Tractor Codes Member Countries

Argentina  México  Brazil  Bulgaria
Philippines  Indonesia  Malaysia  Saudi Arabia  Thailand

Formal Applicant Countries

Brazil  Bulgaria

Potential Member Countries

Argentina  Malaysia  Mexico
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The OECD’s core values

Objective: Our analyses and recommendations are independent and evidence-based.

Open: We encourage debate and a shared understanding of critical global issues.

Bold: We dare to challenge conventional wisdom starting with our own.

Pioneering: We identify and address emerging and long term challenges.

Ethical: Our credibility is built on trust, integrity and transparency.
OECD IN BRIEF

The Organisation for Economic Co-operation and Development (OECD), an inter-governmental organisation founded in 1961, provides a multilateral forum to discuss, develop and reform economic and social policies. Today it has 34 member countries. The OECD’s mission is to promote policies for sustainable economic growth and employment, a rising standard of living, and trade liberalisation. It is at the forefront of efforts to help governments understand and respond to new developments and concerns so that economic and social developments are not achieved at the expense of environmental degradation.

The OECD brings together its Member countries to discuss and develop domestic and international policies. It analyses issues, identifies good policy practices and recommends actions in a unique forum in which countries can compare their experiences, seek answers to common problems, and work to co-ordinate policies. It shares expertise and exchanges views with more than 100 countries worldwide and engages in dialogue with business, labour, and civil society organisations on topics of mutual interest. The OECD is the largest and most reliable source of comparable statistical data and information on economic, environmental and social developments in its Member countries.

The OECD’s work is overseen by several bodies. At the highest level is the OECD Council, made up of Ambassadors from all Member countries. The Council’s main role is to review and approve the OECD budget and Programme of Work. The specific policy and technical work is directed by specialist Committees, supported by Working Parties and ad hoc meetings, which bring together technical expertise from Member countries. The daily work of the OECD is coordinated and supported by its Secretariat in Paris, with 2,500 staff and a budget of over €342 million.

1 OECD member countries in 2011: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States. The European Commission also participates in the work of the Organisation.
The **Directorate** for **Trade and Agriculture** (TAD) is the part of the OECD Secretariat that undertakes the work on behalf of the Trade, Agriculture and Fisheries Committees. The key objective of OECD work on trade is to support a strong, rules-based multilateral trading system that will maintain the momentum for further trade liberalisation, while contributing to rising standards of living and sustainable development. OECD also analyses food, agriculture and fisheries issues and provides advice to governments on practical and innovative options for policy reform and trade liberalisation, as well as facilitating the negotiation of international rules on official export credits. An important part of the mandate of the OECD is to provide analytical support to agricultural trade liberalisation, as well as estimating the effects of further trade liberalisation. Working closely with Member countries, the Directorate collects information and data, and develops modelling capacity to analyse the policy issues identified by the Committees. The **Committee for Trade, the Committee for Agriculture** and the **Committee for Fisheries** are responsible for implementing the trade, agriculture and fisheries biennial programme of work, once it has been approved by the OECD Council.

The **Directorate** is structured around seven divisions that work together to deliver the work programme: Agro-food Trade and Markets, Development Division, Fisheries Policies, Agricultural Policies and Environment, Policies and Trade in Agriculture, Trade Policy Linkages and Services and Export Credits. Two other units are attached to the Directorate: **Agricultural Codes and Schemes**, and the **Co-operative Research Programme**. The staff of the Directorate is drawn from Member countries. In 2011 there were 120 full-time staff, and increasingly, the Directorate also welcomes staff on short-term appointments, consultants and trainees.
AGRICULTURAL CODES AND SCHEMES

The OECD Agricultural Codes and Schemes facilitate international trade through the simplification and harmonisation of documentary, inspection and testing procedures. For Seeds and Forests, the Schemes encourage the production and use of seeds or plants of consistently high quality for which trueness to name or source is guaranteed. For Tractors, the Codes enable an importing country to accept with confidence the results of tests carried out in another country, and in the case of Fruit and Vegetables, the Scheme promotes uniform classification and quality control procedures.

The Codes & Schemes were created in the late 1950s/early 1960s and the number of participating countries has been constantly rising. The Codes and Schemes are open to any OECD or non-OECD country that is a member of the United Nations or of the World Trade Organisation. In addition to the 34 OECD countries which are all members of at least one of the Codes & Schemes, participation currently encompasses 29 non-OECD Economies, including some of the major players in world trade (Argentina, Brazil, China, India, Russia, South Africa, Ukraine, etc.). There are also close co-operation with the UN family, especially the FAO and the UNECE, as well as specific non-governmental and industrial organisations.

The overarching objectives of the Codes & Schemes are to simplify existing international trade procedures; increase transparency, reduce technical barriers to trade; contribute to international harmonization of standards, environmental protection; and, to increase market confidence through enforcement of quality control and inspection procedures, as well as the traceability of the traded products. The objectives are achieved through ongoing dialogue with the designated authorities of Member Countries, Observers and, stakeholders including farmers, industry and trade.
International certification differs from national certification, as domestic regulatory systems may vary to a large extent. A voluntary international system is a tool which heterogeneous countries can use for specific product characteristics, without having to change their domestic framework. The benefits from product certification and guarantees are shared between all stakeholders; consumers, producers, industry, exporters and importers.

