



**SPIRE & PACS**  
**Sorption Coolers**  
*Hardware Tree*

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**SERVICE DES BASSES TEMPERATURES (CEA/DSM/DRFMC/SBT)**

***SPIRE & PACS Sorption Coolers***  
***Hardware Tree***

SBT internal ref : SBT/CT/2001-22

|                         | Name & Function                    | Date             | Signature |
|-------------------------|------------------------------------|------------------|-----------|
| <b>Prepared</b>         | P. Dupont – PA Manager             | April 25th, 2001 |           |
| <b>Verified</b>         |                                    |                  |           |
| <b>QA Check</b>         | P. Dupont – PAManager              | April 25th, 2001 |           |
| <b>Project Approval</b> | L. Duband - Cooler Project Manager | April 25th, 2001 |           |

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*Document Status*

| Issue | Revision | Date       | Nb of Pages | Modifications                       |
|-------|----------|------------|-------------|-------------------------------------|
| Draft |          | 04/04/2001 |             | First draft – released for comments |
| 0     | 0        | 25/04/2001 | 13          | First Issue                         |
|       |          |            |             |                                     |
|       |          |            |             |                                     |
|       |          |            |             |                                     |
|       |          |            |             |                                     |



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## List of Acronyms

|                 |  |                                    |         |
|-----------------|--|------------------------------------|---------|
| AD / RD         | Applicable / Reference Document                              |                                    |         |
| ADP (EIDP)      | Acceptance (End Item) Data Package                           |                                    |         |
| AIT / (M)AIV    | (Manufacturing,) Assembly, Integration & Test / Verification |                                    |         |
| CADM            | Configuration and Data Management                            |                                    |         |
| CDR (DDR)       | Critical (Detailed) Design Review                            | Revue de conception détaillée      | RCD     |
| CEA             | Commissariat à l' Energie Atomique                           |                                    |         |
| CIDL / ABCL     | (As Built) Configuration Items Data List                     |                                    |         |
| CN              | Change Notice  | Demande de Modification            | DM      |
| CQM             | Cryogenic Qualification Model                                |                                    |         |
| DML / DPL       | Declared Material / Process List                             |                                    |         |
| DRB             | Delivery Review Board  | Revue de Qualification             | RQ      |
| EM / (P)FM / FS | Engineering / (Proto)Flight / Spare Model                    |                                    |         |
| ETF             | Environmental Test Facility                                  |                                    |         |
| EV              | Evaporator   |                                    |         |
| FIRST           | Far Infrared and Submillimetre Telescope                     |                                    |         |
| FMECA           | Failure Mode Effects and Criticity Analysis                  |                                    | AMDEC   |
| (M)GSE          | (Mechanical) Ground Support Equipment                        |                                    |         |
| H/W             | Hardware   |                                    |         |
| HIFI            | Heterodyne Instrument for First                              |                                    |         |
| HSE             | Heat Switch (on evaporator)                                  |                                    |         |
| HSP             | Heat Switch (on sorption pump)                               |                                    |         |
| ICD             | Interface Control Document                                   | Dossier de Contrôle des Interfaces | DCI     |
| KIP / MIP       | Key / Mandatory Inspection Point                             |                                    |         |
| MRB             | Material Review Board  |                                    |         |
| N/A             | Not Applicable   |                                    |         |
| NCR             | Non Conformance Report                                       | Fiche d'Anomalie                   | FA      |
| PACS            | Photoconductor. Array Camera and Spectrometer                |                                    |         |
| PDR             | Preliminary Design Review                                    | Revue de Définition Préliminaire   | RDP     |
| PTR             | Post Test Review   | Comité de Revue et d'essai         | CRE     |
| PFM             | ProtoFlight Model  |                                    |         |
| QA / PA         | Quality / Product Assurance                                  | Assurance Qualité / Produit        | AQ / AP |



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|     |                                 |  |  |
|-----|---------------------------------|--|--|
| RFA | Request For Approval            |  |  |
| SAP | Service d'Astrophysique         |  |  |
| SBT | Service des Basses Températures |  |  |
| SCO | Sorption Cooler (full unit)     |  |  |
| S/C | SpaceCraft                      |  |  |



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***SERVICE DES BASSES TEMPERATURES (CEA/DSM/DRFMC/SBT)***

## **1. SCOPE OF THE DOCUMENT**

This document presents the Sorption Cooler Hardware Tree (breakdown of the product into sub-assemblies), and the list of associated drawings.



