

ภาคผนวก ๑

ตารางที่ ๑

ค่าธรรมเนียมสำหรับประกาศนียบัตรฝ่ายเดินเรือ

	ประกาศนียบัตรฝ่ายเดินเรือ	ค่าธรรมเนียม
(๑)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอส หรือมากกว่า (Master on ships of 3,000 gross tonnage or more)	๕,๐๐๐ บาท
(๒)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Master on ships of between 500 and 3,000 gross tonnage)	๕,๐๐๐ บาท
(๓)	ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอสหรือมากกว่า (Chief mate on ships of 3,000 gross tonnage or more)	๕,๐๐๐ บาท
(๔)	ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Chief mate on ships of between 500 and 3,000 gross tonnage)	๔,๐๐๐ บาท
(๖)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Master on ships of between 500 and 3,000 gross tonnage engaged on near-coastal voyages)	๔,๐๐๐ บาท
(๗)	ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Chief mate on ships of between 500 and 3,000 gross tonnage engaged on near-coastal voyages)	๓,๕๐๐ บาท
(๕)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเลขนาด ๕๐๐ ตันกรอสหรือมากกว่า (Officer in charge of a navigational watch on ships of 500 gross tonnage or more)	๓,๕๐๐ บาท
(๘)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐ ตันกรอสหรือมากกว่า (Officer in charge of a navigational watch on ships of 500 gross tonnage or more engaged on near-coastal voyages)	๓,๐๐๐ บาท
(๙)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส (Master on ships of less than 500 gross tonnage engaged on near-coastal voyages)	๑,๕๐๐ บาท
(๑๐)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส (Officer in charge of a navigational watch on ships of less than 500 gross tonnage engaged on near-coastal voyages)	๑,๐๐๐ บาท
(๑๑)	ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือชำนาญงานฝ่ายเดินเรือ (Rating as Able seafarer deck)	๘๐๐ บาท

	ประกาศนียบัตรฝ่ายเดินเรือ	ค่าธรรมเนียม
(๑๒)	ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือเข้ายามฝ่ายเดินเรือ (Rating forming part of navigational watch)	๕๐๐ บาท
(๑๓)	ประกาศนียบัตรแสดงความรู้ความสามารถ พนักงานวิทยุ (Radio Operator)	๕๐๐ บาท

ภาคผนวก ๑

ตารางที่ ๒

ค่าธรรมเนียมสำหรับประกาศนียบัตรฝ่ายช่างกล

	ประกาศนียบัตรฝ่ายช่างกลเรือ	ค่าธรรมเนียม
(๑)	ประกาศนียบัตรแสดงความรู้ความสามารถ ตันกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า (Chief engineer officer on ships powered by main propulsion machinery of 3,000 kW propulsion power or more)	๕,๐๐๐ บาท
(๒)	ประกาศนียบัตรแสดงความรู้ความสามารถ รองตันกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า (Second engineer officer on ships powered by main propulsion machinery of 3,000 kW propulsion power or more)	๔,๕๐๐ บาท
(๓)	ประกาศนียบัตรแสดงความรู้ความสามารถ ตันกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์ (Chief engineer officer on ships powered by main propulsion machinery of between 750-3,000 kW propulsion power)	๔,๕๐๐ บาท
(๔)	ประกาศนียบัตรแสดงความรู้ความสามารถ รองตันกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์ (Second engineer officer on ships powered by main propulsion machinery of between 750-3,000 kW propulsion power)	๓,๕๐๐ บาท
(๕)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายช่างกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์ หรือมากกว่า (Officer in charge of an engineering watch on ships powered by main propulsion machinery of 750 kW propulsion power or more)	๓,๐๐๐ บาท
(๖)	ประกาศนียบัตรแสดงความรู้ความสามารถ นายช่างอิเล็กทรอนิกส์ (Electrotechnical officer)	๓,๐๐๐ บาท
(๗)	ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรืออิเล็กทรอนิกส์ (Electrotechnical rating)	๘๐๐ บาท
(๘)	ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือชำนาญงานฝ่ายช่างกล (Rating as Able seafarer engine)	๘๐๐ บาท
(๙)	ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือเข้ายามฝ่ายช่างกล (Rating forming part of engineering watch)	๕๐๐ บาท

ภาคผนวก ๑  
 ตารางที่ ๓  
 ค่าธรรมเนียมประกาศนียบัตรอื่นใบสำคัญรับรองและอื่นๆ

	ประกาศนียบัตร ใบรับรอง และอื่นๆ	ค่าธรรมเนียม
(๑)	ประกาศนียบัตรแสดงความรู้ความชำนาญ หรือประกาศนียบัตรรับรองสำหรับผู้ทำการในเรือเฉพาะประเภท	๕๐๐ บาท
(๒)	ประกาศนียบัตรรับรองประกาศนียบัตรแสดงความรู้ความสามารถรัฐภาคีอื่น	๓,๐๐๐ บาท
(๓)	ประกาศนียบัตรรับรองประกาศนียบัตรแสดงความรู้ความชำนาญรัฐภาคีอื่น	๕๐๐ บาท
(๔)	ใบรับรองการยกเว้นประกาศนียบัตร	๑,๐๐๐ บาท
(๕)	ใบรับรองมาตรฐานหลักสูตรสำหรับประกาศนียบัตรนายเรือ หลักสูตรละ	๒,๐๐๐ บาท
(๖)	ใบรับรองมาตรฐานหลักสูตรสำหรับประกาศนียบัตรนายประจำเรือ หลักสูตรละ	๑,๐๐๐ บาท
(๗)	ใบรับรองมาตรฐานหลักสูตรอื่นๆ หลักสูตรละ	๕๐๐ บาท
(๘)	ประกาศนียบัตรรับรองแพทย์คนประจำเรือ	๕๐๐ บาท
(๙)	ใบรับรองสถานพยาบาล	๓,๐๐๐ บาท
(๑๐)	การสอบแก้ตัว ในการสอบข้อเขียน รายวิชาละ	๕๐๐ บาท
(๑๑)	การสอบแก้ตัว ในการสอบสัมภาษณ์	๕๐๐ บาท
(๑๒)	การออกใบแทนประกาศนียบัตร ประกาศนียบัตรรับรอง หรือใบรับรองอื่นๆ ตามข้อบังคับนี้	๕๐๐ บาท

**ภาคผนวก ๑**  
**ตารางที่ ๔**  
**ตารางเทียบประกาศนียบัตรฝ่ายเดินเรือ**

ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๔๑	ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๕๕
๑.ประกาศนียบัตรนายเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอส หรือมากกว่า	๑.ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอส หรือมากกว่า (Master on ships of 3,000 gross tonnage or more)
๒.ประกาศนียบัตรนายเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส	๒.ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Master on ships of between 500 and 3,000 gross tonnage)
๓.ประกาศนียบัตรต้นเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอส หรือมากกว่า	๓.ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอสหรือมากกว่า (Chief mate on ships of 3,000 gross tonnage or more)
๔.ประกาศนียบัตรต้นเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส	๔.ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Chief mate on ships of between 500 and 3,000 gross tonnage)
๕.ประกาศนียบัตรนายประจำ เรือฝ่ายเดินเรือของเรือกลเดินทะเลขนาด ๕๐๐ ตันกรอสหรือมากกว่า	๕.ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเลขนาด ๕๐๐ ตันกรอสหรือมากกว่า (Officer in charge of a navigational watch on ships of 500 gross tonnage or more)
๖.ประกาศนียบัตรนายเรือของเรือกลเดินทะเลใกล้ฝั่งขนาด ๕๐๐-๓,๐๐๐ ตันกรอส	๖.ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Master on ships of between 500 and 3,000 gross tonnage engaged on near-coastal voyages)
๗.ประกาศนียบัตรต้นเรือของเรือกลเดินทะเลใกล้ฝั่งขนาด ๕๐๐-๓,๐๐๐ ตันกรอส	๗.ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Chief mate on ships of between 500 and 3,000 gross tonnage engaged on near-coastal voyages)
๘.ประกาศนียบัตรนายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเลใกล้ฝั่งขนาด ๕๐๐ หรือมากกว่า	๘.ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด

ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๔๑	ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๕๕
	๕๐๐ ตันกรอสหรือมากกว่า (Officer in charge of a navigational watch on ships of 500 gross tonnage or more engaged on near-coastal voyages)
๙. ประกาศนียบัตรนายประจำเรือของเรือกลเดินทะเลใกล้ฝั่งขนาดต่ำกว่า ๕๐๐ ตันกรอส	๙. ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส (Master on ships of less than 500 gross tonnage engaged on near-coastal voyages)
๑๐. ประกาศนียบัตรลูกเรือยามสะพานเดินเรือของเรือกลเดินทะเล*	๑๐. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือชำนาญงานฝ่ายเดินเรือ (Rating as Able seafarer deck)
๑๑. ประกาศนียบัตรลูกเรือยามสะพานเดินเรือของเรือกลเดินทะเล	๑๑. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือเข้ายามฝ่ายเดินเรือ (Rating forming part of navigational watch)
๑๒. ประกาศนียบัตรรับรองพนักงานวิทยุของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอสหรือมากกว่า	๑๒. ประกาศนียบัตรแสดงความรู้ความสามารถพนักงานวิทยุ (Radio Operator)

\* สำหรับผู้ที่มีระยะเวลาปฏิบัติงานในทะเลในตำแหน่ง ลูกเรือเข้ายามฝ่ายเดินเรือในเรือเดินทะเลขนาด ๕๐๐ ตันกรอสหรือมากกว่า อย่างน้อย ๑๘ เดือน ภายในช่วงเวลา ๕ ปี ก่อนวันที่ ๑ มกราคม พ.ศ. ๒๕๕๕

ภาคผนวก ๑

ตารางที่ ๕

ตารางเทียบประกาศนียบัตรฝ่ายช่างกลเรือ

ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๔๑	ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๕๕
๑. ประกาศนียบัตรต้นกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า	๑. ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า (Chief engineer officer on ships powered by main propulsion machinery of 3,000 kW propulsion power or more)
๒. ประกาศนียบัตรต้นกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์	๒. ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์ (Chief engineer officer on ships powered by main propulsion machinery of between 750-3,000 kW propulsion power)
๓. ประกาศนียบัตรรองต้นกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า	๓. ประกาศนียบัตรแสดงความรู้ความสามารถ รองต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า (Second engineer officer on ships powered by main propulsion machinery of 3,000 kW propulsion power or more)
๔. ประกาศนียบัตรรองต้นกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์	๔. ประกาศนียบัตรแสดงความรู้ความสามารถ รองต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์ (Second engineer officer on ships powered by main propulsion machinery of between 750-3,000 kW propulsion power)
๕. ประกาศนียบัตรนายประจำเรือฝ่ายช่างกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์ หรือมากกว่า	๕. ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายช่างกลของเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์ หรือมากกว่า (Officer in charge of an engineering watch on ships powered by main propulsion machinery of 750 kW propulsion power or more)
๖. ประกาศนียบัตรลูกเรือเข้ายามฝ่ายช่างกลเรือของเรือเดินทะเล*	๖. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือชำนาญงานฝ่ายช่างกลเรือ (Rating as Able seafarer engine)
๗. ประกาศนียบัตรลูกเรือเข้ายามฝ่ายช่างกลเรือของเรือเดินทะเล	๗. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือเข้ายามฝ่ายช่างกล (Rating forming part of engineering watch)

ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๔๑	ประกาศนียบัตรที่ออกให้ตามข้อบังคับกรมเจ้าท่าว่าด้วยการฝึกอบรมการสอบความรู้และการออกประกาศนียบัตรผู้ทำการในเรือ พ.ศ. ๒๕๕๕
๘. เอกสารหลักฐานแสดงการปฏิบัติงานในตำแหน่งนายช่างไฟฟ้าอิเล็กทรอนิกส์ **	๘. ประกาศนียบัตรแสดงความรู้ความสามารถ นายช่างอิเล็กทรอนิกส์ (Electrotechnical officer)
๙. เอกสารหลักฐานแสดงการปฏิบัติงานในตำแหน่งเจ้าหน้าที่ไฟฟ้าอิเล็กทรอนิกส์ ***	๙. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรืออิเล็กทรอนิกส์ (Electrotechnical rating)

\* สำหรับผู้ที่มีระยะเวลาปฏิบัติงานในทะเลในตำแหน่ง ลูกเรือเข้ายามฝ่ายช่างกลเรือในเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์ หรือมากกว่า อย่างน้อย ๑๒ เดือน ภายในช่วงเวลา ๕ ปี ก่อนวันที่ ๑ มกราคม พ.ศ. ๒๕๕๕

\*\* สำหรับผู้ที่มีเอกสารหลักฐานแสดงว่าผ่านการปฏิบัติงานในทะเลในตำแหน่งนายช่างอิเล็กทรอนิกส์ในเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์ หรือมากกว่า อย่างน้อย ๑๒ เดือน ภายในช่วงเวลา ๕ ปีก่อนวันที่ ๑ มกราคม พ.ศ. ๒๕๕๕

\*\*\* สำหรับผู้ที่มีเอกสารหลักฐานแสดงว่าผ่านการปฏิบัติงานในทะเลในตำแหน่งลูกเรืออิเล็กทรอนิกส์ในเรือเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์หรือมากกว่า อย่างน้อย ๑๒ เดือน ภายในช่วงเวลา ๕ ปีก่อนวันที่ ๑ มกราคม พ.ศ. ๒๕๕๕



ภาคผนวก ๑

ตารางที่ ๖

สิทธิการทำงานในเรือสำหรับประกาศนียบัตรฝ่ายเดินเรือ

ชั้นประกาศนียบัตร	สิทธิที่อนุญาตให้ทำการ
๑. ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอส หรือมากกว่า (Master on ships of 3,000 gross tonnage or more)	ก. นายเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ ข. ต้นเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ ค. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ
๒. นายเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Master on ships of between 500 and 3,000 gross tonnage)	ก. นายเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ทุกเขตการเดินเรือ ข. ต้นเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ทุกเขตการเดินเรือ ค. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม ง. ต้นเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ หากมีคุณสมบัติตามข้อ ๘๑(๖.๑) จ. นายเรือ ของเรือกลเดินทะเลใกล้เคียง ทุกขนาดตันกรอส หากมีคุณสมบัติตามข้อ ๘๑(๖.๒)
๓. ประกาศนียบัตรแสดงความรู้ความสามารถ ต้นเรือของเรือกลเดินทะเลขนาด ๓,๐๐๐ ตันกรอสหรือมากกว่า (Chief mate on ships of 3,000 gross tonnage or more)	ก. ต้นเรือ ของเรือกลเดินทะเลทุกขนาดตันกรอส ทุกเขตการเดินเรือ ข. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม ค. นายเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ทุกเขตการเดินเรือ หากมีคุณสมบัติตามข้อ ๘๒(๖.๑)
๔. ประกาศนียบัตรแสดงความรู้ความสามารถต้นเรือของเรือกลเดินทะเลขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Chief mate on ships of between 500 and 3,000 gross tonnage)	ก. ต้นเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ทุกเขตการเดินเรือ ข. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม ค. นายเรือ ของเรือกลเดินทะเลใกล้เคียง ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ในเขตการเดินเรือใกล้เคียง หากมีคุณสมบัติตามข้อ ๘๓(๖.๑) ง. ต้นเรือ ของเรือกลเดินทะเลใกล้เคียง ทุกขนาดตันกรอส ในเขตการเดินเรือใกล้เคียง หากมีคุณสมบัติตามข้อ ๘๓(๖.๒)

ชั้นประกาศนียบัตร	สิทธิที่อนุญาตให้ทำการ
<p>๕. ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเล ขนาด ๕๐๐ ตันกรอสหรือมากกว่า (Officer in charge of a navigational watch on ships of 500 gross tonnage or more)</p>	<p>ก. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม</p> <p>ข. นายเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง หากมีคุณสมบัติตามข้อ ๗๘(๘.๑)</p>
<p>๖. ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Master on ships of between 500 and 3,000 gross tonnage engaged on near-coastal voyages)</p>	<p>ก. นายเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>ข. นายเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า 500 ตันกรอส ทุกเขตการเดินเรือ</p> <p>ค. ต้นเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>ง. นายประจำเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ทุกขนาดตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>จ. ต้นเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ทุกขนาดตันกรอส ในเขตการเดินเรือใกล้ฝั่ง หากมีคุณสมบัติตามข้อ ๘๔(๖.๑)</p>
<p>๗. ประกาศนียบัตรแสดงความรู้ความสามารถต้นเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐-๓,๐๐๐ ตันกรอส (Chief mate on ships of between 500 and 3,000 gross tonnage engaged on near-coastal voyages)</p>	<p>ก. ต้นเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๓,๐๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>ข. ต้นเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส ทุกเขตการเดินเรือ</p> <p>ค. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ในเขตการเดินเรือใกล้ฝั่ง สิทธิที่สามารถขอรับรองเพิ่มเติม</p> <p>ง. นายเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า 500 ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง หากมีคุณสมบัติตามข้อ ๘๕(๖.๑)</p>
<p>๘. ประกาศนียบัตรแสดงความรู้ความสามารถนายประจำเรือฝ่ายเดินเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาด ๕๐๐ ตันกรอสหรือมากกว่า (Officer in charge of a navigational watch on ships of 500 gross tonnage or more engaged on near-coastal voyages)</p>	<p>ก. นายประจำเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ทุกขนาดตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>ข. นายประจำเรือ ของเรือกลเดินทะเล ขนาดต่ำกว่า ๕๐๐ ตันกรอส ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม</p> <p>ค. นายเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง หากมีคุณสมบัติตามข้อ ๗๙(๘.๑)</p>
<p>๙. ประกาศนียบัตรแสดงความรู้ความสามารถ นายเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส (Master on ships of less than 500 gross tonnage engaged on near-coastal voyages)</p>	<p>ก. นายเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>ข. นายประจำเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง</p> <p>ค. นายเรือ ของเรือกลเดินทะเลเฉพาะเขต ขนาดต่ำ</p>

ชั้นประกาศนียบัตร	สิทธิที่อนุญาตให้ทำการ
	กว่า ๑,๖๐๐ ตันกรอส ในเขตการเดินเรือภายในประเทศ
๑๐. ประกาศนียบัตรแสดงความรู้ความสามารถนายประจำเรือของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส (Officer in charge of a navigational watch on ships of less than 500 gross tonnage engaged on near-coastal voyages)	ก. นายประจำเรือ ของเรือกลเดินทะเลใกล้ฝั่ง ขนาดต่ำกว่า ๕๐๐ ตันกรอส ในเขตการเดินเรือใกล้ฝั่ง
๑๑. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือชำนาญงานฝ่ายเดินเรือ (Rating as Able seafarer deck))	ก. ลูกเรือชำนาญงานฝ่ายเดินเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ ข. ลูกเรือเข้ายามสะพานเดินเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ
๑๒. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือเข้ายามฝ่ายเดินเรือ (Rating forming part of navigational watch)	ก. ลูกเรือเข้ายามสะพานเดินเรือ ของเรือกลเดินทะเล ทุกขนาดตันกรอส ทุกเขตการเดินเรือ

ภาคผนวก ๑

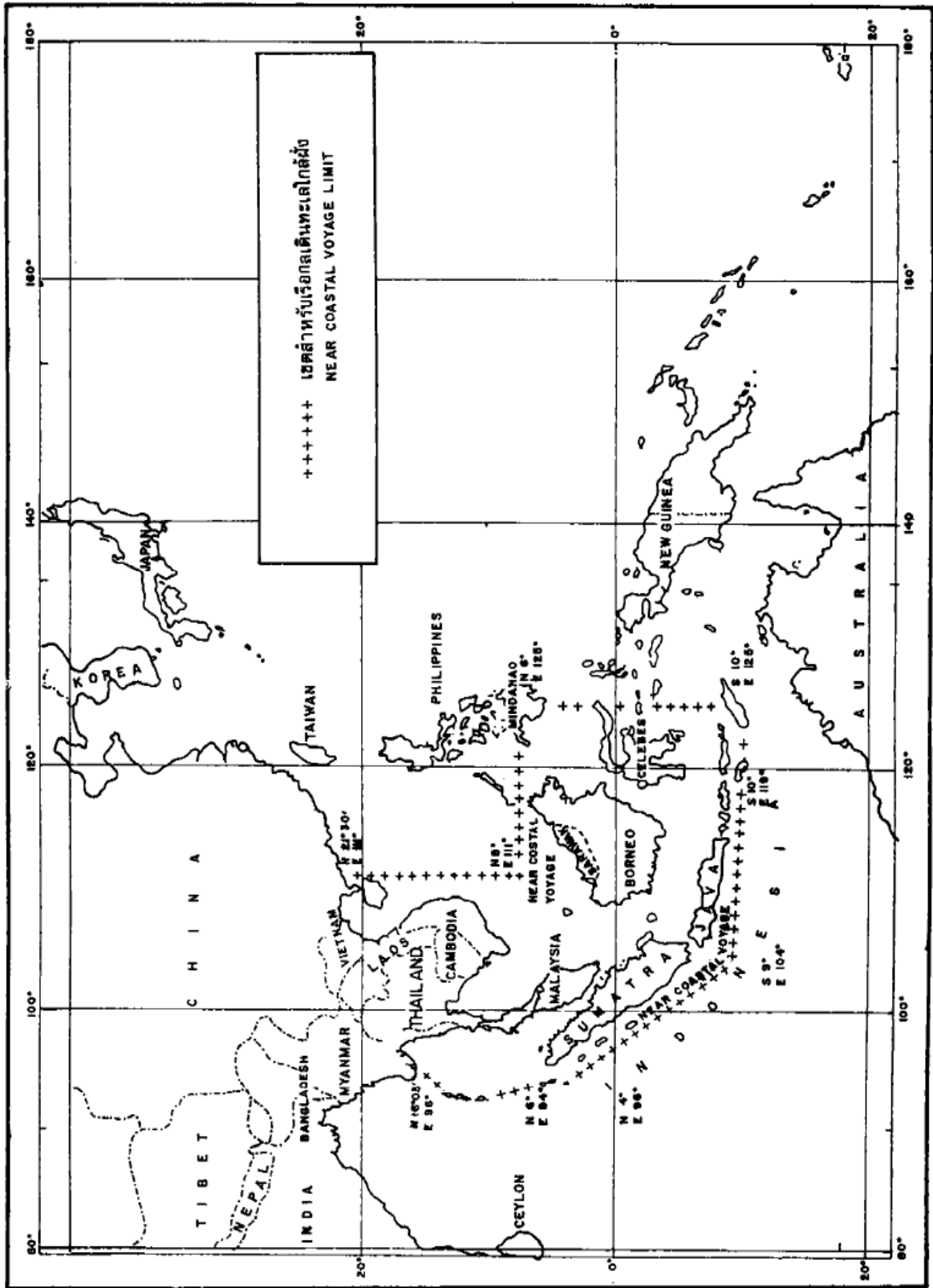
ตารางที่ ๗

สิทธิการทำการในเรือสำหรับประกาศนียบัตรฝ่ายช่างกลเรือ

ชั้นประกาศนียบัตร	สิทธิที่อนุญาตให้ทำการ
๑. ประกาศนียบัตรแสดงความรู้ความสามารถต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า (Chief engineer officer on ships powered by main propulsion machinery of 3,000 kW propulsion power or more)	ก. ต้นกล ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ ข. รองต้นกล ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ ค. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ
๒. รองต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๓,๐๐๐ กิโลวัตต์หรือมากกว่า (Second engineer officer on ships powered by main propulsion machinery of 3,000 kW propulsion power or more)	ก. รองต้นกล ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ ข. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม ค. ต้นกล ของเรือกลเดินทะเลใกล้เคียง ทุกขนาดกำลังขับเคลื่อน ในเขตการเดินเรือใกล้เคียง หากมีคุณสมบัติตามข้อ ๙๒(๖.๑) ง. ต้นกล ของเรือกลเดินทะเล ขนาดกำลังขับเคลื่อนต่ำกว่า ๓,๐๐๐ กิโลวัตต์ ทุกเขตการเดินเรือ หากมีคุณสมบัติตามข้อ ๙๒(๖.๒)
๓. ประกาศนียบัตรแสดงความรู้ความสามารถต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์ (Chief engineer officer on ships powered by main propulsion machinery of between 750-3,000 kW propulsion power)	ก. ต้นกล ของเรือกลเดินทะเล ขนาดกำลังขับเคลื่อนต่ำกว่า ๓,๐๐๐ กิโลวัตต์ ทุกเขตการเดินเรือ ข. รองต้นกล ของเรือกลเดินทะเล ขนาดกำลังขับเคลื่อนต่ำกว่า 3,000 กิโลวัตต์ ทุกเขตการเดินเรือ ค. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม ง. ต้นกล ของเรือกลเดินทะเลใกล้เคียง ทุกขนาดกำลังขับเคลื่อน ในเขตการเดินเรือใกล้เคียง หากมีคุณสมบัติตามข้อ ๙๓(๖.๑) จ. รองต้นกล ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ หากมีคุณสมบัติตามข้อ ๙๓(๖.๒)
๔. ประกาศนียบัตรแสดงความรู้ความสามารถรองต้นกลของเรือกลเดินทะเลขนาดกำลังขับเคลื่อน ๗๕๐-๓,๐๐๐ กิโลวัตต์ (Second engineer officer on ships powered by	ก. รองต้นกล ของเรือกลเดินทะเล ขนาดกำลังขับเคลื่อนต่ำกว่า ๓,๐๐๐ กิโลวัตต์ ทุกเขตการเดินเรือ ข. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาด

ชั้นประกาศนียบัตร	สิทธิที่อนุญาตให้ทำการ
main propulsion machinery of between 750-3,000 kW propulsion power)	กำลังขับเคลื่อน ทุกเขตการเดินเรือ สิทธิที่สามารถขอรับรองเพิ่มเติม ค. รองต้นกล ของเรือกลเดินทะเลใกล้ฝั่ง ทุกขนาด กำลังขับเคลื่อน ในเขตการเดินเรือใกล้ฝั่ง หากมีคุณสมบัติตามข้อ ๙๔(๖.๑)
๕. ประกาศนียบัตรแสดงความรู้ความสามารถ นายประจำเรือฝ่ายช่างกลของเรือเดินทะเล ขนาดกำลังขับเคลื่อน ๗๕๐ กิโลวัตต์ หรือมากกว่า (Officer in charge of an engineering watch on ships powered by main propulsion machinery of 750 kW propulsion power or more)	ก. นายประจำเรือ ของเรือกลเดินทะเล ทุกขนาด กำลังขับเคลื่อน ทุกเขตการเดินเรือ
๖. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือชำนาญงานฝ่ายช่างกล (Rating as Able seafarer engine)	ก. ลูกเรือชำนาญงานฝ่ายช่างกล ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ ข. ลูกเรือเข้ายามฝ่ายช่างกลเรือ ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ
๗. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรือเข้ายามฝ่ายช่างกล (Rating forming part of engineering watch)	ก. ลูกเรือเข้ายามฝ่ายช่างกลเรือ ของเรือกลเดินทะเล ทุกขนาดกำลังขับเคลื่อน ทุกเขตการเดินเรือ
๘. ประกาศนียบัตรแสดงความรู้ความสามารถนายช่างอิเล็กทรอนิกส์ (Electrotechnical officer)	ก. นายช่างอิเล็กทรอนิกส์ของเรือกลเดินทะเล ทุกกำลังขับเคลื่อน ทุกเขตการเดินเรือ ข. ลูกเรืออิเล็กทรอนิกส์ของเรือกลเดินทะเล ทุกกำลังขับเคลื่อน ทุกเขตการเดินเรือ
๙. ประกาศนียบัตรแสดงความรู้ความชำนาญ ลูกเรืออิเล็กทรอนิกส์ (Electrotechnical rating)	ก. ลูกเรืออิเล็กทรอนิกส์ของเรือกลเดินทะเล ทุกกำลังขับเคลื่อน ทุกเขตการเดินเรือ

ภาคผนวก ๑  
 ตารางที่ ๘  
 เขตการเดินเรือใกล้ฝั่ง



ภาคผนวก ๑

ตารางที่ ๙

มาตรฐานขั้นต่ำการมองเห็นสำหรับการปฏิบัติหน้าที่ของคนประจำเรือ

**Minimum in-service eyesight standards for seafarers**

STCW Convention regulation	Category of seafarer	Distance vision Aided <sup>1</sup>		Near/immediate vision	Colour vision <sup>3</sup>	Visual fields <sup>4</sup>	Night blindness <sup>4</sup>	Diplopia (double vision) <sup>4</sup>
		One eye	Other eye	Both eyes together, aided or unaided				
I/11 II/1 II/2 II/3 II/4 II/5 VII/2	Masters, deck officers and ratings required to undertake look-out duties	0.5 <sup>2</sup>	0.5	Vision required for ship's navigation (e.g., chart and nautical publication reference, use of bridge instrumentation and equipment, and identification of aids to navigation)	See Note 6	Normal Visual fields	Vision required to perform all necessary functions in darkness without compromise	No significant condition evident
I/11 III/1 III/2 III/3 III/4 III/5 III/6 III/7 VII/2	All engineer officers, electro-technical officers, electro-technical ratings and ratings or others forming part of an engine-room watch	0.4 <sup>5</sup>	0.4 (see Note 5)	Vision required to read instruments in close proximity, to operate equipment, and to identify systems/components as necessary	See Note 7	Sufficient visual fields	Vision required to perform all necessary functions in darkness without compromise	No significant condition evident
I/11 IV/2	GMDSS Radio operators	0.4	0.4	Vision required to read instruments in close proximity, to operate equipment, and to identify systems/components as necessary	See Note 7	Sufficient visual fields	Vision required to perform all necessary functions in darkness without compromise	No significant condition evident

Notes:

- 1 Values given in Snellen decimal notation.
- 2 A value of at least 0.7 in one eye is recommended to reduce the risk of undetected underlying eye disease.
- 3 As defined in the *International Recommendations for Colour Vision Requirements for Transport* by the Commission Internationale de l'Eclairage (CIE-143-2001 including any subsequent versions).
- 4 Subject to assessment by a clinical vision specialist where indicated by initial examination findings.
- 5 Engine department personnel shall have a combined eyesight vision of at least 0.4.
- 6 CIE colour vision standard 1 or 2.
- 7 CIE colour vision standard 1, 2 or 3.





## ประกาศนียบัตรแสดงความรู้ความสามารถ

.....  
.....

ออกตามพระราชบัญญัติการเดินเรือในน่านน้ำไทย

พระพุทธศักราช ๒๔๕๖ และที่แก้ไขเพิ่มเติม

และสอดคล้องกับบทบัญญัติของอนุสัญญาระหว่างประเทศ

ว่าด้วยมาตรฐานการฝึกอบรม การออกประกาศนียบัตรและการเข้ายาม

สำหรับคนประจำเรือ ค.ศ.๑๙๗๘ และที่แก้ไขเพิ่มเติม

## CERTIFICATE OF COMPETENCY

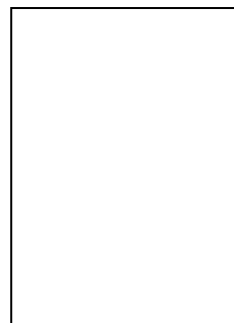
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Issued under the provisions of Navigation in Thai Waters Act,

B.E. 2456 (1913) as amended and comply with

The international Convention on Standards of Training, Certification

And Watchkeeping for Seafarers, 1978 as amended



ประกาศนียบัตรเลขที่

Certificate No.....

ชื่อ - นามสกุล .....

Name - Surname.....

.....  
ลายมือชื่อผู้ถือประกาศนียบัตร

Signature of the holder of certificate

สัญชาติ National		วันเกิด Date of birth	สถานที่เกิด Place of birth
เพศ Sex	สูง Height	เมตร meters	ตำหนิ Special peculiarities
วันที่ออก Date of issue			วันหมดอายุ Date of expiry
ออกให้โดย Authority			

.....  
(.....)

เจ้าพนักงานผู้ได้รับมอบหมายจากอธิบดีกรมเจ้าท่า

ในฐานะเจ้าท่า

Authorized by the Director General

Marine Department

แบบประกาศนียบัตรรับรอง (Certificate of Endorsement)



CERTIFICATE OF ENDORSEMENT

THE GOVERNMENT OF THAILAND

MARINE DEPARTMENT

MINISTRY OF TRANSPORT

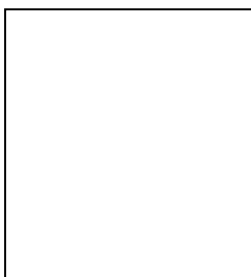
UNDER THE PROVISIONS OF NAVIGATION IN THAI WATERS ACT, B.E.2456 (1913) AS AMENDED  
AND COMPLY WITH THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION  
AND WATCHKEEPING FOR SEAFARERS, 1978, AS AMENDED

The Government of Thailand, certifies that Certificate No.....has been issued  
to.....who has been found duly qualified in accordance with the  
Provisions of regulation.....of the International Convention on Standards of Training, Certification and  
Watchkeeping for Seafarers, 1978, as amended, and has been found competent to perform the following functions,  
at the levels specified, subject to any limitations indicated until.....or until the date of expiry of any extension  
of the validity of this endorsement as shown overleaf:

FUNCTION	LEVEL	LIMITATIONS APPLYING (IF ANY)

The lawful holder of this certificate may serve in the following capacity or capacities specified in the applicable  
Safe manning requirements of the Marine Department:

CAPACITY	LIMITATIONS APPLYING (IF ANY)



issued on.....

.....

(.....)

Authorized by the Director General

Marine Department

Date of birth of the certificate's holder.....

Signature of the certificate's holder.....

แบบประกาศนียบัตรแสดงความรู้ความชำนาญ (Certificate of Proficiency)



CERTIFICATE OF PROFICIENCY

THE GOVERNMENT OF THAILAND

MARINE DEPARTMENT

MINISTRY OF TRANSPORT

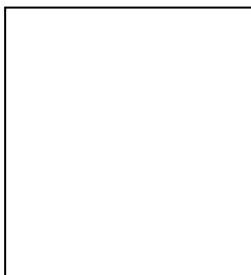
UNDER THE PROVISIONS OF NAVIGATION IN THAI WATERS ACT, B.E.2456 (1913) AS AMENDED  
AND COMPLY WITH THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION  
AND WATCHKEEPING FOR SEAFARERS, 1978, AS AMENDED

The Government of Thailand, certifies that Certificate No.....has been issued to.....who has been found duly qualified in accordance with the Provisions of regulation.....of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended, and has been found competent to perform the following functions, at the levels specified, subject to any limitations indicated until.....or until the date of expiry of any extension of the validity of this endorsement as shown overleaf:

FUNCTION	LEVEL	LIMITATIONS APPLYING (IF ANY)

The lawful holder of this certificate may serve in the following capacity or capacities specified in the applicable Safe manning requirements of the Marine Department:

CAPACITY	LIMITATIONS APPLYING (IF ANY)



issued on.....

.....

(.....)

Authorized by the Director General

Marine Department

Date of birth of the certificate's holder.....

Signature of the certificate's holder.....

แบบใบสำคัญรับรองประกาศนียบัตรที่ออกโดยรัฐภาคีอื่น (Certificate of Recognition)



CERTIFICATE OF PROFICIENCY

THE GOVERNMENT OF THAILAND

MARINE DEPARTMENT

MINISTRY OF TRANSPORT

UNDER THE PROVISIONS OF NAVIGATION IN THAI WATERS ACT, B.E.2456 (1913) AS AMENDED  
AND COMPLY WITH THE INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION  
AND WATCHKEEPING FOR SEAFARERS, 1978, AS AMENDED

The Government of Thailand, certifies that Certificate No..... issued to.....by or on behalf of the Government of.....is duly recognized in accordance with the provisions of regulation V/10 of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995, and the lawful holder is authorized to perform the following functions, at the levels specified, subject to any limitations indicated until.....or until the date of expiry of any extension of the validity of this endorsement as shown overleaf:

FUNCTION	LEVEL	LIMITATIONS APPLYING (IF ANY)

The lawful holder of this endorsement may serve in the following capacity or capacities specified in the applicable Safe manning requirements of the Marine Department:

CAPACITY	LIMITATIONS APPLYING (IF ANY)



Endorsement No.....issued on.....

.....

(.....)

Authorized by the Director General

Marine Department

Date of birth of the certificate's holder.....

Signature of the certificate's holder.....

ภาคผนวก ๒

ตารางที่ ๑ มาตรฐานความรู้ความสามารถสำหรับนายประจำเรือของเรือกลเดินทะเล

ขนาด ๕๐๐ ตันกรอส หรือมากกว่า (Table A-II/1)

Table A-II/1

**Specification of minimum standard of competence for officers in charge of a navigational watch on ships of 500 gross tonnage or more**

**Function: Navigation at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Plan and conduct a passage and determine position	<p><i>Celestial navigation</i></p> <p>Ability to use celestial bodies to determine the ship's position</p> <p><i>Terrestrial and coastal navigation</i></p> <p>Ability to determine the ship's position by use of:</p> <p>.1 landmarks</p> <p>.2 aids to navigation, including lighthouses, beacons and buoys</p> <p>.3 dead reckoning, taking into account winds, tides, currents and estimated speed</p> <p>Thorough knowledge of and ability to use nautical charts, and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routing information</p> <p><i>Electronic systems of position fixing and navigation</i></p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p> <p>using chart catalogues, charts, nautical publications, radio navigational warnings, sextant, azimuth mirror, electronic navigation equipment, echo-sounding equipment, compass</p>	<p>The information obtained from nautical charts and publications is relevant, interpreted correctly and properly applied. All potential navigational hazards are accurately identified</p> <p>The primary method of fixing the ship's position is the most appropriate to the prevailing circumstances and conditions</p> <p>The position is determined within the limits of acceptable instrument/system errors</p> <p>The reliability of the information obtained from the primary method of position fixing is checked at appropriate intervals</p> <p>Calculations and measurements of navigational information are accurate</p> <p>The charts selected are the largest scale suitable for the area of navigation and charts and publications are corrected in accordance with the latest information available</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	Ability to determine the ship's position by use of electronic navigational aids		Performance checks and tests to navigation systems comply with manufacturer's recommendations and good navigational practice
Plan and conduct a passage and determine position ( <i>continued</i> )	<p><i>Echo-sounders</i></p> <p>Ability to operate the equipment and apply the information correctly</p> <p><i>Compass – magnetic and gyro</i></p> <p>Knowledge of the principles of magnetic and gyro-compasses</p> <p>Ability to determine errors of the magnetic and gyro-compasses, using celestial and terrestrial means, and to allow for such errors</p> <p><i>Steering control system</i></p> <p>Knowledge of steering control systems, operational procedures and change-over from manual to automatic control and vice versa. Adjustment of controls for optimum performance</p> <p><i>Meteorology</i></p> <p>Ability to use and interpret information obtained from shipborne meteorological instruments</p> <p>Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems</p> <p>Ability to apply the meteorological information available</p>		<p>Errors in magnetic and gyro-compasses are determined and correctly applied to courses and bearings</p> <p>The selection of the mode of steering is the most suitable for the prevailing weather, sea and traffic conditions and intended manoeuvres</p> <p>Measurements and observations of weather conditions are accurate and appropriate to the passage</p> <p>Meteorological information is correctly interpreted and applied</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain a safe navigational watch	<p><i>Watchkeeping</i></p> <p>Thorough knowledge of the content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended</p> <p>Thorough knowledge of the Principles to be observed in keeping a navigational watch</p> <p>The use of routeing in accordance with the General Provisions on Ships' Routeing</p> <p>The use of information from navigational equipment for maintaining a safe navigational watch</p> <p>Knowledge of blind pilotage techniques</p> <p>The use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The conduct, handover and relief of the watch conforms with accepted principles and procedures</p> <p>A proper look-out is maintained at all times and in such a way as to conform to accepted principles and procedures</p> <p>Lights, shapes and sound signals conform with the requirements contained in the International Regulations for Preventing Collisions at Sea, 1972, as amended, and are correctly recognized</p> <p>The frequency and extent of monitoring of traffic, the ship and the environment conform with accepted principles and procedures</p> <p>A proper record is maintained of the movements and activities relating to the navigation of the ship</p> <p>Responsibility for the safety of navigation is clearly defined at all times, including periods when the master is on the bridge and while under pilotage</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain a safe navigational watch (continued)</p>	<p><i>Bridge resource management</i></p> <p>Knowledge of bridge resource management principles, including:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication</li> <li>.3 assertiveness and leadership</li> <li>.4 obtaining and maintaining situational awareness</li> <li>.5 consideration of team experience</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 approved simulator training</li> </ul>	<p>Resources are allocated and assigned as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Questionable decisions and/or actions result in appropriate challenge and response</p> <p>Effective leadership behaviours are identified</p> <p>Team member(s) share accurate understanding of current and predicted vessel state, navigation path, and external environment</p>
<p>Use of radar and ARPA to maintain safety of navigation</p> <p><i>Note:</i> Training and assessment in the use of ARPA is not required for those who serve exclusively on ships not fitted with ARPA. This limitation shall be reflected in the endorsement issued to the seafarer concerned</p>	<p><i>Radar navigation</i></p> <p>Knowledge of the fundamentals of radar and automatic radar plotting aids (ARPA)</p> <p>Ability to operate and to interpret and analyse information obtained from radar, including the following:</p> <p>Performance, including:</p> <ul style="list-style-type: none"> <li>.1 factors affecting performance and accuracy</li> <li>.2 setting up and maintaining displays</li> <li>.3 detection of misrepresentation of information, false echoes, sea return, etc., racons and SARTs</li> </ul>	<p>Assessment of evidence obtained from approved radar simulator and ARPA simulator plus in-service experience</p>	<p>Information obtained from radar and ARPA is correctly interpreted and analysed, taking into account the limitations of the equipment and prevailing circumstances and conditions</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Use of radar and ARPA to maintain safety of navigation (<i>continued</i>)</p> <p><i>Note:</i> Training and assessment in the use of ARPA is not required for those who serve exclusively on ships not fitted with ARPA. This limitation shall be reflected in the endorsement issued to the seafarer concerned</p>	<p>Use, including:</p> <ul style="list-style-type: none"> <li>.1 range and bearing; course and speed of other ships; time and distance of closest approach of crossing, meeting overtaking ships</li> <li>.2 identification of critical echoes; detecting course and speed changes of other ships; effect of changes in own ship's course or speed or both</li> <li>.3 application of the International Regulations for Preventing Collisions at Sea, 1972, as amended</li> <li>.4 plotting techniques and relative- and true-motion concepts</li> <li>.5 parallel indexing</li> </ul>		<p>Action taken to avoid a close encounter or collision with other vessels is in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended</p> <p>Decisions to amend course and/or speed are both timely and in accordance with accepted navigation practice</p> <p>Adjustments made to the ship's course and speed maintain safety of navigation</p> <p>Communication is clear, concise and acknowledged at all times in a seamanlike manner</p> <p>Manoeuvring signals are made at the appropriate time and are in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Use of radar and ARPA to maintain safety of navigation (<i>continued</i>)</p> <p><i>Note:</i> Training and assessment in the use of ARPA is not required for those who serve exclusively on ships not fitted with ARPA. This limitation shall be reflected in the endorsement issued to the seafarer concerned</p>	<p>Principal types of ARPA, their display characteristics, performance standards and the dangers of over-reliance on ARPA</p> <p>Ability to operate and to interpret and analyse information obtained from ARPA, including:</p> <ol style="list-style-type: none"> <li>.1 system performance and accuracy, tracking capabilities and limitations, and processing delays</li> <li>.2 use of operational warnings and system tests</li> <li>.3 methods of target acquisition and their limitations</li> <li>.4 true and relative vectors, graphic representation of target information and danger areas</li> <li>.5 deriving and analysing information, critical echoes, exclusion areas and trial manoeuvres</li> </ol>		
<p>Use of ECDIS to maintain the safety of navigation</p> <p><i>Note:</i> Training and assessment in the use of ECDIS is not required for those who serve exclusively on ships not fitted with ECDIS</p> <p>These limitations shall be reflected in the endorsements issued to the seafarer concerned</p>	<p><i>Navigation using ECDIS</i></p> <p>Knowledge of the capability and limitations of ECDIS operations, including:</p> <ol style="list-style-type: none"> <li>.1 a thorough understanding of Electronic Navigational Chart (ENC) data, data accuracy, presentation rules, display options and other chart data formats</li> <li>.2 the dangers of over-reliance</li> <li>.3 familiarity with the functions of ECDIS</li> </ol>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved training ship experience</li> <li>.2 approved ECDIS simulator training</li> </ol>	<p>Monitors information on ECDIS in a manner that contributes to safe navigation</p> <p>Information obtained from ECDIS (including radar overlay and/or radar tracking functions, when fitted) is correctly interpreted and analysed, taking into account the limitations of the equipment, all connected sensors (including radar and AIS where interfaced), and prevailing circumstances and conditions</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>required by performance standards in force</p> <p>Proficiency in operation, interpretation, and analysis of information obtained from ECDIS, including:</p> <ol style="list-style-type: none"> <li>.1 use of functions that are integrated with other navigation systems in various installations, including proper functioning and adjustment to desired settings</li> <li>.2 safe monitoring and adjustment of information, including own position, sea area display, mode and orientation, chart data displayed, route monitoring, user-created information layers, contacts (when interfaced with AIS and/or radar tracking) and radar overlay functions (when interfaced)</li> <li>.3 confirmation of vessel position by alternative means</li> <li>.4 efficient use of settings to ensure conformance to operational procedures, including alarm parameters for anti-grounding, proximity to contacts and special areas, completeness of chart data and chart update status, and backup arrangements</li> <li>.5 adjustment of settings and values to suit the present conditions</li> </ol>		<p>Safety of navigation is maintained through adjustments made to the ship's course and speed through ECDIS-controlled track-keeping functions (when fitted)</p> <p>Communication is clear, concise and acknowledged at all times in a seamanlike manner</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Use of ECDIS to maintain the safety of navigation (continued)	.6 situational awareness while using ECDIS including safe water and proximity of hazards, set and drift, chart data and scale selection, suitability of route, contact detection and management, and integrity of sensors		
Respond to emergencies	<p><i>Emergency procedures</i></p> <p>Precautions for the protection and safety of passengers in emergency situations</p> <p>Initial action to be taken following a collision or a grounding; initial damage assessment and control</p> <p>Appreciation of the procedures to be followed for rescuing persons from the sea, assisting a ship in distress, responding to emergencies which arise in port</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 practical training</p>	<p>The type and scale of the emergency is promptly identified</p> <p>Initial actions and, if appropriate, manoeuvring of the ship are in accordance with contingency plans and are appropriate to the urgency of the situation and nature of the emergency</p>
Respond to a distress signal at sea	<p><i>Search and rescue</i></p> <p>Knowledge of the contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual</p>	<p>Examination and assessment of evidence obtained from practical instruction or approved simulator training, where appropriate</p>	<p>The distress or emergency signal is immediately recognized</p> <p>Contingency plans and instructions in standing orders are implemented and complied with</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Use the IMO Standard Marine Communication Phrases and use English in written and oral form	<p><i>English language</i></p> <p>Adequate knowledge of the English language to enable the officer to use charts and other nautical publications, to understand meteorological information and messages concerning ship's safety and operation, to communicate with other ships, coast stations and VTS centres and to perform the officer's duties also with a multilingual crew, including the ability to use and understand the IMO Standard Marine Communication Phrases (IMO SMCP)</p>	Examination and assessment of evidence obtained from practical instruction	<p>English language nautical publications and messages relevant to the safety of the ship are correctly interpreted or drafted</p> <p>Communications are clear and understood</p>
Transmit and receive information by visual signalling	<p><i>Visual signalling</i></p> <p>Ability to use the International Code of Signals</p> <p>Ability to transmit and receive, by Morse light, distress signal SOS as specified in Annex IV of the International Regulations for Preventing Collisions at Sea, 1972, as amended, and appendix 1 of the International Code of Signals, and visual signalling of single-letter signals as also specified in the International Code of Signals</p>	Assessment of evidence obtained from practical instruction and/or simulation	Communications within the operator's area of responsibility are consistently successful

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Manoeuvre the ship	<p><i>Ship manoeuvring and handling</i></p> <p>Knowledge of:</p> <ul style="list-style-type: none"> <li>.1 the effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances</li> <li>.2 the effects of wind and current on ship handling</li> <li>.3 manoeuvres and procedures for the rescue of person overboard</li> <li>.4 squat, shallow-water and similar effects</li> <li>.5 proper procedures for anchoring and mooring</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 approved training on a manned scale ship model, where appropriate</li> </ul>	<p>Safe operating limits of ship propulsion, steering and power systems are not exceeded in normal manoeuvres</p> <p>Adjustments made to the ship's course and speed to maintain safety of navigation</p>

**Function: Cargo handling and stowage at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Monitor the loading, stowage, securing, care during the voyage and the unloading of cargoes	<p><i>Cargo handling, stowage and securing</i></p> <p>Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship</p> <p>Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship</p> <p>Ability to establish and maintain effective communications during loading and unloading</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Cargo operations are carried out in accordance with the cargo plan or other documents and established safety rules/regulations, equipment operating instructions and shipboard stowage limitations</p> <p>The handling of dangerous, hazardous and harmful cargoes complies with international regulations and recognized standards and codes of safe practice</p> <p>Communications are clear, understood and consistently successful</p>
Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks	<p>Knowledge* and ability to explain where to look for damage and defects most commonly encountered due to:</p> <p>.1 loading and unloading operations</p> <p>.2 corrosion</p> <p>.3 severe weather conditions</p> <p>Ability to state which parts of the ship shall be inspected each time in order to cover all parts within a given period of time</p> <p>Identify those elements of the ship structure which are critical to the safety of the ship</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>The inspections are carried out in accordance with laid-down procedures, and defects and damage are detected and properly reported</p> <p>Where no defects or damage are detected, the evidence from testing and examination clearly indicates adequate competence in adhering to procedures and ability to distinguish between normal and defective or damaged parts of the ship</p>

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It should be understood that deck officers need not be qualified in the survey of ships.