For some of the Codes & Schemes, there are prerequisites for joining (e.g. National Seed Law). In all cases, the following general steps must be taken: 1) an official request to join is sent to the OECD Secretary-General, accompanied by the relevant documentation. 2) This is followed by an evaluation process, usually involving a short mission to the applicant country. 3) The evaluation report is circulated to the authorities of the participating countries and discussed at their annual meeting. 4) The final step is an internal OECD process resulting in a Council Decision. The whole procedure takes about one year.

The overall budget is around one million euros, with Seeds accounting for about 40%, Tractors 30%, Fruit and Vegetables 20% and Forests 10%. The annual fee for each of the Codes and Schemes is based on a lump sum payment plus a variable percentage payment based on a formula related to the size of the participating country’s economy (Gross Domestic Product).
# OECD Tractor Codes

## What are the OECD Tractor Codes?

The OECD Standard Codes for the official testing of agricultural and forestry tractors are a set of rules and procedures for tractor testing with the aim to facilitate trade by updating international rules to certify tractors and their protective structures. Implementation of the Codes ensures that protective structures and performance criteria are carried out on a comparative basis, thus increase transparency, simplify international trade procedures, and open markets.

## Participating Countries and International Organisations

Currently, 26 countries implement the Codes; of which, 22 are OECD Members and 4 non-OECD Economies (China, India, Serbia and Russia). Observers include:

- the European Free Trade Association (EFTA);
- the European Committee for Standardization (CEN);
- the European Committee of Manufacturers of Agricultural Machinery (CEMA);
- the Economic Commission for Europe of the United Nations (UN/ECE);
- the International Commission of Agricultural Engineering (CIGR);
- the European Confederation of Agriculture (CEA);
- the Food and Agriculture Organization of the United Nations (FAO);
- the International Organization for Standardization (ISO);
- the European Commission (EC);
- the United Nations Industrial Development Organization (UNIDO);
- the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP);
- the Committee of Professional Agricultural Organizations and General Confederation of Agricultural Co-operatives in the European Union (COPA-COGECA);
- the World Farmers’ Organisation (WFO).

## How do the Tractor Codes operate?

National testing stations in each participating country carry out the tests on tractors to be commercialized according to common procedures. Test results are submitted to OECD for approval and the verification of individual tests are subcontracted to a Co-ordinating Centre. Approved tests are published and used by tractor manufacturers, sellers and buyers. Summaries of performance tests are available on-line ([www.oecd.org/tad/tractor](http://www.oecd.org/tad/tractor)).

## What is OECD’s role?

OECD facilitates co-ordination at the international level, with frequent meetings. These meetings enable dialogue amongst stakeholders, exchange of information, discussion of case studies, preparation of new rules and amendments to the Codes. Since the Codes were established in 1959, over 3 000 tractors have been tested for performance characteristics, and over 10 800 tractors have been tested for noise measurement at the driving position, and driver protection, in the case of tractor roll-over. In addition to regular meetings of the Codes, Test Engineer Conferences are held every two years, each time in a different country. The primary purpose of these conferences is the observation, review and discussion of testing practices by test engineers.

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1. Austria, Belgium, China, Czech Republic, Denmark, Finland, France, Germany, Iceland, India, Ireland, Italy, Japan, Korea, Luxembourg, Norway, Poland, Portugal, Russian Federation, Serbia, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States.
OECD TRACTOR CODES

Benefits of joining the programme

There are a series of inherent advantages associated with joining the OECD Tractor Codes. The first is trade facilitation. Obtaining an OECD approval number facilitates trade among member countries. Tests carried out in one member country are recognized in ALL member countries and allows manufacturers to use OECD test certifications to satisfy import regulations, or to show that their model is safer and more efficient. Second, OECD is an intergovernmental organization and our tests have always a third party certification. This means that the tests done in a particular member country are always validated by OECD’s Co-ordinating Centre, enhancing the credibility of the tests. Finally, the users (farmers) and other stakeholders can benefit as well by comparing the safety and technical reliability of different tractor models and choose the one that better suits their needs.

Who can join?

Membership is open to countries member of the United Nations Organization or its Specialized Agencies.

Application process

1. If a country intends to carry out tractor testing according to the OECD Codes, it needs to submit a written application to the Secretary-General of the OECD expressing its interest in joining the Codes. The application shall provide detailed information, in particular:

   a) A detailed description of any systems of tractor testing already in existence and the legal basis upon which they rest;

   b) A list of tractors that have been tested in the course of the previous 5 years together with, if possible, copies of any test reports that may have been issued;

   c) Details of national production and trade of agricultural tractors, if any;

   d) Indications as to the availability of qualified testing staff;

   e) A detailed list of testing equipment available, together with technical specifications of such equipment. This list should show the equipment available to complete each compulsory test under at least one of the OECD Tractor Codes and also the equipment that is available to complete any optional tests which may, at any time, be carried out. The applicant country must undertake to update this list at regular intervals by providing information concerning newly acquired testing equipment. The presentation outlined in the Quality Manual amended to the Codes shall be followed. The list will be provided in English or French, both being the official languages of the Organisation.

If the applicant country does not intend to carry out OECD tractor testing, a copy of the national regulations concerning domestic requirements applicable to tractors in use shall be sent to the OECD. The required information may be provided in the language of the applicant country. If this is a language other than English or French, a concise version in English or French will be attached.
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2. The application and documentation will be acknowledged by the OECD Secretariat which will visit the applicant country with a representative of a national Designated Authority and possibly the national Institute under contract with OECD acting as Co-ordinating Centre for the tests (hereafter called the “Co-ordinating Centre”).

