STRONG PARTNERS. TOUGH TRUCKS.

Hyster Big Trucks

2011 Range Overview

Camiones de Gran Tonelaje de Hyster
Descripción general de la gama

Contents

Hyster Big Trucks

Hyster Big Trucks have been designed to make light work of the heaviest loads and the toughest working conditions.

The range of high capacity forklift trucks and dedicated container handlers represent market leading solutions for the handling of materials across a wide range of heavy industries, offering a range of products with handling capacities from 8 to 48 tonnes.

The outstanding capability of these machines is thanks to Hyster's unique experience in this market of over 50 years, providing application focused solutions to customers worldwide.

Hyster Big Trucks are supplied through a global network of experienced distribution partners, providing dedicated local service and support.

Product Overview - Industrial Forklift Trucks

Meeting the Demands of Heavy Load Handling in Tough Environments

Designed for outstanding performance and productivity in the toughest of environments, the Hyster range of high capacity forklift trucks is available with lifting capacities from 8 up to 48 tonnes.

A wide range of capacities, engine power outputs, wheelbases, masts, attachments and optional features is on offer, enabling customers to select the optimum solution for an extensive range of industrial application requirements. The trucks can be tailor made to the needs of any demanding and intensive operating environment.

The high-specification packages feature a unique blend of high productivity, fast handling, reliable proven components, low cost of ownership, fuel efficiency and outstanding driver comfort which deliver an excellent return on investment.

8-16t: H8-16XM

- Excellent all-round visibility thanks to modern cab design and sloping counterweight
- Powerful, clean-running Diesel industrial engine
- Engine and transmission protection systems as well as oil-immersed brakes are standard
- Vista Cab offers industry-leading driver comfort, and tilts sideways for easy service access
- **Key Applications: Transport & Logistics, Stevedoring, Building Materials, Concrete, Wood & Forest Products**

16-18t: H16-18XM(S)-12

- Heavy-duty mast and frame designed to meet the dependability requirements of the toughest applications
- Short wheelbase models from 3.5m long offer the most compact solution available in the market for applications where operating space is restricted
- Powerful, modern, clean-running Diesel engine with auto-shift transmission features engine and transmission protection systems as well as oil-immersed brakes
- Vista Cab offers excellent driver comfort and visibility and tilts sideways for easy service access
- **Key Applications: Steel - Coil Handling / Slabs, Aluminium, Concrete**

25-32t: H25-32XMS-9 / H25-32XM-12

- Modern mast design offers excellent visibility and quick-disconnect carriage delivers application flexibility with fast attachment changes
- Vista Cab offers excellent driver comfort, and visibility and tilts sideways for easy service access
- Ultra compact, short wheelbase models with lengths from 3.655m are ideal for applications where operating space is restricted
- Powerful, modern, clean-running Diesel engine with auto-shift transmission features engine and transmission protection systems as well as oil-immersed brakes
- **Key Applications: Steel - Coil Handling / Slabs, Aluminium, Concrete, Timber & Forest Products, Stevedoring**

36-48t: H36-48XM(S)-12

- Short wheelbase models with lengths starting at only 5.38m are ideal for applications where operating space is restricted
- Vista Cab offers excellent driver comfort, and visibility and tilts sideways for easy service access
- Sturdy mast and frame construction, designed for the most demanding operating environments
- Powerful, modern, clean-running Diesel engine with auto-shift transmission features engine and transmission protection systems as well as oil-immersed brakes
- **Key Applications: Steel, Quarrying / Mining**

Product Overview - Container Handlers & Reachstackers for Ports & Terminals Solutions

The Right Choice for your Storage Needs

Empty Container Handlers

Hyster offers an extensive range of Empty Container Handling solutions for both high density (up to 8-high) and low density (3/4-high) empty container storage.

3/4-High Container Handler: H10-12XM-12EC

- Designed for handling single containers only in lower density applications
- Strong frame and mast design for excellent stability and durability
- Engine and transmission protection systems as well as oil-immersed brakes are standard
- Vista Cab offers excellent driver comfort and all-round visibility

5-8 High Container Handler: H16-22XM-12EC

- Designed for handling single and double containers, up to 8-high (2 on 6, 8’6” containers)
- Rear-mounted Vista Cab delivers excellent comfort and maximises visibility of the container during handling operations
- Strong frame and mast design ensure excellent stability and durability during stacking operations
- A high-performance powertrain, (featuring engine and transmission protection systems as well as oil-immersed brakes as standard), together with class leading lifting speeds, deliver optimum productivity

Dedicated Laden Container Handlers: H28-32XM-16CH / H40-50XM-6CH

First Row Container Stackers, for stacking laden containers 3, 4 & 5 high are able to perform container shunting operations at exceptional speeds. These trucks have been purposely developed to deliver these high 'box-rates' in order to offer an alternative cost-effective solution to customers, when 2nd / 3rd row storage is not required.

- First Row Container Stackers, designed for stacking ISO 20' to 40' containers 3, 4 & 5 high
- Powerful, modern, drivetrain features a clean-running Diesel engine, 4-speed auto-shift transmission, oil-immersed brakes and engine protection system
- Vista Cab offers excellent driver comfort and visibility of the container during handling operations and tilts sideways for easy service access. (Mounted at the rear on the models based on 36-48t forklift)
- Dedicated spreader for maximum load carrying capability. (Trucks for the Americas market feature a gantry mounted spreader)

ReachStackers

The Hyster ReachStacker offers more flexibility, and is available in both container handling (CH) and intermodal handling (IH) versions for high density container stacking applications up to 6-high (8’ 6”) and 3-rows deep. This machine has been designed to achieve maximum space utilisation on container terminals, thanks to outstanding manoeuvrability, superior handling speeds and unrestricted stacking capabilities.

Container Handling

- Class leading lifting speeds for maximum productivity
- Hyster Container Spreader for handling 20’- 40’ ISO Containers
- Designed to stack up to 6-high 8’6” containers in first row
- Sliding Vista Cab for excellent comfort and all-round visibility
- High-performance power train, with built in engine protection system

Intermodal Handling

- Class leading lifting speeds for maximum productivity
- Hyster Intermodal Spreader, for handling 20’- 40’ ISO Containers, and ‘Swap-bodies’ or Trailers
- Features Powered Pile Slope function (hydraulically powered sideways articulation of spreader)
- Full-sliding Vista Cab for excellent all-round visibility in varying operating conditions

Emissions Regulations are Driving Change

From January 2011, the largest trucks in the Hyster range are affected by new emissions regulations, which will be followed in 2012 by similar regulations on the 8-16t series trucks. Further emissions regulations will be introduced in in 2014.

NOTE: These regulations apply to trucks operating in EU & North America market areas only and Tier 3 / Stage IIIA compliant Hyster equipment remains available for other markets.

Throughout 2011, customers in the EU & North America will still able to purchase Tier 3 / Stage IIIA equipment, while stocks are available.

2011 EPA Tier 4 Interim & EU Stage IIIB Emissions

Tier 4 Interim is the U.S. Environmental Protection Agency (EPA) emissions regulations for off-highway diesel engines in North America.

Stage IIIB is the equivalent emissions regulations for the European Union (EU) member states.

In terms of effectivity dates and emissions levels, the EPA and EU are closely aligned.

Meeting the New Emissions Requirements

The regulations commence in January 2011 across the 174 to 751 hp (130-560kW) power category, requiring diesel engines to reduce Particulate Matter (PM) exhaust emissions by 90% and Oxides of Nitrogen (NOx) exhaust emissions by 45% compared with the current Tier 3 and Stage IIIA emissions standards.

The emissions standards for this power category are:

2.0g/kW-hr NOx and 0.02 g/kW-hr PM*

The new regulations demand new levels of system integration in order to achieve very low emissions while improving performance. Cummins engines used in the Hyster range of Big Trucks will meet the 2011 low emissions standards with an integrated Cummins Particulate Filter exhaust after-treatment system and a cooled exhaust gas recirculation (EGR) system incorporated into the engines.

*NOx are a regulated diesel emission and a collective term for gaseous emissions composed of nitrogen and oxygen. PM is a regulated diesel emission composed primarily of carbon soot and other combustion by-products.

Looking Ahead – Future Regulations

Beginning in 2014, EPA Tier 4 Final and EU Stage IV will require another major emissions reduction for the industry. Off-highway diesel engines from 174 to 751 hp (130-560kW) must reduce NOx emissions by a further 45% compared to the 2011 level. By 2014, both NOx and PM exhaust emissions will be reduced by 90% compared with current Tier 3 and Stage IIIA levels and will be 'near zero' emissions levels.

For engines within the 75hp to 173hp (56 – 129 kW) power category, Tier 4 Interim and Stage IIIB regulations will commence in January 2012. The Tier 4 Final and Stage IV regulations will be applied in January 2015. Emissions levels are less severe for this power category, enabling more simplified after-treatment.

What do these changes mean to Hyster and its Customers?

Hyster Big Trucks are already compliant. By working with engine partner Cummins, Hyster has developed market leading solutions and now leads the industry with Big Trucks that meet the requirements of the new regulations.

About Cummins

Cummins Inc. is the world's largest designer and manufacturer of diesel engines and related technologies, (including fuel systems, controls, air handling, filtration & emission solutions and electrical power generation systems). The company distributes engines into key markets such as on-highway vehicles, industrial equipment, and power generation.

Cummins serves customers in approximately 190 countries and territories through a network of more than 500 company-owned and independent distributor locations and approximately 5,200 dealer locations.

Fuel Efficiency

The Cummins Tier 4 Interim / Stage IIIB engines have demonstrated improved fuel efficiency compared to Tier 3 / Stage IIIA.

Depending on rating, duty cycle and application, Hyster trucks with Tier 4 Interim / Stage IIIB compliant engines can achieve in the region of 15% better fuel consumption.

In addition to the Cummins technologies applied to Hyster Big Trucks to reduce fuel consumption, the use of performance optimisation techniques, such as cooling on demand, auto-speed hydraulics, rpm management and a change to engine idle speed, also help increase fuel efficiency in all applications.

Lower Operating Costs

These changes will result in a reduction in overall operating costs for Hyster Big Trucks.

The improved fuel consumption will more than offset the marginal cost increase associated with using ULSD (Ultra Low Sulphur Diesel) fuel and low ash lube oil in addition to the requirement to clean the particulate filter at 5,000 hours.

While CO_2 emissions are not regulated by the EPA or EU, the changes that have been made to the engines, as a result of the new legislation, also deliver reduced CO_2 emissions, helping users to reduce the overall carbon footprint of the truck.

Improved Productivity

Although additional costs will be associated with the acquisition of Tier 4 Interim / Stage IIIB powered equipment, when compared with Tier 3 / Stage IIIA equipment, the cost of achieving compliance will be helped by the lower overall operating cost. Furthermore, thanks to faster engine response, fleet managers can expect increased truck productivity, in addition to the benefits of cleaner, quieter operation and lower fuel consumption.

The Science - Engine and System Technology

Controlling Emissions

An advanced cooled Exhaust Gas Recirculation (EGR) system is used to effectively control NOx emissions. EGR combines the current system with high-pressure common-rail fuel injection and electronically controlled air and fuel management.

Cooled EGR works by re-circulating a varying proportion of the exhaust gas back to the cylinder. This reduces the oxygen content to a lower combustion temperature resulting in a reduction of NOx formation. The system enables clean combustion with

NOx reduced by 45% compared to Tier 3 / Stage IIIA, while a Particulate Filter exhaust after-treatment system reduces PM by over 90% from engine exhaust.

This system is completely designed and manufactured by Cummins from air-intake to exhaust after-treatment and is integrated with the engine. Cummins' capability with this technology is unmatched in the industry, with experience of already using this EGR system in numerous on-highway applications for a number of years.

The key components of the Cummins cooled EGR system, are: EGR valve, EGR cooler and Variable Geometry Turbocharger (VGT).

Boosting Performance

The Variable Geometry Turbocharger (VGT) features a sliding nozzle, which varies the exhaust gas flow into the turbine wheel to provide rapid boost at low engine rpm and then maintain high boost at higher rpm.

The system combines the benefits of both a small and large turbocharger in a single unit, enabling Cummins Tier 4i / Stage IIIB engines to achieve significantly improved engine performance and fuel efficiency compared to a Tier 3 / Stage III engine, in addition to meeting the required emissions legislation.

Regeneration

Particulates are collected in a Cummins Diesel Particulate Filter, which replaces the Tier 3 / Stage IIIA muffler and provides equivalent sound reduction. The particulates are oxidized by passive and/or active regeneration. The Particulate Filter consists of four sections: an inlet, a Diesel Oxidation Catalyst (DOC), a Diesel Particulate Filter (DPF) and an outlet.

Exhaust flows out of the engine and into the Particulate Filter. It passes through the DOC and then into the DPF where PM is collected on the walls of the DPF. The carbon collected is then oxidized to remove it from the DPF. This is known as regeneration.

When operating conditions maintain sufficient exhaust temperatures, the DPF is continually self-regenerating. This is known as passive regeneration and results in clean exhaust gases out of the tailpipe. On very infrequent occasions, an active self-regeneration is required to burn-off a build-up of PM in the DPF, due to insufficient exhaust temperatures.

This means that in the vast majority of operating conditions, the truck can continue to work as normal, while regeneration takes place, without any intervention from the operator. In only 1% of cases will the truck need to be taken out of service to facilitate manual DPF cleaning.

Enhanced Air Filtration

Engine filtration enhancements include a new Cummins Direct Flow air cleaner and Cummins crankcase ventilation system with a highly-efficient coalescing filter, both manufactured by Cummins Filtration. Air flow to the engine is improved and the highest levels of protection are assured with virtually 100% efficiency over the lifetime of the filter.

Furthermore, air filter element service intervals can be extended, resulting in potentially lower air filter costs.

Even Cleaner Oil Filtration

Tier 4 Interim / Stage IIIB requires that crankcase emissions, also known as blowby gasses, be eliminated. To achieve this, Cummins engines incorporate a highly efficient coalescing filter. The filter returns the oil to the crankcase and provides the added benefit of removing oil mist and tiny oil droplets, ensuring that the engine and powertrain remain cleaner than at Tier 3 / Stage IIIA. The crankcase filter requires a simple filter element change at 2,500 hour intervals.

Electronic Engine Management

The Tier 4 Interim / Stage IIIB engine management system has been significantly upgraded with the latest Cummins CM2250 electronic control module, providing three times faster processing power and double memory capability compared to the Tier 3 / Stage IIIA module.

2011 Product Changes – Tier 4i / Stage IIIB

Tier 4i / Stage IIIB emissions regulations commence in January 2011 across the 174 to 751 hp (130-560 kW) power category.

NOTE: Tier 3 / Stage IIIA compliant equipment remains available for markets outside of EU and North America.

The model series affected by this legislation are:

- H16-18XM(S)-12 - 16-18t Forklift Trucks
- H25-32XMS-9 / H25-32XM-12 – 25-32t Forklift Trucks
- H36-48XM(S)-12 - 36-48t Forklift Trucks
- H16-22XM-12EC - 5-8 high Empty Container Handlers
- H28-32XM-16CH & H40-50XM-6CH

- Laden Container Handlers

- ReachStackers

Performance vs. Economy

The new Cummins Tier 4 Interim / Stage IIIB compliant engines, several of which feature smaller displacements with increased power, have demonstrated improved fuel efficiency compared to Tier 3 / Stage IIIA during extensive testing.

In addition to the Cummins technologies applied to reduce fuel consumption, the use of Hyster performance optimisation techniques also contribute to the reduction in the total fuel consumption across all types of application.

For example, Hyster has introduced selectable operating modes to its Big Trucks range, so that trucks can be tailored to perform at the optimum efficiency level, according to the demands of the application.

A key-switch is located in the operator compartment enabling a supervisor or service engineer to select either ECO-eLo “Fuel Efficiency” or HiP “High Performance” mode.

The HiP mode is the normal operating mode, whereas the ECO-eLo mode reduces the maximum engine speed and re-tunes the engine response. The result is additional fuel savings with a minimal loss of performance.

The ECO-eLo function, together with the use of cooling on demand & auto-speed hydraulics, means that overall operating costs for Hyster Big Trucks will be lower.

Depending on rating, duty cycle and application, Hyster trucks with Tier 4 Interim / Stage IIIB compliant engines can achieve in the region of 15% better fuel consumption.

In addition, the improvements in engine efficiency have translated into reduced CO_2 emissions and productivity has been enhanced, thanks to faster engine response.

Engine Upgrades

16-18t forklifts, and the related EC models feature a new Cummins 6.7 litre Tier 4i / Stage IIIB compliant engine, with one power output – Rated power is 164 kW (220 hp) @ 2000 rpm, maximum torque is 949 Nm @ 1400 rpm and maximum power is 172 kW (230 hp) @ 1800 rpm. This engine is compatible with the TE-17 transmission only.

The existing Cummins QSC 8.3 engine in **the 25-32t forklifts and related CH trucks** has been replaced by a new Cummins QSB 6.7 Tier 4 Interim / Stage IIIB compliant engine. This engine's torque and power are similar to that of the current Tier 3 engines – Rated power is 194 kW (260 hp) @ 2200 rpm, maximum torque is 990 Nm @ 1500 rpm and maximum power is 201 kW (270 hp) @ 2000 rpm. The transmission system has not changed, and remains the TE-17 series.

The 36-48t forklifts and related CH models plus the ReachStackers are available with a new Cummins QSL9 350hp engine. (The Cummins QSM11, 300hp and 335hp versions remain available for Tier 3 / Stage IIIA compliant trucks). Rated power for the QSL9 is 261 kW (350 hp) @ 2100 rpm, maximum torque is 1491 Nm @ 1500 rpm and maximum power is 276 kW (370 hp) @ 1900 rpm. The transmission available as standard with this new engine option is the TE-27 series, with the TE-32 available as an option.

All engines are equipped with a Variable Geometry Turbo, which continuously varies the airflow boost to precisely match engine rpm and load demands for optimal performance.
In addition, fan drive ratios have been increased and intake, exhaust and charge air cooling routings have been changed in order to achieve a higher cooling airflow and optimise the operational efficiency of the engines.

Air Filtration

All trucks feature a new rectangular Cummins Direct Flow air filter. This filter unit contains a combined temperature barometric and atmospheric pressure sensor that provides data to the engine control module. Before intake air goes into the air filter, it passes through a Sy-klone pre-cleaner that ejects up to 80% of the contamination. This pre-cleaner together with the single stage air filter makes the whole system 2-stage.

A secondary safety filter has been included as part of the air filtration system, in order to minimise the risk of contamination and expensive repair. It ensures clean air is delivered to the engine even if the main filter becomes compromised. This air filter system includes a self-cleaning external pre-cleaner and filter monitoring as standard.

Ultra low sulphur fuel is required to run Tier 4i / Stage IIIB compliant engines and the pre-filter is equipped with a Water-In-Fuel sensor and a drain valve.

Engine Cooling

Due to the revised cooling needs, the cooling package has been upgraded with a bigger radiator section and a smaller charge air cooler.

On **the 16-18t forklifts, and the related EC trucks**, the transmission cooler has been reduced in size and optimised to make it more efficient. The increased demand for cooling has been met by increasing the engine's fan drive ratio. In order to optimise cooling requirements and energy efficiency the fan has a clutch to allow variable fan speeds, depending on the level of cooling required.

The 36-48t forklifts and related CH models, plus the ReachStackers also feature a cooling on demand system. The hydraulically driven fan reduces both power consumption and noise during cooling - A hydraulic controller controls the fan speed based on temperature inputs for charge air, engine coolant, hydraulic oil and transmission oil. The fan is able to operate a variable speeds, according to the cooling requirements, ensuring that the maximum amount of engine power is available for driving and handling operations, which improves application efficiency and productivity and contributes to reducing overall operating costs.

Exhaust System

On all trucks, the exhaust muffler has been replaced with a Diesel Particulate Filter (DPF). The DPF consists of a stainless steel drum with a ceramic filter element inside, where soot is filtered out of the exhaust gasses. As the DPF heats up during normal operation the soot is burned off. If the DPF is not heated sufficiently, the system automatically burns diesel fuel in order to heat the system to the required temperature (DPF regeneration).

This whole process takes place while the truck continues to work and without any intervention from the operator, helping to maximise truck uptime and productivity.

Pressure and temperature sensors provide data to the engine's ECU to monitor constantly the condition of the DPF. The exhaust tubing between turbo charger and DPF is insulated to guarantee the minimum operating temperature that is required for the passive regeneration.

Other Features

ReachStackers feature two Variable Displacement Pumps (VDP) to supply the steering and main hydraulic functions. At low engine rpm one pump is active and the second pump cuts in when the engine revs up. A third Variable Displacement Pump provides pressure and flow to the hydraulic fan. This VDP always provides a minimum pressure and flow for filtration and axle cooling. When there is cooling demand the pressure and flow rise.

Service and Maintenance

The emissions regulations have not affected Hyster's strategy of maximising component commonality. Several serviceable components such as air filters, fuel filters and oil filter are shared across all Tier 4i / Stage IIIB engines.

All daily checks, such as engine oil dipstick, transmission oil dipstick, coolant level, can be performed with the same ease as on truck with a Tier 3 engine.

Filters for air, fuel and oil have similar access as on a truck with a Tier 3 engine.

The engine control module is set up for automatic active regeneration of the DPF.

Operator Compartment

The well renowned design of the Hyster "Vista" Cab continues to deliver industry leading all-round visibility, low noise levels and outstanding ergonomics, to ensure a comfortable and productive working environment for the operator.

Visibility of the operating area is maximised thanks to the extensive glass area and effective heating & ventilation system. The operator compartment is mounted on anti-vibration isolators, which together with the fully-adjustable suspension seat help to minimise operator fatigue during the course of the shift. Driver on-off access is comfortable and convenient, with wide anti-slip steps and conveniently placed handrails.

The operating position is extremely ergonomic, with a familiar automotive layout – the finger-light operation of steering and controls and responsive, fully hydraulic brakes contribute to making such large machines easy to operate.

The dash display is conveniently located to the right of the operator, to ensure maximum forward visibility.

Changes to the Operator Compartment as a result of the new emissions legislation are limited.

The display accommodates new warning lamps for the DPF (Diesel Particulate Filter) – These are *DPF Restriction, Regeneration Disabled and High Exhaust Gas Temperature*, while some under-utilized warnings have been removed.

A key switch activates the ECO-eLo and HiP modes. A supervisor or service engineer can set the appropriate setting and then remove the key.

The **ReachStacker** operator compartment features enhanced ergonomics, thanks to the introduction of E-hydraulic controls and reduced noise levels.

The controls for rotate and side-shift on the new E-hydraulic joystick are proportional and the automatic "throttle-up on hoist" reduces the amount of operations the driver has to carry out. With the removal of the hydraulic pilot hoses from the armrest, the armrest can pivot up fully and there is space for an optional storage compartment behind the seat. The load moment controller and the hydraulic controller are now mounted in the cab side console.

Why Hyster

A Leading Global Full-line Provider

Hyster is one of the best known names in the industry, with a reputation for making durable lifting equipment dating back to the 1920's.

As a world leader in the manufacture of materials handling equipment, Hyster offers a comprehensive range of warehousing equipment, industrial lift trucks, container handlers and reachstackers as well as quality parts to meet your materials handling needs.

Expert consultancy and responsive local service are provided through our worldwide network of distribution partners. Together, we deliver a complete package of products and solutions to help you improve efficiency, drive down costs and streamline your materials flow.

Hyster benefits from the expertise and resources of a global manufacturing organisation. Operations in 11 locations across the globe produce quality components and assemble complete trucks for the different world markets.

Global Advantages

Behind Hyster you will find the strength of a large world-wide organisation that takes a global approach to product design, manufacturing and supply-chain.

This helps maximise economies of scale and achieve consistent quality. At the same time, the company retains flexibility to tailor products and solutions and flex production capacity in line with regional market demands.

Tailored Solutions

A large proportion of Big Truck sales require special engineering and Hyster has a highly experienced engineering team actively supporting specific application requirements.

This may include a special attachment, paintwork or even a longer chassis, and Hyster focuses on understanding the application and correctly specifying the equipment from the start.

A Strong Worldwide Network

Hyster products are distributed and supported through an extensive network of exclusive dealers, providing local coverage through their sales and service locations, located across the globe.

These distribution partners have been carefully selected by Hyster on the strength of their customer support capability and outstanding service ethic.

Hyster dealers employ expert sales consultants and qualified technical personnel, who have been trained and certified to consult on and maintain the entire product offering and have access to Hyster's extensive technical reference and support services.

World Class Manufacturing

Hyster Big Trucks are designed and built in Hyster's global centre for Big Trucks in Nijmegen, The Netherlands.

Parts

Big Trucks are a long term investment for many businesses and Hyster has a long term vision to support them throughout their life. Hyster builds the most dependable heavy duty trucks in the market. This is of utmost importance as Big Trucks do not have a back-up that can be used in the case of breakdowns, so it is critical that key parts are stocked by our local distribution partners with full support for all other parts from the parts distribution centre. We have emergency response times inside 2 hours and next day delivery for most parts.

For more information on Hyster and its full range of materials handling solutions visit www.hyster.com.


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Strong Partners, Tough Trucks, for Demanding Operations, Everywhere.

Hyster supplies a complete range of warehouse equipment, IC and electric counterbalanced trucks, container handlers and reach stackers. Hyster is committed to being much more than a lift truck supplier.

Our aim is to offer a complete partnership capable of responding to the full spectrum of material handling issues: Whether you need professional consultancy on your fleet management, fully qualified service support, or reliable parts supply, you can depend on Hyster.

Our network of highly trained dealers provides expert, responsive local support. They can offer cost-effective finance packages and introduce effectively managed maintenance programmes to ensure that you get the best possible value. Our business is dealing with your material handling needs so you can focus on the success of your business today and in the future.

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3/4-High Container Handler: H10-12XM-12EC

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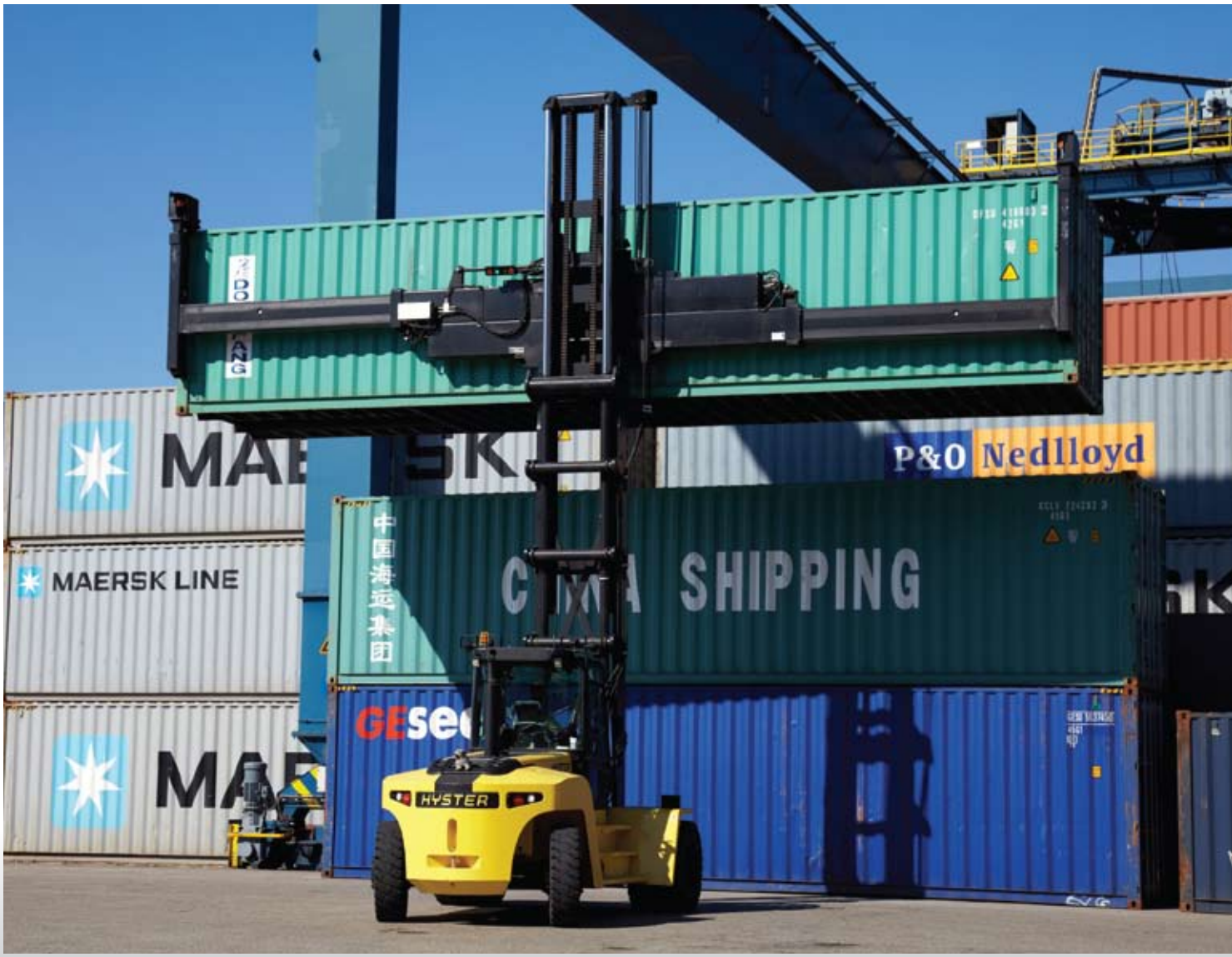
- Engine and transmission protection systems as well as oil-immersed brakes are standard
- Vista Cab offers excellent driver comfort and all-round visibility



5-8 High Container Handler: H16-22XM-12EC

- Designed for handling single and double containers, up to 8-high (2 on 6, 8'6" containers)
- Rear-mounted Vista Cab delivers excellent comfort and maximises visibility of the container during handling operations
- Strong frame and mast design ensure excellent stability and durability during stacking operations
- A high-performance powertrain, (featuring engine and transmission protection systems as well as oil-immersed brakes as standard), together with class leading lifting speeds, deliver optimum productivity

Dedicated Laden Container Handlers: H28-32XM-16CH / H40-50XM-6CH

First Row Container Stackers, for stacking laden containers 3, 4 & 5 high are able to perform container shunting operations at exceptional speeds. These trucks have been purposely developed to deliver these high 'box-rates' in order to offer an alternative cost-effective solution to customers, when 2nd / 3rd row storage is not required.

- First Row Container Stackers, designed for stacking ISO 20' to 40' containers 3, 4 & 5 high
- Powerful, modern, drivetrain features a clean-running Diesel engine, 4-speed auto-shift transmission, oil-immersed brakes and engine protection system
- Vista Cab offers excellent driver comfort and visibility of the container during handling operations and tilts sideways for easy service access. (Mounted at the rear on the models based on 36-48t forklift)
- Dedicated spreader for maximum load carrying capability. (Trucks for the Americas market feature a gantry mounted spreader)

ReachStackers

The Hyster ReachStacker offers more flexibility, and is available in both container handling (CH) and intermodal handling (IH) versions for high density container stacking applications up to 6-high (8’ 6”) and 3-rows deep. This machine has been designed to achieve maximum space utilisation on container terminals, thanks to outstanding manoeuvrability, superior handling speeds and unrestricted stacking capabilities.

Container Handling

- Class leading lifting speeds for maximum productivity
- Hyster Container Spreader for handling 20’- 40’ ISO Containers
- Designed to stack up to 6-high 8’6” containers in first row
- Sliding Vista Cab for excellent comfort and all-round visibility
- High-performance power train, with built in engine protection system

Intermodal Handling

- Class leading lifting speeds for maximum productivity
- Hyster Intermodal Spreader, for handling 20’- 40’ ISO Containers, and ‘Swap-bodies’ or Trailers
- Features Powered Pile Slope function (hydraulically powered sideways articulation of spreader)
- Full-sliding Vista Cab for excellent all-round visibility in varying operating conditions

Emissions Regulations are Driving Change

From January 2011, the largest trucks in the Hyster range are affected by new emissions regulations, which will be followed in 2012 by similar regulations on the 8-16t series trucks. Further emissions regulations will be introduced in in 2014.

NOTE: These regulations apply to trucks operating in EU & North America market areas only and Tier 3 / Stage IIIA compliant Hyster equipment remains available for other markets.

Throughout 2011, customers in the EU & North America will still able to purchase Tier 3 / Stage IIIA equipment, while stocks are available.

2011 EPA Tier 4 Interim & EU Stage IIIB Emissions

Tier 4 Interim is the U.S. Environmental Protection Agency (EPA) emissions regulations for off-highway diesel engines in North America.

Stage IIIB is the equivalent emissions regulations for the European Union (EU) member states.

In terms of effectivity dates and emissions levels, the EPA and EU are closely aligned.

Meeting the New Emissions Requirements

The regulations commence in January 2011 across the 174 to 751 hp (130-560kW) power category, requiring diesel engines to reduce Particulate Matter (PM) exhaust emissions by 90% and Oxides of Nitrogen (NOx) exhaust emissions by 45% compared with the current Tier 3 and Stage IIIA emissions standards.

The emissions standards for this power category are:

2.0g/kW-hr NOx and 0.02 g/kW-hr PM*

The new regulations demand new levels of system integration in order to achieve very low emissions while improving performance. Cummins engines used in the Hyster range of Big Trucks will meet the 2011 low emissions standards with an integrated Cummins Particulate Filter exhaust after-treatment system and a cooled exhaust gas recirculation (EGR) system incorporated into the engines.

*NOx are a regulated diesel emission and a collective term for gaseous emissions composed of nitrogen and oxygen. PM is a regulated diesel emission composed primarily of carbon soot and other combustion by-products.

Looking Ahead – Future Regulations

Beginning in 2014, EPA Tier 4 Final and EU Stage IV will require another major emissions reduction for the industry. Off-highway diesel engines from 174 to 751 hp (130-560kW) must reduce NOx emissions by a further 45% compared to the 2011 level. By 2014, both NOx and PM exhaust emissions will be reduced by 90% compared with current Tier 3 and Stage IIIA levels and will be 'near zero' emissions levels.

For engines within the 75hp to 173hp (56 – 129 kW) power category, Tier 4 Interim and Stage IIIB regulations will commence in January 2012. The Tier 4 Final and Stage IV regulations will be applied in January 2015. Emissions levels are less severe for this power category, enabling more simplified after-treatment.

What do these changes mean to Hyster and its Customers?

Hyster Big Trucks are already compliant. By working with engine partner Cummins, Hyster has developed market leading solutions and now leads the industry with Big Trucks that meet the requirements of the new regulations.

About Cummins

Cummins Inc. is the world's largest designer and manufacturer of diesel engines and related technologies, (including fuel systems, controls, air handling, filtration & emission solutions and electrical power generation systems). The company distributes engines into key markets such as on-highway vehicles, industrial equipment, and power generation.

Cummins serves customers in approximately 190 countries and territories through a network of more than 500 company-owned and independent distributor locations and approximately 5,200 dealer locations.

Fuel Efficiency

The Cummins Tier 4 Interim / Stage IIIB engines have demonstrated improved fuel efficiency compared to Tier 3 / Stage IIIA.

Depending on rating, duty cycle and application, Hyster trucks with Tier 4 Interim / Stage IIIB compliant engines can achieve in the region of 15% better fuel consumption.

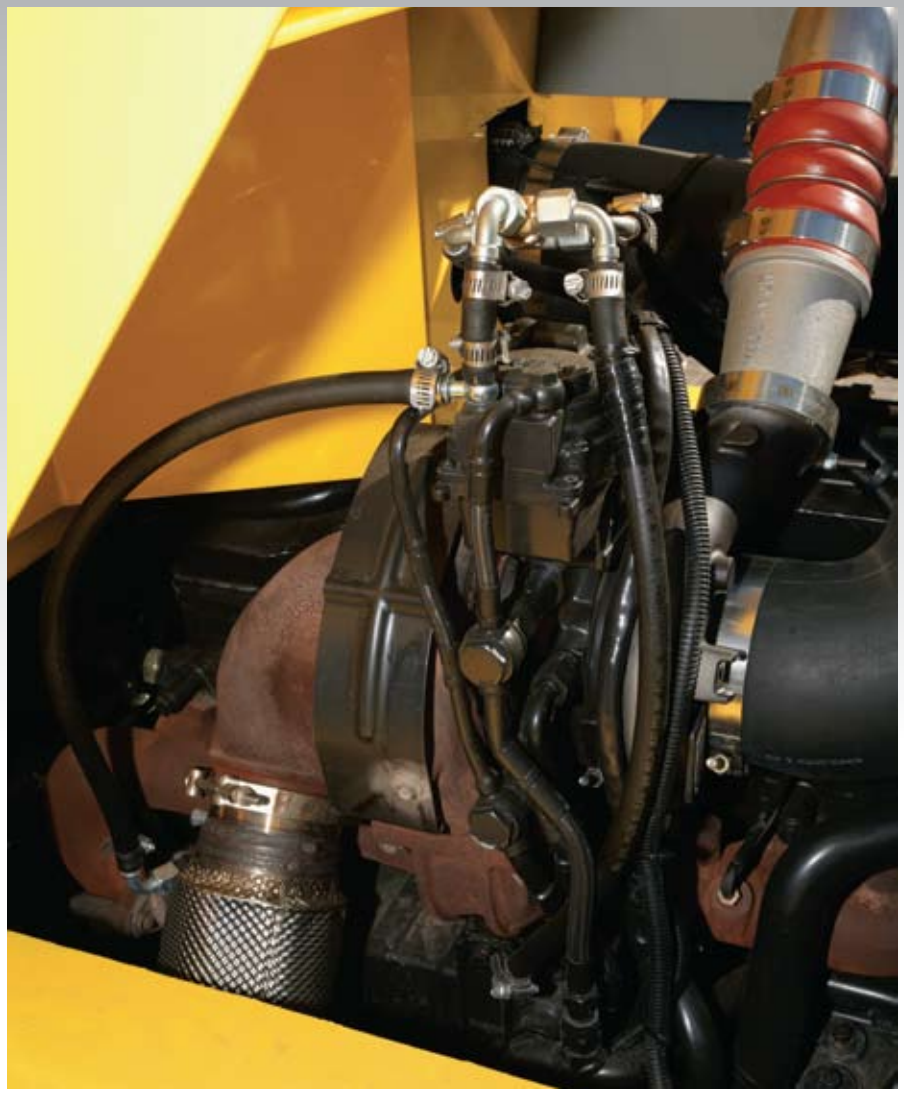
In addition to the Cummins technologies applied to Hyster Big Trucks to reduce fuel consumption, the use of performance optimisation techniques, such as cooling on demand, auto-speed hydraulics, rpm management and a change to engine idle speed, also help increase fuel efficiency in all applications.

Lower Operating Costs

These changes will result in a reduction in overall operating costs for Hyster Big Trucks.

The improved fuel consumption will more than offset the marginal cost increase associated with using ULSD (Ultra Low Sulphur Diesel) fuel and low ash lube oil in addition to the requirement to clean the particulate filter at 5,000 hours.

While CO_2 emissions are not regulated by the EPA or EU, the changes that have been made to the engines, as a result of the new legislation, also deliver reduced CO_2 emissions, helping users to reduce the overall carbon footprint of the truck.



Improved Productivity

Although additional costs will be associated with the acquisition of Tier 4 Interim / Stage IIIB powered equipment, when compared with Tier 3 / Stage IIIA equipment, the cost of achieving compliance will be helped by the lower overall operating cost. Furthermore, thanks to faster engine response, fleet managers can expect increased truck productivity, in addition to the benefits of cleaner, quieter operation and lower fuel consumption.

The Science - Engine and System Technology

Controlling Emissions

An advanced cooled Exhaust Gas Recirculation (EGR) system is used to effectively control NOx emissions. EGR combines the current system with high-pressure common-rail fuel injection and electronically controlled air and fuel management.

Cooled EGR works by re-circulating a varying proportion of the exhaust gas back to the cylinder. This reduces the oxygen content to a lower combustion temperature resulting in a reduction of NOx formation. The system enables clean combustion with

NOx reduced by 45% compared to Tier 3 / Stage IIIA, while a Particulate Filter exhaust after-treatment system reduces PM by over 90% from engine exhaust.

This system is completely designed and manufactured by Cummins from air-intake to exhaust after-treatment and is integrated with the engine. Cummins' capability with this technology is unmatched in the industry, with experience of already using this EGR system in numerous on-highway applications for a number of years.

The key components of the Cummins cooled EGR system, are: EGR valve, EGR cooler and Variable Geometry Turbocharger (VGT).

Boosting Performance

The Variable Geometry Turbocharger (VGT) features a sliding nozzle, which varies the exhaust gas flow into the turbine wheel to provide rapid boost at low engine rpm and then maintain high boost at higher rpm.

The system combines the benefits of both a small and large turbocharger in a single unit, enabling Cummins Tier 4i / Stage IIIB engines to achieve significantly improved engine performance and fuel efficiency compared to a Tier 3 / Stage III engine, in addition to meeting the required emissions legislation.

Regeneration

Particulates are collected in a Cummins Diesel Particulate Filter, which replaces the Tier 3 / Stage IIIA muffler and provides equivalent sound reduction. The particulates are oxidized by passive and/or active regeneration. The Particulate Filter consists of four sections: an inlet, a Diesel Oxidation Catalyst (DOC), a Diesel Particulate Filter (DPF) and an outlet.

Exhaust flows out of the engine and into the Particulate Filter. It passes through the DOC and then into the DPF where PM is collected on the walls of the DPF. The carbon collected is then oxidized to remove it from the DPF. This is known as regeneration.

When operating conditions maintain sufficient exhaust temperatures, the DPF is continually self-regenerating. This is known as passive regeneration and results in clean exhaust gases out of the tailpipe. On very infrequent occasions, an active self-regeneration is required to burn-off a build-up of PM in the DPF, due to insufficient exhaust temperatures.

This means that in the vast majority of operating conditions, the truck can continue to work as normal, while regeneration takes place, without any intervention from the operator. In only 1% of cases will the truck need to be taken out of service to facilitate manual DPF cleaning.

Enhanced Air Filtration

Engine filtration enhancements include a new Cummins Direct Flow air cleaner and Cummins crankcase ventilation system with a highly-efficient coalescing filter, both manufactured by Cummins Filtration. Air flow to the engine is improved and the highest levels of protection are assured with virtually 100% efficiency over the lifetime of the filter.

Furthermore, air filter element service intervals can be extended, resulting in potentially lower air filter costs.

Even Cleaner Oil Filtration

Tier 4 Interim / Stage IIIB requires that crankcase emissions, also known as blowby gasses, be eliminated. To achieve this, Cummins engines incorporate a highly efficient coalescing filter. The filter returns the oil to the crankcase and provides the added benefit of removing oil mist and tiny oil droplets, ensuring that the engine and powertrain remain cleaner than at Tier 3 / Stage IIIA. The crankcase filter requires a simple filter element change at 2,500 hour intervals.

Electronic Engine Management

The Tier 4 Interim / Stage IIIB engine management system has been significantly upgraded with the latest Cummins CM2250 electronic control module, providing three times faster processing power and double memory capability compared to the Tier 3 / Stage IIIA module.

2011 Product Changes – Tier 4i / Stage IIIB

Tier 4i / Stage IIIB emissions regulations commence in January 2011 across the 174 to 751 hp (130-560 kW) power category.

NOTE: Tier 3 / Stage IIIA compliant equipment remains available for markets outside of EU and North America.

The model series affected by this legislation are:

- H16-18XM(S)-12 - 16-18t Forklift Trucks
- H25-32XMS-9 / H25-32XM-12 – 25-32t Forklift Trucks
- H36-48XM(S)-12 - 36-48t Forklift Trucks
- H16-22XM-12EC - 5-8 high Empty Container Handlers
- H28-32XM-16CH & H40-50XM-6CH

- Laden Container Handlers

- ReachStackers

Performance vs. Economy

The new Cummins Tier 4 Interim / Stage IIIB compliant engines, several of which feature smaller displacements with increased power, have demonstrated improved fuel efficiency compared to Tier 3 / Stage IIIA during extensive testing.

In addition to the Cummins technologies applied to reduce fuel consumption, the use of Hyster performance optimisation techniques also contribute to the reduction in the total fuel consumption across all types of application.

For example, Hyster has introduced selectable operating modes to its Big Trucks range, so that trucks can be tailored to perform at the optimum efficiency level, according to the demands of the application.

A key-switch is located in the operator compartment enabling a supervisor or service engineer to select either ECO-eLo “Fuel Efficiency” or HiP “High Performance” mode.

The HiP mode is the normal operating mode, whereas the ECO-eLo mode reduces the maximum engine speed and re-tunes the engine response. The result is additional fuel savings with a minimal loss of performance.

The ECO-eLo function, together with the use of cooling on demand & auto-speed hydraulics, means that overall operating costs for Hyster Big Trucks will be lower.

Depending on rating, duty cycle and application, Hyster trucks with Tier 4 Interim / Stage IIIB compliant engines can achieve in the region of 15% better fuel consumption.

In addition, the improvements in engine efficiency have translated into reduced CO_2 emissions and productivity has been enhanced, thanks to faster engine response.

Engine Upgrades

16-18t forklifts, and the related EC models feature a new Cummins 6.7 litre Tier 4i / Stage IIIB compliant engine, with one power output – Rated power is 164 kW (220 hp) @ 2000 rpm, maximum torque is 949 Nm @ 1400 rpm and maximum power is 172 kW (230 hp) @ 1800 rpm. This engine is compatible with the TE-17 transmission only.

The existing Cummins QSC 8.3 engine in **the 25-32t forklifts and related CH trucks** has been replaced by a new Cummins QSB 6.7 Tier 4 Interim / Stage IIIB compliant engine. This engine's torque and power are similar to that of the current Tier 3 engines – Rated power is 194 kW (260 hp) @ 2200 rpm, maximum torque is 990 Nm @ 1500 rpm and maximum power is 201 kW (270 hp) @ 2000 rpm. The transmission system has not changed, and remains the TE-17 series.

The 36-48t forklifts and related CH models plus the ReachStackers are available with a new Cummins QSL9 350hp engine. (The Cummins QSM11, 300hp and 335hp versions remain available for Tier 3 / Stage IIIA compliant trucks). Rated power for the QSL9 is 261 kW (350 hp) @ 2100 rpm, maximum torque is 1491 Nm @ 1500 rpm and maximum power is 276 kW (370 hp) @ 1900 rpm. The transmission available as standard with this new engine option is the TE-27 series, with the TE-32 available as an option.

All engines are equipped with a Variable Geometry Turbo, which continuously varies the airflow boost to precisely match engine rpm and load demands for optimal performance.
In addition, fan drive ratios have been increased and intake, exhaust and charge air cooling routings have been changed in order to achieve a higher cooling airflow and optimise the operational efficiency of the engines.

Air Filtration

All trucks feature a new rectangular Cummins Direct Flow air filter. This filter unit contains a combined temperature barometric and atmospheric pressure sensor that provides data to the engine control module. Before intake air goes into the air filter, it passes through a Sy-klone pre-cleaner that ejects up to 80% of the contamination. This pre-cleaner together with the single stage air filter makes the whole system 2-stage.

A secondary safety filter has been included as part of the air filtration system, in order to minimise the risk of contamination and expensive repair. It ensures clean air is delivered to the engine even if the main filter becomes compromised. This air filter system includes a self-cleaning external pre-cleaner and filter monitoring as standard.

Ultra low sulphur fuel is required to run Tier 4i / Stage IIIB compliant engines and the pre-filter is equipped with a Water-In-Fuel sensor and a drain valve.

Engine Cooling

Due to the revised cooling needs, the cooling package has been upgraded with a bigger radiator section and a smaller charge air cooler.

On **the 16-18t forklifts, and the related EC trucks**, the transmission cooler has been reduced in size and optimised to make it more efficient. The increased demand for cooling has been met by increasing the engine's fan drive ratio. In order to optimise cooling requirements and energy efficiency the fan has a clutch to allow variable fan speeds, depending on the level of cooling required.

The 36-48t forklifts and related CH models, plus the ReachStackers also feature a cooling on demand system. The hydraulically driven fan reduces both power consumption and noise during cooling - A hydraulic controller controls the fan speed based on temperature inputs for charge air, engine coolant, hydraulic oil and transmission oil. The fan is able to operate a variable speeds, according to the cooling requirements, ensuring that the maximum amount of engine power is available for driving and handling operations, which improves application efficiency and productivity and contributes to reducing overall operating costs.

Exhaust System

On all trucks, the exhaust muffler has been replaced with a Diesel Particulate Filter (DPF). The DPF consists of a stainless steel drum with a ceramic filter element inside, where soot is filtered out of the exhaust gasses. As the DPF heats up during normal operation the soot is burned off. If the DPF is not heated sufficiently, the system automatically burns diesel fuel in order to heat the system to the required temperature (DPF regeneration).

This whole process takes place while the truck continues to work and without any intervention from the operator, helping to maximise truck uptime and productivity.

