FEFCO RECOMMANDATION N° 105

(July 2006)

GUIDE LINES FOR THE INTRODUCTION AND USE OF THE SI SYSTEM IN THE CORRUGATED BOARD INDUSTRY

This FEFCO recommendation is one of a series numbered from 101 upwards, which gives guidance to FEFCO Members appropriate to the issue as described in the title, in practical matters dealing with production, or customer-related problems. It is hoped that it will provide a uniform means of operation, for example in a comparative study of a problem. The issuing body is the FEFCO Standards Committee working under the auspices of the FEFCO Board. The FEFCO Recommendations are supplementary to the internationally recognized FEFCO Testing Methods. The latter will continue to be developed for testing corrugated board products.

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Revised version of original dated 2002

Appendix Trilingual Appendix of Technical Terms applicable to corrugated board and its components papers, their attributes and derived characteristics (17 pages)

Compiled by the Juselius sub-committee of the FEFCO TECHNICAL COMMITTEE.
Published with the approval of the COUNCIL OF FEFCO for the guidance of the member organisations of the Federation following on the decision of the Governments of all European countries to adopt the SI as the only system to be used for the expression of technical units of measurements in Science, Technology and Commerce, after December 31, 1977, as recommended by the International Organisation of Standards (ISO).
Many countries outside Europe have also agreed to or have adopted the SI system.

Distribution: Active, Corresponding, Sympathizer Members of FEFCO

FEFCO TECHNICAL COMMITTEE – RECOMMANDATIONS FOR CHANGING TO & USING THE SI SYSTEM OF UNITS IN THE CORRUGATED BOARD INDUSTRY

SI, THE INTERNATIONAL SYSTEM OF UNITS

"SI" is an abbreviation of "Système International d'Unités", and is universally used to denote a modern, new system of units for measurement. SI is applicable to all fields of activity, - scientific, technical or commercial.

The International System of Units, SI, is a rational and coherent form of the traditional metric system. SI was designed by CIPM, the International Committee for Weights and Measures, and approved by CGPM, the General Conference for Weights and Measures, in 1960.

The International Organization for Standardization, ISO, has established detailed rules for the use of SI. These rules are published as International Standards and they are the basis for corresponding national standards in most countries.

The International System of Units, SI, is being actively introduced and accepted all over the world. After December 31, 1977 the SI will be used as the only system for measurement in Europe. Many other countries outside Europe also have accepted the SI.

STRUCTURE OF SI

SI consists of 7 base units, which are defined physically, and 2 supplementary units, which are defined geometrically.

By combining these units according to simple laws of physics, the derived units are formed.

The derived units together with the base and supplementary units are the coherent SI units.

A limited number of non-SI units are accepted for use together with the SI units. They are called additional units.

A SI unit or an additional unit can be combined with a prefix, which indicates multiplication by a certain power of 10. A unit containing a prefix is called a multiple unit.

BASE UNITS

The 7 base units are chosen for technical and scientific convenience, and for historical reasons.

Quantity	Units	
Base Units	Name	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol
Supplementary units		
Plane angle	radian	rad
Solid angle	steradian	sr

DERIVED UNITS

The derived units are built up from the base units according to simple laws of physics.

Quantity	Unit	Unit	Definition
Frequency	hertz	Hz	$1\ Hz = 1s^{-1}$
Force	newton	N	$1\ N = 1kg\ .\ m/s^2$
Pressure and stress	pascal	Pa	$1\ Pa = 1\ N/m^2$
Energy	joule	J	$1\ J = 1\ N\ .\ m$
Power	watt	W	$1\ W = 1\ J/s$
Quantity of electricity	coulomb	C	$1C = 1\ A\ .\ s$

Electric potential, potential difference	volt	V	1 V = 1 W/A
Electric capacitance	farad	F	1 F = 1 C/V
Electric resistance	ohm	O	1 O = 1V/A
Electric conductance	siemens	S	1 S = 1A/V
Magnetic flux	weber	Wb	1 Wb = 1V . s
Magnetic flux density, Magnetic induction	tesla	T	1 T = 1 Wb/m²
Inductance	henry	H	1 H = 1 Wb/A
Luminous flux	lumen	lm	1 lm = 1 cd . sr
Illuminance	lux	lx	1 lx = 1 lm/ m²
Dose (of ionizing radiation)	gray	Gy	1Gy = 1 J/kg
Activity (of a radioactive substance)	bequerel	Bq	1 Bq = $1s^{-1}$

PREFIXES AND MULTIPLES

A prefix combined with a unit indicates that the unit has been multiplied by a certain power of 10. The unit thus formed is called a multiple of the unit.

