

MUSTER

New Ships

by **Ship&Offshore**

www.new-ships.net

//

A large new container ship order for 12,000-TEU vessels is set to be placed in China after a long period of low boxship contracts. But the U.S./China trade war is depressing the overall volumes of world shipbuilding orders, which is especially reflected in sluggish South Korean contracts so far this year. But South Korean orders were more active than in past weeks, with orders for liquefied natural gas (LNG) carriers placed and negotiations about more orders reported. Warship orders continue to hold market attention, with reports of a big Middle Eastern corvette contract won by France.

//

PROSPECTS AND ORDERS

EUROPE

FINLAND

Ferry retrofit project in Finland

Finnish yard Suomenlahden Telakka Oy has an order from Finnish ferry operator Finferries to convert a ferry from diesel-powered to diesel-electric propulsion. Finnish company Danfoss Editron has been commissioned by the yard to provide a diesel-electrical drivetrain system for the ferry, named Prosvik 1. The project aims to improve the ship's overall efficiency and reduce its emissions. Built in 1983, the 50m-long vessel can carry approximately 140 passengers and 30 vehicles on sailings in Finnish domestic waters. The ship will arrive at the yard in late August and return to operation by late November this year.

CONTACT

Contact: Suomenlahden Telakka Oy, Mr Jukka Jaatinen, Managing Director, Station 12 07910 Valko, Finland. Tel. ++358 400 409 120. Email etunimi.sukunimi@st.fi Web <http://suomenlahdentelakka.fi/>

FRANCE **Big naval vessel order said placed in France**

French yard Naval Group has an order worth about 750 million euros for two corvettes placed by the United Arab Emirates, reports in Paris say. Talks about the Gowind-class vessels have been underway for 17 months. The contract would include options for two repeat vessels. The UAE's 2,700-tonne displacement corvettes will be equipped with Naval Group's SETIS combat management system, Exocet missiles and Raytheon's Evolved Seasparrow missile. The order has not yet been confirmed. During a visit to the UAE in November 2017 by French President Emmanuel Macron, the two countries had officially announced that the UAE had decided in principle to order the Gowind corvette. In a joint statement in 2017, it was specified that the ships will be built by Naval Group, in partnership with Abu Dhabi Ship Building Company (ADSB). The contract represents significant expansion by Naval Group into the UAE market. The Gowind corvettes are powered by engines made by Germany's MTU. This means the German government may have to approve the order. The German government is restricting licenses to export military supplies to Saudi Arabia and the UAE over their involvement in the war in Yemen and the resulting humanitarian crisis there. Reports say Naval Group plans to transfer technologies and know-how to UAE institutions and to the UAE shipyard industry, with the aim of developing UAE industrial capabilities as part of the order.

CONTACT

Contact: Abu Dhabi Ship Building PJSC, PO Box 8922, Mussafah Industrial Area, Abu Dhabi, United Arab Emirates. Tel. ++971 2 502 80 00. Fax ++971 2 502 8065. Web www.adsb.ae/contact-us/contact/ Contact: Naval Group, 40-42, rue du Docteur Finlay, 75732 Paris cedex 15, France. Tel. ++33 1 40 59 50 00. Web www.naval-group.com/en/

NETHERLANDS **Initial FPSO deal agreed**

Dutch offshore contractor SBM Offshore said it has signed a letter of intent with a consortium around Brazilian energy group Petrobras to provide a newbuilding floating production, storage and offloading vessel (FPSO). SBM Offshore will design and construct the FPSO to be named Mero 2 using its Fast4Ward concept. This concept involves using SBM's new build, multi-purpose hull combined with several standardised topsides modules. This means that two out of three Fast4WardTM hulls currently under construction have now formally been allocated to projects. The FPSO for Petrobras will be designed to produce 180,000 barrels of oil per day. The FPSO will also have a water injection capacity of 250,000 barrels per day, associated gas treatment capacity of 12 million standard cu.m per day and a minimum storage capacity of 1.4 million barrels of crude oil. The vessel will be operated under a 22.5-years lease at the Mero field in the Santos Basin offshore Brazil, 180 kilometres offshore Rio de Janeiro.

CONTACT

Contact: SBM Offshore Amsterdam B.V., Evert van de Beekstraat 1-77, 1118 CL Amsterdam,

The Netherlands. Tel. ++31 20 23 63 000. Web www.sbmoffshore.com/

NORWAY **New customer for platform supply vessel**

A new customer has been found for a contract for a platform supply vessel which was previously cancelled, said Norwegian yard Havyard Ship Technology. Havyard had said in January 2017 that the original shipbuilding contract had been cancelled for the vessel, which has the hull number 126. The ship had originally been ordered by an Icelandic customer. Havyard said it “has now entered into a new shipbuilding contract with a foreign customer for the completion and delivery of the vessel, which will basically constitute a completion of the original project with some minor modifications.” Delivery is planned to take place in April 2020. “Net profit for the project is calculated to be low, but the contract will provide an immediate cash liquidity effect for the yard,” Havyard said.

CONTACT

Contact: Havyard Group AS, Mr Dag Alvik, The Chief Procurement Officer, P.O. Box 215, 6099 Fosnavag, Norway. Tel. ++47 916 30 128. Email dag.alvik@havyard.com Web www.havyard.com/

New crew transfer vessel ordered

Swedish offshore contractor Northern Offshore Services has ordered a new type of crew transfer vessel with hybrid propulsion from Norwegian yard Grovfjord Mek. Verksted. To be named Energizer, it is scheduled to be delivered in late 2020. The new design is called the E-class and has the possibility to run completely with zero CO₂emissions. The E-class will be the largest vessel in the Northern Offshore fleet with its 34m length. The vessel is a complete inhouse design and has been developed with the focus on the environment and green energy. New concepts in the propulsion plant allow lower propeller speed and larger diameter of the propeller gives the E-class high efficiency propulsion. This results in lower fuel consumption during transit and higher bollard push during docking of up to 30 tonnes, which is one of the highest in the market today, Northern Offshore said. The vessel has batteries installed that can be recharged from shore which will contribute to greener operations. The vessel is also prepared for charging the batteries from wind farms, so using clean renewable energy directly from production to consumer. The CTV can also operate only on the battery mode, without any CO₂emissions.

CONTACT

Contact: Grovfjord Mek. Verksted, Mr Bard Meek-Hansen, The General Manager, Astafjordveien 566, 9446 Grovfjord, Norway. Tel. ++47 770 89 600. Mobil + 47 930 59 831. Fax ++47 770 89 620. Email firmapost@gmv.no Web Security Check Required

Wellboat under construction in Norway

Norwegian yard Aas Mekaniske Verksted is building a wellboat vessel for transporting live fish from fish farms for customer Solvtrans. The newbuilding number 204 from Aas Mekaniske Verksted will have a storage capacity of 2,500cu.m, equivalent to 375 tonnes of live fish. The new vessel will be 69.69m long and 17.80m wide. Delivery is scheduled for October 2020.

CONTACT

Contact: Aas Mekaniske Verksted, Buktavegen 50, 6390 Vestnes, Norway. Tel. ++47 71 18 98 00. Email office@aasmek.no Web www.aasmek.no/kontakt/

RUSSIA **Russia designs new types of green oil rigs**

Russian marine architects have completed designs for new types of environmentally friendly submersible drilling rigs and their construction will begin soon. So said United Shipbuilding Corporation (USC) President Mr Aleksey Rakhmanov at the St. Petersburg International Economic Forum. "Our major clients, Gazpromneft and other Russian oil and gas companies, have green policies and regard themselves to be leaders in environmental protection. So they have requirements for submersible drilling rigs, which we have finished designing and will start building in the near future. We will also provide monitoring systems plus robotic, and energy complexes are obviously based on the zero-emission principles." He described a drilling module, which was built in the Caspian Sea two years ago, as an example of eco-friendly oil production facility. "It was the first zero-emission module, which means the environmental protection element is not new to us, and we are hopeful to set the pace or a trend for arranging oil production facilities, including those in the Arctic," he said. Western sanctions on Russia, which restricted the supply of high-tech oil and gas production equipment to the country several years ago, encouraged relevant domestic research, Rakhmanov said. "We do not feel as if we have lost anything from sanctions. Quite the opposite, we have gained a lot. Projects, which were shelved for a long time, were put to use and adjusted to the new technological system," he said.

CONTACT

Contact: Mr Aleksey Rakhmanov, The President, Objedinennaye Sudostroitelnaya Korporatsiya – OSK (United Shipbuilding Corporation - USC), Office in St Petersburg: 90 Marata Street, St Petersburg, 191119, Russia. Tel. ++7 812 49 41 742. Fax ++7 812 49 41 743. Email info@oaosk.ru Office in Moscow: 11 Sadovaya-Kudrinskaya Street, Moscow, 123242, Russia. Tel. ++7 495 61 733 00. Fax ++7 495 61 734 00. Email info@oaosk.ru Web www.oaosk.ru

Finance for Russian tanker order agreed

Russian shipping group Sovcomflot said it has signed an agreement under which Russia's VEB Leasing will finance the construction of three LNG-fuelled medium-range tankers. Sovcomflot had initially placed the order for the three tankers of 51,000dwt with Russia's Zvezda Shipyard in December 2018. The delivery of the vessels is scheduled for 2022 to 2023. They will transport petroleum products and gas condensate, operating under 20-year time charter agreements with Russian energy company Novatek. The vessels will have an ice class 1B classification, enabling them to provide safe and reliable year-round transport in difficult ice conditions, such as in the northern sections of the Baltic Sea. The vessels' technical specifications have been designed to meet the new international regulations on emissions which come into force in 2020. Sovcomflot already successfully operates six new-generation aframax tankers which are powered by LNG fuel. Five more LNG-powered vessels have been ordered by Sovcomflot from the Zvezda shipyard and will be built over the next few years.

CONTACT

Contact: Mr S.I. Tseluiko, SK Zvezda (Shipbuilding Complex "Zvezda", 1 Lebedeva Street,

Bolshoy Kamen, Primorsky Kray, 692801, Russia. Tel. ++7 42 335 411 75. Email sskzvezda@sskzvezda.ru Web www.sskzvezda.ru

SPAIN Large superyacht ordered

A contract for a 111m-long superyacht has been placed with Spanish yard Freire. It will be among the largest superyachts ever built in Spain. The ship, of Norwegian design, will have seven decks and aluminium superstructure.

CONTACT

Contact: Freire Shipyard Beiramar 18, 36208 Vigo (Pontevedra), Spain. Purchasing Department Tel. ++34 986 23 30 00. Email compras@freireshipyard.com Web www.freireshipyard.com/

UNITED KINGDOM Fishing vessel launched

British yard Harris&Garrod has launched a fishing vessel of about 10m length. The Grimsby-based yard launched the vessel using a new 17m high, 200-tonne hoist/lifting system.

CONTACT

Contact: Harris and Garrod, Web www.harrisandgarrod.co.uk/

ASIA

CHINA China set for large container ship deal

A letter of intent for up to ten container ships of 12,000 TEU has been agreed by China's Yangzijiang Shipbuilding Group with customer Mediterranean Shipping Com-



Get the
news of the
week with the
Ship&Offshore
Newsletter!

Test now!

[www.shipandoffshore.net/
registration](http://www.shipandoffshore.net/registration)

pany, brokers say. The order is likely to be a mixture of seven firm orders and three options for repeats. The order would be worth US\$910 million if all options are confirmed.

CONTACT

Contact: Jiangsu Yangzijiang Shipbuilding Industry Group, Jingjiang City, Jiangsu Province, Jiangyin - Jingjiang Industrial Park, 214532 China. Tel. ++86 523 84 66 00 22. Fax ++86 523 84 66 30 00. Email yzjship@yzjship.com Web www.yzjship.com/en/

Car carriers ordered by Chinese customer

Brokers say two car carriers for 3,800 vehicles have been ordered from Chinese yard China Merchants Heavy Industry. Customer is Chinese transport company CSC Roro Logistics, they said. The vessels will be delivered in 2021.

CONTACT

Contact: China Merchants Heavy Industry, No.1045 Mawan Avenue, Qianhai Road, Nanshan District, Shenzhen, Guangdong, 518054 China. Tel. ++86 755 26 81 25 30. Fax. ++86 755 26 85 16 97. Email business@cmhk.com Web www.cmhicom.com

More assault ships for the Chinese navy

The series of amphibious assault ships for the Chinese navy being built by Hudong-Zhonghua shipyard is larger than previously thought. The eighth Type-071 Yuzhao-class amphibious assault ship on order for China's navy was launched by Hudong-Zhonghua in Shanghai on 6 June. Construction of the seventh of these 20,000-tonne landing platform dock (LPD) vessels began in April 2018. Reports say another hull is being constructed in the same dock as the LPDs, and it seems certain that this will be the Chinese navy's first Type 075 helicopter assault ship.

CONTACT

Contact: Hudong-Zhonghua Shipbuilding (Group) Co., 2851 pudong dadao Shanghai 200129, China. Tel. ++86 21 58 71 32 22. Fax ++86 21 587 12 603. Email bmd@hz-shipgroup.com Web www.hz-shipgroup.com/

JAPAN Tanker order placed in Japan

Brokers say Japanese shipyard Sumitomo Heavy Industries has an order for one more oil tanker of 112,000dwt from Valles Steamship, a company with offices in Canada and Hong Kong. A previous order for a tanker of this size had been placed with the yard in February 2019.

CONTACT

Contact: Sumitomo Heavy Industries Web www.shi.co.jp/english/contact/index.html

SOUTH KOREA Major order for LNG carriers

A US\$381 million order to build two liquefied natural gas (LNG) carriers has been won by South Korean yard Samsung Heavy Industries. Samsung Heavy said the order was placed by an unnamed Bermuda-based customer for delivery by June 2022. Samsung gave no more details in a statement to the Korean stock exchange, but brokers said the shipping company Flex LNG, owned by Norwegian shipowner John Fredriksen, is believed to be the customer.

CONTACT

Contact: Samsung Heavy Industries, Web www.samsungshi.com/Eng/etc/contact.aspx

Greek order for LNG carrier

An order to build a liquefied natural gas (LNG) carrier of 174,000cu.m for a Greek customer has been won by South Korean yard Daewoo Shipbuilding & Marine Engineering and talks about more orders are underway. Under the deal with Maran Gas Maritime, part of Greece's Angelicoussis Shipping Group, Daewoo Shipbuilding will deliver the vessel by the first half of 2022, the shipbuilder said in a statement. The yard did not provide the value of the contract. But brokers said the order was worth about US\$186.5 million. Daewoo said five of the six LNG shipbuilding orders it has received this year were from MGM, adding that the two sides are currently in talks on additional LNG carrier orders.

CONTACT

Contact: Daewoo Shipbuilding & Marine Engineering, 125, Namdaemun-ro, Jung-gu, Seoul, South Korea. Tel. ++82 2 21 29 01 14. Web www.dsme.co.kr/

Greek tanker order

A contract for two 158,000dwt oil tankers has been placed with South Korean yard Hyundai Heavy Industries by Greek customer Avin International, brokers say. They will be delivered in 2021. The Suezmax, Tier II vessels, will cost US\$64 million per ship.

CONTACT

Contact: Hyundai Heavy Industries Co Ltd, 1 Jeonha dong Dong gu, Ulsan, 682 792 South Korea. Tel. ++82 52 202 21 14. Email hhiopr@hhi.co.kr Web Welcome to Hyundai Heavy Industries

Patrol vessels ordered

Four patrol vessels have been ordered by the South Korean government from Korean yard Kangnam Corporation. They will be delivered by 2020.

CONTACT

Contact: Kangnam Corporation, #71, Gupyeong-Ro, 16 Beon-Gil, Saha-Gu, Busan 49454, South Korea. Tel. ++82 51 260 61 97. Web www.kangnamship.co.kr/

NORTH AMERICA

UNITED STATES

New ferry ordered for Great Lakes

A US\$4 million order for a passenger ferry to operate on the U.S. Great Lakes has been placed by Mackinac Island Ferry with U.S. yard Moran Iron Works. The 28m-long vessel will be used for sailings to Mackinac Island, which is located in Lake Huron between Michigan's Upper and Lower Peninsulas. It is scheduled to be delivered in summer 2020 and will be 60 tonnes. Developed by marine architects SeaCraft Design, it will have four hydrojets. The new 210-passenger vessel will be wheelchair accessible and have a large aft deck for luggage and bicycles. It will also include improved air conditioning and heating capabilities to keep passengers comfortable in all weather. Construction will require some 13,000 man hours over the next several months.

CONTACT

Contact: Moran Iron Works, P.O. Box 732, 11739 M-68/33 Onaway, Michigan 49765, United States. Tel. ++1 989 733 20 11. Web <http://moraniron.com/>

INSIDE REPORT

U.S./China trade conflict depresses shipbuilding orders

Shipbuilding orders are depressed because of the continued U.S.-China trade dispute and South Korean yards are especially suffering, analysts say. The low level of new orders means some South Korean yards may not meet their order targets in 2019. Clarkson Research Services said global shipbuilding orders in the first four months of 2019 totalled 7.69 million compensated gross tonnes (CGTs), a 36.8% drop compared with the same period in 2018. In April 2019 alone, global shipbuilding orders totalled 1.21 million CGTs, which was down by more than 50% from 2.88 million CGTs in March. Some analysts are now reducing their 2019 shipbuilding order forecasts. Hanwha Investment & Securities said it has cut its estimate of global shipbuilding orders in 2019 from 41 million CGTs to 28 million CGTs. Clarkson also cut its 2019 order forecast to 30.4 million CGTs in March, down from its earlier projection of 34.44 million CGTs at the beginning of this year. South Korea's three major shipbuilders - Hyundai Heavy Industries, Samsung Heavy Industries and Daewoo Shipbuilding & Marine Engineering – together won a total US\$7.53 billion worth of orders in 2019 up to the beginning of June. This was only 23.5% of their annual order target of US\$32 billion. The largest yard Hyundai Heavy, including its subsidiaries Hyundai Samho Heavy Industries and Hyundai Mipo Dockyard, has so far in 2019 won US\$2.5 billion worth of orders. This is only 15.7% of Hyundai Heavy's 2019 full year target of \$15.9 billion. Samsung Heavy won US\$2.53 billion worth of orders, just 32.4% of its annual target, while Daewoo Shipbuilding won US\$2.5 billion worth of orders, or 29.8% of its annual target. Industry observers said that it is unlikely that Korean shipbuilders can increase the speed of new orders won as trade disputes, especially the U.S./China trade war, are depressing cargo volumes and making future ocean freight volumes difficult to forecast. "Since the trade war between the United States and China appears to be going longer than expected, global shipbuilding orders are declining," said one analyst "Even if the two sides strike a deal this month, it is not likely that global shipbuilding orders will quickly surge." South Korean shipyards are also struggling to get ahead of their Chinese rivals. While Chinese shipbuilders rely on making generally simpler vessels, such as container ships, tankers and bulk carriers, South Korean shipyards have been focusing on building high-value ships such as liquefied natural gas (LNG) carriers. South Korean shipbuilders originally expected orders for some 100 LNG carriers would be placed this year on the back of gas development projects from Qatar, Mozambique and Russia. However, with rising concerns over global economy uncertainties, industry observers are also cutting forecasts for likely LNG vessel orders. Last year, Clarkson expected that 69 LNG shipbuilding orders would be placed in 2019, but that forecast has now declined to 55 carriers.

Korean yards lead world shipbuilding orders in May

South Korean yards won most shipbuilding orders placed in May 2019, moving ahead of

yards in China. In May, South Korean yards won shipbuilding orders totalling 640,000 GCTs for 16 large merchant ships, winning 60% of orders placed worldwide, said Britain's Clarkson Research Services. Chinese shipbuilders won 270,000 CGTs in orders for eight vessels, accounting for 26% of the global orders, the data showed. Japan came in third with 60,000 CGTs for three ships. In the first five months of this year, South Korean shipbuilders won orders totalling 2.83 million CGTs for 63 vessels, with a 30% market share. China held the lead with 4.06 million CGTs for 166 ships, with a 43% share, the data showed. In terms of order backlog, China also came in first with 29.47 million CGTs for a 37% share, followed by South Korea with 21.12 million CGTs, or 26%, and Japan with 14.09 million CGTs, or 18%, according to Clarkson.

New project for a bulk carrier design

A joint development project to modernise the Crown Crown 63.5k ultramax bulk carrier design has been agreed between China's SUMEC Marine Company and classification society DNV GL. The agreement was signed at the Nor-Shipping trade fair in Oslo and involves SUMEC's yard New Dayang Shipbuilding. The project will include the application of the new harmonised common structural rules (HCSR) to the design, as well as a focus on improving the energy efficiency of the design, particularly in the ship board machinery and electrical systems. The project also includes a more general evaluation of different propulsion systems for bulk carrier designs in general, in terms of future environmental requirements that can impact investment and operating costs. "The Crown 63.5k Ultramax design has been very popular and successful with over 100 vessels built to date," said Mr Xu Gang, General Manager of SUMEC Marine. New environmental regulations will put pressure on many owners to improve the performance of their vessels, while maintaining compliance to safety standards, and the project will aim to meet these challenges, said DNV GL.

Cooperation to develop environmentally friendly bulk carrier

Japan's Oshima Shipbuilding and classification society DNV GL have signed a long-term strategic cooperation to conduct research and development together on new bulk carrier designs. The first design to result from the cooperation, called the Oshima Ultramax 2030 aims to achieve a leading to a 50% reduction in the energy efficiency design index, which measures CO₂ emissions from cargo ships. The new Oshima Ultramax 2030 design maximises operational performance while minimising exhaust gas emissions by utilising LNG as fuel, by using an improved hull shape, using a sail to generate extra propulsion, as well as solar panels and a battery to cover energy needs during waiting times and port operations.

More research planned by Hyundai/Daewoo yard

More research and development is planned by the new shipyard to be formed after the merger of Hyundai Heavy Industries and Daewoo Shipbuilding. The new shipyard formed after the merger, Korea Shipbuilding & Offshore Engineering (KSOE), will hire more research and development personnel to achieve growth in high-value orders. So said KSOE chief executive officer Mr Kwon Oh-gap in an email to the yard's employees. Currently, KSOE is acting as a holding company for Hyundai Heavy Industries,

Hyundai Mipo Dockyard and Hyundai Samho Heavy Industries. But Daewoo Shipbuilding & Marine Engineering will officially become its new subsidiary once competition regulators approve of the takeover. “Shipbuilding has been a labour-intensive industry, but our company will transform the industry to be more dependent on new technologies,” Kwon said. “With fast followers like Chinese competitors growing based on cheap labour and more companies from resource-abundant countries like Russia and Saudi Arabia preparing to start shipbuilding businesses, we need innovation to continue leading the market.” Kwon said he plans to gradually hire more employees at a new research and development centre to be built in Pangyo, Gyeonggi, by 2021. He said the company will fully support a research and development team that could number up to 5,000 employees. Some of the new technologies Kwon said will be crucial for the Korean shipbuilding industry to survive in the future include developing environmentally friendly ships and smart ships. Also as cars get smarter with autonomous driving technologies and wireless internet connectivity, shipbuilders are trying to make use of automobile technology to make their ships capable of self-monitoring and finding sea routes on their own. Kwon also shared his ambition to make all of KSOE’s subsidiaries prosper under its leadership.

Ulstein introduces the X-Bow for RoPax ships

Norwegian shipbuilder Ulstein has developed a range of RoPax vessels using its X-Bow concept. The X-Bow is an inverted bow whose farthest forward point is not at the top. It was originally developed for offshore support vessels. Many RoRo passenger vessels operate in harsh areas, for which the X-Bow was originally designed, Ulstein said. An X-Bow vessel at the same speed and weather conditions will use less power than a conventional bow vessel. The concept aims to achieve improved seakeeping, and reduced speed loss and fuel consumption, and so reduced environmental pollution.

New Ships is published weekly by DVV Media Group GmbH
Address: Heidenkampsweg 73-79, D-20097 Hamburg/P.O. Box 105605, D-20038 Hamburg, Germany.
Managing Director: Martin Weber; Publishing Director: Manuel Bosch; Editor-in-Chief (responsible):
Dr. Silke Sadowski, Tel +49 40 23714-143, Fax +49 40 23714-154, e-mail silke.sadowski@dvvmedia.com;
Advertising: Florian Visser (Advertising Director); Subscription/Distribution: Markus Kukuk (Director Sales +
Marketing); Additional digital subscriptions: lizenzen@dvvmedia.com; Readers’ and Subscribers’ Service:
Tel +49 40 23714-260, Fax +49 40 23714-243. Annual subscription rates: Email version EUR 623 (Germany
plus 19 % VAT). Cancellation is possible at the end of a billing period (12 months) with a notice of six weeks.
Internet: new-ships.net VAT ID. No. DE 811 230 424.

This newsletter and its articles are for personal use only. The publication, articles and illustrations are protected by copyright. Any form of reproduction such as reprinting, copying, use in electronic data bases, on the internet, by intranet or any other electronic storage method is forbidden except by permission. Copyright DVV Media Group.