

EXTERNAL FIRE-FIGHTING SYSTEMS

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Abstract: The offshore industry is considered a field "on steroids" for its fast expansion, largely owned to the ever increasing mankind need of oil and gas. This commercial pressure experience by naval sector has led to shortcuts in the safety of the operations undertaken, thus the recent accidents encountered (i.e. BP Platform in Gulf of Mexico). One major component is the human capital invested and retained within the maritime industry. Present paper-project's aim is to refresh professionals about a crucial system found on board offshore vessels: the external fire fighting systems (Fi-Fi System). Many operators are still in doubt about the correct usage, start-up procedure and monitoring its efficiency. An emergency is not the time for uncertainty, as the situation can escalate from delicate to critical in a short period of time and everyone must be crystal clear on how machinery and equipment works.

Keywords: External Fire-Fighting (Fi-Fi) Systems, Fi-Fi Class Notations, Start-Up Procedure, General Procedure under Operation.

INTRODUCTION

Fire is a phenomenon with which everyone is familiar. We use it daily to heat our homes and cook our meals. When harnessed, the power and energy from fire serves us well; however, when it is uncontrolled, a fire can quickly consume and destroy whatever lies in its path.

While we are all familiar with fire, few of us are aware of its nature and complex processes.¹ On the high seas there is a paradox: even if a vessel is surrounded by a large amount of water, if the fire-fighting operations are inefficient (i.e. too slow reaction time, ineffective communication, poor crew performance, wrong extinguishing agent etc.) the fire can spread rapidly and become uncontrollable, thus leading to fatalities, injuries, property damage and environmental pollution.

THE EXTERNAL FIREFIGHTING SYSTEM (FI-FI SYSTEM)

The external firefighting system (Fi-Fi system), is a system that is fully integrated with the vessel. The power source is very often the main engine which utilizes the vacant power through a power-take-off (PTO) during station keeping and maneuvering during firefighting operations. The power is transferred to the pumps via remote operated clutch and necessary transmission.

On ships with no vacant power available, a dedicated diesel driver or electrical or hydraulic driver may be used to avoid impact from ships operation to the Fi-Fi system. The pumps are normally located in the engine room below water line for best possible performance via suction line design. They deliver water to the discharge pipe which supplies the monitor on top of the bridge or similar position. The water jet is created in the monitor outlet by pressing water at optimum speed through the special designed monitor nozzle. A foam mixture can be pressed out through the monitor to extinguish chemical and or high hazardous fires.²

The reaction force must be compensated by the vessel propulsion and maneuvering system for station keeping. The system may also include self-protection deluge system (Water Spray) with water taken from the Fi-Fi pumps and / or various types of foam systems / additional pumps onboard.³

It is important to have the complete system operation in mind during design process for optimum performance at minimum power consumption and equipment cost.



Figure 1: Basic layout of Fi-Fi System

Fire fighter 1 (or 2 or 3) is class notations granted to vessels built and equipped in compliance with the relevant class requirements. These requirements are based upon experience and an appraisal of future vessels, size of object to be protected and available firefighting equipment.

EXTERNAL FI-FI SYSTEMS⁴

Non-classed Fi-Fi vessels (FiFi 0)

Any type of vessel with an external Fi-Fi system but without any formal classification will be covered under this heading. Normally capacities between 300m³/h and up to Fi-Fi I (2400m³/h) are used. Fire water for the monitors may be supplied by one or more fire pumps, driven by dedicated diesel engines, PTO gearboxes or electrically driven pumps. The monitors can be either remote controlled (recommended) or manual.

Fi-Fi I

¹See: ABS GUIDANCE NOTES ON FIRE-FIGHTING SYSTEMS, MAY 2005 (Updated February 2014)

² See: www.novenco-ff.com/Files/Billeder/PDF/Brochures/FiFi_spread.pdf

³ See: www.academia.edu/506443/Marine_info_19_THE_EXTERNAL_FIRE_FIGHTING_SYSTEM_FI-FI_SYSTEM_

⁴ See: www.aksismak.com.tr/fifisystems.htm

The class notation Fi-Fi I means that the vessel is to be equipped with minimum 2 fire monitors, able to throw water to a minimum distance of 120 meters from the vessel and to a height of minimum 45meters. The monitors are to be remote controlled from the wheelhouse. Since the fire pumps and related equipment are located in the engine room these are also normally remote controlled. Fi-Fi I Systems are normally installed on Escort tugs, Fire fighting vessels etc.