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## **2. DOCUMENTS**

### **2.1 Applicable documents**

All Applicable Documents are listed in the AD chapter of the CIDL (HSO-SBT-LI-010).

### **2.2 Reference documents**

N/A.



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### **3. HARDWARE TREE & DRAWING LIST**

The SCO Hardware Tree and associated Drawings are presented in the figures below.





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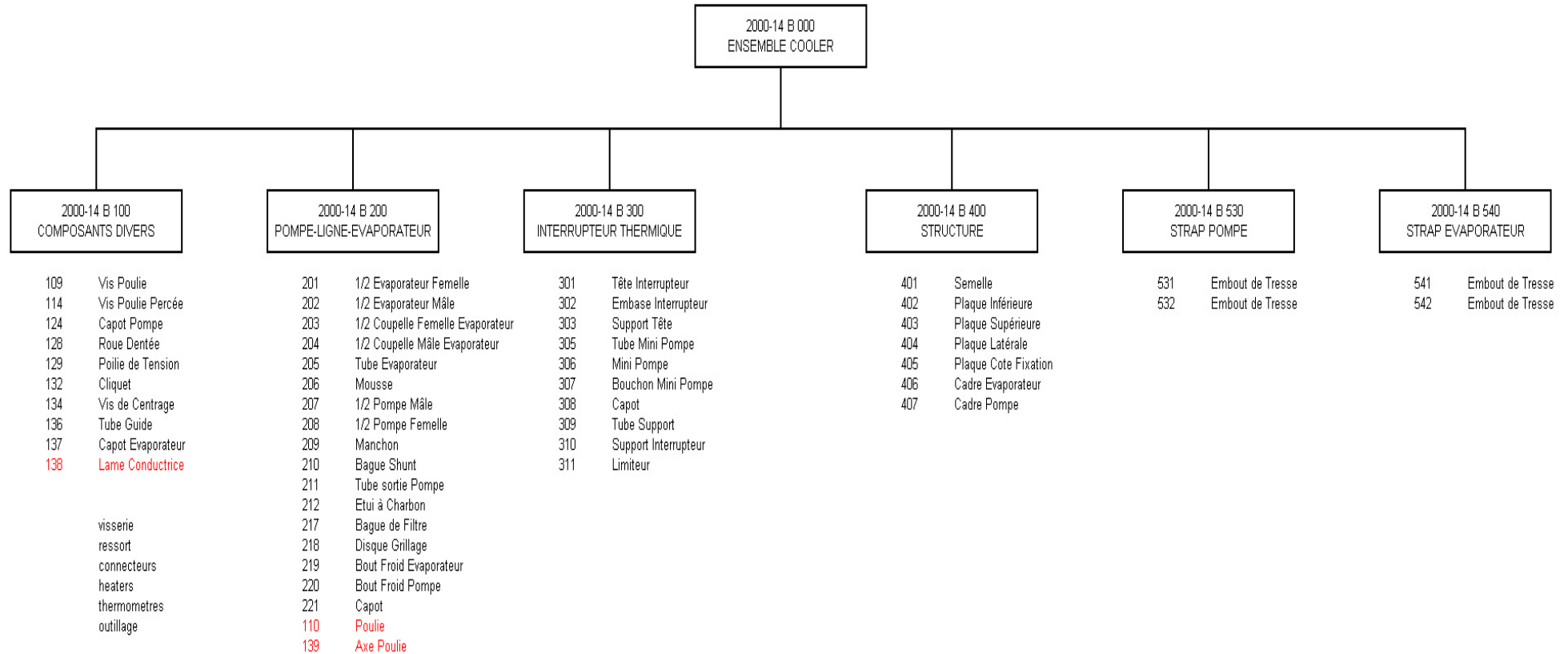


