

# DIN EN 12999:2025-05 (E)

## Cranes - Loader cranes (includes Amendment :2025)

---

<b>Contents</b>		<b>Page</b>
European foreword .....		6
Introduction .....		7
<b>1</b>	<b>Scope .....</b>	<b>8</b>
<b>2</b>	<b>Normative references .....</b>	<b>8</b>
<b>3</b>	<b>Terms, definitions, illustration of parts and abbreviated terms .....</b>	<b>10</b>
<b>3.1</b>	<b>Terms and definitions .....</b>	<b>10</b>
<b>3.1.1</b>	<b>Loader crane .....</b>	<b>10</b>
<b>3.1.2</b>	<b>Components .....</b>	<b>11</b>
<b>3.1.3</b>	<b>Hydraulics .....</b>	<b>13</b>
<b>3.1.4</b>	<b>Kinematics .....</b>	<b>13</b>
<b>3.1.5</b>	<b>Loads .....</b>	<b>14</b>
<b>3.1.6</b>	<b>Moments .....</b>	<b>14</b>
<b>3.1.7</b>	<b>Valves .....</b>	<b>15</b>
<b>3.1.8</b>	<b>Miscellaneous .....</b>	<b>15</b>
<b>3.2</b>	<b>Illustration of parts .....</b>	<b>15</b>
<b>3.3</b>	<b>Abbreviated terms .....</b>	<b>17</b>
<b>4</b>	<b>List of significant hazards .....</b>	<b>17</b>
<b>5</b>	<b>Safety requirements and/or protective/risk reduction measures .....</b>	<b>20</b>
<b>5.1</b>	<b>General .....</b>	<b>20</b>
<b>5.2</b>	<b>Structural calculation .....</b>	<b>20</b>
<b>5.2.1</b>	<b>Information to be given in the calculation .....</b>	<b>20</b>
<b>5.2.2</b>	<b>Dynamic factors .....</b>	<b>21</b>
<b>5.2.3</b>	<b>Loads and forces .....</b>	<b>23</b>
<b>5.2.4</b>	<b>Load combinations .....</b>	<b>25</b>
<b>5.3</b>	<b>Stress analysis .....</b>	<b>26</b>
<b>5.3.1</b>	<b>General .....</b>	<b>26</b>
<b>5.3.2</b>	<b>Bolted connections .....</b>	<b>27</b>
<b>5.4</b>	<b>Mechanical arrangements .....</b>	<b>27</b>
<b>5.4.1</b>	<b>Stabilizers .....</b>	<b>27</b>
<b>5.4.2</b>	<b>Manual boom extensions .....</b>	<b>28</b>
<b>5.4.3</b>	<b>Securing for transport .....</b>	<b>28</b>
<b>5.4.4</b>	<b>Hoists .....</b>	<b>29</b>
<b>5.4.5</b>	<b>Load hooks .....</b>	<b>29</b>
<b>5.5</b>	<b>Hydraulic system .....</b>	<b>29</b>
<b>5.5.1</b>	<b>General .....</b>	<b>29</b>
<b>5.5.2</b>	<b>Pump .....</b>	<b>29</b>
<b>5.5.3</b>	<b>Hydraulic reservoir .....</b>	<b>30</b>
<b>5.5.4</b>	<b>Pressure limiting device .....</b>	<b>30</b>
<b>5.5.5</b>	<b>Hoses, tubes and fittings .....</b>	<b>30</b>
<b>5.5.6</b>	<b>Precautions against hydraulic line rupture .....</b>	<b>30</b>
<b>5.5.7</b>	<b>Sink rate for boom system .....</b>	<b>31</b>
<b>5.5.8</b>	<b>Slewing mechanism .....</b>	<b>31</b>
<b>5.6</b>	<b>Limiting and indicating devices .....</b>	<b>31</b>
<b>5.6.1</b>	<b>General .....</b>	<b>31</b>
<b>5.6.2</b>	<b>Rated capacity limiter .....</b>	<b>34</b>
<b>5.6.3</b>	<b>Lowering facility .....</b>	<b>34</b>

