INTERNATIONAL STANDARD

ISO 1628-2

Second edition
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Determination of the viscosity of polymers in dilute solution using capillary viscometers —

Part 2:
Poly(vinyl chloride) resins

Plastiques — Détermination de la viscosité des polymères en solution diluée à l'aide de viscosimètres à capillaires —

Partie 2: Résines de poly(chlorure de vinyle)

Reference number
ISO 1628-2:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1628-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee 9, *Thermoplastic materials*.

This second edition cancels and replaces the first edition (ISO 1628-2:1988) which has been modified to include:

— the determination of the K-value;

— a limit on the volatile-matter content of resins that can be tested using this part of ISO 1628;

— revised viscometer specifications;

— a reference viscometer;

— a precision statement.

ISO 1628 consists of the following parts, under the general title *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers:*

— *Part 1: General principles*

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— *Part 2: Poly(vinyl chloride) resins*

— *Part 3: Polyethylenes and polypropylenes*

— *Part 4: Polycarbonate (PC) moulding and extrusion materials*

— *Part 5: Thermoplastic polyester (TP) homopolymers and copolymers*

— *Part 6: Methyl methacrylate polymers*

Determination of the viscosity of polymers in dilute solution using capillary viscometers —

Part 2:
Poly(vinyl chloride) resins

1 Scope

This part of ISO 1628 specifies conditions for the determination of the reduced viscosity (also known as viscosity number) and K-value of PVC resins. It is applicable to resins in powder form which consist of homopolymers of the monomer vinyl chloride and copolymers, terpolymers, etc., of vinyl chloride with one or more other monomers, but where vinyl chloride is the main constituent. The resins may contain small amounts of unpolymerized substances (e.g. emulsifying or suspending agents, catalyst residues, etc.) and other substances added during the course of the polymerization. This part of ISO 1628 is not applicable, however, to resins having a volatile-matter content in excess of 0,5 % ± 0,1 %, when determined in accordance with ISO 1269. In addition to this, it is not applicable to resins which are not entirely soluble in cyclohexanone.

The reduced viscosity and K-value of a particular resin are related to its molecular mass, but the relationship varies depending on the concentration and type(s) of other monomer(s) present. Hence homopolymers and copolymers having the same reduced viscosity or K-value may not have the same molecular mass.

The values determined for reduced viscosity and K-value, for a particular sample of PVC resin, are influenced differently by the concentration of the solution chosen for the determination. Hence the use of the procedures described in this part of ISO 1628 will only give values for reduced viscosity and K-value that are comparable when the concentrations of the solutions used are identical.

Limiting viscosity number is not used for PVC resins.

The experimental procedures described in this part of ISO 1628 can also be used to characterize the polymeric fraction obtained during the chemical analysis of a PVC composition. However, the values calculated for the reduced viscosity and K-value in these circumstances may not indicate the actual values for the resin used to produce the composition because of the impure nature of the recovered polymer fraction.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1628. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1628 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1042:1998, *Laboratory glassware — One-mark volumetric flasks.*

ISO 1269:1980, *Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of volatile matter (including water).*

ISO 1628-1:1998, *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 1: General principles.*

ISO 3105:1994, *Glass capillary kinematic viscometers — Specifications and operating instructions.*

3 Definitions

The terms used in this part of ISO 1628 are defined in ISO 1628-1:1998, clause 3, and, in particular, definitions 3.3.3 (reduced viscosity) and 3.3.6 (K-value).

4 Principle

A test portion is dissolved in a solvent. The reduced viscosity and the K-value are calculated from the efflux times for the solvent and the solution in a capillary tube viscometer.

5 Materials

5.1 Cyclohexanone, having a viscosity/density ratio (kinematic viscosity) between $2{,}06 \times 10^{-6}$ m^2 s^{-1} and $2{,}33 \times 10^{-6}$ m^2 s^{-1} (2,06 mm^2 s^{-1} and 2,33 mm^2 s^{-1}) at 25 °C. The specified boiling point shall be 155 °C. Store the solvent in the dark in a dark-coloured bottle fitted with a ground-glass stopper. Check the kinematic viscosity before use.

6 Apparatus

The apparatus required to carry out viscosity measurements on polymers in dilute solution is described in ISO 1628-1:1998, clause 5. In addition, the following particular items are required for the procedures described in this part of ISO 1628:

6.1 Viscometer: From the viscometers described in subclause 5.1 of ISO 1628-1:1998, model 1C, with a capillary diameter of 0,77 mm ± 2 %, from table B.4 of ISO 3105:1994, shall be used as the reference viscometer.

Other viscometers described in ISO 1628-1 may be used provided the correlation between the chosen viscometer and the reference viscometer has been established over the range of reduced viscosities and K-values to be measured, and the results are corrected accordingly.

6.2 Graduated flask (one-mark volumetric flask), class A, as specified in ISO 1042, with a volume of 50 ml.

NOTE The use of a flask calibrated at a temperature of 20 °C — as specified in ISO 1042 — causes a systematic error which can, however, be neglected.

6.3 Filter funnel, with fritted-glass filter disc of medium porosity (pore size 40 μm to 50 μm), or **glass funnel with paper filter.**

6.4 Mechanical agitator, equipped with a heating device to keep the flask (6.2) and its contents at a temperature between 80 °C and 85 °C.

As an alternative, a rotary agitator or shaker may be placed in an oven at a temperature between 80 °C and 85 °C.

6.5 Analytical balance, accurate to 0,1 mg.

6.6 Temperature-regulated bath, capable of being set at 25,0 °C ± 0,5 °C in steps of 0,1 °C and maintaining a stability of ± 0,05 °C around the set temperature.

6.7 Thermometer, with a sensitivity of 0,05 °C.

6.8 Time-measuring device, with a sensitivity of 0,1 s.

7 Sampling

Take a sample which is representative of the resin whose properties are to be determined and large enough for at least two determinations.

8 Number of determinations

Carry out two complete determinations, starting each with a fresh test portion.

9 Procedure

9.1 Preparation of solution

General requirements for the dissolution of polymer in solvent are given in ISO 1628-1:1998, clause 6.

Prepare a solution with a concentration of 5 g/l ± 0,1 g/l at 25 °C ± 1 °C, as follows:

Weigh, to the nearest 0,2 mg, 0,250 g ± 0,005 g of resin and transfer it quantitatively to the 50 ml flask (6.2). Add about 40 ml of cyclohexanone (5.1) to the flask, swirling the flask by hand to prevent coagulation or the formation of lumps. Continue dissolution by agitating for 1 h between 80 °C and 85 °C using the agitator (6.4). Check visually that dissolution is complete. If gelatinized particles are still visible, start again with a new portion of the resin. Cool the solution to 25 °C ± 1 °C and make up to the mark with cyclohexanone at the same temperature. Mix the solution thoroughly by shaking.

