Submission by China

Reporting form on national and regional initiatives supporting the implementation of the Kigali Amendment to the Montreal Protocol on substances that deplete the ozone layer, in accordance with decision XXXVII/5

Name of the Party: China

1. **Please provide the names and locations of existing centres of excellence for sustainable cooling and testing centres for energy efficiency in your country or region.**

   Name: Hefei General Machinery & Electrical Products Inspection Institute (GMPI)
   Location: Hefei, Anhui Province, China
   Affiliation: China National Machinery Industry Corporation (SINOMACH)

2. **Are there plans to set up a centre of excellence for sustainable cooling and/or testing centres for energy efficiency in your country/region? If yes, please provide more information on these ongoing efforts.**

   GMPI currently serves as the established national-level testing centre. While no specific new centre construction is reported at this time, GMPI continuously upgrades its facilities to maintain global leadership, including the expansion of capabilities for low-GWP refrigerants and data center liquid cooling technologies.

3. **Please describe policies implemented in your country/region that support the setting up and operations of such centers of excellence for sustainable cooling and testing centers for energy efficiency.**

   The Chinese government supports GMPI through the "National Quality Infrastructure" initiative. Policies include:
   1. Standardization Leadership: Designating GMPI as the national technical authority for refrigeration and air-conditioning sector.
   2. Certification & Compliance: Authorizing GMPI as the official registered laboratory for China's Energy Efficiency Labeling and China Energy Conservation Certification.
   3. International Alignment: Supporting GMPI in obtaining

international accreditations from authoritative bodies such as AHRI, Keymark, and SASO, thereby helping domestic manufacturers meet export compliance requirements under the Kigali Amendment.

4. **Please describe activities and specific functions of the existing/planned centres of excellence for sustainable cooling and testing centres for energy efficiency.**

   Core Functions & Activities:
   1. Full-Spectrum Testing: Covers residential, commercial, and industrial refrigeration/AC products.
   2. Global Climate Simulation: Operates the world's only freely adjustable atmospheric pressure lab and the largest multi-split system/air-source heat pump labs.
   3. International Certification Services: Acts as an AHRI authorized lab (serving APAC exports to North America/Latin America) and Keymark authorized lab (serving exports to EU).

5. **Please share key lessons learned including best practices and challenges encountered in establishing or operating the centres of excellence for sustainable cooling and testing centres for energy efficiency.**

   Best Practices:
   1. Integration of Hardware & Standards: Combining cutting-edge labs (e.g., liquid cooling for data centers) with immediate standard updates ensures market relevance.
   2. Anti-Commercial Bribery Mechanism: Established robust data traceability and integrity systems to ensure impartiality.

   Challenges:
   1. Rapid Technology Shift: Keeping pace with the transition to low-GWP refrigerants requires constant capital investment in facility upgrades.
   2. Global Harmonization: Aligning diverse regional standards (North America vs. EU vs. Middle East) remains complex.

6. **Please provide any supporting documentation (e.g., policy documents, reports, website links, etc.)**

   Please refer to the annex: Introduction to the Energy Efficiency Testing Capabilities of Hefei General Machinery and Electrical Products Testing Institute (GMPI).

7. **Any other information**

GMPI is committed to supporting energy efficiency testing efforts in developing countries across the Asia-Pacific region through technology transfer and capacity building, within the framework of the Montreal Protocol and its Kigali Amendment.

Annex

Introduction to Energy Efficiency Testing Capabilities of Hefei General Machinery and Electrical Products Testing Institute (GMPI)

I. Overview of GMPI: An Authoritative Third-Party Comprehensive Technical Service Provider

GMPI is affiliated with the China National Machinery Industry Corporation (SINOMACH) and serves as **a national-level, third-party comprehensive quality and technical service provider** that integrates inspection, testing, certification, standardization, metrology, and industry management services. Its services cover general machinery and electrical products such as refrigeration (heat pump) and air conditioning systems, compressors, fans, valves, and packaging machinery. With over fifty years of technical expertise and industry credibility, particularly in the refrigeration and air conditioning sector, the Institute serves as the national technical authority for this specialized field in China.