Fi-Fi II

The class notation Fi-Fi II means that the vessel is to be equipped with minimum 2 fire monitors, (DNV rules) able to throw water to a minimum distance of 180 meters from the vessel and to a height of minimum 110meters, or if other classification for the vessel (i.e. LRS, ABS, R.I.N.A, BV, GL etc), the vessel is to be equipped with 3 or 4 fire monitors, able to throw water to a minimum distance of 150 meters from the vessel and to a height of minimum 70meters. Whatever configuration is chosen for the Fi-Fi II vessel the total water capacity shall be not less than 7200m³/h. The monitors are to be remote controlled from the wheelhouse. Since the fire pumps and related equipment are located in the engine room these are also normally remote controlled. Fi-Fi II Systems are normally installed on offshore vessels like Anchor-handling tug/supply vessels, or other specialized vessels.

Fi-Fi III

The class notation Fi-Fi III means that the vessel is to be equipped with minimum 3 fire monitors, (DNV rules) able to throw water to a minimum distance of 180 meters from the vessel and to a height of minimum 110meters, or if other classification for the vessel (i.e. LRS, ABS, R.I.N.A, BV, GL etc), the vessel is to be equipped with 4 fire monitors, able to throw water to a minimum distance of 150 meters from the vessel and to a height of minimum 70meters. Whatever configuration is chosen for the Fi-Fi II vessel the total water capacity shall be not less than 9600m³/h. The monitors are to be remote controlled from the wheelhouse. Since the fire pumps and related equipment are located in the engine room these are also normally remote controlled. Fi-Fi III Systems are not so common, but are normally installed on larger offshore vessels, or other specialized vessels.

Table 1: Fi-Fi Classification

Class Notation	FiFi1	FiFi2			FiFi3	
No. of Monitors	2	2	3	4	3	4
Monitor capacity (m ³ /h)	1200	3600	2400	1800	3200	2400/2500
No. of Pumps	1-2	2	2-4		2	2-4
Total pump capacity (m ³ /h)	2400	7200	7200		9600	9600/10000
Throw length (m)	120	180 (from bow)	150		180 (From bow)	150
Throw height (m)	45	110 at 70m	70		110 at 70m	

START-UP PROCEDURE⁵

Operations necessary to protect the monitors and to operate them in a safe manner contained in this start-up procedure:

1. Remove monitor-parking supports.
2. Switch on the main control panel.

⁵ See: Aker Kvaerner Subsea As-Manual for Fire-Fighting Monitor Model MM602E, page 9;



Figure 2: Fi-Fi Monitor in parked position

3. Test the monitors for correct movement in all directions together with the correct operation of any remote deflectors and valves.

4. If the system and ALL monitors are operation correctly, point each of the monitors' nozzles towards a safe area.

NOTE! Personal injury or damage to the vessel can result if a valve is opened incorrectly or by accident.

5. Open the pump suction (sea chest) valve together with valves in the by-pass line around the pump discharge valve.

6. Check that the pump discharge valve is closed.

7. Open the monitor stop valves.

8. Start the pump against a closed discharge valve.

Water will now flow through the by-pass line and fill up the main pipeline to the monitor

GENERAL PROCEDURE UNDER OPERATION⁶

SAFETY: Due to the possibility of personal injury or damage to property, the monitors and the area on which they are trained must be held under constant supervision.

The following procedure should be regarded as the minimum requirements for continuous operation:

1. Continuously observe the water jet target area and adjust the monitor as necessary.



Figure 3: Fire-Fighting System under operation

2. Check the pump speed and bearing and temperature every hour during the first 24 hours. If possible a log should be kept.

3. Check the pump pressure each hour during the first 24 hours.

⁶ See: See: Aker Kvaerner Subsea As-Manual for Fire-Fighting Monitor Model MM602E, page 10;



Figure 4: Marine External Fire Fighting System under operation

4. Check the water pipe system for leakage in the Engine-Room or Pump-Room. These compartments have been flooded due to leakage in the pipe system!

5. If no problems are encountered with the system in the first 24 hours the observation intervals can be extended. During operation never direct the water jet directly to other vessels, structures or personnel escape ways without first making sure that all personnel have been evacuated. The jet should never be directed towards live electrical installations.

Note: The impact force of the jet can reach 1 ton.

REFERENCES

1. ABS GUIDANCE NOTES ON FIRE-FIGHTING SYSTEMS, MAY 2005 (Updated February 2014)
2. www.novenco-ff.com/Files/Billeder/PDF/Brochures/FiFi_spread.pdf
3. www.academia.edu/506443/Marine_info_19_THE_EXTERNAL_FIRE_FIGHTING_SYSTEM_FI-FI_SYSTEM
4. www.aksismak.com.tr/fifisystems.htm
5. Aker Kvaerner Subsea As-Manual for Fire-Fighting Monitor Model MM602E, page 9
6. Aker Kvaerner Subsea As-Manual for Fire-Fighting Monitor Model MM602E, page 10