ANNEX 12

RESOLUTION MEPC.81(43)
adopted on 1 July 1999

AMENDMENTS TO SECTION 9 OF THE STANDARD FORMAT FOR THE COW MANUAL (RESOLUTION MEPC.3(XII))

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING article 38(a) of the Convention on the International Maritime Organization concerning the function of the Committee conferred upon it by international conventions for the prevention and control of marine pollution,

NOTING regulation 13B of Annex I of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78), which provides that every tanker operating with a crude oil washing system shall be provided with an Operations and Equipment Manual (COW Manual) detailing the system and equipment and specifying operational procedures,

NOTING ALSO that the COW Manual is intended not only to provide guidance to the crew of the ship for proper operation of the system, but also to provide information on the system and its operational procedures for port State control officers going on board for inspection in ports,

NOTING FURTHER that the Committee, by resolution MEPC. 3 (XII) on 30 November 1979, adopted the Recommendation on the Standard Format for the COW Manual,

HAVING CONSIDERED proposals made by Member Governments to amend the Standard Format of the COW Manual in the light of experience gained,

1. ADOPTS the amendments to the Standard Format of Section 9 for the COW Manual, the text of which is set out at Annex to the present resolution,

2. INVITES Member Governments to take into account the amendments to Section 9 of the Standard Format for the COW Manual when approving the Manual as called for by regulation 13B of MARPOL 73/78.

ANNEX

AMENDMENTS TO SECTION 9 OF THE STANDARD FORMAT FOR THE COW MANUAL (RESOLUTION MEPC.3(XII))

Section 9 of the Standard Format for the COW Manual is replaced by the following:

"SECTION 9: DETERMINATION OF THE SUITABILITY OF A CRUDE OIL FOR USE IN CRUDE OIL WASHING"

This section contains guidance in determining the suitability of a crude oil for use in crude oil washing.

In lieu of a list of crude oils unsuitable for carriage and crude oil washing to be inserted in the Crude Oil Washing and Equipment Manual the following standard text maybe used:

(1) **For a Tanker not fitted with heating coils.**

This tanker is not fitted with heating coils in the cargo tanks and should not carry cargoes which will require to be heated either to obtain pumpability criteria or to avoid excessive sludging of both the designated clean ballast tanks and the vessel's tanks to be washed for sludge control.

Notes and Definitions:

- *Pumpability Criterion is determined by the oil's Kinematic Viscosity at the observed temperature of the cargo prior to its discharge. In order to attain optimum efficiency for discharge this viscosity should not exceed 250 centistokes and* ***never*** *in excess of 600 centistokes.*

- *Excessive sludging criterion is determined primarily by the crude oil's temperature throughout its transportation and storage. If the cargo's temperature is likely to drop below the crude oil cargo's cloud point temperature then sludging of cargo tanks is to be expected. The cloud point temperature is the temperature at which the crude oil's wax and associated oil phase separates from the bulk liquid phase of the cargo.*

(2) **For a Tanker fitted with heating coils in Slop Tank(s)**

This tanker is fitted with heating coils only in her Slop Tank(s) and should not carry cargoes which will require to be heated for pumpability.

Notes:

If sludge deposition is suspected or determined in the main cargo tanks then an alternative crude oil washing programme should be utilised. Recommendations regarding this programme and procedure are to be found in Section 11 of this manual.

(3) **For a Tanker fitted with heating coils**

This tanker is fitted with heating coils in all the cargo tanks and, subject to the limitations of the cargo heating system, can carry cargoes which require heating for either pumpability or sludge deposition/control.

General Guidance

Attention is drawn to the difficulties which may be encountered with certain crude oils. During the discharge of crude oils that exhibit the necessary criteria that would create either pumpability problems or sludge deposition, crude oil washing of each tank scheduled for such an operation should be carried out concurrently with the discharging of the particular tank in order to minimise the affect on the crude oil residues for cooling. Cooling will increase both the Kinematic and Dynamic Viscosities[1] of the tank residues and therefore affect the efficiency of the Crude Oil Washing programme.

As a general guidance to the suitability of an oil for crude oil washing on board this tanker, the following criteria should be used:

For Aromatic crude oils whose Kinematic viscosity is the temperature controlling characteristic, the Kinematic viscosity of the oil used for crude oil washing should not exceed 60 centistokes at the oil wash medium temperature;

OR

For Paraffinic crude oils whose pour point temperature is the controlling characteristic, the temperature of the cargo to be used for crude oil washing should exceed its Cloud Point temperature by at least 10ºC if excessive sludging is present and should only be used once in a "closed cycle" washing programme.

The approximate Cloud Point temperature of an oil may be calculated by use of the following formula where the Pour Point temperature(x) of the crude oil is known

The Cloud Point Temperature ºC = 20.2 ($10^{0.00708\ x\ -\ 0.1157714}$) + 8

Worked example:
Assume the Pour Point Temperature is + 1ºC.
Then:

$$= 20.2 \times (10^{(0.00708 \times 1) - 0.1157714}) + 8$$
$$= 20.2 \times (10^{0.00708 - 0.1157714}) + 8$$
$$= 20.2 \times (10^{-0.1086914}) + 8$$
$$= (20.2 \times 0.7785896) + 8$$
$$= 15.72 + 8$$

Answer: Approx. Cloud Point ºC = 24ºC

OR

Consult the accompanying graph, *(Fig 1)* where if the Pour Point is known then the Cloud Point can be extracted.

