



ENERGY STAR® Central Air Conditioners & Heat Pumps

Version 6.0

Draft 2

Feb. 11th, 2020





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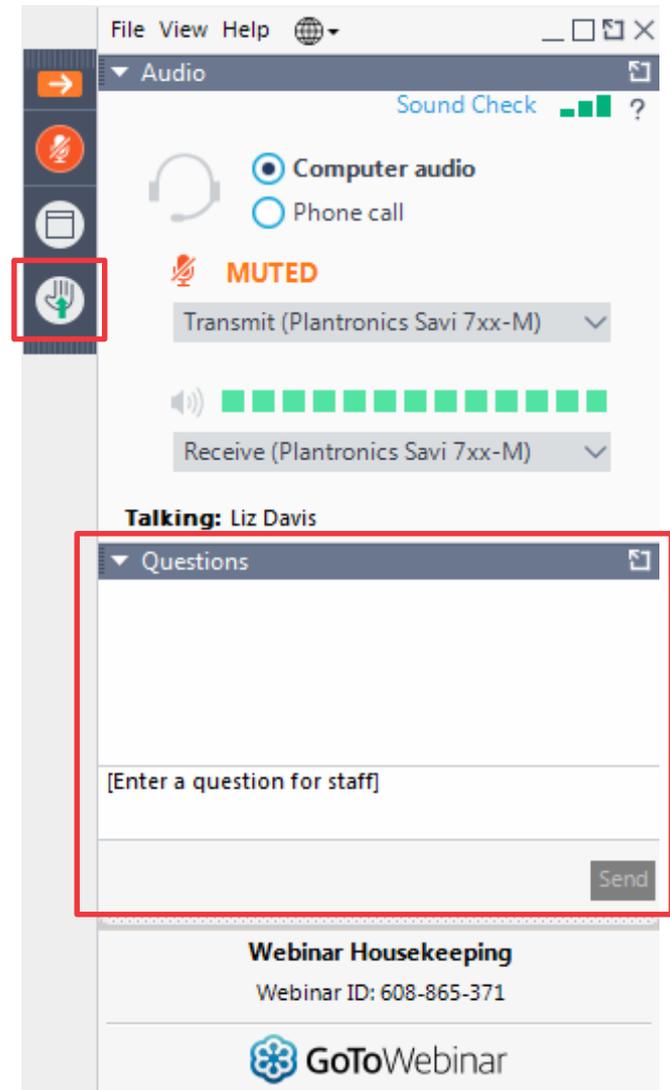
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- Please mute yourself when you are not speaking (use local mute or dial *6)
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Please send written comments to CAC-ASHP@energystar.gov by **February 28, 2020**





Meeting Agenda

1. Introductions/Background
2. Changes from Draft 1
 - Timeline
 - Energy Efficiency Criteria
 - Installation Capabilities
 - Other Requirements
3. Summary & Timeline