There are 16 prefixes:

Factor	Prefix	
	Name	Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T

10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10	deca	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	µ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

The choice of prefix is governed by convenience. Normally, choose the prefix so that the numerical value falls between 0,1 and 1000.

ADDITIONNAL UNITS

In principle the SI covers all applications in science, technology and commerce. However, some non-SI units have such standing that they are accepted for general use together with the SI units. They are called additional units.

Plane angle

degree	°	1° = 1/360 of a full circle
minute	’	1’ = (1/60)°

second	”	1” = (1/60)’
grade or gon	^{g}	1^{g} = 1/400 of a full circle

Volume

litre	l	1 l = 1dm³

Time

minute	min	1 min = 60 s
hour	h	1 h = 3600 s = 60 min
day	d	1 d = 24 h

In commercial and everyday life, the units week, month and year are also used.

Mass

tonne	t	1 t = 1000 kg =1 Mg

Temperature

degree Celsius	°C

DIMENSIONLESS UNITS

Several units are in fact ratios, and can be expressed by the number 1. Such units are called dimensionless units or non-dimensional units.

More details about SI units are available from ISO Standards and from corresponding national standards.

The following ISO Standards concern the SI

ISO	100-1973	Rules for the use of the international system of units and a selection of the decimal multiples and sub-multiple of the SI-units
ISO/R	31/ I-1965	Basic quantities and units of the SI international system of units
ISO/R	31/ II-1958	Quantities and units of periodic and related phenomena
ISO/R	31/ III-1960	Quantities and units of mechanics
ISO/R	31/ IV-1960	Quantities and units of heat
ISO/R	31/ V-1965	Quantities and units of electricity and magnetism
ISO	31/ VI-1973	Quantities and units of light and related electromagnetic radiations
ISO/R	31/ VII-1965	Quantities and units of acoustics
ISO	31/ VIII-1973	Quantities and units of physical chemistry and molecular physics
ISO	31/ IX-1973	Quantities and units of atomic and nuclear physics
ISO	31/ X-1973	Quantities and units of nuclear reactions and ionizing radiations
ISO/R	31/ XI-1961	Mathematical signs and symbols for use in the physical sciences and technology

SI Symbols in the communication traffic

Name of unit	Printed text	Typewriter	Telex	Computer
Base SI units				
metre	m	m	m	M
kilogram	kg	kg	kg	KG
second	s	s	s	S
ampere	A	A	a	A
kelvin	K	K	k	K
candela	cd	cd	cd	CD
mole	mol	mol	mol	MOL

Supplementary SI units				
radian	rad	rad	rad	RAD
steradian	sr	sr	sr	SR
Derived SI units				
hertz	Hz	Hz	hz	HZ
newton	N	N	n	N
pascal	Pa	Pa	pa	PA
joule	J	J	j	J
watt	W	W	w	W
coulomb	C	C	c	C
volt	V	V	v	V
farad	F	F	f	F
ohm	O	Ohm	ohm	OHM
siemens	S	S	s	S
henry	H	H	h	H

Other units				
degree (angle)	°	°	deg	DEG
minute (angle)	’	’	mnt	MNT
second (angle)	”	”	sec	SEC
litre	l	l	l	L
are	a	a	are	ARE
minute (time)	min	min	min	MIN
hour	h	h	hr	HR
day	d	d	d	D
year	a	a	ann	ANN
gram	g	g	g	G

tonne	t	t	tne	TNE
bar	bar	bar	bar	BAR
degree Celsius	°C	°C	cel	CEL
Prefixes				
exa 10^{18}	E	E	-	-
peta 10^{15}	P	P	-	-
tera 10^{12}	T	T	t	T
giga 10^{9}	G	G	g	G
mega 10^{6}	M	M	ma	MA
kilo 10^{3}	k	k	k	K
deca 10^{1}	da	da	da	DA
deci 10^{-1}	d	d	d	D
centi 10^{-2}	c	c	c	C
milli 10^{-3}	m	m	m	M
micro 10^{-6}	µ	u	u	U
nano 10^{-9}	n	n	n	N
pico 10^{-12}	p	p	p	P
femto 10^{-15}	f	f	f	F
atto10^{-18}	a	a	a	A