OR

[1]Definitions: **Kinematic viscosity** is the measure of resistance to flow with gravitation under its own mass force. This is normally reported in the units of centistokes(cst) or mm^2 /sec.

Dynamic viscosity is the measure of resistance to flow with an induced shear stress or at a known rate of shear. This is determined from the equation of Shear Stress (Pascals - Pa) divided by Rate of Shear (inverse seconds - s^{-1}). The unit of Dynamic viscosity is either Centipose (cps) or mPa s.

If the Pour Point exceeds Approximately 25ºC then the Bondi test procedure could be used to determine this temperature.

The Bondi Test Procedure (See Fig 2)

This method will obtain the cloud point temperature of high pour point type crude oils.

Equipment and Procedure

(1) Obtain a representative sample of the cargo. Do not allow the Cargo sample to cool before commencing the test procedure.

(2) Obtain a glass container (preferably nearly spherical) that is made of heat/temperature resistant glass and fill the container with the sample.

(3) Insert a thermometer into the centre of the sample volume and heat the sample to a temperature of at least 30ºC above the pour point temperature of the crude oil in a hot water bath. ***Do not tightly stopper the container during this process.***

(4) Prepare an alternative bath with water whose temperature is at least 15ºC below the sample's pour point temperature. Have a clock or watch available with a second hand.

(5) Immerse the heated sample contained into the cold bath and record at very regular intervals (at least every 30 seconds) the temperature of the sample.

(6) Graphically plot the sample temperature against time elapse from the start of the test. Determine the temperatures at which there was no loss of temperature with time elapse. The first such instance as detected will be the approximate Cloud Point temperature and the second instance, if testing time is extended to the required period, will be the approximate pour point temperature of the crude oil.