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Introductions

Abigail Daken

U.S. Environmental Protection Agency

Antonio M. Bouza

U.S. Department of Energy

Julia Hegarty

ICF

Sam Jasinski

Navigant – A Guidehouse Company

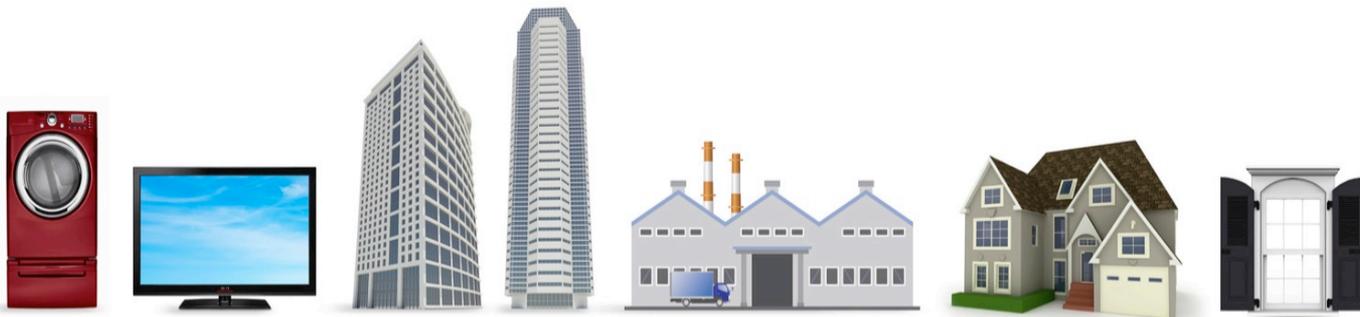
Meeting Attendees – Poll



ENERGY STAR is the simple choice for energy efficiency.

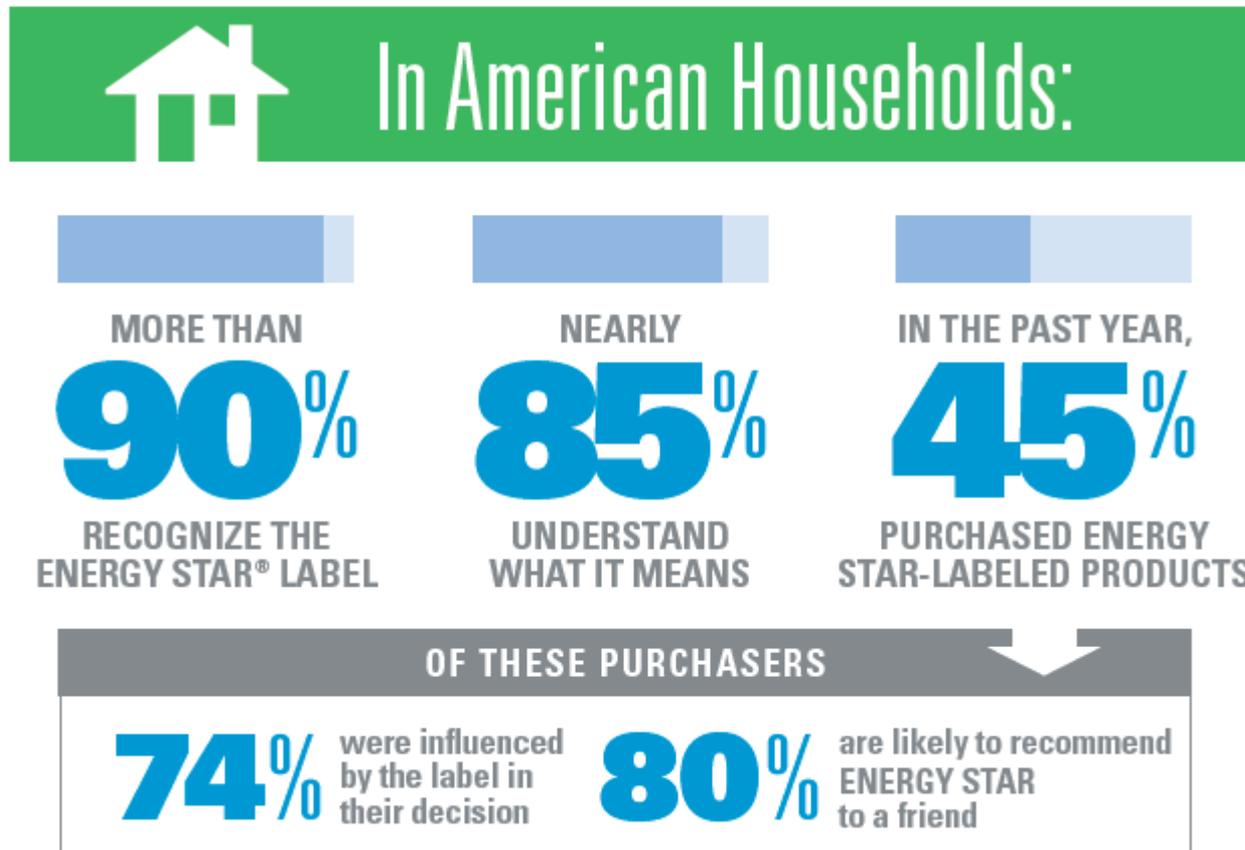
EPA's ENERGY STAR identifies the most energy-efficient **products**, **buildings**, **plants**, and **new homes** – all based on the latest government-backed standards.