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks <i>(continued)</i>	State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented  Knowledge of procedures on how the inspections shall be carried out  Ability to explain how to ensure reliable detection of defects and damages  Understanding of the purpose of the “enhanced survey programme”		



**Function: Controlling the operation of the ship and care for persons on board at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ensure compliance with pollution-prevention requirements	<p><i>Prevention of pollution of the marine environment and anti-pollution procedures</i></p> <p>Knowledge of the precautions to be taken to prevent pollution of the marine environment</p> <p>Anti-pollution procedures and all associated equipment</p> <p>Importance of proactive measures to protect the marine environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved training</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed</p> <p>Actions to ensure that a positive environmental reputation is maintained</p>
Maintain seaworthiness of the ship	<p><i>Ship stability</i></p> <p>Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment</p> <p>Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy</p> <p>Understanding of the fundamentals of watertight integrity</p> <p><i>Ship construction</i></p> <p>General knowledge of the principal structural members of a ship and the proper names for the various parts</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The stability conditions comply with the IMO intact stability criteria under all conditions of loading</p> <p>Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice</p>
Prevent, control and fight fires on board	<p><i>Fire prevention and fire-fighting appliances</i></p> <p>Ability to organize fire drills</p> <p>Knowledge of classes and chemistry of fire</p> <p>Knowledge of fire-fighting systems</p>	<p>Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3</p>	<p>The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship</p> <p>Evacuation, emergency shutdown and isolation</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	Knowledge of action to be taken in the event of fire, including fires involving oil systems		<p>procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The order of priority and the levels and time-scales of making reports and informing personnel on board are relevant to the nature of the emergency and reflect the urgency of the problem</p>
Operate life-saving appliances	<p><i>Life-saving</i></p> <p>Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	<p><i>Medical aid</i></p> <p>Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship</p>	Assessment of evidence obtained from approved training as set out in section A-VI/4, paragraphs 1 to 3	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor compliance with legislative requirements	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea, security and protection of the marine environment are correctly identified

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Application of leadership and teamworking skills	<p>Working knowledge of shipboard personnel management and training</p> <p>A knowledge of related international maritime conventions and recommendations, and national legislation</p> <p>Ability to apply task and workload management, including:</p> <ul style="list-style-type: none"> <li>.1 planning and co-ordination</li> <li>.2 personnel assignment</li> <li>.3 time and resource constraints</li> <li>.4 prioritization</li> </ul> <p>Knowledge and ability to apply effective resource management:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication onboard and ashore</li> <li>.3 decisions reflect consideration of team experiences</li> <li>.4 assertiveness and leadership, including motivation</li> <li>.5 obtaining and maintaining situational awareness</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 practical demonstration</li> </ul>	<p>The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned</p> <p>Training objectives and activities are based on assessment of current competence and capabilities and operational requirements</p> <p>Operations are demonstrated to be in accordance with applicable rules</p> <p>Operations are planned and resources are allocated as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Effective leadership behaviours are demonstrated</p> <p>Necessary team member(s) share accurate understanding of current and predicted vessel status and operational status and external environment</p> <p>Decisions are most effective for the situation</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Application of leadership and teamworking skills (continued)	Knowledge and ability to apply decision-making techniques: <ol style="list-style-type: none"> <li>.1 situation and risk assessment</li> <li>.2 identify and consider generated options</li> <li>.3 selecting course of action</li> <li>.4 evaluation of outcome effectiveness</li> </ol>		
Contribute to the safety of personnel and ship	Knowledge of personal survival techniques  Knowledge of fire prevention and ability to fight and extinguish fires  Knowledge of elementary first aid  Knowledge of personal safety and social responsibilities	Assessment of evidence obtained from approved training and experience as set out in section A-VI/1, paragraph 2	Appropriate safety and protective equipment is correctly used  Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times  Procedures designed to safeguard the environment are observed at all times  Initial and follow-up action on becoming aware of an emergency conforms with established emergency response procedures

Table A-II/2

**Specification of minimum standard of competence for masters and chief mates  
on ships of 500 gross tonnage or more**

**Function: Navigation at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Plan a voyage and conduct navigation	<p>Voyage planning and navigation for all conditions by acceptable methods of plotting ocean tracks, taking into account, e.g.:</p> <p>.1 restricted waters</p> <p>.2 meteorological conditions</p> <p>.3 ice</p> <p>.4 restricted visibility</p> <p>.5 traffic separation schemes</p> <p>.6 vessel traffic service (VTS) areas</p> <p>.7 areas of extensive tidal effects</p> <p>Routeing in accordance with the General Provisions on Ships' Routeing</p> <p>Reporting in accordance with the General principles for Ship Reporting Systems and with VTS procedures</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved simulator training, where appropriate</p> <p>.3 approved laboratory equipment training</p> <p>using: chart catalogues, charts, nautical publications and ship particulars</p>	<p>The equipment, charts and nautical publications required for the voyage are enumerated and appropriate to the safe conduct of the voyage</p> <p>The reasons for the planned route are supported by facts and statistical data obtained from relevant sources and publications</p> <p>Positions, courses, distances and time calculations are correct within accepted accuracy standards for navigational equipment</p> <p>All potential navigational hazards are accurately identified</p>
Determine position and the accuracy of resultant position fix by any means	<p>Position determination in all conditions:</p> <p>.1 by celestial observations</p> <p>.2 by terrestrial observations, including the ability to use appropriate charts, notices to mariners and other publications to assess the accuracy of the resulting position fix</p> <p>.3 using modern electronic</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved simulator training, where appropriate</p> <p>.3 approved laboratory equipment training</p>	<p>The primary method chosen for fixing the ship's position is the most appropriate to the prevailing circumstances and conditions</p> <p>The fix obtained by celestial observations is within accepted accuracy levels</p> <p>The fix obtained by terrestrial observations is</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>navigation aids, with specific knowledge of their operating principles, limitations, sources of error, detection of misrepresentation of information and methods of correction to obtain accurate position fixing</p>	<p>using:</p> <ul style="list-style-type: none"> <li>.1 charts, nautical almanac, plotting sheets, chronometer, sextant and a calculator</li> <li>.2 charts, nautical publications and navigational instruments (azimuth mirror, sextant, log, sounding equipment, compass) and manufacturers' manuals</li> <li>.3 radar, terrestrial electronic position-fixing systems, satellite navigation systems and appropriate nautical charts and publications</li> </ul>	<p>within accepted accuracy levels</p> <p>The accuracy of the resulting fix is properly assessed</p> <p>The fix obtained by the use of electronic navigational aids is within the accuracy standards of the systems in use. The possible errors affecting the accuracy of the resulting position are stated and methods of minimizing the effects of system errors on the resulting position are properly applied</p>
<p>Determine and allow for compass errors</p>	<p>Ability to determine and allow for errors of the magnetic and gyro-compasses</p> <p>Knowledge of the principles of magnetic and gyro-compasses</p> <p>An understanding of systems under the control of the master gyro and a knowledge of the operation and care of the main types of gyro-compass</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> <li>.3 approved laboratory equipment training</li> </ul> <p>using: celestial observations, terrestrial bearings and comparison between magnetic and gyro-compasses</p>	<p>The method and frequency of checks for errors of magnetic and gyro-compasses ensures accuracy of information</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Coordinate search and rescue operations	<p>A thorough knowledge of and ability to apply the procedures contained in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> <li>.3 approved laboratory equipment training</li> </ul> <p>using: relevant publications, charts, meteorological data, particulars of ships involved, radiocommunication equipment and other available facilities and one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved SAR training course</li> <li>.2 approved simulator training, where appropriate</li> <li>.3 approved laboratory equipment training</li> </ul>	<p>The plan for coordinating search and rescue operations is in accordance with international guidelines and standards</p> <p>Radiocommunications are established and correct communication procedures are followed at all stages of the search and rescue operations</p>
Establish watchkeeping arrangements and procedures	<p>Thorough knowledge of content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended</p> <p>Thorough knowledge of the content, application and intent of the Principles to be observed in keeping a navigational watch</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> </ul>	<p>Watchkeeping arrangements and procedures are established and maintained in compliance with international regulations and guidelines so as to ensure the safety of navigation, protection of the marine environment and safety of the ship and persons on board</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain safe navigation through the use of information from navigation equipment and systems to assist command decision making</p> <p><i>Note:</i> Training and assessment in the use of ARPA is not required for those who serve exclusively on ships not fitted with ARPA. This limitation shall be reflected in the endorsement issued to the seafarer concerned</p>	<p>An appreciation of system errors and thorough understanding of the operational aspects of navigational systems</p> <p>Blind pilotage planning</p> <p>Evaluation of navigational information derived from all sources, including radar and ARPA, in order to make and implement command decisions for collision avoidance and for directing the safe navigation of the ship</p> <p>The interrelationship and optimum use of all navigational data available for conducting navigation</p>	<p>Examination and assessment of evidence obtained from approved ARPA simulator and one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> <li>.3 approved laboratory equipment training</li> </ul>	<p>Information obtained from navigation equipment and systems is correctly interpreted and analysed, taking into account the limitations of the equipment and prevailing circumstances and conditions</p> <p>Action taken to avoid a close encounter or collision with another vessel is in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended</p>
<p>Maintain the safety of navigation through the use of ECDIS and associated navigation systems to assist command decision making</p> <p><i>Note:</i> Training and assessment in the use of ECDIS is not required for those who serve exclusively on ships not fitted with ECDIS. This limitation shall be reflected in the endorsement issued to the seafarer concerned</p>	<p>Management of operational procedures, system files and data, including:</p> <ul style="list-style-type: none"> <li>.1 manage procurement, licensing and updating of chart data and system software to conform to established procedures</li> <li>.2 system and information updating, including the ability to update ECDIS system version in accordance with vendor's product development</li> <li>.3 create and maintain system configuration and backup files</li> <li>.4 create and maintain log files in accordance with established procedures</li> <li>.5 create and maintain route plan files in accordance with established procedures</li> </ul>	<p>Assessment of evidence obtained from one of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved ECDIS simulator training</li> </ul>	<p>Operational procedures for using ECDIS are established, applied, and monitored</p> <p>Actions taken to minimize risk to safety of navigation</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>.6 use ECDIS log-book and track history functions for inspection of system functions, alarm settings and user responses</p> <p>Use ECDIS playback functionality for passage review, route planning and review of system functions</p>		
Forecast weather and oceanographic conditions	<p>Ability to understand and interpret a synoptic chart and to forecast area weather, taking into account local weather conditions and information received by weather fax</p> <p>Knowledge of the characteristics of various weather systems, including tropical revolving storms and avoidance of storm centres and the dangerous quadrants</p> <p>Knowledge of ocean current systems</p> <p>Ability to calculate tidal conditions</p> <p>Use all appropriate nautical publications on tides and currents</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved laboratory equipment training</p>	<p>The likely weather conditions predicted for a determined period are based on all available information</p> <p>Actions taken to maintain safety of navigation minimize any risk to safety of the ship</p> <p>Reasons for intended action are backed by statistical data and observations of the actual weather conditions</p>
Respond to navigational emergencies	<p>Precautions when beaching a ship</p> <p>Action to be taken if grounding is imminent, and after grounding</p> <p>Refloating a grounded ship with and without assistance</p> <p>Action to be taken if collision is imminent and following a collision or impairment of the watertight integrity of the hull by any cause</p>	<p>Examination and assessment of evidence obtained from practical instruction, in-service experience and practical drills in emergency procedures</p>	<p>The type and scale of any problem is promptly identified and decisions and actions minimize the effects of any malfunction of the ship's systems</p> <p>Communications are effective and comply with established procedures</p> <p>Decisions and actions maximize safety of persons on board</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>Assessment of damage control</p> <p>Emergency steering</p> <p>Emergency towing arrangements and towing procedure</p>		
<p>Manoeuvre and handle a ship in all conditions</p>	<p>Manoeuvring and handling a ship in all conditions, including:</p> <ul style="list-style-type: none"> <li>.1 manoeuvres when approaching pilot stations and embarking or disembarking pilots, with due regard to weather, tide, headreach and stopping distances</li> <li>.2 handling ship in rivers, estuaries and restricted waters, having regard to the effects of current, wind and restricted water on helm response</li> <li>.3 application of constant-rate-of-turn techniques</li> <li>.4 manoeuvring in shallow water, including the reduction in under-keel clearance caused by squat, rolling and pitching</li> <li>.5 interaction between passing ships and between own ship and nearby banks (canal effect)</li> <li>.6 berthing and unberthing under various conditions of wind, tide and current with and without tugs</li> <li>.7 ship and tug interaction</li> <li>.8 use of propulsion and manoeuvring systems</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> <li>.3 approved manned scale ship model, where appropriate</li> </ul>	<p>All decisions concerning berthing and anchoring are based on a proper assessment of the ship's manoeuvring and engine characteristics and the forces to be expected while berthed alongside or lying at anchor</p> <p>While under way, a full assessment is made of possible effects of shallow and restricted waters, ice, banks, tidal conditions, passing ships and own ship's bow and stern wave so that the ship can be safely manoeuvred under various conditions of loading and weather</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Manoeuvre and handle a ship in all conditions <i>(continued)</i>	<p>.9 choice of anchorage; anchoring with one or two anchors in limited anchorages and factors involved in determining the length of anchor cable to be used</p> <p>.10 dragging anchor; clearing fouled anchors</p> <p>.11 dry-docking, both with and without damage</p> <p>.12 management and handling of ships in heavy weather, including assisting a ship or aircraft in distress; towing operations; means of keeping an unmanageable ship out of trough of the sea, lessening drift and use of oil</p> <p>.13 precautions in manoeuvring to launch rescue boats or survival craft in bad weather</p> <p>.14 methods of taking on board survivors from rescue boats and survival craft</p> <p>.15 ability to determine the manoeuvring and propulsion characteristics of common types of ships, with special reference to stopping distances and turning circles at various draughts and speeds</p> <p>.16 importance of navigating at reduced speed to avoid damage caused by own ship's bow wave and stern wave</p>		

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Manoeuvre and handle a ship in all conditions (continued)	.17 practical measures to be taken when navigating in or near ice or in conditions of ice accumulation on board  .18 use of, and manoeuvring in and near, traffic separation schemes and in vessel traffic service (VTS) areas		
Operate remote controls of propulsion plant and engineering systems and services	Operating principles of marine power plants  Ships' auxiliary machinery  General knowledge of marine engineering terms	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved simulator training, where appropriate	Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times

**Function: Cargo handling and stowage at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes	Knowledge of and ability to apply relevant international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargoes  Knowledge of the effect on trim and stability of cargoes and cargo operations  Use of stability and trim diagrams and stress-calculating equipment, including automatic data-based (ADB) equipment, and knowledge of loading cargoes and ballasting in order to keep hull stress within acceptable limits	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved simulator training, where appropriate  using: stability, trim and stress tables, diagrams and stress-calculating equipment	The frequency and extent of cargo condition monitoring is appropriate to its nature and prevailing conditions  Unacceptable or unforeseen variations in the condition or specification of the cargo are promptly recognized and remedial action is immediately taken and designed to safeguard the safety of the ship and those on board  Cargo operations are planned and executed in accordance with

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes (continued)</p>	<p>Stowage and securing of cargoes on board ships, including cargo-handling gear and securing and lashing equipment</p> <p>Loading and unloading operations, with special regard to the transport of cargoes identified in the Code of Safe Practice for Cargo Stowage and Securing</p> <p>General knowledge of tankers and tanker operations</p> <p>Knowledge of the operational and design limitations of bulk carriers</p> <p>Ability to use all available shipboard data related to loading, care and unloading of bulk cargoes</p> <p>Ability to establish procedures for safe cargo handling in accordance with the provisions of the relevant instruments such as IMDG Code, IMSBC Code, MARPOL 73/78 Annexes III and V and other relevant information</p> <p>Ability to explain the basic principles for establishing effective communications and improving working relationship between ship and terminal personnel</p>		<p>established procedures and legislative requirements</p> <p>Stowage and securing of cargoes ensures that stability and stress conditions remain within safe limits at all times during the voyage</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Assess reported defects and damage to cargo spaces, hatch covers and ballast tanks and take appropriate action	<p>Knowledge of the limitations on strength of the vital constructional parts of a standard bulk carrier and ability to interpret given figures for bending moments and shear forces</p> <p>Ability to explain how to avoid the detrimental effects on bulk carriers of corrosion, fatigue and inadequate cargo handling</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> </ul> <p>using: stability, trim and stress tables, diagrams and stress-calculating equipment</p>	<p>Evaluations are based on accepted principles, well-founded arguments and correctly carried out. The decisions taken are acceptable, taking into consideration the safety of the ship and the prevailing conditions</p>
Carriage of dangerous goods	<p>International regulations, standards, codes and recommendations on the carriage of dangerous cargoes, including the International Maritime Dangerous Goods (IMDG) Code and the International Maritime Solid Bulk Cargoes (IMSBC) Code</p> <p>Carriage of dangerous, hazardous and harmful cargoes; precautions during loading and unloading and care during the voyage</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved simulator training, where appropriate</li> <li>.3 approved specialist training</li> </ul>	<p>Planned distribution of cargo is based on reliable information and is in accordance with established guidelines and legislative requirements</p> <p>Information on dangers, hazards and special requirements is recorded in a format suitable for easy reference in the event of an incident</p>

**Function: Controlling the operation of the ship and care for persons on board at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Control trim, stability and stress	<p>Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability</p> <p>Knowledge of the effect on trim and stability of a ship in the event of damage to and consequent flooding of a compartment and countermeasures to be taken</p> <p>Knowledge of IMO recommendations concerning ship stability</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Stability and stress conditions are maintained within safe limits at all times</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and the protection of the marine environment</p>	<p>Knowledge of international maritime law embodied in international agreements and conventions</p> <p>Regard shall be paid especially to the following subjects:</p> <ol style="list-style-type: none"> <li>.1 certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and their period of validity</li> <li>.2 responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended</li> <li>.3 responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea, 1974, as amended</li> <li>.4 responsibilities under the International Convention for the Prevention of Pollution from Ships, as amended</li> <li>.5 maritime declarations of health and the requirements of the International Health Regulations</li> <li>.6 responsibilities under international instruments affecting the safety of the ship, passengers, crew and cargo</li> <li>.7 methods and aids to prevent pollution of the marine environment by ships</li> <li>.8 national legislation for implementing international agreements and conventions</li> </ol>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> </ol>	<p>Procedures for monitoring operations and maintenance comply with legislative requirements</p> <p>Potential non-compliance is promptly and fully identified</p> <p>Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain safety and security of the ship's crew and passengers and the operational condition of life-saving, fire-fighting and other safety systems</p>	<p>Thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)</p> <p>Organization of fire drills and abandon ship drills</p> <p>Maintenance of operational condition of life-saving, fire-fighting and other safety systems</p> <p>Actions to be taken to protect and safeguard all persons on board in emergencies</p> <p>Actions to limit damage and salvage the ship following a fire, explosion, collision or grounding</p>	<p>Examination and assessment of evidence obtained from practical instruction and approved in-service training and experience</p>	<p>Procedures for monitoring fire-detection and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures</p>
<p>Develop emergency and damage control plans and handle emergency situations</p>	<p>Preparation of contingency plans for response to emergencies</p> <p>Ship construction, including damage control</p> <p>Methods and aids for fire prevention, detection and extinction</p> <p>Functions and use of life-saving appliances</p>	<p>Examination and assessment of evidence obtained from approved in-service training and experience</p>	<p>Emergency procedures are in accordance with the established plans for emergency situations</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Use of leadership and managerial skill	<p>Knowledge of shipboard personnel management and training</p> <p>A knowledge of related international maritime conventions and recommendations, and national legislation</p> <p>Ability to apply task and workload management, including:</p> <ul style="list-style-type: none"> <li>.1 planning and co-ordination</li> <li>.2 personnel assignment</li> <li>.3 time and resource constraints</li> <li>.4 prioritization</li> </ul> <p>Knowledge and ability to apply effective resource management:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication on board and ashore</li> <li>.3 decisions reflect consideration of team experiences</li> <li>.4 assertiveness and leadership, including motivation</li> <li>.5 obtaining and maintaining situation awareness</li> </ul> <p>Knowledge and ability to apply decision-making techniques:</p> <ul style="list-style-type: none"> <li>.1 situation and risk assessment</li> <li>.2 identify and generate options</li> <li>.3 selecting course of action</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 approved simulator training</li> </ul>	<p>The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned</p> <p>Training objectives and activities are based on assessment of current competence and capabilities and operational requirements</p> <p>Operations are demonstrated to be in accordance with applicable rules</p> <p>Operations are planned and resources are allocated as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Effective leadership behaviours are demonstrated</p> <p>Necessary team member(s) share accurate understanding of current and predicted vessel state and</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Use of leadership and managerial skill ( <i>continued</i> )	.4 evaluation of outcome effectiveness  Development, implementation, and oversight of standard operating procedures		operational status and external environment  Decisions are most effective for the situation  Operations are demonstrated to be effective and in accordance with applicable rules
Organize and manage the provision of medical care on board	A thorough knowledge* of the use and contents of the following publications:  .1 International Medical Guide for Ships or equivalent national publications  .2 medical section of the International Code of Signals  .3 Medical First Aid Guide for Use in Accidents Involving Dangerous Goods	Examination and assessment of evidence obtained from approved training	Actions taken and procedures followed correctly apply and make full use of advice available

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\* The relevant IMO Model Course(s) may be of assistance in the preparation of courses.