A Graph to determine The Cloud Point Temperature

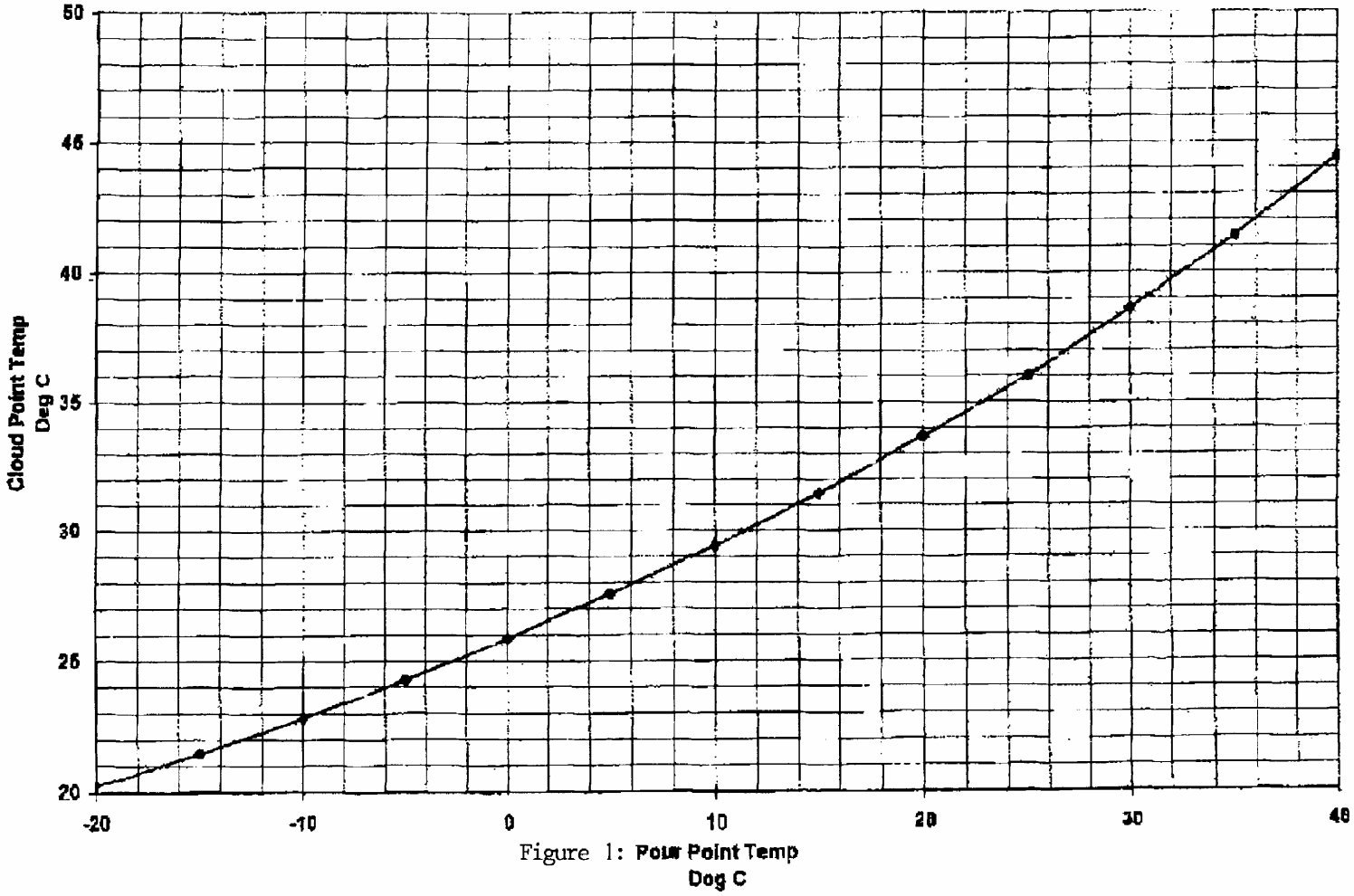

Figure 1:

***

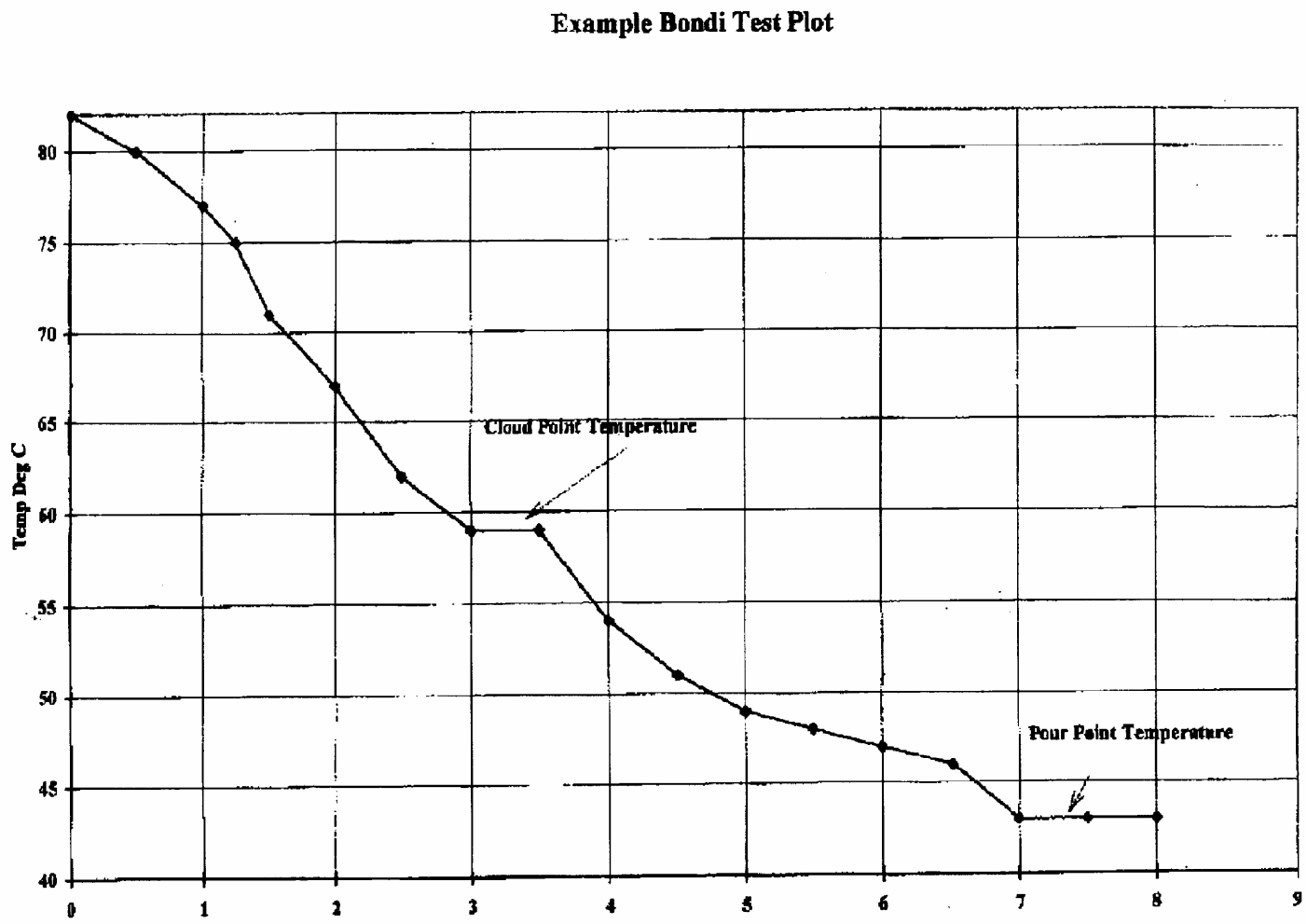
Example Bondi Test Plot
Temp Deg C
80
75
70
65
60
55
50
45
40
0
1
2
3
4
5
6
7
8
9
Cloud Point Temperature
Pour Point Temperature
Time in Minutes

Figure 2: