**	157.1
92	27.4	**194**	67.7	**296**	95.2	**398**	116.6	**500**	134	**664**	157.7
94	28.5	**196**	68.3	**298**	95.7	**400**	117	**502**	134.5	**668**	158.2
96	29.5	**198**	68.9	**300**	96.2	**402**	117.3	**504**	134.8	**672**	158.7
98	30.5	**200**	69.5	**302**	96.6	**404**	117.7	**506**	135.2	**676**	159.2
100	31.2	**202**	70.1	**304**	97.1	**406**	118.1	**508**	135.5	**680**	159.8
102	32.2	**204**	70.7	**306**	97.5	**408**	118.5	**510**	135.8	**684**	160.3
104	33.2	**206**	71.4	**308**	98	**410**	118.8	**512**	136.1	**688**	160.8
106	34.1	**208**	72	**310**	98.4	**412**	119.2	**514**	136.4	**692**	161.3
108	35.1	**210**	72.6	**312**	98.9	**414**	119.6	**516**	136.7	**696**	161.8
110	35.5	**212**	73.2	**314**	99.3	**416**	119.9	**518**	137		
112	36.9	**214**	73.8	**316**	99.7	**418**	120.3	**520**	137.3		