ตารางที่ ๓ มาตรฐานความรู้ความสามารถสำหรับนายเรือและนายประจำเรือของเรือกลเดินทะเลใกล้ฝั่งขนาด  
ต่ำกว่า 500 ตันกรอส

Table A-II/3

**Specification of minimum standard of competence for officers in charge of  
a navigational watch and for masters on ships of less than 500 gross tonnage engaged on  
near-coastal voyages**

**Function: Navigation at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Plan and conduct a coastal passage and determine position</p> <p>Note: Training and assessment in the use of ECDIS is not required for those who serve exclusively on ships not fitted with ECDIS. These limitations shall be reflected in the endorsement issued to the seafarer concerned</p>	<p><i>Navigation</i></p> <p>Ability to determine the ship's position by the use of:</p> <p>.1 landmarks</p> <p>.2 aids to navigation, including lighthouses, beacons and buoys</p> <p>.3 dead reckoning, taking into account winds, tides, currents and estimated speed</p> <p>Thorough knowledge of and ability to use nautical charts and publications, such as sailing directions, tide tables, notices to mariners, radio navigational warnings and ships' routing information</p> <p>Reporting in accordance with General Principles for Ship Reporting Systems and with VTS procedures</p> <p><i>Note:</i> This item is only required for certification as master</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p> <p>using: chart catalogues, charts, nautical publications, radio navigational warnings, sextant, azimuth mirror, electronic navigation equipment, echo-sounding equipment, compass</p>	<p>Information obtained from nautical charts and publications is relevant, interpreted correctly and properly applied</p> <p>The primary method of fixing the ship's position is the most appropriate to the prevailing circumstances and conditions</p> <p>The position is determined within the limits of acceptable instrument/system errors</p> <p>The reliability of the information obtained from the primary method of position fixing is checked at appropriate intervals</p> <p>Calculations and measurements of navigational information are accurate</p> <p>Charts and publications selected are the largest scale on board suitable for the area of navigation and charts are corrected in accordance with the latest information available</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Plan and conduct a coastal passage and determine position ( <i>continued</i> )	<p>Voyage planning and navigation for all conditions by acceptable methods of plotting coastal tracks, taking into account, e.g.:</p> <ul style="list-style-type: none"> <li>.1 restricted waters</li> <li>.2 meteorological conditions</li> <li>.3 ice</li> <li>.4 restricted visibility</li> <li>.5 traffic separation schemes</li> <li>.6 vessel traffic service (VTS) areas</li> <li>.7 areas of extensive tidal effects</li> </ul> <p><i>Note:</i> This item is only required for certification as master</p> <p>Thorough knowledge of and ability to use ECDIS</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved training ship experience</li> <li>.2 approved ECDIS simulator training</li> </ul>	

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Plan and conduct a coastal passage and determine position <i>(continued)</i>	<p><i>Navigational aids and equipment</i></p> <p>Ability to operate safely and determine the ship's position by use of all navigational aids and equipment commonly fitted on board the ships concerned</p> <p><i>Compasses</i></p> <p>Knowledge of the errors and corrections of magnetic compasses</p> <p>Ability to determine errors of the compass, using terrestrial means, and to allow for such errors</p> <p><i>Automatic pilot</i></p> <p>Knowledge of automatic pilot systems and procedures; change-over from manual to automatic control and vice versa; adjustment of controls for optimum performance</p> <p><i>Meteorology</i></p> <p>Ability to use and interpret information obtained from shipborne meteorological instruments</p> <p>Knowledge of the characteristics of the various weather systems, reporting procedures and recording systems</p> <p>Ability to apply the meteorological information available</p>	<p>Assessment of evidence obtained from approved radar simulator</p>	<p>Performance checks and tests of navigation systems comply with manufacturer's recommendations, good navigational practice and IMO resolutions on performance standards for navigational equipment</p> <p>Interpretation and analysis of information obtained from radar is in accordance with accepted navigational practice and takes account of the limits and accuracy levels of radar</p> <p>Errors in magnetic compasses are determined and applied correctly to courses and bearings</p> <p>Selection of the mode of steering is the most suitable for prevailing weather, sea and traffic conditions and intended manoeuvres</p> <p>Measurements and observations of weather conditions are accurate and appropriate to the passage</p> <p>Meteorological information is evaluated and applied to maintain the safe passage of the vessel</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain a safe navigational watch</p>	<p><i>Watchkeeping</i></p> <p>Thorough knowledge of content, application and intent of the International Regulations for Preventing Collisions at Sea, 1972, as amended</p> <p>Knowledge of content of the Principles to be observed in keeping a navigational watch</p> <p>Use of routeing in accordance with the General Provisions on Ships' Routeing</p> <p>Use of reporting in accordance with the General Principles for Ship Reporting Systems and with VTS procedures</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 approved laboratory equipment training</li> </ul>	<p>The conduct, handover and relief of the watch conforms with accepted principles and procedures</p> <p>A proper look-out is maintained at all times and in conformity with accepted principles and procedures</p> <p>Lights, shapes and sound signals conform with the requirements contained in the International Regulations for Preventing Collisions at Sea, 1972, as amended and are correctly recognized</p> <p>The frequency and extent of monitoring of traffic, the ship and the environment conform with accepted principles and procedures</p> <p>Action to avoid close encounters and collision with other vessels is in accordance with the International Regulations for Preventing Collisions at Sea, 1972, as amended</p> <p>Decisions to adjust course and/or speed are both timely and in accordance with accepted navigation procedures</p> <p>A proper record is maintained of movements and activities relating to the navigation of the ship</p> <p>Responsibility for safe navigation is clearly defined at all times, including periods when the master is on the bridge and when under pilotage</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies	<p>Emergency procedures, including:</p> <ul style="list-style-type: none"> <li>.1 precautions for the protection and safety of passengers in emergency situations</li> <li>.2 initial assessment of damage and damage control</li> <li>.3 action to be taken following a collision</li> <li>.4 action to be taken following a grounding</li> </ul> <p>In addition, the following material should be included for certification as master:</p> <ul style="list-style-type: none"> <li>.1 emergency steering</li> <li>.2 arrangements for towing and for being taken in tow</li> <li>.3 rescuing persons from the sea</li> <li>.4 assisting a vessel in distress</li> <li>.5 appreciation of the action to be taken when emergencies arise in port</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 practical instruction</li> </ul>	<p>The type and scale of the emergency is promptly identified</p> <p>Initial actions and, if appropriate, manoeuvring are in accordance with contingency plans and are appropriate to the urgency of the situation and the nature of the emergency</p>
Respond to a distress signal at sea	<p><i>Search and rescue</i></p> <p>Knowledge of the contents of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual</p>	<p>Examination and assessment of evidence obtained from practical instruction or approved simulator training, where appropriate</p>	<p>The distress or emergency signal is immediately recognized</p> <p>Contingency plans and instructions in standing orders are implemented and complied with</p>



<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Manoeuvre the ship and operate small ship power plants	<p><i>Ship manoeuvring and handling</i></p> <p>Knowledge of factors affecting safe manoeuvring and handling</p> <p>The operation of small ship power plants and auxiliaries</p> <p>Proper procedures for anchoring and mooring</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Safe operating limits of ship propulsion, steering and power systems are not exceeded in normal manoeuvres</p> <p>Adjustments made to the ship's course and speed maintain safety of navigation</p> <p>Plant, auxiliary machinery and equipment is operated in accordance with technical specifications and within safe operating limits at all times</p>

**Function: Cargo handling and stowage at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Monitor the loading, stowage, securing and unloading of cargoes and their care during the voyage	<p><i>Cargo handling, stowage and securing</i></p> <p>Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship</p> <p>Use of the International Maritime Dangerous Goods (IMDG) Code</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Cargo operations are carried out in accordance with the cargo plan or other documents and established safety rules/regulations, equipment operating instructions and shipboard stowage limitations</p> <p>The handling of dangerous, hazardous and harmful cargoes complies with international regulations and recognized standards and codes of safe practice</p>

**Function: Controlling the operation of the ship and care for persons on board at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ensure compliance with pollution-prevention requirements	<p><i>Prevention of pollution of the marine environment and anti-pollution procedures</i></p> <p>Knowledge of the precautions to be taken to prevent pollution of the marine environment</p> <p>Anti-pollution procedures and all associated equipment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain seaworthiness of the ship	<p><i>Ship stability</i></p> <p>Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment</p> <p>Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy</p> <p>Understanding of the fundamentals of watertight integrity</p> <p><i>Ship construction</i></p> <p>General knowledge of the principal structural members of a ship and the proper names for the various parts</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The stability conditions comply with the IMO intact stability criteria under all conditions of loading</p> <p>Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice</p>
Prevent, control and fight fires on board	<p><i>Fire prevention and fire-fighting appliances</i></p> <p>Ability to organize fire drills</p> <p>Knowledge of classes and chemistry of fire</p> <p>Knowledge of fire-fighting systems</p> <p>Understanding of action to be taken in the event of fire, including fires involving oil systems</p>	<p>Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3</p>	<p>The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Operate life-saving appliances	<p><i>Life-saving</i></p> <p>Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	<p><i>Medical aid</i></p> <p>Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship</p>	Assessment of evidence obtained from approved training as set out in section A-VI/4, paragraphs 1 to 3	The identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor compliance with legislative requirements	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea, security and protection of the marine environment are correctly identified
Contribute to the safety of personnel and ship	<p>Knowledge of personal survival techniques</p> <p>Knowledge of fire prevention and ability to fight and extinguish fires</p> <p>Knowledge of elementary first aid</p> <p>Knowledge of personal safety and social responsibilities</p>	Assessment of evidence obtained from approved training and experiences as set out in section A-VI/1, paragraph 2	<p>Appropriate safety and protective equipment is correctly used</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times</p> <p>Procedures designed to safeguard the environment are observed at all times</p> <p>Initial and follow-up actions on becoming aware of an emergency conform with established emergency response procedures</p>

*Table A-II/4*  
**Specification of minimum standard of competence for ratings  
forming part of a navigational watch**

**Function:     Navigation at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Steer the ship and also comply with helm orders in the English language	Use of magnetic and gyro-compasses  Helm orders  Change-over from automatic pilot to hand steering and vice versa	Assessment of evidence obtained from:  .1 practical test, or  .2 approved in-service experience, or  .3 approved training ship experience	A steady course is steered within acceptable limits, having regard to the area of navigation and prevailing sea state. Alterations of course are smooth and controlled  Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner
Keep a proper look-out by sight and hearing	Responsibilities of a look-out, including reporting the approximate bearing of a sound signal, light or other object in degrees or points	Assessment of evidence obtained from:  .1 practical test, or  .2 approved in-service experience, or  .3 approved training ship experience	Sound signals, lights and other objects are promptly detected and their approximate bearing, in degrees or points, is reported to the officer of the watch
Contribute to monitoring and controlling a safe watch	Shipboard terms and definitions  Use of appropriate internal communication and alarm systems  Ability to understand orders and to communicate with the officer of the watch on matters relevant to watchkeeping duties  Procedures for the relief, maintenance and handover of a watch  Information required to maintain a safe watch  Basic environmental protection procedures	Assessment of evidence obtained from approved in-service experience or approved training ship experience	Communications are clear and concise and advice/clarification is sought from the officer on watch where watch information or instructions are not clearly understood  Maintenance, handover and relief of the watch is in conformity with accepted practices and procedures

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Operate emergency equipment and apply emergency procedures	<p>Knowledge of emergency duties and alarm signals</p> <p>Knowledge of pyrotechnic distress signals; satellite EPIRBs and SARTs</p> <p>Avoidance of false distress alerts and action to be taken in event of accidental activation</p>	Assessment of evidence obtained from demonstration and approved in-service experience or approved training ship experience	<p>Initial action on becoming aware of an emergency or abnormal situation is in conformity with established practices and procedures</p> <p>Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner</p> <p>The integrity of emergency and distress alerting systems is maintained at all times</p>

Table A-II/5

**Specification of minimum standards of competence of ratings as able seafarer deck****Function: Navigation at the support level**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to a safe navigational watch	<p>Ability to understand orders and to communicate with the officer of the watch on matters relevant to watchkeeping duties</p> <p>Procedures for the relief, maintenance and handover of a watch</p> <p>Information required to maintain a safe watch</p>	Assessment of evidence obtained from in-service experience or practical test	<p>Communications are clear and concise</p> <p>Maintenance, handover and relief of the watch is in conformity with acceptable practices and procedures</p>
Contribute to berthing, anchoring and other mooring operations	<p>Working knowledge of the mooring system and related procedures, including:</p> <p>.1 the function of mooring and tug lines and how each line functions as part of an overall system</p> <p>.2 the capacities, safe working loads, and breaking strengths of mooring equipment, including mooring wires, synthetic and fibre lines, winches, anchor windlasses, capstans, bits, chocks and bollards</p> <p>.3 the procedures and order of events for making fast and letting go mooring and tug lines and wires, including towing lines</p> <p>.4 the procedures and order of events for the use of anchors in various operations</p> <p>Working knowledge of the procedures and order of events associated with mooring to a buoy or buoys</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p> <p>.5 approved simulator training, where appropriate</p>	Operations are carried out in accordance with established safety practices and equipment operating instructions

**Function: Cargo handling and stowage at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the handling of cargo and stores	<p>Knowledge of procedures for safe handling, stowage and securing of cargoes and stores, including dangerous, hazardous and harmful substances and liquids</p> <p>Basic knowledge of and precautions to observe in connection with particular types of cargo and identification of IMDG labelling</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p> <p>.5 approved simulator training, where appropriate</p>	<p>Cargo and stores operations are carried out in accordance with established safety procedures and equipment operating instructions</p> <p>The handling of dangerous, hazardous and harmful cargoes or stores complies with established safety practices</p>

**Function: Controlling the operation of the ship and care for persons on board at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe operation of deck equipment and machinery	<p>Knowledge of deck equipment, including:</p> <p>.1 function and uses of valves and pumps, hoists, cranes, booms, and related equipment</p> <p>.2 function and uses of winches, windlasses, capstans and related equipment</p> <p>.3 hatches, watertight doors, ports, and related equipment</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Operations are carried out in accordance with established safety practices and equipment operating instructions</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe operation of deck equipment and machinery <i>(continued)</i>	<p>.4 fibre and wire ropes, cables and chains, including their construction, use, markings, maintenance and proper stowage</p> <p>.5 ability to use and understand basic signals for the operation of equipment, including winches, windlasses, cranes, and hoists</p> <p>.6 ability to operate anchoring equipment under various conditions, such as anchoring, weighing anchor, securing for sea, and in emergencies</p> <p>Knowledge of the following procedures and ability to:</p> <p>.1 rig and unrig bosun's chairs and staging</p> <p>.2 rig and unrig pilot ladders, hoists, rat-guards and gangways</p> <p>.3 use marlin spike seamanship skills, including the proper use of knots, splices and stoppers</p> <p>Use and handling of deck and cargo-handling gear and equipment:</p> <p>.1 access arrangements, hatches and hatch covers, ramps, side/bow/stern doors or elevators</p> <p>.2 pipeline systems – bilge and ballast suctions and wells</p>	<p>Assessment of evidence obtained from practical demonstration</p> <p>Assessment of evidence obtained from practical demonstration</p> <p>Assessment of evidence obtained from practical demonstration</p>	<p>Communications within the operator's area of responsibility are consistently successful</p> <p>Equipment operation is safely carried out in accordance with established procedures</p> <p>Demonstrate the proper methods for rigging and unrigging in accordance with safe industry practice</p> <p>Demonstrate the proper creation and use of knots, splices, stoppers, whippings, servings as well as proper canvas handling</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to the safe operation of deck equipment and machinery <i>(continued)</i>	.3 cranes, derricks, winches  Knowledge of hoisting and dipping flags and the main single-flag signals. (A, B, G, H, O, P, Q)		Demonstrate the proper use of blocks and tackle  Demonstrate the proper methods for handling lines, wires, cables and chains
Apply occupational health and safety precautions	Working knowledge of safe working practices and personal shipboard safety including:  .1 working aloft .2 working over the side .3 working in enclosed spaces .4 permit to work systems .5 line handling .6 lifting techniques and methods of preventing back injury .7 electrical safety .8 mechanical safety .9 chemical and biohazard safety .10 personal safety equipment	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience .2 practical training .3 examination .4 approved training ship experience	Procedures designed to safeguard personnel and the ship are observed at all times  Safe working practices are observed and appropriate safety and protective equipment is correctly used at all times
Apply precautions and contribute to the prevention of pollution of the marine environment	Knowledge of the precautions to be taken to prevent pollution of the marine environment  Knowledge of the use and operation of anti-pollution equipment  Knowledge of the approved methods for disposal of marine pollutants	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience .2 practical training .3 examination .4 approved training ship experience	Procedures designed to safeguard the marine environment are observed at all times

	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Operate survival craft and rescue boats	<p>Knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment</p> <p>Knowledge of survival at sea techniques</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards

**Function: Maintenance and repair at the support level**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to shipboard maintenance and repair	<p>Ability to use painting, lubrication and cleaning materials and equipment</p> <p>Ability to understand and execute routine maintenance and repair procedures</p> <p>Knowledge of surface preparation techniques</p> <p>Understanding manufacturer's safety guidelines and shipboard instructions</p> <p>Knowledge of safe disposal of waste materials</p> <p>Knowledge of the application, maintenance and use of hand and power tools</p>	<p>Assessment of evidence obtained from practical demonstration</p> <p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	Maintenance and repair activities are carried out in accordance with technical, safety and procedural specifications

Table A-III/1

**Specification of minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room**

**Function: Marine engineering at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain a safe engineering watch	<p>Thorough knowledge of Principles to be observed in keeping an engineering watch, including:</p> <p>.1 duties associated with taking over and accepting a watch</p> <p>.2 routine duties undertaken during a watch</p> <p>.3 maintenance of the machinery space logs and the significance of the readings taken</p> <p>.4 duties associated with handing over a watch</p> <p>Safety and emergency procedures; change-over of remote/automatic to local control of all systems</p> <p>Safety precautions to be observed during a watch and immediate actions to be taken in the event of fire or accident, with particular reference to oil systems</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The conduct, handover and relief of the watch conforms with accepted principles and procedures</p> <p>The frequency and extent of monitoring of engineering equipment and systems conforms to manufacturers' recommendations and accepted principles and procedures, including Principles to be observed in keeping an engineering watch</p> <p>A proper record is maintained of the movements and activities relating to the ship's engineering systems</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain a safe engineering watch (continued)	<p><i>Engine-room resource management</i></p> <p>Knowledge of engine-room resource management principles, including:</p> <ol style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication</li> <li>.3 assertiveness and leadership</li> <li>.4 obtaining and maintaining situational awareness</li> <li>.5 consideration of team experience</li> </ol>	<p>Assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 approved simulator training</li> </ol>	<p>Resources are allocated and assigned as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Questionable decisions and/or actions result in appropriate challenge and response</p> <p>Effective leadership behaviours are identified</p> <p>Team member(s) share accurate understanding of current and predicted engine-room and associated systems state, and of external environment</p>
Use English in written and oral form	Adequate knowledge of the English language to enable the officer to use engineering publications and to perform engineering duties	Examination and assessment of evidence obtained from practical instruction	<p>English language publications relevant to engineering duties are correctly interpreted</p> <p>Communications are clear and understood</p>
Use internal communication systems	Operation of all internal communication systems on board	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 approved laboratory equipment training</li> </ol>	<p>Transmission and reception of messages are consistently successful</p> <p>Communication records are complete, accurate and comply with statutory requirements</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Operate main and auxiliary machinery and associated control systems	<p>Basic construction and operation principles of machinery systems, including:</p> <ul style="list-style-type: none"> <li>.1 marine diesel engine</li> <li>.2 marine steam turbine</li> <li>.3 marine gas turbine</li> <li>.4 marine boiler</li> <li>.5 shafting installations, including propeller</li> <li>.6 other auxiliaries, including various pumps, air compressor, purifier, fresh water generator, heat exchanger, refrigeration, air-conditioning and ventilation systems</li> <li>.7 steering gear</li> <li>.8 automatic control systems</li> <li>.9 fluid flow and characteristics of lubricating oil, fuel oil and cooling systems</li> <li>.10 deck machinery</li> </ul> <p>Safety and emergency procedures for operation of propulsion plant machinery, including control systems</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved laboratory equipment training</li> </ul>	<p>Construction and operating mechanisms can be understood and explained with drawings/instructions</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Operate main and auxiliary machinery and associated control systems <i>(continued)</i>	Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems:  .1 main engine and associated auxiliaries  .2 steam boiler and associated auxiliaries and steam systems  .3 auxiliary prime movers and associated systems  .4 other auxiliaries, including refrigeration, air-conditioning and ventilation systems	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training, where appropriate  .4 approved laboratory equipment training	Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations and avoid pollution of the marine environment  Deviations from the norm are promptly identified  The output of plant and engineering systems consistently meets requirements, including bridge orders relating to changes in speed and direction  The causes of machinery malfunctions are promptly identified and actions are designed to ensure the overall safety of the ship and the plant, having regard to the prevailing circumstances and conditions
Operate fuel, lubrication, ballast and other pumping systems and associated control systems	Operational characteristics of pumps and piping systems, including control systems  Operation of pumping systems:  .1 routine pumping operations  .2 operation of bilge, ballast and cargo pumping systems  Oily-water separators (or-similar equipment) requirements and operation	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training, where appropriate  .4 approved laboratory equipment training	Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations and avoid pollution of the marine environment  Deviations from the norm are promptly identified and appropriate action is taken

**Function: Electrical, electronic and control engineering at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Operate electrical, electronic and control systems	<p>Basic configuration and operation principles of the following electrical, electronic and control equipment:</p> <ul style="list-style-type: none"> <li>.1 electrical equipment:               <ul style="list-style-type: none"> <li>.a generator and distribution systems</li> <li>.b preparing, starting, paralleling and changing over generators</li> <li>.c electrical motors including starting methodologies</li> <li>.d high-voltage installations</li> <li>.e sequential control circuits and associated system devices</li> </ul> </li> <li>.2 electronic equipment:               <ul style="list-style-type: none"> <li>.a characteristics of basic electronic circuit elements</li> <li>.b flowchart for automatic and control systems</li> <li>.c functions, characteristics and features of control systems for machinery items, including main propulsion plant operation control and steam boiler automatic controls</li> </ul> </li> <li>.3 control systems:               <ul style="list-style-type: none"> <li>.a various automatic control methodologies and characteristics</li> <li>.b Proportional–Integral–Derivative (PID) control characteristics and associated system devices for process control</li> </ul> </li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 approved laboratory equipment training</li> </ul>	<p>Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations</p> <p>Electrical, electronic and control systems can be understood and explained with drawings/instructions</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintenance and repair of electrical and electronic equipment</p>	<p>Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment</p> <p>Maintenance and repair of electrical system equipment, switchboards, electric motors, generator and DC electrical systems and equipment</p> <p>Detection of electric malfunction, location of faults and measures to prevent damage</p> <p>Construction and operation of electrical testing and measuring equipment</p> <p>Function and performance tests of the following equipment and their configuration:</p> <p>.1 monitoring systems</p> <p>.2 automatic control devices</p> <p>.3 protective devices</p> <p>The interpretation of electrical and simple electronic diagrams</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p> <p>.3 approved in-service experience</p> <p>.4 approved training ship experience</p>	<p>Safety measures for working are appropriate</p> <p>Selection and use of hand tools, measuring instruments, and testing equipment are appropriate and interpretation of results is accurate</p> <p>Dismantling, inspecting, repairing and reassembling equipment are in accordance with manuals and good practice</p> <p>Reassembling and performance testing is in accordance with manuals and good practice</p>

**Function: Maintenance and repair at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board</p>	<p>Characteristics and limitations of materials used in construction and repair of ships and equipment</p> <p>Characteristics and limitations of processes used for fabrication and repair</p> <p>Properties and parameters considered in the fabrication and repair of systems and components</p> <p>Methods for carrying out safe emergency/temporary repairs</p> <p>Safety measures to be taken to ensure a safe working environment and for using hand tools, machine tools and measuring instruments</p> <p>Use of hand tools, machine tools and measuring instruments</p> <p>Use of various types of sealants and packings</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p> <p>.3 approved in-service experience</p> <p>.4 approved training ship experience</p>	<p>Identification of important parameters for fabrication of typical ship-related components is appropriate</p> <p>Selection of materials is appropriate</p> <p>Fabrication is to designated tolerances</p> <p>Use of equipment and hand tools, machine tools and measuring instruments is appropriate and safe</p>
<p>Maintenance and repair of shipboard machinery and equipment</p>	<p>Safety measures to be taken for repair and maintenance, including the safe isolation of shipboard machinery and equipment required before personnel are permitted to work on such machinery or equipment</p> <p>Appropriate basic mechanical knowledge and skills</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p> <p>.3 approved in-service experience</p>	<p>Safety procedures followed are appropriate</p> <p>Selection of tools and spare gear is appropriate</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintenance and repair of shipboard machinery and equipment <i>(continued)</i>	<p>Maintenance and repair, such as dismantling, adjustment and reassembling of machinery and equipment</p> <p>The use of appropriate specialized tools and measuring instruments</p> <p>Design characteristics and selection of materials in construction of equipment</p> <p>Interpretation of machinery drawings and handbooks</p> <p>The interpretation of piping, hydraulic and pneumatic diagrams</p>	.4 approved training ship experience	<p>Dismantling, inspecting, repairing and reassembling equipment is in accordance with manuals and good practice</p> <p>Re-commissioning and performance testing is in accordance with manuals and good practice</p> <p>Selection of materials and parts is appropriate</p>

