HVACR HERITAGE CENTRE CANADA [HHCC]

THE "START-UP" YEARS 1999-2020

ESSENTIAL DOCUMENT SERIES

DOCUMENT NO. 3

Executive Guide
To
HHCC's Founding HVACR Artifact Collection, Research Program, and Data Base

Prepared By
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August 2020

[Reference: HHCC Data Centre, File 18, Vol 6; Document OA2007C

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Preface

The purpose of this Executive Guide, as is the case for the other Essential Documents in this series, is to help ensure sound footings for HHCC as it moves into new life and times – moving from an industry focused, innovative "Start-Up" to "Mainstream", in helping to tell the many stories of Canada's rich heritage of material culture. For over the last 20 years HHCC has put down substantial footings in the field of Canadian material cultural studies, including collections acquisition, management, cultural interpretation, research, and in the documentation of cultural property.

And, yes, the HHCC desperately needs its "Essential Documents" on hand and in place. For together they are the "essential" reminders of: what HHCC knows now but didn't in 1999; what it has learned, by way of hard-won experience, it's acquired factual knowledge and understandings of what works and doesn't work so well. In short its acquired body of corporate practice as of 2020. For such documents as this provide the sound corporate footings on which reliable "bridges to the future" are built.

The topics covered in this Preface provide needed context for what follows. They provide the larger frame of reference within which HHCC's founding artifact collection takes on a sense of purpose, meaning, and significance:

- The clarification of HHCC's business model
- An introduction and overview of HHCC's Essential Document Series
- An introduction and overview of Essential Document No. 3
- The contribution of Collections and Curatorial Services, as an HHCC board secretariat of sorts, and
- Arrangements for the management of HHCC's material assets

The Clarification of HHCC's Business Model:

Understanding HHCC's multi-purposed business model is an essential first step in understanding what the Organization is and what it does. Just what is the organization committed to, as a not-for-profit, collections-based, national museum and archive – as defined in terms of the production and distribution of public goods and services?

HHCC's comprehensive mandate [See Essential Document No.1] puts HHCC into 4 basic, interactive, and mutually supporting business portfolios:

1. Identification, recovery, and conservation of Canadian material culture and cultural property
2. Research, cultural interpretation, and database development
3. Collection management, and
4. Public programming.

This suggests, in turn, the need for a "close-pack", efficient business structure required to meet its business commitments – to be detailed below.

An Introduction and Overview of HHCC's Essential Document Series:

HHCC's Essential Document series reflects its 4 element business model. The authoring of the series has focused on 3 key questions:

2. What is the ***knowledge*** of most worth to those providing executive and curatorial leadership for HHCC, as it now repositions itself, moving into new times, working in Canada's national museum and archival sector
3. What is the essential ***subject matter*** required, and how can it be succinctly presented ensuring logic flow, continuity of thought, and natural sequence, and
4. How can the ***content*** be best packaged as an executive guide to corporate practice?

This essential document series, covering HHCC's 4 businesses, was created by Collections and Curatorial Services [CCS] in 2020 as an answer to these queries. See Table 1 for an overview of the Series

Overview of Essential Document No. 3:

At the outset it should be clear that this guide to HHCC's founding HVACR artifact collection is not of the nature of a "How to do it" guide, although it contains much "how to do it" material in the Attachments. It is much more a "How to Understand it" guide. It's as a guide to "thought" much more than to "action". It's about the things one needs to understand to make informed executive and curatorial decisions – as well as making a strong executive case for HHCC support.

HHCC's founding artifact collection, along with its sister archival collection, are in many ways its reasons for being. Together they tell many of the fundamental stories of the embryonic, early development, and growth years of the HVACR industry in Canada – the 1920's through 1960's.

This document includes 4 sections, which together provide a solid foundation in coming to understand both founding collections:

- The provenance, identification, recovery, and conservation of the collections
- Their cultural interpretation, research and database development
- The systems and processes developed for collections management, and
- The various public educational programs provided in meeting the conditions set out in HHCC's letters patent.

Somewhat periodically the heart of this Guide lies in its Attachments, which contain the working materials of interest. They constitute a compendium of standalone documents, which are also variously available from the HHCC Data Centre and archives.

The Guide is heavily referenced and foot-noted providing executive and curatorial information on the various sources of authority cited, as well as on the policy, procedural and exemplary materials variously produced by HHCC/ CCS throughout its start-up period. All materials are now held in its Data Centre [digital copy], and Information and Resource Centre [hard copy]

Table No. 1
Overview of HHCC's Essential Document Series
2020

Essential Document ED No. and Name	Content	HHCC Data Centre File Reference
ED 1: Founding Document, Final Report for HVACR Heritage Centre Canada, Carter Associates, June 2004	HHCC's statutory foundations, as a Charitable Canadian corporation, along with its letters patent setting out its public commitments	Reference: Data Centre File 4; Document C:\Les 2020\HVACR Final Report- Jan 14, 2020.docx
ED 2: HVACR Heritage Centre Canada, Draft Manual of Operations, December 2003 First Draft Prepared by David W. Barr PhD for the Founding Committee Re-Issued as working draft April 2020	HHCC's corporate operations: - Vision/mission/mandate - Needs and Objective - Policies - Operational systems - Income Management Plan - Public Funding Tool Kit - Collections Management - Marketing Plan - Business Plan/Annual plan	Reference: Data Centre File 10; Document C:\Les 2020\OA2003F.docx
ED 4: Guide to HHCC Founding Archival Collection of HVACR Trade and Technical Literature	- User Guide - Catalogue - Deed of Gift - Appraisal - General Agreement on Care and Use - March 2019 board briefing notes	Reference: Data Centre File 18, Vol 4.2; Document C:\Les 2020\OA2005B.docx
ED 5: Repositioning HHCC, Moving from Start-Up to Mainstream….	- HHCC Comes of Age - Coming to Understand HHCC's Core work, Principal Assets and Future Opportunities - Conditions for HHCC Success - Historic Images of HHCC at Work as Canadian Start-Up	Reference: Data Centre File 8, Vol 2; Document C;\Les OA1910G.docx

The Contribution of Collections and Curatorial Services [CCS]:

From the outset it was clear to the Founding Board that meeting HHCC's commitments, as set out in its letters patent, would require building expertize in collections management and curatorial work. Accordingly, a HHCC's volunteer Collections and Curatorial Services [CCS] unit emerged almost simultaneously with its Board of directors. It operated as a kind of board secretariat.

The expectation from the outset was that CCS would take the lead in collections management and curatorial work, working hand-in-glove with the board. Leslie Oliver, member of the Founding Committee, and HHCC's Founding Board, as well as the donor of the HHCC's

founding collections would work voluntarily, taking lead responsibility for CCS's operations, seeking additional volunteer and professional assistance as required.

In accordance with HHCC's founding concept as a "Distributed Organization", and as an "Organization without Walls", CCS lab facilities and related Data and Information and Resource Centres for the care of its digital and hard-copy material assets were established in Aurora. They would be provided voluntarily by Leslie, operating as Oliver Associates, Material Culture of Technology.

The Management of HHCC's Material Assets:

In the matter of asset management, it would also become quickly clear that HHCC had a special challenge in meeting its obligations, as a new kind of "distributed organization, without Walls". The challenge came with:

- **Its status as a novel, start-up initiative,** which would require it to management its material assets [both acquired as working resources, and as created] with consummate care. For in the last analysis, they would be central to demonstrating HHCC's innovation and entrepreneurial work, and thus demonstrating its reasons for support
- **Its letters patent,** which would commit HHCC to work simultaneously across boundaries: collections acquisition and management, research and documentation, educational materials production, website development, and public programming.
- **Its mode of operation** as a "lean", volunteer-based, start-up organization, with no central recognized place or personal responsibility for material assets management.

It was evident from the start that HHCC's material assets, would have to be, more or less, "self-managed". And that the first test would come with the acquisition and management of its founding artifact collection. In response CCS proposed a "HHCC Resources Directory", covering 21 areas of activity, across its three subject matter activity groups – HHCC Foundations, Organization, and Operations. Accordingly, all CCS documents carry a file code numbered 1 to 21, indicating the file to which they belong. Documents and emails produced by Oliver Associates, as CCS volunteer, carry the project prefix 114.

The directory, with minor tinkering over the years, stands as the directory to HHCC's Data Centre for the storage of its digital assets, as well as to its Information and Resource Centre for the storage of its hard copy material assets, including its corporate archives[1] - ***See Attachment No. 1***

[1] HHCC's material assets are currently stored in Aurora [courtesy of Oliver Associates] , and in Brampton [courtesy of principal partner Ontario Union UA787]

Section 1
The Provenance, Identification, Recovery, and Conservation of the Founding Artifact Collection

This Section of the Guide provides information and important understandings of the origins of the collection and its representativeness of the work of the Canadian HVACR industry in Canada. These understandings are important in the promotion, branding and fundraising for HHCC, as well as for soliciting the interest and commitment of Industry aficionados, HHCC board members, volunteers, and staff.

1.1 - Date and Place of Origin - Provenance:

Much of the authenticity of this collection of early 20th century HVACR technology derives from its Date and Place of Origin. Its origins and the stories told originate in York County (York Region) Ontario, Canada. The County, once a rich agricultural hinterlands, attracted early settlement in the latter years of the 18th century.

Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to become a relatively wealthy market area, a place of "early adopters" of the emerging household and consumer technologies of the early and mid-20th century. The County, by sheer circumstance, would become a show place of sorts for the latest technology-enabled devices of town and country – in a sense, the best that early 20th century science and technology could provide in the times.

The "technology enabled devices" that make up this collection were discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario. For, seen retrospectively, Howard Oliver would be one of Canada's early "High Tech" workers of the period[2]. Much of the exceptionality of the collection came with the man and his times.

The 1920's and 30's came with the expectation that, of course, if it didn't work it could be somehow repaired. In the WWII years to follow, repair was also the only game in town, often requiring parts scavenged from old equipment. Howard Oliver's warehouse, full of used equipment was in its times a "gold mine", mined constantly for used parts and equipment to be rebuilt and reused. Half a century later that same warehouse would, once more become a "gold mine" of historic "material culture" and Canadian cultural property, mined for the stories it told of those embryonic, early development, and growth years of the HVACR Industry in Canada.

Much of the uniqueness and exceptionality of the collection also rests with the man himself. Howard Oliver [1896 - 1976] was above all intellectually engaged with the rapidly emerging science and technology of his times – its opportunities for new life's learning and understanding,

[2] Other examples of Howard Oliver's work can be found variously in the collections held by the Canadian Museum of Science and Technology, Toronto Museums, and the Archives of Ontario.

as much as for the opportunities for business development[3]. Among other technical interests, Howard Oliver was an early pioneer worker in the Canadian refrigeration and automatic heating industry. With a formal grade 8 education, and thence largely self-educated, he would come to pride himself in his extensive, personal library of trade, technical, and professional development literature, as well as his participation in the "self-help" and professional development organizations of his times.

This artifact collection is not at all the random collection of an "industry aficionados" intrigued by what history has left behind. Rather, it's the natural remainder of one man's life's work, his intellectual passions, and personal commitment to profession, community, and family. It's a unique product, telling the many stories of the seemingly contradictory nature of its times. For it was, in classic terms, "The best, and the worst of times"[4]. Among the lean and war-torn years into which the HVACR industry was born, there was also new life emerging - a renaissance of sorts, a re-awakening to the possibities that the 20th century held for Canadians[5] in social, cultural, and economic terms.

The early to mid-years of the 20th century was a period of emerging electro-magnetic devices, which brought much promise for labor-saving and potentially enriching life-style - much as the digitally-enabled technology of the early 21st century. Retrospectively, the early to mid-years of the 20th century was a period of acknowledged, unequalled economic growth, of new potentially enriching social and cultural thought, of previously unheard of levels of expendable personal income, and of the emergence of a Canadian middle class.

In short, the stories documented in this collection are as much about its socio-cultural context, as about the innovative electro-magnetic devices that were created by the HVACR industry of the period. They provide a rich array of cultural learning opportunities and experiences, and teachable moments.

We will return to the socio-cultural significance of the collection in Section No. 2 [Research, Cultural Interpretation, and Database Development] to focus on 21st century ways of thinking and talking about the meaningful transmission of cultural information. Of interest is the notion that objects have cultural meaning and significance as "objects of culture", "objects of memory", and "objects of significance"- well beyond their meaning and significance as engineered, functional components within an operating system.

[3] Howard Oliver's personal technical and trade library of exemplary material of his times would become HHCC's second founding collections – see HHCC Essential Document No. 4, HHCC Data Centre File 18, Vol. 4.2, Document OA2005B

[4] This contradictory view of life's realities was first popularized by Charles Dickens, in the opening lines of his famous novel "The Tale of Two Cities", 1859.

[5] See also "Born at the Right Time, A History of the Baby-Boom Generation", Doug Owram, 1996.

1.2 - Identification, Recovery, Conservation, and Classification:

Dedicated work on the identification, recovery, conservation, classification, research, documentation, and interpretation of the collection was initiated by Oliver Associates, Material Culture of Technology [Principal Leslie Oliver P. Eng., PhD.] in 1998. [6]

The work was undertaken following an acknowledged, systematic three step process for the conservation, preservation, and renewal of acknowledged artifacts and archival materials viewed as potentially significant Canadian cultural property[7].

Classification coding, included the assignment of:

- **Artifact Identification Codes -** for the 344 item, duly identified and recovered,
- **Artifact Classification Codes [Series] –** as recommended by the donor and approved by the HHCC board August 2003. The classification codes [Category System] grouped all artifacts into 16 series, according to their operating function in household, commercial, and industrial HVACR systems. The bracketed number in the right column [Attachment 2] indicates the approximate number of artifacts in each category – ***See Attachment No.2***, and
- **Artifact Accession Codes** – assigned by then Acting HHCC Executive Director David Barr. The HHCC collection accession process was scheduled by David over 3 years from 2003 to 2006, as required to arrange for the requisite transportation, warehousing facilities, and management details.

A set of Cross Reference Tables [63 pages] **–** facilitates the artifact search function by Identification, Classification, and/or Accession codes, - ***See Attachment No. 3***. Section 4, below, describes a "Quick Visual Access System" for accessing a particular artifact of interest for further study, display, or for educational materials development purposes.

1.3 - Boxing, Labelling, Cataloguing, Appraising, Gifting, Warehousing, and Tracking:

All artifacts were boxed and labelled, by the donor for cataloguing[8] and professional appraisal[9] purposes, prior to gifting, and subsequent warehousing by HHCC. They were subsequently mapped for "on-demand", quick access style, warehouse storage. To help ensure precision, box labels were automatically generated as part of the research documentation process [See below]

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[6] Leslie is the youngest son of T. H, [Howard] Oliver, and one-time vice-president and general manager of the Oliver refrigeration and heating family business - a company first established by his father in 1924.

[7] For "Identification and Recovery, Preservation and Renewal, Interpretation and Use". See "A Strategy for Conserving Ontario's Heritage, A Report of the Ontario Heritage Policy Review", Ontario Ministry of Culture and Communication, 1990

[8] See Catalogue: "The HVACR Heritage Centre Canada, Collection Data Sheets, Core Data + Photographs" [Hard copy], HHCC Information and Resource Centre

[9] Professional appraisal was undertaken by Ray Irving, Fine Arts Appraisal, providing validation for fair market value of goods, totaling $32,018.00 , 25th August 2006 – See HHCC Data Centre File 18, Vol.2

Figure 1

Boxing and Labelling

Following identification, conservation, research, documentation, and photographing equipment was mounted on custom made pallets, fitted to custom purchased, heavy duty, cartons, tagged, labelled, and weighed prior to shipment to HHCC

HHCC's original warehouse facilities, funded by generous start-up grants provided by Industry partners was complete with toe motor and lift facilities - on request. The facilities, however, proved to be unsustainable, too costly, and premature, well in advance of the stable long term funding provisions required. In the interim, container storage [close-packed storage] arrangements have been provided through the generous support of HHCC's partner, Union UA787, Refrigeration Workers of Ontario.

Detailed coded mapping of both warehouse and close-packed storage options ensures ready on-demand access to all artifacts for research, educational materials development, and public display.[10]

Warehouse Tagging and Space Requirements: All artifacts are tagged using standard shipping tags and stainless steel wire stock. To ensure precision in identification and accuracy in warehouse retrieval, tags carry a thumbnail description of the artifact, transcribed directly from the research report/catalogue sheet. Four data elements are included on each tag:

1. Inventory Report No.
2. Artifact Ref. Code No.
3. Series/Group Code No.
4. Summary Description

A warehouse space requirement guide, with related mapping, was developed in 2007 - first used at a storage facility at 25 Iron Street Toronto. The guide included 6 basic data elements [See doc. HVACR0702B, Item 5 in the list of reference Documents, See Section 9, P. 8]:

1. Artifact Name
2. Location [Building location/Storage area/shelf position]
3. Artifact dimensions [L/W/H]
4. Required linear feet, floor or shelf storage space
5. Required vertical height floor or shelf storage space, and
6. Special requirements

[10] See especially: Doc HVACR0707G, memorandum to Executive Director Ron Shuker with detailed mapping for close-pack storage and transfer from warehouse storage: doc HVACR0707G, Maps: HVACR0707D, 13 pp; HVACR0707E, HVACR0707F, HHCC Data Centre

Figure 2

HHCC Large and Small Artifact Warehouse Storage Facilities, 2006.

All artifacts are boxed and labeled with box descriptors, ID, classification, and accession codes, all mapped and logged for quick-access warehouse storage

Section 2

Research, Cultural Interpretation, and Database Development

This Section of the Guide deals with the application and various uses of HHCC's founding artifact collection, including:

1. The research program that has evolved over 20 years
2. The evolution of HHCC's "Three Level Cultural Interpretive Model"
3. Research data base development
4. Opportunities for further research

2.1 -The Research Program

The work, on what would become HHCC's founding artifact collection, was undertaken by Oliver Associates over several years, largely between 1998 and 2004 - prior to HHCC's founding. As variously outlined in the HHCC archives and in HHCC Data Centre [File 18, Volumes No's. 1-3], the research program included the classic processes of identification, recovery, research, and documentation.

It should be noted that while the collection was officially deeded to HHCC in 2007[11], the research data base has remained the property of the donor, with HHCC's documented Rights-of-Use - ***See Attachment No.4***.

The research program undertaken reflected both the understandings and limitations of the emerging sciences [concepts, principles and key ideas] of the times. Included, principally, was work in the fields of what came to be known as "The New Museology" [12] and in "Cultural Conservation" - taken as complementary, emerging field of thought and practice[13] - See Section 2.2 below.

The principled research program that emerged, piece by piece, over several years was reflected in a 40 data element, open ended data template. The template anticipated ongoing research on the founding collection, as well as on subsequent HHCC artifactual acquisitions - as the emerging science, conditions, needs, and resources dictated [See Section 2.4]. ***See Attachment No.5*** for a research report template, document HVACR1705A, May 27, 2017.

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[11] Details of the collection appraisal process, Deed of Gift, and transfer process are documented variously in the HHCC corporate archives and in the HHCC Data Centre - See File 18, Volumes No's 1 to 3

[12] The term "New Museology", as used here, is after the work Peter Vergo, editor, "The new Museology", 1989. Vergo's work is representative of a new generation of thought which saw historic artifacts as objects of cultural meaning and significance. "It's not the artifact, so much as the stories it tells that is important". See also the seminal work in "Culture as History", Warren Susman, 1984.

[13] Cultural Conservation as concept and idea, viewed variously as philosophy and mindset, remains relatively ill defined. See, for example, the work of Herb Stovel, Francois Leblanc, and Mark Evans, Internet July 2020

Based on the research template, research findings were, in turn, reflected in a multi-page, standardized, research report format of 4 to 5 pages. The format includes a printed label for attachment to a shipping tag/ carton [See above]. ***See Attachment No.6*** for an informative sampling of representative HHCC catalogue sheets and research reports.

2.2 - The Three Level Cultural Interpretive Model:

The foundation stones on which HHCC's collections research and cultural interpretive program lie are in the two adjoining fields of "Cultural Conservation" and the "New Museology". Together they provide 21st century ways of thinking and talking about the meaningful transmission of cultural information, and the cultural meaning and significance of objects.

In the matter of cultural conservation, it has been said that: *"Cultural conservation permits the meaningful transmission of cultural information….That transmission is ultimately dependent on the degree to which people care if they attach emotional values to our monuments and sites – values shared publicly and politically, values which can generate public and private respect"* [Herb Stovel] [14]

The "new museology", in turn, teaches, among other things, that for a post-industrial, Western people, it's not the artifact that is important, so much as the stories it tells of people, place, and times. These 21st century style insights would become major driving forces for the cultural interpretation of HHCC's founding artifact collection.

What emerged in the 1990's, in the early years of the work on the collection, would become known in HHCC research practice, as "The Three Level Model". The simplicity and power of the model, following emerging thought in the fields museology and cultural conservation, lay in its ability to recognize the importance of, and give due voice to, three levels of cultural information, meaning, and significance:

Level 1 - Tombstone Data: Largely those data obtained through direct sensory contact, in identifying primarily physical attributes, and what can be typically read from them. Included are: **Provenance** [date and place of origin, manufacturer, ownership, patent numbers (name plate information) and historic narrative-type information as available], **Form [**material, construction, design, and special features], and **Application [**intended purposes and uses].

Level 2 - Background Information [Information drawn from historical, social and cultural analyses and interpretations, drawings, and photographs], **Function** [Information on why the object was created, under whose direction and for what reasons; how it works, what it does and why], **Context** [Information on social, cultural, economic and technological factors, which

[14] Professor Herb Stovel, ICROM, Rome, "Defining the Canadian Identity", Occasional paper, PP. 5, Golitz, East Germany [undated], Private Collection.

contribute to an understanding of the artifact's sense of self and being], **Importance** [Information which suggests the influence and power over human affairs which the artifact has had, in its times and subsequently].

Level 3 - Cultural Knowledge[15], information of special value in the cultural interpretive process, contributing to higher level public learning objectives and subsequent understandings. Beyond mere knowledge of historic fact, it helps individuals and communities to understand their culture better, as well as the forces that have come to shape it. Included are:

- **Significance** [Signifying broad patterns of social, cultural and economic, as well as technological, change];
- **Social change [** How it helped to alter the patterns of human, community and civic interactions, and routine practices],
- **Cultural change [** How it helped to alter the way individuals and communities come to think about themselves, others and the world beyond],
- **Consequence [**Indications of significant social, cultural , economic and technological change, which followed its introduction],
- **Ensuing Events [**Intended, anticipated, unintended, unanticipated and unplanned for happenings],
- **Changing Values [**Human judgments of worth, material, including the aesthetic and spiritual],
- **Acquired New Meanings [**Symbols or proxies of the object's suggestive power, giving the artifact, or its technology, meanings, well beyond itself and the obvious.].