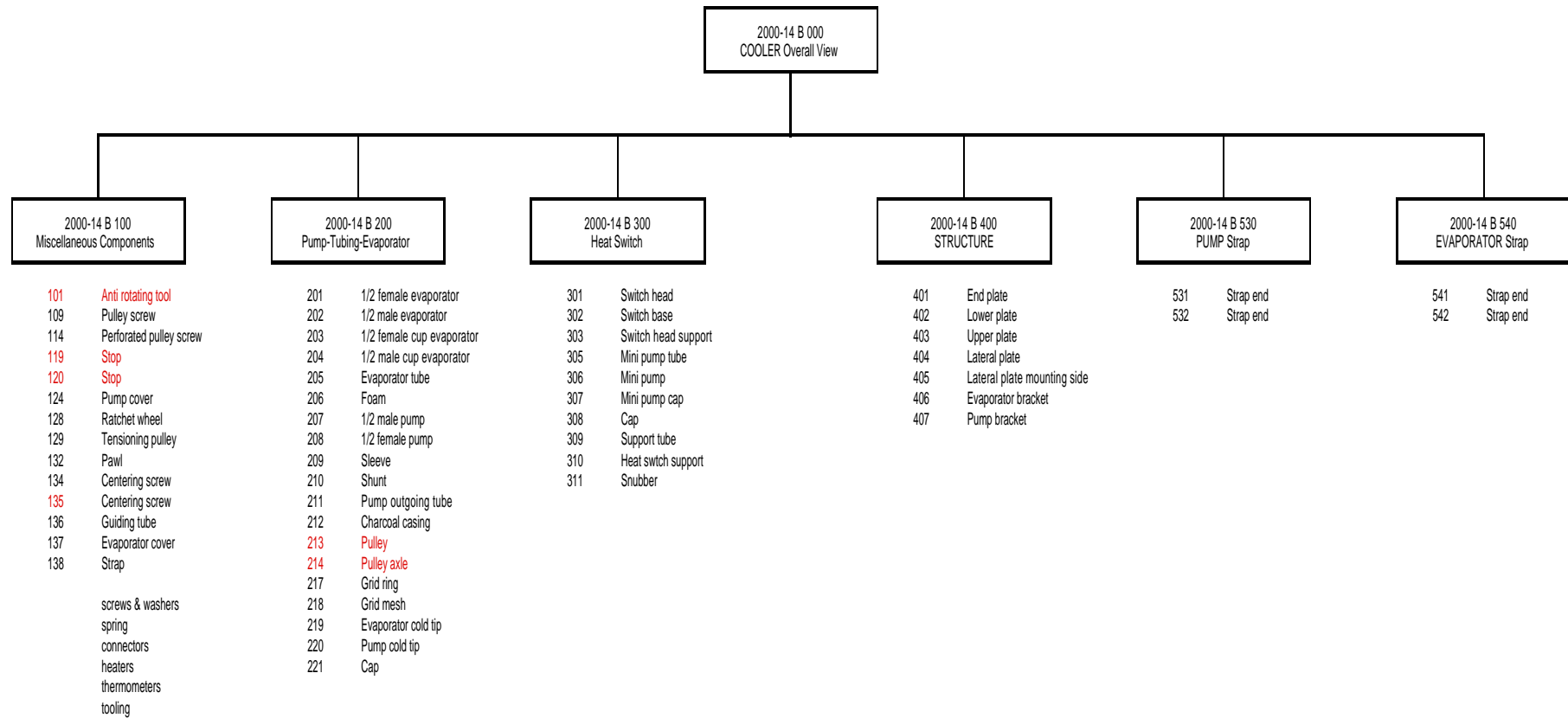
Figure 3-1: SCO Hardware Tree (version française)



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**Figure 3-2: SCO Hardware Tree (version anglaise)**