5.6.4	Rated capacity indicators .....	34
5.6.5	Limiters .....	35
5.6.6	Operational warning .....	35
5.6.7	Acoustic warning .....	35
5.6.8	Stopping device .....	35
5.7	Controls .....	36
5.7.1	General .....	36
5.7.2	Symbols .....	36
5.7.3	Layout of bi-directional controls .....	37
5.7.4	Guidance for high seat controls .....	37
5.8	Control stations .....	37
5.8.1	General .....	37
5.8.2	Raised control stations .....	39
5.9	Electrical systems .....	40
5.9.1	General .....	40
5.9.2	Electromagnetic compatibility .....	40
5.10	Installation .....	40
5.10.1	General .....	40
5.10.2	Mounting .....	40
5.10.3	Stability .....	41
5.10.4	Noise .....	42
5.10.5	Vibrations .....	42
5.10.6	Electrical systems (installation) .....	42
5.10.7	Hydraulic components .....	42
5.10.8	Access .....	42
6	Verification of the safety requirements and/or protective/risk reduction measures .....	43
6.1	General .....	43
6.2	Testing and test procedures .....	48
6.2.1	General .....	48
6.2.2	Functional test .....	48
6.2.3	Static test .....	48
6.2.4	Dynamic test .....	49
6.2.5	Stability test .....	49
6.2.6	Test documentation .....	52
6.2.7	"Documentation of variable rated capacity" .....	52
6.3	Noise emission measurement .....	53
7	Information for use .....	53
7.1	General .....	53
7.2	Instructions .....	53
7.2.1	Provision of instructions .....	53
7.2.2	Instructions for the installer .....	53
7.2.3	Instructions for use .....	54
7.2.4	Maintenance instructions .....	56
7.3	Marking .....	56
7.3.1	General .....	56
7.3.2	Manufacturer's plate .....	56
7.3.3	Installer's plate .....	56
7.3.4	Load signs .....	57
7.3.5	Special signs on timber handling cranes .....	62
7.3.6	Marking of slewing centre .....	64
7.3.7	Marking of maximum ground load .....	64
7.3.8	Marking for high seat .....	64
Annex A (informative)	Examples of configurations and mountings .....	65
A.1	Boom systems .....	65
A.1.1	Loader cranes with straight boom system .....	65
A.2	Examples of loader crane mountings .....	66
Annex B (informative)	Stress history parameter s and stress history classes S .....	72

<b>Annex C (informative) Explanatory notes .....</b>	<b>76</b>
<b>C.1 Rated capacity limiters .....</b>	<b>76</b>
<b>C.2 Safety functions of the rated capacity limiter .....</b>	<b>76</b>
<b>C.3 Timber handling cranes - Line rupture .....</b>	<b>77</b>
<b>C.4 Control stations .....</b>	<b>78</b>
<b>Annex D (informative) Examples of dangerous movements .....</b>	<b>79</b>
<b>Annex E (normative) Symbols for working and setting-up functions .....</b>	<b>81</b>
<b>Annex F (informative) Control system - Preferred vertical layout for controls operated from the ground .....</b>	<b>83</b>
<b>Annex G (informative) Control system - Horizontal layout order .....</b>	<b>85</b>
<b>Annex H (informative) Control levers for high seats and remote controls .....</b>	<b>88</b>
<b>H.1 High seat controls .....</b>	<b>88</b>
<b>H.1.1 Multidirectional (joy-stick) controls .....</b>	<b>88</b>
<b>H.1.2 Bi-directional controls .....</b>	<b>88</b>
<b>H.2 Remote controls .....</b>	<b>88</b>
<b>Annex I (normative) "Crane cabins fitted on vehicle mounted loader cranes up to a net lifting moment of 250 kNm" .....</b>	<b>91</b>
<b>Annex J (informative) Examples of raised control stations .....</b>	<b>94</b>
<b>Annex K (normative) Raised control stations - Measures regarding handrails and handholds, ladders and steps .....</b>	<b>97</b>
<b>Annex L (informative) Installation of a loader crane on a vehicle .....</b>	<b>100</b>
<b>L.1 General .....</b>	<b>100</b>
<b>L.2 Installation: minimum data .....</b>	<b>100</b>
<b>L.2.1 Crane dimensions in transport position: data .....</b>	<b>100</b>
<b>L.2.2 Crane data (see Figure L.2) .....</b>	<b>100</b>
<b>L.2.3 Mounting data .....</b>	<b>101</b>
<b>L.2.4 Power requirements .....</b>	<b>101</b>
<b>L.2.5 Stability calculations: data .....</b>	<b>101</b>
<b>L.3 Power take off (PTO) and pump displacement .....</b>	<b>102</b>
<b>L.4 Calculation method for determination of sub-frame dimensions .....</b>	<b>103</b>
<b>L.4.1 General considerations .....</b>	<b>103</b>
<b>L.4.2 Stresses .....</b>	<b>103</b>
<b>L.4.3 Strength calculation of sub-frame .....</b>	<b>103</b>
<b>Annex M (informative) Selection of a suitable set of crane standards for a given application .....</b>	<b>106</b>
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of EU Directive 2006/42/EC aimed to be covered .....</b>	<b>108</b>
<b>Bibliography .....</b>	<b>112</b>