The model became the center-piece for the research undertaken for HHCC by Oliver Associates, as volunteer. For each of the 344 artifacts in the collection, 5 key research questions were asked with answers variously recorded in the research report ***[See template Attachment No. 5]***:

1. What it is
2. How it worked
3. What it does, and
4. With what results and
5. Consequences for Canadian society and culture

Cultural information reported was based on 4 measures:

1. Item 30,Technological Significance

[15] Research literature, in the field of cultural conservation studies and the new museology begin to suggest an emerging science contributing to new understandings of historic artifacts as: "objects of meaning and significance", "objects of memory", "objects of knowledge" and "objects of conscience". See for example in "Interpretation of Sites of Memory", International Coalition of Sites of Conscience, World Heritage Centre UNESCO, 2018, A History of Architectural Conservation, Second Edition 2018, Jukka Jokilehto. See also "Objects of Knowledge: A Historic Perspective on Museums" in The New Museology, editor, Peter Vergo

2. Item 31, Industrial Significance
3. Item 32, Socio-economic Significance
4. Item 33, Socio-cultural Significance

For a sampling of research reports, showing the template in use **See Attachments No. 6**. The Attachment, detailing 8 representative research reports, demonstrating the story telling power of the artifacts of history - now viewed as objects of meaning, memory, and cultural significance.

The Contribution to Canadian Culture and Consciousness: The centrality of cultural knowledge to 21st century learning and human understanding has been further underlined by Canadian Futurist Ruben Nelson. He concludes that, for Canadians as a post-industrial, Western people, technology and the many devices it spawns, are "principal carries of our culture and consciousness"[16]. They are major driving forces of our awareness, perception, and understanding of our rapidly unfolding world. Similarly, it has been noted, earlier, by cultural historian Warren Susman that our visual world has become one dominated by signs and symbols – in short a new "hieroglyphics civilization" [17]

Figure 3

[16] A position elaborated by Canadian futurist Ruben Nelson. See "The Post-Industrial Future Project, Working Paper No. 3, "Technology: Carrier of Consciousness and Culture", 1989, Square One Management Ltd, unpublished paper

[17] See "Culture as History, The Transformation of American Society in the Twentieth Century", 1984

A Kelvinator Model E, Hydraulic Bellows Actuated Temperature Control Circa 1925[18] HHCC Accession Code No. 2006.005

In the early to mid-1920's the refrigeration industry was possibly the first to introduce "automation" [Devices that operated without the touch of human hand] and "Machinery" [Motors, belts, pulleys and compressors] into the Canadian home.

In so doing the HVACR Industry became a major driving force in the re-shaping of Canadian culture and consciousness – ***see also Attachment 6, Item 5****.*

2.3 Research Data Base Development – Clearly, a secure data base of sorts was required for the 100's of pages of research undertaken over several years. Given the practicalities that go with resource-lean start-ups, what emerged was an arrangement of convenience, much less than the research data base that might have been otherwise imagined.

A four-part data base just happened, hammered together, piece by piece, by dint of circumstance:

1. **A Digital Computer File** – A computer file containing all 344 research reports, in Microsoft Word, was developed in the early years of the research, and progressively updated. The present file, in Word 2013, on Windows 10, is held by Oliver Associates in Aurora,

[18] HHCC Founding Artifact Collection, Accession Code 2006.005

2. **A Hard-Copy Collection Research Catalogue** - In addition to digital access to the research reports, an 8 volume, hard copy research catalogue was produced. Twenty inches in shelf length, it is also currently held in Aurora as part of HHCC Information and Resource Centre,
3. **A Hard Copy Catalogue of Images -** As part of the collections appraisal process, a catalogue of images, automatically generated by the research documentation process, was developed by David Barr – then acting HHCC Executive Director. See "The HVACR Heritage Centre Canada Collection Data Sheets, Core Data and Photographs". It is also currently held in Aurora, as part of HHCC Information and Resource Centre.
4. **A Hard Copy Catalogue of CD Working and Archival Quality Images –** As archival back-up a catalogue containing CD images of all 344 artifacts is held in Aurora, as part of HHCC Information and Resource Centre.

2.4 Opportunities for Further Research –The successful development and application of HHCC's three level cultural interpretive model opens further opportunities for investigation - including

1. **Further Research on HHCC's Founding Artifact Collection -** Viewing the artifacts of history as objects of meaning and memory may well yield further insights into the results and consequences of HVACR technology on Canadian life and times – i.e., beyond technological, industrial, socio-economic, and socio-cultural significance. For example, the three level model suggests further research variously in matters of socio/cultural/economic change, ensuing events, changing values, acquired new meanings, and an altered Canadian culture and consciousness.
2. **Research on HVACR Industry Artifacts from Other Reference Periods –** It is recognized that HHCC's national letters patent by no means restrict its research to the early and mid-years of the 20 century - other reference periods are of equal interest.[19]. All such research is of potential benefit in coming to understand the consequences of HVACR products, services, systems, equipment, and myriad devices.
1. **Level 3 Research, Working Collaboratively with Other Canadian Museums and Archives** – We are reminded also, that in moving from "Start-Up to Mainstream" a principal task will be sharing HHCC's experience in cultural interpretive research. Possibly working toward the development of a unique Canadian model for level 3 research, as a contribution to the field of Canadian cultural studies [See "Repositioning HHCC, Moving from Start-Up to Mainstream…" Essential Document No. 5, Doc OA1910G].
2. **Research in "Rapid Response Collecting"** - Rapid Response Collecting[20]**,** a recent innovation in the museum and archive sector, is of possible special interest to HHCC. Here the focus is on the collection of contemporary objects, as objects of cultural

[19] A notion also attributable to Canadian Futurist Rueben Nelson - See footnote 16
[20] See "Rapid Response Collecting" Internet July 2020

significance, revealing emerging truths about the changing nature of Canadian society and culture. Rapid Response Collecting, as currently described in the literature, might be of special interest to HHCC's industry-base, in the manner in which it focusses quite naturally on the industry's inherent innovation and entrepreneualism, exploring their cultural and social consequences "on-the-run".

2.5 General Conclusion – The new insights [concepts, principles, ideas, and theories] variously cited in this Section are the makings of a maturing science of cultural conservation, interpretation, and museology. It's a welcoming, emerging science, in helping HHCC to further develop its "Three Level Cultural Interpretive Model" and, in turn, speak more effectively to its national mandate.

As well, HHCC's work in research and cultural interpretation is a further reminder of its reasons for being. As heralded in its letters patent, HHCC has a dual perspective. On the one hand it's about promoting general understanding of material culture, Canadian cultural property, and of technology as a principal carrier of Canadian culture and consciousness. On the other, it's about the specifics of promoting understandings of the results and consequences of the work of the Canadian HVACR industry. In fact HHCC does this while doing that.

This dual perspective is a significant point not to be missed in promoting, marketing and branding HHCC - as it moves into new life and times. For HHCC simultaneously serves the interests of the HVACR industry, as well as the larger interest of the Canadian museums and cultural studies sectors.

Section 3

The Collection Management Process

Quick, reliable, and convenient access to all 344 artifacts was seen from the outset as a basic requirement to be met in the management of HHCC's founding artifact collection. In order to meet its statutory commitments, a relatively simple and secured mechanism for access to the collection was required for the use of: executive and professional staff, volunteers, and board members - as well as for promotion and marketing, building a body of well-informed, enthusiasts, as well as public support for HHCC and its national collections.

To date several tools have been developed to provide such ready access. In keeping with its budget constraints, as a resource-lean "Start-Up", the tools are relatively primitive by current collections management standards and expectations – given the systems currently in use by other national museums and archives.

This Section of the Guide covers HHCC's current state of development on:

- A Collection Management Information Repository [CMIR] and User Manual
- A Quick Visual Access System [QVAS], and on
- The early development of a Secured Collection Management Information System [CMIS]

3.1 The Collection Management Information Repository [CMIR] and User Manual:

A report on the evaluation and installation of, what would come to be called the "Collection Management Information Repository [CMIR] and User Manual", is dated August 31 2007[21]. A subsequent report to the board on the development and application of the repository is dated November 21, 2007.[22]

The accompanying User Manual sets out steps in identifying the items of possible interest by name and classification code, making use of classification cross-reference tables [See Section 1 and 2 above]. While the repository was/is useful, it is time-consuming in application and requires a certain "a priori" knowledge of what one is looking for - for example a refrigeration evaporator, compressor, or condenser. With that knowledge as a starting point, the repository can be searched by classification code, to find a picture or complete research report of the artifact of possible interest.

[21] See Report on evaluation and installation, doc HVACR07C, HHCC Data Centre
[22] See Report to the Board document HVACR0711D, HHCC Data Centre

3.2 The Quick Visual Access System [QVAS]:

While the repository, alone, was helpful, its inherent awkwardness's and limitations discouraged browsing the collection for general interest, information, and understanding of the nature of the collection and its possible applications and uses.

The development of what came to be known as the "Quick Visual Access System" [QVAS], as an CMIR appendage, made an important contribution. It provided, as a starting point for the search by providing a complete set of thumb-nail images with reference code numbers for browsing, familiarity, and general information gathering - ***See Attachment No. 7***.

3.3 The Development of a Secured, Collection Management Information System [CMIS]:

In 2017, the search limitations of the current CMIR, with QVAS appendage, having been recognized, exploratory work was initiated on the feasibility of developing an affordable, user-friendly, searchable Collections Management Information System [CMIS]. The goal was to find existing, open-source software, with an acknowledged record of success in the collections management field, one that would serve HHCC's purposes and budget.

Accordingly, development work was undertaken for CCS, by Roland Gee, testing and demonstrating the performance attributes of the "Collective Access" system - a system widely used in the professional collections management field. As part of his development work, Roland arranged a demonstration of the system for the HHCC board, mounted on Amazon, and using sample data transferred from HHCC's CMIR, Unfortunately the board was not meeting at the time, and the demonstration had to be taken down - although otherwise the test was considered a success, holding promise for HHCC's future development work in collections management.

A substantial file on this work, much of it undertaken for Collections and Curatorial Service [CCS] by Roland Gee[23], is held in the HHCC archive, as well as the HHCC Data Centre, See File 114-18, Vol. 6, A comprehensive report "Review and Redevelopment of HHCC Collections Management Information System, July 15, 2017" was tabled for board consideration [See doc. OA1705Q]

[23] Starting as a student, Roland Gee has provided professional IT, and volunteer services for CCS over a number of years. Roland currently holds degrees in chemical engineering, as well as computer science.

Section 4
The Public Programming of the Founding Collection

This Section focuses on the array of mutually supporting and interacting public programming initiatives mounted by HHCC - all contributing to its success as a start-up, national museum and archive. The requirements for public programming were a significant part of HHCC's public commitments under the conditions of its letters patent. Public programming is the focus of 7 out of 13 articles.

During the start-up period, the subject matter focus of HHCC's programming initiatives built largely on the topics suggested by its founding artifact collection, while its founding archival collection [See Essential Document No. 4] provided much of the research material required for storytelling.

Four principal public programming initiatives were undertaken during HHCC"s start-up years:

1. The Education Materials Research and Development Program,
2. The On-Line, Virtual Museum and Archive Program,
3. The On-Line Interactive Educational Website Program, and
4. The On-Site Educational Display and Exhibition Program.

4.1 The Education Materials Research and Development [EMD] Program[24] - HHCC's Education Materials Research Development Program would evolve as the major link between its collections-based research and its public educational mandate. The program relied heavily on the research findings held in HHCC's Research Database [See Section 2.3 above]. This collections-based research provided the spring-board for the applied research and development work required for the support of a wide range of public educational initiatives – including public displays and exhibitions, and interactive educational websites [See Sections 4.2 to 4.4 below].

A storyboard template was developed to meet the needs of the program for solid research-based content. One to two pages in length, depending on the story to be told, the template followed closely the cultural interpretive process [See Section 2.2], variously highlighting for each artifact: What it is, How it works, What it does, and With what results, and consequences for Canadian society and culture. The larger purposes to be served by the storyboards were in telling the stories of the object, as an object of history and culture, meaning, or significance.

A working draft of a formal HHCC policy position paper on educational materials research and development was tabled for board discussion in 2014. [See doc. HVACR1402D]. An extensive collection of story boards, variously produced over the years in support of its four public programming initiatives can be found in HHCC's archives, with related documentation in HHCC's Data Centre.

[24] See for details HHCC File 19, Data Centre and HHCC corporate archives

Work has begun on assembling a cumulative inventory and repository of storyboards developed over HHCC's start-up years. The work is currently reflected in "Storyboard Sampler, A Representative Sampling of Storyboard Produced under HHCC's Education Materials Development Program", Doc. OA2008B, File 19-7. As HHCC moves into new life and times these storyboards clearly remain a significant capital resource with future value - much like its collections-based research program [See Section 2.1]

4.2 The On-Line, Virtual Museum and Archive Program[25] – HHCC's virtual museum and archive [website] was, in many ways, intended as its principal window on the world – central in meeting its mandate under letters patent. As intended by HHCC's Founding Committee, its virtual museum and archive would be a cornerstone on which the Organization would build, as a "21st Century Museum Without Walls". A substantial file exists in HHCC archives, as well as in the HHCC Data Centre, documenting the serious work undertaken in 2003-2010 on the development of the virtual museum concept, and on its first and second generation websites.

Under the direction of David Barr, PhD, the first virtual museum was mounted with a generous grant from the Ontario Trillium Foundation. The work followed board briefing and discussion of technology issues and options, as well as on the content, structure, and operation of the website, so as to function as a virtual museum and archive - essential to HHCC's mandate.[26]

The founding artifact collection catalogue prepared by David [see Section 2. 3 above] provided the core content and structure for the site, helping to ensure precision and authenticity.[27] In many ways, HHCC's early generation virtual museum proved to be a runway success, attracting international attention with enquiries from across the USA and Europe. Queries were logged and responded to as resources allowed.

Unfortunately, without executive oversight and the professional curatorial resources required to guide on-going development, and sustain the site, it lost its sense of purpose and fell well short of potential and expectations. That having been said, as documentation in HHCC's archives will demonstrate, as a "start-up", innovative and entrepreneurial initiative, its early work in virtual museum and archive development provide a wealth of experience to build on.

4.3 The On-Line, Interactive, Educational Website Program[28] – HHCC's initial foray into the then newly evolving field of interactive educational websites, constituted another HHCC innovative, start up adventure. The adventure consisted of 2 sites, both undertaken over several

[25] See for details File 17, HHCC Data Centre and HHCC corporate archives

[26] See "Report on the Evaluation of technology Options", Revised draft 7 Feb. 2003, HHCC Data Centre, file 17

[27] Not-with-standing its original purposes as envisioned by the Founding Committee, as a state-of-the-art, virtual museum and archive, the website has "lost its bite". It no longer reflects standards and expectations in virtual museums practice - having evolved into much more of a corporate promotion for HHCC and the HVACR industry. Looking ahead, to HHCC's "repositioning" [see "Repositioning HHCC, Moving from Start-up to Mainstream….", HHCC Data Centre doc OA1910G], it has been proposed that HHCC's virtual museum and archive be part of its Data Centre, as a public module, thus helping to ensure required authenticity and adherence to mandate and mission.

[28] See for details HHCC File 19, Vol.1, Data Centre and HHCC corporate archives

years, involving 100's of hours of detailed work in storyboard preparation[29], site content design, and operations development, working under stringent contractual conditions with the Virtual Museum of Canada [VMC].

The initial interactive website "Chilling out" was developed under the guidance of David Barr [See Data Centre and archive File 17-7]. The second site "Warming Up"[30] was subsequently developed under the guidance of acting executive director Ronald Shuker. [See Data Centre and archive file 19. Vol. 1].

Unfortunately, once more, without the financial resources, continuity of thought, executive oversight, and professional curatorial resources, all required for the ongoing guidance and development, neither site is currently operational. Once more, HHCC's pioneering work in the field of interactive educational website programming was an important part of its innovative and entrepreneur, start-up experience on which to grow.

4.4 The On-Site, Educational Display and Exhibition Program[31] – Much of HHCC's educational programming work was on-line, in keeping with its founding identity as a virtual museum and archive. However, its physical, "on-site" presence has remained key to promotion, marketing and branding its operations. Over its start-up years its "on-site presence has taken 2 forms:

- Permanent educational, rotating displays, based on special arrangements with corporate partners and others
- One-time, special purpose displays and exhibitions

A cumulative list of on-site displays and exhibits, including programs and catalogues, was issued in October 2006. It stood as a measure of HHCC's achievements in collections–based, educational programming [see File 20, doc. HVACR0610G]. Related promotional materials, programs, exhibit catalogues, and professionally produced large wall graphic display materials are capital resources of future value[32]. See for example:

- The 24 page display catalogue developed for UA787 and ORAC Joint Training and Apprenticeship Committee, Open House and Trade Show, Sept 2004 [see file 20, doc HVACR0409A, "A Celebration of Canadian HVACR Technology, Canada's First Half Century, 1900 to 1950, Automatic Self-regulating, Refrigerant Flow Control Valves, and Electric Temperature and Pressure Controls].

[29] As examples of the educational materials developed for the program see variously HHCC Data Centre and archives, Research by Oliver Associates, Project 138, documents: HD0912B. HD1006A, OA1201H, OA1104A, HD0911A, HD1006V

[30] Formally launched under the name of "A Canadian History of Automated Heating and Social Change in Canada"

[31] See for details HHCC File 20, Vol's 1 -7, Data Centre and HHCC corporate archives

[32] Much of this material is variously available from the HHCC's Information and Resource Centre, held by CCS in Aurora and by HHCC partner UA787 in Brampton

- The 28 page exhibition catalogue prepared for the semi-annual, CMX, national exhibits in 2004 [File 20, doc. HVACR0402B],
- The Thematic Development for a National CMX Exhibit in 2010, detailing: artifact ID code and name, accession, and classification codes, size and weight, stories lines and topics, dominant ideas, social and cultural significance, 10 page analysis [file 20, doc. HVACR1002D]

Figure 5

HHCC Display, Canadian Mechanical Exposition [CMX], Toronto, 2008

CMX is a semi-annual event attracting the industry's business, aficionados, and enthusiasts, as well as general public interests. HHCC's display are mounted in custom display cases, modularly built to its specifications, with the financial support of HRAI

HHCC's public programming initiatives are thematically-based, telling stories of cultural and social interest. Here the theme is "Progress, Innovation and the Power of Ideas". The display tells of the innovative "Industry Outliers" of the 1920-30's, and their socio-cultural impacts. Included are: direct drive high-speed rotary refrigeration compressors, close-coupled, high/low side mounting assemblies, and hermetic refrigeration systems, as well as oil and electric space heating equipment – all new ventures for their times.

With custom built display cases, HHCC work was generously supported by principal partner "The Heating, Refrigeration and Air Conditioning Institute of Canada", HRAI.

4.5 General Conclusion – Over the course of its start-up period HHCC's work in both Collections Research [Section 2 above] and in Public Programming is a reminder of the substantial educational materials resource base on which it now sits. HHCC has a wealth of "resources-in-stock" ready for further use in promotion, marketing, branding, and fund raising - helping to move HHCC into new life and times.

HHCC Resources Directory, Digital and Material Assets,
Start-up Years, 1990 to 2020
Prepared by Collections and Curatorial Services [CCS][1]

File No.

SUBJECT MATTER GROUP I: FOUNDATIONS

1) Founding Years 1999 to 2004 - General Log, Address Book [BK. 1]
2) Founding Years 1999 to 2004 - General Correspondence [BK. 1]
3) Founding Committee's Terms of Reference [BK. 1]
4) Founding Documents [BK. 2]
5) Staff meetings and Correspondence [Early years archived] [BK. 3]
6) Board Meetings and Reports [Early years archived]

SUBJECT MATTER GROUP II: ORGANIZATION

7) Organization [Incorporation, Structure and Function, Partners and Associates] [BK. 4]
8) Vision and Strategic Planning
Volume 1: 2003 to 2011 [BK. 5]
Volume 2: 2012 to 2020 [BK. 6]
9) Policies and Procedures [BK. 7]
10) Operations [Operations Manual]
11) General Work Planning and Budgeting [BK. 8]
12) **Human Resources [Staff, Volunteers, Associates, and contractors]]**
13) Accounting and Financial Management

SUBJECT MATTER GROUP III: OPERATIONS

14) Fund Raising: Vol. No. 1, 1998-2017; Vol. No. 2, 2018; Vol. No. 3 Exemplary Materials [BK. 9]
15) Promotion, Marketing, and Branding [BK. 10]
16) Facilities, Equipment, and Warehousing [BK. 11]
17) HHCC Virtual Museum [Website] [BK. 12]
18) Collections:
Volume 1 Preparation of THO Artifact Collection [BK. 13]
Volume 2 Gifting &Transfer THO Artifact Collection [BK. 14]
Volume 3 Acquisition of THO Artifact Collection by HHCC [BK. 15]
Volume 4 Archives: [BK. 16]
Volume 4.1 – Archival Sites and Aural Histories
Volume 4.2 – Founding Archival Literature Collection and Guide
Volume 5 – Founding Artifact Collection, Management Information Repositories [CMIR] [BK. 17]
Volume 6 – Founding Artifact Collection, Collection Planning and Development [BK. 18]
- **Volume 7 - Founding Artifacts Collection, CD back-up**
19) Research and Educational Materials Development [BK. 19]
Volume 1 Interactive Educational Websites
Volume 2 Educational Materials Development [EMD] Program
Volume 3 Information Requests, Tech Papers, Research Topics [BK. 20]
20) On-Site Educational Exhibits and Public Programming
Volume 1 Policy, Planning, and Development [BK. 21]
Volume 2 Permanent, Rotating Exhibits [BK. 22]
Volume 3 One-time Exhibits 2002 to 2006 [BK. 23]
Volume 4 One-Time Exhibits in 2007 to 2008 [BK. 24]
Volume 5 One-Time Exhibit, CMX2006 [BK. 25]
Volume 6 One-Time Exhibit, CMX2008, [BK. 26]
Volume 7 One-Time Exhibit, CMX2010, CMX2014 [BK. 27]
21) HHCC Corporate Data Centre [BK. 28]

[1] CCS's support functions were carried out by Oliver Associates, Principal Leslie Oliver, as volunteer, under Oliver Associates project number 114, Bks. 1 to 28.