Determine the actual concentration of the solution to an accuracy of ± 0,1 %.

If a mass of 0,250 g ± 0,000 25 g is taken and made up to 50 ml of solution as described above, table 1 can be used to read off the reduced viscosity and K-value from the ratio of the efflux time of the solution to that of the solvent (the so-called viscosity ratio).

Alternative methods for the preparation of the solution may be used, for example the addition of a measured volume of solvent to a measured mass of test portion, provided that the values obtained for the reduced viscosity and K-value can be shown to be equivalent to those obtained with the method of solution preparation described above. Such alternative methods of solution preparation will require the amounts of solvent and test portion taken to be determined by experiment, and may also require compensation for loss of solvent by evaporation during the dissolution process.

With resins having K-values greater than 85, the ratio of the efflux time of the solution to that of the solvent will exceed the maximum value of 2,0, which is contrary to the requirement specified in subclause 6.2 of ISO 1628-1:1998. In order to ensure uniformity of testing for PVC, this non-conformity shall be ignored and all currently available resins tested using the same test-portion mass.

9.2 Determination of efflux times

The procedure is described in ISO 1628-1:1998, clause 8.

The temperature of the thermostat (see 6.6) shall be set such that the actual temperature which is measured by the thermometer (6.7) lies in the range 25 °C ± 0,5 °C. The measured temperature shall be stable to ± 0,05 °C around the temperature at which the thermostat has been set.

When filling the viscometer, filter the solvent and the solution using a filter funnel or a glass funnel and paper filter (see 6.3).

Particular care shall be taken over viscometer cleaning, which shall be based on the procedure described in ISO 1628-1:1998, annex A. Efflux times with the control solvent cyclohexanone shall remain constant to within 0,2 s for a given viscometer. With the solution, repeat the measurement of the efflux time until two successive measurements differ by less than 0,25 %. Always discard the first efflux time reading.

NOTE This is a manual procedure. Proprietary equipment is available which will organize the charging of the viscometer with solution and solvent and measure the respective efflux times automatically. The use of such equipment is included in the scope of this part of ISO 1628 provided that all the procedures and verification checks described above are followed by the automated procedure.

10 Expression of results

10.1 Reduced viscosity

Calculate the reduced viscosity I for each test portion as specified in ISO 1628-1:1998, clause 9, using the equation

$$I = \frac{t - t_0}{t_0 c}$$

where

t and t_0 are the efflux times, in seconds, of the solution and solvent, respectively;

c is the concentration of the solution, in grams per millilitre.

Calculate the reduced viscosity I for the sample as the mean value of the two individual values obtained in the two determinations, expressing the result to the nearest whole number. If the I values obtained in the two determinations deviate by more than ± 0,4 % from the mean value, these results shall be rejected and further determinations carried out with fresh test portions.

If the solution concentration is 5 g/l ± 0,005 g/l, it is more convenient to read off the values of I from table 1, expressing I in $(m^3/kg) \times 10^{-3}$, i.e. ml/g, rounded to the first place of decimals.

10.2 K-value

For each test portion, calculate the K-value as specified in ISO 1628-1:1998, clause 9, using the equation

$$K = \frac{1{,}5 \log \eta_r - 1 + \sqrt{1 + \left(\frac{2}{c} + 2 + 1{,}5 \log \eta_r\right) 1{,}5 \log \eta_r}}{150 + 300\, c} \times 1000$$

where

$\eta_r = \frac{\eta}{\eta_0} = \frac{t}{t_0}$ is the ratio of the viscosities (efflux times) of the solution and solvent;

t and t_0 are the efflux times, in seconds, of the solution and solvent, respectively;

c is the concentration of the solution, in grams per millilitre.

Calculate the K-value for the sample as the mean value of the two individual K-values obtained in the two determinations, expressing the result to the first place of decimals. If the K-values obtained in the two determinations deviate by more than $\pm$ 0,4 % from the mean value, these results shall be rejected and further determinations carried out with fresh test portions.

If the solution concentration is 5 g/l $\pm$ 0,005 g/l, it is more convenient to read off the K-value from table 1, rounding to the second place of decimals.

11 Precision

Interlaboratory trials conducted on three resins in 11 laboratories on four different dates gave the following results for the repeatability standard deviation s_r (within the same laboratory) and the reproducibility standard deviation s_R (among different laboratories):

	K-value		
	approx. 50	approx. 70	approx. 90
s_r	0,132	0,115	0,120
s_R	0,420	0,291	0,495

	Reduced viscosity		
	approx. 61	approx. 124	approx. 227
s_r	0,313	0,458	0,742
s_R	0,984	1,202	3,042

12 Test report

The test report shall include the following information:

a) a reference to this part of ISO 1628;

b) all details necessary for complete identification of the material under test;

c) the reduced viscosity and/or K-value of the resin sample;

d) any difference between the type of viscometer used and the reference viscometer specified in this part of ISO 1628;

e) the date of the test.

Table 1 — Conversion of viscosity ratio (VR) to reduced viscosity (I) and K-value

Unit for reduced viscosity: $(m^3/kg) \times 10^{-3}$, i.e. ml/g
Concentration of resin in solution = 5 g/ml