CONVERSION TABLE – OLD UNIT / SI UNIT / OLD UNIT.

	OLD UNIT	CONVERSION FACTOR	RECOMMENDED SI UNIT	RECIPROCAL FACTOR
AIR PERMEANCE (CURLEY)	s / 100 m I	1,00	s	1,00
BENDING STIFFNESS	p.cm	0,0981	mN.m	10,1937
BENDING STIFFNESS	cN.10 mm	0,100	mN.m	10,0
BENDING STIFFNESS	cN.50 mm	0,500	mN.m	2,0
BENDING STIFFNESS	p.10 mm	0,0981	mN.m	10,1937
BENDING STIFFNESS	p.50 mm	0,4905	mN.m	2,0387
BOX COMPRESSION STRENGTH	kp	9,81	N	0,1019
BURSTING STRENGTH (Mullen)	kp/cm^2	98,10	kPa	0,0102
BURST INDEX	$\frac{1000\ kp.m^2}{cm^2.g}$	0,0981	$\frac{kPa.m^2}{g}$	10,1937
CMT, CONCORA	1bf	4.45	N (CMT)	0,2247
DENSITY	g / cm3	1000.0	kg / m^3, (g/ cm3)	0,001
EDGEWISE CRUSH RESISTANCE, ECT	kp / cm	0.981	kN /m	1,019
FLAT CRUSH RESISTANCE, FCT	1 bf / sq in	6.897	kPa	0,14499
FLAT CRUSH RESISTANCE, FCT	kp / cm2	98,10	kPa	0,0102
INTERNAL BOND STRENGTH	1 bf.ft / 1000 in2	2,102	J/m2	0,47574

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PUNCTURE RESISTANCE	GE	0,0299 (0,03)	J	33,445 (33,333)
PUNCTURE RESISTANCE	kp.cm	0,0981	J	10,1937
RING CRUSH RESISTANCE RCT	1 bf /15.2 cm	0,0293	kN/m	34,1297
TEARING RESISTANCE	p	9,81	mN	0,1019
TEAR INDEX	$\frac{100\ p.m2}{g}$	0,0981	$\frac{mN.m2}{g}$	10,1937
TENSILE ENERGY ABSORPTION	kp.cm /15mm.100mm	65,40	J/m2	0,1529
TENSILE ENERGY ABSORPTION	kp.cm /15mm.180mm	36,33	J/m2	0,02753
TENSILE ENERGY ABSORPTION	kp.cm /15mm.200mm	32,70	J/m2	0,03058
TENSILE INDEX	m	0,00981	N.m/g	101,937
TENSILE STRENGTH	kp/15mm	0,654	kN/m	1,529

Recommended SI Unit = Conversion factor X Old unit

Old unit = Recommended SI unit X Reciprocal factor

NOTE: - Also see FEFCO RECOMMANDATION N°106 for guide lines to ‘Round-off’ the resulting values after their conversion from old into SI units.

FEFCO Testing Methods I

Changing of old units into SI units

Testing Method		Old units	SI units
N°1	Sampling procedure	-	-
N°2	Determination of the basis weight of corrugated fibreboard	g/m²	g/m²
N°3	Determination of the thickness of corrugated fibreboard	mm	mm
N°4	Determination of the bursting resistance of corrugated fibreboard	kp/cm²	kPa
N°5	Determination of the puncture resistance of corrugated fibreboard	kp.cm	J
N°6	Determination of the flat crush resistance of corrugated fibreboard	kp/cm²	kPa
N°7	Determination of the water absorption property of corrugated fibreboard	g/m²	g/m²
N°8	Determination of the edge crush compression resistance of corrugated fibreboard	kp/cm	kN/m
N°9	Determination of water resistance of the glue bond of corrugated fibreboard by immersion	time	time
N°10	Determination of the basis weight of the component papers of corrugated fibreboard after separation	g/m²	g/m²
N°11	Determination of the adhesion strength of the glue bonds of corrugated fibreboard	kp/cm	kN/m