Today, every ENERGY STAR label is verified by a rigorous third-party certification process.

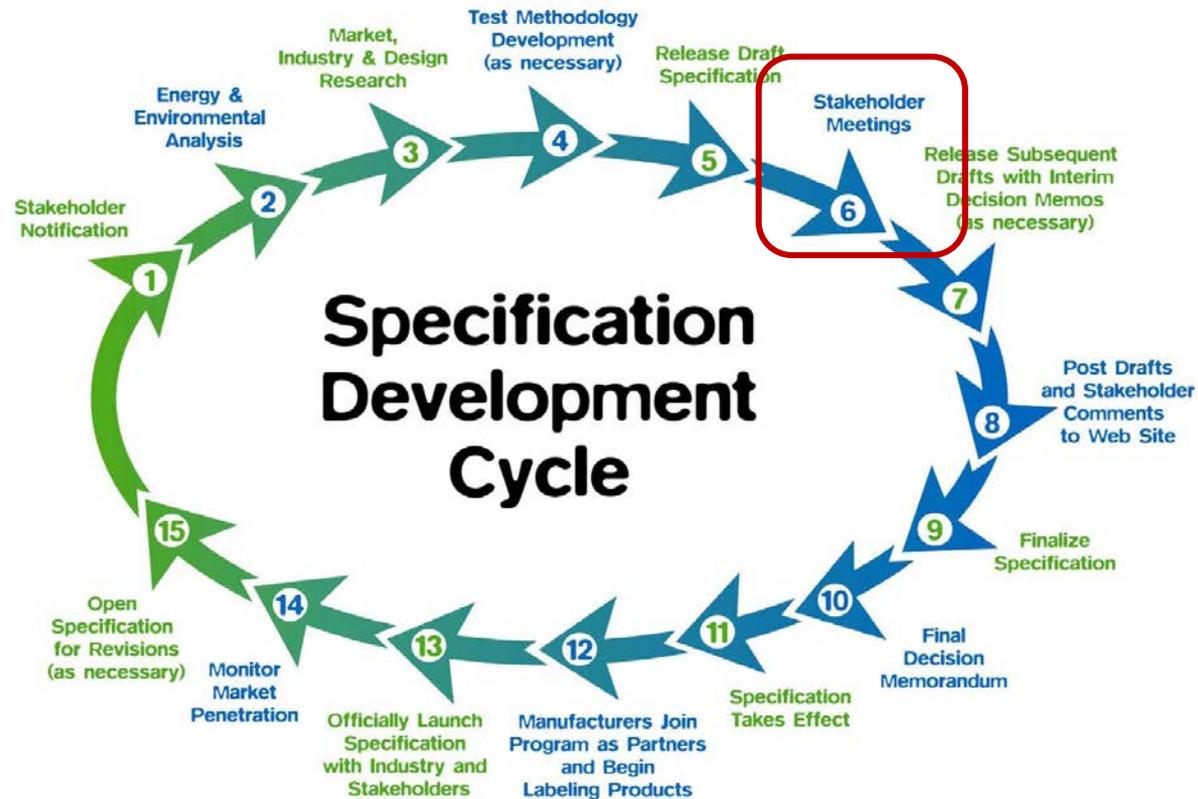




Brand Preference and Loyalty



Specification Revision Process





Revision Drivers

- Time to take another look – Version 5.0 effective 2015
- Market changes
 - Increased interest in electrification & cold climate optimized heat pumps
 - Prevalence of dual capacity units for increased comfort
- Developing consensus around grid services for CAC/ASHP