VR	I	K	VR	I	K	VR	I	K
1,195	39,0	39,74	1,237	47,4	44,02	1,279	55,8	47,87
1,196	39,2	39,85	1,238	47,6	44,12	1,280	56,0	47,95
1,197	39,4	39,95	1,239	47,8	44,22	1,281	56,2	48,04
1,198	39,6	40,06	1,240	48,0	44,31	1,282	56,4	48,13
1,199	39,8	40,17	1,241	48,2	44,41	1,283	56,6	48,21
1,200	40,0	40,27	1,242	48,4	44,50	1,284	56,8	48,30
1,201	40,2	40,38	1,243	48,6	44,60	1,285	57,0	48,38
1,202	40,4	40,49	1,244	48,8	44,69	1,286	57,2	48,47
1,203	40,6	40,59	1,245	49,0	44,79	1,287	57,4	48,55
1,204	40,8	40,70	1,246	49,2	44,88	1,288	57,6	48,64
1,205	41,0	40,80	1,247	49,4	44,98	1,289	57,8	48,72
1,206	41,2	40,91	1,248	49,6	45,07	1,290	58,0	48,81
1,207	41,4	41,01	1,249	49,8	45,16	1,291	58,2	48,89
1,208	41,6	41,12	1,250	50,0	45,26	1,292	58,4	48,98
1,209	41,8	41,22	1,251	50,2	45,35	1,293	58,6	49,06
1,210	42,0	41,33	1,252	50,4	45,44	1,294	58,8	49,15
1,211	42,2	41,43	1,253	50,6	45,53	1,295	59,0	49,23
1,212	42,4	41,53	1,254	50,8	45,63	1,296	59,2	49,32
1,213	42,6	41,64	1,255	51,0	45,72	1,297	59,4	49,40
1,214	42,8	41,74	1,256	51,2	45,81	1,298	59,6	49,48
1,215	43,0	41,84	1,257	51,4	45,90	1,299	59,8	49,57
1,216	43,2	41,94	1,258	51,6	45,99	1,300	60,0	49,65
1,217	43,4	42,05	1,259	51,8	46,09	1,301	60,2	49,73
1,218	43,6	42,15	1,260	52,0	46,18	1,302	60,4	49,81
1,219	43,8	42,25	1,261	52,2	46,27	1,303	60,6	49,90
1,220	44,0	42,35	1,262	52,4	46,36	1,304	60,8	49,98
1,221	44,2	42,45	1,263	52,6	46,45	1,305	61,0	50,06
1,222	44,4	42,55	1,264	52,8	46,54	1,306	61,2	50,14
1,223	44,6	42,65	1,265	53,0	46,63	1,307	61,4	50,23
1,224	44,8	42,75	1,266	53,2	46,72	1,308	61,6	50,31
1,225	45,0	42,85	1,267	53,4	46,81	1,309	61,8	50,39
1,226	45,2	42,95	1,268	53,6	46,90	1,310	62,0	50,47
1,227	45,4	43,05	1,269	53,8	46,99	1,311	62,2	50,55
1,228	45,6	43,15	1,270	54,0	47,07	1,312	62,4	50,63
1,229	45,8	43,25	1,271	54,2	47,16	1,313	62,6	50,71
1,230	46,0	43,34	1,272	54,4	47,25	1,314	62,8	50,79
1,231	46,2	43,44	1,273	54,6	47,34	1,315	63,0	50,87
1,232	46,4	43,54	1,274	54,8	47,43	1,316	63,2	50,95
1,233	46,6	43,64	1,275	55,0	47,52	1,317	63,4	51,03
1,234	46,8	43,73	1,276	55,2	47,60	1,318	63,6	51,11
1,235	47,0	43,83	1,277	55,4	47,69	1,319	63,8	51,19
1,236	47,2	43,93	1,278	55,6	47,78	1,320	64,0	51,27

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
1,321	64,2	51,35	1,371	74,2	55,14	1,421	84,2	58,59
1,322	64,4	51,43	1,372	74,4	55,21	1,422	84,4	58,65
1,323	34,6	51,51	1,373	74,6	55,28	1,423	84,6	58,72
1,324	34,8	51,59	1,374	74,8	55,35	1,424	84,8	58,79
1,325	65,0	51,67	1,375	75,0	55,42	1,425	85,0	58,85
1,326	65,2	51,75	1,376	75,2	55,49	1,426	85,2	58,92
1,327	65,4	51,83	1,377	75,4	55,57	1,427	85,4	58,98
1,328	65,6	51,91	1,378	75,6	55,64	1,428	85,6	59,05
1,329	65,8	51,98	1,379	75,8	55,71	1,429	85,8	59,11
1,330	66,0	52,06	1,380	76,0	55,78	1,430	86,0	59,18
1,331	66,2	52,14	1,381	76,2	55,85	1,431	86,2	59,24
1,332	66,4	52,22	1,382	76,4	55,92	1,432	86,4	59,31
1,333	66,6	52,29	1,383	76,6	55,99	1,433	86,6	59,37
1,334	66,8	52,37	1,384	76,8	56,06	1,434	86,8	59,44
1,335	67,0	52,45	1,385	77,0	56,13	1,435	87,0	59,50
1,336	67,2	52,53	1,386	77,2	56,20	1,436	87,2	59,57
1,337	67,4	52,60	1,387	77,4	56,27	1,437	87,4	59,63
1,338	67,6	52,68	1,388	77,6	56,34	1,438	87,6	59,70
1,339	67,8	52,76	1,389	77,8	56,41	1,439	87,8	59,76
1,340	68,0	52,83	1,390	78,0	56,48	1,440	88,0	59,82
1,341	68,2	52,91	1,391	78,2	56,55	1,441	88,2	59,89
1,342	68,4	52,99	1,392	78,4	56,62	1,442	88,4	59,95
1,343	68,6	53,06	1,393	78,6	56,69	1,443	88,6	60,02
1,344	68,8	53,14	1,394	78,8	56,76	1,444	88,8	60,08
1,345	69,0	53,21	1,395	79,0	56,83	1,445	89,0	60,14
1,346	69,2	53,29	1,396	79,2	56,90	1,446	89,2	60,21
1,347	69,4	53,37	1,397	79,4	56,97	1,447	89,4	60,27
1,348	69,6	53,44	1,398	79,6	57,04	1,448	89,6	60,33
1,349	69,8	53,52	1,399	79,8	57,11	1,449	89,8	60,40
1,350	70,0	53,59	1,400	80,0	57,17	1,450	90,0	60,46
1,351	70,2	53,67	1,401	80,2	57,24	1,451	90,2	60,52
1,352	70,4	53,74	1,402	80,4	57,31	1,452	90,4	60,59
1,353	70,6	53,82	1,403	80,6	57,38	1,453	90,6	60,65
1,354	70,8	53,89	1,404	80,8	57,45	1,454	90,8	60,71
1,355	71,0	53,96	1,405	81,0	57,51	1,455	91,0	60,78
1,356	71,2	54,04	1,406	81,2	57,58	1,456	91,2	60,84
1,357	71,4	54,11	1,407	81,4	57,65	1,457	91,4	60,90
1,358	71,6	54,19	1,408	81,6	57,72	1,458	91,6	60,96
1,359	71,8	54,26	1,409	81,8	57,79	1,459	91,8	61,03
1,360	72,0	54,33	1,410	82,0	57,85	1,460	92,0	61,09
1,361	72,2	54,41	1,411	82,2	57,92	1,461	92,2	61,15
1,362	72,4	54,48	1,412	82,4	57,99	1,462	92,4	61,21
1,363	72,6	54,55	1,413	82,6	58,05	1,463	92,6	61,27
1,364	72,8	54,63	1,414	82,8	58,12	1,464	92,8	61,34
1,365	73,0	54,70	1,415	83,0	58,19	1,465	93,0	61,40
1,366	73,2	54,77	1,416	83,2	58,26	1,466	93,2	61,46
1,367	73,4	54,85	1,417	83,4	58,32	1,467	93,4	61,52
1,368	73,6	54,92	1,418	83,6	58,39	1,468	93,6	61,58
1,369	73,8	54,99	1,419	83,8	58,45	1,469	93,8	61,64
1,370	74,0	55,06	1,420	84,0	58,52	1,470	94,0	61,70