HVACR Heritage Centre Canada, Collections Management
Category System, Revised July 16, 2002[1]

Part I: Refrigerating And Air Conditioning Technologies

Section 1.00: Unitary Refrigerating and Air Conditioning Equipment

1.01 Household Cabinet Refrigerators (3)
1.02 Household Air Conditioners [2] (2)
1.03 Commercial Refrigerating Equipment [3] (4)[4]
1.04 Commercial Air Conditioning Equipment

Section 2.00: Refrigerating and Air Conditioning Evaporators

2.01 Household Refrigerating and Air Conditioning Evaporators (12)
2.02 Commercial Refrigerating and Air conditioning Evaporators (8)

Section 3.00: Refrigerant Flow Controls

3.01 Household Refrigerant Flow Controls (13)
3.02 Commercial Refrigerant Flow Controls (26)

Section 4.00: Refrigerating and Air Conditioning Condensing Units

4.01 Household Refrigerating and Air Conditioning Condensing Units (9)
4.02 Commercial Refrigerating and Air Conditioning Condensing Units (20)

Section 5.00: Refrigerating and Air Conditioning Compressors

5.01 Household Refrigerating and Air Conditioning Compressors (13)
5.02 Commercial Refrigerating and Air Conditioning Compressors (23)

Section 6.00: Refrigerating and Air Conditioning Condensers and Receivers

6.01 Household Refrigerating and Air Conditioning Condenser and Receivers (8)
6.02 Commercial Refrigerating and Air conditioning Condenser and Receivers (10)

Section 7.00: Refrigerating and Air Conditioning Pressure and Temperature Controls

7.01 Household Refrigerating and Air conditioning Pressure and Temperature controls (19)
7.02 Commercial Refrigerating and Air Conditioning Pressure and Temperature Controls (18)

Section 8.00: Other Refrigerating and Air conditioning Components and Parts

8.01 Household Refrigerating and Air Conditioning Components and Parts (12)
8.02 Commercial Refrigerating and Air Conditioning Components and Parts (10)

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[1] Numbers in brackets indicate the approximate number of artifacts currently available from the T. H. Oliver historic collection , total 312 (order of magnitude)

[2] Equipment two refrigeration tons and less are designated "Household" for the sake of this grouping, either cabinet or split systems. Over two tons is classified as commercial

[3] For the purposes of this general grouping small "Industrial" applications may be included under "Commercial"

[4] Cabinet Refrigerators

Section 9.00: Refrigerating and Air Conditioning Installation, Test and Repair (10)

Part II: Automatic Heating Technologies [5]

Section 10.00: Solid Fuel (Coal and Wood) Burning Equipment and Systems

10.01 Solid Fuel Burning Equipment (Coal and Wood), Burners
10.02 Solid Fuel Burning Water Heating Equipment (1)
10.03 Solid Fuel Burning Space Heating Equipment
10.04 Solid Fuel Burning Equipment, Heat Exchangers
10.05 Solid Fuel Burning Equipment, Firing Assemblies
10.06 Solid Fuel Burning Equipment, Fuel flow, Ignition and Combustion Controls
10.07 Solid Fuel Burning Equipment, Temperature Controls
10.08 Other Solid Fuel Burning Equipment, Components and Parts (2)
10.09 Solid fuel Burning Equipment, Installation, Test and Repair

Section 11.00: Vaporizing Oil Burning Equipment and Systems

11.01 Vaporizing Oil Burners
11.02 Vaporizing Oil Burning Water Heating Equipment
11.03 Vaporizing Oil Burning Space Heating Equipment
11.04 Vaporizing Oil Burning Equipment, Heat Exchangers
11.05 Vaporizing Oil Burning Equipment, Ignition and Firing Assemblies
11.06 Vaporizing Oil Burning Equipment, Fuel Flow and Combustion Controls (1)
11.07 Vaporizing Oil Burning Equipment, Temperature Controls
11.08 Other Vaporizing Oil Burning Equipment, Components and Parts
11.09 Vaporizing Oil Burning Equipment, Installation, Test and Repair

Section 12.00: Pressure Atomizing Oil Burner Equipment and Systems

12.01 Pressure Atomizing Oil Burning Equipment, Burners (6)
12.02 Pressure Atomizing Oil Burning Hot Water Heating Equipment
12.03 Pressure Atomizing Oil Burning Space Heating Equipment
12.04 Pressure Atomizing Oil Burning Equipment, Heat Exchangers
12.05 Pressure Atomizing Oil Burning Equipment, Firing Assemblies (2)
12.06 Pressure Atomizing Oil Burning Equipment, Oil Pumps (14)
12.07 Pressure Atomizing Oil Burning Equipment, Ignition Transformers (4)
12.08 Pressure Atomizing Oil Burning Equipment, Fuel Flow and Combustion Controls (9)
12.09 Pressure Atomizing Oil Burning Equipment, High Temperature Limit Controls (3)
12.10 Pressure Atomizing Oil Burning Equipment, Room Temperature Thermostats (6)
12.11 Other Pressure Atomizing Oil Burning Equipment, Components and Parts 10)
12.12 Pressure Atomizing Oil Burning Equipment, Installation, Test and Repair (5)

[5] May include both "Industrial", as well as "Commercial" examples of the technology

Section 13.00: Gas Burning Equipment and Systems

! 3.01 Gas Burning Equipment, Burners
13.02 Gas Burning Water Heating Equipment
13.03 Gas Burning Space Heating Equipment
13.04 Gas Burning Equipment, Heat Exchangers
13.05 Gas Burning Equipment, Firing Assemblies
13.06 Gas Burner Equipment, Ignition Devices
13.07 Gas Burning Equipment, Fuel Flow and Combustion Controls
13.08 Gas Burning Equipment, High Temperature Limit Controls
13.09 Gas Burning Equipment, Room Temperature Thermostats
13.10 Other Gas Burning Equipment, Components and Parts
13.11 Gas Burning Equipment, Installation, Test and Repair

Section 14.00: Electric Heating Equipment

! 4.01 Electric Heating Equipment, Heating Coils
14.02 Electric Water Heating Equipment
14.03 Electric Space Heating Equipment (3)
14.04 Electric Heating Equipment, Switches and High Limit Controls (2)
14.05 Electric Heating Equipment, Room Temperature Thermostats (2)
14.06 Other Electric Heating Equipment, Components and Parts
14.07 Electric Heater Equipment, Installation, Test and Repair

Part 1II: Ventilation Technologies

Section 15.00: Ventilation Equipment and Systems

15.01 Household Ventilation Equipment
15.02 Commercial Ventilation Equipment[6] (1)
15.03 Ventilation Equipment, Fan Blades and Assemblies (5)
15.04 Ventilation Equipment, Air Flow Control Devices
15.05 Ventilation Equipment, Motor Control Devices
15.06 Ventilation Equipment, Components and Parts
15.07 Ventilation Equipment, Installation, Test and Repair

Part IV: HVACR Electric Motor Technologies

Section 16.00: Electric Motors

16.01 Electric Motors, Single Phase, Repulsion Induction and Repulsion Motors (12)
16.02 Electric Motors, Single Phase Capacitor Start and Capacitor Run Motors (7)
16.03 Electric Motors, Single Phase, Split Phase (6)
16.04 Electric Motors, Single Phase, Shaded Pole (11)
16.05 Electric Motors, Poly Phase
16.06 Electric Motors, Components and Parts (5)
16.07 Electric Motors, Installation, Test and Repair (8)

[6] May include both "Industrial as well as "Commercial" examples of the technology

HVACR Heritage Centre Canada

Collections and Curatorial Services

WORKING MATERIAL ONLY

HHCC Artifact Collection: Artifact Identification Tables[1]

[1] Tables are formatted in Pdf as well as Word 7, Use word 7 for changes and export to Pdf as needed

HHCC Artifact Collections Management Information System
Cross Reference Tables

Artifact ID Number, Classification Code, and Accession Number

Table Number 1: Reported by ID

Artifact ID	Artifact Classification Name	Artifact Classification Code	Artifact Accession Number	Notes
1	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-2	2003.001	
2	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-3	2003.002	
3	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-4	2003.003	
4	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-6	2003.004	
5	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-7	2003.005	
6	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-8	2003.006	
7	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-9	2003.007	
8	Unitary Refrig and A/C Equipment and Systems - Commercial Refrigerating Equipment	1.03-1	2003.008	
9	Unitary Refrig and A/C Equipment and Systems - Commercial Refrigerating Equipment	1.03-2	2003.009	
10	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-5	2003.010	

11	Refrigerating and Air Conditioning Evaporators - Household	2.01-2	2003.011	
12	Refrigerating and Air Conditioning Evaporators - Household	2.01-3	2003.012	
13	Refrigerating and Air Conditioning Evaporators - Household	2.01-4	2003.013	
14	Refrigerating and Air Conditioning Evaporators - Household	2.01-5	2003.014	
15	Refrigerating and Air Conditioning Evaporators - Household	2.01-7	2003.015	
16	Refrigerating and Air Conditioning Evaporators - Household	2.01-8	2003.016	
17	Refrigerating and Air Conditioning Evaporators - Household	2.01-9	2003.017	
18	Refrigerating and Air Conditioning Evaporators - Household	2.01-10	2003.018	
19	Refrigerating and Air Conditioning Evaporators - Household	2.01-12	2003.019	
20	Refrigerating and Air Conditioning Evaporators - Household	2.01-13	2003.020	
21	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-1	2003.021	
22	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-2	2003.022	
23	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-3	2003.023	
24	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-4	2003.024	
25	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-5	2003.025	
26	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-6	2003.026	
27	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-7A	2003.027	

28	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-7B	2003.028	
29	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-8	2003.029	
30	Refrigerating and Air Conditioning Condensing Units – Household	4.01-2	2003.030	
31	Refrigerating and Air Conditioning Condensing Units – Household	4.01-3	2003.031	
32	Refrigerating and Air Conditioning Condensing Units – Household	4.01-4	2003.032	
33	Refrigerating and Air Conditioning Condensing Units – Household	4.01-5	2003.033	
34	Refrigerating and Air Conditioning Condensing Units – Household	4.01-6A	2003.034	
35	Refrigerating and Air Conditioning Condensing Units – Household	4.01-6B	2003.035	
36	Refrigerating and Air Conditioning Condensing Units – Household	4.01-8	2003.036	
37	Refrigerating and Air Conditioning Condensing Units – Household	4.01-7A	2003.037	
38	Refrigerating and Air Conditioning Condensing Units – Household	4.01-7B	2003.038	
39	Refrigerating and Air Conditioning Condensing Units – Household	4.01-10	2003.039	
40	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-1	2003.040	
41	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-2	2003.041	
42	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-3	2003.042	
43	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-4	2003.043	
44	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-5	2003.044	

45	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-7	2003.045	
46	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-6	2003.046	
47	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-8	2003.047	
48	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-10	2003.048	
49	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-11	2003.049	
50	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-12	2003.050	
51	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-13	2003.051	
52	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-14	2003.052	
53	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-15	2003.053	
54	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-16	2003.054	
55	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-17	2003.055	
56	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-18	2003.056	
57	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-19	2003.057	
58	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-20	2003.058	
59	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-21	2003.059	
60	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-1	2003.060	
61	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-2	2003.061	

62	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-3	2003.062	
63	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-4	2003.063	
64	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-5	2003.064	
65	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-6	2003.065	
66	Refrigerating and Air Conditioning Condensers and Receivers - Household	6.01-1	2003.066	
67	Refrigerating and Air Conditioning Condensers and Receivers - Household	6.01-2	2003.067	
68	Refrigerating and Air Conditioning Condensers and Receivers - Household	6.01-3	2003.068	
69	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-7	2003.069	
70	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-8	2003.070	
71	Other Refrigerating and Air conditioning Components and Parts - Household	8.01-1	2003.071	
72	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-3	2003.072	
73	Other Refrigerating and Air conditioning Components and Parts - Household	8.01-2	2003.073	
74	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-2	2003.074	
75	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-1	2003.075	
76	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-2	2003.076	
77	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-3	2003.077	
78	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-4	2003.078	

79	Pressure Atomizing Oil Burner Equipment and Systems - Burners	12.01-1	2003.079	
80	Pressure Atomizing Oil Burner Equipment and Systems - Burners	12.01-2	2003.080	
81	Solid Fuel (Coal and Wood) Burning Equipment - Water Heating	10.02-1	2003.081	
82	Vaporizing Oil Burning Equipment and Systems - Space Heating	11.03-1	2003.082	
83	Electric Heating Equipment – Water Heating	14.02-1	2003.083	
84	Electric Heating Equipment - Space Heating	14.03-1	2003.084	
85	Ventilation Equipment and Systems - Commercial	15.02-1	2003.085	
86	Ventilation Equipment and Systems - Commercial	15.02-2	2003.086	
87	Refrigerating and Air Conditioning Compressors - Household	5.01-1A	2003.087	
88	Refrigerating and Air Conditioning Compressors - Household	5.01-1B	2003.088	
89	Refrigerating and Air Conditioning Compressors - Household	5.01-3	2003.089	
90	Refrigerating and Air Conditioning Compressors - Household	5.01-4	2003.090	
91	Refrigerating and Air Conditioning Compressors - Household	5.01-5A	2003.091	
92	Refrigerating and Air Conditioning Compressors - Household	5.01-5B	2003.092	
93	Refrigerating and Air Conditioning Compressors - Household	5.01-6	2003.093	
94	Refrigerating and Air Conditioning Compressors - Household	5.01-7	2003.094	
95	Refrigerating and Air Conditioning Compressors - Household	5.01-8	2003.095	
96	Refrigerating and Air Conditioning Compressors - Household	5.01-9	2003.096	
97	Refrigerating and Air Conditioning Compressors - Household	5.01-10	2003.097	

98	Refrigerating and Air Conditioning Compressors - Household	5.01-11	2003.098	
99	Refrigerating and Air Conditioning Compressors - Household	5.01-13	2003.099	
100	Refrigerating and Air Conditioning Compressors - Household	5.01-17	2003.100	
101	Refrigerating and Air Conditioning Compressors - Household	5.01-18	2003.101	
102	Refrigerating and Air Conditioning Compressors - Household	5.01-19	2003.102	
103	Refrigerating and Air Conditioning Compressors - Household	5.01-20	2003.103	
104	Refrigerating and Air Conditioning Compressors - Commercial	5.02-1	2003.104	
105	Refrigerating and Air Conditioning Compressors - Commercial	5.02-2	2003.105	
106	Refrigerating and Air Conditioning Compressors - Commercial	5.02-3	2003.106	
107	Refrigerating and Air Conditioning Compressors - Commercial	5.02-4	2003.107	
108	Refrigerating and Air Conditioning Compressors - Commercial	5.02-5	2003.108	
109	Refrigerating and Air Conditioning Compressors - Commercial	5.02-6A	2003.109	
110	Refrigerating and Air Conditioning Compressors - Commercial	5.02-6B	2003.110	
111	Refrigerating and Air Conditioning Compressors - Commercial	5.02-6C	2003.111	
112	Refrigerating and Air Conditioning Compressors - Commercial	5.02-7	2003.112	
113	Refrigerating and Air Conditioning Compressors - Commercial	5.02-8	2003.113	
114	Refrigerating and Air Conditioning Compressors - Commercial	5.02-9A	2003.114	

115	Refrigerating and Air Conditioning Compressors - Commercial	5.02-9B	2003.115	
116	Refrigerating and Air Conditioning Compressors - Commercial	5.02-10	2003.116	
117	Refrigerating and Air Conditioning Compressors - Commercial	5.02-11	2003.117	
118	Refrigerating and Air Conditioning Compressors - Commercial	5.02-12	2003.118	
119	Refrigerating and Air Conditioning Compressors - Commercial	5.02-13	2003.119	
120	Refrigerating and Air Conditioning Compressors - Commercial	5.02-14A	2003.120	
121	Refrigerating and Air Conditioning Compressors - Commercial	5.02-14B	2003.121	
122	Refrigerating and Air Conditioning Compressors - Commercial	5.02-15	2003.122	
123	Refrigerating and Air Conditioning Compressors - Commercial	5.02-16	2003.123	
124	Refrigerating and Air Conditioning Compressors - Commercial	5.02-17	2003.124	
125	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1A	2006.001	
126	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1B	2006.002	
127	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1C	2006.003	
128	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1D	2006.004	
129	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2A	2006.005	
130	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2B	2006.006	
131	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3A	2006.007	

132	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3B	2006.008	
133	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3C	2006.009	
134	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3D	2006.010	
135	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3E	2006.011	
136	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3F	2006.012	
137	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3G	2006.013	
138	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2C	2006.014	
139	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2D	2006.015	
140	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2E	2006.016	
141	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2F	2006.017	
142	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-4A	2006.018	
143	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-4B	2006.019	
144	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-5	2006.020	
145	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-6	2006.021	
146	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-7	2006.022	
147	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-8A	2006.023	
148	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-8B	2006.024	

149	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-9	2006.025	
150	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-10	2006.026	
151	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-11	2006.027	
152	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1A	2006.028	
153	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1B	2006.029	
154	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1C	2006.030	
155	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1D	2006.031	
156	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-2	2006.032	
157	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-3A	2006.033	
158	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-3B	2006.034	
159	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-4	2006.035	
160	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-5	2006.036	
161	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-6	2006.037	
162	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-7	2006.038	
163	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-8	2006.039	
164	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-9	2006.040	
165	Refrigerant Flow Controls - Household	3.01-1A	2006.041	
166	Refrigerant Flow Controls - Household	3.01-1B	2006.042	

167	Refrigerant Flow Controls - Household	3.01-1C	2006.043	
168	Refrigerant Flow Controls - Household	3.01-2	2006.044	
169	Refrigerant Flow Controls - Household	3.01-3A	2006.045	
170	Refrigerant Flow Controls - Household	3.01-3B	2006.046	
171	Refrigerant Flow Controls - Household	3.01-4	2006.047	
172	Refrigerant Flow Controls - Household	3.01-5A	2006.048	
173	Refrigerant Flow Controls - Household	3.01-5B	2006.049	
174	Refrigerant Flow Controls - Household	3.01-6	2006.050	
175	Refrigerant Flow Controls - Household	3.01-7	2006.051	
176	Refrigerant Flow Controls - Household	3.01-8	2006.052	
177	Refrigerant Flow Controls - Household	3.01-9A	2006.053	
178	Refrigerant Flow Controls - Household	3.01-9B	2006.054	
179	Refrigerant Flow Controls - Household	3.01-10A	2006.055	
180	Refrigerant Flow Controls - Household	3.01-19B	2006.056	
181	Refrigerant Flow Controls - Household	3.01-11	2006.057	
182	Refrigerant Flow Controls - Household	3.01-12	2006.058	
183	Refrigerant Flow Controls - Commercial	3.02-1	2006.059	
184	Refrigerant Flow Controls - Commercial	3.02-2A	2006.060	
185	Refrigerant Flow Controls - Commercial	3.02-2B	2006.061	
186	Refrigerant Flow Controls - Commercial	3.02-3	2006.062	
187	Refrigerant Flow Controls - Commercial	3.02-4A	2006.063	
188	Refrigerant Flow Controls - Commercial	3.02-4B	2006.064	
189	Refrigerant Flow Controls - Commercial	3.02-5	2006.065	
190	Refrigerant Flow Controls - Commercial	3.02-6A	2006.066	
191	Refrigerant Flow Controls - Commercial	3.02-6B	2006.067	
192	Refrigerating and Air Conditioning Condensing Units – Household	3.03-1	2006.068	
193	Refrigerating and Air Conditioning Condensing Units – Household	3.03-2	2006.069	
194	Refrigerating and Air Conditioning Condensing Units – Household	3.03-3	2006.070	
195	Refrigerating and Air Conditioning Condensing Units – Household	3.03-4	2006.071	

196	Refrigerating and Air Conditioning Condensing Units – Household	3.03-5	2006.072	
197	Refrigerating and Air Conditioning Condensing Units – Household	3.03-6	2006.073	
198	Refrigerating and Air Conditioning Condensing Units – Household	3.03-7	2006.074	
199	Refrigerating and Air Conditioning Condensing Units – Household	3.03-8	2006.075	
200	Refrigerating and Air Conditioning Condensing Units – Household	3.03-9	2006.076	
201	Refrigerant Flow Controls - Commercial	3.02-7	2006.077	
202	Refrigerant Flow Controls - Commercial	3.02-8	2006.078	
203	Refrigerant Flow Controls - Commercial	3.02-9	2006.079	
204	Refrigerant Flow Controls - Commercial	3.02-10	2006.080	
205	Refrigerant Flow Controls - Commercial	3.02-11	2006.081	
206	Refrigerant Flow Controls - Commercial	3.02-12	2006.082	
207	Refrigerant Flow Controls - Commercial	3.02-13	2006.083	
208	Refrigerant Flow Controls - Commercial	3.02-14	2006.084	
209	Refrigerant Flow Controls - Commercial	3.02-15	2006.085	
210	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-3	2006.086	
211	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-4	2006.087	
212		VOID	2006.088	
213	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-1	2006.089	
214	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-2	2006.090	
215	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-3	2006.091	
216	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-4	2006.092	
217	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-5	2006.093	

218	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-6	2006.094	
219	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-7	2006.095	
220	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-8	2006.096	
221	Electric Heating Equipment - Room Temperature Thermostats	14.05-1	2006.097	
222	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-1	2006.098	
223	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-2	2006.099	
224	Electric Heating Equipment - Space Heating	14.03-1	2006.100	
225	Solid Fuel (Coal and Wood) Burning Equipment - Fuel flow, Ignition and Combustion Controls	10.06-1	2006.101	
226	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-1	2006.102	
227	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-2	2006.103	
228	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-3	2006.104	
229	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-4	2006.105	
230	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-5	2006.106	
231	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-6	2006.107	
232	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-7	2006.108	
233	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-8	2006.109	
234	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-9	2006.110	

235	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-10	2006.111	
236	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	12.08-11	2006.112	
237	Pressure Atomizing Oil Burner Equipment and Systems - High Temperature Limit Controls	12.09-1	2006.113	
238	Pressure Atomizing Oil Burner Equipment and Systems - High Temperature Limit Controls	12.09-2	2006.114	
239	Pressure Atomizing Oil Burner Equipment and Systems - High Temperature Limit Controls	12.09-3	2006.115	
240	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-10	2006.116	
241	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-9	2006.117	
242	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-3	2006.118	
243	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-4A&B	2006.119	
244	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-5	2006.120	
245	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-6	2006.121	
246	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-7	2006.122	
247	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-8	2006.123	
248	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	12.12-1A&B	2006.124	
249	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	12.12-2	2006.125	
250	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	12.12-3	2006.126	
251	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-4	2006.127	

252	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-5	2006.128	
253	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-6	2006.129	
254	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	12.11-7	2006.130	
255	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	12.07-1	2006.131	
256	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	12.07-2	2006.132	
257	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	12.07-3	2006.133	
258	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	12.07-4	2006.134	
259	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12.05-1	2006.135	
260	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12-05.2	2006.136	
261	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12.05-3	2006.137	
262	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12.05-4	2006.138	
263	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12.05-5	2006.139	
264	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12.05-6	2006.140	
265	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	12.05-7	2006.141	
266	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-9	2006.142	
267	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-10	2006.143	
268	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-1	2006.144	

269	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-2	2006.145	
270	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-3	2006.146	
271	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-4	2006.147	
272	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-5	2006.148	
273	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-6	2006.149	
274	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-7	2006.150	
275	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-8	2006.151	
276	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-11	2006.152	
277	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	12.06-12	2006.153	
278	Vaporizing Oil Burning Equipment and Systems - Burners	11.01-1	2006.154	
279	Solid Fuel (Coal and Wood) Burning Equipment - Other Components and Parts	10.08-1	2006.155	
280	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-1	2006.156	
281	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-2A	2006.157	
282	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-2B	2006.158	
283	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-3	2006.159	
284	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-4	2006.160	
285	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-5	2006.161	

286	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-6	2006.162	
287	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	16.02-7	2006.163	
288	Electric Motors - Single Phase, Split Phase	16.03-2	2006.164	
289	Electric Motors - Single Phase, Split Phase	16.03-3	2006.165	
290	Electric Motors - Single Phase, Split Phase	16.03-4	2006.166	
291	Electric Motors - Single Phase, Split Phase	16.03-5	2006.167	
292	Electric Motors - Single Phase, Split Phase	16.03-6	2006.168	
293	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-1	2006.169	
294	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-2	2006.170	
295	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-4	2006.171	
296	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-5	2006.172	
297	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-6	2006.173	
298	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-7	2006.174	
299	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-8	2006.175	
300	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-9	2006.176	
301	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-10A	2006.177	
302	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-10B	2006.178	
303	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-11	2006.179	
304	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-12	2006.180	
305	Electric Motors - Single Phase, Repulsion Induction and	16.01-13A	2006.181	

