

Circular From SKULD**Date: 5 July 2019****Wood pellets and risk of fire**

In recent years a number of formerly coal fired power stations have started to turn to biomass as feedstock in order to improve sustainability of fuel sources. This has resulted in worldwide shipments of wood pellets intended to be burned. Most of these shipments are executed without incident but there are significant hazards associated with the carriage of wood pellets.

The commodity consists of wood fragments/shavings etc compressed into pelletised form. These pellets can include a binder additive but not all wood pellets use binders. Either type can self-heat when in bulk form. The processes involved result in depletion of oxygen in enclosed spaces containing the cargoes and evolution of carbon monoxide - those are hazards associated with the carriage of wood pellets which are noted in the IMSBC Code.

IMSBC Code - Group B commodities

The Code has two schedules for wood pellets. The only distinction between the schedules for pellets with and without binders is that the schedule with additives/binders categorises the cargo as one which can evolve flammable gases when wet. Both are Group B commodities with the principle hazard when in bulk form being the oxygen depletion and carbon monoxide evolution.

In common with many commodities of a plant nature, the IMSBC Code warns that wood pellets can undergo microbiological deterioration/fermentation when at a moisture content of over 15%. These cargoes are typically shipped at lower moisture levels and the Code notes that gas concentrations resulting from fermentation tend not to reach flammable levels. Unlike some commodities, there is no requirement for any documentation certifying moisture content to be provided to the vessel.

Wood pellets can also generate heat by oxidation of the fibrous material. Intact wood does not heat significantly by oxidation at room temperature and only burns when its temperature is significantly elevated. However, wood pellets consist of fibrous material from the wood which has been broken up and reconstituted into pellets. This exposes the fibres to the oxygen in the air adjacent to a pellet and the fibres can then slowly oxidise. This process depletes oxygen in a space containing freshly-loaded wood pellets. Fine material produced from the mechanical breakdown of pellets during handling can be expected to be more prone to oxidation.

The oxidation of wood pellets or fines releases heat. If that heat is generated relatively slowly, the cargo temperature may rise a little, but the situation will stabilise. It is however possible for wood pellet heating to become self-accelerating to the point of fire.

Monitoring of gas levels recommended

The crucial factor is the availability of oxygen. It is generally advisable to carry wood pellets without applying any ventilation. This means that any tendency towards self-heating, and the consequences of that including carbon monoxide evolution and oxygen depletion, is self-limiting. Although the IMSBC Code does not refer to the need to take gas measurements of the holds during carriage, we recommend that records are kept of oxygen, carbon monoxide and flammable gas levels during a voyage in a similar fashion to the records kept when carrying coal cargoes. We also recommend that cargo temperatures are taken if possible, using sounding pipes. These unfortunately provide limited useful information on the temperatures elsewhere in a hold.

When carrying wood pellets without ventilation there may be a risk of condensation wetting on the surfaces of the cargo stowages especially if the vessel is to be discharging in low ambient temperatures. This can be unavoidable depending on the climatic conditions.

In the event of a smoke evolution, levels of carbon monoxide increasing above 100ppm, or high temperatures experienced during carriage of wood pellets, all holds should be immediately sealed if not already and not opened until discharge is imminent. It is however important to note that evolution of high levels of carbon monoxide is not necessarily an indication of a problem.

Always follow enclosed space entry procedures

As set out in the IMSBC Code, any enclosed spaces on the vessel's deck or in the accommodation which are immediately adjacent to a hold containing wood pellets should be periodically checked for the presence of carbon monoxide and low oxygen levels. A high level of vigilance in following enclosed space entry procedures is essential.

Source of Information: Skuld P&I Club