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
1,471	94,2	61,77	1,521	104,2	64,71	1,571	114,2	67,46
1,472	94,4	61,83	1,522	104,4	64,77	1,572	114,4	67,51
1,473	94,6	61,89	1,523	104,6	64,83	1,573,	114,6	67,57
1,474	94,8	61,95	1,524	104,8	64,88	1,574	114,8	67,62
1,475	95,0	62,01	1,525	105,0	64,94	1,575	115,0	67,67
1,476	95,2	62,07	1,526	105,2	65,00	1,576	115,2	67,73
1,477	95,4	62,13	1,527	105,4	65,05	1,577	115,4	67,78
1,478	95,6	62,19	1,528	105,6	65,11	1,578	115,6	67,83
1,479	95,8	62,25	1,529	105,8	65,17	1,579	115,8	67,88
1,480	96,0	62,31	1,530	106,0	65,22	1,580	116,0	67,94
1,481	96,2	62,37	1,531	106,2	65,28	1,581	116,2	67,99
1,482	96,4	62,43	1,532	106,4	65,33	1,582	116,4	68,04
1,483	96,6	62,49	1,533	106,6	65,39	1,583	116,6	68,09
1,484	96,8	62,55	1,534	106,8	65,45	1,584	116,8	68,15
1,485	97,0	62,61	1,535	107,0	65,50	1,585	117,0	68,20
1,486	97,2	62,67	1,536	107,2	65,56	1,586	117,2	68,25
1,487	97,4	62,73	1,537	107,4	65,61	1,587	117,4	68,30
1,488	97,6	62,79	1,538	107,6	65,67	1,588	117,6	68,36
1,489	97,8	62,85	1,539	107,8	65,72	1,589	117,8	68,41
1,490	98,0	62,91	1,540	108,0	65,78	1,590	118,0	68,46
1,491	98,2	62,97	1,541	108,2	65,83	1,591	118,2	68,51
1,492	98,4	63,03	1,542	108,4	65,89	1,592	118,4	68,56
1,493	98,6	63,09	1,543	108,6	65,95	1,593	118,6	68,61
1,494	98,8	63,15	1,544	108,8	66,00	1,594	118,8	68,67
1,495	99,0	63,21	1,545	109,0	66,06	1,595	119,0	68,72
1,496	99,2	63,27	1,546	109,2	66,11	1,596	119,2	68,77
1,497	99,4	63,33	1,547	109,4	66,17	1,597	119,4	68,82
1,498	99,6	63,38	1,548	109,6	66,22	1,598	119,6	68,87
1,499	99,8	63,44	1,549	109,8	66,27	1,599	119,8	68,92
1,500	100,0	63,50	1,550	110,0	66,33	1,600	120,0	68,97
1,501	100,2	63,56	1,551	110,2	66,38	1,601	120,2	69,03
1,502	100,4	63,62	1,552	110,4	66,44	1,602	120,4	69,08
1,503	100,6	63,68	1,553	110,6	66,49	1,603	120,6	69,13
1,504	100,8	63,73	1,554	110,8	66,55	1,604	120,8	69,18
1,505	101,0	63,79	1,555	111,0	66,60	1,605	121,0	69,23
1,506	101,2	63,85	1,556	111,2	66,66	1,606	121,2	69,28
1,507	101,4	63,91	1,557	111,4	66,71	1,607	121,4	69,33
1,508	101,6	63,97	1,558	111,6	66,76	1,608	121,6	69,38
1,509	101,8	64,02	1,559	111,8	66,82	1,609	121,8	69,43
1,510	102,0	64,08	1,560	112,0	66,87	1,610	122,0	69,48
1,511	102,2	64,14	1,561	112,2	66,93	1,611	122,2	69,53
1,512	102,4	64,20	1,562	112,4	66,98	1,612	122,4	69,59
1,513	102,6	64,26	1,563	112,6	67,03	1,613	122,6	69,64
1,514	102,8	64,31	1,564	112,8	67,09	1,614	122,8	69,69
1,515	103,0	64,37	1,565	113,0	67,14	1,615	123,0	69,74
1,516	103,2	64,43	1,566	113,2	67,19	1,616	123,2	69,79
1,517	103,4	64,49	1,567	113,4	67,25	1,617	123,4	69,84
1,518	103,6	64,54	1,568	113,6	67,30	1,618	123,6	69,89
1,519	103,8	64,60	1,569	113,8	67,36	1,619	123,8	69,94
1,520	104,0	64,66	1,570	114,0	67,41	1,620	124,0	69,99