	Repulsion Motors			
306	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-13B	2006.182	
307	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-13C	2006.183	
308	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-14	2006.184	
309	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-15	2006.185	
310	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	16.01-16	2006.186	
311	Electric Motors - Single Phase, Shaded Pole	16.04-1	2006.187	
312	Electric Motors - Single Phase, Shaded Pole	16.04-2	2006.188	
313	Electric Motors - Single Phase, Shaded Pole	16.04-3	2006.189	
314	Electric Motors - Single Phase, Shaded Pole	16.04-4	2006.190	
315	Electric Motors - Single Phase, Shaded Pole	16.04-5A	2006.191	
316	Electric Motors - Single Phase, Shaded Pole	16.04-5B	2006.192	
317	Electric Motors - Single Phase, Shaded Pole	16.04-5C	2006.193	
318	Electric Motors - Single Phase, Shaded Pole	16.04-6	2006.194	
319	Electric Motors - Single Phase, Shaded Pole	16.04-7	2006.195	
320	Electric Motors - Single Phase, Shaded Pole	16.04-8	2006.196	
321	Electric Motors - Single Phase, Shaded Pole	16.04-9	2006.197	
322	Electric Motors - Single Phase, Shaded Pole	16.04-10	2006.198	
323	Electric Motors - NEC	16.08-1	2006.199	
324	Electric Motors - NEC	16.08-2	2006.200	
325	Electric Motors - NEC	16.08-3	2006.201	
326	Electric Motors - Components and Parts	16.06-1	2006.202	
327	Electric Motors - Components and Parts	16.06-2	2006.203	
328	Electric Motors - Components and Parts	16.06-3	2006.204	
329	Electric Motors - Components and Parts	16.06-4	2006.205	
330	Electric Motors - Components and Parts	16.06-5	2006.206	
331	Electric Motors - Components and Parts	16.06-6	2006.207	
332	Electric Motors - Components and Parts	16.06-7	2006.208	

333	Electric Motors – Installation, Test and Repair	16.07-1	2006.209	
334	Electric Motors – Installation, Test and Repair	16.07-2	2006.210	
335	Electric Motors – Installation, Test and Repair	16.07-3	2006.211	
336	Electric Motors – Installation, Test and Repair	16.07-4	2006.212	
337	Electric Motors – Installation, Test and Repair	16.07-5	2006.213	
338	Electric Motors – Installation, Test and Repair	16.07-6	2006.214	
339	Electric Motors – Installation, Test and Repair	16.07-7	2006.215	
340	Electric Motors - Components and Parts	16.06-8	2006.216	
341	Electric Motors - Components and Parts	16.06-9	2006.217	
342	Electric Motors - Components and Parts	16.06-10	2006.218	
343	Electric Motors - Components and Parts	16.06-11	2006.219	
344	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	12.12-8	2006.220	

HHCC Collections Management Information System

Cross Reference Tables

Artifact ID Number, Classification Code and Accession Number

Table Number 2: Reported by Classification Name and Code

Artifact Classification Code	Artifact Classification Name	Artifact ID	Artifact Accession Number	Notes
1.01-2	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1	2003.001	
1.01-3	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	2	2003.002	
1.01-4	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	3	2003.003	
1.01-6	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	4	2003.004	
1.01-7	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	5	2003.005	
1.01-8	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	6	2003.006	
1.01-9	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	7	2003.007	

1.03-1	Unitary Refrig and A/C Equipment and Systems - Commercial Refrigerating Equipment	8	2003.008	
1.03-2	Unitary Refrig and A/C Equipment and Systems - Commercial Refrigerating Equipment	9	2003.009	
2.01-2	Refrigerating and Air Conditioning Evaporators - Household	11	2003.011	
2.01-3	Refrigerating and Air Conditioning Evaporators - Household	12	2003.012	
2.01-4	Refrigerating and Air Conditioning Evaporators - Household	13	2003.013	
2.01-5	Refrigerating and Air Conditioning Evaporators - Household	14	2003.014	
2.01-7	Refrigerating and Air Conditioning Evaporators - Household	15	2003.015	
2.01-8	Refrigerating and Air Conditioning Evaporators - Household	16	2003.016	
2.01-9	Refrigerating and Air Conditioning Evaporators - Household	17	2003.017	
2.01-10	Refrigerating and Air Conditioning Evaporators - Household	18	2003.018	
2.01-12	Refrigerating and Air Conditioning Evaporators - Household	19	2003.019	
2.01-13	Refrigerating and Air Conditioning Evaporators - Household	20	2003.020	
2.02-1	Refrigerating and Air Conditioning Evaporators - Commercial	21	2003.021	
2.02-2	Refrigerating and Air Conditioning Evaporators -	22	2003.022	

	Commercial			
2.02-3	Refrigerating and Air Conditioning Evaporators - Commercial	23	2003.023	
2.02-4	Refrigerating and Air Conditioning Evaporators - Commercial	24	2003.024	
2.02-5	Refrigerating and Air Conditioning Evaporators - Commercial	25	2003.025	
2.02-6	Refrigerating and Air Conditioning Evaporators - Commercial	26	2003.026	
2.02-7A	Refrigerating and Air Conditioning Evaporators - Commercial	27	2003.027	
2.02-7B	Refrigerating and Air Conditioning Evaporators - Commercial	28	2003.028	
2.02-8	Refrigerating and Air Conditioning Evaporators - Commercial	29	2003.029	
3.01-1A	Refrigerant Flow Controls - Household	165	2006.041	
3.01-1B	Refrigerant Flow Controls - Household	166	2006.042	
3.01-1C	Refrigerant Flow Controls - Household	167	2006.043	
3.01-2	Refrigerant Flow Controls - Household	168	2006.044	
3.01-3A	Refrigerant Flow Controls - Household	169	2006.045	
3.01-3B	Refrigerant Flow Controls - Household	170	2006.046	
3.01-4	Refrigerant Flow Controls - Household	171	2006.047	
3.01-5A	Refrigerant Flow Controls - Household	172	2006.048	
3.01-5B	Refrigerant Flow Controls - Household	173	2006.049	

3.01-6	Refrigerant Flow Controls - Household	174	2006.050	
3.01-7	Refrigerant Flow Controls - Household	175	2006.051	
3.01-8	Refrigerant Flow Controls - Household	176	2006.052	
3.01-9A	Refrigerant Flow Controls - Household	177	2006.053	
3.01-9B	Refrigerant Flow Controls - Household	178	2006.054	
3.01-10A	Refrigerant Flow Controls - Household	179	2006.055	
3.01-11	Refrigerant Flow Controls - Household	181	2006.057	
3.01-12	Refrigerant Flow Controls - Household	182	2006.058	
3.01-19B	Refrigerant Flow Controls - Household	180	2006.056	
3.02-1	Refrigerant Flow Controls - Commercial	183	2006.059	
3.02-2A	Refrigerant Flow Controls - Commercial	184	2006.060	
3.02-2B	Refrigerant Flow Controls - Commercial	185	2006.061	
3.02-3	Refrigerant Flow Controls - Commercial	186	2006.062	
3.02-4A	Refrigerant Flow Controls - Commercial	187	2006.063	
3.02-4B	Refrigerant Flow Controls - Commercial	188	2006.064	
3.02-5	Refrigerant Flow Controls - Commercial	189	2006.065	
3.02-6A	Refrigerant Flow Controls - Commercial	190	2006.066	
3.02-6B	Refrigerant Flow Controls - Commercial	191	2006.067	
3.02-7	Refrigerant Flow Controls - Commercial	201	2006.077	
3.02-8	Refrigerant Flow Controls - Commercial	202	2006.078	
3.02-9	Refrigerant Flow Controls - Commercial	203	2006.079	
3.02-10	Refrigerant Flow Controls - Commercial	204	2006.080	

3.02-11	Refrigerant Flow Controls - Commercial	205	2006.081	
3.02-12	Refrigerant Flow Controls - Commercial	206	2006.082	
3.02-13	Refrigerant Flow Controls - Commercial	207	2006.083	
3.02-14	Refrigerant Flow Controls - Commercial	208	2006.084	
3.02-15	Refrigerant Flow Controls - Commercial	209	2006.085	
3.03-1	Refrigerating and Air Conditioning Condensing Units – Household	192	2006.068	
3.03-2	Refrigerating and Air Conditioning Condensing Units – Household	193	2006.069	
3.03-3	Refrigerating and Air Conditioning Condensing Units – Household	194	2006.070	
3.03-4	Refrigerating and Air Conditioning Condensing Units – Household	195	2006.071	
3.03-5	Refrigerating and Air Conditioning Condensing Units – Household	196	2006.072	
3.03-6	Refrigerating and Air Conditioning Condensing Units – Household	197	2006.073	
3.03-7	Refrigerating and Air Conditioning Condensing Units – Household	198	2006.074	
3.03-8	Refrigerating and Air Conditioning Condensing Units – Household	199	2006.075	
3.03-9	Refrigerating and Air Conditioning Condensing Units – Household	200	2006.076	
4.01-2	Refrigerating and Air Conditioning Condensing Units – Household	30	2003.030	
4.01-3	Refrigerating and Air Conditioning Condensing Units –	31	2003.031	

	Household			
4.01-4	Refrigerating and Air Conditioning Condensing Units – Household	32	2003.032	
4.01-5	Refrigerating and Air Conditioning Condensing Units – Household	33	2003.033	
4.01-6A	Refrigerating and Air Conditioning Condensing Units – Household	34	2003.034	
4.01-6B	Refrigerating and Air Conditioning Condensing Units – Household	35	2003.035	
4.01-7A	Refrigerating and Air Conditioning Condensing Units – Household	37	2003.037	
4.01-7B	Refrigerating and Air Conditioning Condensing Units – Household	38	2003.038	
4.01-8	Refrigerating and Air Conditioning Condensing Units – Household	36	2003.036	
4.01-10	Refrigerating and Air Conditioning Condensing Units – Household	39	2003.039	
4.02-1	Refrigerating and Air Conditioning Condensing Units - Commercial	40	2003.040	
4.02-2	Refrigerating and Air Conditioning Condensing Units - Commercial	41	2003.041	
4.02-3	Refrigerating and Air Conditioning Condensing Units - Commercial	42	2003.042	
4.02-4	Refrigerating and Air Conditioning Condensing Units - Commercial	43	2003.043	
4.02-5	Refrigerating and Air Conditioning Condensing Units - Commercial	44	2003.044	

4.02-6	Refrigerating and Air Conditioning Condensing Units - Commercial	46	2003.046	
4.02-7	Refrigerating and Air Conditioning Condensing Units - Commercial	45	2003.045	
4.02-8	Refrigerating and Air Conditioning Condensing Units - Commercial	47	2003.047	
4.02-10	Refrigerating and Air Conditioning Condensing Units - Commercial	48	2003.048	
4.02-11	Refrigerating and Air Conditioning Condensing Units - Commercial	49	2003.049	
4.02-12	Refrigerating and Air Conditioning Condensing Units - Commercial	50	2003.050	
4.02-13	Refrigerating and Air Conditioning Condensing Units - Commercial	51	2003.051	
4.02-14	Refrigerating and Air Conditioning Condensing Units - Commercial	52	2003.052	
4.02-15	Refrigerating and Air Conditioning Condensing Units - Commercial	53	2003.053	
4.02-16	Refrigerating and Air Conditioning Condensing Units - Commercial	54	2003.054	
4.02-17	Refrigerating and Air Conditioning Condensing Units - Commercial	55	2003.055	
4.02-18	Refrigerating and Air Conditioning Condensing Units - Commercial	56	2003.056	
4.02-19	Refrigerating and Air Conditioning Condensing Units - Commercial	57	2003.057	
4.02-20	Refrigerating and Air Conditioning Condensing Units -	58	2003.058	

	Commercial			
4.02-21	Refrigerating and Air Conditioning Condensing Units - Commercial	59	2003.059	
5.01-1A	Refrigerating and Air Conditioning Compressors - Household	87	2003.087	
5.01-1B	Refrigerating and Air Conditioning Compressors - Household	88	2003.088	
5.01-3	Refrigerating and Air Conditioning Compressors - Household	89	2003.089	
5.01-4	Refrigerating and Air Conditioning Compressors - Household	90	2003.090	
5.01-5A	Refrigerating and Air Conditioning Compressors - Household	91	2003.091	
5.01-5B	Refrigerating and Air Conditioning Compressors - Household	92	2003.092	
5.01-6	Refrigerating and Air Conditioning Compressors - Household	93	2003.093	
5.01-7	Refrigerating and Air Conditioning Compressors - Household	94	2003.094	
5.01-8	Refrigerating and Air Conditioning Compressors - Household	95	2003.095	
5.01-9	Refrigerating and Air Conditioning Compressors - Household	96	2003.096	
5.01-10	Refrigerating and Air Conditioning Compressors - Household	97	2003.097	
5.01-11	Refrigerating and Air Conditioning Compressors - Household	98	2003.098	

5.01-13	Refrigerating and Air Conditioning Compressors - Household	99	2003.099	
5.01-17	Refrigerating and Air Conditioning Compressors - Household	100	2003.100	
5.01-18	Refrigerating and Air Conditioning Compressors - Household	101	2003.101	
5.01-19	Refrigerating and Air Conditioning Compressors - Household	102	2003.102	
5.01-20	Refrigerating and Air Conditioning Compressors - Household	103	2003.103	
5.02-1	Refrigerating and Air Conditioning Compressors - Commercial	104	2003.104	
5.02-2	Refrigerating and Air Conditioning Compressors - Commercial	105	2003.105	
5.02-3	Refrigerating and Air Conditioning Compressors - Commercial	106	2003.106	
5.02-4	Refrigerating and Air Conditioning Compressors - Commercial	107	2003.107	
5.02-5	Refrigerating and Air Conditioning Compressors - Commercial	108	2003.108	
5.02-6A	Refrigerating and Air Conditioning Compressors - Commercial	109	2003.109	
5.02-6B	Refrigerating and Air Conditioning Compressors - Commercial	110	2003.110	
5.02-6C	Refrigerating and Air Conditioning Compressors - Commercial	111	2003.111	
5.02-7	Refrigerating and Air Conditioning Compressors -	112	2003.112	

	Commercial			
5.02-8	Refrigerating and Air Conditioning Compressors - Commercial	113	2003.113	
5.02-9A	Refrigerating and Air Conditioning Compressors - Commercial	114	2003.114	
5.02-9B	Refrigerating and Air Conditioning Compressors - Commercial	115	2003.115	
5.02-10	Refrigerating and Air Conditioning Compressors - Commercial	116	2003.116	
5.02-11	Refrigerating and Air Conditioning Compressors - Commercial	117	2003.117	
5.02-12	Refrigerating and Air Conditioning Compressors - Commercial	118	2003.118	
5.02-13	Refrigerating and Air Conditioning Compressors - Commercial	119	2003.119	
5.02-14A	Refrigerating and Air Conditioning Compressors - Commercial	120	2003.120	
5.02-14B	Refrigerating and Air Conditioning Compressors - Commercial	121	2003.121	
5.02-15	Refrigerating and Air Conditioning Compressors - Commercial	122	2003.122	
5.02-16	Refrigerating and Air Conditioning Compressors - Commercial	123	2003.123	
5.02-17	Refrigerating and Air Conditioning Compressors - Commercial	124	2003.124	
6.01-1	Refrigerating and Air Conditioning Condensers and Receivers - Household	66	2003.066	

6.01-2	Refrigerating and Air Conditioning Condensers and Receivers - Household	67	2003.067	
6.01-3	Refrigerating and Air Conditioning Condensers and Receivers - Household	68	2003.068	
6.02-1	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	60	2003.060	
6.02-2	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	61	2003.061	
6.02-3	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	62	2003.062	
6.02-4	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	63	2003.063	
6.02-5	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	64	2003.064	
6.02-6	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	65	2003.065	
6.02-7	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	69	2003.069	
6.02-8	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	70	2003.070	
7.01-1A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	125	2006.001	
7.01-1B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	126	2006.002	
7.01-1C	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	127	2006.003	
7.01-1D	Refrigerating and Air Conditioning Pressure and	128	2006.004	

	Temperature Controls - Household			
7.01-2A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	129	2006.005	
7.01-2B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	130	2006.006	
7.01-2C	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	138	2006.014	
7.01-2D	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	139	2006.015	
7.01-2E	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	140	2006.016	
7.01-2F	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	141	2006.017	
7.01-3A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	131	2006.007	
7.01-3B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	132	2006.008	
7.01-3C	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	133	2006.009	
7.01-3D	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	134	2006.010	
7.01-3E	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	135	2006.011	
7.01-3F	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	136	2006.012	
7.01-3G	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	137	2006.013	

7.01-4A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	142	2006.018	
7.01-4B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	143	2006.019	
7.01-5	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	144	2006.020	
7.01-6	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	145	2006.021	
7.01-7	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	146	2006.022	
7.01-8A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	147	2006.023	
7.01-8B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	148	2006.024	
7.01-9	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	149	2006.025	
7.01-10	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	150	2006.026	
7.01-11	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	151	2006.027	
7.02-1A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	152	2006.028	
7.02-1B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	153	2006.029	
7.02-1C	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	154	2006.030	
7.02-1D	Refrigerating and Air Conditioning Pressure and	155	2006.031	

	Temperature Controls - Commercial			
7.02-2	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	156	2006.032	
7.02-3A	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	157	2006.033	
7.02-3B	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	158	2006.034	
7.02-4	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	159	2006.035	
7.02-5	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	160	2006.036	
7.02-6	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	161	2006.037	
7.02-7	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	162	2006.038	
7.02-8	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	163	2006.039	
7.02-9	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	164	2006.040	
8.01-1	Other Refrigerating and Air conditioning Components and Parts - Household	71	2003.071	
8.01-2	Other Refrigerating and Air conditioning Components and Parts - Household	73	2003.073	
8.02-2	Other Refrigerating and Air conditioning Components and Parts - Commercial	74	2003.074	
8.02-3	Other Refrigerating and Air conditioning Components and Parts - Commercial	72	2003.072	

8.02-3	Other Refrigerating and Air conditioning Components and Parts - Commercial	210	2006.086	
8.02-4	Other Refrigerating and Air conditioning Components and Parts - Commercial	211	2006.087	
8.02-5	Other Refrigerating and Air conditioning Components and Parts - Commercial	10	2003.010	
8.03-1	Other Refrigerating and Air conditioning Components and Parts - NEC	75	2003.075	
8.03-2	Other Refrigerating and Air conditioning Components and Parts - NEC	76	2003.076	
8.03-3	Other Refrigerating and Air conditioning Components and Parts - NEC	77	2003.077	
8.03-4	Other Refrigerating and Air conditioning Components and Parts - NEC	78	2003.078	
10.02-1	Solid Fuel (Coal and Wood) Burning Equipment - Water Heating	81	2003.081	
10.06-1	Solid Fuel (Coal and Wood) Burning Equipment - Fuel flow, Ignition and Combustion Controls	225	2006.101	
10.08-1	Solid Fuel (Coal and Wood) Burning Equipment - Other Components and Parts	279	2006.155	
11.01-1	Vaporizing Oil Burning Equipment and Systems - Burners	278	2006.154	
11.03-1	Vaporizing Oil Burning Equipment and Systems - Space Heating	82	2003.082	
12-05.2	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	260	2006.136	
12.01-1	Pressure Atomizing Oil Burner Equipment and Systems -	79	2003.079	

	Burners			
12.01-2	Pressure Atomizing Oil Burner Equipment and Systems - Burners	80	2003.080	
12.05-1	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	259	2006.135	
12.05-3	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	261	2006.137	
12.05-4	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	262	2006.138	
12.05-5	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	263	2006.139	
12.05-6	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	264	2006.140	
12.05-7	Pressure Atomizing Oil Burner Equipment and Systems - Firing Assemblies	265	2006.141	
12.06-1	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	268	2006.144	
12.06-2	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	269	2006.145	
12.06-3	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	270	2006.146	
12.06-4	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	271	2006.147	
12.06-5	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	272	2006.148	
12.06-6	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	273	2006.149	

12.06-7	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	274	2006.150	
12.06-8	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	275	2006.151	
12.06-9	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	266	2006.142	
12.06-10	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	267	2006.143	
12.06-11	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	276	2006.152	
12.06-12	Pressure Atomizing Oil Burner Equipment and Systems - Oil Pumps	277	2006.153	
12.07-1	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	255	2006.131	
12.07-2	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	256	2006.132	
12.07-3	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	257	2006.133	
12.07-4	Pressure Atomizing Oil Burner Equipment and Systems - Ignition Transformers	258	2006.134	
12.08-1	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	226	2006.102	
12.08-2	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	227	2006.103	
12.08-3	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	228	2006.104	
12.08-4	Pressure Atomizing Oil Burner Equipment and Systems -	229	2006.105	

	Fuel Flow and Combustion Controls			
12.08-5	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	230	2006.106	
12.08-6	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	231	2006.107	
12.08-7	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	232	2006.108	
12.08-8	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	233	2006.109	
12.08-9	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	234	2006.110	
12.08-10	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	235	2006.111	
12.08-11	Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls	236	2006.112	
12.09-1	Pressure Atomizing Oil Burner Equipment and Systems - High Temperature Limit Controls	237	2006.113	
12.09-2	Pressure Atomizing Oil Burner Equipment and Systems - High Temperature Limit Controls	238	2006.114	
12.09-3	Pressure Atomizing Oil Burner Equipment and Systems - High Temperature Limit Controls	239	2006.115	
12.10-1	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	213	2006.089	
12.10-2	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	214	2006.090	
12.10-3	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	215	2006.091	

12.10-4	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	216	2006.092	
12.10-5	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	217	2006.093	
12.10-6	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	218	2006.094	
12.10-7	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	219	2006.095	
12.10-8	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	220	2006.096	
12.11-1	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	222	2006.098	
12.11-2	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	223	2006.099	
12.11-3	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	242	2006.118	
12.11-4	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	251	2006.127	
12.11-4A&B	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	243	2006.119	
12.11-5	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	244	2006.120	
12.11-5	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	252	2006.128	
12.11-6	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	245	2006.121	
12.11-6	Pressure Atomizing Oil Burner Equipment and Systems -	253	2006.129	

	Other Components and Parts			
12.11-7	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	246	2006.122	
12.11-7	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	254	2006.130	
12.11-8	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	247	2006.123	
12.11-9	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	241	2006.117	
12.11-10	Pressure Atomizing Oil Burner Equipment and Systems - Other Components and Parts	240	2006.116	
12.12-1A&B	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	248	2006.124	
12.12-2	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	249	2006.125	
12.12-3	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	250	2006.126	
12.12-8	Pressure Atomizing Oil Burner Equipment and Systems – Installation, Test and Repair	344	2006.220	
14.02-1	Electric Heating Equipment – Water Heating	83	2003.083	
14.03-1	Electric Heating Equipment - Space Heating	84	2003.084	
14.03-1	Electric Heating Equipment - Space Heating	224	2006.100	
14.05-1	Electric Heating Equipment - Room Temperature Thermostats	221	2006.097	
15.02-1	Ventilation Equipment and Systems - Commercial	85	2003.085	
15.02-2	Ventilation Equipment and Systems - Commercial	86	2003.086	

