



**Emission  
Solutions**

# 康明斯排放处理系统客户指导手册

Cummins Emission Solution Customer Guide Manual



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## SCR 系统介绍 SCR System Introduction

### 什么是 SCR 系统? What is SCR system

SCR 的中文含义是选择性催化还原, 它是以 32.5% 的尿素水溶液 (DEF) 作为还原剂, 将其注入尾气气流中, 在高温的尾气中 DEF 雾化分解成氨气, 在催化还原剂的作用下, 氨气与尾气中的氮氧化物 (NOx) 发生化学反应, 生成无害的氮气和水。

SCR = Selective Catalytic Reduction. Use of chemistry to reduce vehicle emissions. Urea dosing system is a reductant delivery system that accurately injects a 32.5% solution of urea in water, also known as Diesel Exhaust Fluid (DEF), into the exhaust stream. Utilizing heat from the exhaust the urea and then decomposes into ammonia. The ammonia reacts with the SCR catalyst, converting Nitrous Oxides (Nox) in the exhaust into harmless nitrogen and water.

### 车用 DEF 溶液 DEF Solution for Vehicle

- DEF 是浓度为 32.5% 的尿素水溶液。

DEF is a high-purity 32.5% (by weight) aqueous urea solution, Hot urea melt is drawn directly from the plant and diluted with demineralised water.

- 无毒, 无污染, 清澈的液体, 泄漏出来的尿素很容易变成白色结晶物, 满足 ISO22241 标准, 终端用户和操作人员无法自行生产符合这种严格标准的尿素溶液。It's Non-toxic, Pollution-free, clear liquid, leak out of the urea can easily become a white crystal. The mixture conforms to "ISO022241" standards. End users and operators can not produced by the strict standards of urea solution.

- 在 -11°C 时开始结冰, 存储时间通常为 6-12 个月。

At -11 °C began to freeze. DEF has a typical shelf life of 6-12 months.



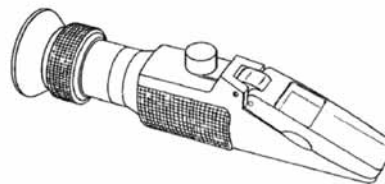
### DEF 浓度折射计 DEF Concentration Meter

- 在下列情况下需要您检查 DEF 溶液的浓度:

- 1、车辆已存放较长一段时间;
- 2、怀疑 DEF 储液罐中加入了水。

Check the DEF concentration. Concentration of the DEF should be checked when:

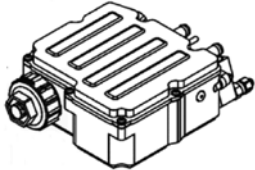
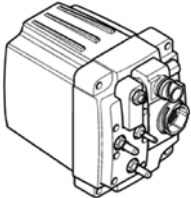
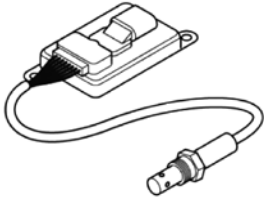
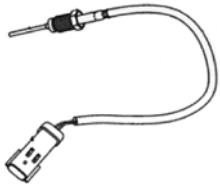

1. The vehicle has been stored for an extended period of time;
2. It is suspected that water has been added to the DEF tank.

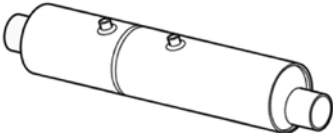
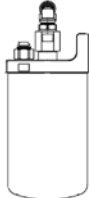
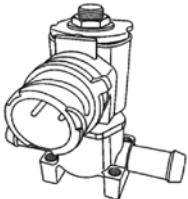
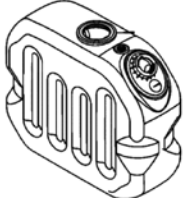
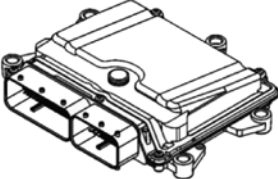
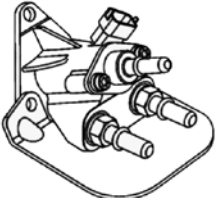
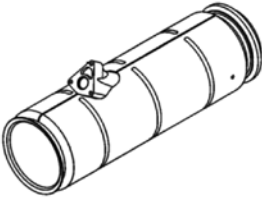


- 如果 DEF 浓度不符合要求，须排干 DEF 罐内 DEF 溶液，并用蒸馏水冲洗，然后加注新的优质 DEF 溶液。  
If the DEF concentration is found to be outside of this specification, drain the DEF tank, flush with distilled water, and fill with new and/or known good DEF.