FEFCO Testing Methods II and Recommendations

Changing of old units into SI units

Testing Method		Old units	SI units
N°50	Determination of the compression resistance of corrugated fibreboard containers	kp	N
N°51	Method for drop testing filled corrugated fibreboard containers	-	-
N°52	Vibration test for filled corrugated fibreboard containers	Hz	Hz
N°53	Method for inclined plane impact test for filled corrugated fibreboard containers	m/s	m/s
N°54*	Method for the pendulum horizontal impact test for filled corrugated fibreboard containers	m/s	m/s
N°55	Determination of the strength of the manufacturers' joint of corrugated fibreboard containers	kp	N

* = under discussion

Recommendation		Old units	SI units
N°101	Procedure for determining the approximate internal dimensions of flap type or one piece of corrugated cases	mm	mm
N°102	Determination of the take-up factor of the fluting paper	mm	mm
N°103	Standard case for compression testing	kp	N
N°104	Determination of the slip angle of corrugated board	(degree)°	(degree)°

APPENDIX 1

FEFCO SI unit recommendations

1. ABSORBENCY

F pouvoir absorbent

D Saugfähigkeit

SI unit : s or kg/m^2

Recommended unit: g/m^2

2. AIR PERMEANCE (Bendtsen)

F perméance à l'air

D Luftdurchlässigkeit

SI unit : m^3/s

Recommended unit : ml/min

3. AIR RESISTANCE (Gurley)

F résistance de l'air

D Luftwiderstand

SI unit : s

Recommended unit: s

Earlier unit: s/100 ml

4. AREA

F aire

D Fläche

SI unit: m^2

Recommended unit: km^2, cm^2, mm^2

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5. BENDING STIFFNESS (Taber)

F rigidité

D Biegesteifigkeit

SI unit : N.m

Recommended unit: mN.m

Earlier unit: 1pcm = 0,09807 mN.m, 1 mN.m = 10,20 pcm

6. BENDING STRENGTH

F résitance à la flexion

D Biegefestigkeit

SI unit : Pa = N/m^2

Recommended unit: N/mm^2

Earlier unit: kp/cm^2

Conversion factors: $1 kp/cm^2 = 0,0980665 N/mm^2$

$1 N/mm^2 = 10,1972 kp/cm^2$

7. BREAKING LENGTH

F longueur de rupture

D Reisslänge

SI unit : m

Recommended unit: km

8. BULK (of paper or board)

F main

D Spezifisches Volumen

SI unit: m^3/kg

Meantime unit: cm^3/g

Conversion: bulk = 1 / density, density = 1/ bulk

9. BURST INDEX

F indice d'éclatement

D Spezifischer Berstwiderstand

SI unit: N/kg

Recommended index: $x_1 = kPa.m^2/g$

Earlier index: $x_2 = \frac{1000\ kpm^2}{cm^2 g}$

Conversion factors: $x_1 = 0{,}0981\ x2$

$x_2 = 10{,}20\ x1$

10. BURSTING STRENGTH (paper)

F résistance à l'éclatement

D Berstwiderstand

SI unit : $Pa = N/m^2$

Recommended unit: kPa

Earlier unit: kp/cm^2

Conversion factors: $1kp/cm^2 = 98{,}07\ kPa$

1 kPa = 0,01020 kp/cm²

11. CAPILLARY RISE (Klemm)

F ascension capillaire

D Saughöhe

SI unit : m

Recommended unit: mm

Earlier unit: mm/10 min

12. COMPRESSION STRENGTH

F résistance à la compression

D Stauchwiderstand

SI unit : Pa = N/m²

Recommended unit: N/mm²

Earlier unit: kp/cm²

Conversion factors: 1kp/cm² = 0,0980665 N/mm²

1 N/mm² = 10,1972 kp/cm²

13. CONTACT ANGLE

F angle de contact

D Kontaktwinkel

SI unit : rad

Recommended unit : degree (°)

