INTERNATIONAL STANDARD

ISO 3551-2

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Rotary core diamond drilling equipment — System A —

Part 2: Inch units

Matériel de forage rotatif au diamant avec carottage — Système A —

Partie 2: Unités en inches

Reference number
ISO 3551-2 : 1992 (E)

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International Organization for Standardization
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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 3551-2 was prepared by Technical Committee ISO/TC 82, *Mining*, Sub-Committee SC 6, *Diamond core drilling equipment.*

ISO 3551 consists of the following parts, under the general title *Rotary core diamond drilling equipment — System A*:

— *Part 1: Metric units*

— *Part 2: Inch units*

Introduction

This part of ISO 3551 is published in parallel with ISO 3552-2 : 1992, *Rotary core diamond drilling equipment — System B — Part 2: Inch units*. The two International Standards cover rotary core diamond drilling equipment.

The two systems are referred to as System A and System B but this is not of any significance since the two systems are not intended as replacements for each other. The system to be adopted by the user will depend on his drilling requirements. The two sets of equipment are not interchangeable. System A is characterized by a series of hole sizes oriented to standard pipe sizes, with relatively wide "nesting", relatively greater reduction in hole diameters as the depth of hole increases, and employing relatively heavy casings between hole sizes. System B is characterized by a series of hole sizes specifically designed to "nest" closely, permitting relatively small reductions in hole diameters as the depth of the hole increases, and employing relatively thin casings between hole sizes. It should not be assumed that, for comparable hole sizes, the physical properties of similar elements of the two systems are equal.

NOTE — Another system (System C) is described in ISO 8866 : 1991, *Rotary core diamond drilling equipment — System C*. It is characterized by a series of nesting holes providing small clearances between the hole wall and the equipment, making it possible to use thin-walled casing tubes. System C is considered to be a separate system to be applied in parallel with systems A and B; it is not interchangeable with these systems.

System A was originally drawn up and standardized in inches, and the conversion was subsequently made into metric units; therefore, in the event of a dispute, the values expressed in this part of ISO 3551 shall be taken as the authentic values.

Rotary core diamond drilling equipment — System A —

Part 2:
Inch units

1 Scope

This part of ISO 3551 establishes the nomenclature and lays down the leading dimensions to ensure interchangeability within the limits of System A of the following equipment:

a) drill rods and couplings;

b) casings, casing couplings, casing bits, casing shoes, drive shoes and casing reaming shells;

c) core barrels, core bits, core lifters and reaming shells.

It specifies the characteristics of a range of equipment for drilling holes having diameters from 1.18 in to 7.88 in and yielding cores having diameters from 0.73 in to 6.5 in.

NOTE — The title of this part of ISO 3551 specifies diamond core drilling, but it is also possible to use other cutting materials.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 3551. 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 3551 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 263 : 1973, *ISO inch screw threads — General plan and selection for screws, bolts and nuts — Diameter range* 0.06 *to* 6 in.

ISO 5864 : 1978, *ISO inch screw threads — Allowances and tolerances.*

BS 1580 : 1962, *Specification for Unified screw threads — Parts 1 and 2: Diameters* 1/4 in *and larger.*

API 7, *Rotary shouldered connection, internal flush type (IF).*

3 Designation

Items manufactured in accordance with this part of ISO 3551 shall be designated by its number followed by the symbols as listed in table 1.

4 Materials

Materials used in the manufacture of the equipment specified in this part of ISO 3551 shall have the mechanical properties specified in table 2, though for special purposes other materials may be used by agreement between manufacturer and purchaser.

The method by which the mechanical properties of tubes are obtained is left to the manufacturer.

5 Dimensions and tolerances

5.1 Dimensions

All dimensions and tolerances shall be in accordance with tables 4 to 57. All dimensions given in this part of ISO 3551, unless otherwise stated, are in inches (see Introduction).

NOTES

1 In System A, maximum and minimum values are included for all dimensions.

2 All these items have a right-hand thread. Where a left-hand thread is necessary, it is stipulated for each individual case in the footnotes to the figure or to the corresponding table.