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| dwg level |   | n° etude | s/s ens. | n° pièce | Issue | S/Ens                   | Titre                            | Title                      | Matière       |
|-----------|---|----------|----------|----------|-------|-------------------------|----------------------------------|----------------------------|---------------|
| X         |   | 2000-14  | B        | 000      | A     |                         | Ensemble Cooler                  | Cooler overall view        |               |
|           | X | 2000-14  | B        | 100      | A     | Composants Divers       | Composants Divers                | Miscellaneous components   |               |
|           | X | 2000-14  | B        | 101      | A     | Composants Divers       | Outillage anti rotation          | Anti rotating tool         | 304L          |
|           | X | 2000-14  | B        | 109      | A     | Composants Divers       | Vis Poulie                       | Pulley screw               | TA6V ELI      |
|           | X | 2000-14  | B        | 114      | A     | Composants Divers       | Vis Poulie Percée                | Perforated pulley screw    | TA6V ELI      |
|           | X | 2000-14  | B        | 119      | A     | Composants Divers       | Butée                            | Stop                       | TA6V ELI      |
|           | X | 2000-14  | B        | 120      | A     | Composants Divers       | Butée                            | Stop                       | TA6V ELI      |
|           | X | 2000-14  | B        | 124      | A     | Composants Divers       | Capot Pompe                      | Pump cover                 | 6061          |
|           | X | 2000-14  | B        | 128      | A     | Composants Divers       | Roue Dentée                      | Ratchet wheel              | TA6V ELI      |
|           | X | 2000-14  | B        | 129      | A     | Composants Divers       | Poulie de Tension                | Tensioning pulley          | TA6V ELI      |
|           | X | 2000-14  | B        | 132      | A     | Composants Divers       | Cliquet                          | Pawl                       | TA6V ELI      |
|           | X | 2000-14  | B        | 134      | A     | Composants Divers       | Vis de Centrage                  | Centering screw            | TA6V ELI      |
|           | X | 2000-14  | B        | 135      | A     | Composants Divers       | Vis de Centrage                  | Centering screw            | TA6V ELI      |
|           | X | 2000-14  | B        | 136      | A     | Composants Divers       | Tube Guide                       | Guiding tube               | 2017 A        |
|           | X | 2000-14  | B        | 137      | A     | Composants Divers       | Capot Evaporateur                | Evaporator cover           | 6061          |
|           | X | 2000-14  | B        | 138      | A     | Composants Divers       | Lame Conductrice                 | Strap                      | CuC1          |
| X         |   | 2000-14  | B        | 200      | A     | Pompe-Ligne-Evaporateur | Pompe-Ligne-Evaporateur          | Pump - tubing - evaporator |               |
|           | X | 2000-14  | B        | 201      | A     | Pompe-Ligne-Evaporateur | 1/2 Evaporateur Femelle          | 1/2 female evaporator      | TA6V ELI      |
|           | X | 2000-14  | B        | 202      | A     | Pompe-Ligne-Evaporateur | 1/2 Evaporateur Mâle             | 1/2 male evaporator        | TA6V ELI      |
|           | X | 2000-14  | B        | 203      | A     | Pompe-Ligne-Evaporateur | 1/2 Coupelle Femelle Evaporateur | 1/2 female cup evaporator  | CuC1          |
|           | X | 2000-14  | B        | 204      | A     | Pompe-Ligne-Evaporateur | 1/2 Coupelle Mâle Evaporateur    | 1/2 male cup evaporator    | CuC1          |
|           | X | 2000-14  | B        | 205      | A     | Pompe-Ligne-Evaporateur | Tube Evaporateur                 | Evaporator tube            | TA6V ELI      |
|           | X | 2000-14  | B        | 206      | A     | Pompe-Ligne-Evaporateur | Mousse                           | Foam                       | Procelit P160 |
|           | X | 2000-14  | B        | 207      | A     | Pompe-Ligne-Evaporateur | 1/2 Pompe Mâle                   | 1/2 male pump              | TA6V ELI      |

Figure 3-3: SCO Drawing List (1/3)