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
1,621	124,2	70,04	1,671	134,2	72,46	1,721	144,2	74,75
1,622	124,4	70,09	1,672	134,4	72,51	1,722	144,4	74,79
1,623	124,6	70,14	1,673	134,6	75,55	1,723	144,6	74,84
1,624	124,8	70,19	1,674	134,8	72,60	1,724	144,8	74,88
1,625	125,0	70,24	1,675	135,0	72,65	1,725	145,0	74,93
1,626	125,2	70,29	1,676	135,2	72,70	1,726	145,2	74,97
1,627	125,4	70,34	1,677	135,4	72,74	1,727	145,4	75,02
1,628	125,6	70,39	1,678	135,6	72,79	1,728	145,6	75,06
1,629	125,8	70,43	1,679	135,8	72,84	1,729	145,8	75,10
1,630	126,0	70,48	1,680	136,0	72,88	1,730	146,0	75,15
1,631	126,2	70,53	1,681	136,2	72,93	1,731	146,2	75,19
1,632	126,4	70,58	1,682	136,4	72,98	1,732	146,4	75,24
1,633	126,6	70,63	1,683	136,6	73,02	1,733	146,6	75,28
1,634	126,8	70,68	1,684	136,8	73,07	1,734	146,8	75,32
1,635	127,0	70,73	1,685	137,0	73,11	1,735	147,0	75,37
1,636	127,2	70,78	1,686	137,2	73,16	1,736	147,2	75,41
1,637	127,4	70,83	1,687	137,4	73,21	1,737	147,4	75,46
1,638	127,6	70,88	1,688	137,6	73,25	1,738	147,6	75,50
1,639	127,8	70,93	1,689	137,8	73,30	1,739	147,8	75,54
1,640	128,0	70,97	1,690	138,0	73,35	1,740	148,0	75,59
1,641	128,2	71,02	1,691	138,2	73,39	1,741	148,2	75,63
1,642	128,4	71,07	1,692	138,4	73,44	1,742	148,4	75,67
1,643	128,6	71,12	1,693	138,6	73,48	1,743	148,6	75,72
1,644	128,8	71,17	1,694	138,8	73,53	1,744	148,8	75,76
1,645	129,0	71,22	1,695	139,0	73,58	1,745	149,0	75,80
1,646	129,2	71,27	1,696	139,2	73,62	1,746	149,2	75,85
1,647	129,4	71,32	1,697	139,4	73,67	1,747	149,4	75,89
1,648	129,6	71,36	1,698	139,6	73,71	1,748	149,6	75,93
1,649	129,8	71,41	1,699	139,8	73,76	1,749	149,8	75,98
1,650	130,0	71,46	1,700	140,0	73,80	1,750	150,0	76,02
1,651	130,2	71,51	1,701	140,2	73,85	1,751	150,2	76,06
1,652	130,4	71,56	1,702	140,4	73,89	1,752	150,4	76,11
1,653	130,6	71,60	1,703	140,6	73,94	1,753	150,6	76,15
1,654	130,8	71,65	1,704	140,8	73,99	1,754	150,8	76,19
1,655	131,0	71,70	1,705	141,0	74,03	1,755	151,0	76,24
1,656	131,2	71,75	1,706	141,2	74,08	1,756	151,2	76,28
1,657	131,4	71,80	1,707	141,4	74,12	1,757	151,4	76,32
1,658	131,6	71,84	1,708	141,6	74,17	1,758	151,6	76,36
1,659	131,8	71,89	1,709	141,8	74,21	1,759	151,8	76,41
1,660	132,0	71,94	1,710	142,0	74,26	1,760	152,0	76,45
1,661	132,2	71,99	1,711	142,2	74,30	1,761	152,2	76,49
1,662	132,4	72,03	1,712	142,4	74,35	1,762	152,4	76,54
1,663	132,6	72,08	1,713	142,6	74,39	1,763	152,6	76,58
1,664	132,8	72,13	1,714	142,8	74,44	1,764	152,8	76,62
1,665	133,0	72,18	1,715	143,0	74,48	1,765	153,0	76,66
1,666	133,2	72,22	1,716	143,2	74,53	1,766	153,2	76,71
1,667	133,4	72,27	1,717	143,4	74,57	1,767	153,4	76,75
1,668	133,6	72,32	1,718	143,6	74,62	1,768	153,6	76,79
1,669	133,8	72,37	1,719	143,8	74,66	1,769	153,8	76,83
1,670	134,0	72,41	1,720	144,0	74,70	1,770	154,0	76,88

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
1,771	154,2	76,92	1,821	164,2	78,98	1,871	174,2	80,94
1,772	154,4	76,96	1,822	164,4	79,02	1,872	174,4	80,98
1,773	154,6	77,00	1,823	164,6	79,06	1,873	174,6	81,02
1,774	154,8	77,04	1,824	164,8	79,10	1,874	174,8	81,05
1,775	155,0	77,09	1,825	165,0	79,14	1,875	175,0	81,09
1,776	155,2	77,13	1,826	165,2	79,18	1,876	175,2	81,13
1,777	155,4	77,17	1,827	165,4	79,22	1,877	175,4	81,17
1,778	155,6	77,21	1,828	165,6	79,26	1,878	175,6	81,21
1,779	155,8	77,25	1,829	165,8	79,30	1,879	175,8	81,24
1,780	156,0	77,30	1,830	166,0	79,34	1,880	176,0	81,28
1,781	156,2	77,34	1,831	166,2	79,38	1,881	176,2	81,32
1,782	156,4	77,38	1,832	166,4	79,42	1,882	176,4	81,36
1,783	156,6	77,42	1,833	166,6	79,46	1,883	176,6	81,40
1,784	156,8	77,46	1,834	166,8	79,50	1,884	176,8	81,43
1,785	157,0	77,50	1,835	167,0	79,54	1,885	177,0	81,47
1,786	157,2	77,55	1,836	167,2	79,58	1,886	177,2	81,51
1,787	157,4	77,59	1,837	167,4	79,61	1,887	177,4	81,55
1,788	157,6	77,63	1,838	167,6	79,65	1,888	177,6	81,58
1,789	157,8	77,67	1,839	167,8	79,69	1,889	177,8	81,62
1,790	158,0	77,71	1,840	168,0	79,73	1,890	178,0	81,66
1,791	158,2	77,75	1,841	168,2	79,77	1,891	178,2	81,70
1,792	158,4	77,80	1,842	168,4	79,81	1,892	178,4	81,74
1,793	158,6	77,84	1,843	168,6	79,85	1,893	178,6	81,77
1,794	158,8	77,88	1,844	168,8	79,89	1,894	178,8	81,81
1,795	159,0	77,92	1,845	169,0	79,93	1,895	179,0	81,85
1,796	159,2	77,96	1,846	169,2	79,97	1,896	179,2	81,89
1,797	159,4	78,00	1,847	169,4	80,01	1,897	179,4	81,92
1,798	159,6	78,04	1,848	169,6	80,05	1,898	179,6	91,96
1,799	159,8	78,08	1,849	169,8	80,09	1,899	179,8	82,00
1,800	160,0	78,12	1,850	170,0	80,13	1,900	180,0	82,03
1,801	160,2	78,17	1,851	170,2	80,17	1,901	180,2	82,07
1,802	160,4	78,21	1,852	170,4	80,20	1,902	180,4	82,11
1,803	160,6	78,25	1,853	170,6	80,24	1,903	180,6	82,15
1,804	160,8	78,29	1,854	170,8	80,28	1,904	180,8	82,18
1,805	161,0	78,33	1,855	171,0	80,32	1,905	181,0	82,22
1,806	161,2	78,37	1,856	171,2	80,36	1,906	181,2	82,26
1,807	161,4	78,41	1,857	171,4	80,40	1,907	181,4	82,29
1,808	161,6	78,45	1,858	171,6	80,44	1,908	181,6	82,33
1,809	161,8	78,49	1,859	171,8	80,48	1,909	181,8	82,37
1,810	162,0	78,53	1,860	172,0	80,51	1,910	182,0	82,41
1,811	162,2	78,57	1,861	172,2	80,55	1,911	182,2	82,44
1,812	162,4	78,61	1,862	172,4	80,59	1,912	182,4	82,48
1,813	162,6	78,65	1,863	172,6	80,63	1,913	182,6	82,52
1,184	162,8	78,69	1,864	172,8	80,67	1,914	182,8	82,55
1,815	163,0	78,74	1,865	173,0	80,71	1,915	183,0	82,59
1,816	163,2	78,78	1,866	173,2	80,75	1,916	183,2	82,63
1,817	163,4	78,82	1,867	173,4	80,78	1,917	183,4	82,66
1,818	163,6	78,86	1,868	173,6	80,82	1,918	183,6	82,70
1,819	163,8	78,90	1,869	173,8	80,86	1,919	183,8	82,74
1,820	164,0	78,94	1,870	174,0	80,90	1,920	184,0	82,77