3 The radius (or chamfer) of the thread crest and the radius in thread root corners are left to the manufacturers (determined by national standards of manufacturers' countries).

5.2 Conformity

When drilling in conformity with American Diamond Core Drill Manufacturers Association (DCDMA) and Canadian Diamond Drilling Association (CDDA) standards, the lengths of rods and casings shall be 120 in, 60 in or 30 in, but in those industries where drilling depths are measured in metres, the rod and casing lengths may be 3 m, 1,5 m or 0,75 m.

5.3 Eccentricity

The eccentricity is defined as the distance between the centres of the outside and inside diameters and shall not exceed 10 % of the nominal wall thickness Q. The eccentricity is calculated according to the formula

$$\frac{Q_{max} - Q_{min}}{2\,Q_{nom}} \times 100$$

where Q_{max} and Q_{min} are values of the wall thickness measured in the same section.

5.4 Straightness

When measured over the whole length of the tube by rolling against a straightedge, the maximum deviation shall not be greater than 1 in 1 200.

Table 1 — Identification symbols

Drill rods (see tables 4, 6, 7 and 8)	RW	EW	AW	BW	NW	HW	—	—	—	—
Casing — flush coupled (see tables 4, 9 and 15 to 19)	RX	EX	AX	BX	NX	HX	PX	SX	UX	ZX
Casing — flush jointed (see tables 4 and 9 to 14)	RW	EW	AW	BW	NW	HW	PW	SW	UW	ZW
"WF" design, face discharge core barrel (see figure 6)	—	—	—	—	—	HWF	PWF	SWF	UWF	ZWF
"WG" design, internal discharge core barrel (see figures 7 and 8)	—	EWG	AWG	BWG	NWG	HWG	—	—	—	—
"WM" design, internal discharge core barrel*) (see figure 9)	—	EWM	AWM	BWM	NWM	—	—	—	—	—
"WT" design, thin wall, internal discharge core barrel (see figures 10, 11 and 12)	RWT	EWT	AWT	BWT	NWT	HWT	—	—	—	—

*) These may be used with face discharge bits.

Table 2 — Mechanical properties

Component	Tensile strength, R_m, min. lbf/in^2	Yield stress, R_e, min. lbf/in^2	Percent elongation after fracture $A_{2\,in}$, min. %
Parallel wall rods	90 000	76 000	15
Upset or forged end of rod	72 000	45 000	18
Casing and casing coupling sizes R to H	90 000	76 000	15
Casing and casing coupling sizes P to Z	72 000	45 000	18
Drill-rod coupling and adaptors	101 500	72 000	15
All other components	Not specified		