16.01-1	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	293	2006.169	
16.01-2	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	294	2006.170	
16.01-4	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	295	2006.171	
16.01-5	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	296	2006.172	
16.01-6	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	297	2006.173	
16.01-7	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	298	2006.174	
16.01-8	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	299	2006.175	
16.01-9	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	300	2006.176	
16.01-10A	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	301	2006.177	
16.01-10B	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	302	2006.178	
16.01-11	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	303	2006.179	
16.01-12	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	304	2006.180	
16.01-13A	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	305	2006.181	
16.01-13B	Electric Motors - Single Phase, Repulsion Induction and	306	2006.182	

	Repulsion Motors			
16.01-13C	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	307	2006.183	
16.01-14	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	308	2006.184	
16.01-15	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	309	2006.185	
16.01-16	Electric Motors - Single Phase, Repulsion Induction and Repulsion Motors	310	2006.186	
16.02-1	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	280	2006.156	
16.02-2A	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	281	2006.157	
16.02-2B	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	282	2006.158	
16.02-3	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	283	2006.159	
16.02-4	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	284	2006.160	
16.02-5	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	285	2006.161	
16.02-6	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	286	2006.162	
16.02-7	Electric Motors - Single Phase, Capacitor Start and Capacitor Run Motors	287	2006.163	
16.03-2	Electric Motors - Single Phase, Split Phase	288	2006.164	
16.03-3	Electric Motors - Single Phase, Split Phase	289	2006.165	

16.03-4	Electric Motors - Single Phase, Split Phase	290	2006.166	
16.03-5	Electric Motors - Single Phase, Split Phase	291	2006.167	
16.03-6	Electric Motors - Single Phase, Split Phase	292	2006.168	
16.04-1	Electric Motors - Single Phase, Shaded Pole	311	2006.187	
16.04-2	Electric Motors - Single Phase, Shaded Pole	312	2006.188	
16.04-3	Electric Motors - Single Phase, Shaded Pole	313	2006.189	
16.04-4	Electric Motors - Single Phase, Shaded Pole	314	2006.190	
16.04-5A	Electric Motors - Single Phase, Shaded Pole	315	2006.191	
16.04-5B	Electric Motors - Single Phase, Shaded Pole	316	2006.192	
16.04-5C	Electric Motors - Single Phase, Shaded Pole	317	2006.193	
16.04-6	Electric Motors - Single Phase, Shaded Pole	318	2006.194	
16.04-7	Electric Motors - Single Phase, Shaded Pole	319	2006.195	
16.04-8	Electric Motors - Single Phase, Shaded Pole	320	2006.196	
16.04-9	Electric Motors - Single Phase, Shaded Pole	321	2006.197	
16.04-10	Electric Motors - Single Phase, Shaded Pole	322	2006.198	
16.06-1	Electric Motors - Components and Parts	326	2006.202	
16.06-2	Electric Motors - Components and Parts	327	2006.203	
16.06-3	Electric Motors - Components and Parts	328	2006.204	
16.06-4	Electric Motors - Components and Parts	329	2006.205	
16.06-5	Electric Motors - Components and Parts	330	2006.206	
16.06-6	Electric Motors - Components and Parts	331	2006.207	
16.06-7	Electric Motors - Components and Parts	332	2006.208	

16.06-8	Electric Motors - Components and Parts	340	2006.216	
16.06-9	Electric Motors - Components and Parts	341	2006.217	
16.06-10	Electric Motors - Components and Parts	342	2006.218	
16.06-11	Electric Motors - Components and Parts	343	2006.219	
16.07-1	Electric Motors – Installation, Test and Repair	333	2006.209	
16.07-2	Electric Motors – Installation, Test and Repair	334	2006.210	
16.07-3	Electric Motors – Installation, Test and Repair	335	2006.211	
16.07-4	Electric Motors – Installation, Test and Repair	336	2006.212	
16.07-5	Electric Motors – Installation, Test and Repair	337	2006.213	
16.07-6	Electric Motors – Installation, Test and Repair	338	2006.214	
16.07-7	Electric Motors – Installation, Test and Repair	339	2006.215	
16.08-1	Electric Motors - NEC	323	2006.199	
16.08-2	Electric Motors - NEC	324	2006.200	
16.08-3	Electric Motors - NEC	325	2006.201	
VOID		212	2006.088	

HHCC Collections Management Information System

Cross Reference Tables

Artifact ID Number, Classification Code and Accession Number

Table Number 3: Reported by Accession Number

Artifact Accession Number	Artifact ID	Artifact Classification Name	Artifact Classification Code	Notes
2003.001	1	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-2	
2003.002	2	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-3	
2003.003	3	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-4	
2003.004	4	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-6	
2003.005	5	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-7	
2003.006	6	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-8	
2003.007	7	Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators	1.01-9	
2003.008	8	Unitary Refrig and A/C Equipment and Systems - Commercial Refrigerating Equipment	1.03-1	
2003.009	9	Unitary Refrig and A/C Equipment and Systems - Commercial Refrigerating Equipment	1.03-2	
2003.010	10	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-5	
2003.011	11	Refrigerating and Air Conditioning Evaporators - Household	2.01-2	

2003.012	12	Refrigerating and Air Conditioning Evaporators - Household	2.01-3	
2003.013	13	Refrigerating and Air Conditioning Evaporators - Household	2.01-4	
2003.014	14	Refrigerating and Air Conditioning Evaporators - Household	2.01-5	
2003.015	15	Refrigerating and Air Conditioning Evaporators - Household	2.01-7	
2003.016	16	Refrigerating and Air Conditioning Evaporators - Household	2.01-8	
2003.017	17	Refrigerating and Air Conditioning Evaporators - Household	2.01-9	
2003.018	18	Refrigerating and Air Conditioning Evaporators - Household	2.01-10	
2003.019	19	Refrigerating and Air Conditioning Evaporators - Household	2.01-12	
2003.020	20	Refrigerating and Air Conditioning Evaporators - Household	2.01-13	
2003.021	21	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-1	
2003.022	22	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-2	
2003.023	23	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-3	
2003.024	24	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-4	
2003.025	25	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-5	
2003.026	26	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-6	
2003.027	27	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-7A	
2003.028	28	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-7B	

2003.029	29	Refrigerating and Air Conditioning Evaporators - Commercial	2.02-8	
2003.030	30	Refrigerating and Air Conditioning Condensing Units – Household	4.01-2	
2003.031	31	Refrigerating and Air Conditioning Condensing Units – Household	4.01-3	
2003.032	32	Refrigerating and Air Conditioning Condensing Units – Household	4.01-4	
2003.033	33	Refrigerating and Air Conditioning Condensing Units – Household	4.01-5	
2003.034	34	Refrigerating and Air Conditioning Condensing Units – Household	4.01-6A	
2003.035	35	Refrigerating and Air Conditioning Condensing Units – Household	4.01-6B	
2003.036	36	Refrigerating and Air Conditioning Condensing Units – Household	4.01-8	
2003.037	37	Refrigerating and Air Conditioning Condensing Units – Household	4.01-7A	
2003.038	38	Refrigerating and Air Conditioning Condensing Units – Household	4.01-7B	
2003.039	39	Refrigerating and Air Conditioning Condensing Units – Household	4.01-10	
2003.040	40	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-1	
2003.041	41	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-2	
2003.042	42	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-3	
2003.043	43	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-4	
2003.044	44	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-5	
2003.045	45	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-7	

2003.046	46	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-6	
2003.047	47	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-8	
2003.048	48	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-10	
2003.049	49	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-11	
2003.050	50	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-12	
2003.051	51	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-13	
2003.052	52	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-14	
2003.053	53	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-15	
2003.054	54	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-16	
2003.055	55	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-17	
2003.056	56	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-18	
2003.057	57	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-19	
2003.058	58	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-20	
2003.059	59	Refrigerating and Air Conditioning Condensing Units - Commercial	4.02-21	
2003.060	60	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-1	
2003.061	61	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-2	
2003.062	62	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-3	

2003.063	63	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-4	
2003.064	64	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-5	
2003.065	65	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-6	
2003.066	66	Refrigerating and Air Conditioning Condensers and Receivers - Household	6.01-1	
2003.067	67	Refrigerating and Air Conditioning Condensers and Receivers - Household	6.01-2	
2003.068	68	Refrigerating and Air Conditioning Condensers and Receivers - Household	6.01-3	
2003.069	69	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-7	
2003.070	70	Refrigerating and Air Conditioning Condensers and Receivers - Commercial	6.02-8	
2003.071	71	Other Refrigerating and Air conditioning Components and Parts - Household	8.01-1	
2003.072	72	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-3	
2003.073	73	Other Refrigerating and Air conditioning Components and Parts - Household	8.01-2	
2003.074	74	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-2	
2003.075	75	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-1	
2003.076	76	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-2	
2003.077	77	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-3	
2003.078	78	Other Refrigerating and Air conditioning Components and Parts - NEC	8.03-4	
2003.079	79	Pressure Atomizing Oil Burner Equipment and Systems - Burners	12.01-1	

2003.080	80	Pressure Atomizing Oil Burner Equipment and Systems - Burners	12.01-2	
2003.081	81	Solid Fuel (Coal and Wood) Burning Equipment - Water Heating	10.02-1	
2003.082	82	Vaporizing Oil Burning Equipment and Systems - Space Heating	11.03-1	
2003.083	83	Electric Heating Equipment – Water Heating	14.02-1	
2003.084	84	Electric Heating Equipment - Space Heating	14.03-1	
2003.085	85	Ventilation Equipment and Systems - Commercial	15.02-1	
2003.086	86	Ventilation Equipment and Systems - Commercial	15.02-2	
2003.087	87	Refrigerating and Air Conditioning Compressors - Household	5.01-1A	
2003.088	88	Refrigerating and Air Conditioning Compressors - Household	5.01-1B	
2003.089	89	Refrigerating and Air Conditioning Compressors - Household	5.01-3	
2003.090	90	Refrigerating and Air Conditioning Compressors - Household	5.01-4	
2003.091	91	Refrigerating and Air Conditioning Compressors - Household	5.01-5A	
2003.092	92	Refrigerating and Air Conditioning Compressors - Household	5.01-5B	
2003.093	93	Refrigerating and Air Conditioning Compressors - Household	5.01-6	
2003.094	94	Refrigerating and Air Conditioning Compressors - Household	5.01-7	
2003.095	95	Refrigerating and Air Conditioning Compressors - Household	5.01-8	
2003.096	96	Refrigerating and Air Conditioning Compressors - Household	5.01-9	
2003.097	97	Refrigerating and Air Conditioning Compressors - Household	5.01-10	
2003.098	98	Refrigerating and Air Conditioning Compressors - Household	5.01-11	

2003.099	99	Refrigerating and Air Conditioning Compressors - Household	5.01-13	
2003.100	100	Refrigerating and Air Conditioning Compressors - Household	5.01-17	
2003.101	101	Refrigerating and Air Conditioning Compressors - Household	5.01-18	
2003.102	102	Refrigerating and Air Conditioning Compressors - Household	5.01-19	
2003.103	103	Refrigerating and Air Conditioning Compressors - Household	5.01-20	
2003.104	104	Refrigerating and Air Conditioning Compressors - Commercial	5.02-1	
2003.105	105	Refrigerating and Air Conditioning Compressors - Commercial	5.02-2	
2003.106	106	Refrigerating and Air Conditioning Compressors - Commercial	5.02-3	
2003.107	107	Refrigerating and Air Conditioning Compressors - Commercial	5.02-4	
2003.108	108	Refrigerating and Air Conditioning Compressors - Commercial	5.02-5	
2003.109	109	Refrigerating and Air Conditioning Compressors - Commercial	5.02-6A	
2003.110	110	Refrigerating and Air Conditioning Compressors - Commercial	5.02-6B	
2003.111	111	Refrigerating and Air Conditioning Compressors - Commercial	5.02-6C	
2003.112	112	Refrigerating and Air Conditioning Compressors - Commercial	5.02-7	
2003.113	113	Refrigerating and Air Conditioning Compressors - Commercial	5.02-8	
2003.114	114	Refrigerating and Air Conditioning Compressors - Commercial	5.02-9A	
2003.115	115	Refrigerating and Air Conditioning Compressors - Commercial	5.02-9B	

2003.116	116	Refrigerating and Air Conditioning Compressors - Commercial	5.02-10	
2003.117	117	Refrigerating and Air Conditioning Compressors - Commercial	5.02-11	
2003.118	118	Refrigerating and Air Conditioning Compressors - Commercial	5.02-12	
2003.119	119	Refrigerating and Air Conditioning Compressors - Commercial	5.02-13	
2003.120	120	Refrigerating and Air Conditioning Compressors - Commercial	5.02-14A	
2003.121	121	Refrigerating and Air Conditioning Compressors - Commercial	5.02-14B	
2003.122	122	Refrigerating and Air Conditioning Compressors - Commercial	5.02-15	
2003.123	123	Refrigerating and Air Conditioning Compressors - Commercial	5.02-16	
2003.124	124	Refrigerating and Air Conditioning Compressors - Commercial	5.02-17	
2006.001	125	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1A	
2006.002	126	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1B	
2006.003	127	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1C	
2006.004	128	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-1D	
2006.005	129	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2A	
2006.006	130	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2B	
2006.007	131	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3A	
2006.008	132	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3B	

2006.009	133	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3C	
2006.010	134	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3D	
2006.011	135	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3E	
2006.012	136	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3F	
2006.013	137	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-3G	
2006.014	138	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2C	
2006.015	139	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2D	
2006.016	140	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2E	
2006.017	141	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-2F	
2006.018	142	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-4A	
2006.019	143	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-4B	
2006.020	144	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-5	
2006.021	145	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-6	
2006.022	146	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-7	
2006.023	147	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-8A	
2006.024	148	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-8B	
2006.025	149	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-9	

2006.026	150	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-10	
2006.027	151	Refrigerating and Air Conditioning Pressure and Temperature Controls - Household	7.01-11	
2006.028	152	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1A	
2006.029	153	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1B	
2006.030	154	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1C	
2006.031	155	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-1D	
2006.032	156	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-2	
2006.033	157	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-3A	
2006.034	158	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-3B	
2006.035	159	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-4	
2006.036	160	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-5	
2006.037	161	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-6	
2006.038	162	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-7	
2006.039	163	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-8	
2006.040	164	Refrigerating and Air Conditioning Pressure and Temperature Controls - Commercial	7.02-9	
2006.041	165	Refrigerant Flow Controls - Household	3.01-1A	
2006.042	166	Refrigerant Flow Controls - Household	3.01-1B	
2006.043	167	Refrigerant Flow Controls - Household	3.01-1C	
2006.044	168	Refrigerant Flow Controls - Household	3.01-2	

2006.045	169	Refrigerant Flow Controls - Household	3.01-3A	
2006.046	170	Refrigerant Flow Controls - Household	3.01-3B	
2006.047	171	Refrigerant Flow Controls - Household	3.01-4	
2006.048	172	Refrigerant Flow Controls - Household	3.01-5A	
2006.049	173	Refrigerant Flow Controls - Household	3.01-5B	
2006.050	174	Refrigerant Flow Controls - Household	3.01-6	
2006.051	175	Refrigerant Flow Controls - Household	3.01-7	
2006.052	176	Refrigerant Flow Controls - Household	3.01-8	
2006.053	177	Refrigerant Flow Controls - Household	3.01-9A	
2006.054	178	Refrigerant Flow Controls - Household	3.01-9B	
2006.055	179	Refrigerant Flow Controls - Household	3.01-10A	
2006.056	180	Refrigerant Flow Controls - Household	3.01-19B	
2006.057	181	Refrigerant Flow Controls - Household	3.01-11	
2006.058	182	Refrigerant Flow Controls - Household	3.01-12	
2006.059	183	Refrigerant Flow Controls - Commercial	3.02-1	
2006.060	184	Refrigerant Flow Controls - Commercial	3.02-2A	
2006.061	185	Refrigerant Flow Controls - Commercial	3.02-2B	
2006.062	186	Refrigerant Flow Controls - Commercial	3.02-3	
2006.063	187	Refrigerant Flow Controls - Commercial	3.02-4A	
2006.064	188	Refrigerant Flow Controls - Commercial	3.02-4B	
2006.065	189	Refrigerant Flow Controls - Commercial	3.02-5	
2006.066	190	Refrigerant Flow Controls - Commercial	3.02-6A	
2006.067	191	Refrigerant Flow Controls - Commercial	3.02-6B	
2006.068	192	Refrigerating and Air Conditioning Condensing Units – Household	3.03-1	
2006.069	193	Refrigerating and Air Conditioning Condensing Units – Household	3.03-2	
2006.070	194	Refrigerating and Air Conditioning Condensing Units – Household	3.03-3	
2006.071	195	Refrigerating and Air Conditioning Condensing Units – Household	3.03-4	
2006.072	196	Refrigerating and Air Conditioning Condensing Units – Household	3.03-5	

2006.073	197	Refrigerating and Air Conditioning Condensing Units – Household	3.03-6	
2006.074	198	Refrigerating and Air Conditioning Condensing Units – Household	3.03-7	
2006.075	199	Refrigerating and Air Conditioning Condensing Units – Household	3.03-8	
2006.076	200	Refrigerating and Air Conditioning Condensing Units – Household	3.03-9	
2006.077	201	Refrigerant Flow Controls - Commercial	3.02-7	
2006.078	202	Refrigerant Flow Controls - Commercial	3.02-8	
2006.079	203	Refrigerant Flow Controls - Commercial	3.02-9	
2006.080	204	Refrigerant Flow Controls - Commercial	3.02-10	
2006.081	205	Refrigerant Flow Controls - Commercial	3.02-11	
2006.082	206	Refrigerant Flow Controls - Commercial	3.02-12	
2006.083	207	Refrigerant Flow Controls - Commercial	3.02-13	
2006.084	208	Refrigerant Flow Controls - Commercial	3.02-14	
2006.085	209	Refrigerant Flow Controls - Commercial	3.02-15	
2006.086	210	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-3	
2006.087	211	Other Refrigerating and Air conditioning Components and Parts - Commercial	8.02-4	
2006.088	212		VOID	
2006.089	213	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-1	
2006.090	214	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-2	
2006.091	215	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-3	
2006.092	216	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-4	
2006.093	217	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-5	
2006.094	218	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-6	

2006.095	219	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-7	
2006.096	220	Pressure Atomizing Oil Burner Equipment and Systems - Room Temperature Thermostats	12.10-8	
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Proj. 114-18

Memorandum of Understanding on Continued Rights of Use:

To: Craig McDonald, Board Chair HVACR Heritage Centre Canada [HHCC]
Subject: Conditional Rights of Use of Oliver Asociates Research and Research Data Base
Date: September 28, 2020
CC: Hart Holmstrom, HHCC Founding Director

Craig, this memorandum of understanding is to confirm HHCC continued rights of use of the research and related research database built in support of the "T. H. Oliver Collection of Historic Artifacts of Canadian Refrigeration, Heating and Air Conditioning Technology". Several years in development, much of this work was undertaken well before HHCC's founding.

The Research - As you are aware this research, as recently detailed in HHCC's Essential Document No. 3 [Doc.OA2007C] [1], has been the backbone of HHCC's work throughout its 20 year start-up period. The research base, on which HHCC's founding collection rests, is what distinquishes it as Canadian material culture and cultural property – beyond Industry memorabillia of interest to industry aficionados and enthusiasts. The reseach gives meaning and significance to the artifacts of history viewed much more as objects of meaning, memory and conciousness – documenting: What it is; How it works: What it does, and with What results and consequences for Canadian society and culture.

A Little History - In a memorandum to board chair Norman Fraser, November 6, 2001 I stated my intention to gift the collection to HHCC, putting it in their custodial care as cultural property. The memorandum detailed the:

- Nature and scope of the collection, as Committee members viewed it May 16th,
- Storage area requirements,
- Conservation process and criteria employed,
- Provisions made through database development for documentation and interpretation of artifacts, and
- Conditions for the gifting of the collection.

The collection was subsequently transferred to HHCC's warehouse facilities at 25 Iron Street, over a 3 year period under the direction of acting executive director David Barr. However, the

[1] For reference purposes, a copy of this memorandum is included in Essential Document No. 3 as Attachment No. 4.

accompanying research and database, always works in progress, have remained my property and will continue to be so. This facilitates my further research as requirements and conditions allow.

HHCC's Ongoing Conditional Rights of Use - That having been said, this memorandum of understanding acknowledges HHCC's right to the ongoing use of the research, much as in the past, under the condition that it will be used in helping HHCC to meet its obligations under letters patent, as outlined in its Founding Document.[2]

G, Leslie Oliver,
Oliver Associates,
Sept 28, 2020

[2] A copy of HHCC's founding document, by Carter and Associates, was recently reissue and forwarded Feb.12, 2020, to the HHCC board by founding members Hart Holmstrom and myself. [See HHCC Data Centre doc. OA2004J].