14. CONTENT

F concentration de masse

D Inhalt

SI units : 1 = kg/kg (pure figure)

kg/m³

m³/kg

1 = m³ / m³ (pure figure)

Recommended units : g/kg, mg/kg, µg/kg

g/m³, mg/ m³, dm³/m³, cm³/m³

g/l, mg/l

% (m/m), % (V/V)

Earlier unit: ppm = 10^{-6}

ppb = 10^{-9}

15. DENSITY

F masse volumique

D Dichte

SI units : kg/m³

Recommended unit : g/cm³

Earlier unit: kg/dm³

Conversion factors: 1kg/dm³ = 1000 kg/m³ = 1 g/cm³

1kg/m³ = 10^{-3} kg/dm³ = 10^{-3} g/cm³

16. DRY SOLIDS CONTENT

F teneur en matière sèche

D Trockengehalt

SI unit : 1 (pure figure)

Recommended unit : %

17. EDGEWISE CRUSH RESISTANCE

F résistance à la compression sur chant

D Kantenstauchwiderstand

SI unit : N/m

Recommended unit: kN/m

18. ENERGY, WORK, W

F énergie, travail

D Energie, Arbeit

Si unit: joule (J) (1J = 1 Nm = 1 Ws)

Recommended units: KJ, MJ

Earlier units: kilopondmetre (kpm)

kilocalory (kcal)

kilowatt hour (kWh)

Conversion factors: 1 kpm = 9,80665 J 1J = 0,101972 kpm

1kcal = 4,1868 kJ 1kJ = 0,23885 kcal

1 kWh = 3,600 MJ 1MJ = 0,28000 kWh

19. FLAT CRUSH RESISTANCE

F résistance à la compression à plat

D Flachstauchwiderstand

SI unit : Pa = N/m^2

Recommended unit: kPa = kN/m^2

Concora (CMT)

SI unit: N

20. FOLD NUMBER (double folds)

F double plis

D Falzzahl

SI unit: 1 (pure figure)

21. FORCE, F

F force

D Kraft

SI unit: newton (N) ($1N = \frac{1\ kgm}{s^2}$)

Recommended units: mN, KN, MN

Earlier units: kp, kgf, dyn

Conversion factors: 1kp = 1 kgf = 9,80665 N, 1 N = 0,101972 kp

1 dyn = 10^{-5} N, 1 N = 10^5 dyn

22. GAS PERMEABILITY

F perméabilité aux gaz

D Gasdurchlässigkeit

SI unit : $m^3/ (m^2.S)$

Recommended unit : $cm^3/(m^2.d)$

23. GLUE AMOUNT

F quantité de colle
D Leimauftrag

SI unit : kg/m²
Recommended unit: g/m²

24. GRAMMAGE

F grammage
D Flächenbezogene Masse

SI unit : kg/m²
Recommended unit: g/m²

25. HEAT, QUANTITY OF HEAT, Q

F quantité de chaleur
D Wärme, Wärmemenge

SI unit : joule (J)
Recommended unit: kJ
Earlier unit: cal
Conversion factors: 1 cal = 4,1868 J
1 J = 0,23885 cal

26. HEAT VALUE

F capacité calorifique
D Heizwert

SI unit : J/kg
Recommended units kJ/kg, MJ/kg
Earlier unit: kcal/kg
Conversion factors: 1 kcal/kg = 4,1868 kJ/kg = 0,0041868 MJ/kg
1 kJ/kg = 0,23885 kcal/kg

1 MJ/kg = 238,85 kcal/kg

27. HUMIDITY OF AIR

F humidité de l'air
D Lufteuchtigkeit

Absolute humidity of air
SI unit: kg/m³
Relative humidity (RH) of air
SI unit: 1 (pure figure)
Recommended unit : %

28. INTERNAL BOND STRENGTH

F résistance du délaminage ou cohésion interne
D Spaltfestigkeit

SI unit : J/m²
Earlier unit: lbfft/1000 in²
Conversion factors: 1 lbfft/1000 in² = 2,1015 J/m²
1 J/m² = 0,4758 lgfft/1000 in²