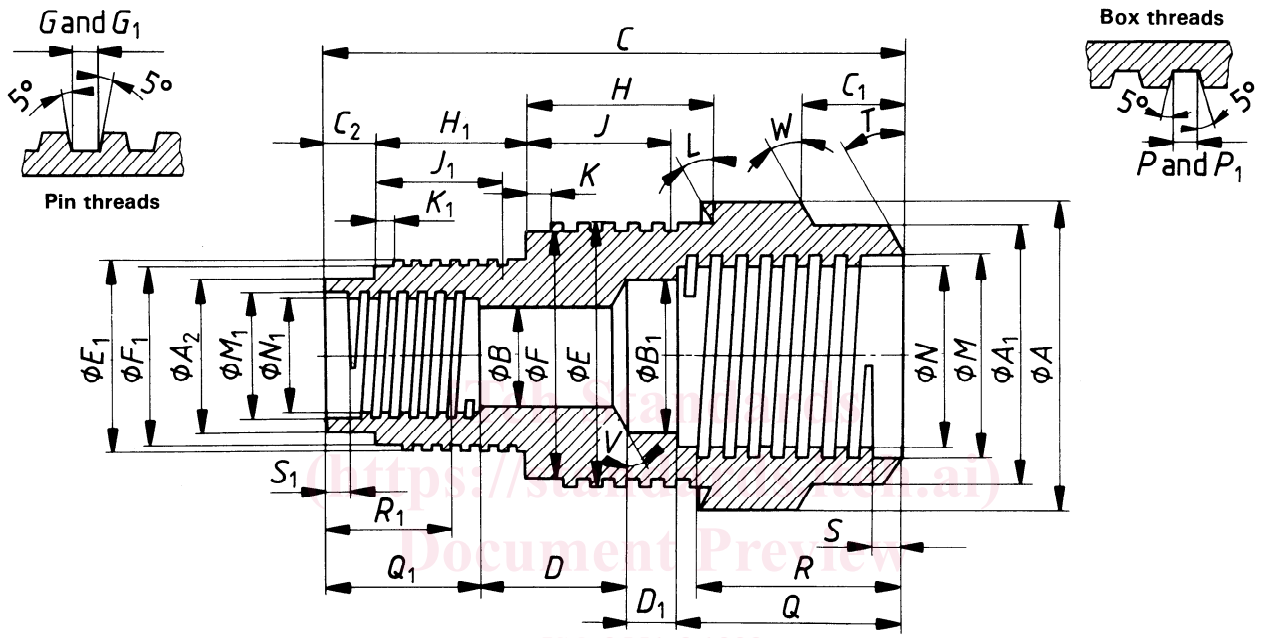


Figure 1 — System of dimensional identification letters

Table 3 — System of dimensional identification letters

A, A_1, etc.	Outside diameters — A being largest; A_1, A_2, etc. progressively smaller
B, B_1, etc.	Inside diameters — B being smallest; B_1, B_2, etc. progressively larger
C, C_1, etc.	External lengths — C being longest; C_1, C_2, etc. progressively shorter
D, D_1, etc.	Internal lengths — D being longest; D_1, D_2, etc. progressively shorter
E, E_1, etc.	Major diameter of pin threads — E being largest; E_1, E_2, etc. smaller
F, F_1, etc.	Minor diameter of pin threads F being largest; F_1, F_2, etc. smaller
Thread pitch (Threads per inch)	Pin threads
G, G_1, etc.	Width at root of pin thread
H, H_1, etc.	Length of outside diameter machined for external threading
J, J_1, etc.	Minimum length for full depth of pin threads
K, K_1, etc.	Length of relief at the starting-point of pin threads
L, L_1, etc.	Angle of bevel for pin thread shoulder
M, M_1, etc.	Major diameter of box threads — M being largest; M_1, M_2, etc. smaller
N, N_1, etc.	Minor diameter of box threads — N being largest; N_1, N_2, etc. smaller
Thread pitch (Threads per inch)	Box threads
P, P_1, etc.	Width at root of box threads
Q, Q_1, etc.	Length of inside diameter machined for internal threading
R, R_1, etc.	Minimum length for full depth of box threads
S, S_1, etc.	Length of counterbore at the starting-point of box threads
T, T_1, etc.	Angle of bevel for box thread shoulder
U, U_1, etc.	Included angles — internal and external
V, V_1, etc.	Internal angles — not pertaining to threaded connections
W, W_1, etc.	External angles — not pertaining to threaded connections
X	Diamond set dimensions — external diameter
Y	Diamond set dimensions — internal diameter

NOTE — The following common abbreviations are sometimes used in tables in the English version for the sake of simplicity:

O.D. = outside diameter

I.D. = inside diameter.

Table 4 — Nomenclature and basic dimensions for drill rods and casings and their related diamond set items

