

# SERVICE

## MAKES MORE OUT OF REFRIGERATION.

COFELY Refrigeration offers more than just conventional service.



BUILDING SERVICES

ENERGY SERVICES

FACILITY SERVICES

REFRIGERATION

**COFELY**  
GDF SUEZ

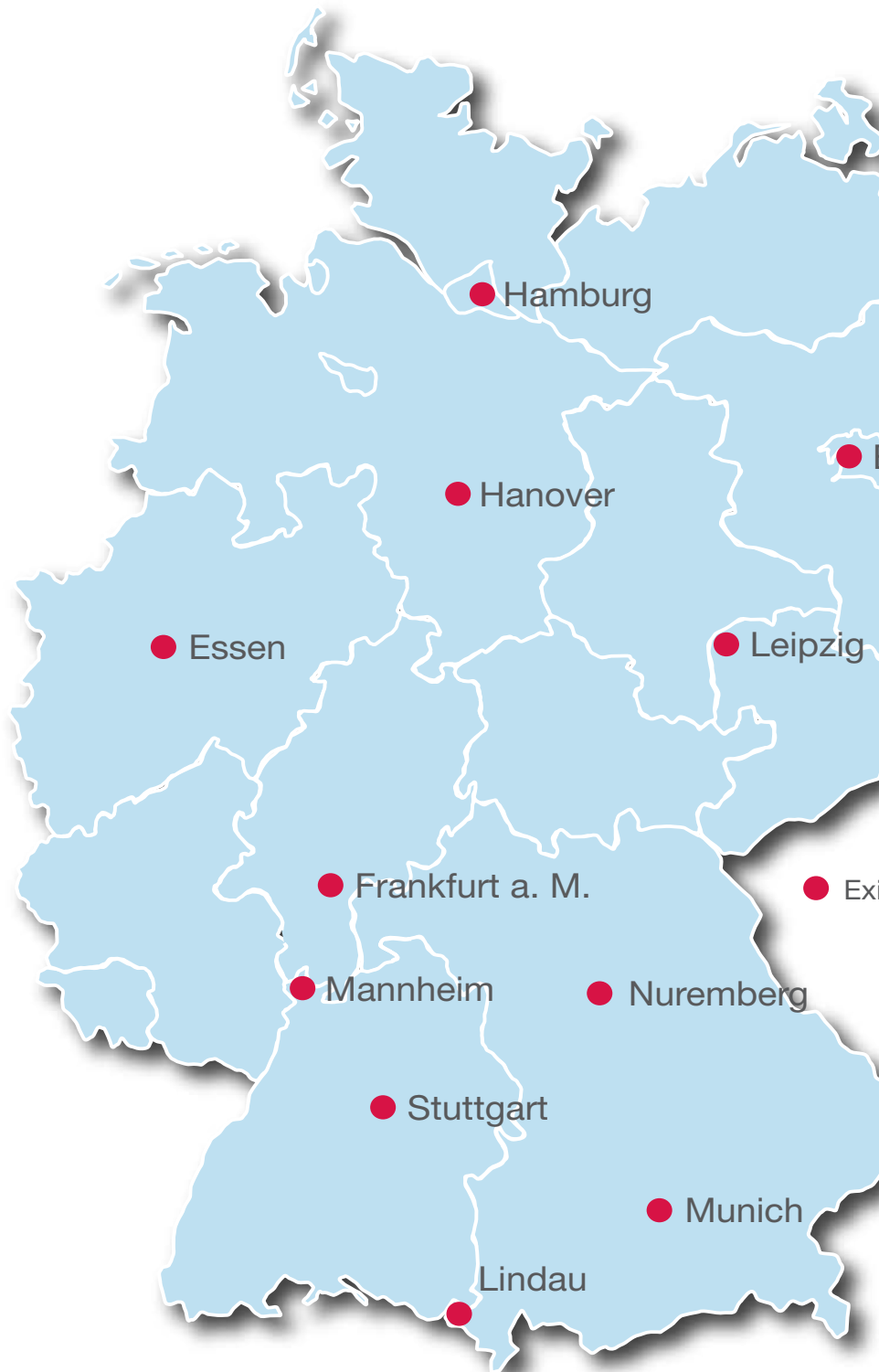
# COFELY REFRIGERATION IS CLOSE TO YOU EVERYWHERE.

