CEN Workshop 10 – European Handbook for Defence Procurement

Expert Group 12: FLUID HANDLING SYSTEMS

Final Report

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1. References

- Considering CEN / WS 10 Phase I results (Expert Group EG 3), STANAG 1135 is the most important standard within the scope of interoperability and quality for fuels and lubricants.

- CEN/WS 010 N 0018: General framework paper.

2. Introduction

The European Commission requested the European Committee for Standardization to establish Workshop 10 to improve the efficiency and enhance the competitiveness of European Defence Industry. Eight Experts groups have been set up in February 2007 with the objective to extend the applicability of EHDP (European Handbook for Defence Procurement).

The EHDP has been prepared by Experts Groups reporting to CEN Workshop 10. This document is a guide designed as a tool for anyone involved in the European Defence procurement contractual negotiations.

The primary target audiences for the Handbook are:

- The staff in the Ministries of Defence (MoD) who are producing procurement specifications and invitations to tender
- The staff in Defence suppliers who are responding to those requirements

EHDP is designed to provide Defence Procurement Agencies and Defence Industries with a preferential list of selected recommended standards qualified as best practice ones to be included in armament contracts together with concise recommendations for an optimum use of those standards in such a Defence Procurement context.

These types of resulting informative data should be used in the acquisition process by MoD and in the development process by Industry such that system will be built and operated better and cheaper.

The aim of a recommendation is to develop good practices in the domain addressed by the Expert Group and to assist the final user in using recommended best practices standards in the best cost-effective way:

- Increasing the controlled use of existing standardization, a necessity to harmonise European practices used by Defence procurement stakeholders.
- The objective is to deploy a common approach through Nations Procurement agencies about an optimized utilization of standards : civil ones and military ones, the possible limitations of civilian standards with respect to military applications,… to provide a useful guide to all stakeholders involved in Defence procurement process
- Description of how to implement standards successfully in armament contracts
- The overall result will be a better use of standards in armament contracts

Recommendations are, during the drafting process, designed to allow EHDP final users to be provided with the right information for timely and quickly acquiring the best control in writing standards clauses related to the selected material, in armaments contracts.

That's why the volume of recommendations will be accordingly fully compatible with respect to EHDP vocation and purpose.

EG 12 has identified the Key Area “Fluid Handling Systems” standards used within the Nations of the European Union. Considering our large scope and the lack of experts, we decided to restrict the study to POL (Petroleum, Oil, and Lubricant) handling systems. EG 12 selected 104 Best Practice Standards. This document aims at providing recommendations on the best use of those best practice standards in armament contracts.

Those standards will be listed, presented (scope), commented as far as the reasons for their selection (reduction process) and the way of implementing them in contracts according a tailored approach (recommendation for best practices) are concerned.

Furthermore, an additional feature will focus on possible findings resulting in recommendations impacting the related standardization process to meet up identified needs.

General conclusions will sum up the main axis revealed by the investigation work carried out by experts along the recommendation drafting process.

3. Scope and presentation of selected best practice standards

- **Definition of the scope**

Considering the need for interoperability between military users, EG 12 experts limited the scope to the bulk fuel and lubricant products identified in STANAG 1135. For the handling systems, EG 12 experts considered the followings as the main criteria:

- Interface (Connectors) Interoperability
- Safety (Environment)
- Quality

The scope is:

Bulk fuels and lubricants from STANAG 1135 for interoperability between military users.

- **Presentation of best standards (Excel file)**

- Listing the references of the related selected “best practice” standards (“bp” standards);

- Describing the scope and limitations of each identified “best-practice” standard or (of each sub-group of “bp” standards related to a sub-domain of the Key Area) ; purpose, content, status, ICS classification, category, comments,… regarding those standards will be mentioned

- Describing the way to obtain them (link to the website where to download or to order them)

EG 12 experts selected 104 references listed in the Best Practice Standards list (excel file) according to the General framework paper – CEN/WS 010 N 0018.

Reference	Title	Why chosen as best practice?	How to use it?
STANAG 1065	Replenishment At Sea - Atp-16(D)/Mtp-16(D)	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs. STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 1084	Replenishment of fuel in harbour and replenishment of water in harbour and at sea	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 1310	Design criteria for replenishment aspects of new construction naval vessels	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 1357	NATO standard f-44 hose coupling	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 1414	Guidelines to ensure that contractors design and supply new equipment capable of using standardized fuels, lubricants and associated products	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 1438	Standardization of small bore liquid transfer rig by astern method	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 2946	Forward area refuelling equipment	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 2947	Technical criteria for a closed-circuit refuelling system	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
STANAG 3105	Pressure refuelling connections and defuelling for aircraft	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3109	Symbol marking of aircraft servicing and safety/hazard points	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3212	Diameters for gravity filling orifices	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3294	Aircraft fuel caps and fuel cap access covers	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3416	Methanol/water and demineralized water replenishment	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3447	Air-to-air refuelling equipment: probe-drogue interface characteristics	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3510	The provision of hydraulic power for servicing aircraft hydraulic systems	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3583	Standards of accuracy for differential pressure gauges for aviation fuel filters and filter separator vessels	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3609	Standards for maintenance of fixed aviation fuel receipt, storage and dispensing systems	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3632	Aircraft and ground support equipment electrical connections for static grounding	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3681	Criteria for pressure fuelling/defuelling of aircraft	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
STANAG 3682	Electrostatic safety connection procedures for aviation fuel handling and liquid fuel loading/unloading operations during ground transfer and aircraft fuelling/defuelling [view	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3698	Connections for checking aircraft hydraulic systems by ground appliances - threaded type	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3756	Facilities and equipment for receipt and delivery of aviation kerosene and diesel fuels	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3765	Pressure replenishment of aircraft engine oil	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3784	Technical guidance for the design and construction of aviation and ground fuel installations on NATO airfields	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3847	Helicopter in-flight refuelling (hifr) equipment	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 3887	Trial reports and design criteria for in-shelter fuelling and damage repair - aflp-3	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 3967	Design and performance requirements for aviation fuel filter separator vessels and coalescer and separator elements	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 4167	NATO pollutant discharge connection for sewage and for oily water	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 4604	Performance criteria for collapsible hose assemblies for fuel transfer	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
STANAG 4605	Tactical fuels handling equipment (tfhe) technical characteristics - aflp-7	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 7011	Automated fuel system monitoring and control equipment	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 7013	Aircraft fuelling hazard zones	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 7029	Characteristics of aircraft fuelling hoses and couplings	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
STANAG 7071	Design and performance criteria for aviation fuel additive injection equipment	NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.	Interoperability/Interface standards - Technical/performance standards
STANAG 7102	Environmental protection handling requirements for petroleum handling facilities and equipment	STANAG´s guarantee the interoperability between military users from the NATO. STANAG´s are ratificated and used by many NATO-countries.	Interoperability/Interface standards - Technical/performance standards
VG 85281-1	Hose fittings with thread - part 1: fittings with female thread, dn 65, pn up to 16	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85281-2	Hose couplings with thread; double nipple, dn 65, pn up to 16	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85282-1	Joining piece dn 150 - part 1: type b for supplying ship	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85283	Adapter with flange dn 150 and 2 threaded pipe ends dn 65	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85284	Adapter with flange and thread, dn 150, dn 65	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85286	Caps dn 65, pn 16	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85289	Hose fitting - dn 150, pn up to 16	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 85292	Elbow for fuel and oil hoselines, pn up to 10	Used by NATO countries	Interop/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