Drill rod	Rod tube	Rod coupling	Casing flush coupling	Casing tube	Casing coupling	Casing flush jointed	Casing		Casing reaming shell	Casing bit		Casing shoe	
	O.D.	I.D.		O.D.	I.D.		O.D.	I.D.	Set O.D.	Set O.D.	Set I.D.	Set O.D.	Set I.D.
RW	1.098 1.093	0.416 0.401	**RX**	1.442 1.437	1.20 1.19	**RW**	1.442 1.437	1.20 1.19	not required	1.49 1.48	1.005 0.995	1.49 1.48	1.188 1.183
EW	1.380 1.375	0.447 0.432	**EX**	1.822 1.812	1.51 1.50	**EW**	1.822 1.812	1.51 1.50	1.895 1.885	1.88 1.87	1.41 1.40	1.88 1.87	1.497 1.492
AW	1.728 1.718	0.635 0.620	**AX**	2.26 2.25	1.916 1.906	**AW**	2.26 2.25	1.916 1.906	2.365 2.355	2.35 2.34	1.785 1.775	2.35 2.34	1.902 1.897
BW	2.135 2.125	0.760 0.745	**BX**	2.885 2.875	2.385 2.375	**BW**	2.885 2.875	2.385 2.375	2.985 2.975	2.97 2.96	2.22 2.21	2.97 2.96	2.372 2.367
NW	2.635 2.625	1.385 1.370	**NX**	3.515 3.500	3.015 3.000	**NW**	3.515 3.500	3.015 3.000	3.635 3.625	3.62 3.61	2.845 2.835	3.62 3.61	2.997 2.987
HW	3.515 3.500	2.390 2.375	**HX**	4.515 4.500	3.952 3.937	**HW**	4.515 4.500	4.000 3.985	not required	4.632 4.617	3.782 3.772	4.632 4.617	3.93 3.92
			PX	5.541 5.459	5.015 4.865	**PW**	5.541 5.459	5.015 4.865	not required	5.66 5.64	4.640 4.625	5.66 5.64	4.860 4.845
			SX	6.675 6.575	6.002 5.815	**SW**	6.675 6.575	6.124 5.953	not required	6.80 6.78	5.640 5.625	6.80 6.78	5.785 5.770
			UX	7.682 7.568	7.055 6.937	**UW**	7.682 7.568	7.108 6.921	not required	7.815 7.785	6.765 6.745	7.815 7.785	6.915 6.895
			ZX	8.69 8.56	8.108 7.937	**ZW**	8.69 8.56	8.207 7.992	not required	8.825 8.795	7.765 7.745	8.825 8.795	7.915 7.895

Table 5 — Nomenclature and basic dimensions for core barrels and their related diamond set items

Core barrel designs				Coring bits		Reaming shells	Kerf width	Kerf area	Core area	Hole area	Core-to-hole ratio	Nominal core size[1]	Nominal hole size[1]
WF	WG	WM	WT	Set I.D.	Set O.D.	Set O.D.	in	in^2	in^2	in^2	%		
			RWT	0.74 0.73	1.165 1.155	1.18 1.17	0.22	0.658	0.424	1.083	39.1	0.73	1.18
	EWG	EWM		0.85 0.84	1.475 1.465	1.49 1.48	0.32	1.17	0.561	1.732	32.4	0.84	1.5
			EWT	0.91 0.90	1.475 1.465	1.49 1.48	0.29	1.089	0.643	1.732	37.1	0.9	1.5
	AWG	AWM		1.19 1.18	1.88 1.87	1.895 1.885	0.352	1.703	1.103	2.805	39.3	1.18	1.9
			AWT	1.286 1.276	1.88 1.87	1.895 1.885	0.304	1.517	1.289	2.805	45.9	1.27	1.9
	BWG	BWM		1.66 1.65	2.35 2.34	2.365 2.355	0.352	2.222	2.151	4.374	49.1	1.65	2.37
			BWT	1.755 1.745	2.35 2.34	2.365 2.355	0.305	1.968	2.405	4.374	55	1.75	2.37
	NWG	NWM		2.16 2.15	2.97 2.96	2.985 2.975	0.412	3.326	3.647	6.973	52.2	2.15	3
			NWT	2.318 2.308	2.97 2.96	2.985 2.975	0.333	2.771	4.202	6.973	60	2.3	3
HWF	HWG			3.005 2.995	3.897 3.882	3.912 3.902	0.453	4.919	7.069	11.987	59	3	3.92
			HWT	3.192 3.182	3.897 3.882	3.912 3.902	0.36	4.011	7.976	11.987	66.5	3.18	3.92
PWF				3.635 3.620	4.735 4.715	4.755 4.740	0.56	7.367	10.335	17.702	58.4	3.62	4.75
SWF				4.447 4.432	5.735 5.715	5.755 5.740	0.654	10.465	15.478	25.945	59.7	4.43	5.75
UWF				5.515 5.495	6.855 6.825	6.88 6.86	0.682	13.266	23.801	37.068	64.2	5.5	6.88
ZWF				6.515 6.495	7.855 7.825	7.88 7.86	0.682	15.411	33.233	48.645	68.3	6.5	7.88

1) Nominal core and hole sizes are rounded inch units and are not directly convertible into the metric values.