With our regional service network in Germany, we are quickly at your side.

The importance of service increases proportionately to the complexity of the advancement in ultra-modern production. COFELY Refrigeration provides a service network with complete regional coverage and short access routes. Our extensive, central warehouse and the inventory available at each individual branch office guarantees fast replacement using original spare parts. The total servicing of your refrigeration system is carried out quickly and competently by our personnel.

We offer you service for the complete life cycle of your system – special priorities are work safety, economy and environmental protection. Through modification and professional maintenance, great savings can be made on existing systems. Our specialists are glad to consult with you.

The broad training program offered by COFELY's Refrigeration Academy, enables you and your workers to recognise operational irregularities and repair small disturbances. And of course, our regional offices train your workers on-site.



**Figure 1:** The service network from COFELY Refrigeration in Germany and all its branch offices.

**SERVICE**

We accompany you throughout the whole life cycle of your system. Routine maintenance, servicing, inspection, repairs – our service team offers you all this on-site. You can rely on our competence through established know-how, speed due to regional presence and reliability by principle.

**ENERGY MANAGEMENT**

You want your refrigeration to be more efficient and transparent to operate? We look for savings and cost potential savings ensuring that your refrigeration system is perfectly adapted to your application. Through minimal adjustments, the life of your refrigeration machine can be prolonged. Through modification to modern components and operating fluids, we optimise your refrigeration system and bring it to the most current state of technology.

**SPARE PARTS WITHOUT COMPROMISE**

Our extensive, central warehouse, as well as the local stockage in the individual branches, guarantees you quick replacements with original spare parts of all current proprietary brands:

- Other brands
- Traditional brands, such as Borsig-liquid chiller units
- Our own products such as cooling towers and QUANTUM

We are there for you – no matter which replacement part you need. Contact us and test our first-class COFELY Refrigeration Spare Part Service.

Berlin

isting Branches



# COFELY REFRIGERATION IS EXPERIENCED IN SERVICE.

Professional maintenance, industry and system service.

COFELY Refrigeration is a service specialist with experience. Our routine maintenance of power plants strictly complies with the guidelines of VDMA Regulation 24186. As a reliable service partner for small refrigeration plants up to completely refrigerated central warehouses, and in addition to an inspection and maintenance contract, we offer professional service which includes the disposal of exchanged operating fluids according to regulation. A routine inspection of your system by specialists, assures not only reliability but also improves the degree of effectiveness and longevity.

## THE ADVANTAGES OF REGULAR PROFESSIONAL MAINTENANCE.

- Guarantee and improve the reliability of your refrigeration system
- Improve the system's degree of effectiveness
- Reduce standstill time
- Extend the life of the system
- Manageable costs for operation safeguarding
- Improve the system's reliability

### Professional maintenance and repair of refrigeration systems.

Definition, goals and specification profile according to VDMA 24186/DIN 31051

#### Inspection

Measures to ascertain and access the present condition:

- Record the current state by means of testing and measuring specific system performance data and results
- Deduce the necessary consequences and lay appropriate measures to reach the target condition

#### Maintenance

Measures to keep the target condition:

- Create a specific maintenance plan
- Implement all control and maintenance steps: tests, adjustments, replacements and prolongation
- Keep a protocol
- Guaranteed spare parts inventory

#### Repairs

Measures to restore the target condition:

- Plan and execute maintenance measures including correct disposal of used materials
- Implement constructive changes to correct weak points
- Do function tests, examine and optimise operation

# COFELY REFRIGERATION IS ALWAYS READY FOR YOU.

With the nationwide, 24/7 hotline, you reach the COFELY Refrigeration Repair Service around the clock.

Disturbance in refrigeration systems means production stillstand and waiting. Through regional customer representation and 24-hour service availability, our service team is immediately present to solve your problem. Whether it is a fast unexpected repair, or a planned one: we analyse the malfunction and damage, eliminate the weak points and keep expensive standstill times to a minimum.

A quick supply of spare parts is guaranteed because of the extensive inventory at the central warehouse and regional service offices.