VG 85318-1	Discharge of dirty oil and oily mixtures, dn 50, pn 10; concepts, assembly	Discharge device complying with the corresponding interface of NATO ships. Indispensable for environment protection requirements	Horizontal/transversal standards (fundamental/generic/systems/method) - Technical/performance standards
VG 85318-2	Discharge of oils and oily mixtures, dn 50 - pn 10 - part 2: discharge elbows	Discharge device complying with the corresponding interface of NATO ships. Indispensable for environment protection requirements	Interop/Interface standards - Technical/performance standards
VG 85318-3	Discharge of dirty oil and oily mixtures, dn 50, pn 10; adapter with flange according to din 86285 (flange for international connection for the disposal of oily mixtures)	Discharge device complying with the corresponding interface of NATO ships. Indispensable for environment protection requirements	Interop/Interface standards - Technical/performance standards
VG 85328-1	Hose fittings with clamp units, dn 20 to 200, pn up to 25; synopsis	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Interop/Interface standards - Technical/performance standards
VG 85328-2	Hose fittings with clamp unit, dn 20 to dn 200, pn up to 25 - part 2: clamp units, bolted	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Interop/Interface standards - Technical/performance standards
VG 85605-3	Fire resistant hoses pn 10 for diesel fuels, oils, fresh- and seawater - part 3: hose nipple dimensions and clamp units	For high fire safety standards according to EN ISO 15540.	Interop/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
VG 85605-4	Fire resistant hoses pn 10 for diesel fuels, oils, fresh- and seawater - part 4: technical specification / note: applies in conjunction with vg 85605-3 (2001-09).	For high fire safety standards according to EN ISO 15540.	Technical/performance standards
VG 95920-1	Hose assemblies, hoses and hose fittings; standards and documents for pipelines and refuelling; synopsis	Necessary for unified interfaces for refuelling and other hose connections. No other alternative standard known.	Management/organization standard/conformity assessment
VG 95920-4	Hose assemblies, hoses and hose fittings; part 4: adapter - overview	Necessary for unified interfaces for refuelling and other hose connections. No other alternative standard known.	Management/organization standard/conformity assessment
VG 95922-1	Hose assemblies; production and testing specification; hose assemblies for refuelling and pipelines	Quality assurance. No other alternative standard known.	Management/organization standard/conformity assessment - Horizontal/transversal standards (fundamental/generic/systems/method)
VG 95923-1	Hoses and hose assemblies - part 1: storage	Assurance of operational readiness and of quality of stored hoses and hose assemblies. No other alternative standard known.	Management/organization standard/conformity assessment - Horizontal/transversal standards (fundamental/generic/systems/method)
VG 95923-2	Hoses and hose assemblies - part 2: cleaning	Assurance of operational readiness and of quality of cleaned hoses and hose assemblies. No other alternative standard known.	Management/organization standard/conformity assessment - Horizontal/transversal standards (fundamental/generic/systems/method)
VG 95924-1	Hoses and hose assemblies - for refuelling and pipelines - age control and preventive maintenance	Assurance of operational readiness and of quality of hoses and hose assemblies. No other alternative standard known.	Management/organization standard/conformity assessment - Horizontal/transversal standards (fundamental/generic/systems/method)
VG 95925-1	Hose assemblies - part 1: for fuelling and pipelines; summary	Assurance of operational readiness and of quality of hoses and hose assemblies. No other alternative standard known.	Management/organization standard/conformity assessment
VG 95926-1	Guide for routing and installation of hose assemblies - part 1: hose assemblies for refuelling and pipelines	Assurance of operational readiness and of quality of hoses and hose assemblies. No other alternative standard known.	Horizontal/transversal standards (fundamental/generic/systems/method) - Technical/performance standards
VG 95926-3	Guide for routing and mounting of hose assemblies; hose assemblies for flexible joints, mounting directions, principles of design	Avoidance of danger resulting from incorrect construction and incorrect installation. No other alternative standard known.	Horizontal/transversal standards (fundamental/generic/systems/method) - Technical/performance standards
VG 95927	Marking of hose assemblies and hoses; methods and colour marks		Horizontal/transversal standards (fundamental/generic/systems/method) - Technical/performance standards
VG 95950-1	Hose fittings with whitworth-pipe thread - part 1: v-hose fittings, dn 20 to dn 150, pn up to 16	Used by NATO countries	Interop/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
VG 95950-2	Hose fittings with whitworth pipe thread - part 2: m-hose fittings, dn 20 to dn 80, pn up to 16	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 95952-1	Hose fittings with couplings for tank trucks - part 1: vk-hose fittings, dn 40 to dn 80, pn up to 10	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 95952-2	Hose fittings with couplings for tank trucks - part 2: mk-hose fittings, dn 40 to dn 80, pn up to 10	Used by NATO countries	Interop/Interface standards - Technical/performance standards
VG 95953	Grooved pipe ends	Connectors according to STANAG 3756	Technical/performance standards
VG 95954	Hose fitting with grooved end configuration, dn 100 up to dn 200, pn up to 25	No other adequate standard found for this application	Interop/Interface standards - Technical/performance standards
VG 95955-1	Hoses for fueling and pipelines; pressure-hoses without helix type d, pn 16	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Technical/performance standards
VG 95955-2	Hoses for fueling and pipelines; pressure-hoses with pa helix type p, pn 16	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
VG 95955-3	Hoses for fueling and pipelines; suction and discharge-hoses with steel helix type s, pn 10	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Technical/performance standards
VG 95955-4	Hoses for fuelling and pipelines; technical specification	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Management/organization standard/conformity assessment - Technical/performance standards
VG 95955-5	Hoses for fuelling and pipelines; marking by branding	- Higher requirements than EN 1361, for example: - Limitation of torsion under test pressure - Limitation of bending force at low temperature - Lower limit of electrical resistance between the end fittings: 104 / 105 Ohm (EN 1361: 106 Ohm) - Limitation of electrical resistance through the hose wall - Higher minimum values for different mechanical rubber properties of the liner and of the cover including requirements not included at all in EN 1361 (e. g. compression set)	Horizontal/transversal standards (fundamental/generic/systems/method) - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
VG 95956	Expansion joints - rubber expansion joints - storing, mounting, supervision	Avoidance of danger resulting from incorrect mounting. No other alternative standard known.	Management/organization standard/conformity assessment - Horizontal/transversal standards (fundamental/generic/systems/method)
VG 95958	Expansion joints - rubber expansion joints - technical specification	Important for the safe operation of rubber expansion joints. No other alternative standard known.	Technical/performance standards
VG 95959	Expansion joints - bellows made of elastomers, pn 10 and pn 16	Important for the safe operation of rubber expansion joints No other alternative standard known.	Interop/Interface standards - Technical/performance standards
VG 95964-1	Cylindrical rubber expansion joints - part 1: type b, pn up to 10 and pn up to 50, dn 6 to dn 32 - design principles, dimensions	Specification of importance especially for submarines. No other alternative standard known.	Interop/Interface standards - Technical/performance standards
VG 95964-3	Cylindrical rubber expansion joints - part 3: type c and type d, pn up to 10 and pn up to 50, dn 32 to dn 200 - design principles, dimensions	Specification of importance especially for submarines. No other alternative standard known.	Interop/Interface standards - Technical/performance standards
VG 95964-4	Hose assemblies - cylindrical rubber expansion joints, pn up to 10 and pn up to 50 - part 4: expansion joints consisting of hose assemblies, technical specification	Specification of importance especially for submarines. No other alternative standard known.	Technical/performance standards
VG 95964-5	Cylindrical rubber expansion joints - part 5: type e and type f, pn up to 10 and pn up to 16, dn 32 to dn 200 - oprimesed due to sound insulation, design principles, dimensions	Specification of importance especially for submarines. No other alternative standard known.	Interop/Interface standards - Technical/performance standards
VG 95967	Oil and fuel restistant gaskets; technical specification	Avoidance of oil and fuel leakage	Technical/performance standards
VG 95967 Beiblatt 1	Oil and fuel resistant gaskets; materials	Avoidance of oil and fuel leakage	Technical/performance standards
TL 4730-0031	Coupling set for refuelling and pipeline equipment stanag 3756 / din 28450	Connectors according to STANAG 3756	Interop/Interface standards - Technical/performance standards
EN ISO 15540	Ships and marine technology - fire resistance of hose assemblies - test methods (iso 15540:1999)	Safety standard for hoses.	Horizontal/transversal standards (fundamental/generic/systems/method) - Technical/performance standards
EN 1361	Rubber hoses and hose assemblies for aviation fuel handling - specification	In accordance with STANAG 7029	Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
EN 1761	Rubber hoses and hose assemblies for fuel truck delivery - specification		Technical/performance standards
EN 14420-1	Hose fittings with clamp units - part 1: requirements, survey, designation and testing	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-2	Hose fittings with clamp units - part 2: hose side parts of hose tail	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-3	Hose fittings with clamp units - part 3: clamp units, bolted or pinned	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-4	Hose fittings with clamp units - part 4: flange connections	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-5	Hose fittings with clamp units - part 5: threaded connections	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-6	Hose fittings with clamp units - part 6: tw tank truck couplings	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-7	Hose fittings with clamp units - part 7: cam locking couplings	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14420-8	Hose fittings with clamp units - part 8: symmetrical half coupling (guillemin system)	Comprehensive standard	Interop/Interface standards - Technical/performance standards
EN 14424	Hose fittings with screwed ferrules	Completion to EN 14420	Interop/Interface standards - Technical/performance standards
DEFSTAN 02-319	Requirements for aviation fuel systems in hm ships (cat 2)		Interop/Interface standards - Technical/performance standards
DEFSTAN 02-320	Requirements for the design and installation of fuel systems for gas turbine engines and diesel engines in hm surface ships and submarines		Interop/Interface standards - Technical/performance standards
DEFSTAN 02-322	Oil and bilge water shipboard processing arrangements (cat 2)		Interop/Interface standards - Technical/performance standards
DEFSTAN 02-323	Requirements for centrifuges (cat 3)		Interop/Interface standards - Technical/performance standards
DEFSTAN 02-748	Strainers, preferred range (cat 3)		Interop/Interface standards - Technical/performance standards
DEFSTAN 22-94	Specification for the manufacture of replenishment at sea hoses		Interop/Interface standards - Technical/performance standards