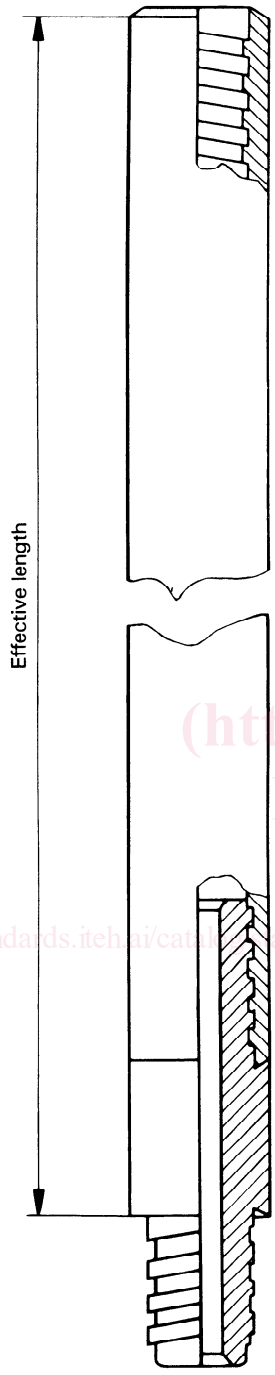


Figure 2 — Drill rod and coupling

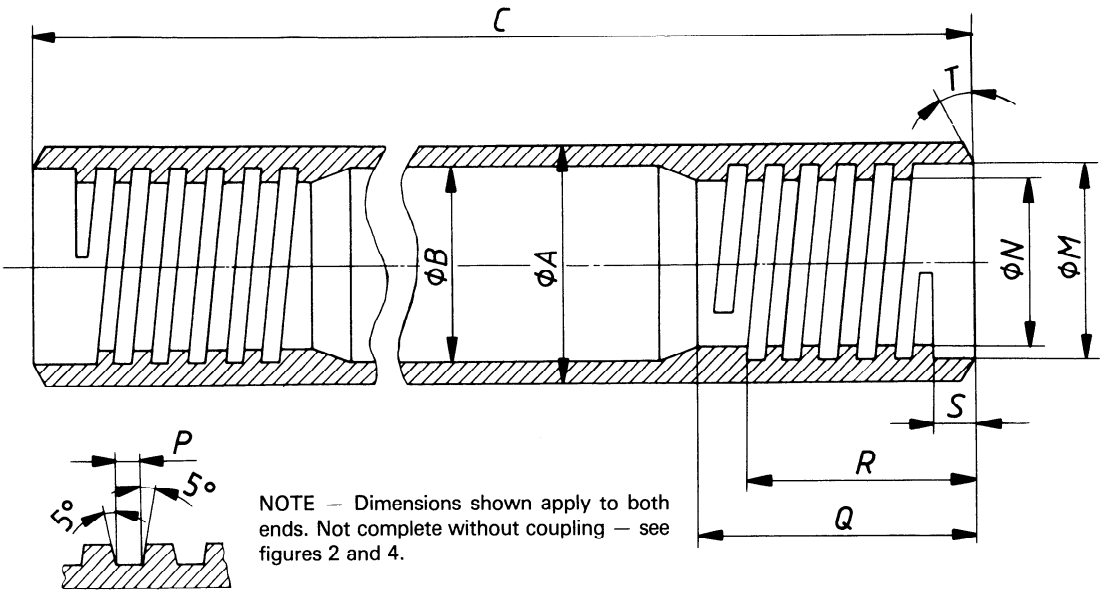
Table 6 — Drill rod and coupling — Main dimensions

Identification symbol	Rod O.D.	Coupling I.D.	Effective lengths (see figure 2)
RW	1.093	0.406	120, 60 or 30
EW	1.375	0.437	
AW	1.718	0.625	
BW	2.125	0.75	
NW	2.625	1.375	
HW	3.5	2.375	