NATIONWIDE HOTLINE

**+49 8382 706-333**

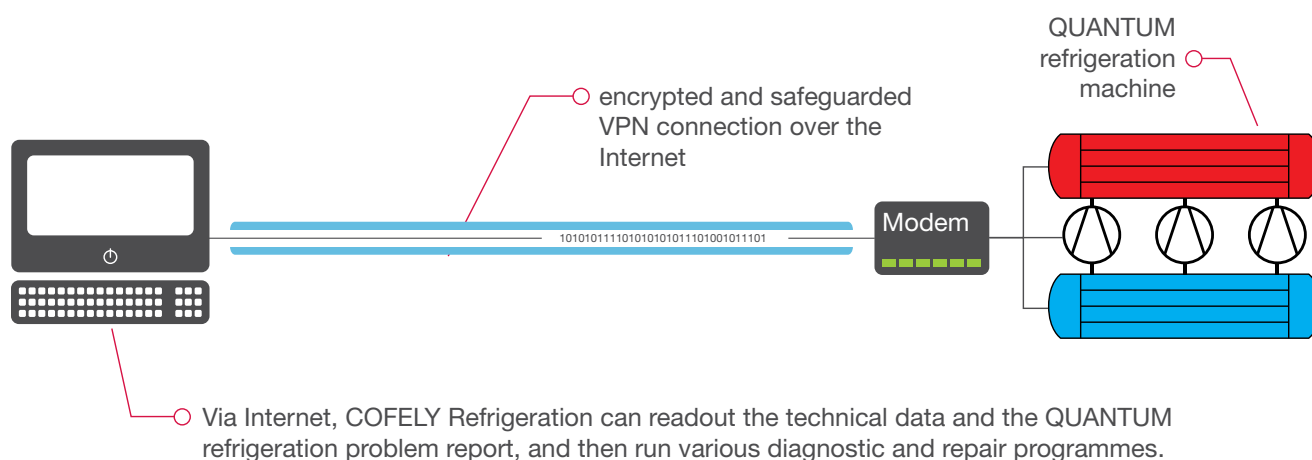
You reach our emergency repair service around the clock under this number.

## REMOTE MONITORING

For remote monitoring, an analogue modem can be installed on the refrigeration system on request. In the case of a disturbance, refrigeration experts from COFELY Refrigeration can be put

directly in contact with your system. That way they are in the position to diagnose and eventually also fix the malfunction. If it is not possible to correct the disturbance over remote monitoring,

the specialists from our repair service could at least name the exact tools and spare parts needed. That shortens the repair time enormously.



**Figure 2:** Schematic diagram of remote monitoring operation. Over a safeguarded data connection, COFELY Refrigeration can gain access to the refrigeration machine.

# COFELY REFRIGERATION PROVIDES VALUABLE SERVICE.

Our service brings you up to the current level of technology.



In order to avoid or postpone the investment costs of a replacement, a small adjustment or modification is often enough to prolong the life cycle of a refrigeration system. In addition to standard maintenance, COFELY Refrigeration offers many other services to optimise the longevity of your system. We pay special attention to energy efficiency and the optimisation of existing systems while taking environmental aspects and legal regulations into consideration.

## An overview of energy management.

QUANTUM-Retrofit	<a href="#">page 7</a>	Gas Warning Systems and Imperviousness Checks	
R22 Phase Out: Refrigerant Conversion		Oil Analyses/Tube Tests	
Cooling Tower Modification to Continuously Variable Revolution Control		Oscillation Measurements	<a href="#">page 10</a>
Pressure Tank Service and New Piping of Evaporators and Condensors	<a href="#">page 8</a>	Thermography/Infrared Camera	
Eddy Current Tests		Coating and Wall Thickness Measurements	
Volumetric Current Measurements		Power Cabinet Maintenance	<a href="#">page 11</a>
Risk and Legal Conformity Analyses	<a href="#">page 9</a>	Changeover from S5 to S7	

### QUANTUM RETROFIT CONVERSION

To update your refrigeration system does not necessarily mean that a new system needs to be exchanged for the old one. Oftentimes, changing the compressor is enough. The oil-free, magnetic bearing QUANTUM compressor works using the enduring refrigerant R134a and distinguishes itself by its high energy efficiency plus compact construction. With the QUANTUM Retrofit offer from COFELY Refrigeration, your existing refrigeration machine can stay where it is. Only the compressor and power cabinet would be exchanged. Necessary pipe replacement on-site could also be done. We would professionally dispose of the old compressor.