Reference	Title	Why chosen as best practice?	How to use it?
DEFSTAN 02-775	Requirements for gasoline systems and stowages in hm surface ships (cat 2)		Interop/Interface standards - Technical/performance standards
DEFSTAN 02-784	Requirements for safety signs and colours		Management/organization standard/conformity assessment - Technical/performance standards
DEFSTAN 05-52 Part 2	Markings for the identification of fuels, lubricants and associated products. containers over 216.5 litres and pipelines.		Management/organization standard/conformity assessment - Technical/performance standards
DEFSTAN 66-2	Gauges,pressure dial indicating (bourdon tube type)		Technical/performance standards
DEFSTAN 91-66	The segregation, handling and quality assurance of petroleum fuels, lubricants and associated products		Management/organization standard/conformity assessment - Technical/performance standards

4. Content

- **Historical background**

CEN / WS 10 Phase I (Expert Group EG 3) works upon interoperability and quality for fuels and lubricants. It was found that STANAG 1135 is the most important standard within this scope.

After interoperability between fuels there is also a great need for interoperability within handling systems.

- **Reduction process**

Reducing the scope of this working group to the handling of Bulk Fuels and Lubricants only, allowed the Working Group to identify immediately the Top Level NATO STANAGS which were relevant. The use of NATIONAL MILITARY Standards was identified next from the European Nations represented. In some cases NATIONAL Civil Standards were then identified, specifying information beyond the Interoperability aspects of the STANAG.

The NATIONAL MILITARY Standards also reference out to European and National CIVIL Standards, through the Normative Reference list within the standards. It was decided for this reason, that there is no requirement within the Handbook to qualify all CIVIL standards further.

The use of Legislative / H&S (Health and Safety) requirements was not included, as it was agreed by the EG, that the use of Best Practice standards is not a mechanism for mandating but instead to give guidance.

- **Recommendations for best practice**

The EG 12 Best Practice Standards are highly recommended in Defence procurement (they purposely do not contain Legislative requirements).

- **Recommendation for standardization process**

- Bulk POL Handling Systems

A two way process is required to ensure that Project Managers in future have the ability to feed back to this "Live document".

- Fluid Handling Systems

EG 12 experts recommend to consider what are the needs considering fluids (water, waste, gas, blood,…)

Further collaboration between NATO-EDA-CEN is required to avoid duplication of work streams and an assurance that the contents of the Handbook will ensure :

- A buy in from other European Nations who have to date not contributed.
- The Handbook is Maintained, Reviewed on a regular Basis
- The Handbook is promoted at every opportunity to ensure that Projects are aware of its benefits and existence
- That user understand the clear distinction between what NATO's objectives are verse's CEN and the European Handbook role.

- **Main Conclusions**

- Bulk POL handling systems scope: NATO works on this subject. Most of European Nations are involved in NATO. The main conclusion for European Nations is to accompany NATO on this subject.

- Fluid handling systems scope: the main conclusion is to define the term fluid and to extend accordingly the standardization process (by other dedicated experts).

- **What is missing ?**

The main concern within this Working Group area was the difficulty in trying to enrol Technical experts with a commitment to contributing to the Area of Fluid Handling and finding

representation from other European Nations (Only representation from Germany, France and UK). This was the reasoning behind limiting the scope to fuel Handling.

Experts were required to identify the agenda because the subject matter was so generic, unfortunately the experts generally have such specialized knowledge, that it became difficult to identify who should attend.

There was considerable confusion about the merits of producing a "Handbook" when all the information was available through the NATO Forum and that this was a duplication of resources. The statement to potential SME's was:

- CEN WS 10's remit is to look for "best practice" standards from standards that already exist and to provide recommendations on how/where to apply those standards. In addition, they should also identify any standards "gaps" so that nations, NATO etc. can develop standards to meet those gaps e.g. by utilising the European Defence Standards Information System (EDSIS) which allows nation to post their standardization projects and seek international collaboration in the development of defence standards which will be recognised as "best practice".

- NATO's prime aim is to achieve interoperability and one way to do that is by "adopting" or developing standards and providing recognition through the production and ratification of STANAGs.

- To some extent, these 2 groups complement each other because NATO could recognise standards that are listed in the European Handbook for Defence Procurement which is the end product of the CEN WS 10.

- To ensure there is no duplication of effort which there is not at this time, the NATO NSA who issue NATO standards/STANAGS are resident members of CEN WS10.

- **Which new standardization actions it would be necessary to initiate in FHS arena ?**

- A new title for a smaller part of the Area of Fluid Handling Systems which should be standardized.
- More and new experts.

- **Where are the possible gaps identified by experts during their selection and recommendation drafting expertise work ?**

- The language: the standards have to be written in English.