

RC REFRIGERATION COMPRESSOR OIL SERIES

RC300 / RC500

OPERATION AND HANDLING INSTRUCTIONS

Document no.	Revision	Issue date	Release status
MOTTA-RC-OHI-EN	REV.02	2026-09-13	Issued for use

Use with the current product TDS, SDS, the compressor manufacturer's instructions and refrigerant safety rules. Issued by MOTTA Lubricants. The current revision of this document is published at motta-lube.com/documents/ — if your copy differs, that list governs.

1 Scope

This document applies to the selection, charging, start-up, in-service monitoring, oil draining and oil change of MOTTA RC300 and RC500 refrigeration compressor oils. For use only by qualified refrigeration technicians, working to the refrigerant-handling rules that apply on site.

Not covered: automotive air-conditioning compressors, hydrocarbon (R290, R600a) and HFO refrigerant systems, and air or process-gas compressors (see MOTTA-S-OHI), unless suitability is confirmed in writing by the compressor manufacturer.

The compressor manufacturer's oil specification, the product TDS and SDS, refrigerant safety rules and local regulations take precedence. Where requirements conflict, apply the stricter condition.

- User responsibility: confirm the refrigerant, compressor type, viscosity grade and seal materials.
- Operator responsibility: record oil charged, oil drained, analysis results and abnormal events.
- Technical boundary: this document does not replace system design or professional refrigeration engineering judgement.

MOTTA products covered by this handbook

Product	Grades	Standards and performance levels	Pack sizes
MOTTA RC300	VG 32, VG 68	ISO 6743-3	18L / 200L
MOTTA RC500	VG 15, VG 22, VG 32, VG 46, VG 68, VG 100, VG 220	ISO 6743-3	18L / 200L

Grades, standards and pack sizes as published on each product's technical data sheet at motta-lube.com/products/. Where a data sheet and this table differ, the data sheet governs.

ISO 6743-3 is the classification cited on both data sheets. No compressor-manufacturer approval is claimed unless separately documented. RC300 is for ammonia; RC500 is for HFC and carbon dioxide.

2 Selection (critical: the refrigerant decides the oil)

Important: RC300 and RC500 are built for different refrigerants, not for different price levels. They must not be substituted or mixed. Choose by refrigerant first, then by the viscosity grade the compressor manufacturer specifies.

Product	Data-sheet base oil	Refrigerant	Key point
RC300, ISO VG 32 and 68	Highly refined naphthenic mineral oil	Ammonia (R717); selected halocarbon systems only where the equipment manufacturer confirms	Not for HFC systems: mineral oil does not dissolve in HFC refrigerant and will not return from the evaporator
RC500, ISO VG 15–220	Full synthetic — base type not stated on the data sheet; confirm before use	HFC and carbon dioxide (R744), where confirmed for the grade	Not for ammonia unless the compressor manufacturer confirms the chemistry; handle as moisture-sensitive

- Seals and materials: confirm elastomers, motor insulation (hermetic and semi-hermetic compressors) and any plastics are compatible with the oil and refrigerant together.
- Retrofits between refrigerant families need the compressor manufacturer's procedure, including the residual old oil allowed. Do not retrofit by oil change alone.
- Verify product name, grade, batch number and an intact, moisture-tight seal.

3 Charging and moisture control

- Evacuate the system to the manufacturer's vacuum level before charging, to remove moisture and non-condensable gas.
- Charge from a closed container with a clean, dry pump. Keep the time the oil is open to air as short as possible.
- Use the smallest pack that suits the job. Reseal part-used containers at once; RC500 left open absorbs moisture from the air.
- Charge the quantity the compressor manufacturer specifies; do not estimate. Record product, grade, batch and quantity.
- Take a new-oil reference sample of the batch for acid number and water content.

4 Start-up

- Energise crankcase heaters for the time specified before starting, so refrigerant does not dilute the oil at start.
- Start at low load. Watch oil level, oil pressure, discharge temperature and foaming in the sight glass.
- Confirm oil is returning to the compressor before loading fully.

Foaming in the sight glass at start or a falling oil level points at refrigerant dilution or poor oil return. Investigate before continuing to load.

5 In-service monitoring and oil draining

The two refrigerant families manage oil in opposite ways: in HFC and CO₂ systems the oil circulates and must return; in ammonia systems it separates and collects at low points.

Item	Minimum requirement	Key judgement point
Oil level	Check the sight glass at a fixed interval	A steady fall means poor return, carry-over or a leak
Oil pressure	Watch reading and trend where fitted	Low pressure means inadequate lubrication — act at once
Discharge temperature	Record against the compressor's allowed limit	A sustained rise degrades the oil and points at a system fault
Ammonia plants: oil drained	Record quantity drained from oil pots, receivers and evaporators	A rising quantity means carry-over from the oil separator
Appearance	Watch for darkening, sludge or an acrid odour	Points at acid formation, moisture or overheating

Ammonia safety: drain oil only by the site procedure, with trained staff and the required protective equipment. Ammonia dissolved in the drained oil is released as it warms. Oil drained from an ammonia system is waste — never return it to the compressor.