Estimated Market Share of ENERGY STAR Certified CAC/HPs		
2018	Overall	33%
	CACs	28%
	ASHPs	43%

[2018 ENERGY STAR Unit Shipment and Market Penetration Report](#)



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Overview of Changes from Draft 1

- Propose delay in effective date to January 1, 2023, coupled with more stringent criteria
 - Higher levels
 - Installation capability criteria
- Propose updated low ambient performance criteria for cold climate heat pumps
- Incorporation of connected criteria from LTP



Draft 1 Feedback and Industry Position focused on the effective date

- Comments indicated that the test method and refrigerant changes in 2023 will stress test & design capacity
- Recognize burden; but delay until 2023 requires raising levels and moving forward on future priorities
- Comments indicated the specification would have maximum impact if finalized promptly
 - Manufacturers can design to spec now, while in a design cycle anyway
 - Once the spec is final, products may be certified to it immediately, e.g. to gain connected recognition



What does this mean for certification?

- All currently certified units will remain listed and can continue using the standard ENERGY STAR certification mark until January 1, 2023
- Partners may certify products to V 6.0 any time after the specification is finalized, for instance to achieve the Cold Climate certification mark or Connected recognition
- All heat pumps certified to V6.0 will use the climate differentiated labels
- For 2023, all products will need to use the Appendix M1 test method and metrics - products that certified during the transition using older methods will need to submit M1 test data



CAC Certification Criteria

- Higher SEER level proposed in Draft 2, otherwise no change from current specification

Product Type	2023 Test Method		Current Test Method	
	SEER2	EER2	SEER	EER
CAC Split Systems	16.0	12.0	17.0	12.5
CAC Single Package Equipment	16.0	11.5	17.0	12.0



Climate Differentiated HP Labels

Comments to the Draft 1 showed a large preference to the climate-based label; EPA pursuing market research on best terms to use

- Moderate and Hot Climates – High EER to control for peak cooling
- Cold Climate – High HSPF + low ambient performance to control for heating

Advantages:

- Refers to performance of the equipment, not the location of install
- Very flexible: programs, contractors, and consumers decide which climate is most appropriate



Climate Differentiated HP Labels

EPA considering approach for super efficient units – very high EER and meets low temperature criteria – that would be the best choice for either climate

Gas-electric packaged heat pumps (Dual-fuel)

- We understand this is a very small portion of the market, mostly in SE/SW climates
- Only allowed to use moderate and hot climates label



HP Criteria – Moderate & Hot Climate

- Maintain high SEER and EER, and HSPF was increased in Draft 2 to maintain distinction over 2023 Federal minimum (8.8 for split systems, 8.0 for single package)

Product Type	2023 Test Method			Current Test Method		
	SEER2	EER2	HSPF2	SEER	EER	HSPF
HP Split Systems	16.0	12.0	7.8	17.0	12.5	9.2
HP Single Package Equipment	16.0	11.5	7.5	17.0	12.0	8.8



HP Criteria – Cold Climate

- Reduced EER requirements, but higher HSPF than M&H climate
- Higher levels in Draft 2 reflecting later effective date

Product Type	2023 Test Method			Current Test Method		
	SEER2	EER2	HSPF2	SEER	EER	HSPF
HP Split Systems	16.0	11.0	8.5	17.0	11.5	10.0
HP Single Package Equipment	16.0	10.6	8.1	17.0	11.0	9.5



HP Criteria – Low ambient performance

- COP @ 5 °F: Harmonized with NEEP ccASHP Specification
- Percentage of Heating Capacity: Minimize use of electric resistance backup, lowered from Draft 1

Product Type	2023 Test Method		Current Test Method	
	COP @ 5°F	Percentage of Heating Capacity @ 5°F	COP @ 5°F	Percentage of Heating Capacity @ 5°F
HP Split Systems	1.75	70%	1.75	70%
HP Single Package Equipment	1.75	70%	1.75	70%



