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Technical requirements on basic equipment, realization, construction setting, machinery and devices.

Applies for:        Mechanical equipment  
                         Special machines and transfer lines

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The latest updated version of this ITS is available at the "<http://cts.skoda-auto.com/>" web site, the company is not obliged to notify their business partners on the ITS update.

Therefore we strongly recommend that everybody checks the ITS regularly. These documents become valid on the date of their last update. For the contracts signed is decisive the validity of the ITS at the time of the order.

Note: In case of any differences between the Czech, English or German language mutation of this ITS, the Czech version takes precedence.

The Czech version is available at <http://cts.skoda-auto.com/>.

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1.	1994-10-01	complete revision
2.	1997-04-13	complete revision
3.	2001-12-10	complete revision
4.	2002-02-01	Arial font, <b>Škoda</b> Auto logotype
5.	2009-02-10	points 1, 2.6.3, 2.6.4, 2.8, 2.8.4, 3.5 updated point 4 – deleted
6.	2010-12-21	complete revision
7.	2011-06-06	point 1.1 updated
8.	2013-12-13	point 2.3 updated
9.	2020-02-20	Points 1.6, 2.1.10, 2.5.14, 2.6.1, 2.6.3, bod 2.8.1- 4 – deleted, actualization point 3

**1. Accompanying documents**

The documents are received in Czech in two hard copies (paper, foil, etc.) and one electronic copy in the scope required by ITS 1.01, including translation of texts in the drawings (e.g. glosses in the drawings) or as agreed in writing.

**ŠkodaAuto reserves the right to approve the drawing documentation of the basic groups of machinery and devices before submitting it to production. For example, fixtures, manipulators, loaders, unloaders, schemes of electricity, pneumatic and hydraulic equipment, lubrication and overall setting of the machine including accessories.**

**1.1 Technical parameters**

The machines must operate faultlessly while fulfilling the entrance parameters:

1.1 Electricity and control technology	ITS 1.11, 5.11, 5.13
1.2 Pneumatic systems	ITS 1.13
1.3 Hydraulic systems	ITS 1.12
1.4 Water	According to the project data
1.5 Lights	ITS 1.25
1.6 Surrounding temperature 5 to 40 °C, ČSN EN 60204-1 ed3.	

**2. Basic equipment****2.1 General requirements**

These are binding for special machines and large technological deliveries such as transfer lines. Equipment according to ITS 1.10 must be consulted with **ŠkodaAuto**.

2.1.1 Diagnostic and programming devices must be part of the delivery.

2.1.2 The machines must include a piece meter and possibly also a working hours meter.

2.1.3 To check the geometric accuracy of the machines (according to paragraph 2.6) regulating and adjusting gauges must be delivered with the machine, as well as preparations, checking spikes and a calibrating device.

2.1.4 A wear and tear checking device must be included. Specific applications are to be agreed on with an expert workplace at **ŠkodaAuto**.

2.1.5 When using compressed air the machine must be equipped with an input air maintenance unit.

2.1.6 The machine must be equipped with an input checking of work pieces and work piece insert position check, so that faulty attachment or machine breakdown is prevented.

2.1.7 Stable pressure tanks to be delivered with checking and filling device.

2.1.8 Sharpening tools to be equipped with signalling of machine blocking function upon achievement of the maximum wear and tear of the sharpening tool.

2.1.9 Special machines and transfer lines to be equipped with tool storages and adjusting desks.

2.1.10 With the machine have to be delivered a inventory of spare parts and short-term parts for 12-month operation run.

2.1.11 To change tools heavier than 15 kilos, the machine must be equipped with corresponding means of manipulation.

**2.2 Electricity and control systems**

Realization according to 1.11, 5.11 and 5.13.

**2.3 Hydraulic and pneumatic systems, Lubrication, Fire Safety**

Realization according to ITS 1.12, 1.13, 1.17.,2.10

**2.4 Cooling**

2.4.1 Use of cooling and cutting emulsions must be previously agreed with **ŠkodaAuto**. They must be replaceable with a Czech equivalent.

2.4.2 When using special liquids or media, attestation of hygienic quality (non-harmfulness) and the procedure of their liquidation approved by the hygienic service authorities of the Czech Republic.

2.4.3 It is imperative that self-cleaning and ecological filtration systems are used. Specific use must be approved at **ŠkodaAuto**.

2.4.4 Preferably, cutting liquid tank should have multiple chambers.

2.4.5 Cooling liquid tanks must be placed so that they are accessible in case of repairs.

2.4.6 At transfer lines divided into sections, it must be possible to regulate and shut the cooling mains of the individual sections separately and the regulation parts must be accessible to the operator.

