

关于重庆康明斯 NT、K 系列发动机 PT 燃油系统的特别说明

1、简介

SOLAS(海上人命安全公约)是IMO（国际海事组织）针对从事国际航线营运的载重超过500总吨的货船以及乘员数超过12人的客船而制定的准则。

此说明阐述了SOLAS防火要求细则，并对重庆康明斯生产的船用发动机的影响进行了说明。

2、SOLAS 规范要求

最近, SOLAS 将执行船级社所接受的最新的防火要求, 后续新建船舶所使用的发动机, 无论是船级社入级还是申请 SOLAS 认证, 都必须满足此要求:

高压油泵和喷油器之间的所有外部高压管路应设有套管, 以防燃油泄漏, 并应有漏油收集和发声报警的功能。

此要求高压燃油管路必须为双层, 并且双层管路中要有足够的空间, 可将泄漏的燃油导回到漏油收集装置, 同时触发报警装置发出声音报警, 以提示操作者燃油已泄漏。

3、讨论

此项要求针对油泵为高压喷射泵的燃油系统而制定。因喷射所需的压力是在油泵内产生, 故在油泵与喷油器之间的燃油管路中承载了喷射所需的高压, 这些管路必须加以套管保护。

而康明斯专利的 PT 燃油系统是低压燃油系统(油泵传输压力<20 bar).依靠凸轮轴和摇臂作用, 提供喷油正时和推杆压力, 燃烧所需的喷射压力是在缸盖中的喷油器内产生。因此, 油泵到喷油器的燃油管路中保持低压。

4、结论

重庆康明斯发动机公司生产的所有 NT、K19、K38、K50 系列船用主推、辅助发动机, 均采用这种 PT 低压燃油系统, 故不必对燃油管路套管保护。

附件: 康明斯船机事业部的证明文件及中国船级社的传真件

重庆康明斯发动机有限公司

2010年2月9日

Explanation for PT fuel system of CCEC NT & K series engine

1、Introduction

SOLAS(Safety of Life at Sea) is an IMO/UN organization which develops rules for vessels, cargo ships>500 gross tons and passenger ships carrying more than 12 passengers,engaged in international voyages.

The purpose of this explanation is to detail the SOLAS fire prevention requirements and explain how they affect Chongqing Cummins Marine engines

2、The requirements of SOLAS

Increasingly, fire prevention has been the subject of many of rules; most recently,SOLAS implemented new requirements that the Marine Classification Societies have also adopted. Subsequently, new engines delivered to new ships, either classed by the Marine Societies or requiring SOLAS certification, will have to meet these requirements:

All external high-pressure fuel delivery lines between the high-pressure fuel pump and fuel injectors shall be jacketed and capable of containing fuel from a high-pressure line failure. There must also be provisions for collection of leakage and sounding an alarm.

This means that fuel lines must have two skins, enough space between the two skins to allow leaking fuel to drain into a collection device, and an alarm, triggered by the collection device, that will alert the operator of a fuel leak.

3、Discussion

This requirement was written for fuel system where the fuel pump is a high pressure injection pump.The pump provides the pressure required for injection.Therefore the lines between the pump and the injectors contain the high injection pressure.These are the lines that are required to be jacketed.

The Cummins patent PT fuel pump is a low pressure pump(<20 bar).The injection pressure necessary for combustion is supplied by the injectors in the cylinder head.The engine camshaft and rocker arms provide the injection timing and the force to the injector to provide the necessary injection pressure.Therefore there are no external pressure fuel lines.