HP Criteria – Low ambient performance - CVP

- Performance certified to ENERGY STAR is based on fixed fan/compressor speed tests for equipment with variable speed components.
- The controls verification procedure (CVP) is intended to validate that this performance reflects how variable speed systems would operate in the field.
- The CVP accomplishes this by using the unit under test's native controls instead of "test modes" to achieve fixed speeds.
- The CVP will focus on validating the low ambient performance metrics: COP and Percent Heating Capacity at 5°F
- The proposed CVP will be informed by the CVP developed by The ASRAC Working Group for VRF systems, but is expected to be much less complicated
- EPA estimates it will release a Draft CVP for this specification around the end of February for stakeholder feedback prior to releasing any subsequent specification drafts



Installation Capabilities - Background

- Previous stakeholder discussions: at some point (maybe now), investment in quality installation more cost-effective path to energy savings than raising criteria
- Proper installation ensures predicted energy savings realized + consumers remain confident in high efficiency units
- Goal: Equipment capabilities that give contractors feedback + facilitate programs incentivizing quality installation
 - Programs remain interested in rewarding excellent installation
 - In consumers' and manufacturers' interests as well
 - How do contractors react?



Installation Capabilities

Installation Capabilities: To certify as ENERGY STAR, CAC/HPs (with their controllers) must provide at least three of the following capabilities to aid in quality installation:

- a. Refrigerant charge
- b. Airflow measurement or ESP
- c. Blower fan power draw
- d. Test mode – lock in highest fan speed and compressor capacity
- e. Automatic system discovery
- f. Preprogrammed system tests



Alignment with Other Efforts

- Draft ACC/RESNET 330: HVAC installation grading standard
 - a, b, and c are or are closely related to quantities raters would need to measure
 - d would allow a rater to more easily measure those quantities for a variable speed system
 - e and f are from ENERGY STAR Most Efficient criteria
- Long term goal of moving system smarts from the highest end equipment to medium-high efficiency equipment
- Requiring 3 of these 6 to make certification accessible for a wider variety of systems



Installation Capabilities

- a. Refrigerant charge – System can verify that the refrigerant charge is within OEM recommended tolerances
- b. Airflow measurement or external static pressure – Display and confirm airflow is within the OEM recommended settings, or display the ESP and fan speed setting
- c. Blower fan power draw – System can measure and report the watt draw of the blower fan
- d. If a, b, or c are not included – variable speed units shall have a test mode that locks in the highest fan speed and compressor capacity
 - This will allow a technician to test for the above measures with external equipment.



Installation Capabilities

- e. Automatic system discovery – System is capable of recognizing compatible communicating indoor/outdoor units, furnaces. Automatic discovery of humidifiers and dehumidifiers is encouraged.
- f. Preprogrammed system tests - System shall automatically prompt the installer to run preconfigured system tests following the initial setup to verify fan blower, cooling-mode, defrost mode, heat pump only heating, and auxiliary heating tests

These features are available on the market, and are criteria for ENERGY STAR Most Efficient



Installation Capabilities – Certification

- These features may be enabled by a thermostat/controller, or a contractor tool (such as a Bluetooth connection or app), which will be considered part of the system for this section
 - EPA appreciates feedback on what can be accomplished with or without a controller or contractor tool, and which system design they favor
- Certification will be determined by review of installation and maintenance manuals of the products, and any associated controller



Staged & Variable Capacity

“Units must be capable of operating at two or more capacities.”

- Intended to include all methods of providing more than one cooling capacity
- Staged capacity can compensate for oversizing of the equipment and provide better consumer comfort

We received a range of comments – from against this prescriptive requirement, to pushing the requirement to fully variable, and ultimately did not make a change here.