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
1,921	184,2	82,81	1,971	194,2	84,60	2,021	204,2	86,32
1,922	184,4	82,85	1,972	194,4	84,64	2,022	204,4	86,35
1,923	184,6	82,88	1,973	194,6	84,67	2,023	204,6	86,38
1,924	184,8	82,92	1,974	194,8	84,71	2,024	204,8	86,42
1,925	185,0	82,96	1,975	195,0	84,74	2,025	205,0	86,45
1,926	185,2	82,99	1,976	195,2	84,78	2,026	205,2	86,48
1,927	185,4	83,03	1,977	195,4	84,81	2,027	205,4	86,52
1,928	185,6	83,07	1,978	195,6	84,85	2,028	205,6	86,55
1,929	185,8	83,10	1,979	195,8	84,88	2,029	205,8	86,58
1,930	186,0	83,14	1,980	196,0	84,92	2,030	206,0	86,62
1,931	186,2	83,17	1,981	196,2	84,95	2,031	206,2	86,65
1,932	186,4	83,21	1,982	196,4	84,98	2,032	206,4	86,68
1,933	186,6	83,25	1,983	196,6	85,02	2,033	206,6	86,72
1,934	186,8	83,28	1,984	196,8	85,05	2,034	206,8	86,75
1,935	187,0	83,32	1,985	197,0	85,09	2,035	207,0	86,78
1,936	187,2	83,36	1,986	197,2	85,12	2,036	207,2	86,82
1,937	187,4	83,39	1,987	197,4	85,16	2,037	207,4	86,85
1,938	187,6	83,43	1,988	197,6	85,19	2,038	207,6	86,88
1,939	187,8	83,46	1,989	197,8	85,23	2,039	207,8	86,92
1,940	188,0	83,50	1,990	198,0	85,26	2,040	208,0	86,95
1,941	188,2	83,54	1,991	198,2	85,30	2,041	208,2	86,98
1,942	188,4	83,57	1,992	198,4	85,33	2,042	208,4	87,02
1,943	188,6	83,61	1,993	198,6	85,36	2,043	208,6	87,05
1,944	188,8	83,64	1,994	198,8	85,40	2,044	208,8	87,08
1,945	189,0	83,68	1,995	199,0	85,43	2,045	209,0	87,12
1,946	189,2	83,72	1,996	199,2	85,47	2,046	209,2	87,15
1,947	189,4	83,75	1,997	199,4	85,50	2,047	209,4	87,18
1,948	189,6	83,79	1,998	199,6	85,54	2,048	209,6	87,21
1,949	189,8	83,82	1,999	199,8	85,57	2,049	209,8	87,25
1,950	190,0	83,86	2,000	200,0	85,60	2,050	210,0	87,28
1,951	190,2	83,89	2,001	200,2	85,64	2,051	210,2	87,31
1,952	190,4	83,93	2,002	200,4	85,67	2,052	210,4	87,35
1,953	190,6	83,97	2,003	200,6	85,71	2,053	210,6	87,38
1,954	190,8	84,00	2,004	200,8	85,74	2,054	210,8	87,41
1,955	191,0	84,04	2,005	201,0	85,78	2,055	211,0	87,44
1,956	191,2	84,07	2,006	201,2	85,81	2,056	211,2	87,48
1,957	191,4	84,11	2,007	201,4	85,84	2,057	211,4	87,51
1,958	191,6	84,14	2,008	201,6	85,88	2,058	211,6	87,54
1,959	191,8	84,18	2,009	201,8	85,91	2,059	211,8	87,57
1,960	192,0	84,21	2,010	202,0	85,95	2,060	212,0	87,61
1,961	192,2	84,25	2,011	202,2	85,98	2,061	212,2	87,64
1,962	192,4	84,28	2,012	202,4	86,01	2,062	212,4	87,67
1,963	192,6	84,32	2,013	202,6	86,05	2,063	212,6	87,70
1,964	192,8	84,36	2,014	202,8	86,08	2,064	212,8	87,74
1,965	193,0	84,39	2,015	203,0	86,11	2,065	213,0	87,77
1,966	193,2	84,43	2,016	203,2	86,15	2,066	213,2	87,80
1,967	193,4	84,46	2,017	203,4	86,18	2,067	213,4	87,83
1,968	193,6	84,50	2,018	203,6	86,22	2,068	213,6	87,87
1,969	193,8	84,53	2,019	203,8	86,25	2,069	213,8	87,90
1,970	194,0	84,57	2,020	204,0	86,28	2,070	214,0	87,93