- 康明斯零件号：4919554，弗列加零件号：CC36049。  
Cummins tool part number: 4919554, Fleet-guard tool part number: CC36049.

## SCR 系统主要零件 Major Parts of SCR System

项目 Item	零件名称 Part Name	零件图 Part Picture
	康明斯计量泵 EcoFit Dosing Pump	
	艾米泰克计量泵 Emitec Dosing Pump	
空气辅助喷射系统 主要零件 Major Parts of Air Assisted Injection System	氮氧化物传感器 NOx Sensor	
	排气温度传感器 Exhaust Temperature Sensor	
	喷嘴 Nozzle	

空气辅助喷射系统 主要零件 Major Parts of Air Assisted Injection System	催化器 SCR Catalyst	
	油气分离器 Air Oil Separator Assembly	
	断水电磁阀 DEF Tank Heater Control Valve	
	DEF 罐 DEF Tank	
无空气辅助喷射系统主要 零件 Parts of Airless Injection System	给料单元 Supply Module	
	计量控制单元 Dosing Control Unit	
	定量喷射阀 Dosing Module	
	分解管 Decomposition Pipe	

## SCR 系统应用 SCR System Application

### 康明斯计量泵 EcoFit Dosing Pump

- 康明斯计量泵为康明斯排放处理系统自主开发的产品，具有独特的创新设计和更高的可靠性。

It is produced from Cummins Emission Solution, EcoFit dosing pump have Innovative Design and Better Reliability.



- 康明斯计量泵滤芯需要定期保养，更换里程为 12 万公里。

The aftertreatment DEF dosing unit filter is a maintenance item. The replacing mileage is 120000km.



### 艾米泰克计量泵 Emitec Dosing Pump



- 计量泵的工作过程大致分为三个阶段：预注、计量喷射、排空。

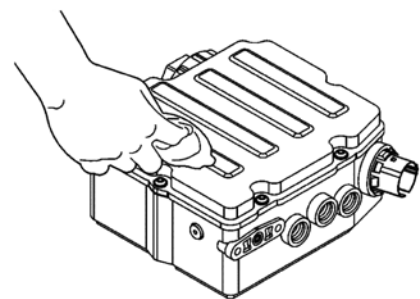
Air assist system process has three stages: Priming, Dosing, Purging.

- 需要确保系统排空的正常进行：当点火开关回到关闭状态时，系统将进入排空阶段。此时压缩空气将任何残留在管路中 DEF 溶液从系统中排出，避免这些液滴可能结晶并堵塞计量泵和喷嘴，此阶段持续 30 秒，然后自动关闭。每次发动机熄火后，都会进行排空工作，因此在发动机熄火后至少 30 秒内切勿断开整车电源。

When the Key Switch is turned to the OFF position the system enters the purging phase. Compressed air flows through the injector and the pump. The air removes any DEF droplets from the system that could otherwise crystallise and block the pump valves, urea lines or the injection nozzle. The phase lasts for 30 seconds then the system switches off, the solenoid can be heard "clicking" off. After turning off the engine for at least 30 seconds do not disconnect the power supply of the vehicle. After turning off the engine for at least 30 seconds do not disconnect the power supply of the vehicle.

- 不要将计量泵浸入任何类型的清洗溶液中。不要用任何清洁剂清洗计量泵，如有脏污只能使用干净的湿布擦拭。

Do not immerse the unit in any type of cleaning solution. Do not wash the unit with any detergents. Use only a clean damp cloth to wipe the unit.