The purpose of the visit will be:

   a) to obtain information about legislative regulations concerning tractors including type approval, use and international trade;

   b) to explain the technical and administrative implications of the rules of the Codes as well as their organisation and co-ordination on an international level;

   c) to ascertain that adequate technical and administrative facilities are available for the operation of the Codes if the country intends to carry out tests.

The financing of the mission will be the responsibility of the applicant country.

3. Upon admission to the Codes of a country intending to start testing, and in case it did not participate in the mission provided in paragraph 2 above, the Co-ordinating Centre may be invited to visit the testing station(s) in order to assist in setting up the testing site and to report drafting procedures in accordance with the Codes.

4. The applicant country is authorised, before admission to the Codes, to attend the Annual Meetings of Representatives of the National Designated Authorities as an observer. The applicant country agrees that, upon admission, its representatives will attend the annual meeting. The applicant country agrees that its representatives attending the Annual Meetings will be persons directly responsible for the implementation of the Codes.

5. The applicant country shall agree to accept the necessary minimum supervision by the OECD, which is essential if the Codes are to maintain their standards. If, in the course of implementation of the Codes by the applicant country, it is considered necessary, the Organisation may be required to send a person or persons responsible for Codes application in that country to a selected OECD country for a period of further instruction and/or to accept further periodical visits from engineers selected by the OECD for that purpose. The timing, duration and financing of such missions will be decided by the OECD in consultation with the Authorities of the applicant country.

6. Provided the OECD is satisfied with the results of the review specified in paragraph 2, the Committee for Agriculture of the OECD will be asked to recommend that the Council should admit the applicant country to the Codes.
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7. Following the approval by the Council, the Secretary-General of the OECD will notify the applicant country that the application has been approved. The National Designated Authorities in all countries participating in the Codes will also be informed of the acceptance of the country concerned.

Outlook

The OECD Tractor Testing Codes are in constant evolution with the growth in demand for greater harmonization across countries as new tractor models continue to proliferate. They have become an important international reference in the certification of tractors and their protective structures, underpinning existing international agreements, and contributing actively to the harmonization of regional and global standards. There is regular updating of the Codes so as to identify significant improvements in technical performance, safety and environmental protection.

The OECD Tractor Codes cover the testing of:

- **Tractor performance** - All tested tractors must complete compulsory tests of: engine power output and fuel consumption; drawbar power output and fuel consumption; hydraulic power output; hydraulic lift capacity. In addition, the manufacturer can complete optional test procedures including: braking performance, turning area and turning circle; low temperature starting; centre of gravity location; external noise level; axle power; engine (bench) test; waterproofing test; performance in a hot atmosphere.
- **Noise levels** at the operator's driving position
- **Operator safety** - Roll-over Protective Structures (ROPS) and Falling Object Protective Structures (FOPS)
  
  Code 1
  Repealed - for the record.

  **Code 2**
  Repealed and replaced by testing of agricultural and forestry tractor performance.

  **Code 3**
  Testing of the strength of protective structures for agricultural and forestry tractors (dynamic test).

  **Code 4**
  Testing of the strength of protective structures for agricultural and forestry tractors (static test).

  **Code 5**
  Noise measurement at the driver's position(s).

  **Code 6**
  Testing of front-mounted protective structures on narrow-track wheeled agricultural and forestry tractors.

  **Code 7**
  Testing of the rear-mounted protective structures on narrow-track wheeled agricultural and forestry tractors.

  **Code 8**
  Testing of protective structures on tracklaying tractors.

  **Code 9**
  Protective structures for telehandlers (testing of falling-object and roll-over protective structures fitted to self-propelled variable reach all-terrain trucks for agricultural use).

  **Code 10**
  Testing of Falling object protective structures
About the OECD Tractor Testing Codes

Tractor Performance Test Code

This was where it all began. The first Standard Code for the Official Testing of Agricultural Tractors was approved by OECD (then the OEEC) in April 1959, the desire being to develop and publicise an internationally-recognised standard method by which to assess tractor performance. Research and testing centres in many different countries had been testing tractors and measuring their performance levels for many, many decades, but the testing methods used were not all the same: it was not always possible to compare test results produced in different countries. The OECD Standard Test Code attempted to solve this problem and, after over 50 years of testing and over 2750 tractor models tested, the success of the venture is clear for all to see.

The first tractor tested according to the OECD Standard Code
- McCormick International B-450 - March / April 1959

So what exactly is the OECD Tractor Performance Test Code? In simple terms, it’s a series of standardised procedures which test laboratories (Testing Stations) can follow to measure the performance characteristics of agricultural (and forestry) tractors. As you may imagine, the Test Code has developed a great deal since 1959, increasing in detail and complexity to keep pace with the introduction of new features on the tractors submitted for testing. Diesel Particulate Filters, Selective Catalytic Reduction systems and Continuously Variable Transmissions had not been thought of then! Also a family of OECD test codes has developed progressively since 1967 to address other issues of tractor operation, such as operator safety (roll-over and falling-object protection) and comfort (noise level at the driving position).
About the OECD Tractor Testing Codes