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
2,071	214,2	87,96	2,121	224,2	89,55	2,171	234,2	91,07
2,072	214,4	88,00	2,122	224,4	89,58	2,172	234,4	91,10
2,073	214,6	88,03	2,123	224,6	89,61	2,173	234,6	91,13
2,074	214,8	88,06	2,124	224,8	89,64	2,174	234,8	91,16
2,075	215,0	88,09	2,125	225,0	89,67	2,175	235,0	91,19
2,076	215,2	88,12	2,126	225,2	89,70	2,176	235,2	91,22
2,077	215,4	88,16	2,127	225,4	89,73	2,177	235,4	91,25
2,078	215,6	88,19	2,128	225,6	89,76	2,178	235,6	91,28
2,079	215,8	88,22	2,129	225,8	89,79	2,179	235,8	91,31
2,080	216,0	88,25	2,130	226,0	89,82	2,180	236,0	91,34
2,081	216,2	88,28	2,131	226,2	89,85	2,181	236,2	91,37
2,082	216,4	88,32	2,132	226,4	89,89	2,182	236,4	91,40
2,083	216,6	88,35	2,133	226,6	89,92	2,183	236,6	91,43
2,084	216,8	88,38	2,134	226,8	89,95	2,184	236,8	91,46
2,085	217,0	88,41	2,135	227,0	89,98	2,185	237,0	91,49
2,086	217,2	88,44	2,136	227,2	90,01	2,186	237,2	91,52
2,087	217,4	88,48	2,137	227,4	90,04	2,187	237,4	91,54
2,088	217,6	88,51	2,138	227,6	90,07	2,188	237,6	91,57
2,089	217,8	88,54	2,139	227,8	90,10	2,189	237,8	91,60
2,090	218,0	88,57	2,140	228,0	90,13	2,190	238,0	91,63
2,091	218,2	88,60	2,141	228,2	90,16	2,191	238,2	91,66
2,092	218,4	88,64	2,142	228,4	90,19	2,192	238,4	91,69
2,093	218,6	88,67	2,143	228,6	90,22	2,193	238,6	91,72
2,094	218,8	88,70	2,144	228,8	90,25	2,194	238,8	91,75
2,095	219,0	88,73	2,145	229,0	90,28	2,195	239,0	91,78
2,096	219,2	88,76	2,146	229,2	90,31	2,196	239,2	91,81
2,097	219,4	88,79	2,147	229,4	90,35	2,197	239,4	91,84
2,098	219,6	88,83	2,148	229,6	90,38	2,198	239,6	91,87
2,099	219,8	88,86	2,149	229,8	90,41	2,199	239,8	91,90
2,100	220,0	88,89	2,150	230,0	90,44	2,200	240,0	91,93
2,101	220,2	88,92	2,151	230,2	90,47	2,201	240,2	91,96
2,102	220,4	88,95	2,152	230,4	90,50	2,202	240,4	91,99
2,103	220,6	88,98	2,153	230,6	90,53	2,203	240,6	92,02
2,104	220,8	89,01	2,154	230,8	90,56	2,204	240,8	92,04
2,105	221,0	89,05	2,155	231,0	90,59	2,205	241,0	92,07
2,106	221,2	89,08	2,156	231,2	90,62	2,206	241,2	92,10
2,107	221,4	89,11	2,157	231,4	90,65	2,207	241,4	92,13
2,108	221,6	89,14	2,158	231,6	90,68	2,208	241,6	92,16
2,109	221,8	89,17	2,159	231,8	90,71	2,209	241,8	92,19
2,110	222,0	89,20	2,160	232,0	90,74	2,210	242,0	92,22
2,111	222,2	89,23	2,161	232,2	90,77	2,211	242,2	92,25
2,112	222,4	89,27	2,162	232,4	90,80	2,212	242,4	92,28
2,113	222,6	89,30	2,163	232,6	90,83	2,213	242,6	92,31
2,114	222,8	89,33	2,164	232,8	90,86	2,214	242,8	92,34
2,115	223,0	89,36	2,165	233,0	90,89	2,215	243,0	92,36
2,116	223,2	89,39	2,166	233,2	90,92	2,216	243,2	92,39
2,117	223,4	89,42	2,167	233,4	90,95	2,217	243,4	92,42
2,118	223,6	89,45	2,168	233,6	90,98	2,218	243,6	92,45
2,119	223,8	89,48	2,169	233,8	91,01	2,219	243,8	92,48
2,120	224,0	89,51	2,170	234,0	91,04	2,220	244,0	92,51

Table 1 (*continued*)

VR	*I*	*K*	VR	*I*	*K*	VR	*I*	*K*
2,221	244,2	92,54	2,271	254,2	93,95	2,321	264,2	95,32
2,222	244,4	92,57	2,272	254,4	93,98	2,322	264,4	95,35
2,223	244,6	92,60	2,273	254,6	94,01	2,323	264,6	95,38
2,224	244,8	92,62	2,274	254,8	94,04	2,324	264,8	95,40
2,225	245,0	92,65	2,275	255,0	94,07	2,325	265,0	95,43
2,226	245,2	92,68	2,276	255,2	94,09	2,326	265,2	95,46
2,227	245,4	92,71	2,277	255,4	94,12	2,327	265,4	95,49
2,228	245,6	92,74	2,278	255,6	94,15	2,328	265,6	95,51
2,229	245,8	92,77	2,279	255,8	94,18	2,329	265,8	95,54
2,230	246,0	92,80	2,280	256,0	94,20	2,330	266,0	95,57
2,231	246,2	92,83	2,281	256,2	94,23	2,331	266,2	95,59
2,232	246,4	92,85	2,282	256,4	94,26	2,332	266,4	95,62
2,233	246,6	92,88	2,283	256,6	94,29	2,333	266,6	95,65
2,234	246,8	92,91	2,284	256,8	94,32	2,334	266,8	95,67
2,235	247,0	92,94	2,285	257,0	94,34	2,335	267,0	95,70
2,236	247,2	92,97	2,286	257,2	94,37	2,336	267,2	95,73
2,237	247,4	93,00	2,287	257,4	94,40	2,337	267,4	95,75
2,238	247,6	93,02	2,288	257,6	94,43	2,338	267,6	95,78
2,239	247,8	93,05	2,289	257,8	94,45	2,339	267,8	95,81
2,240	248,0	93,08	2,290	258,0	94,48	2,340	268,0	95,83
2,241	248,2	93,11	2,291	258,2	94,51	2,341	268,2	95,86
2,242	248,4	93,14	2,292	258,4	94,54	2,342	268,4	95,89
2,243	248,6	93,17	2,293	258,6	94,56	2,343	268,6	95,91
2,244	248,8	93,20	2,294	258,8	94,59	2,344	268,8	95,94
2,245	249,0	93,22	2,295	259,0	94,62	2,345	269,0	95,96
2,246	249,2	93,25	2,296	259,2	94,65	2,346	269,2	95,99
2,247	249,4	93,28	2,297	259,4	94,67	2,347	269,4	96,02
2,248	249,6	93,31	2,298	259,6	94,70	2,348	269,6	96,04
2,249	249,8	93,34	2,299	259,8	94,73	2,349	269,8	96,07
2,250	250,0	93,37	2,300	260,0	94,75	2,350	270,0	96,10
2,251	250,2	93,39	2,301	260,2	94,78	2,351	270,2	96,12
2,252	250,4	93,42	2,302	260,4	94,81	2,352	270,4	96,15
2,253	250,6	93,45	2,303	260,6	94,84	2,353	270,6	96,18
2,254	250,8	93,48	2,304	260,8	94,86	2,354	270,8	96,20
2,255	251,0	93,51	2,305	261,0	94,89	2,355	271,0	96,23
2,256	251,2	93,53	2,306	261,2	94,92	2,356	271,2	96,26
2,257	251,4	93,56	2,307	261,4	94,95	2,357	271,4	96,28
2,258	251,6	93,59	2,308	261,6	94,97	2,358	271,6	96,31
2,259	251,8	93,62	2,309	261,8	95,00	2,359	271,8	96,33
2,260	252,0	93,65	2,310	262,0	95,03	2,360	272,0	96,36
2,261	252,2	93,68	2,311	262,2	95,05	2,361	272,2	96,39
2,262	252,4	93,70	2,312	262,4	95,08	2,362	272,4	96,41
2,263	252,6	93,73	2,313	262,6	95,11	2,363	272,6	96,44
2,264	252,8	93,76	2,314	262,8	95,13	2,364	272,8	96,47
2,265	253,0	93,79	2,315	263,0	95,16	2,365	273,0	96,49
2,266	253,2	93,82	2,316	263,2	95,19	2,366	273,2	96,52
2,267	253,4	93,84	2,317	263,4	95,22	2,367	273,4	96,54
2,268	253,6	93,87	2,318	263,6	95,24	2,368	273,6	96,57
2,269	253,8	93,90	2,319	263,8	95,27	2,369	273,8	96,60
2,270	254,0	93,93	2,320	264,0	95,30	2,370	274,0	96,62

