

### 1 - INTRODUCTION

The lubricant oils used in Embraco compressors undergo severe approval tests which assure a reliable performance during the complete life span of the compressor.

Embraco charges its compressors with the exact quantity of degassed lubricant oil properly dehydrated from moisture. When this operation is done at the customer plant, the same conditions have to be assured.

Embraco deems null and void the warranty of compressors which undergo any change or adulteration of the originally specified lubricant oil, as well as when a different refrigerant/lubricant is applied, according to the table below.

For the cases in which it is convenient to add lubricant oil in the customer's assembly line, both the lubricant and its treatment process should be approved by Embraco.

The table below shows the lubricant oils and refrigerants approved for use with Embraco compressors:

#### 1.1 - PRODUCT LINE - BRAZIL

| REFRIGERANT | COMPRESSOR SERIES            |                                   |                             |                                   |                                 |                                   |                                 |                                   |                                                   |                                   |                                                  |                                   |
|-------------|------------------------------|-----------------------------------|-----------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------|--------------------------------------------------|-----------------------------------|
|             | EM/EMI                       |                                   | F/FG/FGS130                 |                                   | FGV/FGS/FGT/FFV/FFI/FFU         |                                   | EG/EGS                          |                                   | EGT/EGU/EGY/EGZ/EGX/EGUS/EGYS/EGZS/VEGT/VEGY/VEGZ |                                   | EMT/EMU/EMY/EMZ/EMX/ EM2U/EM2Y/ EM2Z/ VEMY/ VEMZ |                                   |
|             | Lubricant Type and Supplier  | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier     | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier     | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier                       | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier                      | Viscosity Grade, 40°C cSt (mm²/s) |
| R 12        | SUNISO 3GS (SONNEBORN)       | ISO VG 32                         | SUNISO 3GS (SONNEBORN)      | ISO VG 32                         | SUNISO 3GS (SONNEBORN)          | ISO VG 32                         | SUNISO 3GS (SONNEBORN)          | ISO VG 32                         | —                                                 | —                                 | —                                                | —                                 |
|             | CP-4708-32 (CPI)             | ISO VG 32                         | CP-4708-32 (CPI)            | ISO VG 32                         | SUNISO 1GS (SONNEBORN)          | ISO VG 10                         | CP-4708-32 (CPI)                | ISO VG 32                         | —                                                 | —                                 | —                                                | —                                 |
|             | —                            | —                                 | —                           | —                                 | CP-4708-32 (CPI)                | ISO VG 32                         | —                               | —                                 | —                                                 | —                                 | —                                                | —                                 |
| R 134a      | PROECO RF 22S (COGNIS)       | ISO VG 22                         | —                           | —                                 | PROECO RF 22S (COGNIS)          | ISO VG 22                         | PROECO RF 22S (COGNIS)          | ISO VG 22                         | EMKARATE RL10H (CRODA)                            | ISO VG 10                         | EMKARATE RL10H (CRODA)                           | ISO VG 10                         |
|             | FREOL α 22E (JEC/JOMO)       | ISO VG 22                         | FREOL α 22E (JEC/JOMO)      | ISO VG 22                         | FREOL α 22E (JEC/JOMO)          | ISO VG 22                         | FREOL α 22E (JEC/JOMO)          | ISO VG 22                         | EMKARATE RL 9H PLUS (CRODA)                       | ISO VG 10                         | EMKARATE RL 9H PLUS (CRODA)                      | ISO VG 10                         |
|             | CP-2922E (CPI/ INNOVATTI)    | ISO VG 22                         | CP-2922E (CPI/ INNOVATTI)   | ISO VG 22                         | CP-2922E (CPI/ INNOVATTI)       | ISO VG 22                         | CP-2922E (CPI/ INNOVATTI)       | ISO VG 22                         | EMKARATE RL 7H (CRODA) (*)                        | ISO VG 7                          | EMKARATE RL 7H (CRODA) (*)                       | ISO VG 7                          |