Still, returning to the Tractor Performance Code (Code 2). Today it still attempts to satisfy the same requirement as it did back in 1959, namely the standardised assessment of tractor performance. To achieve this aim, the Test Code provides a range of test procedures, each focussing on a specific aspect of the vehicle, namely:-

i) **Engine Power Output and Fuel Consumption** *(measured at the Power Take Off (P.T.O.) shaft)*

ii) **Drawbar Power Output and Fuel Consumption** *(measured using a dynamometer loading car on a concrete or asphalt test track)*;

iii) **Hydraulic Power Output** *(as available at the auxiliary service (spool valve) couplings)*

iv) **Hydraulic (3-point linkage) Lift Capacity** *(measured at the lower link ends and on a coupled frame)*

In addition to these ‘Compulsory’ tests, which all tested tractors must complete, there are a range of additional ‘Optional’ test procedures which can also be followed if the tractor manufacturer wishes, including:-

- Braking Performance
- Turning Area and Turning Circle
- Low Temperature Starting
- Centre of Gravity location
- External Noise Level
- Axle Power
- Engine *(bench)* Test
- Waterproofing Test
- Performance in a Hot Atmosphere
About the OECD Tractor Testing Codes

Plus repeats of any of the ‘Compulsory’ tests, but with different system settings, e.g. tractor ballasted during drawbar power test, 3pt hitch lift performance with different linkage geometry. Performance Code (Code 2) test results are tractor specific; they relate only to one model /vehicle configuration. Code 2 test results are available from the OECD Tractor Website (www.oecd.org/tad/tractor).

Description of each Code 2 ‘Compulsory’ Test

1. Engine Power Output and Fuel Consumption

This test is used to measure the tractor’s engine torque–speed, power and fuel consumption characteristics under controlled laboratory conditions: this starts to show exactly how powerful and fuel-efficient the test tractor actually is.

Engine power output is measured at the power take-off (P.T.O.) shaft by means of an instrumented dynamometer. Fuel is not supplied from the tractor’s tank, but from an external, temperature-controlled supply, which enables the test tractor’s fuel consumption to be measured instantly at any loading level used during the test. If the test tractor consumes material in addition to (diesel) fuel, e.g. exhaust reagent fluid for SCR systems, this consumption rate is also measured alongside fuel consumption. Atmospheric conditions during the test, such as air temperature and barometric pressure, are also noted and the test bay temperature is kept within specified limits, to prevent excessive influence upon engine performance.

The engine power output measured at the P.T.O. shaft will always be lower than the values quoted by tractor manufacturers for engine ‘flywheel’ power output. This is because small amounts of power are lost as it is transferred through the driveline from the engine to the P.T.O. or to the axle ends. Also engine and vehicle ancillary systems such as cooling fans, hydraulic pumps (e.g. for power steering and suspension) and cab air conditioning systems all consume a certain amount of engine power. Consequently, the although the power available at the tractor’s P.T.O. may only be 90 – 95% of the stated ‘rated’ engine power, depending upon the complexity and design of the tractor, the P.T.O. power output level is probably closer to what the user can actually expect to be available when the tractor is put to work in the field.

During the test, engine (P.T.O.) power output (torque and speed) and fuel consumption levels are measured as increasing load is applied via the dynamometer. This is initially done with the throttle control / governor set for maximum engine speed: increasing the dynamometer load effectively drags the engine speed down as the test progresses. This produces a series of measurements which create a ‘Full-Load’ power curve. In addition to this, power output / fuel consumption is also measured at the tractor’s ‘Rated’ engine speed, at the standard P.T.O. speed (540 and/or 1000 rpm) and also at a series of specified ‘Part-Load’ engine speed - load settings. If the test tractor has the ability to ‘boost’ its power output under certain conditions, the P.T.O. power tests are repeated both in ‘Normal’ and ‘Boosted’ engine operating modes.

The results of the tests are presented both as tables and graphs of engine power and torque output across the engine speed range investigated. Fuel and reagent consumption levels are also reported, both in terms of Hourly Consumption (litres/hour & kg/hour) and Specific Consumption (g/kWh); a further quantity ‘Specific Energy’ (kWh/litre) is also reported. These last two quantities are important and effectively indicate how efficiently the tractor can convert (diesel) fuel into usable energy or work. Specific Consumption (g/kWh) shows how many grammes of fuel are required by the tractor to produce one kilowatt-hour of work. Conversely Specific Energy (kWh/litre) tells us how efficiently the test tractor can convert the energy present in one litre to diesel fuel into actual,
About the OECD Tractor Testing Codes

practical P.T.O. work (at a given engine torque-speed setting); as such it provides a realistic measure of the overall (P.T.O. power) efficiency of the test tractor.

2. Drawbar Power Output and Fuel Consumption

This test complements the static P.T.O. power test and measures the tractor’s ability to convert engine power into drawbar power. Tractors spend a lot of their time pulling implements, so it is important to identify how efficiently the vehicle’s driveline can transfer power from the engine to the wheels / ground. This is done by following a similar test procedure to that used during the P.T.O. Power Test, but instead of loading the tractor via a P.T.O. dynamometer, this time a Loading Car is towed by the tractor around a concrete or asphalt. Whilst this test surface may not be very ‘agricultural’, it does provide very consistent results, removing the variability which different surface conditions could introduce into data produced by different testing stations or at different times of year. This approach enables direct comparison between any OECD drawbar power test data.