Table 1 (*concluded*)

VR	I	K	VR	I	K	VR	I	K
2,371	274,2	96,65	2,421	284,2	97,93	2,471	294,2	99,17
2,372	274,4	96,67	2,422	284,4	97,96	2,472	294,4	99,20
2,373	274,6	96,70	2,423	284,6	97,98	2,473	294,6	99,22
2,374	274,8	96,73	2,424	284,8	98,01	2,474	294,8	99,25
2,375	275,0	96,75	2,425	285,0	98,03	2,475	295,0	99,27
2,376	275,2	96,78	2,426	285,2	98,06	2,476	295,2	99,29
2,377	275,4	96,80	2,427	285,4	98,08	2,477	295,4	99,32
2,378	275,6	96,83	2,428	285,6	98,11	2,478	295,6	99,34
2,379	275,8	96,86	2,429	285,8	98,13	2,479	295,8	99,37
2,380	276,0	96,88	2,430	586,0	98,16	2,480	296,0	99,39
2,381	276,2	96,91	2,431	586,2	98,18	2,481	296,2	99,42
2,382	276,4	96,93	2,432	286,4	98,21	2,482	296,4	99,44
2,383	276,6	96,96	2,433	286,6	98,23	2,483	296,6	99,47
2,384	276,8	96,99	2,434	286,8	98,26	2,484	296,8	99,49
2,385	277,0	97,01	2,435	287,0	98,28	2,485	297,0	99,51
2,386	277,2	97,04	2,436	287,2	98,31	2,486	297,2	99,54
2,387	277,4	97,06	2,437	287,4	98,33	2,487	297,4	99,56
2,388	277,6	97,09	2,438	287,6	98,36	2,488	297,6	99,59
2,389	277,8	97,11	2,439	287,8	98,38	2,489	297,8	99,61
2,390	278,0	97,14	2,440	288,0	98,41	2,490	298,0	99,63
2,391	278,2	97,17	2,441	288,2	98,43	2,491	298,2	99,66
2,392	278,4	97,19	2,442	288,4	98,46	2,492	298,4	99,68
2,393	278,6	97,22	2,443	288,6	98,48	2,493	298,6	99,71
2,394	278,8	97,24	2,444	288,8	98,51	2,494	298,8	99,73
2,395	279,0	97,27	2,445	289,0	98,53	2,495	299,0	99,76
2,396	279,2	97,29	2,446	289,2	98,56	2,496	299,2	99,78
2,397	279,4	97,32	2,447	289,4	98,58	2,497	299,4	99,80
2,398	279,6	97,35	2,448	289,6	98,61	2,498	299,6	99,83
2,399	279,8	97,37	2,449	289,8	98,63	2,499	299,8	99,85
2,400	280,0	97,40	2,450	290,0	98,66	2,500	300,0	99,88
2,401	280,2	97,42	2,451	290,2	98,68	2,501	300,2	99,90
2,402	280,4	97,45	2,452	290,4	98,70	2,502	300,4	99,92
2,403	280,6	97,47	2,453	290,6	98,73	2,503	300,6	99,95
2,404	280,8	97,50	2,454	290,8	98,75	2,504	300,8	99,97
2,405	281,0	97,52	2,455	291,0	98,78	2,505	301,0	100,00
2,406	281,2	97,55	2,456	291,2	98,80	2,506	301,2	100,02
2,407	281,4	97,58	2,457	291,4	98,83	2,507	301,4	100,04
2,408	281,6	97,60	2,458	291,6	98,85	2,508	301,6	100,07
2,409	281,8	97,63	2,459	291,8	98,88	2,509	301,8	100,09
2,410	282,0	97,65	2,460	292,0	98,90	2,510	302,0	100,12
2,411	282,2	97,68	2,461	292,2	98,93			
2,412	282,4	97,70	2,462	292,4	98,95			
2,413	282,6	97,73	2,463	292,6	98,98			
2,414	282,8	97,75	2,464	292,8	99,00			
2,415	283,0	97,78	2,465	293,0	99,03			
2,416	283,2	97,80	2,466	293,2	99,05			
2,417	283,4	97,83	2,467	293,4	99,07			
2,418	283,6	97,85	2,468	293,6	99,10			
2,419	283,8	97,88	2,469	293,8	99,12			
2,420	284,0	97,90	2,470	294,0	99,15			

ICS 83.080.20

Descriptors: plastics, resins, polyvinyl chloride, soluble matter, tests, determination, viscosity index, viscosity measurement.

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