



从制冷剂管理角度 分享中国的回收&再利用实践

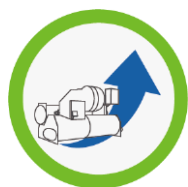
Sharing China's recycling practices from the perspective of
refrigerant management

► 我们的愿景： Our Vision:



十亿吨挑战 Gigaton Challenge

- 帮助客户减少**10亿吨**二氧化碳排放
Reduce customer carbon footprint by **1 gigaton**
- 加速以可持续发展方式制热和制冷的清洁能源技术
Accelerate clean technologies that heat and cool buildings in sustainable ways
- 提升建筑、生宅和运输环境的能效
Increase energy efficiency in buildings, homes and transport
- 减少全球冷链运输中的食品损耗
Reduce food loss in the global cold chain
- 提前实现高全球变暖潜能值 (GWP) 制冷剂的淘汰
Transition out of high-Global Warming Potential Refrigerants



提供高能效的产品
Provide high energy-efficient products



倡导极低GWP制冷剂
Advocate for low GWP refrigerants



全系列电气化产品
Full range of electrified products



碳中和运营 Carbon Neutral

- 实现公司自身的**碳中和运营**
Achieve **carbon neutral** operations
- 实现零垃圾填埋
Deliver zero waste to landfills
- 水资源利用率持续增长
Become net positive with water use
- 10%的能源消耗绝对减少
Reduce absolute energy consumption by 10%



▶ 特灵制冷剂管理流程:

Refrigerant Management Process from Trane:

严格执行制冷剂管理的目的: 环境保护&践行可持续发展战略

The strict implementation of refrigerant management aims to achieve environmental protection and uphold the strategy of sustainable development

Step 1

制冷剂泄露检测

Refrigerant leak detection

- 特灵独有线上自动制冷剂检漏
Online automatic refrigerant leak detection
- 定期的机房制冷剂检漏巡检
Regular refrigerant leak inspections
- 标准化制冷剂现场捡漏操作流程
The standardized on-site refrigerant recovery process

Step 2

制冷剂回收

Refrigerant recovery

- 标准化的制冷剂回收流程
The standardized refrigerant recovery process
- 定期的技术员培训
Regular technician training for Refrigerant recovery operation
- 先进&完备的制冷剂回收工具
Advanced and complete refrigerant recovery tools

Step 3

制冷剂管理软件输入

RMS Software Input

- 定期对回收&填充制冷剂进行记录
Regular recording of refrigerant recovery & refilling
- 版本不断更新的制冷剂管理软件
Continuously updated RMS Software versions

Step 4

审核报告

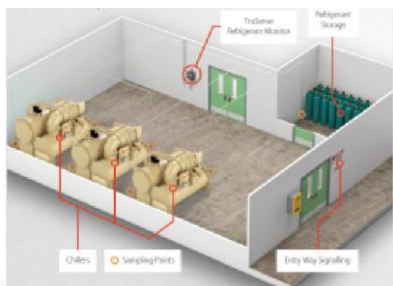
Audit report

- 主管每月通过RMS系统, 进行全国制冷剂管理统计及汇报
Supervisors use the RMS system on a monthly basis to conduct nationwide refrigerant management statistics and reporting
- 总部定期对各区域制冷剂管理情况进行审核
Headquarter regularly audits the refrigerant management in each region

▶ 制冷剂泄露检测: Refrigerant leak detection:

线上自动制冷剂检测, 如发生泄露, 我们和客户将第一时间了解并及时补救
Online automatic refrigerant detection; in the event of a leak, we will be informed immediately and take timely remedial actions

自动制冷剂检测装置 Automatic refrigerant detection device



手动制冷剂检测流程 Manual refrigerant detection process



- ① 校验检漏工具
Verify leak detection tools
- ② 检查所有接缝、螺栓、螺帽等
Inspect all joints, bolts, nuts, etc.
- ③ 检查排气装置
Check exhaust device
- ④ 定期进行制冷剂&油化验
Regularly conduct refrigerant and oil analysis
- ⑤ 记录
Keep records

制冷剂检测标准 Refrigerant detection standards

项目 Item	标准 Standard
检漏频率 (检查是否有泄漏) Leak detection frequency	<p>对于自动制冷剂漏检测的: 可设定 10ppm, 20 ppm, 50ppm作为警告 For automatic refrigerant leak detection, it can be set to trigger a warning at 10ppm, 20ppm, or 50ppm.</p> <p>对于手动制冷剂检测的: 制冷剂重量在50-500磅之间: 每季度检查一次 (4次/年) 制冷剂重量超过500磅: 每月检查一次 (12次/年) For manual refrigerant detection: Refrigerant weights between 50-500 pounds: Check once per quarter (4 times per year). Refrigerant weights exceeding 500 pounds: Check once per month (12 times per year).</p>

▶ 制冷剂回收: Refrigerant recovery:

我们可以提供十年来维修过程中的制冷剂回收报告

We can provide refrigerant recovery reports from the past ten years of maintenance processes

1

对现场制冷剂进行化验
Analyzing refrigerants

对不同制冷剂容器
进行不同颜色标记

Different color labels to mark
different refrigeran
tcontainers

2

制冷剂回收
Refrigerant recovery

更换制冷剂回收装置
的过滤器&干燥器

Replacing the filters and
dryers of the refrigerant
recovery device

3

保真空检测
Vacuum integrity testing

整个过程应确保达
到规定的真空度

The entire process should ensu
-re the specified vacuum level

4

制冷剂充注
Refrigerant charging

使用数字秤记录回收
的制冷剂数量

Using the digital scale to
record the quantity of
refrigerant

5

对回收&充注制冷剂量记录
Recording the amount of
refrigerant In and Out

每个月对回收设备进行
泄漏测试Trane 将此作
为维保工作的重要流程

Performing leak test on each
component of the recovery
equipment every month is an
important maintenance process
that Trane follows.