Each testing station has its own load car, but all work in a similar way. Based on a truck or bus chassis, the vehicles incorporate a dynamometer which can apply a precisely-controlled braking force to the load car wheels. This in turn applies a draught (pull) force to the tractor drawbar, the size of which is measured by a load cell at the front of the load car. As with the P.T.O. power test, fuel is not supplied from the tractor’s tank, but from a temperature-controlled supply on the load car. The load car is fitted with a great deal of electronic measuring equipment, to record not only the drawbar load applied to the tractor, but also the forward speed, the tractor’s fuel consumption, engine coolant and oil temperature, atmospheric conditions and all other relevant information during the test. The level of drawbar power generated by the test tractor is calculated from the drawbar pull and vehicle forward speed.

During the test various loading levels are applied to the tractor in a range of transmission gears / forward speeds. Tractors with steplessly variable transmissions (e.g. CVTs) are tested in a similar way, but it is likely that, as intelligent tractor engine-transmission control systems become more commonplace in the future, the test procedures will have to evolve yet further. In all cases the tractor is tested in unballasted condition, but further tests may also be performed with ballast added (e.g. front end / wheel weights, tyre liquid ballast). Once again, as with the P.T.O. power test, specific fuel consumption and specific energy values are derived, together with reagent (SCR fluid) consumption, to show how efficient the test tractor actually is. However, because further power losses are always present between engine (flywheel) and drawbar power, due to driveline losses and wheelslip, the specific fuel consumption values will be higher (and the Specific Energy levels lower) than during the static P.T.O. power test.

3. Hydraulic Power Output

This test procedure measures the tractor’s ability to produce hydraulic power, as would be required to power hydraulic motors or actuate hydraulic rams on attached implements. Most modern tractors deliver hydraulic flow externally via auxiliary or spool valves, many having four or more pairs of such valves.

External test equipment is used to measure the maximum hydraulic pressure (at max. engine speed) which the tractor can supply at one of its spool valve couplers. After this, the hydraulic flow rate delivered by the coupler at 90% of this max. pressure is recorded, enabling calculation of max. hydraulic power availability. The oil temperature in the tractor’s hydraulic reservoir is monitored throughout the test. These tests may be repeated using more than one pair of couplers, simultaneously, where a single coupler may limit maximum flow rate. Also, whilst initially tested
with the oil flow being subject to no return pressure, further tests may be performed with the ‘return’ oil flow re-entering the tractor via coupler pair, as would often be the case in normal use. This creates greater back pressure and consequently reduces the oil flow and hydraulic power available.

By performing these tests in a number of different ways it is possible to obtain a truly realistic assessment of the hydraulic flow / power available from the tractor to operate attached implements.

4. **Hydraulic (3-point linkage) Lift Capacity**

Sufficient hydraulic lift capacity is an important requirement for most modern tractors, except perhaps very large models designed for use mainly with trailed implements. The geometry of the three-point (3pt) linkage has an important influence upon a tractor’s lift capacity. Whilst a manufacturer may only state the maximum lift capacity in the product information, the OECD Test Report shows all the relevant dimensions of the 3pt linkage and then goes on to measure the tractor’s hydraulic lift capacity throughout the entire range of linkage movement. It’s no good if a tractor can start to lift an implement off the ground but then runs out of lift capacity further up into the lift range.

Exactly how tractor the stated 3pt linkage lift capacity corresponds to actual ability to lift a mounted implement is rather a complex situation. It depends not only on the mass of the implement, but also the location of the Centre of Gravity (Centre of Mass) – how far this is behind the implement headstock / linkage attachment points – and the tractor’s linkage geometry, some of which you may be able to see and some of which may be hidden away inside the rear axle casing.

OECD testing stations measure 3pt linkage lift capacity by two complementary methods. Firstly, at the lower link ends and, secondly, at a point on a simple frame attached to the lower and upper (top) links, 610 mm behind the lower link attachment points. In each case the max. lifting force is recorded at various points throughout the lift range, at 90% of the hydraulic lift system’s relief valve pressure. The tests are often repeated (at the manufacturer’s request) with slightly modified 3pt linkage geometry, such as may be obtained on the test tractor by shortening the lift rods, attaching the lift rods the lower links in a different location, or changing the top link mounting point / hole.
About the OECD Tractor Testing Codes

Tractor Noise Test Code (Code 5)

This Test Code is slightly unique in that, from a technical point of view, it sits part-way between the Performance and the Protective Structure test codes. During the 1970s many countries required that operator roll-over protective structures (safety cabs, frames, or roll-bars) be fitted to tractors to reduce the number of drivers killed in overturning accidents.

These early ROPS worked well, but most designs were attached directly to the tractor chassis or engine-transmission housings. When fitted with cladding to give the operator some level of weather protection, it was found that very high noise levels were generated inside the cab ... much higher than if no protective structure had been fitted. It was almost as if the driver was sitting inside a personal loudspeaker! It soon became clear that there was a real danger of tractor operators suffering damage to their hearing and many countries rapidly introduced legal requirements for in-cab noise levels to be reduced, particularly when the tractor was working under full-load.

OECD Code 5 is a test procedure to enable measurement of noise levels at the operator’s driving position ... in effect, close to the driver’s ear. Noise levels are recorded both with the tractor “Under Load” and also “Without Load”, with the cab “openings” windows, doors, roof hatches) open and closed.