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| dwg | level | n° etude | s/s ens. | n° pièce | Issue | S/Ens | Titre                   | Title                  | Matière  |
|-----|-------|----------|----------|----------|-------|-------|-------------------------|------------------------|----------|
|     |       | X        | 2000-14  | B        | 208   | A     | Pompe-Ligne-Evaporateur | 1/2 Pompe Femelle      | TA6V ELI |
|     |       | X        | 2000-14  | B        | 209   | A     | Pompe-Ligne-Evaporateur | Manchon                | TA6V ELI |
|     |       | X        | 2000-14  | B        | 210   | A     | Pompe-Ligne-Evaporateur | Bague Shunt            | CuC1     |
|     |       | X        | 2000-14  | B        | 211   | A     | Pompe-Ligne-Evaporateur | Tube sortie Pompe      | TA6V ELI |
|     |       | X        | 2000-14  | B        | 212   | A     | Pompe-Ligne-Evaporateur | Etui à Charbon         | CuC1     |
|     |       | X        | 2000-14  | B        | 213   | A     | Pompe-Ligne-Evaporateur | Poulie                 | TA6V ELI |
|     |       | X        | 2000-14  | B        | 214   | A     | Pompe-Ligne-Evaporateur | Axe Poulie             | TA6V ELI |
|     |       | X        | 2000-14  | B        | 217   | A     | Pompe-Ligne-Evaporateur | Bague pour Grille      | TA6V ELI |
|     |       | X        | 2000-14  | B        | 218   | A     | Pompe-Ligne-Evaporateur | Disque Grillage        | 304L     |
|     |       | X        | 2000-14  | B        | 219   | A     | Pompe-Ligne-Evaporateur | Bout Froid Evaporateur | CuC1     |
|     |       | X        | 2000-14  | B        | 220   | A     | Pompe-Ligne-Evaporateur | Bout Froid Pompe       | CuC1     |
|     |       | X        | 2000-14  | B        | 221   | A     | Pompe-Ligne-Evaporateur | Capot                  | TA6V ELI |
|     | X     |          | 2000-14  | B        | 300   | A     | Interrupteur Thermique  | Interrupteur Thermique |          |
|     |       | X        | 2000-14  | B        | 301   | A     | Interrupteur Thermique  | Tête Interrupteur      | CuC1     |
|     |       | X        | 2000-14  | B        | 302   | A     | Interrupteur Thermique  | Embase Interrupteur    | CuC1     |
|     |       | X        | 2000-14  | B        | 303   | A     | Interrupteur Thermique  | Support Tête           | TA6V ELI |
|     |       | X        | 2000-14  | B        | 305   | A     | Interrupteur Thermique  | Tube Mini Pompe        | 304L     |
|     |       | X        | 2000-14  | B        | 306   | A     | Interrupteur Thermique  | Mini Pompe             | 304L     |
|     |       | X        | 2000-14  | B        | 307   | A     | Interrupteur Thermique  | Bouchon Mini Pompe     | 304L     |
|     |       | X        | 2000-14  | B        | 308   | A     | Interrupteur Thermique  | Capot                  | TA6V ELI |
|     |       | X        | 2000-14  | B        | 309   | A     | Interrupteur Thermique  | Tube Support           | TA6V ELI |
|     |       | X        | 2000-14  | B        | 310   | A     | Interrupteur Thermique  | Support Interrupteur   | TA6V ELI |
|     |       | X        | 2000-14  | B        | 311   | A     | Interrupteur Thermique  | Limiteur               | TA6V ELI |

Figure 3-4: SCO Drawing List (2/3)



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| dwg level |   | n° etude | s/s ens. | n° pièce | Issue | S/Ens             | Titre                | Title                       | Matière  |
|-----------|---|----------|----------|----------|-------|-------------------|----------------------|-----------------------------|----------|
|           | X | 2000-14  | B        | 400      | A     | Structure         | Structure            | Structure                   |          |
|           | X | 2000-14  | B        | 401      | A     | Structure         | Semelle              | End plate                   | TA6V ELI |
|           | X | 2000-14  | B        | 402      | A     | Structure         | Plaque Inférieure    | Lower plate                 | TA6V ELI |
|           | X | 2000-14  | B        | 403      | A     | Structure         | Plaque Supérieure    | Upper plate                 | TA6V ELI |
|           | X | 2000-14  | B        | 404      | A     | Structure         | Plaque Latérale      | Lateral plate               | TA6V ELI |
|           | X | 2000-14  | B        | 405      | A     | Structure         | Plaque Cote Fixation | Lateral plate mounting side | TA6V ELI |
|           | X | 2000-14  | B        | 406      | A     | Structure         | Cadre Evaporateur    | Evaporator bracket          | TA6V ELI |
|           | X | 2000-14  | B        | 407      | A     | Structure         | Cadre Pompe          | Pump bracket                | TA6V ELI |
|           | X | 2000-14  | B        | 530      | A     | Strap Pompe       | Strap Pompe          | Pump strap                  |          |
|           | X | 2000-14  | B        | 531      | A     | Strap Pompe       | Embout de Tresse     | Strap end                   | CuC1     |
|           | X | 2000-14  | B        | 532      | A     | Strap Pompe       | Embout de Tresse     | Strap end                   | CuC1     |
|           | X | 2000-14  | B        | 530      | A     | Strap Evaporateur | Strap Evaporateur    | Evaporator strap            |          |
|           | X | 2000-14  | B        | 541      | A     | Strap Evaporateur | Embout de Tresse     | Strap end                   | CuC1     |
|           | X | 2000-14  | B        | 542      | A     | Strap Evaporateur | Embout de Tresse     | Strap end                   | CuC1     |

Figure 3-5: SCO Drawing List (3/3)