2.4.7 Distillery and cooling liquid cleansers must be used which are easily operated, maintained and removed.

2.4.8 Cleaning of the cooling liquid must include separation of other impurities (non-magnetic metals and materials).

2.4.9 To prevent pollution of the floor with the cooling liquid at the point of output of chips or work pieces, residual liquid must be channelled back to the cooling system.

2.4.10 If the cooling central is placed below the level of the surrounding terrain, the floor below the tanks must be finished with a collecting reservoir and a grate must be incorporated. The reservoir must include an automatic cooling liquid pump. Operation of the pump must be signalled at the control panel.

2.4.11 Waste must be liquidated using a adequate physical strain without danger of threatening health and the procedure must be approved by hygienic service and working safety authorities as well and fulfil ergonomic standards.

2.4.12 The cooling centre must have a sufficient reserve for washing off fasteners and flushing chips.

2.4.13 For chip unloaders secure an interval halt of the line with the possibility of timing according to the amount of chips, to limit the unloaded amount of residual liquid.

## **2.5 Machines, realization and construction requirements**

Should any discrepancies occur, the following conditions of realization and construction must be consulted with **Škoda Auto**.

2.5.1 Machine parts must be produced according to the ČSN, ČSN ISO or DIN standards in metric system.

2.5.2 Use of standardized joining parts, catalogue parts and prefabricated elements is preferred.

2.5.3 Use weldments for basic sections of the machine. In the case of transfer lines, adhere to the principle of transverse solid basic section.

2.5.4 Energy mains of electricity, hydraulic and pneumatic systems must be conducted in the upper part in energy channels or in auxiliary support constructions located on the machine so that the upper and one of the lateral sides are accessible for disassembly during repairs.

2.5.5 The same condition must be met for cooling and rinsing pipes.

2.5.6 Tempered bars, replaceable tempered steel blocks or rolling leads should be used for gliding surfaces of the beds. Other realization must be approved by **ŠkodaAuto**.

2.5.7 Fast wearing parts must be easy to disassemble and access.

2.5.8 Supporting surfaces and tactile parts of fasteners and fastening mechanisms which come into contact with the forage must be easily replaceable and included in the ND specification.

2.5.9 Mobile mechanisms must be secured against overload.

2.5.10 Mandrel heads must be secured against inlet of the cooling liquid, overpressure is preferred.

2.5.11 Mandrel heads with long tool holders must be constructed so that the mandrels are not damaged when the machine is operated (functions) incorrectly.

2.5.12 Quick-fasteners are preferred for fastening the tools.

2.5.13 For special machines with revolving desks, the fasteners are to be located on a common desk in order to speed up the repairs. Secure the mutual position with a lock or a stopper.

2.5.14 Lockable regulating and lockable adjusting elements can be used only in cases approved by ŠA.

2.5.15 Housing must be designed so that the cooling and lubricating liquids are not spread outside of the machine. However, they must be easy to check.

2.5.16 Fastening station or mechanisms must include a device to check if the workpiece fits or one that signals the fastened status with blocking of the machine function.

2.5.17 The machine must enable easy maintenance, repairs, calibration, quick replacement of components and cleaning.

2.5.18 With transfer lines, minimum clearance of 700 mm between the stations (including housing) must be maintained.

2.5.19 Transfer lines must be constructed in sections so that the individual sections may work independently. These sections must include work piece storages.

2.5.20 Transfer lines must be placed in an isolated base container with a transverse cross-section (3-4%) into a collecting drain for flushing the chips. Space between the machine and the edge of the container must be housed with a metal grate.

2.5.21 Transport of the chips at cutting lines to be solved by

- a) flushing into a "V"-shaped metal drain placed below the machine or inside the machine above the floor-level.
- b) Flushing into the pipage placed in the floor, covered conduit. The conduit housing must allow checking and cleaning of the pipage.
- c) Detailed realization and placing of the conduits or pipes for the individual projects must be consulted with and approved by **ŠkodaAuto**.

2.5.22 Install flushing jets into the drain, the flushing liquid must be identical with the cooling one.

2.5.23 The flushing jets must be channelled to the metal from the upper part. The pipage to the jets must be equipped with regulation elements that must be accessible for the operators.

2.5.24 „Central-stop“ for the cutting lines to be placed along the whole lateral sections. (E.g. with a rope, „Central-stop“ signs). Use el. connection for the rope „Central-stop“ which activates the emergency status when the rope is torn.

2.5.25 Working units to be equipped with electro-mechanic shifting motors with ball screws. In particular cases or as the need arises, hydraulic or pneumatic motors may be used. Smooth regulation of the shifting mechanism or the use of other motors must be consulted with **ŠkodaAuto**. Quill units are not allowed.

2.5.26 Stable pressure tanks must be placed so that they can be checked regularly.

2.5.27 Material which comes into contact with erosive substances must be protected against corrosion.

2.5.28 Mechanic chip conveyors must be secured against overload in case the line is blocked. (E.g. electro-mechanically).