29. LENGTH, l

F longueur
D Länge

SI unit: metre (m)
Recommended units : nm, µm, mm, km
Earlier units: (A) (µ) (ft)
Conversion factors: 1 A = 10^{-10} m = 0,1 nm 1m = 10^{10} ?
1m = 10^{-4} pK
1µ = 1 µm = 10^{-6} m 1 m = 10^{6} µm
1 ft = 0,3048 m 1 m = 3,281 ft

30. LOADING SPEED

F vitesse de chargement
D Belastungsgeschwindigkeit

SI unit : m/s
Recommended unit: mm/s, µm/s

31. MASS, m

F masse
D Masse

SI unit : kg
Recommended units: ng, µg, mg, g

32. MODULUS OF ELASTICITY, E

F module d'élasticité
D Elastizitätsmodul

SI unit: Pa = N/m^2
Recommended unit: N/mm^2
Earlier unit: kp/cm^2
Conversion factors: $1 kp/cm^2 = 0{,}09807 N/mm^2$
$1 N/mm^2 = 10{,}20 kp/cm^2$

33. MOISTURE CONTENT

F teneur en humidité
D Feuchtigkeitsgehalt

SI unit : 1 (pure figure)
Recommended unit : %

34. POWER, P

F puissance
D Leistung

SI unit: watt (W)
Recommended units: kW, MW
Earlier units: kcal/ h

hp
kpm/s

Conversion factors: 1 kcal/h = 1,163 W 1W = 0,8598 kcal/h
1 hp = 735,5 W 1W = 0,001360 hp
1 kpm/s = 9,80665 W 1W = 0,101972 kpm/s

35. PRESSURE, p

F pression
D Druck

SI unit: pascal, (Pa) (1 Pa = 1N/m²)
Recommended units: kPa, Mpa, bar
Earlier units: kp/cm², torr (1torr = mm Hg, 0 °C), atm
Conversion factors: 1kPa = 0,0101972 kp/cm²
1 kp/cm² = 98,0665 kPa, 1kPa = 0,00750064 torr
1 torr = 133,322 Pa, 1 kPa = 0,00986923 atm
1 atm = 101,325 kPa (760 mm Hg), 1 Pa = 10^{-5} bar
1 bar = 10^{5} Pa

36. PUNCTURE RESISTANCE

F résistance à la perforation
D Durchstosswiderstand

SI unit : J
Earlier unit : kpcm
Conversion factors: 1 kpcm = 0,0981 J
1 J = 10,193679 kp cm

37. RESISTANCE OF GLUE BONDS, pin adhesion

F résistance des lignes de collage
D Festigkeit der Leimfuge

SI units : N/m
Recommended unit: kN/m

Earlier unit: kp/cm
Conversion factors: 1kp/cm = 0,9807 kN/m
1 kN/m = 1,020 kp/cm

38. RING CRUSH RESISTANCE

F résistance à la compression d'un anneau de papier
D Ringstauchwiderstand

SI unit : N/m
Recommended unit: kN/m

39. ROUGHNESS (Bendtsen paper)

F rugosité
D Rauheit

SI unit: m^3/s
Recommended unit : ml/min

40. SHEAR STENGTH

F résistance au cisaillement
D Scherfestigkeit

SI unit : Pa = N/m^2
Recommended unit: N/mm^2
Earlier unit: kp/cm^2
Conversion factors: 1 N/mm^2 = 10,1972 kp/cm^2
1 kp/cm^2 = 0,0980665 N/mm^2

41. SHEAR STRESS, t

F tension de cisaillement
D Schub (Scher) spannung

SI unit: Pa = N/m^2

Earlier units: dyn/cm², kp/cm²
Conversion factors:
1 dyn/cm² = 0,1 N/m² 1 N/m² = 10 dyn/cm²
1 kp/cm² = 9,80665 10^{-4} N/m² 1 N/m² = 1,01972 10^{3} kp/cm²