II. International Authorized Energy Efficiency Testing Qualifications: Most Comprehensive Authorizations and Widest Mutual Recognition

GMPI has obtained numerous top-tier domestic and international energy efficiency testing authorizations, establishing the qualification foundation required to serve as an international regional center:

- **National-level Platform**: National Quality Inspection and Testing Center for Compressor and Refrigeration Equipment (national-level inspection and testing center).
- **North American Authorizations**: Energy Star Authorized Laboratory, AHRI Certified Authorized Laboratory.
- **Middle East and EU Authorizations**: SASO-certified Authorized Laboratory (Saudi Arabia), Keymark-certified Authorized Laboratory (EU).
- **Full Domestic Licenses**: Third-party Registered Laboratory for China Energy Efficiency Labeling, Registered Laboratory for China Energy Efficiency Labeling, and Authorized Laboratory for Nationally Promoted Energy-Saving Certification.

These qualifications cover the energy efficiency regulatory frameworks of major global economies, making GMPI an institutions with **a full suite of energy efficiency testing authorizations for North America, the EU, the Middle East, and China.**

III. World-Leading Energy Efficiency Testing Capabilities: Most Comprehensive Equipment and Parameters

GMPI possesses the world's largest, most extensive, and technologically advanced cluster of laboratories in the field of refrigeration and air conditioning energy efficiency testing:

- The largest number of refrigeration and air conditioning energy efficiency laboratories among global testing institutions;
- The world's largest multi-split system energy efficiency testing laboratory and the world's largest air-source heat pump energy efficiency testing laboratory;
- Data center liquid-cooling energy efficiency testing laboratory and ultra-low temperature comprehensive enthalpy difference laboratory;
- The world's only refrigeration and air conditioning energy efficiency testing laboratory capable of freely adjusting atmospheric pressure.

These facilities ensure that GMPI can simulate real-world energy efficiency operating conditions under any climate and altitude conditions worldwide. Its testing capabilities cover the full range of residential, commercial, and industrial refrigeration and air conditioning products, with technical indicators reaching internationally leading levels.

Authorized Standards and Qualifications

- ISO 5151:2017 *Non-ducted air conditioners and heat pumps — Testing and rating for performance*
- ISO 5151:2017/Amd 1:2020 *Non-ducted air conditioners and heat pumps — Testing and rating for performance*
- ISO 5801:2017 *Fans — Performance testing using standardized airways*
- ISO 13253:2017 *Ducted air-conditioners and air-to-air heat pumps — Testing and rating for performance*
- BS ISO/IEC 30134-2:2016 *Information technology — Data centres — Key performance indicators — Part 2: Power usage effectiveness (PUE)*
- ISO 14067:2018 *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification*
- ISO 13253:2017/Amd.1:2020 Ducted air-conditioners and air-to-air heat pumps — Testing and rating for performance
- ISO 13256-1:2021 *Water-source heat pump — Testing and rating for performance — Part 1: Water-to-air and brine-to-air heat pumps*
- ISO 13256-2:2021 *Water-source heat pump — Testing and rating for performance — Part 2: Water-to-water and brine-to-water heat pumps*
- ANSI/AHRI 1230-2023 *Performance rating of variable refrigerant flow (VRF) multi-split air-conditioning and heat pump equipment*
- AHRI 210/240-2024 *Performance rating of unitary air-conditioning*