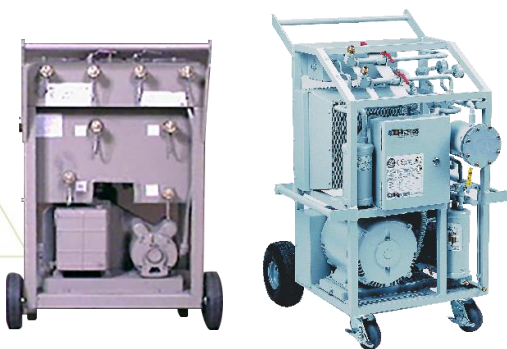
► 工具与培训: Tools and training:

我们并不吝惜在工具以及培训上的投入，并认为这是值得的
We are not hesitant to invest in tools and training, as we believe it is worthwhile

● 制冷剂检测设备
Refrigerant leak detection
equipment

● 工具数量
Quantity of
tools

● 技术员制冷剂实操能力证书
Certificate for Technical Technician's Practical
Operation Ability



设备名称 Equipment name	数量 Quantity	制造商 Manufacturer
低压制冷剂回收设备 Low pressure refrigerant recovery equipment	25	Trane Trane
高压制冷剂回收设备 High pressure refrigerant recovery equipment	50	Trane Trane
检漏仪 Leak detector	60	进口 Imported
真空泵 Vacuum pump	80	进口 Imported



▶ 制冷剂管理软件: RMS Software:

我们还开发了制冷剂管理软件，以切实贯彻我们应尽的义务

We have also developed refrigerant management software to effectively fulfill our obligations

现在
NO
W

Date	Technician	Refrigerant Type	Amount	Wt% Oil
13 May 2009	林明	R-410A	10	0
20 May 2009	林明	R-410A	10	0

Date	Technician	Refrigerant Type	Amount	Wt% Oil
01 Jun 2009	林明	R-410A	10	0
02 Jun 2009	林明	R-410A	10	0
03 Jun 2009	林明	R-410A	10	0
04 Jun 2009	林明	R-410A	10	0
05 Jun 2009	林明	R-410A	10	0
06 Jun 2009	林明	R-410A	10	0
07 Jun 2009	林明	R-410A	10	0
08 Jun 2009	林明	R-410A	10	0
09 Jun 2009	林明	R-410A	10	0
10 Jun 2009	林明	R-410A	10	0
11 Jun 2009	林明	R-410A	10	0
12 Jun 2009	林明	R-410A	10	0
13 Jun 2009	林明	R-410A	10	0
14 Jun 2009	林明	R-410A	10	0
15 Jun 2009	林明	R-410A	10	0
16 Jun 2009	林明	R-410A	10	0
17 Jun 2009	林明	R-410A	10	0
18 Jun 2009	林明	R-410A	10	0
19 Jun 2009	林明	R-410A	10	0
20 Jun 2009	林明	R-410A	10	0
21 Jun 2009	林明	R-410A	10	0
22 Jun 2009	林明	R-410A	10	0
23 Jun 2009	林明	R-410A	10	0
24 Jun 2009	林明	R-410A	10	0
25 Jun 2009	林明	R-410A	10	0
26 Jun 2009	林明	R-410A	10	0
27 Jun 2009	林明	R-410A	10	0
28 Jun 2009	林明	R-410A	10	0
29 Jun 2009	林明	R-410A	10	0
30 Jun 2009	林明	R-410A	10	0

▶ 详细记录每一次维修的制冷剂充注&排放
We meticulously record each refrigerant recharge and discharge during maintenance

▶ 可定期拉出相关报告，做到制冷剂管理可追溯
Regular reports can be generated to ensure traceability in refrigerant management

将来
FUTURE

Service Territory	Parent Territory	Work Order Number	RMS	Location Name	Asset Serial Number	Cylinder ID	Refrigerant Type	Amount Lbs
Total Canada (25)	Montreal (24)	643359 (1)	RMS-42041	Innovadem Recherches Inc	2008-3737-B	23-0113173	R-407C	-
		646127 (2)	RMS-42640	Laval Policores	234010003D	None	R-410A	14
			RMS-42643	Laval Policores	234010003D	None	R-410A	14
		6495483 (12)	RMS-42682	Institut de tourisme et hotelierie du Quebec	U23G01770	24-6495483-7	R-513A	69
			RMS-42680	Institut de tourisme et hotelierie du Quebec	U23G01770	24-6495483-6	R-513A	110
			RMS-42751	Institut de tourisme et hotelierie du Quebec	U23G01785	24-6495483-8	R-513A	9
			RMS-42744	Institut de tourisme et hotelierie du Quebec	U23G01785	24-6495483-2	R-513A	79
			RMS-42740	Institut de tourisme et hotelierie du Quebec	U23G01784	24-6495483-2	R-513A	75
			RMS-42738	Institut de tourisme et hotelierie du Quebec	U23G01784	24-6495483-1	R-513A	179
			RMS-42747	Institut de tourisme et hotelierie du Quebec	U23G01769	24-6495483-2	R-513A	31
			RMS-42748	Institut de tourisme et hotelierie du Quebec	U23G01769	24-6495483-1	R-513A	66
			RMS-42742	Institut de tourisme et hotelierie du Quebec	U23G01769	24-6495483-1	R-513A	100

▶ 更人性化的操作界面
more friendly interface and operation

▶ 更简洁的数据统计
Simpler data statistics

▶ 更快的响应速度
Faster response time

▶ 已在北美上线，即将登录中国
Already launched in North America, will be available in China soon



我们关注 每一磅制冷剂的全生命周期管理

THANK YOU!!