Connected Criteria

Optional Connected Criteria were published in the LTP released in July, based on:

- Demand response based on AHRI 1380
- User amenity - including SHERMS integration, open standards, energy reporting
- DR responses are tested and certified
 - Criteria will be developed ahead of the test method
 - DOE does not want to proceed without prototypes to test
 - Until the DR test method is available, certified by examination of product and documentation

Minor changes from the LTP in the Draft 2 to better align with AHRI 1380



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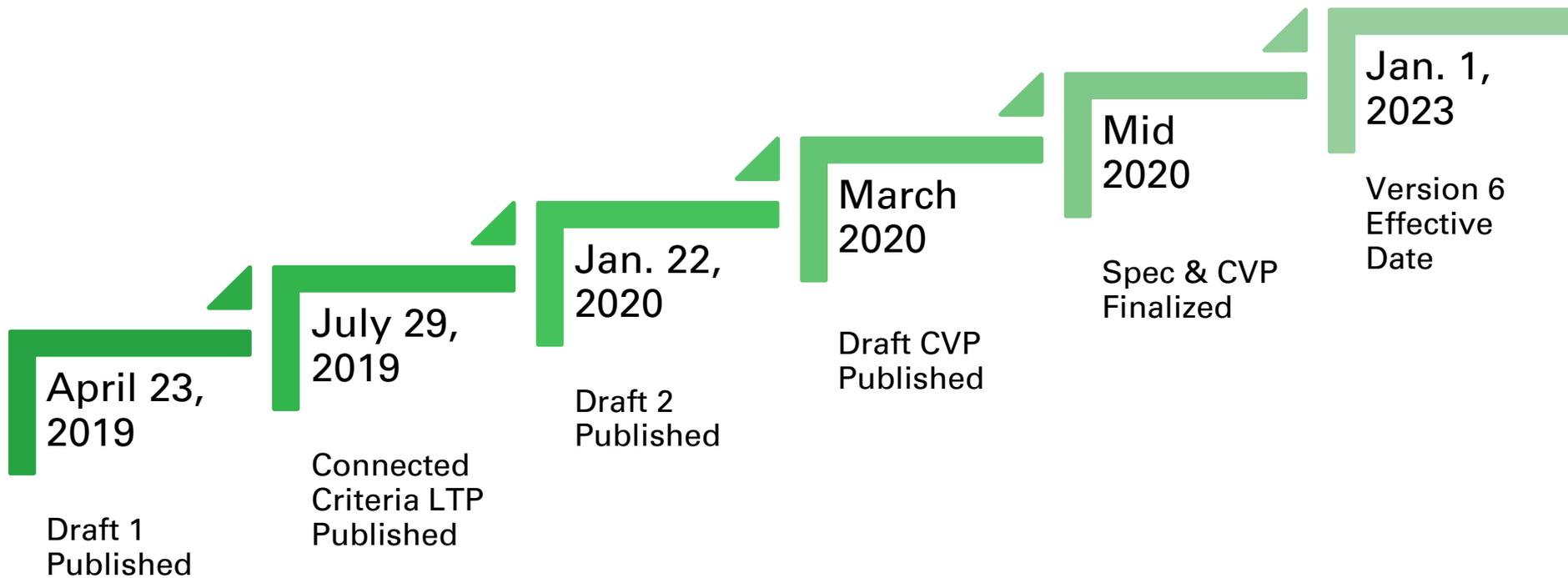


Summary of Proposed Changes

- Version 6.0 Effective date is Jan. 1, 2023
- Efficiency criteria were raised, and provided in current metrics to allow for certification once specification is finalized
- Added installation criteria
- Incorporated previous connected criteria



Anticipated timeline for revision





Controllers for Variable Speed HVAC

Workshop March 26 9:00am to 3:00pm
ASHRAE Headquarters, Atlanta
All are invited, look for RSVP [here](#)
Remote participation will be available

Topics:

- Controls verification procedure for Residential variable speed HVAC controllers: The specifics and usefulness of the test.
- Using field data to reward controls that successfully avoid cycling variable speed systems and instead run at moderate capacity.
- Updates to the specification criteria and associated software as needed for these controllers.



Questions

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Stakeholders are encouraged to provide written comments for EPA consideration to CAC-ASHP@energystar.gov by Feb. 28th, 2020.