- “Under Load” tests are performed with the tractor pulling a drawbar load (dynamometer car). The maximum sound level generated in each forward gear is recorded, together with that in a gear and corresponding engine speed which gives as near as 7.5 km/h forward speed as possible;
- “Without Load” tests are performed with no drawbar load but, to provide comparison with the “Under Load” tests, in a gear and corresponding engine speed which gives as near as 7.5 km/h forward speed as possible. A further “Without Load” noise level is also recorded at the tractor’s maximum forward speed.

Noise Code (Code 5) test results are similar to those of the Performance Code (Code 2) in that they are tractor specific; they relate only to one model /vehicle configuration. Also, unless made public at the wish of the test applicant / manufacturer, the test results remain confidential and are not released by OECD.
About the OECD Tractor Testing Codes

Operator Safety (ROPS / FOPS) Test Codes

Roll-Over Protective Structure (ROPS) Test Codes

Why Do Tractors Need ROPS?

Tractors spend much of their time working off-road in the countryside, but these often variable conditions (e.g. slopes, slippery surfaces, rivers and drainage ditches) introduce a risk of instability, potentially leading to vehicle roll-over. Historically, before the widespread introduction of ROPS, tractor roll-over caused the deaths of many tractor drivers each year: the risk of severe injury or fatality was very high. Fortunately ROPS have long been recognised as an effective means of greatly reducing the likelihood of operator injury during overturning accidents involving agricultural tractors, construction or related forestry machinery. The presence of a ROPS cannot guarantee the operator will survive every type of roll-over accident; unfortunately some are simply too severe, but the practical benefits of ROPS are clearly shown by the data below, which comes from the UK.

![Tractor Overturning Fatalities](chart)

(courtesy UK Health & Safety Executive)

In 1970 it was made a legal requirement for all ‘new’ tractors sold in the UK to be fitted with ROPS and from 1977 onwards ROPS had to be fitted to all existing tractors in-use on farms. As can be seen, the number of operator deaths due to tractor roll-over dropped dramatically from approx. 35 – 45 per year to approx. 4 – 8 per year. Today in the UK, most roll-over deaths result from the operator having been partially ejected from the protective zone provided by the ROPS, often because of the failure to wear a seat belt.
About the OECD Tractor Testing Codes

History of ROPS / ROPS Test Standards Development

Sweden was one of the first countries to require tractors to be fitted with Roll-over Protective Structures (ROPS) back in the late-1950s, but similar national ROPS legislation followed in many other countries over the next 10 years. However, it’s all very well to require ROPS to be fitted, but how can you ensure that the designs are fit-for-purpose and indeed are suitable for the particular design and size of tractor to which they are fitted? Many different agricultural engineering research institutes and universities studied the design and testing requirements for ROPS. This was achieved by a combination of research, testing and examination of tractor roll-over accidents. In many cases tractor roll-overs were re-created under relatively controlled conditions, so the likely loadings applied to the ROPS and their subsequent behaviour of the structures could be studied. Today computer simulation modelling is often used.

Over time the resulting national ROPS testing standards were harmonised to create those which we know today, allowing OECD to be at the forefront of ROPS test standards development.

Initially ROPS performance validation tests were performed by use of a sequential combination of ‘Dynamic’ swinging (pendulum-type) mass impacts from the rear, side and possibly the front of the structure, supplemented by gradually-applied crushing loads to the upper ‘roof’ of the ROPS. This procedure is typified by OECD Code 3, which was originally introduced in 1966. The purpose of all ROPS tests is to ensure the ROPS will safely absorb a certain minimum level of strain energy during loading, without the structure failing or deflecting into the safety ‘clearance’ zone likely to be occupied by the operator. The level of test loading is related directly to the test tractor’s mass because, during a roll-over, the heavier the vehicle, the greater the forces and impact energy which will be applied to the ROPS.

As tractor power and mass increased during the late-1960s and early-1970s, it became clear that the ‘Dynamic’ ROPS test procedure had certain limitations for testing ROPS fitted to heavier tractors. Quite simply it was increasingly difficult to apply the mass-related dynamic loading in a controlled and safe way as tractor mass increased. This problem was solved by the development and introduction of the ‘Static’ ROPS test procedure (OECD Code 4) in 1983. Following a great deal of research in a number of countries, a test procedure was developed which replaced the swinging pendulum mass with a series of slowly-applied loadings. The direction and sequence of loadings was retained, as were the vertically-applied crushing loads. The loading sequence for OECD Code 4 is shown in Figure 1. As before, the loading / strain energy levels which the ROPS must withstand are directly related to mass of the test vehicle.
About the OECD Tractor Testing Codes

Today’s ROPS Test Codes have not changed so very much from the 1980’s. The family of OECD ROPS Codes has expanded to include test procedures for Narrow-Track (wheeled, vineyard and orchard) tractors (Codes 6 and 7), plus Crawler (tracklaying) tractors (Code 8) and Telehandlers (self-propelled variable reach all-terrain forklift trucks for agriculture) (Code 9). Fewer dynamic ROPS tests are performed today, the majority being conducted by the ‘static’-type procedures, of which Code 4 is the most frequently used. However, unlike the other OECD Test Codes, a ROPS test relates to the particular structure tested, which may subsequently be fitted to a range of different tractor models. So the structure if usually tested with loadings to suit the heaviest model in the vehicle range, in the safe knowledge that the requirements of the lighter models will be satisfied. Also, the results of OECD ROPS tests are not made available to the Public, but remain confidential to the vehicle / ROPS manufacturer and the testing station which performed the test. When tested a test report is produced; this is subsequently checked by the OECD Coordinating (Quality Control) Centre and, if all is in order, an OECD Approval Number is issued for the ROPS to prove that it has met the test requirements. A list of ROPS tested, their OECD Approval numbers and the tractor makes and models for which they are suitable is available to the Public via the OECD Tractor Codes Website (www.oecd.org/tad/tractor).
About the OECD Tractor Testing Codes