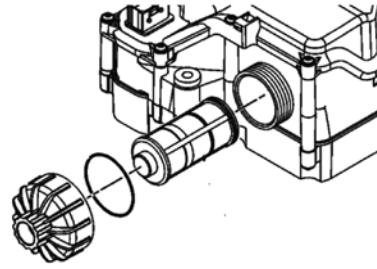


## 油气分离器 Air Oil Separator Assembly

- 油气分离器的作用是阻止压缩空气中的机油等杂质进入 SCR 系统中。  
In order to prevent the oil from the compressed air machine into the SCR system, OEM have to install this component.
- 油气分离器滤芯的更换周期为 60,000 公里。  
The unit is a maintenance item. The replacing mileage is 60000km.

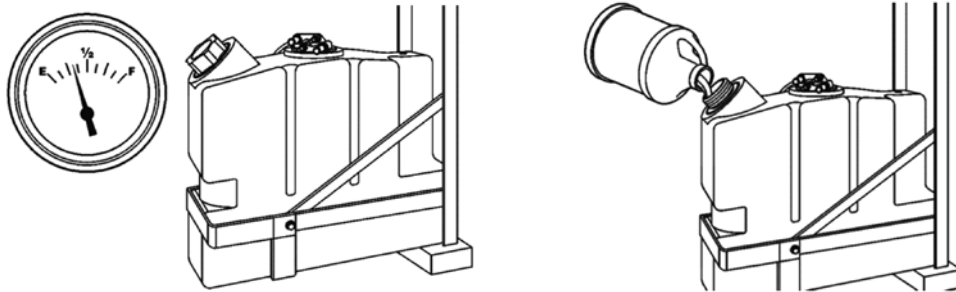


## 博世泵维护要求 Maintenance on BOSCH dosing pump



- 给料单元主滤清器更换间隔为 120,000 公里。  
The replacing mileage is 120,000 kilometers.
- 具体更换间隔随应用的不同有所差别，但不得超过 320,000 公里。  
The interval of replacing is different for different application, but no more than 320000 kilometers.

## DEF 储液罐 DEF tank



- 必须每天检查 DEF 液位，发现不足请及时添加。  
The DEF level must be checked daily, If the level is low, Please add soon.
- 切勿向 DEF 罐加入以下溶液：柴油、水、自制尿素水溶液，否则将导致计量泵严重损坏，并引起发动机降功率。



一旦误加以上溶液，请立即联系当地的康明斯服务经销商，并进行修理。

Use only good quality DEF from a reliable supplier in the DEF tank. Never use diesel fuel, water, or any other fluid in this tank, avoid damage to the dosing system and catalyst. Once use above solution, please contact the local Cummins service dealers immediately to repair it.

- 应保持 DEF 罐加注口、加注设备（漏斗等）及其相邻部位清洁，避免杂质进入。

Keep the DEF tank filler, filling equipment and its adjacent area clean, otherwise the filling DEF solution will make the dust and other impurities into the urea tank, causing clogging of filter, aging, and pollution problems of DEF.



## 高硫燃油对 SCR 系统的影响 Impact of High-Sulfur Fuel on SCR System

### 康明斯柴油燃料标准 /Cummins Inc. Required Diesel Fuel Specifications

- 使用颗粒捕捉器和氧化催化器的发动机柴油硫含量不得超过 15ppm。  
Not to exceed 15 ppm on engines with diesel particulate filters and diesel oxidation catalyst.
- 使用 SCR 系统的发动机柴油硫含量不得超过 50ppm。  
Not to exceed 50 ppm on engines with SCR system.

### 为什么高硫燃油会影响 SCR 系统？

#### Why can High-Sulfur fuel impact on the SCR system?

- 燃油中过高的硫含量将导致催化器硫中毒，活性降低，从而降低氮氧化物的转化效率，继而影响车辆排放指标。  
High-sulfur fuel will lead to S poisoning in the SCR catalyst. It will be reduced for NOx conversion.
- 如果尾气的转化效率过低，氮氧传感器将会监测到车辆排放超标，如不及时维修，一段时间后 ECM 将激活功率限制代码，车辆的使用将会受到较大影响。  
If conversion efficiency of tail gas is too low, NOx sensors would detect vehicle emissions exceed the standard, if not timely to repair. Related fail code of restricted engine torque will be active, at the same time use of vehicles will influence.