Pressure and temperature sensors provide data to the engine's ECU to monitor constantly the condition of the DPF. The exhaust tubing between turbo charger and DPF is insulated to guarantee the minimum operating temperature that is required for the passive regeneration.

Other Features

ReachStackers feature two Variable Displacement Pumps (VDP) to supply the steering and main hydraulic functions. At low engine rpm one pump is active and the second pump cuts in when the engine revs up. A third Variable Displacement Pump provides pressure and flow to the hydraulic fan. This VDP always provides a minimum pressure and flow for filtration and axle cooling. When there is cooling demand the pressure and flow rise.

Service and Maintenance

The emissions regulations have not affected Hyster's strategy of maximising component commonality. Several serviceable components such as air filters, fuel filters and oil filter are shared across all Tier 4i / Stage IIIB engines.

All daily checks, such as engine oil dipstick, transmission oil dipstick, coolant level, can be performed with the same ease as on truck with a Tier 3 engine.

Filters for air, fuel and oil have similar access as on a truck with a Tier 3 engine.

The engine control module is set up for automatic active regeneration of the DPF.

Operator Compartment

The well renowned design of the Hyster "Vista" Cab continues to deliver industry leading all-round visibility, low noise levels and outstanding ergonomics, to ensure a comfortable and productive working environment for the operator.

Visibility of the operating area is maximised thanks to the extensive glass area and effective heating & ventilation system. The operator compartment is mounted on anti-vibration isolators, which together with the fully-adjustable suspension seat help to minimise operator fatigue during the course of the shift. Driver on-off access is comfortable and convenient, with wide anti-slip steps and conveniently placed handrails.

The operating position is extremely ergonomic, with a familiar automotive layout – the finger-light operation of steering and controls and responsive, fully hydraulic brakes contribute to making such large machines easy to operate.

The dash display is conveniently located to the right of the operator, to ensure maximum forward visibility.

Changes to the Operator Compartment as a result of the new emissions legislation are limited.

The display accommodates new warning lamps for the DPF (Diesel Particulate Filter) – These are *DPF Restriction, Regeneration Disabled and High Exhaust Gas Temperature*, while some under-utilized warnings have been removed.

A key switch activates the ECO-eLo and HiP modes. A supervisor or service engineer can set the appropriate setting and then remove the key.

The **ReachStacker** operator compartment features enhanced ergonomics, thanks to the introduction of E-hydraulic controls and reduced noise levels.

The controls for rotate and side-shift on the new E-hydraulic joystick are proportional and the automatic "throttle-up on hoist" reduces the amount of operations the driver has to carry out. With the removal of the hydraulic pilot hoses from the armrest, the armrest can pivot up fully and there is space for an optional storage compartment behind the seat. The load moment controller and the hydraulic controller are now mounted in the cab side console.

Why Hyster

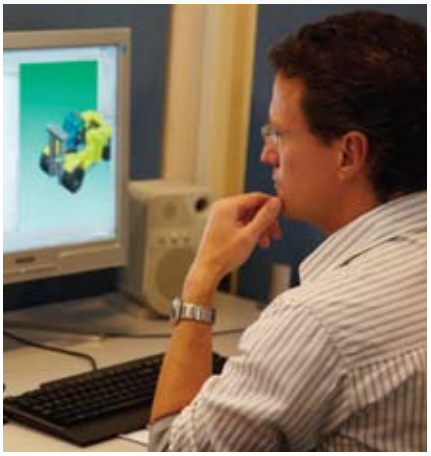
A Leading Global Full-line Provider

Hyster is one of the best known names in the industry, with a reputation for making durable lifting equipment dating back to the 1920's.

As a world leader in the manufacture of materials handling equipment, Hyster offers a comprehensive range of warehousing equipment, industrial lift trucks, container handlers and reachstackers as well as quality parts to meet your materials handling needs.

Expert consultancy and responsive local service are provided through our worldwide network of distribution partners. Together, we deliver a complete package of products and solutions to help you improve efficiency, drive down costs and streamline your materials flow.

Hyster benefits from the expertise and resources of a global manufacturing organisation. Operations in 11 locations across the globe produce quality components and assemble complete trucks for the different world markets.



Global Advantages

Behind Hyster you will find the strength of a large world-wide organisation that takes a global approach to product design, manufacturing and supply-chain.

This helps maximise economies of scale and achieve consistent quality. At the same time, the company retains flexibility to tailor products and solutions and flex production capacity in line with regional market demands.

Tailored Solutions

A large proportion of Big Truck sales require special engineering and Hyster has a highly experienced engineering team actively supporting specific application requirements.

This may include a special attachment, paintwork or even a longer chassis, and Hyster focuses on understanding the application and correctly specifying the equipment from the start.

A Strong Worldwide Network

Hyster products are distributed and supported through an extensive network of exclusive dealers, providing local coverage through their sales and service locations, located across the globe.

These distribution partners have been carefully selected by Hyster on the strength of their customer support capability and outstanding service ethic.

Hyster dealers employ expert sales consultants and qualified technical personnel, who have been trained and certified to consult on and maintain the entire product offering and have access to Hyster's extensive technical reference and support services.

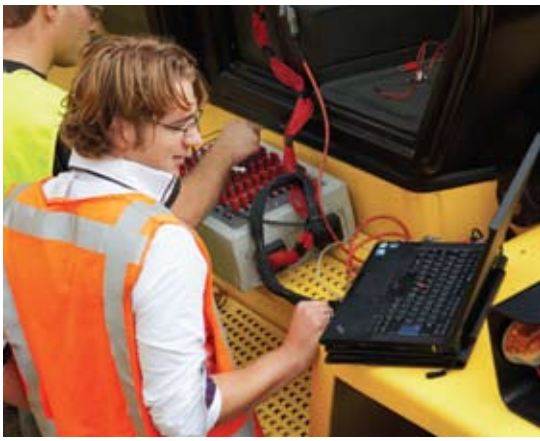
World Class Manufacturing

Hyster Big Trucks are designed and built in Hyster's global centre for Big Trucks in Nijmegen, The Netherlands.

Parts

Big Trucks are a long term investment for many businesses and Hyster has a long term vision to support them throughout their life. Hyster builds the most dependable heavy duty trucks in the market. This is of utmost importance as Big Trucks do not have a back-up that can be used in the case of breakdowns, so it is critical that key parts are stocked by our local distribution partners with full support for all other parts from the parts distribution centre. We have emergency response times inside 2 hours and next day delivery for most parts.

For more information on Hyster and its full range of materials handling solutions visit www.hyster.com.

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Strong Partners, Tough Trucks, for Demanding Operations, Everywhere.

Hyster supplies a complete range of warehouse equipment, IC and electric counterbalanced trucks, container handlers and reach stackers. Hyster is committed to being much more than a lift truck supplier.

Our aim is to offer a complete partnership capable of responding to the full spectrum of material handling issues: Whether you need professional consultancy on your fleet management, fully qualified service support, or reliable parts supply, you can depend on Hyster.

Our network of highly trained dealers provides expert, responsive local support. They can offer cost-effective finance packages and introduce effectively managed maintenance programmes to ensure that you get the best possible value. Our business is dealing with your material handling needs so you can focus on the success of your business today and in the future.

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