Falling-Object Protective Structure (FOPS) Test Codes

Why Do Tractors Need FOPS?
Falling-Object Protective Structures (FOPS) are more commonly found on vehicles used in construction and forestry applications. They are frequently provided either by strengthening the cab roof or by fitting some form of external protective guard above it. In any case the purpose of a FOPS is to prevent vertically-falling objects from entering the operator’s safety zone and causing injury.

Certain regions, notably the Scandinavian countries, where it is common for agricultural tractors to spend part of the year performing light-duty forestry tasks, have required tractors be fitted with FOPS for many years. In recent years greater interest has been shown in this requirement within the European Union. In agricultural applications the specified (light-duty) FOPS requirements can often be met by a suitably reinforced plastic or composite material cab roof, supported by the ROPS.

The OECD FOPS Test Code
Many different FOPS test procedures exist, but all are relatively similar. A drop test object (usually a steel sphere or cylinder) is dropped from a certain height onto the FOPS. If it penetrates the FOPS or causes the FOPS to deflect to such an extent that it enters the driver’s safety zone, then the test is failed: otherwise the FOPS passes. The test object drop height and mass is chosen to subject the FOPS to a certain level of impact energy. The more demanding the intended operating environment of the vehicle, the higher the impact energy level. Depending upon the precise construction of the FOPS (e.g. different materials or thicknesses), more than one drop test may have to be performed upon different areas of the FOPS upper surface.

The OECD (Code 10) FOPS Test is intended only for tractors used for traditional agricultural tasks and therefore features a relatively low impact energy level compared with FOPS test procedures intended for construction or forestry equipment. A FOPS test procedure is also included within OECD Code 9 for the testing of both ROPS and FOPS fitted to Telehandlers (variable-reach rough terrain forklift trucks). The impact energy levels of the Code 9 FOPS test (two alternative levels are provided) are significantly greater than that found in Code 10 for agricultural tractors.

Similar to the OECD ROPS Test Codes, a FOPS test relates only to the particular structure tested, not a particular tractor or telehandler model. The FOPS may subsequently be fitted to a range of different tractor / telehandler models: as long as the mountings to the vehicle and the (precise) operator seating location are unchanged, the results are broadly applicable.

Again, as with ROPS tests, the results of OECD FOPS tests are not made available to the Public, but remain confidential to the vehicle / FOPS manufacturer and the testing station which performed the test. When tested a test report is produced, this is subsequently checked by the OECD Coordinating (Quality Control) Centre and, if all is in order, an OECD Approval Number is issued for the FOPS to prove that it has met the test requirements.
Advantages of the OECD Tractor Codes

- **Global Certificate**
  OECD approval numbers are recognized in 26 countries including 4 non-OECD members (China, India, the Russian Federation and Serbia).

- **Global Network of Testing Stations**
  OECD has currently 30 testing stations located in Europe, Asia and America, which ensure compliance with OECD tests and procedures.

- **Fast Turnaround**
  Average approval time is less than 5 days.

- **EU Equivalence**
  Equivalence of OECD Tractor Codes to EU Directives

- **Enhanced Credibility and Fair Trade**
  Tests done in a member country are always validated by the OECD’s Co-ordinating Centre. This enhances credibility of tests for operators and guarantees compliance of manufacturers with rules and regulations promoting fair trade.

- **Operator Safety**
  Operator safety is one of the main pillars of the OECD Tractor Codes. The certification of adequate Roll-over protective structures (ROPS) and falling object protective structures (FOPS) has contributed to the reduction of tractor fatal accidents.

- **Constant Evolution**
  OECD Tractor Codes are updated regularly to take into account improvements in technical performance, safety and environmental protection.

- **New Markets**
  OECD Tractor Codes membership is constantly expanding bringing new market opportunities.

- **Export Growth**
  On average OECD Tractor Codes member countries report a 30 percent increase in tractor exports.

www.oecd.org/tad/tractor
OECD TRACTOR CODES IN ASIA

A particular feature of the OECD Tractor Codes is that, since 1981, a Test Engineers’ Conference is organized every two years at the invitation of a participating country. The first Asian country that joined the Tractor Codes was Japan in 1966. Japan hosted the OECD Test Engineers’ Conference in Omiya, in 1997. China joined the OECD Tractor Codes in 1988 and was the second Asian country to host the Engineers’ Conference in Beijing and Luoyang in 2005. Korea became an official Member of the Tractor Codes in 1995 and was the third Asian country to host the Engineers’ Conference in Suwon in 2009. Test Engineers’ Conferences permit a correct and coherent interpretation of testing procedures and their development. Their primary purpose is the observation, review and discussion of testing practices by Test Engineers. They facilitate the verification of test reports carried out by the Co-ordinating Centre, which liaises between the National Testing Stations and the OECD for technical matters.