## 高硫燃油对环境的影响 Impact of High-Sulfur fuel on environment

- 高硫柴油大大增加了颗粒物和氮氧化物的排放。

High sulfur fuel will lead to an increase of PM (particulate matter) and NOx (Nitrous Oxides) emissions.

- 氮氧化物不仅会导致酸雨，还能诱发光化学烟雾。

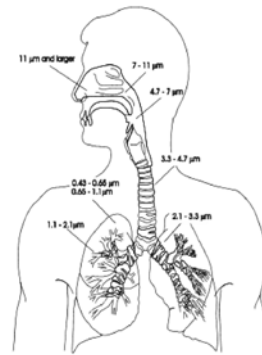
Nitrogen oxides not only causes acid rain, can induce photochemical smog.



- 细小颗粒物将对人的健康造成危害，引发呼吸及心血管疾病。

Fine particles from combustion of high-sulfur fuel will cause harm to human health, cause respiratory and cardiovascular diseases.

- 高硫燃油燃烧生成的积碳坚硬，易导致发动机磨损和腐蚀。  
combustion of high sulfur fuel generates hard carbon, easily lead to wear and corrosion of engine.

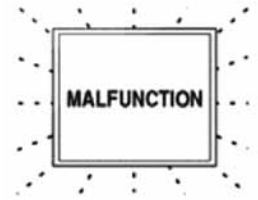


11  $\mu\text{m}$ 及以上颗粒不会进入人体  
7-11  $\mu\text{m}$ 颗粒只能进入鼻腔  
4.7-7  $\mu\text{m}$ 颗粒可到达咽部  
3.3-4.7  $\mu\text{m}$ 颗粒可进入气管及浅层支气管  
2.1-3.3  $\mu\text{m}$ 颗粒可进入深层支气管  
1.1-2.1  $\mu\text{m}$ 颗粒可达到支气管末梢  
0.65-1.1  $\mu\text{m}$ 颗粒可进入细支气管  
0.43-0.65  $\mu\text{m}$ 颗粒可进入肺泡

## 服务经验分享 Service Experience Sharing

### 故障指示灯 (MIL)

对于带 SCR 系统的发动机，当 MIL 灯点亮的时候说明 SCR 系统或发动机急需修理。



康明斯中国服务热线：400-810-5252

### SCR 系统日常检查和保养

序号	项目	保养内容	周期
1	油气分离器	更换	60000 公里
2	DEF 罐	检查 DEF 罐液位	每天
3	空气辅助喷射系统排空	在发动机熄火后至少 30 秒内切勿断开车辆总电源。	车辆点火开关关闭时
4	艾米泰克计量泵	定期清洗计量泵空气路	48000 公里 / 1000 小时 / 1 年。
5	康明斯计量泵	更换泵滤芯和 DEF 罐滤芯	120000 公里
6	博世泵	更换滤芯	120000 公里
7	无空气辅助喷射系统排空	在发动机熄火后至少 45 秒内切勿断开整车电源。	车辆点火开关关闭时

## Malfunction Indicator Lamp (MIL)

For applications equipped with SCR system, the Malfunction or Engine Malfunction lamp indicates that the vehicle may be exceeding emission level limits when illuminated. The lamp indicates the engine or SCR system is in need of repair at the first available opportunity.



Cummins China Service Hotline: 400-810-5252

### Daily check and maintenance on SCR system

Item	Part	Description	Cycle
1	Air Oil Separator Assembly	Replacing	60000 kilometre
2	DEF tank	Check DEF level	Daily
3	Air assisted system purging	The phase lasts for 30 seconds then the system switches off. After turning off the engine for at least 30 seconds do not disconnect the power supply of the vehicle.	When you close key switch, you should be power of vehicle off after 30 seconds
4	Emitec dosing pump	Clean air side of dosing pump	48000 kilometre or 1000hours, or 1 year
5	EcoFit dosing pump	Replace filter of pump and filter of DEF tank	120000 kilometre
6	BOSCH dosing pump	Replace filter	120000 kilometre
7	Airless system purging	The phase lasts for 45 seconds then the system switches off. After turning off the engine for at least 45 seconds do not disconnect the power supply of the vehicle.	When you close key switch, you should be power of vehicle off after 45 seconds



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