HVACR Heritage Centre Canada

Collections and Curatorial Services

Data Elements
Historic Artifacts of HVACR Technology
Research Report, Collections Management Information System

1. **Artifact Identification No. ……Classification Code No……. Accession No……**
2. **Research Report Prepared By:……Date:…….Revised By:…….Date:……**
3. **Group:**
4. **Description:**
5. **Film Image No.:**
6. **Digital Image No.:**
7. **Make:**
8. **Manufacturer:**
9. **Model:**
10. **Serial No.:**
11. **Size:**
12. **Weight:**
13. **Circa:**
14. **Rating:**
15. **Patent Date/Number:**
16. **Provenance:**
17. **Type and Design:**
18. **Construction**

19. Materials:

20. Special Features:

21. Accessories

22. Capacities:

23. Performance Characteristics:

24. Operation:

25. Control and Regulation:

26. Targeted Market Segment:

27. Consumer Acceptance:

28. Merchandising:

29. Market Price:

30. Technological Significance:

31. Industrial Significance:

32. Socio-economic Significance:

33. Socio-cultural Significance:

34. Donor:

35. HHCC Storage Location:

36. Tracking:

37. Bibliographic References:

38. Notes:

39. Related Reports

40. Catalogue Sheet Image Number

Table No 2
Research Program
Representative Sampling of HHCC Catalogue Sheets and Research Reports
By Classification Code
HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Item 1: Classification Code: 1.00 - Unitary Refrigerating and Air Conditioning Equipment

- **Subclass 1.01 -** Household Cabinet Refrigerators
- **Identification Code 1.01-2 -** Kelvinator Household Cabinet Refrigerator Circa 1926

Item 2: Classification Code 2.0 - Refrigerating and Air Conditioning Evaporators

- **Subclass 2.01** - Household Refrigerating and Air Conditioning Evaporators
- **Identification Code 2.01-5** – Two Tray Norge, flooded evaporator with low-side float, Circa 1936

Item 3: Classification Code 3.0 – Refrigerant Flow Controls

- **Subclass 3.02** – Commercial Refrigerant Flow Controls
- **Identification Code 3.02-2A** – Early adjustable Frigidaire, thermostatic expansion valve, Circa 1932

Item 4: Classification Code 4.0 - Refrigeration and Air conditioning Condensing Units

- **Subclass 4.02** – Refrigeration and Air conditioning Condensing Units – Commercial
- **Identification Code 4.02-10** – Frigidaire condensing unit, with static oval-tube condenser, Circa 1929

Item 5: Classification Code 7.0 – Refrigeration and Air Conditioning, Pressure and Temperature Controls

- **Subclass 7.01** - Refrigerating and Air Conditioning Pressure and Temperature Controls - Household
- **Identification Code 7.01-2A –** Kelvinator Model E, **e**arly hydraulic bellows actuated temperature control [thermostat] for cabinet household refrigerator, Circa 1925

Item 6: Classification Code 11.0 – Vaporizing Oil Burning Equipment and Systems

- **Subclass 11.01** – Burners
- **Identification Code 11.06-1** – Colman Lamp and Stove Co., non-motorized, vaporizing oil burner, employing gravity feed, and float valve regulator, Circa 1922

Item 7: Classification Code 12.0 – Heating, Atomizing Oil Burners- Household, commercial/ Industrial

- **Subclass 12.01 - Pressure** Atomizing Oil Burner Equipment and Systems
- **Identification Code 12.01-1** – Early 20th century high pressure oil burner assembly with direct drive 2 stage gear pump and oil reservoir, Leiman Bros, Circa 1926 [Motor not original]

Item 8: Classification Code 12.0 - Heating, Atomizing Oil Burners- Household, Commercial/ Industrial

- **Subclass 12.08** – Pressure Atomizing Oil Burner Equipment and Systems, Fluid Flow and Combustion Controls
- **Identification Code 12.08-7 –** Early one-piece, stack mounted, trend setting, combustion controller; a marvel of interconnected mechanical, electrical and electro-magnetic components; the “Pyrotherm”, Mercoid, Circa 1930

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports By Classification Code

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Item 1: Classification Code: 1.00 - Unitary Refrigerating and Air Conditioning Equipment

- **Subclass 1.01 - Household Cabinet Refrigerators**
- **Identification Code 1.01-2 - Kelvinator Household Cabinet Refrigerator, Circa 1926**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.001 **HHCC Classification Code: 1.01-2**
Group: 1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators
Description: Five Cubic Foot household, Cabinet Refrigerator with Condensing Unit for Remote Mounting, Kelvinator Circa 1926.
Digital Image: CD8-6A, Cabinet Refrigerator

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.001 **HHCC Classification Code: 1.01-2**
Group: 1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators
Description: Five Cubic Foot household, Cabinet Refrigerator with Condensing Unit for Remote Mounting, Kelvinator Circa 1926.
Digital Image: CD8-7A, Cabinet Refrigerator, Interior

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.001 HHCC Classification Code: 1.01-2
Group: 1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators
Description: Five Cubic Foot household, Cabinet Refrigerator with Condensing Unit for Remote Mounting, Kelvinator Circa 1926.
Digital Image: CD8-8A, Cabinet Refrigerator, and Condensing Unit

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.001 **HHCC Classification Code: 1.01-2**
Group: 1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators
Description: Five Cubic Foot household, Cabinet Refrigerator with Condensing Unit for Remote Mounting, Kelvinator Circa 1926.
Digital Image: CD1.01.2B, Condensing Unit

Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2003.001 **HHCC Classification Code: 1.01-2**

Last Modified:
July 11, 2003

Group:
1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators

Description:
Five Cubic Foot household, Cabinet Refrigerator With Condensing Unit For Remote Mounting, Kelvinator, Circa 1926

Film Image:
C13- 6,7,8,9,10

Digital Image:
CD8- 6,7,8,9, 1.01-2A

Make:
Kelvinator

Manufacturer:
Kelvinator of Canada, London Ontario

Model:
See Note #1

Serial No.:
See Note #2

Size:
26x22x54

Weight:
See Note #3

Circa:
1927

Rating:
Very rare, education, demonstration and research quality

Patent Date/Number:
First Pat. No, 1926, US, Canada and principal foreign countries, including China, with Chinese characters on name plate

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.
This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

Type and Design:
Operating system: compression refrigeration type, theoretical Carnot cycle.
Design: unitary design and construction with: insulated refrigerated cabinet, evaporator and expansion valve, and self-contained refrigerant condensing unit, electric motor driven.

Air-Cooled Condensing Unit, Type: Self-contained condensing unit with belt driven compressor, single-phase electric motor, and air cooled condenser Design: early open design

Construction:
Condensing Unit: Kelvinator condensing unit, “bread board style”, assembled on early, wooden, plywood base in natural oiled finish, with belt driven compressor and motor (original 25 cycle motor replaced in 1948 with 60 cycle), finned forced air cooled condenser and steel tank receiver for 2.1 lb. SO2 refrigerant charge. (See Ref. 1.1, P. 82D). Condensing unit is mounted on 6 in. steel legs with natural rubber foot pads for remote (basement) installation, with 1/4 in. liquid and suction line, copper tubing with SAE flare connections. For detailed specifications see Ref. 1.1 P. 82D

Cabinet: Construction heavy galvanized brake-formed sheet stock," gauge, wooden cabinet frame and 2 in. cork insulation. See ref 1.1, P. 79D for detailed construction

Cabinet finished in white " Pyroxylin " ,Original paint finish now chipping badly,

Hardware replaced with 1930's style hinges and "ice box" style latch Evaporator: in tinned copper plate with copper tubing refrigerant coils, with inner and outer casings with 1" cork insulation, not original with this cabinet

Material:

Special Features:

This condensing unit, noisy and dirty, often with the smell of sulphur dioxide was designed for "remote" mounting in the basement of the home, to be reconnected to the refrigerator cabinet with copper tubing

Accessories:

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:
Unitary Refrigeration Equipment: The idea of a unitary piece of refrigeration or air conditioning equipment was a significant one in its own right, one that had to wait its time. The scientists, engineers and inventors in the early years of the 20th century were intrigued and obsessed with the power of the technology and of its possible market potential. What they saw was the newly discovered principles of physics and heat engines - following, for example, the early works of Carnot, Faraday, Kelvin, and the later work of Perkins, Larsen and Carrier, to name a few.

They understood the promise of the technology for the public good, not to say its consumer sales potential. Early engineering work advanced on a multiple fronts with development of compressors, heat exchangers, valves and piping variously strung together in configurations that would be found to work, but only after much experimentation.

The arrival of unitary equipment, all those parts organised into a single whole, a single unit of construction, a “black box”, that could be offered to the consumer market was a significant technological and cultural event. Technologically the refrigerator would need to be seen to be safe, reliable, maintainable and useful. As well, in order to attract the development capital needed, it must be seen as potentially saleable and affordable, contributing to life’s needs and desires. Its socio- cultural and economic significance was marked, for it would change much. As Canadians we would quickly come enjoy potentially healthier lives, expect new levels of comfort and convenience, with a broader, safer, more diverse and enjoyable diet.

Canadians would quickly come to think of their day differently, for the day would be defined and punctuated in different ways than ever before, as a result of the introduction of modern, electric, household appliances, of which refrigerators, freezers and room air conditioners would be a central part, by the mid 20th century

J. M Larsen produced a manually operated household refrigerator of sorts in 1913, but it was not until 1918 that the Kelvinator Company marketed the first automatic, unitary refrigerator for the home. In that year, it is reported to have sold sixty-seven machines. (See Note 1) The historic artifacts in Group 1.00, Unitary Equipment, including significant samplings the early work of Kelvinator of Canada, provide a rare view of the evolution of unitary refrigeration and air conditioning applications, as they evolved in Canada in the first half of the 20th century.

For those formative years, the artifacts in this Group, 1.00, are typical of the offerings of the Canadian refrigeration and air conditioning industry. They personified the applications found in the homes, farms and commercial premises of the period for, those that could afford life's new amenities of comfort, convenience and privilege.

This Specimen: This refrigerator stands as a statement of the earliest, embryonic years of refrigerating technology in Canada. Showing the natural effects of ageing and constant use and repair over its 50 year, active, life span. The condensing unit is in original pristine condition with the exception of the 25 cycle motor replaced at the time of frequency conversion in Ontario in 1948, up to which point the machine had been in constant use. The evaporator is likely not original with this machine, but typical of the brine-tank evaporators used in that period. It was a period in which refrigerators were subject to high maintenance, repair over a long life span.

Industrial Significance:
This specimen tells the stories of the early years of the development of the industry in North America, where the commitment of the Industry was to the inherently noisy, mechanically troubled compression refrigeration cycle, with slow speed, often crudely machined "chunking" compressors, open motor drives and fan cooled "whirring" condensers.

The marketing of absorption systems, as an alternative, developed by Electrolux in Europe, and licensed to Servel in Evanseville Ind,. would still be several years away.

The early patent and world-wide registration marks Kelvinator as a pioneer in the field, as well as an aggressive global North American marketer. It had high expectations for industry leadership and domination.

Socio-economic Significance:
Possibly one of the earliest household, all electric, self-contained, cabinet refrigerators, coming out of a Canadian manufacturing plant, this machine would be part of the genre

that would change for ever the way Canadians would think about their kitchens and the food they eat.

Patent Data: First Pat No. 1920, US, Canada, and principal foreign Countries Extensive list of patents cited, including Chinese characters on name plate, indicative of the international marketing of this product by Kelvinator.

Socio-cultural Significance:
The home of the 1920's was not at all used to the sound of electric motors, let alone those that went on and off automatically all day and all night too. Kelvinator's solution in a bid for customer acceptance was this machine with a condensing unit which could be tucked away in the basement out of sight and hopefully out of sound range.

The"Ice Box Styling"of the cabinet reflects the limited manufacturing methods of the day, but also the natural carryover from the age of the ice box. The electric refrigerator, then, was first imagined as an ice box and configured accordingly.

The predisposition of the industry to ice box styling, with square corners and hardware would persist for many manufacturers well through the 1930's (see items 2 and 3). Kelvinator, however, were producing "modern" styled machines by 1934, in a bid for moving the North American mind set beyond the ice box and so to attract first time buyers.

The significance of the refigeration cabinet lies not in its presence as a restored showpiece of the early years of the industry. But rather, with its original finish, showing the effects of the many years of natural wear and tear, its significance is in its demonstrated antiquity and the many stories it tells of the years gone by.

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

Bibliographic References:
Bibliograhic Note #1 Ref. Modern Refrigeration and Air Conditioning, Althouse and Turnquist, Goodheart-Wilcox Co. Chicago, 1960

Notes:
Note #1: Kelvinator Condensing Unit Part No. 12800, Serial 2532C
Note #2: Kelvinator Cabinet and part no. unmarked. Likely part of their "5 1/2 and 9 cu. ft." series built in the early to mid 1920's (See Ref. 1.3, P.54), similar to model 227 (See Ref. 1.1, P. 79D)
Note #3: Wt condensing Unit 80 lbs, Cabinet ? lbs,

Related Reports:
See Thumb-Nail Profile, THOC doc. OC9908B

Inventory Report No. THOC-HVACR-001
THOC Artifact Ref. Code: 1.01-2
Last Modified: July 11, 2003
Group: 1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators
Description: Five Cubic Foot household, Cabinet Refrigerator With Condensing Unit For Remote Mounting, Kelvinator, Circa 1926
Film Image: C13- 6,7,8,9,10
Digital Image: CD8- 6,7,8,9, 1.01-2A

Inventory Report No. THOC-HVACR-001
THOC Artifact Ref. Code: 1.01-2
Group: 1.01 Unitary Refrig and A/C Equipment and Systems - Household Cabinet Refrigerators
Description: Five Cubic Foot household, Cabinet Refrigerator, Circa 1926.

CONDENSING UNIT ONLY

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports By Classification Code

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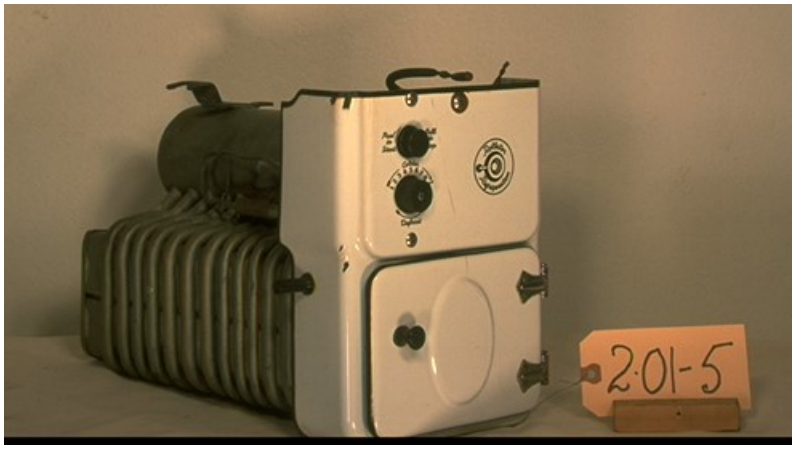
Item 2: Classification Code 2.0 - Refrigerating and Air Conditioning Evaporators

- **Subclass 2.01 - Household Refrigerating and Air Conditioning Evaporators**
- **Identification Code 2.01-5 – Two Tray Norge, flooded evaporator with low-side float, Circa 1936**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.014 **HHCC Classification Code: 2.01-5**
Group:
2.01 Refrigerating and Air Conditioning Evaporators - Household
Description:
Two tray, flooded evaporator with low-side float, modern, formed front plate and hinged door in white porcelain, decorated with black trim and built in temperature control mount; cooling unit for Norge household cabinet refrigerator, Norge, 1936.
Film Image: C16-5
Digital Image: CD8-114



Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.014 **HHCC Classification Code: 2.01-5**

Last Modified:
July 23, 2003

Group:
2.01 Refrigerating and Air Conditioning Evaporators - Household

Description:
Two tray, flooded evaporator with low-side float, modern, formed front plate and hinged door in white porcelain, decorated with black trim and built in temperature control mount; cooling unit for Norge household cabinet refrigerator, Norge, 1936.

Film Image:
C16-5

Digital Image:
CD8-114

Make:
Norge

Manufacturer:
Borg Warner Corp. Michigan

Model:
unknown

Serial No.:
unknown

Size:
7x 14x 10"

Weight:
5 lbs

Circa:
1936

Rating:

Exhibition Quality, a rare example of the work of a market leader in the styling and modernisation of the household refrigerator

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

Type and Design:
Two tray, flooded evaporator in tinned, heavy copper plate, with float chamber, float assembly, and needle valve calibrated for S02 refrigerant; 12 pass 3/8 copper coil distributing tubes, with formed front plate and door in porcelain and front mounted temperature control

Construction:
The smoothly crafted configuration is indicative of a new generation of engineering and manufacturing.

Material:

Special Features:
Styled with modern curved line and form, this cooling unit reflects the Art Deco influences of the mid 1930's. Of special note is the built in temperature control and on-off switch, conveniently place for the homemaker. The control is equipped with a manual, reset overload switch by Ranco, a leading innovation in control technology for the times

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:
With a fresh new look and with a decade of engineering, manufacturing and marketing experience to build on, the marketing appeal was to a second generation of buyers, They were those with new expectations and life style interests to be appeased and with the money to appease them. Many, too, would be first time buyers, reflecting increasing affluence of middle class Canada, now moving into increasingly urban locations and life styles.

Market Price:

Technological Significance:
The technological significance of the evaporator in a mechanical refrigeration system lies in its ability to evaporate liquid refrigerant (allowing it to absorb latent heat and thus perform useful cooling). In the public mind, however, the useful work was more simply that of cooling.

This lead astute manufactures to popularise the use of the term "cooling unit" in place of evaporator. It was the term adopted by the industry in the early years, as it attempted to connect with the human experience of the times to better promote its wares, gaining market share in the embryonic years of Canada's emerging consumer society. (See examples in early sale literature from the Kelvinator Co. of Canada)

Human experience and the social culture of the 1920's also associated useful cooling with the melting of ice. Historically manufactures successfully played to this sense of public understanding by further marketing cooling units as icemakers. By this means they appealed to wide spread cultural understandings of how things got cooled, through the controlled melting of ice (the popular Canadian icebox of the 1920's and 30's). In a peculiar twist, it was often the job of the refrigeration sales or service man to explain to the homemaker that it was not really the ice in the ice cube trays that cooled the refrigerator, but the motor and compressor underneath.

In the 1920's manufactures of mechanical refrigerators for the home appealed to the consumer public by promoting ice and ice cream as the new consumables, the new food sensations available for all those sufficiently affluent to enjoy the experience. Promotional literature focused on the pleasant sensation of ice cold beverages and on ice cream making at home – using the latest cooling unit. A recipe and food life style book came with the refrigerator for the edification and instruction of the homemaker (See examples in early sale literature from the Kelvinator Co. of Canada). Ice and ice cream making in the home was, in fact, one of the significant, new "Gee whiz", household technologies of the times.

This specimen is a remarkable icon of its time, marking a dramatic change in engineering, manufacturing and styling, as the industry geared up to move beyond its embryonic development years. Of particular note, technically, is the inclusion of an automatic overload device, with manual reset. This was representative of the early years of safety control technology designed for equipment protection and personal safety.

Industrial Significance:
With the mid 1930's came increased competition in the refrigeration appliance field, as companies such as Borg Warner and General Motors/Frigidaire, with significant engineering and production experience and resources behind them made major investments in the now rapidly expanding field.

Socio-economic Significance:
The closed back, and tightly fitting door on this cooling unit are significant developments in them selves. They were new for the time, as manufactured attempted to respond to public interest in lower freezer temperatures for holding ice cream and other frozen foods products.

Socio-cultural Significance:

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

Bibliographic References:
See Norge Rollator Refrigeration Service, Open Type Systems

Notes:
Note #1 Norge show this model, manufactured by Borg Warner, replacing an earlier design by Fedders, as in use between 1933 and 1938, see manual

Related Reports:

Inventory Report No. THOC-HVACR-014
THOC Artifact Ref. Code: 2.01-5
Group: 2.01 Refrigerating and Air Conditioning Evaporators - Household
Description: Two tray, flooded evaporator with low-side float, modern, in white porcelain, black trim, temperature control mount; Norge, 1936.
Film Image: C16-5
Digital Image: CD8-114

Inventory Report No. THOC-HVACR-014
THOC Artifact Ref. Code: 2.01-5
Group: 2.01 Refrigerating and Air Conditioning Evaporators - Household
Description: Two tray, flooded evaporator with low-side float, modern, in white porcelain, black trim, temperature control mount; Norge, 1936.

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports
By Classification Code

Item 3: Classification Code 3.0 – Refrigerant Flow Controls

- **Subclass 3.02 – Commercial Refrigerant Flow Controls**
- **Identification Code 3.02-2A – Early adjustable Frigidaire, thermostatic expansion valve, Circa 1932**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2006.060 **HHCC Classification Code: 3.02-2A**
Group:
3.02 Refrigerant Flow Controls - Commercial

Description:
An early, adjustable thermostatic expansion valve, housed in a 4 lb. solid cast brass body with galvanised over coat; thermal power element and 4 ft. capillary tube; engineered for sulphur dioxide and a new generation of forced air cooling unit applications. It would appear much like the company's earlier Model S automatic expansion valve, on which it was patterned; Model TS10, Frigidaire, circa 1932. [On of a set of two, see #ID 185]

Film Image:
nil

Digital Image:
CD11- 3.02-2A

Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2006.060 **HHCC Classification Code: 3.02-2A**

Last Modified:
March 24, 2005

Group:
3.02 Refrigerant Flow Controls - Commercial

Description:
An early, adjustable thermostatic expansion valve, housed in a 4 lb. solid cast brass body with galvanised over coat; thermal power element and 4 ft. capillary tube; engineered for sulphur dioxide and a new generation of forced air cooling unit applications. It would appear much like the company's earlier Model S automatic expansion valve, on which it was patterned; Model TS10, Frigidaire, circa 1932. [On of a set of two, see #ID 185]

Film Image:
nil

Digital Image:
CD11- 3.02-2A

Make:
Frigidaire

Manufacturer:
Frigidaire Corporation, Dayton Ohio

Model:
TS 10

Serial No.:

Size:
4 x 4 x 8 in. h

Weight:
4 lbs.

Circa:
1932

Rating:

Exhibit, education, and research quality, illustrating the engineering design, construction, and operating principles, of one of the first thermostatic expansion valves produced by Frigidaire.

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

Type and Design:
- Inlet strainer
- Fully serviceable power element
- 4 ft capillary line

Construction:
- Cast brass body, with heavy galvanized over coat

Material:

Special Features:
- Original capillary bulb, tubing clamp

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:

- This valve would stand as a wonderful icon of the early years in TX valve development, as the industry searched for an alternative to the costly and often troublesome, liquid refrigerant, float valve technology of the mid 1920, and 30's.
- One of the earliest in production by Frigidaire, then the rapidly developing name brand supplier to the household and commercial refrigeration field.
- This artifact of history tells the many stories of early adoption of this particular refrigerant flow control technology. After a brief flurry of excitement over the use of costly and delicate float operated devices, as a more efficient means of flow control, industry engineers would return to the automatic expansion valve in the early 30's. But for many medium and larger applications the automatic expansion valve would give way to the more elegant and efficient thermostatic valve for use in a new generation of "dry evaporator" applications.

Industrial Significance:

- These valve would see service well into the 1950's attesting to their robust construction and field serviceability, with an operating life of 20 to 30 years and more.

Socio-economic Significance:

Socio-cultural Significance:

- The socio-cultural significance of the impact of the unobtrusive, thermostatic expansion valve on life in Canada, throughout the latter part of the 20th century, would be hard to over-estimate.
- It would become the quintessential, automated refrigerant flow regulating device for most medium and larger commercial refrigeration applications, found in confectioneries, food stores and ware houses. It would help to make possible the wide array of foods and confectionery products Canadians would come to enjoy, as part of the late 20th century Canadian life experience.