#### Advantages.

- Possibility to convert all types of systems
- Work out the best economic solutions according to customer requests
- Professional disposal of used refrigerant
- Solutions that last

### R22 PHASE OUT: REFRIGERANT CONVERSION

Starting in 2010, the chlorine containing refrigerant R22 that has been used in many refrigeration systems up to now will only be allowed to be used in recycled form for service and maintenance. Ultimately in 2015, the use of R22 will be completely banned. Correspondingly, the availability on the market will sink. This will result in a dramatic increase in the price of recycled R22.

In combination with strict legal requirements, this situation has developed into a commercial risk for refrigeration system operators. In order to confront this development, a punctual phase out period should be

planned. COFELY Refrigeration could consult with you offering you and your system the best economical solution.

#### Advantages.

- Fulfil the legal requirements
- Secure a future for the system
- Possibility to convert all types of systems
- Professional disposal of used refrigerant
- Solutions that last

### COOLING TOWER CONVERSION TO CONTINUOUSLY VARIABLE REVOLUTION CONTROL

COFELY Refrigeration modifies standard cooling towers over to continuously variable frequency working

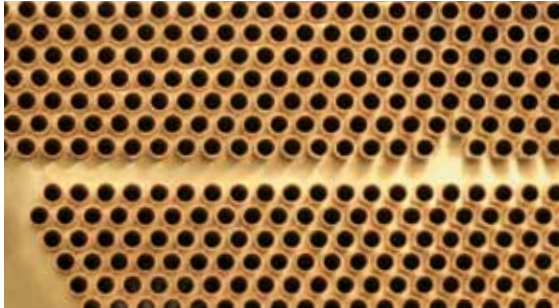
drives. Constant better economy is achieved through less electrical consumption.

#### Advantages.

- Improved economy by using the continuously variable frequency converter which reduces energy consumption
- Less material wear on the ventilator due to smooth starts without electrical peaks
- Excellent compatibility of the frequency converter with the ventilation motor
- Constant water temperature and precise control due to the continuously variable regulation
- Makes no noise during speed changes

### PRESSURE CHAMBER SERVICE AND SECONDARY PIPING FROM THE EVAPORATOR AND CONDENSER

In order to maintain the value of the unit or in case of damage, COFELY Refrigeration offers new piping of the evaporators and condensers as well as tube



**Figure 3:** New copper piping in the tube plate of a heat exchanger.

#### Advantages.

- Minimal dismantling costs and shortened standstill times due to on-site service
- Complete realisation of calculations and documentation
- All common types of internal piping and spare parts are readily available

bundling in the heat exchanger. The retrofitting of the tube plates or the application of corrosion protection and surface coatings are further comprehensive service measures for the pressure vessel. In case of damage, we will make an assessment and cost estimate. We are certified according to the Pressure Equipment Directive 97/23/EG.

### EDDY-CURRENT TESTING

A sensor is put over or through the object to be tested for cracks. As long as there are no damages to the material, the electric resistance is homogeneous and the eddy-current flows evenly in the material. If, however, the element to be tested has an inclusion of foreign matter, whose specific resistance is

#### Advantages.

- Early detection of defective piping in the heat exchanger before leakages happen

smaller than the remaining material, the electrical current density in the inclusion will be larger than in the surroundings. The opposite is true if the inclusion has a larger specific resistance or if there is a hair-line crack, around which the electricity must flow. In any case, the eddy-current density is altered in comparison to the undamaged part. Testing sensors are used, whose coils are switched so that small alterations of the material properties or the distance of the sensors to the surface of the material is largely compensated.

