



## TECHNICAL REPORT 3778

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# Agricultural tractors — Maximum actuating forces required to operate controls

*Tracteurs agricoles — Forces maximales nécessaires pour manœuvrer les organes de commandes*

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ISO/TR 3778 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*.

This second edition cancels and replaces the first edition (ISO/TR 3778-1978), of which it constitutes a minor revision: the terms "pressure" and "traction" in the column "Note" in clause 3 table have been replaced by "push" and "pull" respectively.

The reasons which led to the decision to publish this document in the form of a technical Report type 1 are explained in the Introduction.

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## 0 Introduction

This Technical Report is based upon a proposal for the standardization of maximum actuating forces to operate controls on agricultural tractors and is intended to be used for design purposes.

However, international agreement was not reached on this proposal and it is accepted that required force limits differ among countries and will not permit standardization in the near future. Nevertheless, in view of the fact that many countries intend to recommend maximum actuating forces which can be used as a guide for designers, it was generally agreed that it is advisable to issue this Technical Report as a first recommendation.

It should also be recognized that these recommended forces are not the optimum ergonomically; a document dealing with such forces will be studied subsequently.

## 1 Scope

This Technical Report recommends the maximum actuating forces for operation of controls.

NOTE — The actuating forces specified in this Technical Report do not relate to machine performance.

## 2 Field of application

This Technical Report applies to agricultural tractors equipped with normal controls.

## 3 Maximum actuating forces required to operate controls

Device to be operated	Type of control	Maximum actuating force to operate control N	Note
Service brake	Pedal	600	It should be possible to achieve effective braking performance with these forces applied.
	Hand lever	400	
Parking brake	Pedal	600	
	Hand lever	400	
Clutch	Pedal	350	Push
Dual clutch		400	
Power take-off coupling	Pedal	300	Push
	Hand lever	200	Pull
Manual steering system	Steering wheel	250	Applies when changing from forward drive into the angle of turn needed to achieve a turning circle of 12 m radius.
Power-assisted steering system with failure of the power-assisted steering force		600	
Hydraulic power lift system	Hand lever	70	Push and pull