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

Bibliographic References:
Installation and Service Manual, SER,_405, For Products Manufactured Prior to 1937, Frigidaire Division, General Motors Corp. Dayton Ohio

Notes:

Related Reports

- CMX 02 and 04 catalogues, see Item R10

Inventory Report No. THOC-HVACR 184
THOC Artifact Ref. Code: 3.02-2A
Group: 3.02 Refrigerant Flow Controls
- Commercial
Description: An early thermostatic expansion valve, in 4 lb. solid cast brass body with galvanised over coat; thermal power element and 4 ft. capillary tube; engineered for sulphur dioxide and a new generation of forced air cooling unit applications, Model TS10, Frigidaire, circa 1932. [On of a set of two, see #ID 185]

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports By Classification Code

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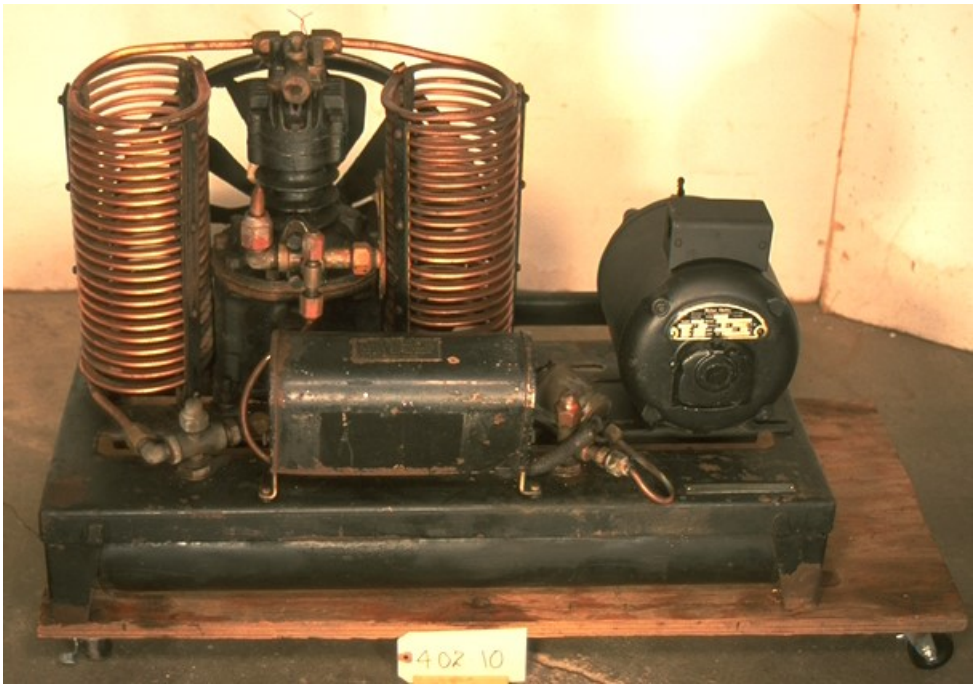
Item 4: Classification Code 4.0 - Refrigeration and Air conditioning Condensing Units

- **Subclass 4.02 – Refrigeration and Air conditioning Condensing Units – Commercial**
- **Identification Code 4.02-10 – Frigidaire condensing unit, with static oval-tube condenser, Circa 1929**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.048 **HHCC Classification Code: 4.02-10**
Group:
4.02 Refrigerating and Air Conditioning Condensing Units - Commercial
Description:
The oval, copper tube, static air condenser, along with the hefty, solid look of a no-nonsense refrigeration machine seemed to be a winning formula for Frigidaire in the late 1930's, one that would be reflected and perpetuated through several years of design and production. The higher capacity Model G, with an added, oval tube stack condenser, was similarly endowed to the Model S [See #046 and #047]. Also using sulphur dioxide refrigerant, the Model G would be seen in Canadian estate homes, institutions, food stores, diary bars and hospitality applications well into the 1950's, when the clear preference of the industry and its publics swung heavily to the use of non-noxious refrigerants, leaving this recognised time piece well behind, Frigidaire, 1929
Film Image: C13-29
Digital Image: CD 8-29



Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2003.048 **HHCC Classification Code: 4.02-10**
[See also Group 4.00, #046, #047 and #049, as well as Group 6.00, item 6.05 and 6.06]

Last Modified:
Nov. 11, 2003

Group:
4.02 Refrigerating and Air Conditioning Condensing Units - Commercial

Description:
The oval, copper tube, static air condenser, along with the hefty, solid look of a no-nonsense refrigeration machine seemed to be a winning formula for Frigidaire in the late 1930's, one that would be reflected and perpetuated through several years of design and production. The higher capacity Model G, with an added oval tube condenser stack, was similarly endowed to the Model S [See #046 and #047]. Also using sulphur dioxide refrigerant, the Model G would be seen in Canadian estate homes, institutions, food stores, diary bars and hospitality applications well into the 1950's, when the clear preference of the industry and its publics swung heavily to the use of non-noxious refrigerants, leaving this recognised time piece well behind, Frigidaire, 1929

Film Image:
C13-29

Digital Image:
CD 8-29

Make:
Frigidaire

Manufacturer:
Frigidaire Corporation Dayton Ohio

Model:
Model G

Serial No.:
568862G

Size:
29x 16x 19"h

Weight:
125 lbs

Circa:
1929

Rating:
Exhibit, education, and research quality demonstrating the unique period in the development of small, commercial application, refrigeration machines in which static air condensers were used in a wide range of applications, building new life expectations and possibilities for Canadian estates, institutions, food stores, dairies and for the hospitality industry in Canada.

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

Type and Design:

Construction:

Material:

Special Features:

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:
Frigidaire's commitment to the oval tube, stacked condensing medium in the period was substantial [See Frigidaire manual for the nature and scope of its application]. A simple engineering response, using the materials and know-how of the times, it seemed to perform passably well. The idea of adding additional stacks was a reasonable one, in order to add machine capacity. For a number of reasons the technology would prove to be limited to small capacity, fractional horsepower machines and Frigidaire would need to rethink the form and structure of their condensers, as the inevitable demand for larger and larger machines continued.

For Frigidaire an important point of inflection in their design and development curve was at hand. There would be a transition to the more efficient, higher performance, forced air, fin and tube condenser, already in popular use by other manufactures, The oval stacked condenser, a hall mark of Frigidaire's refrigeration machines was about to disappear, see item #049 and #045.

With the recognised need to move with the times came the commitment to upgrading and the retrofit of existing machines, as a hedge against their obsolescence – in may ways an uncharacteristic market response. Retrofit kits were engineered, packaged and marketed by Frigidaire for a wide range of earlier static air condenser equipped condensing units – see items Group 6.00, 6.02-5 and 6.02-6. These kits were an early example of technological up-grading and retrofitting by a manufacturer moving with the market opportunities of the times.

Industrial Significance:

Socio-economic Significance:

Socio-cultural Significance:

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

Bibliographic References:

Frigidaire Manual, SER405, products mfd prior to 1937

Notes:

Related Reports

Artifact Labels #8163 2x4”

Inventory Report No. THOC-HVACR 048
THOC Artifact Ref. Code: 4.02-10
Group: 4.02 Refrigerating and Air Conditioning Condensing Units - Commercial
Description: Frigidaire’s Model G, a higher capacity version of the S and similarly endowed, would be seen in Canadian estates, institutions, food stores, diary bars and hospitality applications well into the 1950’s, when the swing to non-noxious refrigerants and fin and tube condensers left it behind, Frigidaire, 1929

Display Cards:

TBC

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports By Classification Code

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Item 5: Classification Code 7.0 – Refrigeration and Air Conditioning, Pressure and Temperature Controls

- **Subclass 7.01 - Refrigerating and Air Conditioning Pressure and Temperature Controls - Household**
- **Identification Code 7.01-2A – Kelvinator Model E, early hydraulic bellows actuated temperature control [thermostat] for cabinet household refrigerator, Circa 1925**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2006.005 **HHCC Classification Code: 7.01-2A**
Group:
7.01 Refrigerating and Air Conditioning Pressure and Temperature Controls - Household
Description:
An early, hydraulic bellows actuated automatic temperature control [thermostat] with fixed factory setting, equipped with glycerine immersion cup for household cabinet refrigerator, senses evaporator suction line temperature, late Model E, Kelvinator of Canada, London, Ont. Circa 1925

One of a rare matched set of six Kelvinator Model E thermostats profiling the evolution of one of the earliest commercially marketed, self-regulating, temperature sensing, electric motor control devices. The model was offered by Kelvinator in various forms from 1923 through to about 1927. The set profiles: 1) the progressive design modifications made to improve performance, 2) something of the expected life expectancy of the technology in use, 3) the often precipitous modes of failure, anticipated by the refrigeration service man of the period, and 4) various stages of physical deterioration, as a result of natural use, misuse and abandonment. See numbers 7.01-2A, B, C, D, E, F.; ID # 129, 130, and 138 to 141
Film Image:
Nil
Digital Image:
CD 11- 7.01-2B, Ba, Bb, Bc

Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2006.005 **HHCC Classification Code: 7.01-2A**

Last Modified:
Jan 4, 2005

Group:
7.01 Refrigerating and Air Conditioning Pressure and Temperature Controls - Household

Description:
An early, hydraulic bellows actuated automatic temperature control [thermostat] with fixed factory setting, equipped with glycerine immersion cup for household cabinet refrigerator, senses evaporator suction line temperature, late Model E, Kelvinator of Canada, London, Ont. Circa 1925

One of a rare matched set of six Kelvinator Model E thermostats profiling the evolution of one of the earliest commercially marketed, self-regulating, temperature sensing, electric motor control devices. The model was offered by Kelvinator in various forms from 1923 through to about 1927. The set profiles: 1) the progressive design modifications made to improve performance, 2) something of the expected life expectancy of the technology in use, 3) the often precipitous modes of failure, anticipated by the refrigeration service man of the period, and 4) various stages of physical deterioration, as a result of natural use, misuse and abandonment. See numbers 7.01-2A, B, C, D, E, F.; ID # 129, 130, and 138 to 141

Film Image:
Nil

Digital Image:
CD 11- 7.01-2B, Ba, Bb, Bc

Make:
Kelvinator

Manufacturer:
Kelvinator, Detroit Michigan, Div of Electric Refrigeration Corp. / Kelvinator of Canada Ltd, London Ont.

Model:
Late Model E with immersion cup [See Note]

Serial No.:
Body stamping # [get SAP when retrieved from Display HRAI]
Up-date 070110, Serial is X1 010

Size:
4in. dia. x 7in. high

Weight:
3 Ibs

Circa:
1925

Rating:
Exhibit, education, research, and demonstration quality illustrating the craftsmanship and immense ingenuity of the period in making use of the materials and processes of the times, while conceiving ways to automatically start and stop a mechanical refrigeration system at a predetermined temperature. For it was a time in which little was known and understood about automatic sensors and the principles of electric control and regulation devices.

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

Type and Design:
Hydraulic bellows actuated, with intricate mechanical linkages and open electrical contacts

Construction:
The Kelvinator1928 service manual provides full details of the operation and maintenance of the early and later Model E thermostats. The later model used in 1925- 27 consisted of a large 2" hydraulic, brass bellows, immersed in a heavy copper cup filled with glycerine. The cup, in turn, slides smoothly inside a tight spiral coil of 1/2" copper tubing installed in the suction line as it leaves the evaporator.

The chilled glycerine solution actuates the bellows, which trips a switch mechanism operating through a delicately balanced spring, hammer and dog mechanism, crafted in brass stock.

The mechanism had to be factory calibrated at a fixed temperature setting, un-adjustable by the householder. The earlier variation of the E apparently operated with out the cup, which was added to prevent frost and ice build up on the bellows [see reference #1]

The bellows was charged with sulphur dioxide. As a result the service mechanic was advised to store unused controls in a shop refrigerator to reduce the strain on the bellows.

Material:
- deep draw copper cup
- forged brass, tined base plate,
- brass bellows, with
- switching mechanism in stamped brass plate
- brown Bakelite switch body

Special Features:

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:

Industrial Significance:
Kelvinator's model E thermostat [temperature control], engineered for their early series household, cabinet refrigerators, is a unique study in the design and manufacture of complex automatic, analogue, mechanical switching in the early 1920's.

Contrasting the design of the Model E thermostat, with those of some 30 years later [See R20], provides a dramatic example of the principle of progressive, engineering simplification - usually hard won.

Socio-economic Significance:

Socio-cultural Significance:
Clearly, automatic temperature control for the household cabinet refrigerator had arrived by 1923 - but just barely. The expectations of what machinery in the homes of the nation might now accomplish and doing it automatically without the touch of human hand was about to change and change dramatically – and the rest is history.

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:
- To HRAI head office display Jan 2004 as R14, Removed Oct 2006
- 07-010-11: While there is some uncertainty at this point it is likely that 7.01-2B, #130 was the control used for CMX02 and 04, the data base was not in place at that time to keep track of things,

Bibliographic References:
THOC biblio Reference Kelvinator Service Manual 1928, 1935 and parts list 1932

Notes:
1) Kelvinator made the model E in a range of variations from the E1 through to the E6 used on various applications from 1922-23 through 1927-28. See Kelvinator Service Manuals 1928 and 1935, also Kelvinator Parts List 1932, selected pages appended
2) See also other artifacts 7.01B, C, D, E, F

Related Reports
See catalogue for CMX02, March 2002 and CMX04 March 2004, HRAI –R1 January 2004Exhibit Code #R14, same control description for A and B codes

Inventory Report No. THOC-HVACR 129
THOC Artifact Ref. Code: 7.01-2A
Group: 7.01 Refrigerating and Air Conditioning Pressure and Temperature Controls - Household
Description: An early, hydraulic bellows actuated automatic temperature control with fixed factory setting, equipped with glycerine immersion cup for household cabinet refrigerator, senses evaporator suction line temperature, late Model E, Kelvinator of Canada, London, Ont. Circa 1925:

Item 6: Classification Code 11.0 – Vaporizing Oil Burning Equipment and Systems

- **Subclass 11.01 – Burners**
- **Identification Code 11.06-1 – Colman Lamp and Stove Co., non-motorized, vaporizing oil burner, employing gravity feed, and float valve regulator, Circa 1922**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2006.154 **HHCC Classification Code: 11.06-1**
Group:
11.01 Vaporizing Oil Burning Equipment and Systems - Burners

Description:
A non motorized, vaporizing oil burner for the Canadian home, employing natural gravity feed, with fuel reservoir and brass float actuated fuel oil metering device, brass valving and tubing, engineered by a widely acknowledged pioneer of oil heating equipment in Canada, Coleman Lamp and Stove Co. Ltd. Toronto, Circa 1922

Film Image:
Nil

Digital Image:
CD11 11.01-1

Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2006.154 **HHCC Classification Code: 11.01-1**

Last Modified:
Oct 25, 2005

Group:
11.01 Vaporizing Oil Burning Equipment and Systems - Burners

Description:
A non motorized, vaporizing oil burner for the Canadian home, employing natural gravity feed, with fuel reservoir and brass float actuated fuel oil metering device, brass valving and tubing, engineered by a widely acknowledged pioneer of oil heating equipment in Canada, Coleman Lamp and Stove Co. Ltd. Toronto, Circa 1922

Film Image:
Nil

Digital Image:
CD 11-11.01-1

Make:
Colman

Manufacturer:
Coleman Lamp and Stove Co. Ltd. Toronto

Model:
unknown

Serial No.:

Size:
6 x 6 x 32inch h [mounted on pedestal]

Weight:
8 lbs.

Circa:
1922

Rating:
Exhibit, education, and research quality, illustrating the engineering and design of early, non motorized, gravity feed, vapourizing oil burners for the Canadian home, by a widely acknowledged leader in the Canadian field, the Colman Lamp and Stove Company of Toronto.

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

It was used in York County, within a day trip north of Toronto. The county towns were settled early by many with acquired urban tastes, as well as the means to enjoy whatever comforts of the day that new 20th century heating technology could provide.

Type and Design:
- Non motorized,
- Vaporizing oil burner,
- Natural gravity feed,
- Fuel reservoir
- Brass float metering device
- Brass valves and tubing

Construction:

Material:

Special Features:

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:

- They were the early years of the 20th century and "the machine" had not yet arrived in the basements of Canadian homes. Electrification, a prerequisite on which the electric motor depended was for many, still years away. Oil heating, as an alternative to solid fuels, wood and coal, must depend on less sophisticated technologies.
- From the vantage point of the early 21st century, the evolution of oil fired, automatic home heating equipment would be seen as generally advancing in four broad waves, each of which would take place over a considerable period of time, each producing many variations of the genre:
    1) ***Vaporizing, non-motorized*** and non-electrified**,** technology [see Group 11.01 artifacts, no. 11.01-1]
    2) ***Elemental, motorized,*** platform mounted technology with peripheral piping and valving components [see Group 12.01, artifact no 12.01-1, and pump assembly 12.06-1]
    3) ***Compacted motorized*** technology with inherent, peripheral component parts engineered into the pump assembly [see pump assembly Group 12.06, artifact, and 12.06-2]
    4) ***Functionally integrated,*** motorized technology, beyond being compacted, a number of functions would be smoothly integrated into a single pump assembly, including piping and valving [see Group 12.01, artifact 12.01-2 and pump assembly 12.06-2]
- This apparatus clearly stands as an example of the first wave, vaporizing, non-motorized and non-electrified**,** technology
- This simple and elegant fuel flow management system was designed with great inventiveness to use the natural force of gravity flow, without reliance on motive power.
- It uses a 36gr. float, hand crafted out of brass sheet stock, to meter oil into a combustion chamber [not included], where it is ignited by hand, vaporized and burned.
- Te apparatus is simply and beautifully executed using the materials and the manufacturing processes of the period in cast iron and brass.

Industrial Significance:

- While systems for automatic fuel feed had been attempted using solid and pulverized fuels [wood and coal], their practical application for household would

depend on the availability of a reliable source of clean-burning liquid or gaseous fuels.

- The casting and hand machining of brass petcocks and fittings demonstrate an unusual commitment to craftsmanship, which would soon not be so evident with the progressive introduction of mass production, automated manufacturing methods.
- The Ontario oil fields of Lambton County, although short lived, and those of Pennsylvania were among the first in the world to be commercially developed by 1860. They provided an early incentive for the Canadian, automatic oil heating industry, as represented here by Colman.
- This equipment was developed and manufactured in the first decade of the 20th century by the Coleman Lamp and Stove Co. Ltd. Toronto, a pre-eminent contributor to the development of HVACR, technology during its embryonic years in Canada.

Socio-economic Significance:

Socio-cultural Significance:

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

Bibliographic References:

Notes:

Related Reports
CMX02 and CMX04 Calalogue item H1

Inventory Report No. THOC-HVACR 278
THOC Artifact Ref. Code:11.01-1
Group: 11.01 Vaporizing Oil Burning Equipment and Systems - Burners
Description: A non-motorized, vaporizing oil burner for the Canadian home, employing natural gravity feed, with fuel reservoir and brass float actuated fuel oil metering device, brass valving and tubing, engineered by a pioneer in oil heating equipment in Canada, Coleman, Circa 1922

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports By Classification Code

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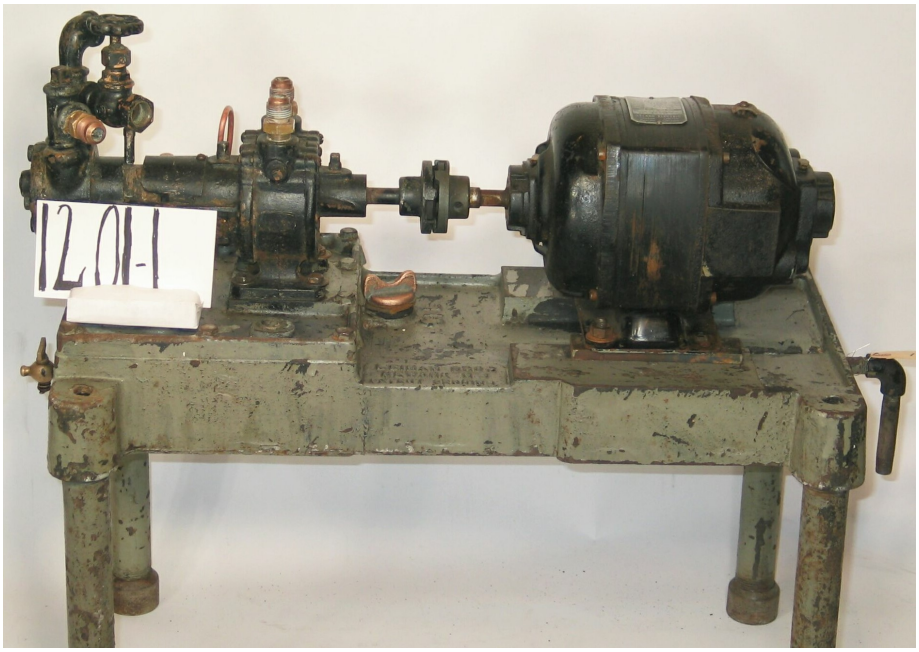
Item 7: Classification Code 12.0 – Heating, Atomizing Oil Burners- Household, commercial/ Industrial

- **Subclass 12.01 - Pressure Atomizing Oil Burner Equipment and Systems**
- **Identification Code 12.01-1 – Early 20th century high pressure oil burner assembly with direct drive 2 stage gear pump and oil reservoir, Leiman Bros, Circa 1926 [Motor not original]**

Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2003.079 **HHCC Classification Code: 12.01-1**
Group:
12.01 Pressure Atomizing Oil Burner Equipment and Systems - Burners
Description:
An unusual and rare example of an early 20th century high pressure oil burner assembly, with direct drive, 2 stage, Tuthill gear pump, buil-in oil reservoir, and original valving, constructed on heavy cast iron base, with 1" pipe legs and cork vibration insulators, equipped brass whistle with embossed plate marked, "when whistle blows, stop motor, fill base with oil", Leiman Bros Newark, circa 1926
Film Image:
Digital Image: CD 11 12.01-1



Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2003.079 **HHCC Classification Code: 12.01-1**

Last Modified:
Dec 8, 2003

Group:
12.01 Pressure Atomizing Oil Burner Equipment and Systems - Burners

Description:
An unusual and rare example of an early 20th century high pressure oil burner assembly, with direct drive, 2 stage, Tuthill gear pump, built-in oil reservoir, and original valving, constructed on heavy cast iron base, with 1" pipe legs and cork vibration insulators, equipped brass whistle with embossed plate marked, "when whistle blows, stop motor, fill base with oil", Leiman Bros Newark, circa 1926

Film Image:

Digital Image: CD 11-12.01-1

Make:
Leiman Bros.

Manufacturer:
Leiman Bros. Newark, N.J.

Model:

Serial No.:

Size:
23x13x20"h

Weight:
98 lbs.

Circa:
1926

Rating:
Exhibit, education, and research quality, illustrating the often aberrant, engineering and construction of early 20th century high pressure oil burners, in a period in which inventors and small, start-up companies were searched for a safe, practical and affordable approach

to automatic, oil fired heating systems for the homes of the day - for those owners with sufficient means to acquire such new fangled household machinery.

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

Type and Design:

Construction:

Material:

Special Features:
Currently equipped with a much later model 60 cycle motor, having been used as a service pump in the repair shop of T. H. Oliver Aurora Ont. a mark of the long life of the Tuthill pump used by Leiman Bros.