6 Oil-change judgement

No oil-change interval is promised independent of the system. Many hermetic compressors run for their life without an oil change; open and semi-hermetic compressors are managed by the manufacturer's interval and oil analysis. The compressor manufacturer's criteria take precedence.

Parameter	Continue in service	Caution / investigate	Change oil
Acid number	Near the new-oil reference	Rising: check moisture and filter-drier condition	At the compressor manufacturer's or laboratory's limit
Water content	Near the new-oil reference	Rising: change the filter-drier and check for leaks on the low-pressure side	Above the manufacturer's limit after correction
Appearance	Clear, normal colour	Slight darkening	Dark, sludgy or acrid — suspect overheating or motor burnout

Note: suspected motor burnout in a hermetic or semi-hermetic compressor is handled by the refrigeration clean-up procedure — acid test, filter-driers and system cleaning — not by an oil change alone.

Recommended methods: acid number ASTM D664 or ASTM D974; water content ASTM D6304 (Karl Fischer); field acid test kits for screening. The laboratory may add dielectric strength and wear-metal analysis.

7 Top-up, mixing and oil change

- Top up only with the same product and grade already in the compressor.
- Never mix RC300 and RC500, or either with another refrigeration oil type.
- Use oil from sealed containers; do not use oil from a container left open.
- Changing oil: follow the compressor manufacturer's procedure, change filter-driers, re-evacuate and record.

8 Shutdown and abnormal-condition handling

Situation	Primary action
Maintenance requiring the circuit to be opened	Recover or isolate refrigerant by the site procedure before opening
Low oil level or oil pressure	Stop and check oil return, separator, carry-over and leaks
High discharge temperature	Reduce load or stop; check refrigerant charge, condenser and superheat
Suspected motor burnout	Stop; follow the refrigeration clean-up procedure; do not restart on new oil alone
Refrigerant or oil leak	Isolate; apply refrigerant safety rules — ammonia is toxic; clean up oil per the SDS

9 Reference values — indicative, not a MOTTA specification

The figures below are published industry references, given so that a reading can be judged on site when the machine documentation is not to hand. They are screening prompts, not scrap limits. Where the equipment manufacturer, the component manufacturer or your oil analysis laboratory states a figure, that figure governs and this table does not apply.

Specification reference

Reference	What it covers	Published by
ISO 6743-3	Classification of lubricants for compressors, including refrigeration compressors	ISO
ISO 3448	Viscosity grade classification	ISO

When a reading is worth investigating

What is measured	Prompt to investigate	Why this figure
Acid number	A rise against the new-oil reference, confirmed on resample	Acids come from moisture, overheating or motor burnout and attack motor insulation and bearings
Water content	A rise against the new-oil reference	Moisture reacts with refrigerant and oil to form acids; the compressor manufacturer sets the limit
Kinematic viscosity at 40 °C	More than ± 10 % from the new-oil reference	A fall points at refrigerant dilution; any change can mean the wrong oil was added
Oil level and foaming at start	A falling level, or persistent foam in the sight glass	Poor oil return or refrigerant dilution; check crankcase heating and the oil separator
Discharge temperature	A sustained rise against the compressor's normal	Oxidation rate roughly doubles for every 10 °C — the standard rule of thumb

A single result is a reason to look, not a reason to drain. Establish the new-oil reference for the product actually in use, trend against it, and find the cause before changing the oil — changing the oil does not remove a contamination source or a mechanical fault.

10 Storage and waste oil

- Keep in the original sealed container in a cool, dry place. Do not store open or part-used containers.
- Store RC300 and RC500 separately and label them clearly.
- Collect used and drained oil separately. Oil from ammonia systems must be degassed by the site procedure before it is handled as waste oil. Hand it to a compliant disposal organisation under local regulations.

Use and document information

Caution: this document provides general operating guidance. It is not system design, a refrigerant-safety procedure, legal advice or a guarantee of results for any specific equipment, country or site.

- Conditions of use: confirm the product with the compressor manufacturer for the refrigerant used. Any unconfirmed substitution or retrofit requires a written technical assessment first.
- Data and limits: grades, charges, analysis limits and other figures are governed by the compressor manufacturer's documents, the product TDS and SDS and your laboratory. This document sets no general guaranteed values.
- Limitation: to the extent permitted by applicable law, MOTTA gives no warranty for loss arising from incorrect selection, moisture contamination, unconfirmed mixing, system defects or failure to follow mandatory requirements. This does not exclude liability that cannot be excluded or limited by law.

Revision 02: moved to the current MOTTA document format; separated RC300 (ammonia, mineral) from RC500 (HFC and CO₂, synthetic); removed an unconfirmed base-oil statement; added oil return, oil draining and ammonia-safety guidance and moisture control; added reference values, the table of MOTTA products covered, and the copyright and trademark notice.

Recommended Records to Retain

Record	Details to retain
System	Unit number, compressor type and model, refrigerant, oil charge.
Product	Full product name, grade, batch number, quantity charged.
Operation	Charging, draining, oil changes, filter-drier changes, dates, person responsible.
Oil analysis	Sample date, acid number, water content, appearance, action.
Abnormal event	Low oil level or pressure, high discharge temperature, burnout, leaks, action taken.

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