### VOLUME FLOW RATE MEASURING

The volume flow rate of fluid media in the filled piping can be quickly and easily recorded with the mobile ultrasonic flow-rate measuring device. Quantity of heat and temperature measurements are also possible. The generated or consumed energy for cooling or heating circuits is calculated according to the



**Figure 4:** One of the ultrasonic probes, which transmits the flow-through data to the mobile measuring device.

#### Advantages.

- Prevent overrunning (= larger volume flow) of the heat exchanger; avoids subsequent damage of the interior piping
- The actual flow-through is checked, whereby the pumps can be more accurately adjusted to the unit

flow-rate amounts and the supply and return temperatures. Supply and discharge temperatures can be measured by two PT100-Clamp-On Probes. The total measuring set-up can be done rapidly and without having to tamper with the piping.

### RISK AND LEGAL CONFORMITY ANALYSIS

The experts at COFELY Refrigeration carry out **risk analysis according to the Labour Protection Laws and the Industrial Safety Regulations**. Following an on-site inspection, you will receive a detailed report about possible deviations to the legal stipulations and sound solution suggestions.

We also offer the **verification of conformity to VDE (Association of German Electricians) 0113**. The VDE guideline 0113 from the Association of Electrical Engineering, Electronics and Information Technology regulates the safety of machinery and the electrical

equipment on machinery. We bring your refrigerating plant up to the required safety regulations and standards.

The Federal Water Act (WHG) establishes in paragraphs G to L of §19 regulations for installations having substances hazardous to water and the proper handling thereof. These statutes are binding for you as the operator of a refrigerating plant and we support you in conforming to the implementation of the regulations, so that you are on the safe side.

### GAS LEAK DETECTOR AND IMPERVIOUSNESS CHECKS

The EC regulations EN 842/2006 and EN 378-3/2008 stipulate the use of gas leak detectors for refrigerating plants with more than 300kg of refrigerant. Detectors in plants with a smaller amount are also worthwhile since the existence of a gas leak detector reduces the frequency of the mandatory imperviousness checks (operator's responsibility). The intervals

for imperviousness checks depend on the filling capacity: plants with more than 3kg must be checked every 12 months, plants with more than 30kg every six months and plants with more than 300kg every three months. The installation of a gas leak detector cuts the frequency in half for plants with a filling capacity of more than 30kg.



**Figure 5:** The function of a gas probe at ground level is checked by means of a test gas.

COFELY Refrigeration offers gas leak detectors in various models. Leakage recognition systems, from compact systems to highly variable 19-inch plug-in modules, can be installed for various industrial gases.

#### Advantages.

- Fulfilment of the legal regulations
- Reduction by half of the mandatory leakage checks for plants with a filling capacity between 30 and 300 kg
- Early warning of gas leakages prevents personal injury or damage to the unit

### OIL ANALYSIS/TUBE TESTS

Our oil analysis can be completed in two different ways. A rapid analysis permits an on-site check of water or acid residue in the refrigeration circuit. During a thorough analysis, the oil is removed from the plant and sent to our lab. You then receive a complete status report about the refrigeration circuit.

#### Advantages.

- Damages due to acid or water in the refrigeration circuit can be detected early before greater damage is done to the compressor or other plant components

**OSCILLATION MEASUREMENTS**

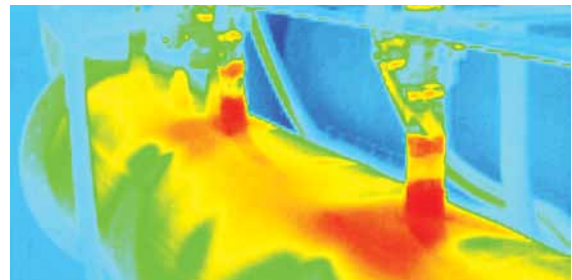
A mobile measuring device, which can record not only the vibrating data but also frequency spectrums of the casing oscillation, is used for the oscillation measurement. An accelerometer serves as sensor and is attached to the casing surface by magnets. The oscillation measurement is part of routine maintenance within the scope of operational monitoring. Increasing oscillation levels at constant operating conditions and charge state indicate a deteriorating condition of the plant.