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:

Industrial Significance:

Socio-economic Significance:

Socio-cultural Significance:

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

Bibliographic References:

Notes:

Related Reports

Artifact Labels #8163 2x4”

Inventory Report No. THOC-HVACR 079
THOC Artifact Ref. Code: 12.01-1
Group: 12.01 Pressure Atomizing Oil Burner
Equipment and Systems - Burners
Description: A rare example of an early 20th century high pressure oil burner assembly with 2 stage, Tuthill gear pump, built in oil reservoir, and original valving, constructed on heavy cast iron base, with cork vibration insulators, equipped brass whistle marked, “when whistle blows, stop motor, fill base with oil”, Leiman Bros, 1926

Display Cards:

TBC

Research Program

HHCC Founding Artifact Collection of HVACR Technology
The Embryonic and Early Development Years in Canada, 1920 -1960

Representative Sampling of HHCC Catalogue Sheets and Research Reports By Classification Code

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Item 8: Classification Code 12.0 - Heating, Atomizing Oil Burners- Household, Commercial/ Industrial

- **Subclass 12.08 – Pressure Atomizing Oil Burner Equipment and Systems, Fluid Flow and Combustion Controls**
- **Identification Code 12.08-7 – Early one-piece, stack mounted, trend setting, combustion controller; a marvel of interconnected mechanical, electrical and electro-magnetic components; the "Pyrotherm", Mercoid, Circa 1930**

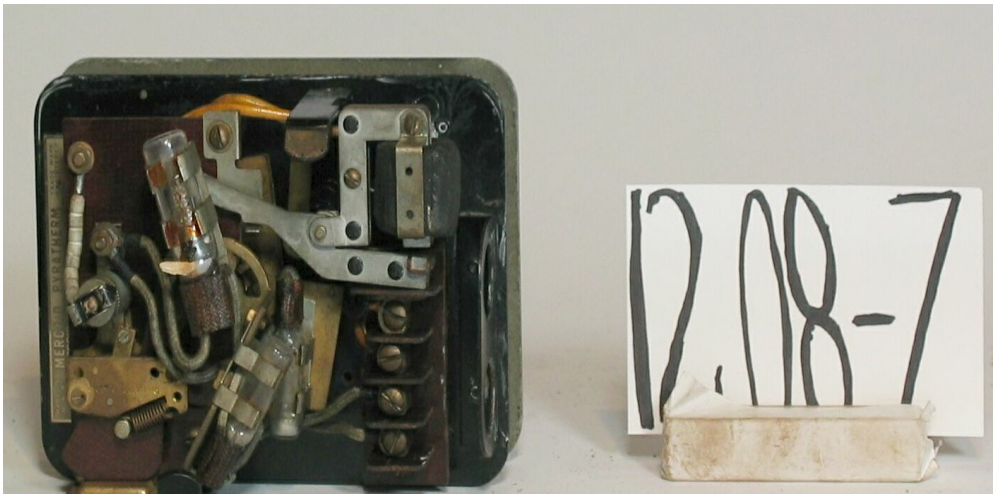
Catalogue
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No. 2006.108 **HHCC Classification Code: 12.08-7**
Group:
12.08 Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls

Description:
A late 1920's, one-piece, trend setting, automated combustion controller for oil fired, home heating systems, elegantly named the "Pyrotherm", it was unitary in design, stack mounted, helical bimetal heat actuated, performing essentially the same functions as the earlier two-piece technology [See ID#231 and ID#229], but with greater precision. The device was a marvel of inter-connected mechanical, electrical and electro-magnetic components, operating three mercury bulb switches; Mercoid, Type 8M, Circa 1930

Film Image:
Nil

Digital Image:
CD11 12.08-7



Research Reports
Founding Collection, HVACR Heritage Centre Canada
The Artifacts of HVACR Technology, Canada's First Half Century

HHCC Accession No.2006.108 **HHCC Classification Code: 12.08-7**

Last Modified:
Aug 11, 2005

Group:
12.08 Pressure Atomizing Oil Burner Equipment and Systems - Fuel Flow and Combustion Controls

Description:
A late 1920's, one-piece, trend setting, automated combustion controller for oil fired, home heating systems, elegantly named the "Pyrotherm", it was unitary in design, stack mounted, helical bimetal heat actuated, performing essentially the same functions as the earlier two-piece technology [See ID#231 and ID#229], but with greater precision. The device was a marvel of inter-connected mechanical, electrical and electro-magnetic components, operating three mercury bulb switches; Mercoid, Type 8M, Circa 1930

Film Image:
Nil

Digital Image:
CD 11-12.08-7

Make:
Mercoid

Manufacturer:
The Mercoid Corp.,Chicago

Model:
Type 8M

Serial No.:

Size:

Weight:
6 lbs.

Circa:
1930

Rating:
Exhibit, education, and research quality, illustrating the engineering and design of late 20th century unitary designed combustion controllers for automatic oil heating systems in Canada.

Patent Date/Number:

Provenance:
From York County (York Region) Ontario, once a rich agricultural hinterlands, attracting early settlement in the last years of the 18th century. Located on the north slopes of the Oak Ridges Moraine, within 20 miles of Toronto, the County would also attract early ex-urban development, to be come a wealthy market place for the emerging household and consumer technologies of the early and mid 20th century.

This artifact was discovered in the 1950's in the used stock of T. H. Oliver, Refrigeration and Electric Sales and Service, Aurora, Ontario, an early worker in the field of agricultural, industrial and consumer technology.

This particular control was used on a residential heating system in York County [York Region], North of Toronto during the 1930's.

Type and Design:
- Unitary design,
- Stack mounted,
- Helical bimetal heat actuator
- Inter-connected, mechanical, electrical and electro-magnetic components, operating three mercury bulb switches.

Construction:

Material:

Special Features:

Accessories

Capacities:

Performance Characteristics:

Operation:

Control and Regulation:

Targeted Market Segment:

Consumer Acceptance:

Merchandising:

Market Price:

Technological Significance:

- The "Pyrotherm", introduced by Mercoid, an early innovator in the field of heating and refrigeration controllers, would trigger a world change, setting the stage for much of the next 30 years of combustion, safely control engineering
- The device was a marvel of inter-connected mechanical, electrical and electro-magnetic components, operating three mercury bulb switches
- A significant design consideration in the development of unitary, stack-mounted controls was the high ambient temperatures to which they were subjected. High temperature wiring and heat shielding were new design requirements to be dealt with.
- These embryonic, electric automated systems were representative of the earliest introduction of complex systems into the Canadian home. See Note #2

Industrial Significance:

- By the standards of that day the introduction of one-piece, compact, electro-magnetic combustion controllers represented a world change in precise engineering design and manufacture, requiring new materials and engineering know how.
- These control systems were a source of wonderment and no little fear for the Canadian public, as well as for many of the tradesmen who were called upon to understand, install and repair them, as well as to advise the homeowner on their proper, satisfactory operation.
- Mercoid, a name no doubt derived from the company's reliance on mercury bulb switching, would prove to be a time honoured one in the HVACR field, as it evolved over the 20th century and into the next - see Dwyer Instruments web site

Socio-economic Significance:

Socio-cultural Significance:

- With combustion safety devices of increasing sophistication and reliability the public's confidence and trust in automatic heating equipment would increase rapidly, or so it was hopped. It was a market of substantial size, but was dependent on the industry's ability to deliver safe and reliable products at a price that Canadians of modest means could afford and believe in.
- A new Canadian culture of comfort and convenience had been triggered and was rapidly evolving in much of urban Canada, by the mid 1930's, but only where the benefits of home electrification had arrived.

Donor:
G. Leslie Oliver, The T. H. Oliver HVACR Collection

HHCC Storage Location:

Tracking:

- **CMX02 exhibit, March 2202**
- **HRAI –Rotation 1, jan.2004, removed Oct 2006**
- **Restocked Jan 2007**

Bibliographic References:

References Cybernetcs and General Systems [Oliver Collection]:

1. Systems Engineering Tools, Harold Chestnut, 1966.
2. Modern Systems Research for the Behavioral Scientist, Walter Buckley, Editor, Aldine, 1968.
3. Systems Behaviour, John Beishon and Geoff Peters, Harper and Row, 1972
4. Systems Engineering Methods, Harold Chestnut, Wiley, 1977

Notes:

1) The Introduction of Popular, Complex Systems into the Canadian Home:

- The 1920's saw the introduction of complex mechanical, electric and electronic systems into the Canadian home and the lives of many Canadians, most of them ill prepared. For the first time the public would experience, as an inherent part of their daily life's routines, the benefits, as well as all too often the vagaries of systems engineering – then in an embryonic state of development. The level of dependence on such systems, with all their inherent imperfections and attendant risks, would be no more apparent than in the field of automatic home heating.
- These systems were at once intimidating, awe inspiring, often the source of feelings of personal ineptitude, as well as of fear for reasons of personal and property safety.
- Included in the early rush to popular technology systems were the automobile, the household radio and automatic home heating. But the most intimidating was, in many ways the latter, immensely obtrusive, in your face, larger than life, and all around you 24 hours a day, bringing with it a degree of dependency that the householder could not afford to forget in the dead of a Canadian winter.
- All three of these pieces of technology [the automobile, the household radio and the automatic home heating system], have in common an elaboration of interconnected and interdependent parts on which the integrity and performance of the system would be desperately dependent. For the automatic home heating system these components, each with its own unique integrity and operating characteristics, would include, for example: electric motors, flame sensors, solenoid valves, pressure sensors and actuators, electric ignition transformers, heat detecting devices and thermostats.

- The advent of such increasingly complex, automated systems [mechanical, electric, and electronic] would, in fact, by the late 1940's lead to a new specialized field of study, known at that time as "Cybernetics", and thence to the larger field of "general systems".
- The focus was on coming to understand better the properties and performance of complex, inanimate systems, including their degree of purposefulness, self regulation and self direction setting, as well as their ability to communicate meaningful information within the network of which they were a part. For each component of the system must communicate effectively with others for the system to function safely and satisfactorily. System performance, stability, reliability and maintainability, among other criteria, were at stake. All of these criteria were of fundamental importance in the development of automated heating systems for the Canadian homeowner, and the inventors and manufacturers of the day knew it. [See References, General Systems]
- For their part the manufacturers of these systems, with their myriad component parts and complexities, would learn from the outset the importance of trained service people in communities across the country, wherever such systems would appear. By the 1940's training courses were increasingly common, as well as control and systems handbooks and systems trouble shooting guides provided by equipment and systems manufacturers.

Related Reports

- Catalogue CMX02, March 2002
- HRAI catalogue Jan 2004

Inventory Report No. THOC-HVACR 232
THOC Artifact Ref. Code: 12.08-7
Group: 12.08 Pressure Atomizing Oil Burner
Equipment and Systems - Fuel Flow and Combustion
Description: A late 1920's, trend setting one-piece combustion controller for oil fired, home heating systems, elegantly named the "Pyrotherm", stack mounted, helical bimetal heat actuated, inter-connected, mechanical, electrical and electro-magnetic components, operating three mercury bulb switches; Mercoid, Type 8M, Circa 1930

HHCC Collections Information Repository, Founding Collection
User Manual

Foreword

This computer-based, collection, information repository was developed over a period of a number of years by Leslie Oliver, Oliver Associates. The original work dates back to 1993, with a commitment to preserve, as Canadian cultural property, valued examples of early 20th century HVACR technology. These historic artifacts of the industry were part of a spare parts warehouse operated by T. H. Oliver, Aurora Ontario, a pioneer worker in the field. In November 2001[1], they were the subject of a formal offer to gift to the HVACR Heritage Centre Canada [HHCC], as Canadian cultural property,

The early development work on the repository, itself, began in October 1999, triggered by the establishment of the Founding Committee for the Centre, conceived as a new kind of virtual museum and archive. It was to be a unique Canadian, not-for-profit, education and scientific organization, with a national charter, and charitable status. It was established to take over custodial responsibility and stewardship for this collection.

Prior to the collection's official transfer and accessioning by the Centre in 2007, it was on formal loan, providing the basis for the Centre's operations since 2002.[2] Following its formal accessioning, the repository would become the primary information source for collection management and inventory control, as well as for research and public education and programming.

Leslie continued development work on the repository, as a volunteer contribution to the Centre's work. He retained the professional services of Dr. David Barr, as a consultant to the development process, as well as Roland Gee as a part-time student assistant in the work. The work involved extensive preservation and conservation, as well as the research, documentation, and the imaging required to support the Centre's public programming, education and display initiatives, fulfilling its mandate.

The repositioning of the repository, as the Centre's collections management information system, required restructuring, reformatting, identification of developmental anomalies, internal inconsistencies and discrepancies which had evolved, as part of the protracted developmental process. As well, re-labeling of hundreds of files was required, including adding the Centre's unique identifiers and accession numbers. This work was undertaken throughout the summer of 2007 by Roland Gee, University of Toronto Engineering student, working with Leslie.[3]

I am indebted to Roland, currently entering second year of Chemical Engineering, for his interest and dedication to the work of the Centre, and especially for his contribution to this last phase of the project, Evaluation and Installation. His contribution has been invaluable.

L. Oliver,
August 27, 2007

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[1] See Memorandum, to the Board, document no. GLO0111A, November 2, 2001

[2] See Memorandum to the Board, Nov. 17, 2003, document no. GLO0311A.

[3] See report on Evaluation and Installation of Collections Information Repository, document no.. HVACR0707C, July 10, 2007

Collections Information Repository: Nature and Scope

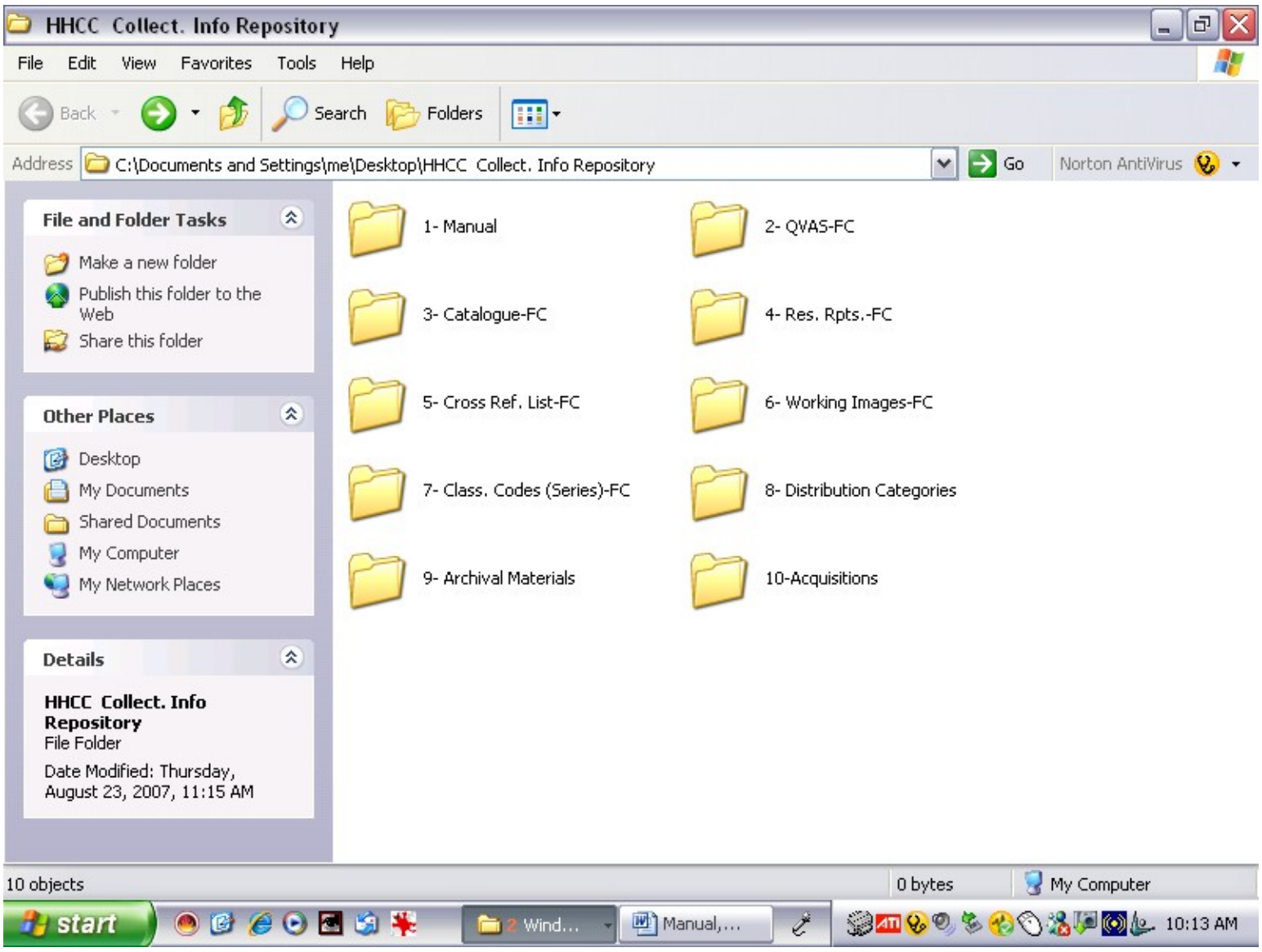
Currently, in addition to this Manual [**Section 1**], the repository consists of:

- **Section 2:** A quick visual access system for the Founding Collection **[QVAS-FC]**, intended for use in quickly identifying and selecting artifacts - size 71 MB, 117 files, 10 folders.
- **Section 3:** A comprehensive collections catalogue for the Founding Collection **[Catalogue-FC],** with thumbnail color images for all artifacts - size 408 MB, 345 files, 1 folder.
- **Section 4:** Individual research reports, for all artifacts in the Founding Collection **[Res Rpts- FC] -** size 27 MB, 687 files 21 folders.
- **Section 5:** A cross reference list for the Founding Collection, linking the artifact's unique classification code to its HHCC Accession number and back to the Oliver collection's original ID number **[Cross Ref. List- FC]**.
- **Section 6:** High resolution "Working Images" for use in the preparation of educational programming and display materials **[Working Images] -** size 576 MB, 806 files, 47 folders
- **Section 7:** A classification system for historic artifact, with classification codes identifying all artifacts in the Founding Collection by type and kind, e.g., heating, temperature control **[Class Codes, Series-FC].**
- **Section 8:** An outline of collection distribution categories, used by the Centre as a guide to identification and selection of artifacts for acquisition and exhibition **[Distribution Categories].**
- **Section 9:** A catalogue of accessioned archival materials **[Archival Materials]**, currently void, awaiting the development and approval of an archival accessions policy and procedures by the Centre.
- **Section 10:** A catalogue of new acquisitions by the Centre **[Acquisitions]**, also currently void pending the development and approval of related policy and procedures on acquisition and formal accessioning.

In total the repository, as created, covers some 350 artifacts in the founding collection - size 1.06 GB, 1,964 files, 89 folders.

HHCC Collections Information Repository

Main Menu



Using the Collections Information Repository

Things you should know:

- At this stage in its development, the repository contains visual access information, catalogue sheets and research reports covering the Centre's founding collection only
- Research reports are all un-edited working materials, as records of work in progress. They provide places for recording notes about new information from research, the status and location of artifacts. They serve as information resources for the production of educational material, public programming, etc. They do not contain text intended for direct publication.
- The Repository is available on a single CD, with the exception of Section 6, high resolution working images [size 576 MB], which is on a second CD.
- System operation requires the use of Microsoft Office Version 97 or higher, and imaging software that can view JPEG Files such as Irfranview, Windows Photoviewer, or an internet browser such as Internet Explorer 5.0 or higher or Mozillla Firefox..
- Some of the collections information contained in the repository will be made available, as appropriate, through the public and internal management modules Centre's OTF website,

Some Examples of the Repository in Use

Some typical applications include:

Example 1: Identifying and Selecting an Artifact for Research, Educational Programming or Display

- With a particular classification of artifact in mind [condenser, compressor, motor, or oil burner] browse the Quick Visual Access System [QVAS] for a picture of a possible candidate [Repository Section 2] – see Helpful Hints below, see also Tutorial in Appendix, as needed.
- Note the Accession Number and Classification Code shown under each thumbnail.
- Using this information go to the Collection Catalogue [Repository, Section 3] for a short description and full picture.
- For more detail go to the corresponding Research Report [Repository, Section 4]. Use cross reference list as needed [Repository, Section 5].

Example 2: Looking for Information on a Particular Artifact

- **Using the Catalogue**: If classification series number of the artifact is known go the Catalogue [Repository Section 3] for a picture and brief description of the item. Then using the Accession Number, shown on the catalogue sheet, go to the corresponding Research Report for more information.

- **Using the Research Reports:** If either the Accession Number, or Classification code [series] is known, go directly to the Research Reports [Repository, Section 4]. Note that Research Reports are listed by both Accession Number and Classification.

- Information from both Catalogue sheets and Research Reports may also be retrieved using the Microsoft Windows Search Function. The search may be performed on any term included in the title of the document. Click on "Search" and follow the leads.

Some Helpful Hints

Using the Quick Visual Access System, Section 2 [QVAS-FC]

- Select "QVAS-FC" from the opening menu, To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar
- The QVAS contains two folders, one intended for artifact identification; the other contains high resolution images for use as needed, principally for backup purposes. It is best to use high resolution "Working Images" in Section 6 of the Repository for the preparation of educational programming and display materials.
- Thumbnail images are organized by classification series, code numbers 1 to 16
- Double click on desired classification series to view thumbnails
- Click 100%, on top tool bar, to maximize the size of thumbnails, viewing one page at a time, three images wide
- To move from one classification series to another, use forward or back arrow, left side of top tool bar
- Each thumbnails is identified by its classification code, followed by its HHCC Accession No in brackets, and its file format (IPG or JPEG, common format), (PCD used by Kodak for Photo CD's)
- To leave a page, click "X "in upper right hand corner.

Finding a Catalogue Sheet for a Particular Artifact, Section 3 [Catalogue-FC]

- Select "Catalogue-FC" from the opening menu. To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar.
- Catalogue sheets are organized by HHCC Accession No., 2003-001 to 2006-220

- Identify the artifact of interest by Accession number and double click on desired catalogue sheet, drag the vertical bar between “Name” and “Size” on the column heads to the right to show the full name of file, allow time for the image to appear at the bottom of the page.
- To leave a page, and look for another catalogue sheet click “-“ in upper right hand corner and repeat.

Finding a Research Report, Section 4 [Res. Rpts-FC]

- Select “Res. Rpts” from the opening menu. To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar.
- Research Reports are organized by both HHCC Accession No. and by Classification Series and number
- To identify the artifact of interest, by Accession number or classification code, double click on desired folder; drag the vertical bar between “Name” and “Size” on the column heads to the right to show the full name of file.
- To leave a page, and look for another catalogue sheet click “-“ in upper right hand corner and repeat.

Cross Reference List, Repository Section 5 [Cross Ref. List-FC]

- Select “Cross Ref. List-FC” from the opening menu. To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar.
- Cross reference List is displayed as a MSW spread sheet, giving cross reference numbers
- If either one of: the HHCC Accession No., T.H. Oliver ID Number, or Classification Series number is known, the others can be determined.

Working Images, Repository Section 6 [Working Images-FC]

- Select “Working Images-FC” from the opening menu. To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar.
- Working Images are organized by both HHCC Classification Series 1 to 16
- Double click on desired series to see all artifacts in the Founding Collection in that series.
- Double click on the desired item to see image.
- Go to Image/ information on the top tool bar to see details
- To leave the image, and look for another image click “-“in upper right hand corner and repeat.

Classification Code (Series), Section 7 [Classification Codes -FC]

- Select “Classification Codes -FC” from the opening menu. To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar.

- Double click on Classification Series Founding Collection to see detailed description of the 16 series of artifacts in Founding Collection, in classification Series 1 to 16. Note that a second folder contains backup files only.

Distribution Categories, Section 8

- Select "Distribution Categories" from the opening menu. To move from one Section of the Repository to another, use forward or back arrow, left side of top tool bar.
- Double click to see twelve cell matrix. The matrix is useful in assessing the balanced distribution among artifacts by industry sector [heating, ventilation, air conditioning and refrigeration], as represented, for example, in the Centre's acquisition, display and educational programming initiatives.

Archival Materials, Section 9

- To be developed, as needed

Acquisitions, Section 10

- To be developed, as needed