The three Asian countries that have hosted an OECD Test Engineers Conference demonstrated the relevance of the programme in the region. Over the last years, China has been one of the three countries with the highest amount of test reports sent to the OECD for approval.

India joined the OECD Tractor Codes in 1988. Farm machines and equipment play a pivotal role in crop production, and its handling, transportation, processing and preservation. Recognizing this, the Govt. of India had undertaken imports of farm equipment in the First Five Year Plan period. Simultaneously, for promoting the use of machines, the Government established the "Agricultural Machinery Utilization Training Centre" in 1955 at Budni (Madhya Pradesh). Prior to this, use of farm machines in the country, was quite scant. The objective of establishing the Budni Centre was to train the prospective farmers on proper use, maintenance and up-keep of farm machines. Subsequently, considering the imperativeness of the indigenous manufacture of farm machines/equipment, in 1959, a testing wing was added to the Centre; primarily with a view to ascertain the suitability of agricultural machines/equipment to the agro-climatic conditions of the country. The Centre was renamed ‘Tractor Training and Testing Station’. In the year 1983, the Tractor Training and Testing Station was upgraded and renamed ‘Central Farm Machinery Training and Testing Institute’. Viewing the importance of the testing of farm machines and training on various aspects of farm machinery, and to cope-up with the increased demand of trained manpower in the field of agricultural mechanization, three more Institutes were set up at Hissar (Haryana), Anantapur (Andhra Pradesh) and Biswanath Chariali (Assam) in the year 1963, 1983 and 1990 respectively.

Over a period of 5 decades, with the growth of indigenous production of tractors and farm equipment, the Institute has developed the necessary expertise and infrastructure and has attained International Standards in the field of farm machinery training and testing and is well recognized amongst leading testing organizations in the world. The Institute has accreditation of Organization for Economic Co-operation & Development OECD), Paris which has helped in export promotion of Indian Tractors.
OECD TRACTOR CODES AND UNESCAP

The OECD Secretariat took part in July 2011 in an Expert Working Group (EGM): Development of a sustainable agricultural machinery and farm implements testing network in the Asia-Pacific Region. The EGM was organised by UNESCAP in Bangkok, Thailand. 14 countries from the region participated in the Meeting, including five countries that are members of the OECD Tractor Codes; Korea, China, India, Russia and Japan.

The focus of the discussions was to identify the modalities in developing an Asia-Pacific network for testing agricultural machinery and to establish a taskforce to develop and operationalise an Asia Pacific Network to oversee the implementation of operator and environmental safety standards.
THE OECD TRACTOR CODES

Code 2: the performance of tractors

Code 3: the strength of protective structures for standard tractors (Dynamic Test)

Code 4: the strength of protective structures for standard tractors (Static Test)

Code 5: noise measurement at the driver’s position(s)

Code 6: the strength of the front-mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors

Code 7: the strength of the rear-mounted roll-over protective structures on narrow-track wheeled agricultural and forestry tractors

Code 8: the strength of protective structures on tracklaying tractors

Code 9: the strength of protective structures for telehandlers

Code 10: the strength of falling object protective structures for agricultural and forestry tractors

OECD Standard Codes For the Official Testing Of Agricultural and Forestry Tractors

www.oecd.org/tad/tractor
Tractor Test Reports

The First Test Report was approved in 1959

Since 1959, test reports are approved by the official Co-ordinating Centre, provided that tests have been satisfactorily carried out in accordance with the procedures laid down in the Tractor Codes.

Results of each tractor test approved according to the OECD Codes are included in a full report issued by the national stations having performed the tests. Access to these reports and their possible distribution remain the testing stations responsibility.

(On the right, copy of a test report received at the end of 2011)
The aim of the Strategic Plan for the OECD Tractor Codes is to strengthen the Codes by improving their relevance, efficiency and effectiveness.

The Strategic Plan will enable to improve the Rules of the Codes and their implementation and to identify new strategic areas of work to be incorporated into the broader work programme.

The OECD Tractor Codes contain a set of rules and testing procedures on performance and safety.

The brochure can be found on the Tractor Codes website at following address: http://www.oecd.org/tad/tractor
Head of Unit, Chair and Organizers pausing during the 16th Test Engineers’ Conference hosted by Germany
Technical Demonstration on Code 4 during the 16th Engineers Conference
(Strength of protective structures for standard tractors
(static test on seat belt anchorage))
Malaysia participated as Observer in the 16th Engineers Conference
Further information

The following OECD web pages can be consulted for additional information on the OECD Tractor Codes (latest publications, news and events, rules and list of participating countries).

Agriculture (general): www.oecd.org/tad

OECD Directorate for Trade and Agriculture
2, rue André – Pascal
75775 Paris, Cedex 16
France

Codes and Schemes (general): www.oecd.org/tad/code

Tractors: www.oecd.org/tad/tractor

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Co-operation with other International Intergovernmental Organisations

Co-operation with Non-Governmental Organisations (NGOs)
Tractor Codes Member Countries

Argentina  Brazil  China  Czech Republic  France  Germany

Formal Applicant Countries

Brazil  Bulgaria

Potential Member Countries

Argentina  Indonesia  Malaysia  Mexico

http://www.oecd.org/tad/tractor

OECD Tractor Codes Brochure

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