2.5.29 At transfer lines where conveyors (pallets) are used to transport work pieces, return track of the pallets must be placed at the same height as in the transfer line and must be equipped with a pallet washing machine.

2.5.30 Construction of the machine must enable the fastener (cart) or work piece to be disjoined in the space between the operational positions.

2.5.31 Service operation or control panels must be placed so that they are accessible to the operator without using stairs, ladders or footbridges.

2.5.32 The use of material containing silicon is strictly prohibited.

2.5.33 Temperature of the parts at the machine output must not exceed 30°C.

2.5.34 For the purposes of parameters check, temperature of the work pieces must range between 20–24°C.

2.5.35 Cable channels must not have sharp edges. Recommended angle is 45°. Furthermore, the upper or lateral cover must be removable.

2.5.36 Welding machines should incorporate transparent barriers against chips flying away.

2.5.37 Construction design of manipulators, loading and unloading mechanisms must be presented to **ŠkodaAuto** for approval. Electro-mechanic motors of the individual axis with linear movement will be preferred.

2.5.38 Dividing lines of tact mechanisms (for example at transfer lines and washing machines) longer than 3 metres must be isolated.

2.5.39 If any construction components are changed during the assembly or run-up period (including electric, hydraulic, pneumatic, mechanical or fast wearing), the supplier is obligated to deliver these parts immediately in an amount necessary for a twelve-month operation and conduct a repair of relevant specification.

2.5.40 When using an electric mandrel, the machine must be delivered with a formulation for assembly and disassembly. The documentation must include description of the disassembly, assembly and adjustment procedures.

## 2.6 Geometric accuracy

If not agreed separately, measurement of geometric accuracy is conducted in line with ITS1.10, articles 2.6.1 and 2.6.8.

The supplier is obligated to deliver the relevant measurement protocols (e.g. of geometric accuracy, head stock toughness, axis balancing or setting) not later than at final handover. **ŠkodaAuto reserves the right to check the geometric accuracy of the machine.**

2.6.1 General requirements on measuring geometric accuracy of forming machines in line with ČSN, EN, ISO.

2.6.2 Technical requirements on realization or handing over of cutting machines in line with ČSN ISO 230-x.

2.6.3 Checking geometric accuracy of cutting machines in line with ČSN, EN, ISO.

2.6.4 Checking geometric accuracy using a product sample based on mutually agreed and confirmed parameters.

2.6.5 Checking of head stock toughness at a 10 kN weight in the direction of movement axes.

2.6.6 Position accuracy, accuracy of circle interpolation in line with ČSN ISO 230 – X.

2.6.7 Normalized tools are preferred for measuring geometric accuracy.

2.6.8 Contingent deviations from ČSN, ČSN ISO or deviations identified at special measuring must be consulted with **ŠkodaAuto**. (e.g. measuring with a counter-gauge)

## **2.7 Work safety**

2.7.1 The machine must adhere to ITS 1.18, 1.25.

2.7.2 Noisiness must not exceed permissible limits as given by ITS 1.19.

If this condition cannot be fulfilled in some locations only, suitable construction dampening must be used to prevent the noisiness from diffusion.

However, the construction dampening must be easy to disassemble, check and adjust.

2.7.3 The machine must be equipped with effective exhaustion of the working space. As regards exhaustion of aerosols, the condensate must be channelled back.

**2.8 Check measurement – vibrodiagnostics** As given by ITS 1.16

## **2.9 Washing machinery**

2.9.1 Washing machines must consist of a tank and an inner space cover of anticorrosive material, the outer cover can be made of galvanized material. Other components must be protected from corrosion.

2.9.2 Washing machine jets should be designed as exchangeable packets with quick switches.

2.9.3 Washing machine tank must be constructed so as to allow cleaning of the inner space and the whole bottom.

2.9.4 Washing machinery must be constructed so as to prevent vapour outlet when opening/closing them. Machines with closed air circulation system are preferred.

2.9.5 Washing machine catch tank must be equipped with signalization of leakage of the washing agent.

## **2.10 Filtration centres with a closed system of reverse pumping of the cooling and lubricating agent with chips**

2.10.1 The cooling centre must be placed in a catch tank whose capacity is sufficient for catching the volume of the cooling agent with a necessary reserve in case of accident. The bottom must be provided with a removable grid and descend into a collecting pool. The pool must be equipped with a pump, closing armature, control components and outlet pipe finished with a flange.

2.10.2 The centre must be equipped with signalling of an agent outlet in case of an accident.

2.10.3 Electric distribution board of the centre and the control must be located outside of the catch tank or in a place where neither the distribution board nor the control access may be flooded with the cooling liquid.