4、Conclusion

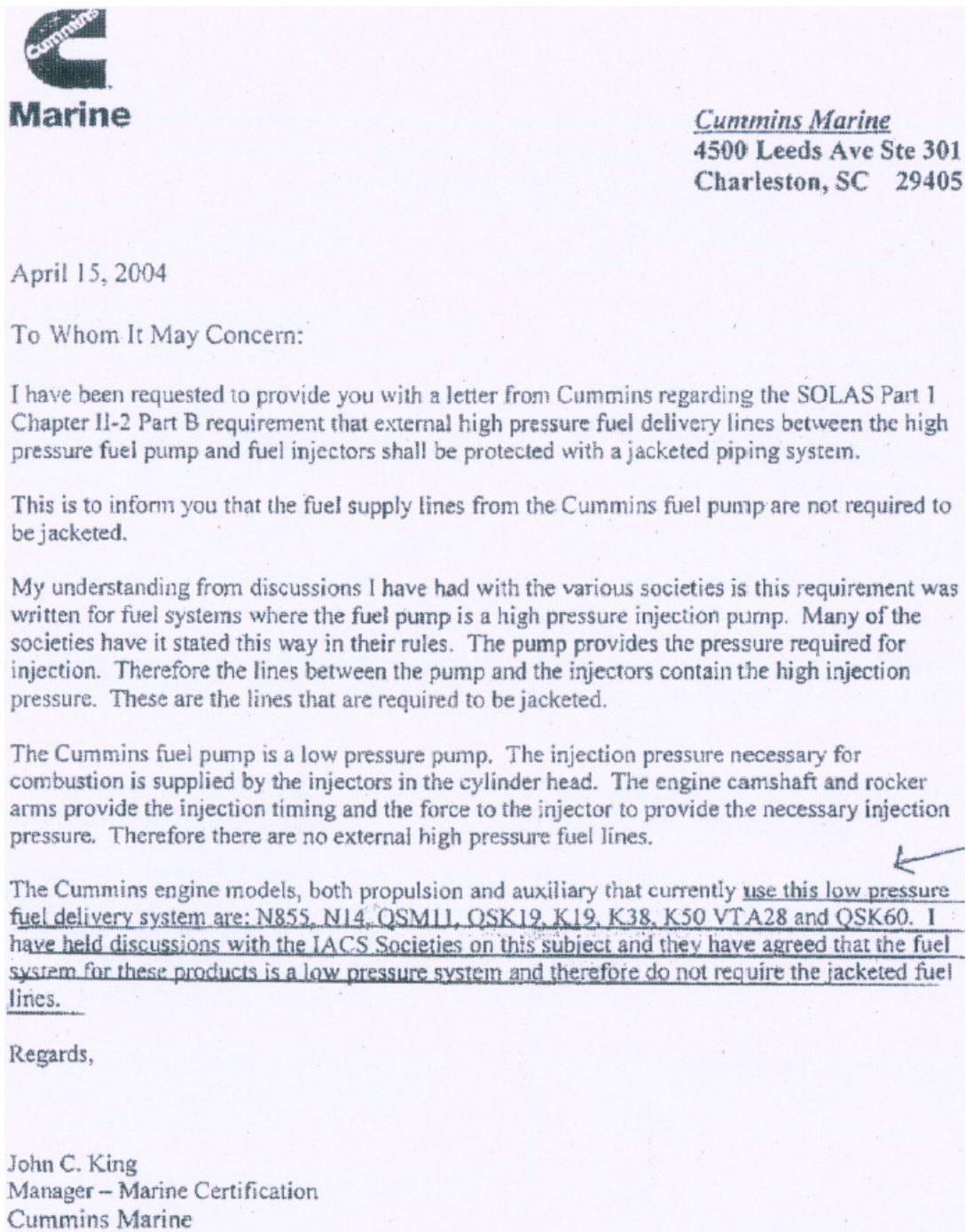
The Chongqing Cummins engine models,both propulsion and auxiliary that currently use this low pressure fuel delivery system are: NT、K19、K38 and K50.So the fuel supply lines form the PT fuel pump are not required to be jacketed.

Attachment: Fax of CMU and CCS

Chongqing Cummins Engine Co.,Ltd

Feb.9,2010

附件 Attachment:



| DIFFERENCES BETWEEN CUMMINS P.T. FUEL SYSTEM & HIGH PRESSURE FUEL SYSTEM | |
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| P.T. SYSTEM | HIGH PRESSURE FUEL SYSTEM |
| A) LOW FUEL PRESS DELIVERY FROM PUMP TO INJECTORS MAXIMUM 300 PSI. | A) VERY HIGH PRESSURE DELIVERY FROM PUMP TO INJECTORS RANGES FROM 2500 - 3200 PSI. |
| B) COMMON FUEL PRESSURE SUPPLY FOR ALL INJECTORS. | B) EACH INJECTOR NEEDS SEPARATE FUEL LINE FROM PUMP. |
| C) AIR ENTRAINED INTO FUEL SYSTEM - DOES NOT STALL ENGINE. | C) ENGINE STALLED INSTANTLY WHEN AIR IS PRESENT IN THE FUEL SYSTEM. |
| D) FUEL PUMP DOES NOT NEED TIMING & ADJUSTMENT. | D) FUEL PUMP NEEDS TIMING & ADJUSTMENT, EACH TIME IT IS FITTED. |
| E) INJECTORS ARE COOLED BY 80% OF RETURNING FUEL. | E) NO ARRANGEMENT OF INJECTOR COOLING BY FUEL. |
| F) INJECTION PRESSURE RANGES FROM 10,000 TO 20,000 PSI ENSURING FINE SPRAY PERMITTING THE EFFICIENT COMBUSTION OF A WIDE RANGE OF FUEL. | F) INJECTION PRESSURE RANGES FROM 2500 - 3200 PSI. |
| G) SMALL FUEL LEAKS AT INJECTOR CONNECTIONS DO NOT AFFECT TOTAL HORSEPOWER. | G) FUEL LEAKS AT JOINTS OF HIGH PRESSURE PIPES CUT OFF THE RESPECTIVELY CYLINDER. |
| H) FUEL QUANTITY IS CONTROLLED BY BOTH PUMP & INJECTOR. | H) FUEL QUANTITY IS CHANGED BY HELIX OF PUMPING PLUNGER. |
| I) CONSTANT HORSEPOWER ON THE JOB WITHOUT POWER LOSS. | I) REQUIRE FREQUENT ADJUSTMENTS TO MAINTAIN PEAK PERFORMANCE. |
| J) FLEXIBILITY-WITH ONLY MINOR MODIFICATION, THE SAME BASIC PUMP & INJECTORS ARE USED OVER A WIDE HORSEPOWER & SPEED RANGE ON VARIOUS ENGINE MODELS. | J) DIFFERENT ENGINE HORSEPOWER & SPEED RANGE REQUIRE A NEW DESIGN PUMP. |

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中国船级社重庆分社
CHINA CLASSIFICATION SOCIETY CHONGQING BRANCH

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题目 (Subj): 关于重庆康明斯发动机有限公司柴油机燃油管符合 SOLAS2000 修正案事的请示

分社近日接上海分社传真(附后),对重庆康明斯发动机有限公司(以下简称 CCBC)生产的由分社检验发证的船用发电柴油机高压燃油管路是否符合 SOLAS2000 修正案的柴油机燃油管路的要求提出核查要求。

关于船用柴油机高压燃油管应满足 SOLAS2000 修正案一事,分社曾于 2002 年根据总部工业产品处(2002)通函第 008 号总第 029 号书面通知 CCBC,CCBC 在给分社的回复中提出其生产的 DR. K 系列船用柴油机均采用 PT 燃油系统,整个系统中燃油高压产生在喷油器内,供油管及溢流管内最高工作压力不超过 1500kPa,不属于 SOLAS2000 修正案所指的高压油管,认为 NH. K 系列船用柴油机已满足 SOLAS2000 修正案相关要求,对此美国康明斯有限公司上海办事处也专门给总部产品处去传真予以证实,分社也核查了工厂图纸及技术文件,认为该情况属实。

鉴于以上情况,分社分别于 2003 年 2 月 20 日和 9 月 12 日向总部传真请示,请求总部对康明斯 DR. K 系列船用柴油机燃油管路最高工作压力不超过 1500kPa 是否属于 SOLAS2000 修正案中的“高压”范围和 CCBC 生产的 NH. K 系列船用柴油机燃油管路是否满足 SOLAS2000 修正案要求给予指示,但一直未得到书面答复,仅得到口头答复,为慎重起见,分社未在燃油机产品证书上注明满足 SOLAS2000 修正案。

现根据产品装船遇到的问题,再次请示总部对上述问题及如何进行该类柴油机的检验



请示总部办研院,认为该种设计的高压管路不需采用双套管系统,即满足 2000 修正案。
李官全院, 2004.7.16

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