42. STRESS, s , R

F tension mécanique
D mechanische Spannung

SI unit : Pa = N/m²
Recommended units: kPa, MPa, N/mm²
Earlier units: kp/cm², kp/mm²
Conversion factors:
1 kp/cm² = 98,0665 kPa 1 kPa = 0,0101972 kp/cm²
1 kp/mm² = 9,80665 MPa 1 MPa = 0,101972 kp/mm²
1 kp/cm² = 0,0980665 N/mm² 1 N/mm² = 10,1972 kp/cm²

43. STRETCH AT BREAK

F allongement à la rupture
D Bruchdehnung

SI unit: 1 (pure figure)
Recommended unit : %

44. SURFACE TENSION, s

F tension superficielle
D Oberflächenspannung

SI unit : N/m
Recommended unit: mN/m
Earlier unit: dyn / cm
Conversion factors: 1 dyn / cm = 1mN/m

45. TEAR INDEX

F indice de déchirement

D Durchreissfaktor

SI unit : $N.m^2 / kg$
Recommended index: $x_1 = mN.m^2 / g$
Earlier index: $x_2 = 100. \frac{pm^2}{g}$
Conversion factors: $x_1 = 0,0981\ x2$
$x_2 = 10,20\ x_1$

46. TEARING RESISTANCE

F résistance au déchirement
D Durchreisswiderstand

SI unit : N
Recommended unit : mN
Earlier unit: p
Conversion factors: 1p = 9,8067 mN
1 mN = 0,10197 p

47. TEMPERATURE, T

F température
D Temperatur

SI unit : kelvin (K)
Common unit: degree Celsius (°C)

48. TENSILE ENERGY ABSORPTION

F Energie de rupture
D Zugzerreissarbeit

SI unit : J / m^2

49. TENSILE INDEX

F indice de la rupture par traction
D Bruchindex (Reissindex)

SI unit: J/ kg

Recommended unit: N.m / g

50. TENSILE STRENGTH (static), paper

F résistance à la rupture par traction
D Bruchfestigkeit

SI unit : N / m
Recommended unit: kN/m
Earlier unit: kp / 15 mm
Conversion factors: 1 kp / 15 mm = 0,6538 kN / m
1 kN/ m = 1,5295 kp /15 mm

51. THICKNESS, d

F épaisseur
D Dicke

SI unit : m
Recommended unit : µm (paper)
mm (board)
Earlier unit: in
Conversion factors: 1 in = 25,4 mm
1 mm = 0,0394 in

52. TIME, t

F temps
D Zeit

SI unit : second (s)
Recommended unit : minute (min)
hour (h)
day (d)
year (a)

53. VELOCITY, v

F vitesse
D Geschwindigkeit

SI unit: m / s

54. VISCOSITY, dynamic, ?, (μ)

F viscosité, dynamique
D Viskosität, dynamisch

SI unit : Pa.s
Recommended unit: mPa.s = mN.s/m²
Earlier units: poise (P), cP
Conversion factors: 1P = 0,1 Pa.s 1Pa.s = 10 P
1 cP = 10^{-3} Pa.s = 1 mPa.s

55. VOLUME, V

F volume
D Volumen

SI unit : m³
Recommended units: mm³, cm³, dm³
μl, ml, l
Earlier unit: cl, ml, hl
Conversion factors: 1 cl = 10^{-2}1 = 10 cm³
1 dl = 10^{-1}1 = 100 cm³
1 hl = 100 l = 0,1 m³

56. WATER RESISTANCE OF GLUE BONDS, (ISO 3038)

F résistance à l'eau des lignes de collage
D Nassfestigkeit der Leimfuge

SI unit : s
Recommended units: h, min

57. WATER VAPOUR TRANSMISSION, paper

F perméabilité à la vapeur d'eau
D Wasserdampfdurchlässigkeit

SI unit : kg / (m^2.s)
Recommended unit: g/ (m^2.d)

58. WET STRENGTH

F résistance à l'état humide
D Nassfestigkeit

SI unit : N/m
Earlier unit : kp
Conversion factors : 1 kp = 9,80665 N
1 N = 0, 101972 kp

59. WIDTH, b

F largeur
D Breite

SI unit: m
Recommended unit: mm