**Advantages.**

- Collecting and comparing oscillation values at defined intervals or at a constant sequence allows for conclusions to be made about the wear and tear and mechanical condition of the monitored machine
- Early recognition of damages and avoidance of interruptions and plant shutdowns

**THERMOGRAPHY/INFRARED CAMERA**

Thermography is a non-contact measuring process for surface detection of heat emissions from objects, buildings and machines. The surface temperature gradation and changes can be made visible in real time with the help of a special camera. Hence conclusions can be made about non-visible flow processes, diminishing density of insulating materials and uncommon heat development on electrical components.



*Figure 6: The change of colour on the thermal image from red to green/blue shows the process of the distribution of the warm refrigerant in the condenser.*

**Advantages.**

- Energy saving due to recognition of defective insulation
- Identification of peculiar contactors in the switch cabinet, before these blow or lock up and ring about repairs
- Drive motors of pumps, compressors and ventilators can be examined and, if there are abnormalities, targeted action can be taken
- Cold or heat loss on the plant can be recognised and targeted action can be taken

**WALL AND COAT THICKNESS MEASURING**

During the coat thickness measuring, the thickness of non-conducting coatings on metal surfaces is determined. Typical application is to determine the colour-layer and rubber-backed coatings on containers and piping of the refrigerating machine. This is an important procedure for early detection of corrosion. By wall thickness measuring, the material thickness

**Advantages.**

- Exact information about the layer thickness of rubber-coatings, priming coats or corrosion protection can be given
- Prevention of a possible refrigerant leak on to the heat exchangers or piping
- Early detection of damages
- Avoidance of interruptions and plant shut-down



*Figure 7: Coat thickness measuring of a ferrous surface (see Fe-designation).*

on heat exchangers and piping is determined, to detect whether these have lost wall thickness due to visible corrosion or cavitation pitting (damages due to pressure fluctuations).



### SWITCH CABINET MAINTENANCE

Routine switch cabinet maintenance protects against damages to the electronics and motors. It includes a comprehensive visual check of all components and a tensile test of the cables located in the switch cabinet. Furthermore all terminal screws



#### Advantages.

- Neither the contactors nor the motors blow out because of loose clamps
- Early detection of defective components by means of the infrared thermography, which preemptively avoids damages

on the contactors and auxiliary contactors, on the coupling relays and cable clamps are checked for tightness. By means of the infrared thermography, defective electrical components are recognised by their excessive heat radiation and can be pinpointed and exchanged.

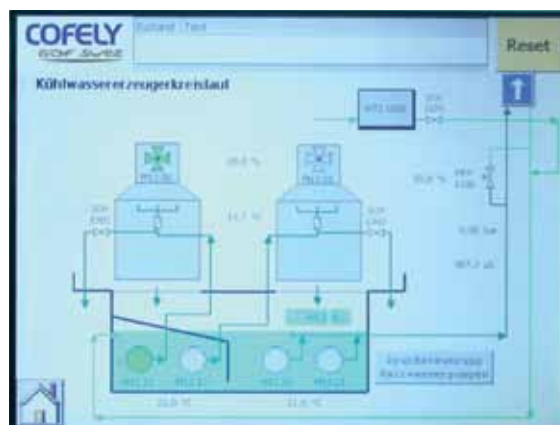
**Figure 8:** One testing method during the switch cabinet maintenance is to test the heat development of the electrical switching units.

### CHANGEOVER FROM S5 TO S7

The S7 touch panel from Siemens is the newest generation of touch-sensitive operating panels. In contrast to the previous models, they offer many technical advantages; such as greater data transparency, better diagnostic possibilities and more ruggedness. The brilliant display quality convinces many customers. COFELY Refrigeration offers an upgrade from the S5 to the S7 touch panel as an integrated service

#### Advantages.

- More programming and control possibilities
- Better legibility with brilliant displays
- Faster maintenance due to optimised software



**Figure 9:** S7-Operating panel for two EWK-cooling towers.

feature. We exchange operating elements and adjust the SPS unit programming to the newest state of the art standard.

COFELY is Europe's leading brand for the efficient use of energy. We design the technology as well as supply and manage facilities, systems and processes so that all energy is optimally used – including the people with whom we work. By using our well-developed technical know-how, close contact with customers, over one-hundred years of tradition and the strength of the global GDF SUEZ Group, out of all these factors emerge total solutions where efficiency is standard.

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