**Function: Controlling the operation of the ship and care for persons on board at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ensure compliance with pollution-prevention requirements	<p><i>Prevention of pollution of the marine environment</i></p> <p>Knowledge of the precautions to be taken to prevent pollution of the marine environment</p> <p>Anti-pollution procedures and all associated equipment</p> <p>Importance of proactive measures to protect the marine environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved training</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed</p> <p>Actions to ensure that a positive environmental reputation is maintained</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain seaworthiness of the ship	<p><i>Ship stability</i></p> <p>Working knowledge and application of stability, trim and stress tables, diagrams and stress-calculating equipment</p> <p>Understanding of the fundamentals of watertight integrity</p> <p>Understanding of fundamental actions to be taken in the event of partial loss of intact buoyancy</p> <p><i>Ship construction</i></p> <p>General knowledge of the principal structural members of a ship and the proper names for the various parts</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The stability conditions comply with the IMO intact stability criteria under all conditions of loading</p> <p>Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice</p>
Prevent, control and fight fires on board	<p><i>Fire prevention and fire-fighting appliances</i></p> <p>Ability to organize fire drills</p> <p>Knowledge of classes and chemistry of fire</p> <p>Knowledge of fire-fighting systems</p> <p>Action to be taken in the event of fire, including fires involving oil systems</p>	<p>Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3, paragraphs 1 to 3</p>	<p>The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Operate life-saving appliances	<p><i>Life-saving</i></p> <p>Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	<p><i>Medical aid</i></p> <p>Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship</p>	Assessment of evidence obtained from approved training as set out in section A-VI/4, paragraphs 1 to 3	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Monitor compliance with legislative requirements	Basic working knowledge of the relevant IMO conventions concerning safety of life at sea, security and protection of the marine environment	Assessment of evidence obtained from examination or approved training	Legislative requirements relating to safety of life at sea, security and protection of the marine environment are correctly identified
Application of leadership and teamworking skills	<p>Working knowledge of shipboard personnel management and training</p> <p>A knowledge of related international maritime conventions and recommendations, and national legislation</p> <p>Ability to apply task and workload management, including:</p> <ol style="list-style-type: none"> <li>.1 planning and co-ordination</li> <li>.2 personnel assignment</li> <li>.3 time and resource constraints</li> <li>.4 prioritization</li> </ol>	<p>Assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 practical demonstration</li> </ol>	<p>The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned</p> <p>Training objectives and activities are based on assessment of current competence and capabilities and operational requirements.</p> <p>Operations are demonstrated to be in accordance with applicable rules</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Application of leadership and teamworking skills <i>(continued)</i>	<p>Knowledge and ability to apply effective resource management:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication on board and ashore</li> <li>.3 decisions reflect consideration of team experiences</li> <li>.4 assertiveness and leadership, including motivation</li> <li>.5 obtaining and maintaining situational awareness</li> </ul> <p>Knowledge and ability to apply decision-making techniques:</p> <ul style="list-style-type: none"> <li>.1 situation and risk assessment</li> <li>.2 identify and consider generated options</li> <li>.3 selecting course of action</li> <li>.4 evaluation of outcome effectiveness</li> </ul>		<p>Operations are planned and resources are allocated as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Effective leadership behaviours are demonstrated</p> <p>Necessary team member(s) share accurate understanding of current and predicted vessel state and operational status and external environment</p> <p>Decisions are most effective for the situation</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to the safety of personnel and ship	<p>Knowledge of personal survival techniques</p> <p>Knowledge of fire prevention and ability to fight and extinguish fires</p> <p>Knowledge of elementary first aid</p> <p>Knowledge of personal safety and social responsibilities</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/1, paragraph 2	<p>Appropriate safety and protective equipment is correctly used</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times</p> <p>Procedures designed to safeguard the environment are observed at all times</p> <p>Initial and follow-up actions on becoming aware of an emergency conform with established emergency response procedures</p>

ตารางที่ ๒ มาตรฐานความรู้ความสามารถสำหรับต้นกลและรองต้นกลของเรือกลเดินทะเล  
ขนาดแรงขับเคลื่อน 3000 กิโลวัตต์หรือมากกว่า

Table A-III/2

**Specification of minimum standard of competence for chief engineer officers  
and second engineer officers on ships powered by main propulsion  
machinery of 3,000 kW propulsion power or more**

**Function: Marine engineering at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Manage the operation of propulsion plant machinery	Design features, and operative mechanism of the following machinery and associated auxiliaries:  .1 marine diesel engine .2 marine steam turbine .3 marine gas turbine .4 marine steam boiler	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	Explanation and understanding of design features and operating mechanisms are appropriate
Plan and schedule operations	<i>Theoretical knowledge</i>  Thermodynamics and heat transmission  Mechanics and hydromechanics  Propulsive characteristics of diesel engines, steam and gas turbines, including speed, output and fuel consumption  Heat cycle, thermal efficiency and heat balance of the following:  .1 marine diesel engine .2 marine steam turbine .3 marine gas turbine .4 marine steam boiler	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training	The planning and preparation of operations is suited to the design parameters of the power installation and to the requirements of the voyage



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Plan and schedule operations (continued)	Refrigerators and refrigeration cycle  Physical and chemical properties of fuels and lubricants  Technology of materials  Naval architecture and ship construction, including damage control		
Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<i>Practical knowledge</i> Start up and shut down main propulsion and auxiliary machinery, including associated systems  Operating limits of propulsion plant  The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery  Functions and mechanism of automatic control for main engine  Functions and mechanism of automatic control for auxiliary machinery including but not limited to: .1 generator distribution systems .2 steam boilers .3 oil purifier .4 refrigeration system .5 pumping and piping systems .6 steering gear system .7 cargo-handling equipment and deck machinery	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training, where appropriate  .4 approved laboratory equipment training	The methods of preparing for the start-up and of making available fuels, lubricants, cooling water and air are the most appropriate  Checks of pressures, temperatures and revolutions during the start-up and warm-up period are in accordance with technical specifications and agreed work plans  Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions  The methods of preparing the shutdown, and of supervising the cooling down of the engine are the most appropriate  The methods of measuring the load capacity of the engines are in accordance with technical specifications  Performance is checked against bridge orders  Performance levels are in accordance with technical specifications

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Manage fuel, lubrication and ballast operations	Operation and maintenance of machinery, including pumps and piping systems	Examination and assessment of evidence obtained from one or more of the following: <ul style="list-style-type: none"> <li data-bbox="815 450 1098 517">.1 approved in-service experience</li> <li data-bbox="815 551 1070 618">.2 approved training ship experience</li> <li data-bbox="815 651 1091 748">.3 approved simulator training, where appropriate</li> </ul>	Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of the marine environment

**Function: Electrical, electronic and control engineering at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Manage operation of electrical and electronic control equipment</p>	<p><i>Theoretical knowledge</i></p> <p>Marine electrotechnology, electronics, power electronics, automatic control engineering and safety devices</p> <p>Design features and system configurations of automatic control equipment and safety devices for the following:</p> <p>.1 main engine</p> <p>.2 generator and distribution system</p> <p>.3 steam boiler</p> <p>Design features and system configurations of operational control equipment for electrical motors</p> <p>Design features of high-voltage installations</p> <p>Features of hydraulic and pneumatic control equipment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>Operation of equipment and system is in accordance with operating manuals</p> <p>Performance levels are in accordance with technical specifications</p>
<p>Manage trouble-shooting, restoration of electrical and electronic control equipment to operating condition</p>	<p><i>Practical knowledge</i></p> <p>Troubleshooting of electrical and electronic control equipment</p> <p>Function test of electrical, electronic control equipment and safety devices</p> <p>Troubleshooting of monitoring systems</p> <p>Software version control</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>Maintenance activities are correctly planned in accordance with technical, legislative, safety and procedural specifications</p> <p>Inspection, testing and troubleshooting of equipment are appropriate</p>

**Function: Maintenance and repair at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Manage safe and effective maintenance and repair procedures	<p><i>Theoretical knowledge</i></p> <p>Marine engineering practice</p> <p><i>Practical knowledge</i></p> <p>Manage safe and effective maintenance and repair procedures</p> <p>Planning maintenance, including statutory and class verifications</p> <p>Planning repairs</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved workshop training</p>	<p>Maintenance activities are correctly planned and carried out in accordance with technical, legislative, safety and procedural specifications</p> <p>Appropriate plans, specifications, materials and equipment are available for maintenance and repair</p> <p>Action taken leads to the restoration of plant by the most suitable method</p>
Detect and identify the cause of machinery malfunctions and correct faults	<p><i>Practical knowledge</i></p> <p>Detection of machinery malfunction, location of faults and action to prevent damage</p> <p>Inspection and adjustment of equipment</p> <p>Non-destructive examination</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The methods of comparing actual operating conditions are in accordance with recommended practices and procedures</p> <p>Actions and decisions are in accordance with recommended operating specifications and limitations</p>
Ensure safe working practices	<p><i>Practical knowledge</i></p> <p>Safe working practices</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved laboratory equipment training</p>	<p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p>

**Function: Controlling the operation of the ship and care for persons on board at the management level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Control trim, stability and stress	<p>Understanding of fundamental principles of ship construction and the theories and factors affecting trim and stability and measures necessary to preserve trim and stability</p> <p>Knowledge of the effect on trim and stability of a ship in the event of damage to, and consequent flooding of, a compartment and countermeasures to be taken</p> <p>Knowledge of IMO recommendations concerning ship stability</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Stability and stress conditions are maintained within safety limits at all times</p>
Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and protection of the marine environment	<p>Knowledge of relevant international maritime law embodied in international agreements and conventions</p> <p>Regard shall be paid especially to the following subjects:</p> <p>.1 certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity</p> <p>.2 responsibilities under the relevant requirements of the International Convention on Load Lines, 1966, as amended</p> <p>.3 responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea, 1974, as amended</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Procedures for monitoring operations and maintenance comply with legislative requirements</p> <p>Potential non-compliance is promptly and fully identified</p> <p>Requirements for renewal and extension of certificates ensure continued validity of survey items and equipment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and protection of the marine environment (continued)</p>	<p>.4 responsibilities under the International Convention for the Prevention of Pollution from Ships, as amended</p> <p>.5 maritime declarations of health and the requirements of the International Health Regulations</p> <p>.6 responsibilities under international instruments affecting the safety of the ships, passengers, crew or cargo</p> <p>.7 methods and aids to prevent pollution of the environment by ships</p> <p>.8 knowledge of national legislation for implementing international agreements and conventions</p>		
<p>Maintain safety and security of the vessel, crew and passengers and the operational condition of life-saving, fire-fighting and other safety systems</p>	<p>A thorough knowledge of life-saving appliance regulations (International Convention for the Safety of Life at Sea)</p> <p>Organization of fire and abandon ship drills</p> <p>Maintenance of operational condition of life-saving, fire-fighting and other safety systems</p> <p>Actions to be taken to protect and safeguard all persons on board in emergencies</p> <p>Actions to limit damage and save the ship following fire, explosion, collision or grounding</p>	<p>Examination and assessment of evidence obtained from practical instruction and approved in-service training and experience</p>	<p>Procedures for monitoring fire-detection and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Develop emergency and damage control plans and handle emergency situations	<p>Ship construction, including damage control</p> <p>Methods and aids for fire prevention, detection and extinction</p> <p>Functions and use of life-saving appliances</p>	Examination and assessment of evidence obtained from approved in-service training and experience	Emergency procedures are in accordance with the established plans for emergency situations
Use leadership and managerial skills	<p>Knowledge of shipboard personnel management and training</p> <p>A knowledge of international maritime conventions and recommendations, and related national legislation</p> <p>Ability to apply task and workload management, including:</p> <ul style="list-style-type: none"> <li>.1 planning and coordination</li> <li>.2 personnel assignment</li> <li>.3 time and resource constraints</li> <li>.4 prioritization</li> </ul> <p>Knowledge and ability to apply effective resource management:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication on board and ashore</li> <li>.3 decisions reflect consideration of team experience</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 approved simulator training</li> </ul>	<p>The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned</p> <p>Training objectives and activities are based on assessment of current competence and capabilities and operational requirements</p> <p>Operations are demonstrated to be in accordance with applicable rules</p> <p>Operations are planned and resources are allocated as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Use leadership and managerial skills <i>(continued)</i>	<p>.4 assertiveness and leadership, including motivation</p> <p>.5 obtaining and maintaining situation awareness</p> <p>Knowledge and ability to apply decision-making techniques:</p> <p>.1 situation and risk assessment</p> <p>.2 identify and generate options</p> <p>.3 select course of action</p> <p>.4 evaluation of outcome effectiveness</p> <p>Development, implementation, and oversight of standard operating procedures</p>		<p>Effective leadership behaviours are demonstrated</p> <p>Necessary team member(s) share accurate understanding of current and predicted vessel state and operational status and external environment</p> <p>Decisions are most effective for the situation</p> <p>Operations are demonstrated to be effective and in accordance with applicable rules</p>



Table A-  
III/4**Specification of minimum standard of competence for ratings forming part of an engineering watch****Function: Marine engineering at the support level**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
<p>Carry out a watch routine appropriate to the duties of a rating forming part of an engine-room watch</p> <p>Understand orders and be understood in matters relevant to watchkeeping duties</p>	<p>Terms used in machinery spaces and names of machinery and equipment</p> <p>Engine-room watchkeeping procedures</p> <p>Safe working practices as related to engine-room operations</p> <p>Basic environmental protection procedures</p> <p>Use of appropriate internal communication system</p> <p>Engine-room alarm systems and ability to distinguish between the various alarms, with special reference to fire-extinguishing gas alarms</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience; or</p> <p>.3 practical test</p>	<p>Communications are clear and concise and advice or clarification is sought from the officer of the watch where watch information or instructions are not clearly understood</p> <p>Maintenance, handover and relief of the watch is in conformity with accepted principles and procedures</p>
<p>For keeping a boiler watch:</p> <p>Maintain the correct water levels and steam pressures</p>	<p>Safe operation of boilers</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience;</p> <p>.2 approved training ship experience;</p> <p>.3 practical test; or</p> <p>.4 approved simulator training, where appropriate</p>	<p>Assessment of boiler condition is accurate and based on relevant information available from local and remote indicators and physical inspections</p> <p>The sequence and timing of adjustments maintains safety and optimum efficiency</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Operate emergency equipment and apply emergency procedures	<p>Knowledge of emergency duties</p> <p>Escape routes from machinery spaces</p> <p>Familiarity with the location and use of fire-fighting equipment in the machinery spaces</p>	Assessment of evidence obtained from demonstration and approved in-service experience or approved training ship experience	<p>Initial action on becoming aware of an emergency or abnormal situation conforms with established procedures</p> <p>Communications are clear and concise at all times and orders are acknowledged in a seamanlike manner</p>

Table A-III/5

**Specification of minimum standard of competence for ratings as able seafarer engine  
in a manned engine-room or designated to perform duties  
in a periodically unmanned engine-room**

**Function: Marine engineering at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to a safe engineering watch	Ability to understand orders and to communicate with the officer of the watch in matters relevant to watchkeeping duties  Procedures for the relief, maintenance and handover of a watch  Information required to maintain a safe watch	Assessment of evidence obtained from in-service experience or practical test	Communications are clear and concise  Maintenance, handover and relief of the watch is in conformity with acceptable practices and procedures
Contribute to the monitoring and controlling of an engine-room watch	Basic knowledge of the function and operation of main propulsion and auxiliary machinery  Basic understanding of main propulsion and auxiliary machinery control pressures, temperatures and levels	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience;  .2 approved training ship experience; or  .3 practical test	The frequency and extent of monitoring of main propulsion and auxiliary machinery conforms with accepted principles and procedures  Deviations from the norm are identified  Unsafe conditions or potential hazards are promptly recognized, reported and rectified before work continues
Contribute to fuelling and oil transfer operations	Knowledge of the function and operation of fuel system and oil transfer operations, including:  .1 preparations for fuelling and transfer operations  .2 procedures for connecting and disconnecting fuelling and transfer hoses	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Transfer operations are carried out in accordance with established safety practices and equipment operating instructions  The handling of dangerous, hazardous and harmful liquids complies with established safety practices  Communications within the operator's area of responsibility are consistently successful

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to fuelling and oil transfer operations <i>(continued)</i>	.3 procedures relating to incidents that may arise during fuelling or transferring operation  .4 securing from fuelling and transfer operations  .5 ability to correctly measure and report tank levels	Assessment of evidence obtained from practical demonstration	
Contribute to bilge and ballast operations	Knowledge of the safe function, operation and maintenance of the bilge and ballast systems, including:  .1 reporting incidents associated with transfer operations  .2 ability to correctly measure and report tank levels	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience  Assessment of evidence obtained from practical demonstration	Operations and maintenance are carried out in accordance with established safety practices and equipment operating instructions and pollution of the marine environment is avoided  Communications within the operator's area of responsibility are consistently successful
Contribute to the operation of equipment and machinery	Safe operation of equipment, including:  .1 valves and pumps  .2 hoists and lifting equipment  .3 hatches, watertight doors, ports and related equipment  Ability to use and understand basic crane, winch and hoist signals	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience  Assessment of evidence obtained from practical demonstration	Operations are carried out in accordance with established safety practices and equipment operating instructions  Communications within the operator's area of responsibility are consistently successful

**Function: Electrical, electronic and control engineering at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Safe use of electrical equipment	<p>Safe use and operation of electrical equipment, including:</p> <p>.1 safety precautions before commencing work or repair</p> <p>.2 isolation procedures</p> <p>.3 emergency procedures</p> <p>.4 different voltages on board</p> <p>Knowledge of the causes of electric shock and precautions to be observed to prevent shock</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Recognizes and reports electrical hazards and unsafe equipment</p> <p>Understands safe voltages for hand-held equipment</p> <p>Understands risks associated with high-voltage equipment and onboard work</p>

**Function: Maintenance and repair at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to shipboard maintenance and repair	<p>Ability to use painting, lubrication and cleaning materials and equipment</p> <p>Ability to understand and execute routine maintenance and repair procedures</p> <p>Knowledge of surface preparation techniques</p> <p>Knowledge of safe disposal of waste materials</p> <p>Understanding manufacturer's safety guidelines and shipboard instructions</p>	<p>Assessment of evidence obtained from practical demonstration</p> <p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Maintenance activities are carried out in accordance with technical, safety and procedural specifications</p> <p>Selection and use of equipment and tools is appropriate</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to shipboard maintenance and repair <i>(continued)</i>	Knowledge of the application, maintenance and use of hand and power tools and measuring instruments and machine tools  Knowledge of metalwork		

**Function: Controlling the operation of the ship and care for persons on board at the support level**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to the handling of stores	Knowledge of procedures for safe handling, stowage and securing of stores	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Stores operations are carried out in accordance with established safety practices and equipment operating instructions  The handling of dangerous, hazardous and harmful stores complies with established safety practices  Communications within the operator's area of responsibility are consistently successful
Apply precautions and contribute to the prevention of pollution of the marine environment	Knowledge of the precautions to be taken to prevent pollution of the marine environment  Knowledge of use and operation of anti-pollution equipment  Knowledge of approved methods for disposal of marine pollutants	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Procedures designed to safeguard the marine environment are observed at all times

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Apply occupational health and safety procedures	<p>Working knowledge of safe working practices and personal shipboard safety, including:</p> <ul style="list-style-type: none"> <li>.1 electrical safety</li> <li>.2 lockout/tag-out</li> <li>.3 mechanical safety</li> <li>.4 permit to work systems</li> <li>.5 working aloft</li> <li>.6 working in enclosed spaces</li> <li>.7 lifting techniques and methods of preventing back injury</li> <li>.8 chemical and biohazard safety</li> <li>.9 personal safety equipment</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 practical training</li> <li>.3 examination</li> <li>.4 approved training ship experience</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used at all times</p>

Table A-III/6

**Specification of minimum standard of competence for electro-technical officers****Function: Electrical, electronic and control engineering at the operational level**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Monitor the operation of electrical, electronic and control systems	<p>Basic understanding of the operation of mechanical engineering systems, including:</p> <ul style="list-style-type: none"> <li>.1 prime movers, including main propulsion plant</li> <li>.2 engine-room auxiliary machinery</li> <li>.3 steering systems</li> <li>.4 cargo handling systems</li> <li>.5 deck machinery</li> <li>.6 hotel systems</li> </ul> <p>Basic knowledge of heat transmission, mechanics and hydromechanics</p> <p><i>Knowledge of:</i></p> <p>Electro-technology and electrical machines theory</p> <p>Fundamentals of electronics and power electronics</p> <p>Electrical power distribution boards and electrical equipment</p> <p>Fundamentals of automation, automatic control systems and technology</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 approved laboratory equipment training</li> </ul>	<p>Operation of equipment and system is in accordance with operating manuals</p> <p>Performance levels are in accordance with technical specifications</p>



<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Monitor the operation of electrical, electronic and control systems ( <i>continued</i> )	Instrumentation, alarm and monitoring systems  Electrical drives  Technology of electrical materials  Electro-hydraulic and electro-pneumatic control systems  Appreciation of the hazards and precautions required for the operation of power systems above 1,000 volts		
Monitor the operation of automatic control systems of propulsion and auxiliary machinery	Preparation of control systems of propulsion and auxiliary machinery for operation	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training, where appropriate  .4 approved laboratory equipment training	Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation condition
Operate generators and distribution systems	Coupling, load sharing and changing over generators  Coupling and breaking connection between switchboards and distribution panels	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training, where appropriate  .4 approved laboratory equipment training	Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations  Electrical distribution systems can be understood and explained with drawings/instructions

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Operate and maintain power systems in excess of 1,000 volts	<p><i>Theoretical knowledge</i></p> <p>High-voltage technology</p> <p>Safety precautions and procedures</p> <p>Electrical propulsion of the ships, electrical motors and control systems</p> <p><i>Practical knowledge</i></p> <p>Safe operation and maintenance of high-voltage systems, including knowledge of the special technical type of high-voltage systems and the danger resulting from operational voltage of more than 1,000 volts</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations</p>
Operate computers and computer networks on ships	<p>Understanding of:</p> <p>.1 main features of data processing</p> <p>.2 construction and use of computer networks on ships</p> <p>.3 bridge-based, engine-room-based and commercial computer use</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>Computer networks and computers are correctly checked and handled</p>
Use English in written and oral form	<p>Adequate knowledge of the English language to enable the officer to use engineering publications and to perform the officer's duties</p>	<p>Examination and assessment of evidence obtained from practical instructions</p>	<p>English language publications relevant to the officer's duties are correctly interpreted</p> <p>Communications are clear and understood</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Use internal communication systems	Operation of all internal communication systems on board	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training, where appropriate</li> <li>.4 approved laboratory equipment training</li> </ul>	<p>Transmission and reception of messages are consistently successful</p> <p>Communication records are complete, accurate and comply with statutory requirements</p>

**Function: Maintenance and repair at the operational level**

Column 1 Competence	Column 2 Knowledge, understanding and proficiency	Column 3 Methods for demonstrating competence	Column 4 Criteria for evaluating competence
<p>Maintenance and repair of electrical and electronic equipment</p>	<p>Safety requirements for working on shipboard electrical systems, including the safe isolation of electrical equipment required before personnel are permitted to work on such equipment</p> <p>Maintenance and repair of electrical system equipment, switchboards, electric motors, generators and DC electrical systems and equipment</p> <p>Detection of electric malfunction, location of faults and measures to prevent damage</p> <p>Construction and operation of electrical testing and measuring equipment</p> <p>Function and performance tests of the following equipment and their configuration:</p> <p>.1 monitoring systems</p> <p>.2 automatic control devices</p> <p>.3 protective devices</p> <p>The interpretation of electrical and electronic diagrams</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved workshop skills training</p> <p>.2 approved practical experience and tests</p> <p>.3 approved in-service experience</p> <p>.4 approved training ship experience</p>	<p>Safety measures for working are appropriate</p> <p>Selection and use of hand tools, measuring instruments, and testing equipment are appropriate and interpretation of results is accurate</p> <p>Dismantling, inspecting, repairing and reassembling equipment are in accordance with manuals and good practice</p> <p>Reassembling and performance testing is in accordance with manuals and good practice</p>
<p>Maintenance and repair of automation and control systems of main propulsion and auxiliary machinery</p>	<p>Appropriate electrical and mechanical knowledge and skills</p> <p><i>Safety and emergency procedures</i></p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p>	<p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
	<p>Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment</p> <p>Practical knowledge for the testing, maintenance, fault finding and repair</p> <p>Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition</p>	<p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>Isolation, dismantling and reassembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions and legislative and safety specifications. Action taken leads to the restoration of automation and control systems by the method most suitable and appropriate to the prevailing circumstances and conditions</p>
<p>Maintenance and repair of bridge navigation equipment and ship communication systems</p>	<p>Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication systems</p> <p><i>Theoretical knowledge:</i></p> <p>Electrical and electronic systems operating in flammable areas</p> <p><i>Practical knowledge:</i></p> <p>Carrying out safe maintenance and repair procedures</p> <p>Detection of machinery malfunction, location of faults and action to prevent damage</p>		<p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and re-assembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions, legislative and safety specifications. Action taken leads to the restoration of bridge navigation equipment and ship communication systems by the method most suitable and appropriate to the prevailing circumstances and conditions</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintenance and repair of electrical, electronic and control systems of deck machinery and cargo-handling equipment</p>	<p>Appropriate electrical and mechanical knowledge and skills</p> <p><i>Safety and emergency procedures</i></p> <p>Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment</p> <p>Practical knowledge for the testing, maintenance, fault finding and repair</p> <p>Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and re-assembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions, legislative and safety specifications. Action taken leads to the restoration of deck machinery and cargo-handling equipment by the method most suitable and appropriate to the prevailing circumstances and conditions</p>
<p>Maintenance and repair of control and safety systems of hotel equipment</p>	<p><i>Theoretical knowledge:</i></p> <p>Electrical and electronic systems operating in flammable areas</p> <p><i>Practical knowledge:</i></p> <p>Carrying out safe maintenance and repair procedures</p> <p>Detection of machinery malfunction, location of faults and action to prevent damage</p>		<p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and re-assembly of plant and equipment are in accordance with manufacturer's safety guidelines and shipboard instructions, legislative and safety specifications. Action taken leads to the restoration of control and safety systems of hotel equipment by the method most suitable and appropriate to the prevailing circumstances and conditions</p>