2.10.4 The centre must ensure the temperature of the agent between 24°C + and -2°C while maintaining a minimum pressure of 3 bars in the whole distribution pipage to the machines with an agent filtration of 100µ, 30µ, 5µ, or according to the project and sealed so as to prevent the agent and vapours from leaking.

2.10.5 The tanks must be dimensioned for a complete distribution system of the agent for the outlet and reverse pipage, machinery, reverse pump stations and other components of the closed system.

2.10.6 The pumps must be equipped with compensators on the side of the suction and delivery. To reduce the turbulence and cavitation the diameter of the compensator must agree with the closing and regulation shutter of the outlet pipage.

2.10.7 The pump frames must be equipped with dampening of oscillation.

2.10.8 The supplier must submit a protocol of axis alignment of the system (pump-clutch-engine) after the assembly at the end-location before starting up the pumps.

2.10.9 The system must be equipped with reserve pumps with automatic switching.

2.10.10 Filtration tanks must be equipped with central suction, service and maintenance staircases and platforms. Possibly lifting equipment for disassembly and repairs of the main components such as filters, engines, pumps and the like.

2.10.11 The centre must be equipped with a filling, closing, regulatory and outlet fittings. Possibly an accident tank with agent pumping may be incorporated – depending on the project.

2.10.12 The centre must be equipped with measuring, automatic regulation, operation status indication, the filling must be equipped with a dosing device for concentration refill and filtration belt continuity check.

2.10.13 The pipage must be fixed so as to prevent loosening or movement of the pipage if streaming of the agent changes.

2.10.14 Reverse pumps at the outlet side must be equipped with compensators so as to prevent the vibration from being transmitted to the pipage.

2.10.15 The reverse pump tank must be equipped with regulatory components for the surveillance of the surface and the emergency status.

2.10.16 The pipage label must indicate the following – the direction of the stream, type of agent, level of filtration (e.g. oil 30  $\mu$ , emulsion 100  $\mu$ ,...)

2.10.17 Channels or pipage for reverse pumping of the cooling agent must be conducted so as to allow access to the machine at repairs, adjustments and cleaning. Realization and placement of the channels or pipage must be consulted with and agreed by ŠkodaAuto.

2.10.18 Construction of the main pipage system must secure a stable circulation of liquid in the inlet and reverse pipage to maintain a constant temperature of the agent in the whole system.

2.10.19 The branch endings must be equipped with pressure and temperature measuring devices.

2.10.20 The filtration tank construction must enable cleaning of the inner space and the whole bottom.

#### **2.11 Filtration centres with dry chips reverse suction mechanism**

2.11. Filtration centres with a system of reverse suction of dry chips.

2.11.1 The centre must have a sufficient power reserve for transport and rinsing of the complete pipage system.

2.11.2 The outlet parameters of the waste air must adhere to the hygienic restrictions applicable.

2.11.3 The centre must be equipped with an automatic air compressor protection against damage or filter defect of the filter.

2.11.4 Parts of the pipage that take the hardest wear must be easy to dismantle – quick-coupling is preferred.

2.11.5 An automatic system must check the level of filling and emptying of the feed boxes, allow a preferred outlet or shutdown of a feed box (for example during a machine repair) and an automatic power regulation in line with operation conditions.

2.11.6 Collection spot must be equipped with a control box with signalling an operation status, a stop button, lockable regime switch and an electric interface for communication with the machine.

2.11.7 The collection spot must enable an independent cut-off from the central device (logout, login).

2.11.8 The collection spot pipage must be equipped with a ball cock for manual closure placed above the control or regulation shutter.

2.11.9 The defect of the collection spot suction must be signalled on the machine.

2.11.10 The collection spot chip grinder must be mobile and equipped with quick-coupling to allow immediate replacement in case of defect.

2.11.11 The pipage label must indicate the direction of streaming and type of agent.

2.11.12 The design and location of the pipage must be consulted with and agreed by expert Skoda Auto departments.



### 3. Release list of suppliers of main components and modules

#### 3.1 Direct measuring and measuring for circle axes

HEIDENHAIN	ROD/RON
BALLUFF	SICK
T+R	

#### 3.2 Active measuring devices

MARPOSS	AMEST
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#### 3.3 Electric mandrels

SIEMENS	WEISS
KESSLER	ACOMEL
GMN	INDRAMAT

#### 3.4 Rotating and linear circuit

SKF	INA
HIWIN	BOSCHREXROTH
SCHNEEBERGER	

#### 3.5 Bearings

SKF	INA
FAG	

#### 3.6 Filtration centres pumps

KSB	
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#### 3.7 High-pressure pumps

KSB	BRINKMANN
GRUNDFOS	

#### 3.8 Screw pumps

KNOLL	BRINKMAN
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