and air-source heat pump equipment

- AHRI 410-2023 *Performance rating of Forced-Circulation Air-Cooling and Air-Heating Coils*
- AHRI 550/590-2023 (I-P) / AHRI 551/591-2023 (SI) *Performance rating of water-chilling and heat pump water-heating packages using the vapor compression cycle*
- AHRI 1361-2022 / AHRI 1360-2022 *Performance rating of computer and data processing room air conditioners*
- AHRI 1060-2023 (I-P) *Performance rating of air-to-air exchangers for energy recovery ventilation equipment*
- AHRI 1110-2024 (SI/I-P) *Performance rating of Vapor Compression Transport Refrigeration Units*
- AHRI 340/360-2022 (I-P) *Performance rating of commercial and industrial unitary air-conditioning and heat pump equipment*
- AHRI 365-2024 (SI/IP) *Performance rating of commercial and industrial unitary air-conditioning condensing units*
- AHRI 560-2023 (I-P) *Performance rating of water-cooled Lithium Bromide absorption water-chilling and water-heating packages*
- AHRI 401 (SI)-2015 / ANSI/AHRI 400 (I-P)-2015 Performance Rating of Liquid to Liquid Heat Exchangers
- AHRI 1350 (SI/I-P)-2014 *Mechanical performance rating of central station air-handling unit casings*
- AHRI 440 (I-P) 2019 *Performance rating of fan-coil units*
- AHRI 310/380-2017 *Packaged terminal air-conditioners and heat pumps*
- ANSI/AHRI 430-2020 *Performance rating of Central station air-handling units supply fans*
- EN 13771-1:2016 *Compressors and condensing units for refrigeration — Performance testing and test methods — Part 1: Refrigerant compressors*
- EN 13053:2019 *Ventilation for buildings — Air handling units — Rating and performance for units, components and sections*
- BS EN 12102-1:2017 / BS EN 12102-2:2019 *Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors. Determination of the sound power level — Part 1: Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers; Part 2: Heat pump water heaters*
- BS EN 62301:2005 *Household electrical appliances — Measurement of standby power*
- BS EN 14511-1:2022 / BS EN 14511-2:2022 / BS EN 14511-3:2022 / BS EN 14511-4:2022 *Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space*

heating and cooling

- BS EN 14825:2022 *Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling, commercial and process cooling. Testing and rating at part load conditions and calculation of seasonal performance*
- BS EN 1886:2007 / EN 1886:2025 *Ventilation for buildings. Air handling units. Mechanical performance*
- EN 16147:2017+A1:2022 *Heat pumps with electrically driven compressors. Testing, performance rating and requirements for marking of domestic hot water units*
- EN 12102-1:2022 *Air conditioners, liquid chilling packages, heat pumps, process chillers and dehumidifiers with electrically driven compressors. Determination of the sound power level Air conditioners, liquid chilling packages, heat pumps for space heating and cooling, dehumidifiers and process chillers*
- SASO 2682/2013 *Ducted air conditioners and heat pumps: testing and rating performance*
- SASO 2663/2021 / SASO 2663:2025 *Air conditioners minimum energy performance, labeling and testing requirements for low-capacity window and single-split types*
- SASO 2874:2016 *Large capacity air conditioners — performance requirement and methods of testing*

IV. Extensive Experience in International Energy Efficiency Testing: Serving the Global Market with Authoritative Data

GMPI has routinely conducted high-standard international energy efficiency certification services, accumulating extensive cross-border testing experience:

- **AHRI Certification** (the most authoritative performance/energy efficiency certification in the global refrigeration and air conditioning industry): Undertakes testing for manufacturers in the Asia-Pacific region exporting to North America, Southeast Asia, the Middle East, Latin America, etc., with an annual testing volume of nearly 1,000 units.
- **Keymark Certification** (the EU's voluntary mark for high-end heat pump products): As an authorized Keymark laboratory, GMPI tests nearly 100 units annually.

Through long-term service to internationally renowned certification bodies and global manufacturers, GMPI has established a quality management system fully aligned with international standards, robust data traceability capabilities, and anti-commercial bribery safeguards, ensuring high acceptance of its test reports.