**Function: Controlling the operation of the ship and care for persons on board at operational level**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Ensure compliance with pollution-prevention requirements	<p><i>Prevention of pollution of the marine environment</i></p> <p>Knowledge of the precautions to be taken to prevent pollution of the marine environment</p> <p>Anti-pollution procedures and all associated equipment</p> <p>Importance of proactive measures to protect the marine environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved training</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with pollution-prevention requirements are fully observed</p> <p>Actions to ensure that a positive environmental reputation is maintained</p>
Prevent, control and fight fire on board	<p><i>Fire prevention and fire-fighting appliances</i></p> <p>Ability to organize fire drills</p> <p>Knowledge of classes and chemistry of fire</p> <p>Knowledge of fire-fighting systems</p> <p>Action to be taken in the event of fire, including fires involving oil systems</p>	<p>Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3, paragraphs 1 to 3</p>	<p>The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Operate life-saving appliances	<p><i>Life-saving</i></p> <p>Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4	Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards
Apply medical first aid on board ship	<p><i>Medical aid</i></p> <p>Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship</p>	Assessment of evidence obtained from approved training as set out in section A-VI/4, paragraphs 1 to 3	Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life
Application of leadership and teamworking skills	<p>Working knowledge of shipboard personnel management and training</p> <p>Ability to apply task and workload management, including:</p> <ol style="list-style-type: none"> <li>.1 planning and co-ordination</li> <li>.2 personnel assignment</li> <li>.3 time and resource constraints</li> <li>.4 prioritization</li> </ol>	<p>Assessment of evidence obtained from one or more of the following:</p> <ol style="list-style-type: none"> <li>.1 approved training</li> <li>.2 approved in-service experience</li> <li>.3 practical demonstration</li> </ol>	<p>The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned</p> <p>Training objectives and activities are based on assessment of current competence and capabilities and operational requirements</p>



<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Application of leadership and teamworking skills (continued)	<p>Knowledge and ability to apply effective resource management:</p> <ul style="list-style-type: none"> <li>.1 allocation, assignment, and prioritization of resources</li> <li>.2 effective communication on board and ashore</li> <li>.3 decisions reflect consideration of team experiences</li> <li>4 assertiveness and leadership, including motivation</li> <li>.5 obtaining and maintaining situational awareness</li> </ul> <p>Knowledge and ability to apply decision-making techniques:</p> <ul style="list-style-type: none"> <li>.1 Situation and risk assessment</li> <li>.2 Identify and consider generated options</li> <li>.3 Selecting course of action</li> <li>.4 Evaluation of outcome effectiveness</li> </ul>		<p>Operations are planned and resources are allocated as needed in correct priority to perform necessary tasks</p> <p>Communication is clearly and unambiguously given and received</p> <p>Effective leadership behaviours are demonstrated</p> <p>Necessary team member(s) share accurate understanding of current and predicted vessel state and operational status and external environment</p> <p>Decisions are most effective for the situation</p>
Contribute to the safety of personnel and ship	<p>Knowledge of personal survival techniques</p> <p>Knowledge of fire prevention and ability to fight and extinguish fires</p> <p>Knowledge of elementary first aid</p> <p>Knowledge of personal safety and social responsibilities</p>	Assessment of evidence obtained from approved training and experience as set out in section A-VI/1, paragraph 2	<p>Appropriate safety and protective equipment is correctly used</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times</p> <p>Procedures designed to safeguard the environment are observed at all times</p> <p>Initial and follow-up actions on becoming aware of an emergency conform with established emergency response procedures</p>

Table A-III/7

**Specification of minimum standard of competence for electro-technical ratings****Function: Electrical, electronic and control engineering at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Safe use of electrical equipment	<p>Safe use and operation of electrical equipment, including:</p> <p>.1 safety precautions before commencing work or repair</p> <p>.2 isolation procedures</p> <p>.3 emergency procedures</p> <p>.4 different voltages on board</p> <p>Knowledge of the causes of electric shock and precautions to be observed to prevent shock</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Understands and follows safety instructions of electrical equipment and machinery</p> <p>Recognizes and reports electrical hazards and unsafe equipment</p> <p>Understands safe voltages for hand-held equipment</p> <p>Understands risks associated with high-voltage equipment and onboard work</p>
Contribute to monitoring the operation of electrical systems and machinery	<p>Basic knowledge of the operation of mechanical engineering systems, including:</p> <p>.1 prime movers, including main propulsion plant</p> <p>.2 engine-room auxiliary machineries</p> <p>.3 steering systems</p> <p>.4 cargo-handling systems</p> <p>.5 deck machineries</p> <p>.6 hotel systems</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Knowledge that ensures:</p> <p>.1 operation of equipment and system is in accordance with operating manuals</p> <p>.2 performance levels are in accordance with technical specifications</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to monitoring the operation of electrical systems and machinery <i>(continued)</i>	<i>Basic knowledge of:</i> .1 electro-technology and electrical machines theory .2 electrical power distribution boards and electrical equipment .3 fundamentals of automation, automatic control systems and technology .4 instrumentation, alarm and monitoring systems .5 electrical drives .6 electro-hydraulic and electro-pneumatic control systems .7 coupling, load sharing and changes in electrical configuration		
Use hand tools, electrical and electronic measurement equipment for fault finding, maintenance and repair operations	Safety requirements for working on shipboard electrical systems Application of safe working practices <i>Basic knowledge of:</i> .1 construction and operational characteristics of shipboard AC and DC systems and equipment .2 use of measuring instruments, machine tools, and hand and power tools	Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests	Implementation of safety procedures is satisfactory Selection and use of test equipment is appropriate and interpretation of results is accurate Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice

**Function: Maintenance and repair at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to shipboard maintenance and repair	<p>Ability to use lubrication and cleaning materials and equipment</p> <p>Knowledge of safe disposal of waste materials</p> <p>Ability to understand and execute routine maintenance and repair procedures</p> <p>Understanding manufacturer's safety guidelines and shipboard instructions</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Maintenance activities are carried out in accordance with technical, safety and procedural specifications</p> <p>Selection and use of equipment and tools is appropriate</p>
Contribute to the maintenance and repair of electrical systems and machinery on board	<p><i>Safety and emergency procedures</i></p> <p>Basic knowledge of electro-technical drawings and safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment</p> <p>Test, detect faults and maintain and restore electrical control equipment and machinery to operating condition</p> <p>Electrical and electronic equipment operating in flammable areas</p> <p>Basics of ship's fire-detection system</p> <p>Carrying out safe maintenance and repair procedures</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and reassembly of plant and equipment is in accordance with manufacturer's safety guidelines and shipboard instructions</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the maintenance and repair of electrical systems and machinery on board (continued)	Detection of machinery malfunction, location of faults and action to prevent damage  Maintenance and repair of lighting fixtures and supply systems		

**Function: Controlling the operation of the ship and care for persons on board at the support level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the handling of stores	Knowledge of procedures for safe handling, stowage and securing of stores	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Stores stowage operations are carried out in accordance with established safety practices and equipment operating instructions  The handling of dangerous, hazardous and harmful stores complies with established safety practices  Communications within the operator's area of responsibility are consistently successful
Apply precautions and contribute to the prevention of pollution of the marine environment	Knowledge of the precautions to be taken to prevent pollution of the marine environment  Knowledge of use and operation of anti-pollution equipment/agents  Knowledge of approved methods for disposal of marine pollutants	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Procedures designed to safeguard the marine environment are observed at all times

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Apply occupational health and safety procedures	<p>Working knowledge of safe working practices and personal shipboard safety, including:</p> <ul style="list-style-type: none"> <li>.1 electrical safety</li> <li>.2 lockout/tag-out</li> <li>.3 mechanical safety</li> <li>.4 permit to work systems</li> <li>.5 working aloft</li> <li>.6 working in enclosed spaces</li> <li>.7 lifting techniques and methods of preventing back injury</li> <li>.8 chemical and biohazard safety</li> <li>.9 personal safety equipment</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 practical training</li> <li>.3 examination</li> <li>.4 approved training ship experience</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used at all times</p>

Table A-IV/2

**Specification of minimum standard of competence for GMDSS radio operators****Function: Radiocommunications at the operational level**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Transmit and receive information using GMDSS subsystems and equipment and fulfilling the functional requirements of GMDSS	<p>In addition to the requirements of the Radio Regulations, a knowledge of:</p> <ul style="list-style-type: none"> <li>.1 search and rescue radiocommunications, including procedures in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual</li> <li>.2 the means to prevent the transmission of false distress alerts and the procedures to mitigate the effects of such alerts</li> <li>.3 ship reporting systems</li> <li>.4 radio medical services</li> <li>.5 use of the International Code of Signals and the IMO Standard Marine Communication Phrases</li> <li>.6 the English language, both written and spoken, for the communication of information relevant to safety of life at sea</li> </ul> <p><i>Note:</i> This requirement may be reduced in the case of the Restricted Radio Operator's Certificate</p>	<p>Examination and assessment of evidence obtained from practical demonstration of operational procedures, using:</p> <ul style="list-style-type: none"> <li>.1 approved equipment</li> <li>.2 GMDSS communication simulator, where appropriate*</li> <li>.3 radiocommunication laboratory equipment</li> </ul>	<p>Transmission and reception of communications comply with international regulations and procedures and are carried out efficiently and effectively</p> <p>English language messages relevant to the safety of the ship, security and persons on board and protection of the marine environment are correctly handled</p>

\* See paragraph 72 of section B-I/12 of this Code.

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Provide radio services in emergencies	<p>The provision of radio services in emergencies such as:</p> <ul style="list-style-type: none"> <li>.1 abandon ship</li> <li>.2 fire on board ship</li> <li>.3 partial or full breakdown of radio installations</li> </ul> <p>Preventive measures for the safety of ship and personnel in connection with hazards related to radio equipment, including electrical and non-ionizing radiation hazards</p>	<p>Examination and assessment of evidence obtained from practical demonstration of operational procedures, using:</p> <ul style="list-style-type: none"> <li>.1 approved equipment</li> <li>.2 GMDSS communication simulator, where appropriate*</li> <li>.3 radiocommunication laboratory equipment</li> </ul>	Response is carried out efficiently and effectively

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\* See paragraph 72 of section B-I/12 of this Code.



ภาคผนวก ๕

ตารางที่ ๑-๑-๑ มาตรฐานความรู้ความสามารถสำหรับการปฏิบัติงานขั้นพื้นฐานบนเรือบรรทุกน้ำมันและสารเคมี

Table A-V/1-1-1

**Specification of minimum standard of competence in basic training  
for oil and chemical tanker cargo operations**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe cargo operation of oil and chemical tankers	<p>Basic knowledge of tankers:</p> <p>.1 types of oil and chemical tankers</p> <p>.2 general arrangement and construction</p> <p>Basic knowledge of cargo operations:</p> <p>.1 piping systems and valves</p> <p>.2 cargo pumps</p> <p>.3 loading and unloading</p> <p>.4 tank cleaning, purging, gas-freeing and inerting</p> <p>Basic knowledge of the physical properties of oil and chemicals:</p> <p>.1 pressure and temperature, including vapour pressure/temperature relationship</p> <p>.2 types of electrostatic charge generation</p> <p>.3 chemical symbols</p> <p>Knowledge and understanding of tanker safety culture and safety management</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications within the area of responsibility are clear and effective</p> <p>Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards	<p>Basic knowledge of the hazards associated with tanker operations, including:</p> <ul style="list-style-type: none"> <li>.1 health hazards</li> <li>.2 environmental hazards</li> <li>.3 reactivity hazards</li> <li>.4 corrosion hazards</li> <li>.5 explosion and flammability hazards</li> <li>.6 sources of ignition, including electrostatic hazards</li> <li>.7 toxicity hazards</li> <li>.8 vapour leaks and clouds</li> </ul> <p>Basic knowledge of hazard controls:</p> <ul style="list-style-type: none"> <li>.1 inerting, water padding, drying agents and monitoring techniques</li> <li>.2 anti-static measures</li> <li>.3 ventilation</li> <li>.4 segregation</li> <li>.5 cargo inhibition</li> <li>.6 importance of cargo compatibility</li> <li>.7 atmospheric control</li> <li>.8 gas testing</li> </ul> <p>Understanding of information on a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures</p> <p>Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best practice</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Apply occupational health and safety precautions and measures</p>	<p>Function and proper use of gas-measuring instruments and similar equipment</p> <p>Proper use of safety equipment and protective devices, including:</p> <ul style="list-style-type: none"> <li>.1 breathing apparatus and tank-evacuating equipment</li> <li>.2 protective clothing and equipment</li> <li>.3 resuscitators</li> <li>.4 rescue and escape equipment</li> </ul> <p>Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to oil and chemical tankers, including:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces</li> <li>.2 precautions to be taken before and during repair and maintenance work</li> <li>.3 safety measures for hot and cold work</li> <li>.4 electrical safety</li> <li>.5 ship/shore safety checklist</li> </ul> <p>Basic knowledge of first aid with reference to a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures for entry into enclosed spaces are observed.</p> <p>Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times</p> <p>Appropriate safety and protective equipment is correctly used</p> <p>First aid do's and don'ts</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Carry out fire-fighting operations	<p>Tanker fire response organization and action to be taken</p> <p>Fire hazards associated with cargo handling and transportation of hazardous and noxious liquids in bulk</p> <p>Fire-fighting agents used to extinguish oil and chemical fires</p> <p>Fixed fire-fighting foam system operations</p> <p>Portable fire-fighting foam operations</p> <p>Fixed dry chemical system operations</p> <p>Spill containment in relation to fire-fighting operations</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g., simulated shipboard conditions) and, whenever possible and practicable, in darkness</p>	<p>Initial actions and follow-up actions on becoming aware of fire on board conform with established practices and procedures</p> <p>Action taken on identifying muster signal is appropriate to the indicated emergency and complies with established procedures</p> <p>Clothing and equipment are appropriate to the nature of the fire-fighting operations</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents</p>
Respond to emergencies	<p>Basic knowledge of emergency procedures, including emergency shutdown</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Take precautions to prevent pollution of the environment from the release of oil or chemicals</p>	<p>Basic knowledge of the effects of oil and chemical pollution on human and marine life</p> <p>Basic knowledge of shipboard procedures to prevent pollution</p> <p>Basic knowledge of measures to be taken in the event of spillage, including the need to:</p> <p>.1 report relevant information to the responsible persons</p> <p>.2 assist in implementing shipboard spill-containment procedures</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Procedures designed to safeguard the environment are observed at all times</p>

*Table A-V/1-1-2*  
**Specification of minimum standard of competence in advanced training  
 for oil tanker cargo operations**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p><i>Design and characteristics of an oil tanker</i></p> <p>Knowledge of oil tanker design, systems and equipment, including:</p> <ul style="list-style-type: none"> <li>.1 general arrangement and construction</li> <li>.2 pumping arrangement and equipment</li> <li>.3 tank arrangement, pipeline system and tank venting arrangement</li> <li>.4 gauging systems and alarms</li> <li>.5 cargo heating systems</li> <li>.6 tank cleaning, gas-freeing and inerting systems</li> <li>.7 ballast system</li> <li>.8 cargo area venting and accommodation ventilation</li> <li>.9 slop arrangements</li> <li>.10 vapour recovery systems</li> <li>.11 cargo-related electrical and electronic control system</li> <li>.12 environmental protection equipment, including Oil Discharge Monitoring Equipment (ODME)</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Communications are clear, understood and successful</p> <p>Cargo operations are carried out in a safe manner, taking into account oil tanker designs, systems and equipment</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment</p> <p>Potential non-compliance with cargo-operation-related procedures is promptly identified and rectified</p> <p>Proper loading, stowage and unloading of cargoes ensures that stability and stress conditions remain within safe limits at all times</p> <p>Actions taken and procedures followed are correctly applied and the appropriate shipboard cargo-related equipment is properly used</p> <p>Calibration and use of monitoring and gas-detection equipment comply with operational practices and procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (<i>continued</i>)</p>	<p>.13 tank coating</p> <p>.14 tank temperature and pressure control systems</p> <p>.15 fire-fighting systems</p> <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation</p> <p>Proficiency in tanker safety culture and implementation of safety-management system</p> <p>Knowledge and understanding of monitoring and safety systems, including the emergency shutdown</p> <p><i>Loading, unloading, care and handling of cargo</i></p> <p>Ability to perform cargo measurements and calculations</p> <p>Knowledge of the effect of bulk liquid cargoes on trim, stability and structural integrity</p> <p>Knowledge and understanding of oil cargo-related operations, including:</p> <p>.1 loading and unloading plans</p> <p>.2 ballasting and deballasting</p> <p>.3 tank cleaning operations</p> <p>.4 inerting</p> <p>.5 gas-freeing</p>		<p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established emergency procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.6 ship-to-ship transfers .7 load on top .8 crude oil washing</p> <p>Development and application of cargo-related operation plans, procedures and checklists</p> <p>Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment</p> <p>Ability to manage and supervise personnel with cargo-related responsibilities</p>		<p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices</p>
<p>Familiarity with physical and chemical properties of oil cargoes</p>	<p>Knowledge and understanding of the physical and chemical properties of oil cargoes</p> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience .2 approved training ship experience .3 approved simulator training .4 approved training programme</p>	<p>Effective use is made of information resources for identification of properties and characteristics of oil cargoes and related gases, and their impact on safety, the environment and vessel operation</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with oil tanker cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 toxicity</li> <li>.2 flammability and explosion</li> <li>.3 health hazards</li> <li>.4 inert gas composition</li> <li>.5 electrostatic hazards</li> </ul> <p>Knowledge and understanding of dangers of non-compliance with relevant rules/regulations</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with oil tanker cargo operations are correctly identified, and proper control measures are taken</p>
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to oil tankers:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces, including correct use of different types of breathing apparatus</li> <li>.2 precautions to be taken before and during repair and maintenance work</li> <li>.3 precautions for hot and cold work</li> <li>.4 precautions for electrical safety</li> <li>.5 use of appropriate Personal Protective Equipment (PPE)</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p> <p>Correct use of breathing apparatus</p> <p>Procedures for entry into enclosed spaces are observed</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies	<p>Knowledge and understanding of oil tanker emergency procedures, including:</p> <ul style="list-style-type: none"> <li>.1 ship emergency response plans</li> <li>.2 cargo operations emergency shutdown</li> <li>.3 actions to be taken in the event of failure of systems or services essential to cargo</li> <li>.4 fire-fighting on oil tankers</li> <li>.5 enclosed space rescue</li> <li>.6 use of a Material Safety Data Sheet (MSDS)</li> </ul> <p>Actions to be taken following collision, grounding, or spillage</p> <p>Knowledge of medical first aid procedures on board oil tankers</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>The type and impact of the emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines</p>
Take precautions to prevent pollution of the environment	<p>Understanding of procedures to prevent pollution of the atmosphere and the environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Monitor and control compliance with legislative requirements	Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL), as amended, and other relevant IMO instruments, industry guidelines and port regulations as commonly applied	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice

*Table A-V/1-1-3*  
**Specification of minimum standard of competence in advanced training  
 for chemical tanker cargo operations**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p><i>Design and characteristics of a chemical tanker</i></p> <p>Knowledge of chemical tanker designs, systems, and equipment, including:</p> <p>.1 general arrangement and construction</p> <p>.2 pumping arrangement and equipment</p> <p>.3 tank construction and arrangement</p> <p>.4 pipeline and drainage systems</p> <p>.5 tank and cargo pipeline pressure and temperature control systems and alarms</p> <p>.6 gauging control systems and alarms</p> <p>.7 gas-detecting systems</p> <p>.8 cargo heating and cooling systems</p> <p>.9 tank cleaning systems</p> <p>.10 cargo tank environmental control systems</p> <p>.11 ballast systems</p> <p>.12 cargo area venting and accommodation ventilation</p> <p>.13 vapour return/recovery systems</p> <p>.14 fire-fighting systems</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications are clear, understood and successful</p> <p>Cargo operations are carried out in a safe manner, taking into account chemical tanker designs, systems and equipment</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.15 tank, pipeline and fittings' material and coatings</p> <p>.16 slop management</p> <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation</p> <p>Proficiency in tanker safety culture and implementation of safety management system</p> <p>Knowledge and understanding of monitoring and safety systems, including the emergency shutdown system</p> <p><i>Loading, unloading, care and handling of cargo</i></p> <p>Ability to perform cargo measurements and calculations</p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity</p> <p>Knowledge and understanding of chemical cargo-related operations, including:</p> <p>.1 loading and unloading plans</p> <p>.2 ballasting and deballasting</p> <p>.3 tank cleaning operations</p> <p>.4 tank atmosphere control</p>		<p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures</p> <p>Proper loading, stowage and unloading of cargoes ensures that stability and stress conditions remain within safe limits at all times</p> <p>Potential non-compliance with cargo-related procedures is promptly identified and rectified</p> <p>Actions taken and procedures followed are correctly identified and appropriate shipboard cargo-related equipment is properly used</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>.5 inerting .6 gas-freeing .7 ship-to-ship transfers .8 inhibition and stabilization requirements .9 heating and cooling requirements and consequences to adjacent cargoes .10 cargo compatibility and segregation .11 high-viscosity cargoes .12 cargo residue operations .13 operational tank entry</p> <p>Development and application of cargo-related operation plans, procedures and checklists</p> <p>Ability to calibrate and use monitoring and gas-detection systems, instruments and equipment</p> <p>Ability to manage and supervise personnel with cargo-related responsibilities</p>		<p>Calibration and use of monitoring and gas-detection equipment are consistent with safe operational practices and procedures</p> <p>Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Familiarity with physical and chemical properties of chemical cargoes	<p>Knowledge and understanding of the chemical and the physical properties of noxious liquid substances, including:</p> <ul style="list-style-type: none"> <li>.1 chemical cargoes categories (corrosive, toxic, flammable, explosive)</li> <li>.2 chemical groups and industrial usage</li> <li>.3 reactivity of cargoes</li> </ul> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Effective use is made of information resources for identification of properties and characteristics of noxious liquid substances and related gases, and their impact on safety, environmental protection and vessel operation</p>
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with chemical tanker cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 flammability and explosion</li> <li>.2 toxicity</li> <li>.3 health hazards</li> <li>.4 inert gas composition</li> <li>.5 electrostatic hazards</li> <li>.6 reactivity</li> <li>.7 corrosivity</li> <li>.8 low-boiling-point cargoes</li> <li>.9 high-density cargoes</li> <li>.10 solidifying cargoes</li> <li>.11 polymerizing cargoes</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with chemical tanker cargo operations are correctly identified, and proper control measures are taken</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards <i>(continued)</i>	Knowledge and understanding of dangers of non-compliance with relevant rules/regulations		
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to chemical tankers:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces, including correct use of different types of breathing apparatus</li> <li>.2 precautions to be taken before and during repair and maintenance work</li> <li>.3 precautions for hot and cold work</li> <li>.4 precautions for electrical safety</li> <li>.5 use of appropriate Personal Protective Equipment (PPE)</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p> <p>Correct use of breathing apparatus</p> <p>Procedures for entry into enclosed spaces are observed</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Respond to emergencies	<p>Knowledge and understanding of chemical tanker emergency procedures, including:</p> <ul style="list-style-type: none"> <li>.1 ship emergency response plans</li> <li>.2 cargo operations emergency shutdown</li> <li>.3 actions to be taken in the event of failure of systems or services essential to cargo</li> <li>.4 fire fighting on chemical tankers</li> <li>.5 enclosed space rescue</li> <li>.6 cargo reactivity</li> <li>.7 jettisoning cargo</li> <li>.8 use of a Material Safety Data Sheet (MSDS)</li> </ul> <p>Actions to be taken following collision, grounding, or spillage</p> <p>Knowledge of medical first aid procedures on board chemical tankers, with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>The type and impact of the emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans</p> <p>The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem</p> <p>Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly</p> <p>The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Take precautions to prevent pollution of the environment	Understanding of procedures to prevent pollution of the atmosphere and the environment	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training  .4 approved training programme	Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment
Monitor and control compliance with legislative requirements	Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied  Proficiency in the use of the IBC Code and related documents	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training  .4 approved training programme	The handling of cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practice