NOTES

1 Thread may be left-hand if required.

2 For detailed dimensions, see tables 7 and 8.



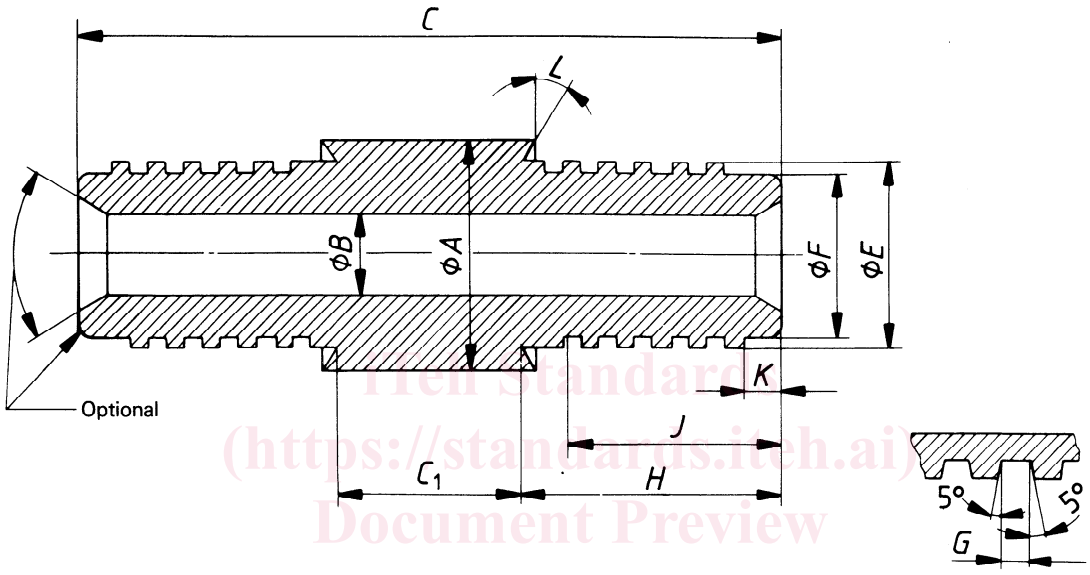
NOTE — Dimensions shown apply to both ends. Not complete without coupling — see figures 2 and 4.

Figure 3 — "W" design drill rod — Drill rod tube (see table 7)

Table 7 — "W" design drill rod — Drill rod tube

Dimension		RW	EW	AW	BW	NW	HW
A	max.	1.098	1.380	1.728	2.135	2.635	3.515
	min.	1.093	1.375	1.718	2.125	2.625	3.500
B [1]	max.	0.719	1	1.344	1.75	2.25	3.062
C	max.	118.92	118.71	118.745	118.285	118.265	117.78
	min.	118.86	118.65	118.685	118.225	118.205	117.72
M	max.	0.853	1.068	1.380	1.690	2.224	3.034
	min.	0.851	1.066	1.378	1.688	2.222	3.032
N	max.	0.746	0.943	1.255	1.533	2.036	2.844
	min.	0.744	0.941	1.253	1.531	2.034	2.842
Thread pitch (Threads per inch)		0.25 (4)	0.333 (3)	0.333 (3)	0.333 (3)	0.333 (3)	0.333 (3)
P	max.	0.125	0.166	0.166	0.166	0.166	0.166
	min.	0.122	0.162	0.162	0.162	0.162	0.162
Q	min.	1.562	1.75	2.125	2.50	3	3.562
R	min.	1.437	1.562	1.875	2.25	2.75	3.25
S	max.	0.26	0.322	0.385	0.385	0.385	0.385
	min.	0.24	0.302	0.365	0.365	0.365	0.365
T		30°	30°	30°	30°	30°	30°

1) The dimension *B* is a maximum and can apply either to upset end rods or parallel wall rods for the RW size only. For all other sizes, this dimension refers to upset end rods only.



NOTE — Dimensions shown apply to both ends.

Figure 4 — "W" design drill rod — Drill-rod coupling (see table 8)