|             | EMKARATE RL 22H (CRODA)      | ISO VG 22                         | EMKARATE RL 22H (CRODA)     | ISO VG 22                         | EMKARATE RL 22H (CRODA)         | ISO VG 22                         | EMKARATE RL 22H (CRODA)         | ISO VG 22                         | FREOL α 10W (JEC/JOMO) (*)                        | ISO VG 10                         | FREOL α 10W (JEC/JOMO) (*)                       | ISO VG 10                         |
|             | EMKARATE RL 10H (CRODA)      | ISO VG 10                         | —                           | —                                 | EMKARATE RL 10H (CRODA) (*)     | ISO VG 10                         | EMKARATE RL 10H (CRODA) (*)     | ISO VG 10                         | FREOL α 10E (JEC/JOMO) (*)                        | ISO VG 10                         | FREOL α 10E (JEC/JOMO) (*)                       | ISO VG 10                         |
|             | EMKARATE RL 9H PLUS (CRODA)  | ISO VG 10                         | —                           | —                                 | EMKARATE RL 9H PLUS (CRODA) (*) | ISO VG 10                         | EMKARATE RL 9H PLUS (CRODA) (*) | ISO VG 10                         | FREOL α 10IET (JEC/JOMO) (*)                      | ISO VG 10                         | FREOL α 10IET (JEC/JOMO) (*)                     | ISO VG 10                         |
|             | FREOL α 10W (JEC/JOMO) (*)   | ISO VG 10                         | —                           | —                                 | FREOL α 10W (JEC/JOMO) (*)      | ISO VG 10                         | FREOL α 10W (JEC/JOMO) (*)      | ISO VG 10                         | PROECO RF 10S (COGNIS) (*)                        | ISO VG 10                         | PROECO RF 10S (COGNIS)                           | ISO VG 10                         |
|             | FREOL α 10E (JEC/JOMO) (*)   | ISO VG 10                         | —                           | —                                 | FREOL α 10E (JEC/JOMO) (*)      | ISO VG 10                         | FREOL α 10E (JEC/JOMO) (*)      | ISO VG 10                         | CP-2910E (CPI/ INNOVATTI) (*)                     | ISO VG 10                         | CP-2910E (CPI/ INNOVATTI) (*)                    | ISO VG 10                         |
|             | FREOL α 10IET (JEC/JOMO) (*) | ISO VG 10                         | —                           | —                                 | FREOL α 10IET (JEC/JOMO) (*)    | ISO VG 10                         | FREOL α 10IET (JEC/JOMO) (*)    | ISO VG 10                         | —                                                 | —                                 | —                                                | —                                 |
|             | PROECO RF 10S (COGNIS)       | ISO VG 10                         | —                           | —                                 | PROECO RF 10S (COGNIS) (*)      | ISO VG 10                         | PROECO RF 10S (COGNIS) (*)      | ISO VG 10                         | —                                                 | —                                 | —                                                | —                                 |
|             | CP-2910E (CPI/ INNOVATTI)    | ISO VG 10                         | —                           | —                                 | CP-2910E (CPI/ INNOVATTI) (*)   | ISO VG 10                         | CP-2910E (CPI/ INNOVATTI) (*)   | ISO VG 10                         | —                                                 | —                                 | —                                                | —                                 |
|             | —                            | —                                 | —                           | —                                 | —                               | —                                 | —                               | —                                 | —                                                 | —                                 | —                                                | —                                 |
| R 600a      | SUNISO 3GS (SONNEBORN) (*)   | ISO VG 32                         | —                           | —                                 | SUNISO 3GS (SONNEBORN) (*)      | ISO VG 32                         | SUNISO 3GS (SONNEBORN) (*)      | ISO VG 32                         | SUNISO 1GSA (SONNEBORN) (*)                       | ISO VG 10                         | AVIA FCA 7EP (BANTLEON) (*)                      | ISO VG 7                          |
|             | SUNISO 1GSA (SONNEBORN) (*)  | ISO VG 10                         | —                           | —                                 | SUNISO 1GSA (SONNEBORN) (*)     | ISO VG 10                         | SUNISO 1GSA (SONNEBORN) (*)     | ISO VG 10                         | AVIA FCA 7EP (BANTLEON) (*)                       | ISO VG 7                          | MicroLAB240 (Microquímica) (*)                   | ISO VG 5                          |

The compressor that receives lubricant oil charge at Embraco is identified with a yellow spot color on the compressor cover or by the inscription:

- **Normal oil** (R 12 or R 600a);
- **Ester oil** (R 134a).

Note: (\*) Use in specific compressor models.

#### 1.2 - PRODUCT LINE - EUROPE

| REFRIGERANT              | APPLICATION         | COMPRESSOR SERIES                  |                                   |                                  |                                   |                                 |                                   |                             |                                   |                             |                                   |
|--------------------------|---------------------|------------------------------------|-----------------------------------|----------------------------------|-----------------------------------|---------------------------------|-----------------------------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|
|                          |                     | NB                                 |                                   | NE/NEK                           |                                   | T/NT                            |                                   | J/NJ                        |                                   | EM                          |                                   |
|                          |                     | Lubricant Type and Supplier        | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier      | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier     | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier | Viscosity Grade, 40°C cSt (mm²/s) |
| R 12                     | ALL                 | AVIA FC 32 BANTLEON                | ISO VG 32                         | AVIA FC 32 <sup>1</sup> BANTLEON | ISO VG 32                         | AVIA FC 32 BANTLEON             | ISO VG 32                         | AVIA FC 32 BANTLEON         | ISO VG 32                         | -                           | -                                 |
|                          |                     | RENISO EM 46 FUCHS                 | ISO VG 46                         |                                  |                                   | RENISO EM 46 FUCHS              | ISO VG 46                         | RENISO EM 46 FUCHS          | ISO VG 46                         |                             |                                   |
| R 22                     | LBP                 | AVIA FC 32 BANTLEON                | ISO VG 32                         | RENISO EM 46 FUCHS               | ISO VG 46                         | RENISO EM 46 FUCHS              | ISO VG 46                         | RENISO EM 46 FUCHS          | ISO VG 46                         | -                           | -                                 |
|                          | MBP - HBP           | RENISO EM 46 FUCHS                 | ISO VG 46                         | RENISO EM 46 FUCHS               | ISO VG 46                         | RENISO EM 46 FUCHS              | ISO VG 46                         | RENISO EM 46 FUCHS          | ISO VG 46                         | -                           | -                                 |
|                          |                     | AVIA FC 32 BANTLEON                | ISO VG 32                         |                                  |                                   |                                 |                                   |                             |                                   |                             |                                   |
|                          | AC                  | -                                  | -                                 | AVIA FC 32 <sup>4</sup> BANTLEON | ISO VG 32                         | AVIA FC 32 BANTLEON             | ISO VG 32                         | AVIA FC 32 BANTLEON         | ISO VG 32                         | -                           | -                                 |
| R 134a                   | ALL                 | EMKARATE RL 22HB CRODA             | ISO VG 22                         | EMKARATE RL 22HB CRODA           | ISO VG 22                         | EMKARATE RL 22HB CRODA          | ISO VG 22                         | EMKARATE RL 22HB CRODA      | ISO VG 22                         | EMKARATE RL 10H CRODA       | ISO VG 10                         |
|                          |                     | EMKARATE RL 10H <sup>8</sup> CRODA | ISO VG 10                         |                                  |                                   |                                 |                                   |                             |                                   |                             |                                   |
| R 404A <sup>6</sup>      | ALL                 | EMKARATE RL 22HB CRODA             | ISO VG 22                         | EMKARATE RL 22HB CRODA           | ISO VG 22                         | EMKARATE RL 22HB CRODA          | ISO VG 22                         | EMKARATE RL 22HB CRODA      | ISO VG 22                         | -                           | -                                 |
| R 407C <sup>6</sup>      | ALL                 | EMKARATE RL 22HB CRODA             | ISO VG 22                         | EMKARATE RL 22HB CRODA           | ISO VG 22                         | EMKARATE RL 22HB CRODA          | ISO VG 22                         | EMKARATE RL 22HB CRODA      | ISO VG 22                         | -                           | -                                 |
| R 502                    | ALL                 | -                                  | -                                 | RENISO EM 46 <sup>2</sup> FUCHS  | ISO VG 46                         | RENISO EM 46 <sup>2</sup> FUCHS | ISO VG 46                         | RENISO EM 46 FUCHS          | ISO VG 46                         | -                           | -                                 |
| R 600a                   | LBP <sup>5</sup>    | AVIA FCA 15EP BANTLEON             | ISO VG 15                         | -                                | -                                 | -                               | -                                 | -                           | -                                 | AVIA FCA 7EP BANTLEON       | ISO VG 7                          |
| R 600a (BPK/NBK BPE/NBT) | LBP HIGH EFFICIENCY | AVIA FCA 10EP BANTLEON             | ISO VG 10                         | -                                | -                                 | -                               | -                                 | -                           | -                                 | -                           | -                                 |
| R 600a (NBU)             | -                   | AVIA FCA 7EP BANTLEON              | ISO VG 7                          | -                                | -                                 | -                               | -                                 | -                           | -                                 | -                           | -                                 |
| R 290                    | ALL                 | -                                  | -                                 | EMKARATE RL 22HB CRODA           | ISO VG 22                         | EMKARATE RL 22HB CRODA          | ISO VG 22                         | -                           | -                                 | -                           | -                                 |

Notes: LBP = Low Back Pressure      HBP = High Back Pressure  
MBP = Medium Back Pressure      AC = Air Conditioning

<sup>1</sup> Except for E 6187A, E 6187B after November 1993 and E 6170A 115V - 60Hz

<sup>2</sup> Except for T 5185A and T 6185A

<sup>3</sup> Except for B6144E and B6152E (SHELL V-7041 ISO 32)

<sup>4</sup> Except for E 7213F

<sup>5</sup> All models except for BPK and NBK very high efficiency models

<sup>6</sup> Before December 1st, 1996, Mobil Arctic EAL46 was used

<sup>7</sup> Color of the mark applied on the top of the compressor shell BP, NB, B, E, T, J. For the

EM compressors a white mark is applied on the top of the cover plus description: mineral or ester

<sup>8</sup> NBK, NBT-LBP.

| LUBRICANT       | TYPE         | COLOR CODE <sup>7</sup> |
|-----------------|--------------|-------------------------|
| AVIA FC 32      | MINERAL      | WHITE                   |
| AVIA FCA15EP    | MINERAL      | PINK                    |
| AVIA FCA 10EP   | MINERAL      | ORANGE                  |
| AVIA FCA 7EP    | MINERAL      | RED                     |
| RENISO EM46     | ALKYLBENZENE | LIGHT BLUE              |
| V-7041          | ALKYLBENZENE | GREEN                   |
| EMKARATE RL22HB | POLYOL-ESTER | YELLOW                  |
| ARCTIC EAL46    | POLYOL-ESTER | RED                     |

1.3 - PRODUCT LINE - CHINA

| REFRIGERANT | COMPRESSOR SERIES           |                                   |                             |                                   |
|-------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|
|             | EMT/EMU/EMR/EMY/EMZ/EMX/EMB |                                   | EMT/EMU/EMY                 |                                   |
|             | Lubricant Type and Supplier | Viscosity Grade, 40°C cSt (mm²/s) | Lubricant Type and Supplier | Viscosity Grade, 40°C cSt (mm²/s) |
| R 134a      | –                           | –                                 | EMKARATE RL 7H (CRODA)      | ISO VG 7                          |
| R 600a      | MICROLAB 240 (Microquímica) | ISO VG 5                          | –                           | –                                 |

2 - OIL DISPOSAL AFTER COMPRESSOR USE \_\_\_\_\_

In order to avoid inadequate disposal that could cause environmental hazards, the used oil must be discharged to final treatment at companies authorized by the environmental agencies. t

Subject to alteration without previous notice.