*Table A-V/1-2-1*  
**Specification of minimum standard of competence in basic training  
 for liquefied gas tanker cargo operations**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe operation of a liquefied gas tanker	<p><i>Design and operational characteristics of liquefied gas tankers</i></p> <p>Basic knowledge of liquefied gas tankers</p> <p>.1 types of liquefied gas tankers</p> <p>.2 general arrangement and construction</p> <p>Basic knowledge of cargo operations:</p> <p>.1 piping systems and valves</p> <p>.2 cargo handling equipment</p> <p>.3 loading, unloading and care in transit</p> <p>.4 emergency shutdown (ESD) system</p> <p>.5 tank cleaning, purging, gas-freeing and inerting</p> <p>Basic knowledge of the physical properties of liquefied gases, including:</p> <p>.1 properties and characteristics</p> <p>.2 pressure and temperature, including vapour pressure/temperature relationship</p> <p>.3 types of electrostatic charge generation</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications within the area of responsibility are clear and effective</p> <p>Cargo operations are carried out in accordance with accepted principles and procedures to ensure safety of operations</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Contribute to the safe operation of a liquefied gas tanker (continued)	<p>.4 chemical symbols</p> <p>Knowledge and understanding of tanker safety culture and safety management</p>		
Take precautions to prevent hazards	<p>Basic knowledge of the hazards associated with tanker operations, including:</p> <p>.1 health hazards</p> <p>.2 environmental hazards</p> <p>.3 reactivity hazards</p> <p>.4 corrosion hazards</p> <p>.5 explosion and flammability hazards</p> <p>.6 sources of ignition</p> <p>.7 electrostatic hazards</p> <p>.8 toxicity hazards</p> <p>.9 vapour leaks and clouds</p> <p>.10 extremely low temperatures</p> <p>.11 pressure hazards</p> <p>Basic knowledge of hazard controls:</p> <p>.1 inerting, drying and monitoring techniques</p> <p>.2 anti-static measures</p> <p>.3 ventilation</p> <p>.4 segregation</p> <p>.5 cargo inhibition</p> <p>.6 importance of cargo compatibility</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Correctly identifies, on an MSDS, relevant cargo-related hazards to the vessel and to personnel, and takes the appropriate actions in accordance with established procedures</p> <p>Identification and actions on becoming aware of a hazardous situation conform to established procedures in line with best practice</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take precautions to prevent hazards (continued)	.7 atmospheric control .8 gas testing Understanding of information on a Material Safety Data Sheet (MSDS)		
Apply occupational health and safety precautions and measures	Function and proper use of gas-measuring instruments and similar equipment Proper use of safety equipment and protective devices, including: .1 breathing apparatus and tank evacuating equipment .2 protective clothing and equipment .3 resuscitators .4 rescue and escape equipment Basic knowledge of safe working practices and procedures in accordance with legislation and industry guidelines and personal shipboard safety relevant to liquefied gas tankers, including: .1 precautions to be taken when entering enclosed spaces .2 precautions to be taken before and during repair and maintenance work .3 safety measures for hot and cold work .4 electrical safety .5 ship/shore safety checklist	Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training .4 approved training programme	Procedures for entry into enclosed spaces are observed Procedures and safe working practices designed to safeguard personnel and the ship are observed at all times Appropriate safety and protective equipment is correctly used

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Apply occupational health and safety precautions and measures <i>(continued)</i>	Basic knowledge of first aid with reference to a Material Safety Data Sheet (MSDS)		First aid do's and don'ts
Carry out fire-fighting operations	<p>Tanker fire organization and action to be taken</p> <p>Special hazards associated with cargo handling and transportation of liquefied gases in bulk</p> <p>Fire-fighting agents used to extinguish gas fires</p> <p>Fixed fire-fighting foam system operations</p> <p>Portable fire-fighting foam operations</p> <p>Fixed dry chemical system operations</p> <p>Basic knowledge of spill containment in relation to fire-fighting operations</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g. simulated shipboard conditions) and, whenever possible and practicable, in darkness</p>	<p>Initial actions and follow-up actions on becoming aware of an emergency conform with established practices and procedures</p> <p>Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures</p> <p>Clothing and equipment are appropriate to the nature of the fire-fighting operations</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents</p>
Respond to emergencies	Basic knowledge of emergency procedures, including emergency shutdown	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	The type and impact of the emergency is promptly identified and the response actions conform to the emergency procedures and contingency plans

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Take precautions to prevent pollution of the environment from the release of liquefied gases</p>	<p>Basic knowledge of the effects of pollution on human and marine life</p> <p>Basic knowledge of shipboard procedures to prevent pollution</p> <p>Basic knowledge of measures to be taken in the event of spillage, including the need to:</p> <ul style="list-style-type: none"> <li>.1 report relevant information to the responsible persons</li> <li>.2 assist in implementing shipboard spill-containment procedures</li> <li>.3 prevent brittle fracture</li> </ul>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard the environment are observed at all times</p>

*Table A-V/1-2-2*  
**Specification of minimum standard of competence in advanced training  
 for liquefied gas tanker cargo operations**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations	<p><i>Design and characteristics of a liquefied gas tanker</i></p> <p>Knowledge of liquefied gas tanker design, systems, and equipment, including:</p> <p>.1 types of liquefied gas tankers and cargo tanks construction</p> <p>.2 general arrangement and construction</p> <p>.3 cargo containment systems, including materials of construction and insulation</p> <p>.4 cargo-handling equipment and instrumentation, including:</p> <p>.1 cargo pumps and pumping arrangements</p> <p>.2 cargo pipelines and valves</p> <p>.3 expansion devices</p> <p>.4 flame screens</p> <p>.5 temperature monitoring systems</p> <p>.6 cargo tank level-gauging systems</p> <p>.7 tank pressure monitoring and control systems</p> <p>.5 cargo temperature maintenance system</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>Communications are clear, understood and successful</p> <p>Cargo operations are carried out in a safe manner, taking into account liquefied gas tanker designs, systems and equipment</p> <p>Pumping operations are carried out in accordance with accepted principles and procedures and are relevant to the type of cargo</p> <p>Cargo operations are planned, risk is managed and carried out in accordance with accepted principles and procedures to ensure safety of operations and avoid pollution of the marine environment</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations <i>(continued)</i></p>	<p>.6 tank atmosphere control systems (inert gas, nitrogen), including storage, generation and distribution systems</p> <p>.7 cofferdam heating systems</p> <p>.8 gas-detecting systems</p> <p>.9 ballast system</p> <p>.10 boil-off systems</p> <p>.11 reliquefaction systems</p> <p>.12 cargo Emergency Shut Down system (ESD)</p> <p>.13 custody transfer system</p> <p>Knowledge of pump theory and characteristics, including types of cargo pumps and their safe operation</p> <p><i>Loading, unloading, care and handling of cargo</i></p> <p>Knowledge of the effect of bulk liquid cargoes on trim and stability and structural integrity</p> <p>Proficiency in tanker safety culture and implementation of safety management requirements</p>		<p>Proper loading, stowage and unloading of liquefied gas cargoes ensures that stability and stress conditions remain within safe limits at all times</p> <p>Potential non-compliance with cargo-related procedures is promptly identified and rectified</p> <p>Actions taken and procedures followed correctly identify and make full use of appropriate shipboard equipment</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ability to safely perform and monitor all cargo operations (continued)</p>	<p>Proficiency to apply safe preparations, procedures and checklists for all cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 post docking and loading: <ul style="list-style-type: none"> <li>.1 tank inspection</li> <li>.2 inerting (Oxygen reduction, dewpoint reduction)</li> <li>.3 gassing-up</li> <li>.4 cooling down</li> <li>.5 loading</li> <li>.6 deballasting</li> <li>.7 sampling, including closed-loop sampling</li> </ul> </li> <li>.2 sea passage: <ul style="list-style-type: none"> <li>.1 cooling down</li> <li>.2 pressure maintenance</li> <li>.3 boil-off</li> <li>.4 inhibiting</li> </ul> </li> <li>.3 unloading: <ul style="list-style-type: none"> <li>.1 unloading</li> <li>.2 ballasting</li> <li>.3 stripping and cleaning systems</li> <li>.4 systems to make the tank liquid-free</li> </ul> </li> <li>.4 pre-docking preparation: <ul style="list-style-type: none"> <li>.1 warm-up</li> <li>.2 inerting</li> <li>.3 gas-freeing</li> </ul> </li> <li>.5 ship-to-ship transfer</li> </ul>		<p>Calibration and use of monitoring and gas-detection equipment is consistent with safe operational practices and procedures</p> <p>Procedures for monitoring and safety systems ensure that all alarms are detected promptly and acted upon in accordance with established procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ability to safely perform and monitor all cargo operations ( <i>continued</i> )	Proficiency to perform cargo measurements and calculations, including: <ul style="list-style-type: none"> <li>.1 liquid phase</li> <li>.2 gas phase</li> <li>.3 On Board Quantity (OBQ)</li> <li>.4 Remain On Board (ROB)</li> <li>.5 boil-off cargo calculations</li> </ul> Proficiency to manage and supervise personnel with cargo-related responsibilities		Personnel are allocated duties and informed of procedures and standards of work to be followed, in a manner appropriate to the individuals concerned and in accordance with safe operational practices
Familiarity with physical and chemical properties of liquefied gas cargoes	Knowledge and understanding of basic chemistry and physics and the relevant definitions related to the safe carriage of liquefied gases in bulk in ships, including: <ul style="list-style-type: none"> <li>.1 the chemical structure of gases</li> <li>.2 the properties and characteristics of liquefied gases (including CO<sub>2</sub>) and their vapours, including:               <ul style="list-style-type: none"> <li>.1 simple gas laws</li> <li>.2 states of matter</li> <li>.3 liquid and vapour densities</li> <li>.4 diffusion and mixing of gases</li> <li>.5 compression of gases</li> </ul> </li> <li>.6 reliquefaction and refrigeration of gases</li> </ul>	Examination and assessment of evidence obtained from one or more of the following: <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	Effective use is made of information resources for identification of properties and characteristics of liquefied gases and their impact on safety, environmental protection and vessel operation

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Familiarity with physical and chemical properties of liquefied gas cargoes <i>(continued)</i>	<ul style="list-style-type: none"> <li>.7 critical temperature of gases and pressure</li> <li>.8 flashpoint, upper and lower explosive limits, auto-ignition temperature</li> <li>.9 compatibility, reactivity and positive segregation of gases</li> <li>.10 polymerization</li> <li>.11 saturated vapour pressure/reference temperature</li> <li>.12 dewpoint and bubble point</li> <li>.13 lubrication of compressors</li> <li>.14 hydrate formation</li> <li>.3 the properties of single liquids</li> <li>.4 the nature and properties of solutions</li> <li>.5 thermodynamic units</li> <li>.6 basic thermodynamic laws and diagrams</li> <li>.7 properties of materials</li> <li>.8 effect of low temperature – brittle fracture</li> </ul> <p>Understanding the information contained in a Material Safety Data Sheet (MSDS)</p>		

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Take precautions to prevent hazards	<p>Knowledge and understanding of the hazards and control measures associated with liquefied gas tanker cargo operations, including:</p> <ul style="list-style-type: none"> <li>.1 flammability</li> <li>.2 explosion</li> <li>.3 toxicity</li> <li>.4 reactivity</li> <li>.5 corrosivity</li> <li>.6 health hazards</li> <li>.7 inert gas composition</li> <li>.8 electrostatic hazards</li> <li>.9 polymerizing cargoes</li> </ul> <p>Proficiency to calibrate and use monitoring and gas-detection systems, instruments and equipment</p> <p>Knowledge and understanding of dangers of non-compliance with relevant rules/regulations</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Relevant cargo-related hazards to the vessel and to personnel associated with liquefied gas tanker cargo operations are correctly identified, and proper control measures are taken</p> <p>Use of gas-detection devices is in accordance with manuals and good practice</p>
Apply occupational health and safety precautions	<p>Knowledge and understanding of safe working practices, including risk assessment and personal shipboard safety relevant to liquefied gas tankers, including:</p> <ul style="list-style-type: none"> <li>.1 precautions to be taken when entering enclosed spaces (such as compressor rooms), including the correct use of different types of breathing apparatus</li> </ul>	<p>Assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> <li>.1 approved in-service experience</li> <li>.2 approved training ship experience</li> <li>.3 approved simulator training</li> <li>.4 approved training programme</li> </ul>	<p>Procedures designed to safeguard personnel and the ship are observed at all times</p> <p>Safe working practices are observed and appropriate safety and protective equipment is correctly used</p> <p>Working practices are in accordance with legislative requirements, codes of practice, permits to work and environmental concerns</p> <p>Correct use of breathing apparatus</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Apply occupational health and safety precautions ( <i>continued</i> )	<p>.2 precautions to be taken before and during repair and maintenance work, including work affecting pumping, piping, electrical and control systems</p> <p>.3 precautions for hot and cold work</p> <p>.4 precautions for electrical safety</p> <p>.5 use of appropriate Personal Protective Equipment (PPE)</p> <p>.6 precautions for cold burn and frostbite</p> <p>.7 proper use of personal toxicity monitoring equipment</p>		
Respond to emergencies	<p>Knowledge and understanding of liquefied gas tanker emergency procedures, including:</p> <p>.1 ship emergency response plans</p> <p>.2 cargo operations emergency shutdown procedure</p> <p>.3 emergency cargo valve operations</p> <p>.4 actions to be taken in the event of failure of systems or services essential to cargo operations</p> <p>.5 fire-fighting on liquefied gas tankers</p> <p>.6 jettisoning of cargo</p> <p>.7 enclosed space rescue</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	<p>The type and impact of emergency is promptly identified and the response actions conform with established emergency procedures and contingency plans</p> <p>The order of priority and the levels and timescales of making reports and informing personnel on board are relevant to the nature of the emergency and reflect the urgency of the problem</p> <p>Evacuation, emergency shutdown and isolation are appropriate to the nature of the emergency and implemented promptly</p>

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Respond to emergencies ( <i>continued</i> )	<p>Actions to be taken following collision, grounding or spillage and envelopment of the ship in toxic or flammable vapour</p> <p>Knowledge of medical first-aid procedures and antidotes on board liquefied gas tankers, with reference to the Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)</p>		The identification of and actions taken in a medical emergency conform to current recognized first aid practice and international guidelines
Take precautions to prevent pollution of the environment	Understanding of procedures to prevent pollution of the environment	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	Operations are conducted in accordance with accepted principles and procedures to prevent pollution of the environment
Monitor and control compliance with legislative requirements	<p>Knowledge and understanding of relevant provisions of the International Convention for the Prevention of Pollution from Ships (MARPOL) and other relevant IMO instruments, industry guidelines and port regulations as commonly applied</p> <p>Proficiency in the use of the IBC and IGC Codes and related documents</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training</p> <p>.4 approved training programme</p>	The handling of liquefied gas cargoes complies with relevant IMO instruments and established industrial standards and codes of safe working practices

*Table A-V/2*  
**Specification of minimum standard of competence in crisis management  
 and human behaviour**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Organize shipboard emergency procedures	<p>Knowledge of:</p> <p>.1 the general design and layout of the ship</p> <p>.2 safety regulations</p> <p>.3 emergency plans and procedures</p> <p>The importance of the principles for the development of ship-specific emergency procedures, including:</p> <p>.1 the need for pre-planning and drills of shipboard emergency procedures</p> <p>.2 the need for all personnel to be aware of and adhere to pre-planned emergency procedures as carefully as possible in the event of an emergency situation</p>	Assessment of evidence obtained from approved training, exercises with one or more prepared emergency plans and practical demonstration	The shipboard emergency procedures ensure a state of readiness to respond to emergency situations
Optimize the use of resources	<p>Ability to optimize the use of resources, taking into account:</p> <p>.1 the possibility that resources available in an emergency may be limited</p> <p>.2 the need to make full use of personnel and equipment immediately available and, if necessary, to improvise</p> <p>Ability to organize realistic drills to maintain a state of readiness, taking into account lessons learnt from previous accidents involving passenger ships; debriefing after drills</p>	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	<p>Contingency plans optimize the use of available resources</p> <p>Allocation of tasks and responsibilities reflects the known competence of individuals</p> <p>Roles and responsibilities of teams and individuals are clearly defined</p>



Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Control response to emergencies	<p>Ability to make an initial assessment and provide an effective response to emergency situations in accordance with established emergency procedures</p> <p><i>Leadership skills</i></p> <p>Ability to lead and direct others in emergency situations, including the need:</p> <p>.1 to set an example during emergency situations</p> <p>.2 to focus decision making, given the need to act quickly in an emergency</p> <p>.3 to motivate, encourage and reassure passengers and other personnel</p> <p><i>Stress handling</i></p> <p>Ability to identify the development of symptoms of excessive personal stress and those of other members of the ship's emergency team</p> <p>Understanding that stress generated by emergency situations can affect the performance of individuals and their ability to act on instructions and follow procedures</p>	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	<p>Procedures and actions are in accordance with established principles and plans for crisis management on board</p> <p>Objectives and strategy are appropriate to the nature of the emergency, take account of contingencies and make optimum use of available resources</p> <p>Actions of crew members contribute to maintaining order and control</p>
Control passengers and other personnel during emergency situations	<p><i>Human behaviour and responses</i></p> <p>Ability to control passengers and other personnel in emergency situations, including:</p>	Assessment of evidence obtained from approved training, practical demonstration and shipboard training and drills of emergency procedures	Actions of crew members contribute to maintaining order and control

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Control passengers and other personnel during emergency situations <i>(continued)</i>	<p>.1 awareness of the general reaction patterns of passengers and other personnel in emergency situations, including the possibility that:</p> <p>.1.1 generally it takes some time before people accept the fact that there is an emergency situation</p> <p>.1.2 some people may panic and not behave with a normal level of rationality, that their ability to comprehend may be impaired and they may not be as responsive to instructions as in non-emergency situations</p> <p>.2 awareness that passengers and other personnel may, <i>inter alia</i>:</p> <p>.2.1 start looking for relatives, friends and/or their belongings as a first reaction when something goes wrong</p> <p>.2.2 seek safety in their cabins or in other places on board where they think that they can escape danger</p> <p>.2.3 tend to move to the upper side when the ship is listing</p> <p>.3 appreciation of the possible problem of panic resulting from separating families</p>		

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Establish and maintain effective communications</p>	<p>Ability to establish and maintain effective communications, including:</p> <ul style="list-style-type: none"> <li>.1 the importance of clear and concise instructions and reports</li> <li>.2 the need to encourage an exchange of information with, and feedback from, passengers and other personnel</li> </ul> <p>Ability to provide relevant information to passengers and other personnel during an emergency situation, to keep them apprised of the overall situation and to communicate any action required of them, taking into account:</p> <ul style="list-style-type: none"> <li>.1 the language or languages appropriate to the principal nationalities of passengers and other personnel carried on the particular route</li> <li>.2 the possible need to communicate during an emergency by some other means, such as by demonstration, or by hand signals or calling attention to the location of instructions, muster stations, life-saving devices or evacuation routes, when oral communication is impractical</li> <li>.3 the language in which emergency announcements may be broadcast during an emergency or drill to convey critical guidance to passengers and to facilitate crew members in assisting passengers</li> </ul>	<p>Assessment of evidence obtained from approved training, exercises and practical demonstration</p>	<p>Information from all available sources is obtained, evaluated and confirmed as quickly as possible and reviewed throughout the emergency</p> <p>Information given to individuals, emergency response teams and passengers is accurate, relevant and timely</p> <p>Information keeps passengers informed as to the nature of the emergency and the actions required of them</p>

ภาคผนวก ๖

ตารางที่ ๑-๑ มาตรฐานความรู้ความสามารถสำหรับการดำรงชีพในทะเล

Table A-VI/1-1

Specification of minimum standard of competence in personal survival techniques

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Survive at sea in the event of ship abandonment	<p>Types of emergency situations which may occur, such as collision, fire, foundering</p> <p>Types of life-saving appliances normally carried on ships</p> <p>Equipment in survival craft</p> <p>Location of personal life-saving appliances</p> <p>Principles concerning survival, including:</p> <p>.1 value of training and drills</p> <p>.2 personal protective clothing and equipment</p> <p>.3 need to be ready for any emergency</p> <p>.4 actions to be taken when called to survival craft stations</p> <p>.5 actions to be taken when required to abandon ship</p> <p>.6 actions to be taken when in the water</p> <p>.7 actions to be taken when aboard a survival craft</p> <p>.8 main dangers to survivors</p>	<p>Assessment of evidence obtained from approved instruction or during attendance at an approved course or approved in-service experience and examination, including practical demonstration of competence to:</p> <p>.1 don a lifejacket</p> <p>.2 don and use an immersion suit</p> <p>.3 safely jump from a height into the water</p> <p>.4 right an inverted liferaft while wearing a lifejacket</p> <p>.5 swim while wearing a lifejacket</p> <p>.6 keep afloat without a lifejacket</p> <p>.7 board a survival craft from the ship and water while wearing a lifejacket</p> <p>.8 take initial actions on boarding survival craft to enhance chance of survival</p> <p>.9 stream a drogue or sea-anchor</p> <p>.10 operate survival craft equipment</p> <p>.11 operate location devices, including radio equipment</p>	<p>Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstance and conditions and minimize potential dangers and threats to survival</p> <p>Method of boarding survival craft is appropriate and avoids dangers to other survivors</p> <p>Initial actions after leaving the ship and procedures and actions in water minimize threats to survival</p>

ภาคผนวก ๖

ตารางที่ ๑-๒ มาตรฐานความรู้ความสามารถสำหรับการป้องกันและการดับไฟ

Table A-VI/1-2

**Specification of minimum standard of competence in fire prevention and fire fighting**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Minimize the risk of fire and maintain a state of readiness to respond to emergency situations involving fire	<p>Shipboard fire-fighting organization</p> <p>Location of fire-fighting appliances and emergency escape routes</p> <p>The elements of fire and explosion (the fire triangle)</p> <p>Types and sources of ignition</p> <p>Flammable materials, fire hazards and spread of fire</p> <p>The need for constant vigilance</p> <p>Actions to be taken on board ship</p> <p>Fire and smoke detection and automatic alarm systems</p> <p>Classification of fire and applicable extinguishing agents</p>	<p>Assessment of evidence obtained from approved instruction or attendance at an approved course</p>	<p>Initial actions on becoming aware of an emergency conform with accepted practices and procedures</p> <p>Action taken on identifying muster signals is appropriate to the indicated emergency and complies with established procedures</p>
Fight and extinguish fires	<p>Fire-fighting equipment and its location on board</p> <p>Instruction in:</p> <p>.1 fixed installations</p> <p>.2 fire-fighter's outfits</p> <p>.3 personal equipment</p> <p>.4 fire-fighting appliances and equipment</p> <p>.5 fire-fighting methods</p> <p>.6 fire-fighting agents</p> <p>.7 fire-fighting procedures</p>	<p>Assessment of evidence obtained from approved instruction or during attendance at an approved course, including practical demonstration in spaces which provide truly realistic training conditions (e.g., simulated shipboard conditions) and, whenever possible and practical, in darkness, of the ability to:</p> <p>.1 use various types of portable fire extinguishers</p> <p>.2 use self-contained breathing apparatus</p>	<p>Clothing and equipment are appropriate to the nature of the fire-fighting operations</p> <p>The timing and sequence of individual actions are appropriate to the prevailing circumstances and conditions</p> <p>Extinguishment of fire is achieved using appropriate procedures, techniques and fire-fighting agents</p> <p>Breathing apparatus procedures and techniques comply with accepted practices and procedures</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Fight and extinguish fires ( <i>continued</i> )	.8 use of breathing apparatus for fighting fires and effecting rescues	.3 extinguish smaller fires, e.g., electrical fires, oil fires, propane fires  .4 extinguish extensive fires with water, using jet and spray nozzles  .5 extinguish fires with foam, powder or any other suitable chemical agent  .6 enter and pass through, with lifeline but without breathing apparatus, a compartment into which high-expansion foam has been injected  .7 fight fire in smoke-filled enclosed spaces wearing self-contained breathing apparatus  .8 extinguish fire with water fog or any other suitable fire-fighting agent in an accommodation room or simulated engine-room with fire and heavy smoke  .9 extinguish oil fire with fog applicator and spray nozzles, dry chemical powder or foam applicators  .10 effect a rescue in a smoke-filled space wearing breathing apparatus	

ภาคผนวก ๖

ตารางที่ ๑-๓ มาตรฐานความรู้ความสามารถสำหรับการปฐมพยาบาลเบื้องต้น

Table A-VI/1-3

Specification of minimum standard of competence in elementary first aid

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take immediate action upon encountering an accident or other medical emergency	<p>Assessment of needs of casualties and threats to own safety</p> <p>Appreciation of body structure and functions</p> <p>Understanding of immediate measures to be taken in cases of emergency, including the ability to:</p> <p>.1 position casualty</p> <p>.2 apply resuscitation techniques</p> <p>.3 control bleeding</p> <p>.4 apply appropriate measures of basic shock management</p> <p>.5 apply appropriate measures in event of burns and scalds, including accidents caused by electric current</p> <p>.6 rescue and transport a casualty</p> <p>.7 improvise bandages and use materials in the emergency kit</p>	<p>Assessment of evidence obtained from approved instruction or during attendance at an approved course</p>	<p>The manner and timing of raising the alarm is appropriate to the circumstances of the accident or medical emergency</p> <p>The identification of probable cause, nature and extent of injuries is prompt and complete and the priority and sequence of actions is proportional to any potential threat to life</p> <p>Risk of further harm to self and casualty is minimized at all times</p>

ภาคผนวก ๖

ตารางที่ ๑-๔ มาตรฐานความรู้ความสามารถสำหรับความปลอดภัยของบุคคลและความรับผิดชอบต่อสังคม

*Table A-VI/1-4*  
**Specification of minimum standard of competence in personal safety  
and social responsibilities**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Comply with emergency procedures	Types of emergency which may occur, such as collision, fire, foundering  Knowledge of shipboard contingency plans for response to emergencies  Emergency signals and specific duties allocated to crew members in the muster list; muster stations; correct use of personal safety equipment  Action to take on discovering potential emergency, including fire, collision, foundering and ingress of water into the ship  Action to take on hearing emergency alarm signals  Value of training and drills  Knowledge of escape routes and internal communication and alarm systems	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Initial action on becoming aware of an emergency conforms to established emergency response procedures  Information given on raising alarm is prompt, accurate, complete and clear
Take precautions to prevent pollution of the marine environment	Basic knowledge of the impact of shipping on the marine environment and the effects of operational or accidental pollution on it  Basic environmental protection procedures  Basic knowledge of complexity and diversity of the marine environment	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Organizational procedures designed to safeguard the marine environment are observed at all times



<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Observe safe working practices	<p>Importance of adhering to safe working practices at all times</p> <p>Safety and protective devices available to protect against potential hazards aboard ship</p> <p>Precautions to be taken prior to entering enclosed spaces</p> <p>Familiarization with international measures concerning accident prevention and occupational health*</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Safe working practices are observed and appropriate safety and protective equipment is correctly used at all times
Contribute to effective communications on board ship	<p>Understand the principles of, and barriers to, effective communication between individuals and teams within the ship</p> <p>Ability to establish and maintain effective communications</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Communications are clear and effective at all times
Contribute to effective human relationships on board ship	<p>Importance of maintaining good human and working relationships aboard ship</p> <p>Basic teamworking principles and practice, including conflict resolution</p> <p>Social responsibilities; employment conditions; individual rights and obligations; dangers of drug and alcohol abuse</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Expected standards of work and behaviour are observed at all times

\* The ILO Code of Practice on “Accident Prevention on Board Ship at Sea and in Port” may be of assistance in the preparation of courses.

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Understand and take necessary actions to control fatigue	<p>Importance of obtaining the necessary rest</p> <p>Effects of sleep, schedules, and the circadian rhythm on fatigue</p> <p>Effects of physical stressors on seafarers</p> <p>Effects of environmental stressors in and outside the ship and their impact on seafarers</p> <p>Effects of schedule changes on seafarer fatigue</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Fatigue management practices are observed and appropriate actions are used at all times

ภาคผนวก ๖

ตารางที่ ๒-๑ มาตรฐานความรู้ความสามารถสำหรับเรือช่วยชีวิตที่ไม่ใช่เรือเร็วช่วยชีวิต

Table A-VI/2-1

**Specification of the minimum standard of competence in survival craft and rescue boats other than fast rescue boats**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take charge of a survival craft or rescue boat during and after launch	<p>Construction and outfit of survival craft and rescue boats and individual items of their equipment</p> <p>Particular characteristics and facilities of survival craft and rescue boats</p> <p>Various types of device used for launching survival craft and rescue boats</p> <p>Methods of launching survival craft into a rough sea</p> <p>Methods of recovering survival craft</p> <p>Action to be taken after leaving the ship</p> <p>Methods of launching and recovering rescue boats in a rough sea</p> <p>Dangers associated with use of on-load release devices</p> <p>Knowledge of maintenance procedures</p>	<p>Assessment of evidence obtained from practical demonstration of ability to:</p> <p>.1 right an inverted liferaft while wearing a lifejacket</p> <p>.2 interpret the markings on survival craft as to the number of persons they are intended to carry</p> <p>.3 give correct commands for launching and boarding survival craft, clearing the ship and handling and disembarking persons from survival craft</p> <p>.4 prepare and safely launch survival craft and clear the ship's side quickly and operate off-load and on-load release devices</p> <p>.5 safely recover survival craft and rescue boats, including the proper resetting of both off-load and on-load release devices</p> <p>using: inflatable liferaft and open or enclosed lifeboat with inboard engine or approved simulator training, where appropriate</p>	<p>Preparation, boarding and launching of survival craft are within equipment limitations and enable survival craft to clear the ship safely</p> <p>Initial actions on leaving the ship minimize threat to survival</p> <p>Recovery of survival craft and rescue boats is within equipment limitations</p> <p>Equipment is operated in accordance with manufacturers' instructions for release and resetting</p>
Operate a survival craft engine	Methods of starting and operating a survival craft engine and its accessories together with the use of the fire extinguisher provided	Assessment of evidence obtained from practical demonstration of ability to start and operate an inboard engine fitted in an open or enclosed lifeboat	Propulsion is available and maintained as required for manoeuvring

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Manage survivors and survival craft after abandoning ship	<p>Handling survival craft in rough weather</p> <p>Use of painter, sea-anchor and all other equipment</p> <p>Apportionment of food and water in survival craft</p> <p>Action taken to maximize detectability and location of survival craft</p> <p>Method of helicopter rescue</p> <p>Effects of hypothermia and its prevention; use of protective covers and garments, including immersion suits and thermal protective aids</p> <p>Use of rescue boats and motor lifeboats for marshalling liferafts and rescue of survivors and persons in the sea</p> <p>Beaching survival craft</p>	<p>Assessment of evidence obtained from practical demonstration of ability to:</p> <p>.1 row and steer a boat and steer by compass</p> <p>.2 use individual items of equipment of survival craft</p> <p>.3 rig devices to aid location</p>	Survival management is appropriate to prevailing circumstances and conditions
Use locating devices, including communication and signalling apparatus and pyrotechnics	<p>Radio life-saving appliances carried in survival craft, including satellite EPIRBs and SARTs</p> <p>Pyrotechnic distress signals</p>	<p>Assessment of evidence obtained from practical demonstration of ability to:</p> <p>.1 use portable radio equipment for survival craft</p> <p>.2 use signalling equipment, including pyrotechnics</p>	Use and choice of communication and signalling apparatus is appropriate to prevailing circumstances and conditions

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Apply first aid to survivors	<p>Use of the first-aid kit and resuscitation techniques</p> <p>Management of injured persons, including control of bleeding and shock</p>	<p>Assessment of evidence obtained from practical demonstration of ability to deal with injured persons both during and after abandonment, using first-aid kit and resuscitation techniques</p>	<p>Identification of the probable cause, nature and extent of injuries or condition is prompt and accurate</p> <p>Priority and sequence of treatment minimizes any threat to life</p>

ภาคผนวก ๖

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Table A-VI/2-2

**Specification of the minimum standard of competence in fast rescue boats**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Understand the construction, maintenance, repair and outfitting of fast rescue boats	Construction and outfitting of fast rescue boats and individual items of their equipment  Knowledge of the maintenance and emergency repairs of fast rescue boats and the normal inflation and deflation of buoyancy compartments of inflated fast rescue boats	Assessment of evidence obtained from practical instruction	The method of carrying out routine maintenance and emergency repairs  Identify components and required equipment for fast rescue boats
Take charge of the launching equipment and appliance as commonly fitted, during launching and recovery	Assessment of the readiness of launching equipment and launching appliance of fast rescue boats for immediate launching and operation  Understand the operation and limitations of the winch, brakes, falls, painters, motion-compensation and other equipment as commonly fitted  Safety precautions during launching and recovery of a fast rescue boat  Launching and recovery of a fast rescue boat in prevailing and adverse weather and sea conditions	Assessment of evidence obtained from practical demonstration of ability to control safe launching and recovery of a fast rescue boat, with equipment as fitted	Ability to prepare and take charge of the launching equipment and appliance during launching and recovery of a fast rescue boat
Take charge of a fast rescue boat as commonly fitted, during launching and recovery	Assessment of the readiness of fast rescue boats and related equipment for immediate launching and operation  Safety precautions during launching and recovery of a fast rescue boat  Launching and recovery of a fast rescue boat in prevailing and adverse weather and sea conditions	Assessment of evidence obtained from practical demonstration of ability to conduct safe launching and recovery of a fast rescue boat, with equipment as fitted	Ability to take charge of a fast rescue boat during launching and recovery

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Take charge of a fast rescue boat after launching	<p>Particular characteristics, facilities and limitations of fast rescue boats</p> <p>Procedures for the righting of a capsized fast rescue boat</p> <p>How to handle a fast rescue boat in prevailing and adverse weather and sea conditions</p> <p>Navigational and safety equipment available in a fast rescue boat</p> <p>Search patterns and environmental factors affecting their execution</p>	<p>Assessment of evidence obtained from practical demonstration of ability to:</p> <ol style="list-style-type: none"> <li>.1 right a capsized fast rescue boat</li> <li>.2 handle a fast rescue boat in prevailing weather and sea conditions</li> <li>.3 swim in special equipment</li> <li>.4 use communications and signalling equipment between the fast rescue boat and a helicopter and a ship</li> <li>.5 use the emergency equipment carried</li> <li>.6 recover a casualty from the water and transfer a casualty to a rescue helicopter or to a ship or to a place of safety</li> <li>.7 carry out search patterns, taking account of environmental factors</li> </ol>	Demonstration of operation of fast rescue boats within equipment limitations in prevailing weather conditions
Operate a fast rescue boat engine	Methods of starting and operating a fast rescue boat engine and its accessories	Assessment of evidence obtained from practical demonstration of ability to start and operate a fast rescue boat engine	Engine is started and operated as required for manoeuvring

ภาคผนวก ๖

ตารางที่ ๓ มาตรฐานความรู้ความสามารถสำหรับการดับไฟขั้นสูง

Table A-VI/3

**Specification of minimum standard of competence in advanced fire fighting**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Control fire-fighting operations aboard ships	<p>Fire-fighting procedures at sea and in port, with particular emphasis on organization, tactics and command</p> <p>Use of water for fire-extinguishing, the effect on ship stability, precautions and corrective procedures</p> <p>Communication and coordination during fire-fighting operations</p> <p>Ventilation control, including smoke extraction</p> <p>Control of fuel and electrical systems</p> <p>Fire-fighting process hazards (dry distillation, chemical reactions, boiler uptake fires, etc.)</p> <p>Fire fighting involving dangerous goods</p> <p>Fire precautions and hazards associated with the storage and handling of materials (paints, etc.)</p> <p>Management and control of injured persons</p> <p>Procedures for coordination with shore-based fire fighters</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions (e.g., simulated shipboard conditions) and, whenever possible and practicable, in darkness</p>	<p>Actions taken to control fires are based on a full and accurate assessment of the incident, using all available sources of information</p> <p>The order of priority, timing and sequence of actions are appropriate to the overall requirements of the incident and to minimize damage and potential damage to the ship, injuries to personnel and impairment of the operational effectiveness of the ship</p> <p>Transmission of information is prompt, accurate, complete and clear</p> <p>Personal safety during fire control activities is safeguarded at all times</p>
Organize and train fire parties	<p>Preparation of contingency plans</p> <p>Composition and allocation of personnel to fire parties</p> <p>Strategies and tactics for control of fires in various parts of the ship</p>	<p>Practical exercises and instruction conducted under approved and truly realistic training conditions, e.g., simulated shipboard conditions</p>	<p>Composition and organization of fire control parties ensure the prompt and effective implementation of emergency plans and procedures</p>



<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Inspect and service fire-detection and fire-extinguishing systems and equipment	Fire-detection systems; fixed fire-extinguishing systems; portable and mobile fire-extinguishing equipment, including appliances, pumps and rescue, salvage, life-support, personal protective and communication equipment  Requirements for statutory and classification surveys	Practical exercises, using approved equipment and systems in a realistic training environment	Operational effectiveness of all fire-detection and fire-extinguishing systems and equipment is maintained at all times in accordance with performance specifications and legislative requirements
Investigate and compile reports on incidents involving fire	Assessment of cause of incidents involving fire	Practical exercises in a realistic training environment	Causes of fire are identified and the effectiveness of countermeasures is evaluated

ภาคผนวก ๖

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Table A-VI/4-1

**Specification of minimum standard of competence in medical first aid**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Apply immediate first aid in the event of accident or illness on board	First-aid kit Body structure and function Toxicological hazards on board, including use of the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG) or its national equivalent Examination of casualty or patient Spinal injuries Burns, scalds and effects of heat and cold Fractures, dislocations and muscular injuries Medical care of rescued persons Radio medical advice Pharmacology Sterilization Cardiac arrest, drowning and asphyxia	Assessment of evidence obtained from practical instruction	The identification of probable cause, nature and extent of injuries is prompt, complete and conforms to current first-aid practice Risk of harm to self and to others is minimized at all times Treatment of injuries and the patient's condition is appropriate and conforms to recognized first-aid practice and international guidelines

ภาคผนวก ๒

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Table A-VI/4-2

Specification of minimum standard of competence in medical care

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Provide medical care to the sick and injured while they remain on board	<p>Care of casualty involving:</p> <ul style="list-style-type: none"> <li>.1 head and spinal injuries</li> <li>.2 injuries of ear, nose, throat and eyes</li> <li>.3 external and internal bleeding</li> <li>.4 burns, scalds and frostbite</li> <li>.5 fractures, dislocations and muscular injuries</li> <li>.6 wounds, wound healing and infection</li> <li>.7 pain relief</li> <li>.8 techniques of sewing and clamping</li> <li>.9 management of acute abdominal conditions</li> <li>.10 minor surgical treatment</li> <li>.11 dressing and bandaging</li> </ul> <p>Aspects of nursing:</p> <ul style="list-style-type: none"> <li>.1 general principles</li> <li>.2 nursing care</li> </ul> <p>Diseases, including:</p> <ul style="list-style-type: none"> <li>.1 medical conditions and emergencies</li> <li>.2 sexually transmitted diseases</li> <li>.3 tropical and infectious diseases</li> </ul> <p>Alcohol and drug abuse</p>	<p>Assessment of evidence obtained from practical instruction and demonstration</p> <p>Where practicable, approved practical experience at a hospital or similar establishment</p>	<p>Identification of symptoms is based on the concepts of clinical examination and medical history</p> <p>Protection against infection and spread of diseases is complete and effective</p> <p>Personal attitude is calm, confident and reassuring</p> <p>Treatment of injury or condition is appropriate and conforms to accepted medical practice and relevant national and international medical guides</p> <p>The dosage and application of drugs and medication complies with manufacturers' recommendations and accepted medical practice</p> <p>The significance of changes in patient's condition is promptly recognized</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Provide medical care to the sick and injured while they remain on board <i>(continued)</i>	Dental care  Gynaecology, pregnancy and childbirth  Medical care of rescued persons  Death at sea  Hygiene  Disease prevention, including: .1 disinfection, disinfestation, de-ratting  .2 vaccinations  Keeping records and copies of applicable regulations: .1 keeping medical records  .2 international and national maritime medical regulations		
Participate in coordinated schemes for medical assistance to ships	External assistance, including: .1 radio medical advice  .2 transportation of the ill and injured, including helicopter evacuation  .3 medical care of sick seafarers involving cooperation with port health authorities or out-patient wards in port		Clinical examination procedures are complete and comply with instructions received  The method and preparation for evacuation is in accordance with recognized procedures and is designed to maximize the welfare of the patient  Procedures for seeking radio medical advice conform to established practice and recommendations

ภาคผนวก ๖

ตารางที่ ๕ มาตรฐานความรู้ความสามารถสำหรับนายเรือการรักษาความปลอดภัยบนเรือ

Table A-VI/5

**Specifications of minimum standard of competence for ship security officers**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain and supervise the implementation of a ship security plan</p>	<p>Knowledge of international maritime security policy and responsibilities of Governments, companies and designated persons, including elements that may relate to piracy and armed robbery</p> <p>Knowledge of the purpose for and the elements that make up a ship security plan, related procedures and maintenance of records, including those that may relate to piracy and armed robbery</p> <p>Knowledge of procedures to be employed in implementing a ship security plan and reporting of security incidents</p> <p>Knowledge of maritime security levels and the consequential security measures and procedures aboard ship and in the port facility environment</p> <p>Knowledge of the requirements and procedures for conducting internal audits, on-scene inspections, control and monitoring of security activities specified in a ship security plan</p> <p>Knowledge of the requirements and procedures for reporting to the company security officer any deficiencies and non-conformities identified during internal audits, periodic reviews, and security inspections</p>	<p>Assessment of evidence obtained from approved training or examination</p>	<p>Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended</p> <p>Legislative requirements relating to security are correctly identified</p> <p>Procedures achieve a state of readiness to respond to changes in maritime security levels</p> <p>Communications within the ship security officer's area of responsibility are clear and understood</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain and supervise the implementation of a ship security plan (continued)</p>	<p>Knowledge of the methods and procedures used to modify the ship security plan</p> <p>Knowledge of security-related contingency plans and the procedures for responding to security threats or breaches of security, including provisions for maintaining critical operations of the ship/port interface, including also elements that may relate to piracy and armed robbery</p> <p>Working knowledge of maritime security terms and definitions, including elements that may relate to piracy and armed robbery</p>		
<p>Assess security risk, threat, and vulnerability</p>	<p>Knowledge of risk assessment and assessment tools</p> <p>Knowledge of security assessment documentation, including the Declaration of Security</p> <p>Knowledge of techniques used to circumvent security measures, including those used by pirates and armed robbers</p> <p>Knowledge enabling recognition, on a non-discriminatory basis, of persons posing potential security risks</p> <p>Knowledge enabling recognition of weapons, dangerous substances and devices and awareness of the damage they can cause</p> <p>Knowledge of crowd management and control techniques, where appropriate</p>	<p>Assessment of evidence obtained from approved training, or approved experience and examination, including practical demonstration of competence to:</p> <p>.1 conduct physical searches</p> <p>.2 conduct non-intrusive inspections</p>	<p>Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended</p> <p>Procedures achieve a state of readiness to respond to changes in the maritime security levels</p> <p>Communications within the ship security officer's area of responsibility are clear and understood</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Assess security risk, threat, and vulnerability <i>(continued)</i>	<p>Knowledge in handling sensitive security-related information and security-related communications</p> <p>Knowledge of implementing and co-ordinating searches</p> <p>Knowledge of the methods for physical searches and non-intrusive inspections</p>		
Undertake regular inspections of the ship to ensure that appropriate security measures are implemented and maintained	<p>Knowledge of the requirements for designating and monitoring restricted areas</p> <p>Knowledge of controlling access to the ship and to restricted areas on board ship</p> <p>Knowledge of methods for effective monitoring of deck areas and areas surrounding the ship</p> <p>Knowledge of security aspects relating to the handling of cargo and ship's stores with other shipboard personnel and relevant port facility security officers</p> <p>Knowledge of methods for controlling the embarkation, disembarkation and access while on board of persons and their effects</p>	Assessment of evidence obtained from approved training or examination	<p>Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS,1974, as amended</p> <p>Procedures achieve a state of readiness to respond to changes in the maritime security levels</p> <p>Communications within the ship security officer's area of responsibility are clear and understood</p>
Ensure that security equipment and systems, if any, are properly operated, tested and calibrated	<p>Knowledge of the various types of security equipment and systems and their limitations, including those that could be used in case of attacks by pirates and armed robbers</p> <p>Knowledge of the procedures, instructions and guidance on the use of ship security alert systems</p>	Assessment of evidence obtained from approved training or examination	Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
	Knowledge of the methods for testing, calibrating, and maintaining security systems and equipment, particularly whilst at sea		
Encourage security awareness and vigilance	<p>Knowledge of training, drill and exercise requirements under relevant conventions, codes and IMO circulars, including those relevant to anti-piracy and anti-armed robbery</p> <p>Knowledge of the methods for enhancing security awareness and vigilance on board</p> <p>Knowledge of the methods for assessing the effectiveness of drills and exercises</p>	Assessment of evidence obtained from approved training or examination	<p>Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended</p> <p>Communications within the ship security officer's area of responsibility are clear and understood</p>



ภาคผนวก ๖

ตารางที่ ๖-๑ มาตรฐานความรู้ความสามารถสำหรับพื้นฐานมาตรฐานการรักษาความปลอดภัย

Table A-VI/6-1

**Specification of minimum standard of competence in security awareness**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Contribute to the enhancement of maritime security through heightened awareness	<p>Basic working knowledge of maritime security terms and definitions, including elements that may relate to piracy and armed robbery</p> <p>Basic knowledge of international maritime security policy and responsibilities of Governments, companies and persons</p> <p>Basic knowledge of maritime security levels and their impact on security measures and procedures aboard ship and in port facilities</p> <p>Basic knowledge of security reporting procedures</p> <p>Basic knowledge of security-related contingency plans</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Requirements relating to enhanced maritime security are correctly identified
Recognition of security threats	<p>Basic knowledge of techniques used to circumvent security measures</p> <p>Basic knowledge enabling recognition of potential security threats, including elements that may relate to piracy and armed robbery</p> <p>Basic knowledge enabling recognition of weapons, dangerous substances and devices and awareness of the damage they can cause</p> <p>Basic knowledge in handling security-related information and security-related communications</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Maritime security threats are correctly identified

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Understanding of the need for and methods of maintaining security awareness and vigilance	Basic knowledge of training, drill and exercise requirements under relevant conventions, codes and IMO circulars, including those relevant for anti-piracy and anti-armed robbery	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Requirements relating to enhanced maritime security are correctly identified

ภาคผนวก ๖

ตารางที่ ๖-๒ มาตรฐานความรู้ความสามารถสำหรับเจ้าหน้าที่รักษาความปลอดภัยประจำเรือ

*Table A-VI/6-2*  
**Specifications of minimum standard of competence for seafarers  
 with designated security duties**

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Maintain the conditions set out in a ship security plan</p>	<p>Working knowledge of maritime security terms and definitions, including elements that may relate to piracy and armed robbery</p> <p>Knowledge of international maritime security policy and responsibilities of Governments, companies and persons, including working knowledge of elements that may relate to piracy and armed robbery</p> <p>Knowledge of maritime security levels and their impact on security measures and procedures aboard ship and in the port facilities</p> <p>Knowledge of security reporting procedures</p> <p>Knowledge of procedures and requirements for drills and exercises under relevant conventions, codes and IMO circulars, including working knowledge of those that may relate to piracy and armed robbery</p> <p>Knowledge of the procedures for conducting inspections and surveys and for the control and monitoring of security activities specified in a ship security plan</p>	<p>Assessment of evidence obtained from approved instruction or during attendance at an approved course</p>	<p>Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended</p> <p>Legislative requirements relating to security are correctly identified</p> <p>Communications within the area of responsibility are clear and understood</p>

Column 1	Column 2	Column 3	Column 4
Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Maintain the conditions set forth in a ship security plan ( <i>continued</i> )	Knowledge of security-related contingency plans and the procedures for responding to security threats or breaches of security, including provisions for maintaining critical operations of the ship/port interface, and including also working knowledge of those that may relate to piracy and armed robbery		
Recognition of security risks and threats	<p>Knowledge of security documentation, including the Declaration of Security</p> <p>Knowledge of techniques used to circumvent security measures, including those used by pirates and armed robbers</p> <p>Knowledge enabling recognition of potential security threats</p> <p>Knowledge enabling recognition of weapons, dangerous substances and devices and awareness of the damage they can cause</p> <p>Knowledge of crowd management and control techniques, where appropriate</p> <p>Knowledge in handling security-related information and security-related communications</p> <p>Knowledge of the methods for physical searches and non-intrusive inspections</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>
<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Undertake regular security inspections of the ship	<p>Knowledge of the techniques for monitoring restricted areas</p> <p>Knowledge of controlling access to the ship and to restricted areas on board ship</p> <p>Knowledge of methods for effective monitoring of deck areas and areas surrounding the ship</p> <p>Knowledge of inspection methods relating to the cargo and ship's stores</p> <p>Knowledge of methods for controlling the embarkation, disembarkation and access while on board of persons and their effects</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS Convention, as amended
Proper usage of security equipment and systems, if any	<p>General knowledge of various types of security equipment and systems, including those that could be used in case of attacks by pirates and armed robbers, including their limitations</p> <p>Knowledge of the need for testing, calibrating, and maintaining security systems and equipment, particularly whilst at sea</p>	Assessment of evidence obtained from approved instruction or during attendance at an approved course	<p>Equipment and systems operations are carried out in accordance with established equipment operating instructions and taking into account the limitations of the equipment and systems</p> <p>Procedures and actions are in accordance with the principles established by the ISPS Code and the SOLAS, 1974, as amended</p>



